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As filed with the Securities and Exchange Commission on June 10, 2019

Registration No. 333-231770

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

Amendment No. 1
to

FORM S-1

REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933

ATRECA, INC.

(Exact name of Registrant as specified in its charter)

Delaware	**2834**	**27-3723255**
(State or other jurisdiction of incorporation or organization)	(Primary Standard Industrial Classification Code Number)	(I.R.S. Employer Identification Number)

500 Saginaw Drive
Redwood City, CA 94063
(650) 595-2595
(Address, including zip code, and telephone number, including area code, of Registrant's principal executive offices)

John A. Orwin
President and Chief Executive Officer
Atreca, Inc.
500 Saginaw Drive
Redwood City, CA 94063
(650) 595-2595
(Name, address, including zip code, and telephone number, including area code, of agent for service)

Copies to:

Barbara Kosacz **Danielle E. Naftulin** **Michael E. Tenta** **Cooley LLP** **3175 Hanover Street** **Palo Alto, CA 94304** **(650) 843-5000**	**Herbert Cross** **Chief Financial Officer** **Atreca, Inc.** **500 Saginaw Drive** **Redwood City, CA 94063** **(650) 595-2595**	**Bruce K. Dallas** **Sarah K. Solum** **Davis Polk &** **Wardwell LLP** **1600 El Camino Real** **Menlo Park, CA 94025** **(650) 752-2000**

Approximate date of commencement of proposed sale to the public:
As soon as practicable after this Registration Statement is declared effective.

If any of the securities being registered on this form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, check the following box. o

If this form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. o

If this form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. o

If this form is a post-effective amendment filed pursuant to Rule 462(d) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. o

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer o	Accelerated filer o	Non-accelerated filer ☒	Smaller reporting company ☒ Emerging growth company ☒

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 7(a)(2)(B) of the Securities Act. o

CALCULATION OF REGISTRATION FEE

Title of Each Class of Securities To Be Registered	Proposed Maximum Aggregate Offering Price(1)(2)	Amount of Registration Fee(3)
Class A common stock, $0.0001 par value per share(4)	$152,145,000	$18,440

(1) Estimated solely for the purpose of calculating the registration fee pursuant to Rule 457(o) under the Securities Act of 1933, as amended.
(2) Includes the aggregate offering price of additional shares that the underwriters have the option to purchase, if any.
(3) Calculated pursuant to Rule 457(o) under the Securities Act of 1933, as amended, based on an estimate of the proposed maximum aggregate offering price. The registrant previously paid a total of $12,120 in connection with previous filings of the registration statement. In accordance with Rule 457(o), an additional $6,320 is being paid with this amendment to the registration statement.
(4) To the extent shares of common stock are purchased by entities affiliated with Baker Brothers Life Sciences L.P., the common stock will initially be issued in the form of Class B common stock, $0.0001 par value per share. The Proposed Maximum Aggregate Offering Price includes such shares of Class B common stock, and this registration statement registers the offer and sale of such Class B common stock and an equivalent number of shares of Class A common stock, $0.0001 par value per share into which such Class B common stock is convertible at the option of the holder thereof.

The Registrant hereby amends this Registration Statement on such date or dates as may be necessary to delay its effective date until the Registrant shall file a further amendment which specifically states that this Registration Statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933 or until the Registration Statement shall become effective on such date as the Commission, acting pursuant to said Section 8(a), may determine.

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PROSPECTUS (Subject to completion) **Dated June 10, 2019**

7,350,000 Shares

Class A Common Stock

This is an initial public offering of shares of our Class A common stock. We are offering 7,350,000 shares of our Class A common stock. Prior to this offering, there has been no public market for our Class A common stock. We have applied for listing of our Class A common stock on The Nasdaq Global Market under the symbol "BCEL". We expect that the public offering price will be between $16.00 and $18.00 per share.

We are an "emerging growth company" under applicable Securities and Exchange Commission rules and will be subject to reduced public company reporting requirements for this prospectus and future filings.

Following this offering, we will have two classes of common stock: Class A common stock and Class B common stock. The rights of the holders of Class A common stock and Class B common stock are identical, except with respect to voting and conversion. Each share of Class A common stock will be entitled to one vote and shares of Class B common stock will be non-voting, except as may be required by law. Each share of Class B common stock may be converted at any time into one share of Class A common stock at the option of its holder, subject to the ownership limitations provided for in our amended and restated certificate of incorporation to become effective upon the closing of this offering.

Our business and an investment in our Class A common stock involve significant risks. These risks are described under the caption "Risk Factors" beginning on page 13 of this prospectus.

Neither the Securities and Exchange Commission nor any other regulatory body has approved or disapproved of these securities or passed upon the accuracy or adequacy of this prospectus. Any representation to the contrary is a criminal offense.

	Per Share	*Total*
Public offering price	**$**	**$**
Underwriting discount	**$**	**$**
Proceeds, before expenses, to us	**$**	**$**

The underwriters may also purchase up to an additional 1,102,500 shares from us at the public offering price, less the underwriting discount, within 30 days from the date of this prospectus to cover overallotments.

In addition, certain existing stockholders have indicated an interest in purchasing up to approximately $60 million of shares of our common stock in this offering at the initial public offering price. However, because these indications of interest are not binding agreements or commitments to purchase, the underwriters may determine to sell more, less or no shares in this offering to any or all of these entities, or any or all of these entities may determine to purchase more, less or no shares in this offering. The underwriters will receive the same underwriting discount on any shares purchased by these entities as they will on any other shares sold to the public in this offering. To the extent shares of common stock offered hereby are purchased by entities affiliated with Baker Brothers Life Sciences L.P., such shares will initially be issued in the form of Class B common stock that will be convertible into an equivalent number of shares of our Class A common stock. The public offering price of and underwriting discount on such shares of Class B common stock will be identical to the shares of Class A common stock otherwise offered hereby. References to Class A common stock being offered hereby include the shares of Class A common stock into which shares of our Class B common stock purchased in this offering are convertible.

The underwriters expect to deliver the shares against payment in New York, New York on , 2019.

Cowen **Evercore ISI** **Stifel**

Canaccord Genuity

Brookline Capital Markets

, 2019

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Through and including , 2019 (the 25th day after the date of this prospectus), all dealers effecting transactions in these securities, whether or not participating in this offering, may be required to deliver a prospectus. This is in addition to a dealer's obligation to deliver a prospectus when acting as an underwriter and with respect to an unsold allotment or subscription.

We and the underwriters have not authorized anyone to provide any information or to make any representations other than those contained in this prospectus or in any free writing prospectuses we have prepared. We and the underwriters take no responsibility for, and can provide no assurance as to the reliability of, any other information that others may give you. We are offering to sell, and seeking offers to buy, shares of our Class A common stock only in jurisdictions where offers and sales are permitted. The information contained in this prospectus is accurate only as of the date of this prospectus, regardless of the time of delivery of this prospectus or of any sale of our Class A common stock. Our business, financial condition, results of operations and prospects may have changed since that date.

For investors outside the United States: Neither we nor any of the underwriters have done anything that would permit this offering or possession or distribution of this prospectus in any jurisdiction where action for that purpose is required, other than in the United States. Persons outside of the United States who come into possession of this prospectus must inform themselves about, and observe any restrictions relating to, the offering of the shares of our Class A common stock and the distribution of this prospectus outside of the United States.

Atreca, Inc. and our logo are our trademarks and are used in this prospectus. This prospectus also includes trademarks, tradenames and service marks that are the property of other organizations. Solely for convenience, our trademarks and tradenames referred to in this prospectus appear without the™ symbol, but those references are not intended to indicate, in any way, that we will not assert, to the fullest extent under applicable law, our rights, or the right of the applicable licensor to these trademarks and tradenames.

PROSPECTUS SUMMARY

This summary highlights selected information contained elsewhere in this prospectus. This summary does not contain all of the information you should consider before investing in our Class A common stock. You should read this entire prospectus carefully, including the sections of this prospectus titled "Risk Factors," "Selected Consolidated Financial Data," "Management's Discussion and Analysis of Financial Condition and Results of Operations" and "Business" and our consolidated financial statements and the related notes included elsewhere in this prospectus, before making an investment decision. Unless the context otherwise requires, all references in this prospectus to "we," "us," "our," "our company" and "Atreca" refer to Atreca, Inc.

Overview

We are a biopharmaceutical company utilizing our differentiated platform to discover and develop novel antibody-based immunotherapeutics to treat a range of solid tumor types. While more traditional oncology drug discovery approaches attempt to generate antibodies against known targets, our approach relies on the human immune system to direct us to unique antibody-target pairs from patients experiencing a clinically meaningful, active immune response against their tumors. These unique antibody-target pairs represent a potentially novel and previously unexplored landscape of immuno-oncology targets. We believe the fact that our approach has the potential to deliver novel, previously unexplored immuno-oncology targets provides us with a significant competitive advantage over traditional approaches which focus on known targets that many companies are aware of and can pursue. We have utilized our drug discovery approach to identify over 1,400 distinct human antibodies that bind preferentially to tumor tissue from patients who are not the source of the antibody. Our lead product candidate, ATRC-101, is a monoclonal antibody with a novel mechanism of action and target derived from an antibody identified using our discovery platform. ATRC-101 reacts *in vitro* with a majority of human ovarian, non-small cell lung, colorectal and breast cancer samples from multiple patients. It has demonstrated robust anti-tumor activity as a single agent in multiple preclinical models, including one model in which PD-1 checkpoint inhibitors typically display limited activity. We anticipate filing an Investigational New Drug, or IND, application for ATRC-101 in late 2019 and initiating a Phase 1b clinical trial in patients with solid tumors in early 2020, subject to U.S. Food and Drug Administration, or FDA, approval of our IND application.

Although existing cancer therapies, including the evolving class of cancer immunotherapeutics, have advanced significantly over recent years, cancer remains the second leading cause of death in the United States. To address this unmet need, we pursue an open-aperture approach, which relies on the human immune system to direct us to antibody-target pairs that are present in patients who have experienced a clinically meaningful response to therapy.

The Atreca Drug Discovery Platform

We believe we may be able to address certain key limitations of the current oncology drug discovery paradigm by focusing on the common phenomenon driving clinical responses in cancer immunotherapy—an active human anti-tumor immune response. Our platform allows us to interrogate an active B cell response within an individual cancer patient to identify novel and relevant antibody-target pairs, which may enable us to develop antibody-based product candidates to treat large populations of patients with solid tumors. We believe that the significant time and capital invested in developing, refining and applying our differentiated discovery platform have provided us with significant first-mover advantages and created barriers to entry.

For example, establishing our non-interventional clinical studies to obtain patient samples, enabling longitudinal analyses, required approximately 1 to 2 years. We built our bioinformatics

expertise in assembling and analyzing our antibodies over seven years of operations. Our hit antibody generation process has been enhanced to deliver hits at a high rate, has already generated over 1,400 hit antibodies and is supported by a growing intellectual property portfolio. Additionally, our investments of capital and time to build industrialized wet-lab and supporting bioinformatics capacity across our platform, including the time required to identify and hire very qualified personnel, were substantial. The figure below illustrates the overall concept of our drug discovery approach:

Our discovery process begins by gathering blood samples, mostly through company-sponsored non-interventional clinical studies, from cancer patients before, during and after they undergo treatment, which can induce an active anti-tumor immune response. Through this process, we have built a broad repository of over 1,200 samples from over 400 donors, representing over 25 different solid tumor types. We identify those patients with clinically meaningful responses to therapy, defined as those that reach validated surrogate endpoints of complete or partial response, stable disease for six months, or long-term progression-free survival. For those patients, we then examine their samples for rare antibody-producing B cells called plasmablasts that are elevated during an active immune response. We believe that these human immune responses, which often occur over an extended period of time, generate antibodies accessible with our platform that would be difficult to obtain through shorter term, non-human immunization or *in vitro* strategies.

If plasmablasts are elevated in a particular sample, we then employ a multi-step process to generate a potential product candidate. We start by isolating single plasmablasts and determining the sequences of the co-expressed antibody genes using our proprietary Immune Repertoire Capture® technology. We analyze these sequences to select antibodies, which we synthesize as recombinant proteins. We then test these antibodies to identify those that bind to tumor tissue from patients who are not the source of the antibody, referred to as non-autologous tumor tissue, preferentially over normal tissue. We then analyze these "hit" antibodies using a number of *in vitro* and *in vivo* assays, and often make structural changes to generate leads. A select number of these leads are refined further using protein engineering to enhance their drug-like properties as we identify and characterize their targets in parallel prior to initiating preclinical development and IND-enabling studies.

Key Attributes of Our Discovery Platform

We take an "open-aperture" approach to drug discovery, in which we are not limited by preconceptions of what constitutes a viable antibody or target. We instead allow the human immune system to direct our efforts. We believe this approach provides us access to a broad underexploited antibody and drug target space. Our approach may lead us to antibodies that are unlikely to have

arisen via more traditional approaches with targets that otherwise may not have been discoverable. We believe our approach and discovery platform provide us with the ability to:

- Generate antibodies made by the human immune system.
- Deliver potentially useful antibodies at a high rate and in a scalable fashion.
- Access a potentially large and underexploited tumor target space.
- Identify antibody-target pairs.
- Generate candidates that direct the immune system to attack tumor tissue.
- Develop potential treatments for large populations of patients across multiple tumor types.

Our Lead Product Candidate: ATRC-101 for the Treatment of Solid Tumors

ATRC-101 is a monoclonal antibody derived from an antibody identified using our discovery platform in the active immune response of a patient. We believe that ATRC-101 may have broad potential as an immunotherapeutic agent in a range of solid tumors. ATRC-101 reacts *in vitro* with a majority of human ovarian, non-small cell lung, colorectal and breast cancer samples from multiple patients. It has also demonstrated robust anti-tumor activity as a single agent in multiple preclinical syngeneic tumor models, including one model in which PD-1 checkpoint inhibitors typically display limited activity. ATRC-101 has also demonstrated preclinical activity in combination with other immunotherapeutics, including PD-1 checkpoint inhibitors. Both the mechanism of action of ATRC-101, which we refer to as Driver Antigen Engagement, and its target appear unlike those of other anti-tumor antibodies that have been or are currently in clinical development. In histology studies, we did not observe binding above background levels across a range of normal human tissues. Additionally, in repeat-dose safety studies in both mice and non-human primates, we did not observe a safety signal. We have identified the target of ATRC-101 as a ribonucleoprotein (RNP) complex. ATRC-101 binds to target reconstituted *in vitro* using a single recombinant protein, polyadenylate-binding protein 1, and *in vitro* transcribed poly(A) RNA.

We anticipate filing an IND for ATRC-101 in late 2019 and launching an open-label dose escalation trial in patients with solid tumors in early 2020. Assuming we observe an acceptable safety profile, we then anticipate dosing ATRC-101 in combination with a PD-1 checkpoint inhibitor. ATRC-101 demonstrates the ability of our platform to generate antibody candidates with novel targets and mechanisms of action.

We own worldwide rights to ATRC-101 and have filed multiple U.S. provisional patent applications relating to ATRC-101 and other variants. We intend to file a nonprovisional patent application in the first quarter of 2020.

Our Lead Generation Programs

ATRC-101, currently our only product candidate, represents one of over 1,400 antibodies that we have identified to date through our discovery platform that may have potential to generate broad anti-tumor activity via a variety of mechanisms of action. While we believe that we will be able to exploit our growing library of novel antibodies in order to develop product candidates with additional distinct and compelling mechanisms of action for tumor destruction, many of these antibodies will likely not yield product candidates for a variety of reasons. For example, while we have identified antibodies that can be coupled to T cell-activating domains in a bispecific format to kill tumor cells; others that directly target tumor cells leading to immune cell-mediated killing; and others that internalize upon binding to tumor cells and therefore may be able to deliver coupled toxins, but less than 25% of the antibodies in our hit library demonstrate one of these mechanisms. In addition, in order to be able to develop product candidates from our hit library in certain of these mechanisms, such as bispecific T cell engagers and antibody-drug conjugates, we will need to partner with biotech

companies that have developed technologies that enable engineering our antibodies into these formats. We are actively pursuing such collaborative partnerships, and plan to allocate resources to these efforts as part of our shift to focus our drug discovery efforts around building out a proprietary pipeline of clinical candidates.

We are currently pursuing numerous potential partnership opportunities, and anticipate entering into a strategic drug discovery partnership as early as 2020, and to file an IND application for a second product candidate in 2021.

Our Strategy

Our goal is to become a leading biopharmaceutical company by utilizing our differentiated platform to discover and develop antibody-based therapeutics against novel targets. In pursuit of that strategy, we intend to:

- Rapidly advance our lead product candidate, ATRC-101, into clinical trials in multiple types of solid tumors.
- Continue to develop and advance our pipeline of antibody-based product candidates for oncology.
- Continue to invest in our discovery platform for applications within oncology and potential indications outside of oncology.
- Selectively enter into collaborations to enhance and expand our product pipeline as well as our drug development capabilities.
- Continue to expand our intellectual property portfolio to further protect our discovery platform and the novel product candidates it may generate.

Our Management Team and Investors

We are led by a highly experienced management team with deep scientific and technical expertise and broad experience in discovering, developing and commercializing antibody therapeutics in oncology. Members of our executive team have held a range of corporate leadership and academic roles including founding multiple biopharmaceutical companies, driving cutting-edge academic research, leading informatics and computational biology teams, discovering and developing novel antibody-based therapeutics and executing the launch and commercialization of multiple approved products. Since our founding, we have raised a total of $219 million in equity financing primarily from leading institutional investors. See "Principal Stockholders".

Risk Factors Summary

Our ability to execute our business strategy is subject to numerous risks, as more fully described in the section titled "Risk Factors" immediately following this prospectus summary. These risks include, among others:

- We are a preclinical stage biopharmaceutical company with a history of losses; we expect to continue to incur significant losses for the foreseeable future and may never achieve or maintain profitability.
- ATRC-101 is in preclinical development, has never been tested in a human subject and may fail in development or suffer delays that materially and adversely affect its commercial viability.
- If ATRC-101 is ever tested in humans, it may not demonstrate the combination of safety and efficacy necessary to become approvable or commercially viable.
- We may not be successful in our efforts to use and expand our discovery platform to build a pipeline of product candidates.

- Our approach to developing and identifying our antibodies using our discovery platform is novel and unproven and may not result in marketable products.
- If we are unable to obtain or protect intellectual property rights related to our technology and current or future product candidates, or if our intellectual property rights are inadequate, we may not be able to compete effectively.
- Patent terms may not be able to protect our competitive position for an adequate period of time with respect to our current or future technologies or product candidates.
- We may be unable to obtain U.S. or foreign regulatory approval and, as a result, be unable to commercialize ATRC-101 or potential future product candidates.
- Even if we receive regulatory approval for any of our current or potential future product candidates, we will be subject to ongoing regulatory obligations and continued regulatory review, which may result in significant additional expense.
- Our quarterly operating results may fluctuate significantly or may fall below the expectations of investors or securities analysts, each of which may cause our stock price to fluctuate or decline.

Corporate Information

We were incorporated under the laws of the state of Delaware in 2010 under the name Atreca, Inc. Our principal executive offices are located at 500 Saginaw Drive, Redwood City, CA 94063. Our telephone number is (650) 595-2595. Our website address is www.atreca.com. Information contained on, or that can be accessed through, our website is not incorporated by reference into this prospectus, and you should not consider information on our website to be part of this prospectus.

The Atreca design logo, "Atreca" and our other registered or common law trademarks, service marks, or trade names appearing in this prospectus are the property of Atreca, Inc. Other trade names, trademarks and service marks used in this prospectus are the property of their respective owners.

Implications of Being an Emerging Growth Company

We qualify as an "emerging growth company" as defined in the Jumpstart Our Business Startups Act of 2012, or JOBS Act, enacted in April 2012. An emerging growth company may take advantage of reduced reporting requirements that are otherwise applicable to public companies. These provisions include, but are not limited to:

- Being permitted to present only two years of audited financial statements and only two years of related Management's Discussion and Analysis of Financial Condition and Results of Operations in this prospectus.
- Not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act of 2002, as amended.
- Reduced disclosure obligations regarding executive compensation in our periodic reports, proxy statements and registration statements.
- Exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved.

We may take advantage of these provisions until the last day of our fiscal year following the fifth anniversary of the date of the first sale of our common equity securities pursuant to an effective registration statement under the Securities Act of 1933, as amended. However, if certain events occur prior to the end of such five-year period, including if we become a "large accelerated filer," our

annual gross revenues exceed $1.07 billion or we issue more than $1.0 billion of non-convertible debt in any three-year period, we will cease to be an emerging growth company prior to the end of such five-year period.

We have elected to avail ourselves of an exemption that allows us to delay adopting new or revised accounting standards until such time as those standards apply to private companies. As a result, we will not be subject to the same new or revised accounting standards as other public companies that comply with the public company effective dates, including but not limited to the new lease accounting standard. We have also elected to take advantage of certain of the reduced disclosure obligations in the registration statement of which this prospectus is a part and may elect to take advantage of other reduced reporting requirements in future filings. As a result of these elections, the information that we provide to our stockholders may be different than you might receive from other public reporting companies.

The Offering

Class A common stock offered	7,350,000 shares
Class A common stock to be outstanding after this offering	22,850,261 shares (23,952,761 shares, if the underwriters exercise their option to purchase additional shares in full)
Class B common stock to be outstanding after this offering	3,934,191 shares
Total Class A and Class B common stock to be outstanding after this offering	26,784,452 shares (27,886,952 shares, if the underwriters exercise their option to purchase additional shares in full)
Underwriters' option to purchase additional shares of Class A common stock	1,102,500 shares
Use of proceeds	We estimate that our net proceeds from the sale of our Class A common stock from this offering will be approximately $113.8 million (or approximately $131.2 million if the underwriters exercise their option to purchase additional shares in full), based on an assumed initial public offering price of $17.00 per share, the midpoint of the estimated price range set forth on the cover page of this prospectus, and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. We currently expect to use the net proceeds from this offering, together with our existing cash and cash equivalents, as follows: § approximately $45 million to fund the development of ATRC-101 through the dose-escalation portion of our Phase 1b clinical trial and a portion of our currently planned protocol amendments to pursue combination studies and expansion cohorts; § approximately $65 million to fund our ongoing efforts to develop additional clinical candidates from our discovery platform; and § the remaining proceeds for continued development and utilization of our discovery platform, hiring of additional personnel, capital expenditures, costs of operating as a public company and other general corporate purposes.

	See the section titled "Use of Proceeds" for additional information.
Voting rights	Following this offering, we will have two classes of common stock: Class A common stock and Class B common stock. The rights of the holders of Class A common stock and Class B common stock are identical, except with respect to voting and conversion. Each share of Class A common stock will be entitled to one vote and shares of Class B common stock will be non-voting, except as may be required by law. Each share of Class B common stock may be converted into one share of Class A common stock at the option of its holder, subject to the ownership limitations provided for in our amended and restated certificate of incorporation to become effective upon the closing of this offering. See the section titled "Description of Capital Stock" for additional information.
Risk factors	See "Risk Factors" and the other information included in this prospectus for a discussion of factors you should carefully consider before deciding to invest in our Class A common stock.
Nasdaq Global Market symbol	"BCEL"

The number of shares of our Class A common stock and Class B common stock that will be outstanding after this offering is based on 15,500,261 shares of our Class A common stock and 3,934,191 shares of Class B common stock (including shares of all of our convertible preferred stock on an as-converted basis) outstanding as of March 31, 2019, assumes no issuance of Class B common stock in connection with this offering and excludes:

- 2,587,996 shares of Class A common stock issuable upon exercise of stock options outstanding as of March 31, 2019 under our 2010 Equity Incentive Plan, or 2010 Plan, with a weighted-average exercise price of $7.08 per share;
- 657,643 shares of Class A common stock issuable upon exercise of stock options granted after March 31, 2019 under our 2010 Plan, with a weighted-average exercise price of $12.30 per share;
- 6,141,842 shares of Class A common stock reserved for future issuance under our 2019 Equity Incentive Plan, or 2019 Plan, which will become effective in connection with this offering, as well as (i) any additional shares of Class A common stock that become available for issuance under the 2019 Plan (including as a result of annual increases) and (ii) any shares of Class A common stock that (A) remain available for issuance under the 2010 Plan as of immediately prior to the time our 2019 Plan becomes effective or (B) that would have otherwise returned to our 2010 Plan in accordance with its terms (which, in each case, will become available for issuance under our 2019 Plan);

- 283,333 shares of Class A common stock reserved for future issuance under our 2019 Employee Stock Purchase Plan, or the ESPP, which will become effective on the business day prior to the public trading date of our Class A common stock, as well as any additional shares of Class A common stock that become available for issuance under our ESPP (including as a result of annual increases); and
- 49,997 shares of Class A common stock issuable upon exercise of outstanding warrants reclassified to purchase our Class A common stock as described below, each with an exercise price of $14.46 per share.

Unless otherwise indicated, the information in this prospectus assumes:

- an initial public offering price of $17.00 per share (which represents the midpoint of the estimated offering price range set forth on the cover of this prospectus);
- the filing and effectiveness of our amended and restated certificate of incorporation and the adoption of our amended and restated bylaws, each of which will occur upon the closing of this offering;
- the automatic conversion of all outstanding shares of our convertible Series A preferred stock, convertible Series B preferred stock and convertible Series C1 preferred stock into 13,314,068 shares of our Class A common stock immediately upon the closing of this offering;
- the automatic conversion of all outstanding shares of our convertible Series C2 preferred stock into 3,934,191 shares of our Class B common stock immediately upon the closing of this offering;
- the issuance of 62,936 shares of Class A common stock upon the exercise of an outstanding warrant in connection with this offering, with an exercise price of $0.0006 per share;
- the automatic reclassification of all of our outstanding warrants to purchase Series A preferred stock into warrants to purchase 49,997 shares of Class A common stock, each with an exercise price of $14.46 per share, immediately upon the closing of this offering and no exercise of these warrants;
- no exercise of outstanding options to purchase our Class A common stock as described above; and
- no exercise of the underwriters' option to purchase additional shares of Class A common stock.

On June 7, 2019, we effected a 1-for-6 reverse stock split of all classes of our capital stock. Upon the effectiveness of the reverse stock split, (i) every one share of our outstanding capital stock was combined into one-sixth of one share of the same class and series of capital stock, (ii) the number of shares of our Class A common stock and our Series A preferred stock for which each outstanding option or warrant, to purchase our Class A common stock and our Series A preferred stock is exercisable was proportionally decreased on a 1-for-6 basis and (iii) the exercise price of each outstanding option or warrant to purchase our Class A common stock and our Series A preferred stock was proportionately increased on a 1-for-6 basis. All of our outstanding Class A common stock and Class B common stock share numbers (including shares of Class A common stock and Class B common stock into which our outstanding preferred stock shares are convertible), Class A common stock warrants, Series A preferred stock warrants, share prices, exercise prices and per share amounts have been adjusted in this prospectus, on a retroactive basis, to reflect this 1-for-6 reverse stock split for all periods presented. The par value per share of our common stock and preferred stock were not adjusted as a result of the reverse stock split. The authorized number of shares of our common stock and preferred stock were increased concurrently with the reverse

stock split and these increases have been reflected in this prospectus on a retroactive basis, for all periods presented.

In addition, certain existing stockholders have indicated an interest in purchasing up to approximately $60 million of shares of our common stock in this offering at the initial public offering price. However, because these indications of interest are not binding agreements or commitments to purchase, the underwriters may determine to sell more, less or no shares in this offering to any or all of these entities, or any or all of these entities may determine to purchase more, less or no shares in this offering. The underwriters will receive the same underwriting discount on any shares purchased by these entities as they will on any other shares sold to the public in this offering. To the extent shares of common stock offered hereby are purchased by entities affiliated with Baker Brothers Life Sciences L.P., such shares will initially be issued in the form of Class B common stock that will be convertible into an equivalent number of shares of our Class A common stock. The public offering price of and underwriting discount on such shares of Class B common stock will be identical to the shares of Class A common stock otherwise offered hereby. References to Class A common stock being offered hereby include the shares of Class A common stock into which shares of our Class B common stock purchased in this offering are convertible.

Summary Consolidated Financial Data

The summary consolidated statements of operations data for the years ended December 31, 2017 and 2018 are derived from our audited consolidated financial statements included elsewhere in this prospectus. The summary consolidated statements of operations data for the three months ended March 31, 2018 and 2019 and the summary consolidated balance sheet data as of March 31, 2019 are derived from our unaudited interim consolidated financial statements included elsewhere in this prospectus. We have prepared the unaudited interim consolidated financial statements on the same basis as the audited financial statements and have included, in our opinion, all adjustments, consisting only of normal recurring adjustments that we consider necessary for a fair statement of the financial information set forth in those statements. You should read the consolidated financial data set forth below in conjunction with our consolidated financial statements and the accompanying notes and the information in "Management's Discussion and Analysis of Financial Condition and Results of Operations" contained elsewhere in this prospectus. Our historical results are not necessarily indicative of the results to be expected for any other period in the future.

	Year Ended December 31,		Three Months Ended March 31,	
	2017	2018	2018	2019
	(in thousands, except share and per share data)			
Consolidated Statements of Operations Data:				
Operating expenses				
Research and development	$ 24,873	$ 32,513	$ 6,643	$ 11,713
General and administrative	4,562	7,060	1,300	2,518
Total operating expenses	29,435	39,573	7,943	14,231
Operating loss	(29,435)	(39,573)	(7,943)	(14,231)
Interest and other income (expense)				
Other income	1,719	961	213	165
Interest income	152	714	56	545
Interest expense	(14)	(9)	(2)	(2)
Preferred stock warrant liability revaluation	6	(33)	20	(50)
Gain (loss) on disposal of property and equipment	48	(1)	—	(5)
Loss before income tax benefit (expense)	(27,524)	(37,941)	(7,656)	(13,578)
Benefit (expense) from income taxes	(3)	1	—	(1)
Net loss	$ (27,527)	$ (37,940)	$ (7,656)	$ (13,579)
Net loss per share—basic and diluted	$ (13.14)	$ (18.02)	$ (3.66)	$ (6.40)
Weighted average shares used to compute net loss per share—basic and diluted	2,094,795	2,104,861	2,093,413	2,120,925
Pro forma net loss per share—basic and diluted (unaudited)(1)		$ (1.95)		$ (0.70)
Weighted average shares used to compute pro forma net loss per share—basic and diluted (unaudited)(1)		19,416,147		19,432,211

	March 31, 2019		
	Actual	Pro Forma(1)	Pro Forma as Adjusted(2)
		(in thousands)	
Consolidated Balance Sheet Data:			
Cash, cash equivalents and investments	$ 100,661	$ 100,661	$ 214,465
Working capital(3)	99,219	99,219	213,023
Total assets	109,126	109,126	222,930
Preferred stock warrant liability	430	—	—
Preferred stock	209,668	—	—
Total stockholders' equity (deficit)	(105,795)	104,303	218,107

(1) Gives effect to:

- the automatic conversion of all outstanding shares of our convertible Series A preferred stock, convertible Series B preferred stock and convertible Series C1 preferred stock into 13,314,068 shares of our Class A common stock immediately upon the closing of this offering;
- the automatic conversion of all outstanding shares of our convertible Series C2 preferred stock into 3,934,191 shares of our Class B common stock immediately upon the closing of this offering;
- the issuance of 62,936 shares of Class A common stock upon the exercise of an outstanding warrant in connection with this offering, with an exercise price of $0.0006 per share;
- the automatic reclassification of warrants to purchase an aggregate of 49,997 shares of our convertible Series A preferred stock, outstanding as of March 31, 2019, into warrants to purchase an equivalent number of shares of our Class A common stock, and the related reclassification of preferred stock warrant liability to stockholders' equity; and
- the filing and effectiveness of our amended and restated certificate of incorporation and the adoption of our amended and restated bylaws, each of which will occur upon the closing of this offering.

(2) Gives effect to (1) the pro forma items described in footnote (1) above and (2) the issuance and sale of 7,350,000 shares of Class A common stock in this offering at the assumed initial public offering price of $17.00 per share, the midpoint of the price range set forth on the cover page of this prospectus, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. Each $1.00 increase (decrease) in the assumed initial public offering price of $17.00 per share would increase (decrease) the pro forma as adjusted amount of each of cash and cash equivalents, working capital (deficit), total assets and total stockholders' deficit by approximately $6.8 million, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. Similarly, each increase (decrease) of 1.0 million shares in the number of shares offered by us would increase (decrease) each of cash and cash equivalents, working capital (deficit), total assets and total stockholders' deficit by approximately $15.8 million, assuming the assumed initial public offering price of $17.00 per share remains the same, and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. The pro forma information discussed above is illustrative only and will be adjusted based on the actual initial public offering price and other terms of our initial public offering determined at pricing.

(3) Working capital represents the difference between current assets and current liabilities.

RISK FACTORS

Investing in our Class A common stock involves a high degree of risk. You should consider and read carefully all of the risks and uncertainties described below, as well as other information included in this prospectus, including our consolidated financial statements and related notes appearing at the end of this prospectus and our "Management's Discussion and Analysis of Financial Conditions and Results of Operations," before making an investment decision. The risks described below are not the only ones facing us. The occurrence of any of the following risks or additional risks and uncertainties not presently known to us or that we currently believe to be immaterial could materially and adversely affect our business, financial condition or results of operations. In such case, the trading price of our Class A common stock could decline, and you may lose all or part of your original investment. This prospectus also contains forward-looking statements and estimates that involve risks and uncertainties. Our actual results could differ materially from those anticipated in the forward-looking statements as a result of specific factors, including the risks and uncertainties described below.

Risks Related to Our Business

We are a preclinical stage biopharmaceutical company with a history of losses. We expect to continue to incur significant losses for the foreseeable future and may never achieve or maintain profitability, which could result in a decline in the market value of our Class A common stock.

We are a preclinical stage biopharmaceutical company with a history of losses. Since our inception, we have devoted substantially all of our resources to research and development, raising capital, building our management team and building our intellectual property portfolio, and we have incurred significant operating losses. As of December 31, 2017, December 31, 2018 and March 31, 2019, we had accumulated deficits of $58.7 million, $96.6 million and $110.2 million, respectively. For the years ended December 31, 2017, 2018 and for the three months ended March 31, 2019, our net losses were $27.5 million, $37.9 million and $13.6 million, respectively. Substantially all of our losses have resulted from expenses incurred in connection with our research and development programs and from general and administrative costs associated with our operations. To date, we have not generated any revenue from product sales, and we have not sought or obtained regulatory approval for any product candidate. Furthermore, we do not expect to generate any revenue from product sales for the foreseeable future, and we expect to continue to incur significant operating losses for the foreseeable future due to the cost of research and development, preclinical studies and clinical trials and the regulatory approval process for our current and potential future product candidates.

We expect our net losses to increase substantially as we enter into clinical development of our lead product candidate, ATRC-101. However, the amount of our future losses is uncertain. Our ability to achieve or sustain profitability, if ever, will depend on, among other things, successfully developing product candidates, obtaining regulatory approvals to market and commercialize product candidates, manufacturing any approved products on commercially reasonable terms, entering into potential future partnerships, establishing a sales and marketing organization or suitable third-party alternatives for any approved product and raising sufficient funds to finance business activities. If we, or our potential future partners, are unable to commercialize one or more of our product candidates, or if sales revenue from any product candidate that receives approval is insufficient, we will not achieve or sustain profitability, which could have a material and adverse effect on our business, financial condition, results of operations and prospects. Any predictions you make about our future success or viability may not be as accurate as they could be if we had a history of successfully developing and commercializing pharmaceutical products.

ATRC-101 is in preclinical development and has never been tested in a human subject. It may fail in development or suffer delays that materially and adversely affect its commercial viability.

We have no products on the market or that have gained regulatory approval and ATRC-101, has not entered clinical trials. Other than ATRC-101, we currently have no product candidates. Neither ATRC-101 nor any of our potential future product candidates have ever been tested in humans. Our ability to achieve and sustain profitability depends on obtaining regulatory approvals for and successfully commercializing product candidates, either alone or with partners.

Before obtaining regulatory approval for the commercial distribution of product candidates, we or a partner must conduct extensive preclinical studies, followed by clinical trials to demonstrate the safety and efficacy of our product candidates in humans. In preliminary feedback, the U.S. Food and Drug Administration, or the FDA, has communicated to us that, while it reserves the right to make final determinations upon review of our Investigational New Drug, or IND, application for ATRC-101, it is supportive of our proposed approach, including preclinical safety assessments and overall clinical trial design. However, there can be no guarantee that upon final review of the IND application, the FDA will not require changes. We cannot be certain of the timely completion or outcome of our preclinical studies and cannot predict if the FDA or other regulatory authorities will accept our proposed clinical programs or if the outcome of our preclinical studies will ultimately support the further development of our preclinical programs. As a result, we cannot be sure that we will be able to submit INDs or similar applications for our preclinical programs on the timelines we expect, if at all, and we cannot be sure that submission of INDs or similar applications will result in the FDA or other regulatory authorities allowing clinical trials to begin.

ATRC-101 is in preclinical development, and we are subject to the risks of failure inherent in the development of product candidates based on novel approaches, targets and mechanisms of action. Although we expect to initiate a Phase 1b clinical trial for ATRC-101 in patients with solid tumors in early 2020, there can be no guarantee that we will be able to do so. Accordingly, you should consider our prospects in light of the costs, uncertainties, delays and difficulties frequently encountered by preclinical stage biopharmaceutical companies such as ours.

We may not have the financial resources to continue development of, or to enter into new collaborations for, ATRC-101 or any potential future product candidates. This may be exacerbated if we experience any issues that delay or prevent regulatory approval of, or our ability to commercialize, a product candidate, such as:

- negative or inconclusive results from our clinical trials or the clinical trials of others for product candidates similar to ours, leading to a decision or requirement to conduct additional preclinical studies or clinical trials or abandon a program;
- product-related side effects experienced by participants in our clinical trials or by individuals using drugs or therapeutic antibodies similar to ours;
- delays in submitting IND applications or comparable foreign applications, or delays or failure in obtaining the necessary approvals from regulators to commence a clinical trial, or a suspension or termination of a clinical trial once commenced;
- conditions imposed by the FDA, or other regulatory authorities regarding the scope or design of our clinical trials;
- delays in enrolling research subjects in clinical trials;
- high drop-out rates of research subjects;
- inadequate supply or quality of product candidate components or materials or other supplies necessary for the conduct of our clinical trials;
- greater-than-anticipated clinical trial costs;

- poor effectiveness of our product candidates during clinical trials;
- unfavorable FDA or other regulatory agency inspection and review of a clinical trial or manufacture site;
- failure of our third-party contractors or investigators to comply with regulatory requirements or otherwise meet their contractual obligations in a timely manner, or at all;
- delays and changes in regulatory requirements, policies and guidelines; or
- the FDA or other regulatory agencies interpreting our data differently than we do.

Further, we and our potential future partners may never receive approval to market and commercialize any product candidate. Even if we or a potential future partner obtains regulatory approval, the approval may be for targets, disease indications or patient populations that are not as broad as we intended or desired or may require labeling that includes significant use or distribution restrictions or safety warnings. We or a potential future partner may be subject to post-marketing testing requirements to maintain regulatory approval.

If ATRC-101 is ever tested in humans, it may not demonstrate the combination of safety and efficacy necessary to become approvable or commercially viable.

ATRC-101 has not been tested in humans. We may ultimately discover that ATRC-101 does not possess certain properties that we currently believe are helpful for therapeutic effectiveness and safety. For example, although ATRC-101 has exhibited encouraging results in animal studies, including anti-tumor activity and safety, it may not demonstrate the same properties in humans and may interact with human biological systems in unforeseen, ineffective or harmful ways. As a result, we may never succeed in developing a marketable product based on ATRC-101. If ATRC-101 or any of our potential future product candidates prove to be ineffective, unsafe or commercially unviable, our entire pipeline could have little, if any, value, which could require us to change our focus and approach to antibody discovery and development, which would have a material and adverse effect on our business, financial condition, results of operations and prospects.

Failure to successfully validate, develop and obtain regulatory approval for companion diagnostics for our product candidates could harm our drug development strategy and operational results.

As one of the elements of our clinical development approach, we may seek to develop lab-based tests to screen and identify subsets of patients who are more likely to benefit from our product candidates, more commonly referred to as companion diagnostics. To achieve this, we may seek to develop and commercialize such companion diagnostics ourselves or through third-party collaborators. Companion diagnostics are generally developed in conjunction with clinical programs for the associated product and can be helpful in enrolling patients in clinical studies who are more likely to respond to the specific therapeutic being developed. The approval of a companion diagnostic as part of the product label could limit the use of the product candidate to those patients who are more likely to benefit from our product candidate.

Companion diagnostics are subject to regulation by the FDA and other regulatory authorities as medical devices and require separate clearance or approval prior to their commercialization. To date, the FDA has required premarket approval of all companion diagnostics for oncology therapies. We and our third-party collaborators may encounter difficulties in developing and obtaining approval for these companion diagnostics. Any delay or failure by us or third-party collaborators to develop or obtain regulatory approval of a companion diagnostic could delay or prevent approval of our related product candidates. The time and cost associated with developing a companion diagnostic may not prove to have been necessary in order to successfully market the product.

We may not be successful in our efforts to use and expand our discovery platform to build a pipeline of product candidates.

A key element of our strategy is to use and expand our discovery platform to build a pipeline of product candidates and progress these product candidates through clinical development for the treatment of various diseases. Although our research and development efforts to date have resulted in our discovery and preclinical development of ATRC-101, ATRC-101 may not be safe or effective as a cancer treatment, and we may not be able to develop any other product candidates. Our discovery platform is evolving and may not reach a state at which building a pipeline of product candidates is possible. Even if we are successful in building our pipeline of product candidates, the potential product candidates that we identify may not be suitable for clinical development or generate acceptable clinical data, including as a result of being shown to have unacceptable toxicity or other characteristics that indicate that they are unlikely to be products that will receive marketing approval from the FDA or other regulatory authorities or achieve market acceptance. If we do not successfully develop and commercialize product candidates, we will not be able to generate product revenue in the future.

Our approach to developing and identifying our antibodies using our discovery platform is novel and unproven and may not result in marketable products.

We plan to develop a pipeline of product candidates using our discovery platform. We believe that we may be able to overcome certain key limitations of the current oncology drug discovery paradigm by focusing on an active human anti-tumor immune response that develops over time. However, our scientific research that forms the basis of our efforts to discover product candidates based on our discovery platform is ongoing. Further, the scientific evidence to support the feasibility of developing therapeutic antibodies based on our platform has not been established. We may not be correct in our beliefs about the differentiated nature of our platform to competing technologies, and our platform may not prove to be superior. If our discovery platform is not able to develop approved antibody constructs that are effective at the necessary speed or scale, it could have a material and adverse effect on our business, financial condition, results of operations and prospects.

The market may not be receptive to our current or potential future product candidates, and we may not generate any revenue from the sale or licensing of our product candidates.

Even if regulatory approval is obtained for a product candidate, including ATRC-101, we may not generate or sustain revenue from sales of the product. Market acceptance of our current and potential future product candidates will depend on, among other factors:

- the timing of our receipt of any marketing and commercialization approvals;
- the terms of any approvals and the countries in which approvals are obtained;
- the safety and efficacy of our product candidates;
- the prevalence and severity of any adverse side effects associated with our product candidates;
- limitations or warnings contained in any labeling approved by the FDA or other regulatory authority;
- relative convenience and ease of administration of our product candidates;
- the success of our physician education programs;
- the availability of coverage and adequate government and third-party payor reimbursement;
- the pricing of our products, particularly as compared to alternative treatments; and
- availability of alternative effective treatments for the disease indications our product candidates are intended to treat and the relative risks, benefits and costs of those treatments.

If any product candidate we commercialize fails to achieve market acceptance, it could have a material and adverse effect on our business, financial condition, results of operations and prospects.

If ATRC-101 or any potential future product candidate begins clinical trials or receives marketing approval and we or others later identify undesirable side effects caused by the product candidate, our ability to market and derive revenue from the product candidate could be compromised.

Undesirable side effects caused by ATRC-101 or any potential future product candidate could cause regulatory authorities to interrupt, delay or halt clinical trials and could result in a more restrictive label or the delay or denial of regulatory approval by the FDA or other regulatory authorities. While we have not yet initiated clinical trials for ATRC-101 or any potential future product candidate, it is likely that there will be side effects associated with their use. Results of our clinical trials could reveal a high and unacceptable severity and prevalence of these side effects. In such an event, our trials could be suspended or terminated and the FDA or other regulatory authorities could order us to cease further development of or deny approval of a product candidate for any or all targeted indications. Such side effects could also affect patient recruitment or the ability of enrolled patients to complete the trial or result in potential product liability claims. Any of these occurrences may materially and adversely affect our business and financial condition and impair our ability to generate revenues.

Further, clinical trials by their nature utilize a sample of the potential patient population. With a limited number of patients and limited duration of exposure, rare and severe side effects of a product candidate may only be uncovered when a significantly larger number of patients are exposed to the product candidate or when patients are exposed for a longer period of time.

In the event that any of our current or potential future product candidates receive regulatory approval and we or others identify undesirable side effects caused by one of these products, any of the following adverse events could occur, which could result in the loss of significant revenue to us and materially and adversely affect our results of operations and business:

- regulatory authorities may withdraw their approval of the product or seize the product;
- we may be required to recall the product or change the way the product is administered to patients;
- additional restrictions may be imposed on the marketing of the particular product or the manufacturing processes for the product or any component thereof;
- we may be subject to fines, injunctions or the imposition of civil or criminal penalties;
- regulatory authorities may require the addition of labeling statements, such as a "black box" warning or a contraindication;
- we may be required to create a Medication Guide outlining the risks of such side effects for distribution to patients;
- we could be sued and held liable for harm caused to patients;
- the product may become less competitive; and
- our reputation may suffer.

Even if we consummate this offering, we will need substantial additional funds to advance development of product candidates and our discovery platform, and we cannot guarantee that we will have sufficient funds available in the future to develop and commercialize our current or potential future product candidates.

The development of biopharmaceutical product candidates is capital-intensive. If ATRC-101 or potential future product candidates enter and advance through preclinical studies and clinical trials, we will need substantial additional funds to expand our development, regulatory, manufacturing,

marketing and sales capabilities. We have used substantial funds to develop our discovery platform and ATRC-101 and will require significant funds to continue to develop our discovery platform and conduct further research and development, including preclinical studies and clinical trials of ATRC-101 and additional potential future product candidates, to seek regulatory approvals for ATRC-101 and potential future product candidates and to manufacture and market products, if any, that are approved for commercial sale. In addition, upon the closing of this offering, we expect to incur additional costs associated with operating as a public company.

As of March 31, 2019, we had $100.7 million in cash, cash equivalents, and investments. Based on our current operating plan, we believe that our cash and cash equivalents as of March 31, 2019, together with the estimated net proceeds from this offering, will be sufficient to fund our operations through the end of 2021. Our future capital requirements and the period for which we expect our existing resources to support our operations may vary significantly from what we expect. Our monthly spending levels vary based on new and ongoing research and development and other corporate activities. Because the length of time and activities associated with successful research and development of product candidates is highly uncertain, we are unable to estimate the actual funds we will require for development and any approved marketing and commercialization activities. The timing and amount of our operating expenditures will depend largely on:

- the timing and progress of preclinical and clinical development activities;
- the timing and progress of our development of our discovery platform;
- the price and pricing structure that we are able to obtain from our third-party contract manufacturers to manufacture our preclinical study and clinical trial materials and supplies;
- the number and scope of preclinical and clinical programs we decide to pursue;
- our ability to maintain our current licenses and research and development programs and to establish new collaborations;
- the progress of the development efforts of parties with whom we may in the future enter into collaboration and research and development agreements;
- the costs involved in obtaining, maintaining, enforcing and defending patents and other intellectual property rights;
- the cost and timing of regulatory approvals; and
- our efforts to enhance operational systems, secure sufficient laboratory space and hire additional personnel, including personnel to support development of our product candidates and satisfy our obligations as a public company.

To date, we have primarily financed our operations through the sale of equity securities and payments and other income received under discovery services agreements not related to our primary business. We may seek to raise any necessary additional capital through a combination of public or private equity offerings, debt financings, collaborations, strategic alliances, licensing arrangements and other marketing and distribution arrangements. We cannot assure you that we will be successful in acquiring additional funding at levels sufficient to fund our operations or on terms favorable to us. If we are unable to obtain adequate financing when needed, we may have to delay, reduce the scope of or suspend one or more of our preclinical studies, clinical trials, research and development programs or commercialization efforts. Because of the numerous risks and uncertainties associated with the development and commercialization of our current and potential future product candidates and the extent to which we may enter into collaborations with third parties to participate in their development and commercialization, we are unable to estimate the amounts of increased capital outlays and operating expenditures associated with our current and anticipated preclinical studies and clinical trials. To the extent that we raise additional capital through collaborations, strategic alliances or licensing arrangements with third parties, we may have to relinquish valuable rights to our current and potential future product candidates, future revenue

streams or research programs or to grant licenses on terms that may not be favorable to us. If we do raise additional capital through public or private equity or convertible debt offerings, the ownership interest of our existing stockholders will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect our stockholders' rights. If we raise additional capital through debt financing, we may be subject to covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends.

We do not expect to realize revenue from product sales or royalties from licensed products in the foreseeable future, if at all, and unless and until our current and potential future product candidates are clinically tested, approved for commercialization and successfully marketed.

We may expend our limited resources to pursue a particular product candidate and fail to capitalize on product candidates that may be more profitable or for which there is a greater likelihood of success.

Because we have limited financial and managerial resources, we intend to focus our efforts on specific research and development programs, including clinical development of ATRC-101. As a result, we may forgo or delay pursuit of other opportunities, including with potential future product candidates that later prove to have greater commercial potential. Our resource allocation decisions may cause us to fail to capitalize on viable commercial products or profitable market opportunities. Our spending on current and future research and development programs and product candidates for specific indications may not yield any commercially viable product candidates. If we do not accurately evaluate the commercial potential or target market for a particular product candidate, we may relinquish valuable rights to that product candidate through partnership, licensing or other royalty arrangements in cases in which it would have been more advantageous for us to retain sole development and commercialization rights to such product candidate.

We have obtained rights to use human samples in furtherance of our research and development of our current and potential future product candidates. However, if we fail to obtain appropriate consent or exceed the scope of the permission to use these samples, we may become liable for monetary damages for, obligated to pay continuing royalties for or required to cease usage of the samples.

We begin our discovery process by gathering samples from patients. While we attempt to ensure that we, our study site partners or other providers have obtained these samples with informed consent and all necessary permissions, there is a risk that one or more patients or their representatives may assert that we have either failed to obtain informed consent or exceeded the scope of permission to use the patient's sample. We cannot guarantee that we would succeed in establishing that we had informed consent or appropriate permission, if a patient or patient representative contested the matter. In such circumstances, we could be required to pay monetary damages, to pay a continuing royalty on any products created or invented by analyzing the patient's sample or even to cease using the sample and any and all materials derived from or created through analysis of the sample, any of which could result in a change to our business plan and materially harm our business, financial condition, results of operations and prospects.

We may not be able to enter into strategic transactions on acceptable terms, if at all, which could adversely affect our ability to develop and commercialize current and potential future product candidates, impact our cash position, increase our expense, and present significant distractions to our management.

From time to time, we may consider strategic transactions, such as collaborations, acquisitions of companies, asset purchases, joint ventures and out- or in-licensing of product candidates or technologies. For example, we will evaluate and, if strategically attractive, seek to enter into

collaborations, including with biotechnology or biopharmaceutical companies or hospitals. The competition for partners is intense, and the negotiation process is time-consuming and complex. If we are not able to enter into strategic transactions, we may not have access to required liquidity or expertise to further develop our potential future product candidates or our discovery platform. Any such collaboration, or other strategic transaction, may require us to incur non-recurring or other charges, increase our near- and long-term expenditures and pose significant integration or implementation challenges or disrupt our management or business. We may acquire additional technologies and assets, form strategic alliances or create joint ventures with third parties that we believe will complement or augment our existing business, but we may not be able to realize the benefit of acquiring such assets. Conversely, any new collaboration that we do enter into may be on terms that are not optimal for us. These transactions would entail numerous operational and financial risks, including:

- exposure to unknown liabilities;
- disruption of our business and diversion of our management's time and attention in order to manage a collaboration or develop acquired products, product candidates or technologies;
- incurrence of substantial debt or dilutive issuances of equity securities to pay transaction consideration or costs;
- higher-than-expected collaboration, acquisition or integration costs, write-downs of assets or goodwill or impairment charges, increased amortization expenses;
- difficulty and cost in facilitating the collaboration or combining the operations and personnel of any acquired business;
- impairment of relationships with key suppliers, manufacturers or customers of any acquired business due to changes in management and ownership; and
- the inability to retain key employees of any acquired business.

Accordingly, although there can be no assurance that we will undertake or successfully complete any transactions of the nature described above, any transactions that we do complete may be subject to the foregoing or other risks and our business could be materially harmed by such transactions. Conversely, any failure to enter any collaboration or other strategic transaction that would be beneficial to us could delay the development and potential commercialization of our product candidates and have a negative impact on the competitiveness of any product candidate that reaches market.

In addition, to the extent that any of our future partners were to terminate a collaboration agreement, we may be forced to independently develop our current and future product candidates, including funding preclinical studies or clinical trials, assuming marketing and distribution costs and maintaining, enforcing and defending intellectual property rights, or, in certain instances, abandon product candidates altogether, any of which could result in a change to our business plan and materially harm our business, financial condition, results of operations and prospects.

If third parties on which we intend to rely to conduct certain preclinical studies, or any future clinical trials, do not perform as contractually required, fail to satisfy regulatory or legal requirements or miss expected deadlines, our development program could be delayed with material and adverse impacts on our business and financial condition.

We intend to rely on third-party clinical investigators, contract research organizations, or CROs, clinical data management organizations and consultants to design, conduct, supervise and monitor certain preclinical studies and any clinical trials. Because we intend to rely on these third parties and will not have the ability to conduct certain preclinical studies or clinical trials independently, we will have less control over the timing, quality and other aspects of such preclinical studies and clinical trials than we would have had we conducted them on our own. These investigators, CROs and

consultants will not be our employees and we will have limited control over the amount of time and resources that they dedicate to our programs. These third parties may have contractual relationships with other entities, some of which may be our competitors, which may draw time and resources from our programs. The third parties with which we may contract might not be diligent, careful or timely in conducting our preclinical studies or clinical trials, resulting in the preclinical studies or clinical trials being delayed or unsuccessful.

If we cannot contract with acceptable third parties on commercially reasonable terms, or at all, or if these third parties do not carry out their contractual duties, satisfy legal and regulatory requirements for the conduct of preclinical studies or clinical trials or meet expected deadlines, our clinical development programs could be delayed and otherwise adversely affected. In all events, we will be responsible for ensuring that each of our preclinical studies and clinical trials are conducted in accordance with the general investigational plan and protocols for the trial. The FDA may require preclinical studies to be conducted in accordance with good laboratory practices and clinical trials to be conducted in accordance with good clinical practices, including for designing, conducting, recording and reporting the results of preclinical studies and clinical trials to ensure that data and reported results are credible and accurate and that the rights, integrity and confidentiality of clinical trial participants are protected. Our reliance on third parties that we do not control will not relieve us of these responsibilities and requirements. Any adverse development or delay in our clinical trials could have a material and adverse impact on our commercial prospects and may impair our ability to generate revenue.

Clinical trials are expensive, time-consuming and difficult to design and implement.

Human clinical trials are expensive and difficult to design and implement, in part because they are subject to rigorous regulatory requirements. Because our current and potential future product candidates are based on new technologies and discovery approaches, we expect that they will require extensive research and development and have substantial manufacturing and processing costs. In addition, costs to treat patients and to treat potential side effects that may result from our product candidates may be significant. Accordingly, our clinical trial costs are likely to be high and could have a material and adverse effect on our business, financial condition, results of operations and prospects.

If we encounter difficulties enrolling patients in our clinical trials, our clinical development activities could be delayed or otherwise adversely affected.

We may not be able to initiate or continue clinical trials for our current or potential future product candidates if we are unable to locate and enroll a sufficient number of eligible patients to participate in these trials as required by the FDA or other regulatory authorities. In particular, we are preparing to advance ATRC-101 into a Phase 1b clinical trial in patients with a limited number of tumor types. We cannot predict how difficult it will be to enroll patients for trials in these indications. We may experience difficulties in patient enrollment in our clinical trials for a variety of reasons. The enrollment of patients depends on many factors, including:

- the severity of the disease under investigation;
- the patient eligibility criteria defined in the clinical trial protocol;
- the size of the patient population required for analysis of the trial's primary endpoints;
- the proximity and availability of clinical trial sites for prospective patients;
- the patient referral practices of physicians;
- our ability to recruit clinical trial investigators with the appropriate competencies and experience;

- clinicians' and patients' perceptions as to the potential advantages of the product candidate being studied in relation to other available therapies, including any new drugs that may be approved for the indications we are investigating;
- our ability to obtain and maintain patient consents; and
- the risk that patients enrolled in clinical trials will drop out of the trials before completion.

In addition, our future clinical trials will compete with other clinical trials for product candidates that are in the same therapeutic areas as our product candidates, and this competition will reduce the number and types of patients available to us, because some patients who might have opted to enroll in our trials may instead opt to enroll in a trial being conducted by one of our competitors. Since the number of qualified clinical investigators is limited, we expect to conduct some of our clinical trials at the same clinical trial sites that some of our competitors use, which will reduce the number of patients who are available for our clinical trials at such clinical trial sites. Additionally, because some of our clinical trials will be in patients with advanced solid tumors, the patients are typically in the late stages of the disease and may experience disease progression or adverse events independent from our product candidates, making them unevaluable for purposes of the trial and requiring additional enrollment. Delays in patient enrollment may result in increased costs or may affect the timing or outcome of the planned clinical trials, which could prevent completion of these trials and adversely affect our ability to advance the development of our product candidates.

We may not be able to conduct, or contract others to conduct, animal testing in the future, which could harm our research and development activities.

Certain laws and regulations relating to drug development require us to test our product candidates on animals before initiating clinical trials involving humans. Animal testing activities have been the subject of controversy and adverse publicity. Animal rights groups and other organizations and individuals have attempted to stop animal testing activities by pressing for legislation and regulation in these areas and by disrupting these activities through protests and other means. To the extent the activities of these groups are successful, our research and development activities may be interrupted or delayed.

Because we may rely on third parties for manufacturing and supply of our product candidates, some of which are or may be sole source vendors, for preclinical and clinical development materials and commercial supplies, our supply may become limited or interrupted or may not be of satisfactory quantity or quality.

We currently rely on third-party contract manufacturers for our preclinical and future clinical trial product materials and supplies. We do not produce any meaningful quantity of our product candidates for preclinical and clinical development, and we do not currently own manufacturing facilities for producing such supplies. Furthermore, some of our manufacturers represent our sole source of supplies of preclinical and future clinical development materials, including our source for the manufacture of ATRC-101. We cannot assure you that our preclinical or future clinical development product supplies and commercial supplies will not be limited or interrupted, especially with respect to our sole source third-party manufacturing and supply partners, or will be of satisfactory quality or continue to be available at acceptable prices. In particular, any replacement of our manufacturers could require significant effort and expertise because there may be a limited number of qualified replacements. For our current and future sole source third-party manufacturing and supply partners, we may be unable to negotiate binding agreements with them or find replacement manufacturers to support our preclinical and future clinical activities at commercially reasonable terms in the event that their services to us becomes interrupted for any reason. We do not currently have arrangements in place for a redundant or second-source supply for our sole source vendors in the event they cease to provide their products or services to us or do not timely provide sufficient quantities to us. Establishing additional or replacement sole source vendors, if

required, may not be accomplished quickly. Any delays resulting from manufacturing or supply interruptions associated with our reliance on third-party manufacturing and supply partners, including those that are sole source, could impede, delay, limit or prevent our drug development efforts, which could harm our business, result of operations, financial condition and prospects.

The manufacturing process for a product candidate is subject to FDA and other regulatory authority review. Suppliers and manufacturers must meet applicable manufacturing requirements and undergo rigorous facility and process validation tests required by regulatory authorities in order to comply with regulatory standards, such as current Good Manufacturing Practices, or cGMP. In the event that any of our manufacturers fails to comply with such requirements or to perform its obligations to us in relation to quality, timing or otherwise, or if our supply of components or other materials becomes limited or interrupted for other reasons, we may be forced to manufacture the materials ourselves, for which we currently do not have the capabilities or resources, or enter into an agreement with another third party, which we may not be able to do on reasonable terms, or at all. In some cases, the technical skills or technology required to manufacture our current and future product candidates may be unique or proprietary to the original manufacturer and we may have difficulty transferring such skills or technology to another third party and a feasible alternative may not exist. These factors would increase our reliance on such manufacturer or require us to obtain a license from such manufacturer in order to have another third party manufacture our product candidates. If we are required to change manufacturers for any reason, we will be required to verify that the new manufacturer maintains facilities and procedures that comply with quality standards and with all applicable regulations and guidelines. The delays associated with the verification of a new manufacturer could negatively affect our ability to develop product candidates in a timely manner or within budget.

We also expect to rely on third-party manufacturers if we receive regulatory approval for any product candidate. We have existing, and may enter into future, manufacturing arrangements with third parties. We will depend on these third parties to perform their obligations in a timely manner consistent with contractual and regulatory requirements, including those related to quality control and assurance. If we are unable to obtain or maintain third-party manufacturing for any product candidate, or to do so on commercially reasonable terms, we may not be able to develop and commercialize our product candidates successfully. Our or a third party's failure to execute on our manufacturing requirements and comply with cGMP could adversely affect our business in a number of ways, including:

- an inability to initiate or continue clinical trials of product candidates under development;
- delay in submitting regulatory applications, or receiving regulatory approvals, for product candidates;
- loss of the cooperation of a potential future partner;
- subjecting third-party manufacturing facilities or our potential future manufacturing facilities to additional inspections by regulatory authorities;
- requirements to cease distribution or to recall batches of product candidates; and
- in the event of approval to market and commercialize a product candidate, an inability to meet commercial demands for our products.

Our third-party manufacturers may be unable to successfully scale manufacturing of ATRC-101 or potential future product candidates in sufficient quality and quantity, which would delay or prevent us from developing product candidates and commercializing approved products, if any.

In order to conduct clinical trials for ATRC-101 as well as any potential future product candidates, we will need to manufacture large quantities of these product candidates. We may continue to and currently expect to use third parties for our manufacturing needs. Our manufacturing partners may be unable to successfully increase the manufacturing capacity for any current or potential future product candidate in a timely or cost-effective manner, or at all. In addition, quality issues may arise during scale-up activities. If our manufacturing partners are unable to successfully scale the manufacture of any current or potential future product candidate in sufficient quality and quantity, the development, testing and clinical trials of that product candidate may be delayed or infeasible, and regulatory approval or commercial launch of any potential resulting product may be delayed or not obtained, which could significantly harm our business.

If the market opportunities for our current and potential future product candidates, including ATRC-101, are smaller than we believe they are, our future product revenues may be adversely affected and our business may suffer.

Our understanding of the number of people who suffer from certain types of cancers and tumors that may be able to be treated with antibodies that have been and may in the future be identified by our discovery platform, including ATRC-101, is based on estimates. These estimates may prove to be incorrect, and new studies may reduce the estimated incidence or prevalence of these diseases. The number of patients in the United States or elsewhere may turn out to be lower than expected, may not be otherwise amenable to treatment with our current or potential future product candidates or patients may become increasingly difficult to identify and access, all of which would adversely affect our business prospects and financial condition. In particular, the treatable population for ATRC-101 may further be reduced if our estimates of addressable populations are erroneous or sub-populations of patients do not derive benefit from ATRC-101.

Further, there are several factors that could contribute to making the actual number of patients who receive our current or potential future product candidates less than the potentially addressable market. These include the lack of widespread availability of, and limited reimbursement for, new therapies in many underdeveloped markets.

We face competition from entities that have developed or may develop product candidates for the treatment of the diseases that we may target, including companies developing novel treatments and technology platforms. If these companies develop technologies or product candidates more rapidly than we do, or if their technologies or product candidates are more effective, our ability to develop and successfully commercialize product candidates may be adversely affected.

The development and commercialization of drugs and therapeutic biologics is highly competitive. We compete with a variety of large pharmaceutical companies, multinational biopharmaceutical companies, other biopharmaceutical companies and specialized biotechnology companies, as well as technology being developed at universities and other research institutions. Our competitors are often larger and better funded than we are. Our competitors have developed, are developing or will develop product candidates and processes competitive with ours. Competitive therapeutic treatments include those that have already been approved and accepted by the medical community and any new treatments that are currently in development or that enter the market. We believe that a significant number of products are currently under development, and may become commercially

available in the future, for the treatment of conditions for which we may try to develop product candidates. There is intense and rapidly evolving competition in the biotechnology, biopharmaceutical and antibody and immuno-oncology fields. We believe that while our discovery platform, its associated intellectual property, the characteristics of ATRC-101 and potential future product candidates and our scientific and technical know-how together give us a competitive advantage in this space, competition from many sources remains.

We are aware of a number of companies that are developing antibodies for the treatment of cancer. Many of these companies are well-capitalized and, in contrast to us, have significant clinical experience, and may include our future partners. In addition, these companies compete with us in recruiting scientific and managerial talent. Our success will partially depend on our ability to obtain, maintain, enforce and defend patents and other intellectual property rights with respect to antibodies that are safer and more effective than competing products. Our commercial opportunity and success will be reduced or eliminated if competing products that are safer, more effective, or less expensive than the antibodies we develop are or become available.

We expect to compete with antibody, biologics and other therapeutic platforms and development companies, including, but not limited to, companies such as Adaptive Biotechnologies Corporation, AIMM Therapeutics B.V., Neurimmune Holding AG, OncoReponse, Inc., and Vir Biotechnology, Inc. In addition, we expect to compete with large, multinational pharmaceutical companies that discover, develop and commercialize antibodies and other therapeutics for use in treating cancer such as AstraZeneca plc, Bristol-Myers Squibb Company, Genentech, Inc. and Merck & Co., Inc. If ATRC-101 or potential future product candidates are eventually approved, they will compete with a range of treatments that are either in development or currently marketed. For example, we expect that ATRC-101 and our potential future product candidates may compete against traditional cancer therapies, such as chemotherapy, as well as cell-based treatments for cancer, such as CAR-T therapies.

Many of our competitors have significantly greater financial, technical, manufacturing, marketing, sales and supply resources or experience than we do. If we successfully obtain approval for any product candidate, we will face competition based on many different factors, including the safety and effectiveness of our products, the ease with which our products can be administered, the timing and scope of regulatory approvals for these products, the availability and cost of manufacturing, marketing and sales capabilities, price, reimbursement coverage and patent position. Competing products could present superior treatment alternatives, including by being more effective, safer, less expensive or marketed and sold more effectively than any products we may develop. Competitive products may make any product we develop obsolete or noncompetitive before we recover the expense of developing and commercializing such product. Such competitors could also recruit our employees, which could negatively impact our level of expertise and our ability to execute our business plan.

Any inability to attract and retain qualified key management, technical personnel and employees would impair our ability to implement our business plan.

Our success largely depends on the continued service of key management, advisors and other specialized personnel, including John A. Orwin, our president and chief executive officer, and Tito A. Serafini, our chief strategy officer and founder. We have a written employment agreement with each of Mr. Orwin and Dr. Serafini. The loss of one or more members of our executive team, management team or other key employees or advisors could delay our research and development programs and have a material and adverse effect on our business, financial condition, results of operations and prospects.

The relationships that our key managers have cultivated within our industry make us particularly dependent upon their continued employment with us. We are dependent on the continued service of our technical personnel because of the highly technical nature of our product candidates and technologies and the specialized nature of the regulatory approval process. Because our management team and key employees are not obligated to provide us with continued service, they could terminate their employment with us at any time without penalty. Our future success will depend in large part on our continued ability to attract and retain other highly qualified scientific, technical and management personnel, as well as personnel with expertise in clinical testing, manufacturing, governmental regulation and commercialization. We face competition for personnel from other companies, universities, public and private research institutions, government entities and other organizations.

As of March 31, 2019, we had 85 full-time employees. Our focus on the development of ATRC-101 and potential future product candidates will require adequate staffing. We may need to hire and retain new employees to execute our future clinical development and manufacturing plans. We cannot provide assurance that we will be able to hire or retain adequate staffing levels to develop our current and potential future product candidates or run our operations or to accomplish all of our objectives.

We may experience difficulties in managing our growth and expanding our operations.

We have limited experience in product development and have not begun clinical trials for any product candidate. As our current and potential future product candidates enter and advance through preclinical studies and any clinical trials, we will need to expand our development, regulatory and manufacturing capabilities or contract with other organizations to provide these capabilities for us. We may also experience difficulties in the discovery and development of new potential future product candidates using our discovery platform if we are unable to meet demand as we grow our operations. In the future, we also expect to have to manage additional relationships with collaborators, suppliers and other organizations. Our ability to manage our operations and future growth will require us to continue to improve our operational, financial and management controls, reporting systems and procedures and secure adequate facilities for our operational needs. We may not be able to implement improvements to our management information and control systems in an efficient or timely manner and may discover deficiencies in existing systems and controls.

If any of our product candidates is approved for marketing and commercialization in the future and we are unable to develop sales, marketing and distribution capabilities on our own or enter into agreements with third parties to perform these functions on acceptable terms, we will be unable to successfully commercialize any such future products.

We currently have no sales, marketing or distribution capabilities or experience. We will need to develop internal sales, marketing and distribution capabilities to commercialize each current and potential future product candidate that gains FDA approval, which would be expensive and time-consuming, or enter into partnerships with third parties to perform these services. If we decide to market any approved products directly, we will need to commit significant financial and managerial resources to develop a marketing and sales force with technical expertise and supporting distribution, administration and compliance capabilities. If we rely on third parties with such capabilities to market any approved products or decide to co-promote products with partners, we will need to establish and maintain marketing and distribution arrangements with third parties, and there can be no assurance that we will be able to enter into such arrangements on acceptable terms or at all. In entering into third-party marketing or distribution arrangements, any revenue we receive will depend upon the efforts of the third parties and we cannot assure you that such third parties will establish adequate sales and distribution capabilities or be successful in gaining market acceptance

for any approved product. If we are not successful in commercializing any product approved in the future, either on our own or through third parties, our business and results of operations could be materially and adversely affected.

Our future growth may depend, in part, on our ability to operate in foreign markets, where we would be subject to additional regulatory burdens and other risks and uncertainties.

Our future growth may depend, in part, on our ability to develop and commercialize product candidates in foreign markets for which we may rely on partnership with third parties. We will not be permitted to market or promote any product candidate before we receive regulatory approval from the applicable regulatory authority in a foreign market, and we may never receive such regulatory approval for any product candidate. To obtain separate regulatory approval in foreign countries, we generally must comply with numerous and varying regulatory requirements of such countries regarding safety and efficacy and governing, among other things, clinical trials and commercial sales, pricing and distribution of a product candidate, and we cannot predict success in these jurisdictions. If we obtain approval of any of our current or potential future product candidates and ultimately commercialize any such product candidate in foreign markets, we would be subject to risks and uncertainties, including the burden of complying with complex and changing foreign regulatory, tax, accounting and legal requirements and the reduced protection of intellectual property rights in some foreign countries.

Price controls imposed in foreign markets may adversely affect our future profitability.

In some countries, particularly member states of the European Union, the pricing of prescription drugs is subject to governmental control. In these countries, pricing negotiations with governmental authorities can take considerable time after receipt of marketing approval for a product. In addition, there can be considerable pressure exerted by governments and other stakeholders on prices and reimbursement levels, including as part of cost-containment measures. Political, economic and regulatory developments, in the United States or internationally, may further complicate pricing negotiations, and pricing negotiations may continue after reimbursement has been obtained. Reference pricing used by various European Union member states and parallel distribution, or arbitrage between low-priced and high-priced member states, can further reduce prices. In some countries, we or future partners may be required to conduct clinical trials or other studies that compare the cost-effectiveness of a product candidate to other available therapies in order to obtain or maintain reimbursement or pricing approval. Publication of discounts by third-party payors or authorities may lead to further pressure on the prices or reimbursement levels within the country of publication and other countries. If reimbursement of any current or potential future product candidate that is approved for marketing in the future is unavailable or limited in scope or amount, or if pricing is set at unsatisfactory levels, our business and results of operations or prospects could be materially and adversely affected and our ability to commercialize such product candidate could be materially impaired.

Our business entails a significant risk of product liability, and our inability to obtain sufficient insurance coverage could have a material and adverse effect on our business, financial condition, results of operations and prospects.

As we move into conducting clinical trials of ATRC-101 or potential future product candidates, we will be exposed to significant product liability risks inherent in the development, testing, manufacturing and marketing of antibody treatments. Product liability claims could delay or prevent completion of our development programs. If we succeed in marketing products, such claims could result in an FDA investigation of the safety and effectiveness of our products, our manufacturing processes and facilities or our marketing programs and potentially a recall of our products or more

serious enforcement action, limitations on the approved indications for which they may be used or suspension or withdrawal of approvals. Regardless of the merits or eventual outcome, liability claims may also result in decreased demand for our products, injury to our reputation, costs to defend the related litigation, a diversion of management's time and our resources, substantial monetary awards to trial participants or patients and a decline in our stock price. Any insurance we have or may obtain may not provide sufficient coverage against potential liabilities. Furthermore, clinical trial and product liability insurance is becoming increasingly expensive. As a result, our partners or we may be unable to obtain sufficient insurance at a reasonable cost to protect us against losses caused by product liability claims that could have a material and adverse effect on our business, financial condition, results of operations and prospects.

Our employees, principal investigators, consultants and commercial partners may engage in misconduct or other improper activities, including noncompliance with regulatory standards and requirements.

We are exposed to the risk of fraud or other misconduct by our employees, principal investigators, consultants and commercial partners. Misconduct by employees could include intentional failures to comply with FDA regulations, provide accurate information to the FDA, comply with manufacturing standards we may establish, comply with federal and state healthcare fraud and abuse laws and regulations, report financial information or data accurately or disclose unauthorized activities to us. In particular, sales, marketing and business arrangements in the healthcare industry are subject to extensive laws and regulations intended to prevent fraud, kickbacks, self-dealing and other abusive practices. These laws and regulations may restrict or prohibit a wide range of pricing, discounting, marketing and promotion, sales commission, customer incentive programs and other business arrangements. Such misconduct could also involve the improper use of information obtained in the course of clinical trials, which could result in regulatory sanctions and serious harm to our reputation. For example, individuals conducting the non-interventional clinical studies that we sponsor through which we obtain antibodies for development into potential antibody-based therapeutics may violate applicable laws and regulations regarding patients' personal data. It is not always possible to identify and deter misconduct, and the precautions we take to detect and prevent this activity may not be effective in controlling unknown or unmanaged risks or losses or in protecting us from governmental investigations or other actions or lawsuits stemming from a failure to be in compliance with such laws or regulations. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a material and adverse effect on our business and financial condition, including the imposition of significant criminal, civil, and administrative fines or other sanctions, such as monetary penalties, damages, fines, disgorgement, imprisonment, exclusion from participation in government-funded healthcare programs, such as Medicare and Medicaid, integrity obligations, reputational harm and the curtailment or restructuring of our operations.

Failure to comply with health and data protection laws and regulations could lead to government enforcement actions (which could include civil or criminal penalties), private litigation or adverse publicity and could negatively affect our operating results and business.

We and our current and potential collaborators may be subject to federal, state and foreign data protection laws and regulations (*i.e.*, laws and regulations that address privacy and data security). In the United States, numerous federal and state laws and regulations, including federal health information privacy laws (*e.g.*, the Health Insurance Portability and Accountability Act, or HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act, or HITECH), state data breach notification laws, state health information privacy laws and federal and state consumer protection laws (*e.g.*, Section 5 of the Federal Trade Commission Act), that govern the collection, use, disclosure and protection of health-related and other personal information could apply

to our operations or the operations of our collaborators. In addition, we may obtain health information from third parties (including research institutions from which we obtain clinical trial data) that are subject to privacy and security requirements under the HIPAA, as amended by HITECH, or other privacy and data security laws. Depending on the facts and circumstances, we could be subject to criminal penalties if we knowingly obtain, use, or disclose individually identifiable health information maintained by a HIPAA-covered entity in a manner that is not authorized or permitted by HIPAA.

International data protection laws, including Regulation 2016/679, known as the General Data Protection Regulation (GDPR) may also apply to health-related and other personal information obtained outside of the United States. The GDPR went into effect on May 25, 2018. The GDPR introduced new data protection requirements in the European Union, as well as potential fines for noncompliant companies of up to the greater of €20 million or 4% of annual global revenue. The regulation imposes numerous new requirements for the collection, use and disclosure of personal information, including more stringent requirements relating to consent and the information that must be shared with data subjects about how their personal information is used, the obligation to notify regulators and affected individuals of personal data breaches, extensive new internal privacy governance obligations and obligations to honor expanded rights of individuals in relation to their personal information (*e.g.*, the right to access, correct and delete their data). In addition, the GDPR includes restrictions on cross-border data transfers. The GDPR will increase our responsibility and liability in relation to personal data that we process where such processing is subject to the GDPR, and we may be required to put in place additional mechanisms to ensure compliance with the GDPR, including as implemented by individual countries. Further, the United Kingdom's vote in favor of exiting the EU, often referred to as Brexit, has created uncertainty with regard to data protection regulation in the United Kingdom. In particular, it is unclear how data transfers to and from the United Kingdom will be regulated.

In addition, California recently enacted the California Consumer Privacy Act (CCPA), which creates new individual privacy rights for California consumers (as defined in the law) and places increased privacy and security obligations on entities handling personal data of consumers or households. The CCPA will require covered companies to provide new disclosure to consumers about such companies' data collection, use and sharing practices, provide such consumers new ways to opt-out of certain sales or transfers of personal information, and provide consumers with additional causes of action. The CCPA goes into effect on January 1, 2020, and the California Attorney General may bring enforcement actions for violations beginning July 1, 2020. The CCPA was amended on September 23, 2018, and it remains unclear what, if any, further modifications will be made to this legislation or how it will be interpreted. As currently written, the CCPA may impact our business activities and exemplifies the vulnerability of our business to the evolving regulatory environment related to personal data and protected health information.

Compliance with U.S. and international data protection laws and regulations could require us to take on more onerous obligations in our contracts, restrict our ability to collect, use and disclose data, or in some cases, impact our ability to operate in certain jurisdictions. Failure to comply with U.S. and international data protection laws and regulations could result in government enforcement actions (which could include civil or criminal penalties), private litigation or adverse publicity and could negatively affect our operating results and business. Moreover, clinical trial subjects about whom we or our potential collaborators obtain information, as well as the providers who share this information with us, may contractually limit our ability to use and disclose the information. Claims that we have violated individuals' privacy rights, failed to comply with data protection laws, or breached our contractual obligations, even if we are not found liable, could be expensive and time consuming to defend and could result in adverse publicity that could harm our business.

If we experience security or data privacy breaches or other unauthorized or improper access to, use of, or destruction of our proprietary or confidential data, employee data or personal data, we may face costs, significant liabilities, harm to our brand and business disruption.

In connection with our discovery platform and efforts, we may collect and use a variety of personal data, such as name, mailing address, email addresses, phone number and clinical trial information. Although we have extensive measures in place to prevent the sharing and loss of patient data in our sample collection process associated with our discovery platform, any failure to prevent or mitigate security breaches or improper access to, use of, or disclosure of our clinical data or patients' personal data could result in significant liability under state (*e.g.*, state breach notification laws), federal (*e.g.*, HIPAA, as amended by HITECH), and international law (*e.g.*, the GDPR). Any failure to prevent or mitigate security breaches or improper access to, use of, or disclosure of our clinical data or patients' personal data may cause a material adverse impact to our reputation, affect our ability to conduct new studies and potentially disrupt our business. We may also rely on third-party service providers to host or otherwise process some of our data and that of users, and any failure by such third party to prevent or mitigate security breaches or improper access to or disclosure of such information could have similarly adverse consequences for us. If we are unable to prevent or mitigate the impact of such security or data privacy breaches, we could be exposed to litigation and governmental investigations, which could lead to a potential disruption to our business.

We depend on sophisticated information technology systems to operate our business and a cyber-attack or other breach of these systems could have a material adverse effect on our business.

We rely on information technology systems that we or our third-party vendors operate to process, transmit and store electronic information in our day-to-day operations. The size and complexity of our information technology systems makes them vulnerable to a cyber-attack, malicious intrusion, breakdown, destruction, loss of data privacy or other significant disruption. A successful attack could result in the theft or destruction of intellectual property, data, or other misappropriation of assets, or otherwise compromise our confidential or proprietary information and disrupt our operations. Cyber-attacks are becoming more sophisticated and frequent. We have invested in our systems and the protection and recoverability of our data to reduce the risk of an intrusion or interruption, and we monitor and test our systems on an ongoing basis for any current or potential threats. There can be no assurance that these measures and efforts will prevent future interruptions or breakdowns. If we or our third-party vendors fail to maintain or protect our information technology systems and data integrity effectively or fail to anticipate, plan for or manage significant disruptions to these systems, we or our third-party vendors could have difficulty preventing, detecting and controlling such cyber-attacks and any such attacks could result in losses described above as well as disputes with physicians, patients and our partners, regulatory sanctions or penalties, increases in operating expenses, expenses or lost revenues or other adverse consequences, any of which could have a material adverse effect on our business, results of operations, financial condition, prospects and cash flows.

Our information technology systems could face serious disruptions that could adversely affect our business.

Our information technology and other internal infrastructure systems, including corporate firewalls, servers, leased lines and connection to the internet, face the risk of systemic failure that could disrupt our operations. A significant disruption in the availability of our information technology and other internal infrastructure systems could cause interruptions and delays in our research and development work.

If we do not comply with laws regulating the protection of the environment and health and human safety, our business could be adversely affected.

Our research, development and manufacturing involves the use of hazardous materials and various chemicals. We maintain quantities of various flammable and toxic chemicals in our facilities that are required for our research, development and manufacturing activities. We are subject to federal, state and local laws and regulations governing the use, manufacture, storage, handling and disposal of these hazardous materials. We believe our procedures for storing, handling and disposing of these materials in our facilities comply with the relevant guidelines of the state of California and the Occupational Safety and Health Administration of the U.S. Department of Labor. Although we believe that our safety procedures for handling and disposing of these materials comply with the standards mandated by applicable regulations, the risk of accidental contamination or injury from these materials cannot be eliminated. If an accident occurs, we could be held liable for resulting damages, which could be substantial. We are also subject to numerous environmental, health and workplace safety laws and regulations, including those governing laboratory procedures, exposure to blood-borne pathogens and the handling of animals and biohazardous materials. Although we maintain workers' compensation insurance to cover us for costs and expenses we may incur due to injuries to our employees resulting from the use of these materials, this insurance may not provide adequate coverage against potential liabilities. Although we have some environmental liability insurance covering certain of our facilities, we may not maintain adequate insurance for all environmental liability or toxic tort claims that may be asserted against us in connection with our storage or disposal of biological or hazardous materials. Additional federal, state and local laws and regulations affecting our operations may be adopted in the future. We may incur substantial costs to comply with, and substantial fines or penalties if we violate, any of these laws or regulations.

Our current operations are concentrated in one location, and we or the third parties upon whom we depend may be adversely affected by natural or other disasters and our business continuity and disaster recovery plans may not adequately protect us from a serious disaster.

Our current operations are concentrated in the San Francisco Bay Area. Any unplanned event, such as flood, fire, explosion, extreme weather condition, medical epidemics, power shortage, telecommunication failure or other natural or manmade accidents or incidents that result in us being unable to fully utilize our facilities or the manufacturing facilities of our third-party contract manufacturers, or lose our repository of blood-based and other valuable laboratory samples, may have a material and adverse effect on our ability to operate our business, particularly on a daily basis, and have significant negative consequences on our financial and operating conditions. Loss of access to these facilities may result in increased costs, delays in the development of our product candidates or interruption of our business operations. Natural disasters such as earthquakes or wildfires, both of which are prevalent in Northern California, floods or tsunamis could further disrupt our operations, and have a material negative impact on our business, financial condition, results of operations and prospects. If a natural disaster, power outage or other event occurred that prevented us from using all or a significant portion of our headquarters, that damaged critical infrastructure, such as our research facilities or the manufacturing facilities of our third-party contract manufacturers, or that otherwise disrupted operations, it may be difficult or, in certain cases, impossible, for us to continue our business for a substantial period of time. The disaster recovery and business continuity plans we have in place may prove inadequate in the event of a serious disaster or similar event. We may incur substantial expenses as a result of the limited nature of our disaster recovery and business continuity plans, which could have a material adverse effect on our business. As part of our risk management policy, we maintain insurance coverage at levels that we believe are appropriate for our business. However, in the event of an accident or incident at these facilities, we cannot assure you that the amounts of insurance will be sufficient to satisfy any damages and losses. If our facilities, or the manufacturing facilities of our third-party contract

manufacturers, are unable to operate because of an accident or incident or for any other reason, even for a short period of time, any or all of our research and development programs may be harmed. Any business interruption may have a material and adverse effect on our business and financial condition.

Risks Related to Our Intellectual Property

If we are unable to obtain or protect intellectual property rights related to our technology and current or future product candidates, or if our intellectual property rights are inadequate, we may not be able to compete effectively.

Our success depends in part on our ability to obtain and maintain protection for our owned and in-licensed intellectual property rights and proprietary technology. We rely on patents and other forms of intellectual property rights, including in-licenses of intellectual property rights and biologic materials of others, to protect our current or future discovery platform, product candidates, methods used to manufacture our current or future product candidates, and methods for treating patients using our current or future product candidates.

We in-license exclusive rights, including patents and patent applications relating to our discovery platform, from the Board of Trustees of the Leland Stanford Junior University, or Stanford University. Patent applications for this in-licensed technology are still pending before the U.S. Patent and Trademark Office and other national patent offices. There is no guarantee that such patent applications will issue as patents, nor any guarantee that issued patents will provide adequate protection for the in-licensed technology or any meaningful competitive advantage.

We also own several patents and applications on our own technology relating to our discovery platform. There is no guarantee that any patents covering this technology will issue from the patent applications we own, or, if they do, that the issued claims will provide adequate protection for our discovery platform or any meaningful competitive advantage.

We currently do not own or in-license any issued patents or pending non-provisional patent applications in connection with ATRC-101. We have filed multiple provisional patent applications in the United States in connection with ATRC-101 and related antibody variants. A provisional patent application is not eligible to become an issued patent until, among other things, we file a non-provisional patent application within 12 months of the filing date of the provisional patent application. If we do not timely file non-provisional patent applications, we may lose our priority date with respect to our provisional patent applications and any patent protection on the inventions disclosed in our provisional patent applications. Moreover, there is no guarantee that any current or future patent applications will result in the issuance of patents that will effectively protect ATRC-101 or other product candidates or will effectively prevent others from commercializing competitive products.

The patent prosecution process is expensive, complex and time-consuming. Patent license negotiations also can be complex and protracted, with uncertain results. We may not be able to file, prosecute, maintain, enforce or license all necessary or desirable patents and patent applications at a reasonable cost or in a timely manner. It is also possible that we will fail to identify patentable aspects of our research and development output before it is too late to obtain patent protection. The patent applications that we own or in-license may fail to result in issued patents, and, even if they do issue as patents, such patents may not cover our current or future technologies or product candidates in the United States or in other countries or provide sufficient protection from competitors. In addition, the coverage claimed in a patent application can be significantly reduced before the patent is issued and its scope can be reinterpreted after issuance. Accordingly, we also rely on our

ability to preserve our trade secrets, to prevent third parties from infringing, misappropriating or violating our proprietary rights and to operate without infringing, misappropriating, or violating the proprietary rights of others.

Further, although we make reasonable efforts to ensure patentability of our inventions, we cannot guarantee that all of the potentially relevant prior art relating to our owned or in-licensed patents and patent applications has been found. For example, publications of discoveries in scientific literature often lag behind the actual discoveries, and patent applications in the United States and other jurisdictions are typically not published until 18 months after filing, and in some cases not at all. Additionally, pending patent applications that have been published can, subject to certain limitations, be later amended in a manner that could cover our discovery platform, our product candidates, or the use of our technologies. We thus cannot know with certainty whether we or our licensors were the first to make the inventions claimed in our owned or in-licensed patents or pending applications, or that we or our licensors were the first to file for patent protection of such inventions. There is no assurance that all potentially relevant prior art relating to our owned or in-licensed patents and patent applications has been found. For this reason, and because there is no guarantee that any prior art search is absolutely correct and comprehensive, we may be unaware of prior art that could be used to invalidate an issued patent or to prevent our owned or in-licensed pending patent applications from issuing as patents. Invalidation of any of our patent rights, including in-licensed patent rights, could materially harm our business.

Moreover, the patent positions of biopharmaceutical companies are generally uncertain because they may involve complex legal and factual considerations that have, in recent years, been the subject of legal development and change. As a result, the issuance, scope, validity, enforceability and commercial value of our pending patent rights is uncertain. The standards applied by the United States Patent and Trademark Office, or USPTO, and foreign patent offices in granting patents are not always certain and moreover, are not always applied uniformly or predictably. For example, there is no uniform worldwide policy regarding patentable subject matter or the scope of claims allowable in patents. Changes in either the patent laws or interpretation of the patent laws in the United States and other countries may diminish the value of our owned or in-licensed patents or narrow the scope of our patent protection.

Even if patents do successfully issue and even if such patents cover our current or any future technologies or product candidates, third parties may challenge their validity, enforceability or scope, which may result in such patents being narrowed, invalidated, or held unenforceable. Any successful challenge to these patents or any other patents owned by or licensed to us could deprive us of rights necessary for the successful commercialization of any current or future technologies or product candidates that we may develop. Likewise, if patent applications we own or have in-licensed with respect to our development programs and current or future technologies or product candidates fail to issue, if their breadth or strength is threatened, or if they fail to provide meaningful exclusivity, other companies could be dissuaded from collaborating with us to develop current or future technologies or product candidates. Lack of valid and enforceable patent protection could threaten our ability to commercialize current or future products and could prevent us from maintaining exclusivity with respect to the invention or feature claimed in the patent applications. Any failure to obtain or any loss of patent protection could have a material adverse impact on our business and ability to achieve profitability. We may be unable to prevent competitors from entering the market with a product that is similar to or the same as ATRC-101 or future product candidates.

The filing of a patent application or the issuance of a patent is not conclusive as to its ownership, inventorship, scope, patentability, validity or enforceability. Issued patents and patent applications may be challenged in the courts and in the patent office in the United States and

abroad. For example, our applications or applications filed by our licensors may be challenged through third-party submissions, opposition or derivation proceedings. By further example, our issued patents or the issued patents we in-license may be challenged through reexamination, *inter partes* review or post-grant review proceedings before the patent office, or in declaratory judgment actions or counterclaims. An adverse determination in any such submission, proceeding or litigation could prevent the issuance of, reduce the scope of, invalidate or render unenforceable our owned or in-licensed patent rights; limit our ability to stop others from using or commercializing similar or identical platforms and products; allow third parties to compete directly with us without payment to us; or result in our inability to manufacture or commercialize products without infringing third-party patent rights. In addition, if the breadth or strength of protection provided by our owned or in-licensed patents and patent applications is threatened, it could dissuade companies from collaborating with us to license, develop or commercialize current or future platforms or product candidates. Any of the foregoing could have a material adverse effect on our business, financial condition, results of operations and prospects.

Moreover, some of our owned and in-licensed patents and patent applications are or may in the future be co-owned with third parties. If we are unable to obtain an exclusive license to any such third party co-owners' interest in such patents or patent application, such co-owners may be able to license their rights to other third parties, including our competitors, and our competitors could market competing products and technology. We may need the cooperation of any such co-owners of our patents to enforce such patents against third parties, and such cooperation may not be provided to us. Any of the foregoing could have a material adverse effect on our competitive position, business prospects and financial conditions.

Our in-licensed patent rights may be subject to a reservation of rights by one or more third parties. For example, we in-license certain patent rights from Stanford University, which co-owns rights with a governmental entity. As a result, the U.S. government may have certain rights, including so-called march-in rights, to such patent rights and any products or technology developed from such patent rights. When new technologies are developed with U.S. government funding, the U.S. government generally obtains certain rights in any resulting patents, including a nonexclusive license authorizing the U.S. government to use the invention for non-commercial purposes. These rights may permit the U.S. government to disclose our confidential information to third parties and to exercise march-in rights to use or to allow third parties to use our licensed technology. The U.S. government can exercise its march-in rights if it determines that action is necessary because we fail to achieve the practical application of government-funded technology, because action is necessary to alleviate health or safety needs, to meet requirements of federal regulations, or to give preference to U.S. industry. In addition, our rights in such inventions may be subject to certain requirements to manufacture products embodying such inventions in the United States. Any exercise by the U.S. government of such rights could harm our competitive position, business, financial condition, results of operations and prospects.

If we fail to comply with our obligations under any license, collaboration or other intellectual property-related agreements, we may be required to pay damages and could lose intellectual property rights that may be necessary for developing, commercializing and protecting our current or future technologies or product candidates or we could lose certain rights to grant sublicenses.

We are heavily reliant upon in-licenses to certain patent rights and proprietary technology from third parties that are important or necessary to our discovery platform and development of product candidates. For example, we rely on an intellectual property license from Stanford University for our discovery platform.

Our current license agreements impose, and any future license agreements we enter into are likely to impose, various development, commercialization, funding, milestone, royalty, diligence, sublicensing, insurance, patent prosecution and enforcement or other obligations on us. If we breach any of these obligations, or use the intellectual property licensed to us in an unauthorized manner, we may be required to pay damages and the licensor may have the right to terminate the license. License termination could result in our inability to develop, manufacture and sell products that are covered by the licensed technology or could enable a competitor to gain access to the licensed technology. In certain circumstances, our licensed patent rights are subject to our reimbursing our licensors for their patent prosecution and maintenance costs. For example, our license agreement with Stanford University requires us to bear the costs of filing and maintaining patent applications.

Furthermore, we may not have the right to control the preparation, filing, prosecution, maintenance, enforcement and defense of patents and patent applications that we license from third parties. For example, pursuant to our license agreement with Stanford University, while we direct and are responsible for the preparation, filing, prosecution and maintenance, and, in certain circumstances, enforcement and defense of the patents and patent applications, all of these actions are subject to Stanford University's final approval. Given Stanford University's right of final approval, we therefore cannot be certain that these patents and patent applications will be prepared, filed, prosecuted, maintained, enforced and defended in a manner consistent with the best interests of our business. If our licensors and future licensors fail to prosecute, maintain, enforce and defend patents we may license, or lose rights to licensed patents or patent applications, our license rights may be reduced or eliminated. In such circumstances, our right to develop and commercialize any of our products or product candidates that is the subject of such licensed rights could be materially adversely affected.

Moreover, our licensors may own or control intellectual property that has not been licensed to us and, as a result, we may be subject to claims, regardless of their merit, that we are infringing, misappropriating or otherwise violating the licensor's intellectual property rights. In addition, while we cannot currently determine the amount of the royalty obligations we would be required to pay on sales of future products if infringement or misappropriation were found, those amounts could be significant. The amount of our future royalty obligations will depend on the technology and intellectual property we use in products that we successfully develop and commercialize, if any. Therefore, even if we successfully develop and commercialize products, we may be unable to achieve or maintain profitability.

In addition, the agreements under which we currently license intellectual property or technology from third parties are complex, and certain provisions in such agreements may be susceptible to multiple interpretations. The resolution of any contract interpretation disagreement that may arise could narrow what we believe to be the scope of our rights to the relevant intellectual property or technology, or increase what we believe to be our financial or other obligations under the relevant agreement, either of which could have a material adverse impact on our business and ability to achieve profitability. Moreover, if disputes over intellectual property that we have licensed prevent or impair our ability to maintain our current licensing arrangements on commercially acceptable terms, we may be unable to successfully develop and commercialize any affected product candidates, which could have a material adverse effect on our business and financial conditions.

Patent terms may not be able to protect our competitive position for an adequate period of time with respect to our current or future technologies or product candidates.

Patents have a limited lifespan. In the United States, the standard patent term is typically 20 years after filing. Various extensions may be available. Even so, the life of a patent and the

protection it affords are limited. As a result, our owned and in-licensed patent portfolio provides us with limited rights that may not last for a sufficient period of time to exclude others from commercializing products similar or identical to ours. For example, given the large amount of time required for the research, development, testing and regulatory review of new product candidates, patents protecting such candidates might expire before or shortly after such candidates are commercialized.

Extensions of patent term are available, but there is no guarantee that we would succeed in obtaining any particular extension—and no guarantee any such extension would confer patent term for a sufficient period of time to exclude others from commercializing products similar or identical to ours. In the United States, the Drug Price Competition and Patent Term Restoration Act of 1984 permits a patent term extension of up to five years beyond the normal expiration of the patent, which is limited to the approved indication (or any additional indications approved during the period of extension). A patent term extension cannot extend the remaining term of a patent beyond 14 years from the date of product approval; only one patent may be extended; and extension is available for only those claims covering the approved drug, a method for using it, or a method for manufacturing it. The applicable authorities, including the FDA and the USPTO in the United States, and any equivalent regulatory authority in other countries, may not agree with our assessment of whether such extensions are available, and may refuse to grant extensions to our patents, or may grant more limited extensions than we request. An extension may not be granted or may be limited where there is, for example, a failure to exercise due diligence during the testing phase or regulatory review process, failure to apply within applicable deadlines, failure to apply before expiration of relevant patents, or some other failure to satisfy applicable requirements. If this occurs, our competitors may be able to launch their products earlier by taking advantage of our investment in development and clinical trials along with our clinical and preclinical data. This could have a material adverse effect on our business and ability to achieve profitability.

Changes in U.S. patent law or the patent law of other countries or jurisdictions could diminish the value of patents in general, thereby impairing our ability to protect our current or any future technologies or product candidates.

Changes in either the patent laws or interpretation of the patent laws in the United States or elsewhere could increase the uncertainties and costs surrounding the prosecution of patent applications and the enforcement or defense of issued patents. The United States has enacted and implemented wide-ranging patent reform legislation. On September 16, 2011, the Leahy-Smith America Invents Act, or the Leahy-Smith Act, was signed into law, which could increase the uncertainties and costs surrounding the prosecution of our owned or in-licensed patent applications and the enforcement or defense of our owned or in-licensed issued patents. The Leahy-Smith Act includes a number of significant changes to U.S. patent law. These include provisions that affect the way patent applications are prosecuted, redefine prior art, may affect patent litigation and switch the U.S. patent system from a "first-to-invent" system to a "first-to-file" system. Under a first-to-file system, assuming the other requirements for patentability are met, the first inventor to file a patent application generally will be entitled to the patent on an invention regardless of whether another inventor had made the invention earlier. These provisions also allow third-party submission of prior art to the USPTO during patent prosecution and set forth additional procedures to challenge the validity of a patent by the USPTO administered post grant proceedings, including derivation, reexamination, inter partes review, post-grant review and interference proceedings. The USPTO developed additional regulations and procedures to govern administration of the Leahy-Smith Act, and many of the substantive changes to patent law associated with the Leahy-Smith Act, and, in particular, the first-to-file provisions, became effective on March 16, 2013. Accordingly, it is not clear what, if any, impact the Leahy-Smith Act will have on the operation of our business. The Leahy-

Smith Act and its implementation could increase the uncertainties and costs surrounding the prosecution of our owned or in-licensed patent applications and the enforcement or defense of our issued owned or in-licensed patents, all of which could have a material adverse impact on our business prospects and financial condition.

As referenced above, for example, courts in the U.S. continue to refine the heavily fact-and-circumstance-dependent jurisprudence defining the scope of patent protection available for therapeutic antibodies, narrowing the scope of patent protection available in certain circumstances or weakening the rights of patent owners in certain situations. This creates uncertainty about our ability to obtain patents in the future and the value of such patents. We cannot provide assurance that future developments in U.S. Congress, the federal courts and the USPTO will not adversely impact our owned or in-licensed patents or patent applications. The laws and regulations governing patents could change in unpredictable ways that could weaken our and our licensors' ability to obtain new patents or to enforce our existing owned or in-licensed patents and patents that we might obtain or in-license in the future. Similarly, changes in patent law and regulations in other countries or jurisdictions or changes in the governmental bodies that enforce them or changes in how the relevant governmental authority enforces patent laws or regulations may have a material adverse effect on our and our licensors' ability to obtain new patents or to protect and enforce our owned or in-licensed patents or patents that we may obtain or in-license in the future.

Other companies or organizations may challenge our or our licensors' patent rights or may assert patent rights that prevent us from developing and commercializing our current or future products.

As the field of antibody-based immunotherapeutics matures, patent applications are being processed by national patent offices around the world. There is uncertainty about which patents will issue, and, if they do, there is uncertainty as to when, to whom, and with what claims. In addition, third parties may attempt to invalidate our or our licensors' intellectual property rights. Even if such rights are not directly challenged, disputes could lead to the weakening of our or our licensors' intellectual property rights. Our defense against any attempt by third parties to circumvent or invalidate our intellectual property rights could be costly to us, could require significant time and attention of our management, and could have a material and adverse impact on our profitability, financial condition and prospects or ability to successfully compete.

There are many issued and pending patents that claim aspects of our current or potential future product candidates and modifications that we may need to apply to our current or potential future product candidates. There are also many issued patents that claim antibodies or portions of antibodies that may be relevant for products we wish to develop.

Further, we cannot guarantee that we are aware of all of patents and patent applications potentially relevant to our technology or products. We may not be aware of potentially relevant third-party patents or applications for several reasons. For example, U.S. applications filed before November 29, 2000, and certain U.S. applications filed after that date that will not be filed outside the U.S. remain confidential until patents issue. Patent applications in the United States and elsewhere are published approximately 18 months after the earliest filing for which priority is claimed, with such earliest filing date being commonly referred to as the priority date. Therefore, patent applications covering our product candidates or platform technologies could have been filed by others without our knowledge. Additionally, pending patent applications that have been published can, subject to certain limitations, be later amended in a manner that could cover our platform, our product candidates or the use of our technologies.

Thus, it is possible that one or more third parties will hold patent rights to which we will need a license, which may not be available on reasonable terms or at all. If such third parties refuse to grant us a license to such patent rights on reasonable terms or at all, we may be required to expend significant time and resources to redesign our technology, product candidates or the methods for manufacturing our product candidates, or to develop or license replacement technology, all of which may not be commercially or technically feasible. In such case, we may not be able to market such technology or product candidates and may not be able to perform research and development or other activities covered by these patents. This could have a material adverse effect on our ability to commercialize our product candidates and our business and financial condition.

We may not be able to protect our intellectual property rights throughout the world, which could negatively impact our business.

Filing, prosecuting and defending patents on current or future technologies or product candidates in all countries throughout the world would be prohibitively expensive. Competitors or other third parties may use our technologies in jurisdictions where we have not obtained patent protection to develop their own products and, further, may export infringing products to territories where we have patent protection or licenses but enforcement is not as strong as that in the United States. These products may compete with our products, and our patents or other intellectual property rights may not be effective or sufficient to prevent them from competing.

Additionally, the laws of some foreign jurisdictions do not protect intellectual property rights to the same extent as the laws in the United States. Many companies have encountered significant difficulties in protecting and defending such rights in such jurisdictions. The legal systems of certain countries, including certain developing countries, do not favor the enforcement of patents and other intellectual property protection, particularly those relating to biotechnology, which could make it difficult for us to stop the infringement of our owned and in-licensed patents or the marketing of competing products in violation of our intellectual property and proprietary rights generally. Proceedings to enforce our owned or in-licensed intellectual property and proprietary rights in foreign jurisdictions could result in substantial costs and could divert our efforts and attention from other aspects of our business. Such proceedings could also put our owned or in-licensed patents at risk of being invalidated or interpreted narrowly, could put our owned or in-licensed patent applications at risk of not issuing, and could provoke third parties to assert claims against us or our licensors. We or our licensors may not prevail in any lawsuits or other adversarial proceedings that we or our licensors initiate, and the damages or other remedies awarded, if any, may not be commercially meaningful. Accordingly, our and our licensors' efforts to enforce such intellectual property and proprietary rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop or in-license.

Further, many countries have compulsory licensing laws under which a patent owner may be compelled to grant licenses to third parties. In addition, many countries limit the enforceability of patents against government agencies or government contractors. In these countries, the patent owner may have limited remedies, which could materially diminish the value of its patents. If we or any of our licensors are forced to grant a license to third parties with respect to any patents relevant to our business, our competitive position in the relevant jurisdiction may be impaired and our business prospects may be materially adversely affected.

Third parties may initiate legal proceedings alleging that we are infringing, misappropriating or violating their intellectual property rights, the outcome of which would be uncertain and could have a material adverse impact on the success of our business.

Our commercial success depends, in part, upon our ability or the ability of our potential future collaborators to develop, manufacture, market and sell our current or any future product candidates and to use our proprietary technologies without infringing, misappropriating or violating the proprietary and intellectual property rights of third parties. The biotechnology and pharmaceutical industries are characterized by extensive and complex litigation regarding patents and other intellectual property rights.

We or our licensors, or any future strategic partners, may be party to, or be threatened with, adversarial proceedings or litigation regarding intellectual property rights with respect to our current or any potential future product candidates and technologies, including derivation, reexamination, *inter partes* review, post-grant review or interference proceedings before the USPTO and similar proceedings in jurisdictions outside of the United States such as opposition proceedings. In some instances, we may be required to indemnify our licensors for the costs associated with any such adversarial proceedings or litigation. For example, we are obligated under our license agreement with Stanford University to indemnify, hold harmless and defend Stanford University for damages from any claim of any kind arising out of or related to the license agreement with Stanford University. Third parties may assert infringement claims against us, our licensors or our strategic partners based on existing patents or patents that may be granted in the future, regardless of their merit. There is a risk that third parties may choose to engage in litigation or other adversarial proceedings with us, our licensors or our strategic partners to enforce or otherwise assert their patent rights. Even if we believe such claims are without merit, a court of competent jurisdiction could hold that these third-party patents are valid, enforceable and infringed, which could have a material adverse impact on our ability to utilize our discovery platform or to commercialize our current or any future product candidates. In order to successfully challenge the validity of any such U.S. patent in federal court, we would need to overcome a presumption of validity by presenting clear and convincing evidence of invalidity. There is no assurance that a court of competent jurisdiction, even if presented with evidence we believe to be clear and convincing, would invalidate the claims of any such U.S. patent.

Further, we cannot guarantee that we will be able to successfully settle or otherwise resolve such adversarial proceedings or litigation. If we are unable to successfully settle future claims on terms acceptable to us, we may be required to engage in or to continue costly, unpredictable and time-consuming litigation and may be prevented from or experience substantial delays in marketing our product candidates. If we, or our licensors, or any future strategic partners are found to infringe, misappropriate or violate a third-party patent or other intellectual property rights, we could be required to pay damages, including treble damages and attorney's fees, if we are found to have willfully infringed. In addition, we, or our licensors, or any future strategic partners may choose to seek, or be required to seek, a license from a third party, which may not be available on commercially reasonable terms, if at all. Even if a license can be obtained on commercially reasonable terms, the rights may be non-exclusive, which could give our competitors access to the same technology or intellectual property rights licensed to us, and we could be required to make substantial licensing and royalty payments. We also could be forced, including by court order, to cease utilizing, developing, manufacturing and commercializing our discovery platform or product candidates deemed to be infringing. We may be forced to redesign current or future technologies or products. Any of the foregoing could have a material adverse effect on our ability to generate revenue or achieve profitability and possibly prevent us from generating revenue sufficient to sustain our operations.

In addition, we or our licensors may find it necessary to pursue claims or to initiate lawsuits to protect or enforce our owned or in-licensed patent or other intellectual property rights. The cost to us in defending or initiating any litigation or other proceeding relating to our owned or in-licensed patent or other intellectual property rights, even if resolved in our favor, could be substantial, and any litigation or other proceeding would divert our management's attention. Such litigation or proceedings could materially increase our operating losses and reduce the resources available for development activities or any future sales, marketing or distribution activities. Some of our competitors may be able to more effectively to sustain the costs of complex patent litigation because they have substantially greater resources. Uncertainties resulting from the initiation and continuation of patent litigation or other proceedings could delay our research and development efforts and materially limit our ability to continue our operations. Furthermore, because of the substantial amount of discovery required in connection with certain such proceedings, there is a risk that some of our confidential information could be compromised by disclosure. In addition, there could be public announcements of the results of hearings, motions or other interim proceedings or developments and if securities analysts or investors perceive these results to be negative, such announcements could have a material adverse effect on the price of our Class A common stock.

If we or our licensors were to initiate legal proceedings against a third party to enforce a patent covering one of our product candidates or our technology, the defendant could counterclaim that such patent is invalid or unenforceable. In patent litigation in the United States, defendant counterclaims alleging invalidity or unenforceability are commonplace. Grounds for a validity challenge could be an alleged failure to meet any of several statutory requirements, for example, claiming patent-ineligible subject matter, lack of novelty, indefiniteness, lack of written description, non-enablement, anticipation or obviousness. Grounds for an unenforceability assertion could be an allegation that someone connected with prosecution of the patent withheld relevant information from the USPTO or made a misleading statement during prosecution. The outcome of such invalidity and unenforceability claims is unpredictable. With respect to the validity question, for example, we cannot be certain that there is no invalidating prior art of which we or our licensors and the patent examiner were unaware during prosecution. If a defendant were to prevail on a legal assertion of invalidity or unenforceability, we could lose at least part, and perhaps all, of the patent protection for one or more of our product candidates or certain aspects of our platform technology. Such a loss of patent protection could have a material adverse effect on our business, financial condition, results of operations and prospects. Patents and other intellectual property rights also will not protect our product candidates and technologies if competitors or third parties design around such product candidates and technologies without legally infringing, misappropriating or violating our owned or in-licensed patents or other intellectual property rights.

Intellectual property rights of third parties could adversely affect our ability to commercialize our current or future technologies or product candidates, and we might be required to litigate or obtain licenses from third parties to develop or market our current or future technologies or product candidates, which may not be available on commercially reasonable terms or at all.

Because the antibody landscape is still evolving, it is difficult to conclusively assess our freedom to operate without infringing, misappropriating or violating third-party rights. There are numerous companies that have pending patent applications and issued patents broadly covering antibodies generally or covering antibodies directed against the same targets as, or targets similar to, those we are pursuing. Our competitive position may materially suffer if patents issued to third parties or other third-party intellectual property rights cover our current or future technologies product candidates or elements thereof or our manufacture or uses relevant to our development plans. In such cases, we may not be in a position to develop or commercialize current or future technologies, product

candidates unless we successfully pursue litigation to nullify or invalidate the third-party intellectual property right concerned, or enter into a license agreement with the intellectual property right holder, if available on commercially reasonable terms. There may be issued patents of which we are not aware, held by third parties that, if found to be valid and enforceable, could be alleged to be infringed by our current or future technologies or product candidates. There also may be pending patent applications of which we are not aware that may result in issued patents, which could be alleged to be infringed by our current or future technologies or product candidates. If such an infringement claim should successfully be brought, we may be required to pay substantial damages or be forced to abandon our current or future technologies or product candidates or to seek a license from any patent holders. No assurances can be given that a license will be available on commercially reasonable terms, if at all.

Third party intellectual property right holders may also actively bring infringement, misappropriation or violation or other claims alleging violations of intellectual property rights against us. We cannot guarantee that we will be able to successfully settle or otherwise resolve such claims. If we are unable to successfully settle future claims on terms acceptable to us, we may be required to engage in or to continue costly, unpredictable and time-consuming litigation and may be prevented from or experience substantial delays in marketing our product candidates. If we fail in any such dispute, in addition to being forced to pay damages, we may be temporarily or permanently prohibited from commercializing any of our current or future technologies or product candidates that are held to be infringing, misappropriating or otherwise violating third-party intellectual property rights. We might, if possible, also be forced to redesign current or future technologies or product candidates so that we no longer infringe, misappropriate or violate the third-party intellectual property rights. Any of these events, even if we were ultimately to prevail, could require us to divert substantial financial and management resources that we would otherwise be able to devote to our business, which could have a material adverse effect on our financial condition and results of operations.

If we are unable to protect the confidentiality of our trade secrets, our business and competitive position would be harmed.

As referenced above, in addition to seeking patent protection for certain aspects of our current or future technologies and product candidates, we also consider trade secrets, including confidential and unpatented know-how, important to the maintenance of our competitive position. However, trade secrets and know-how can be difficult to protect. We protect and plan to protect trade secrets and confidential and unpatented know-how, in part, by entering into non-disclosure and confidentiality agreements with parties who have access to such knowledge, such as our employees, corporate collaborators, outside scientific collaborators, CROs, contract manufacturers, consultants, advisors and other third parties. We also enter into confidentiality and invention or patent assignment agreements with our employees and consultants under which they are obligated to maintain confidentiality and to assign their inventions to us. Despite these efforts, we may not obtain these agreements in all circumstances. Moreover, individuals with whom we have such agreements may not comply with their terms. Any of these parties may breach such agreements and disclose our proprietary information, including our trade secrets, and we may not be able to obtain adequate remedies for any such breaches. We may also become involved in inventorship disputes relating to inventions and patents developed by our employees or consultants under such agreements. Enforcing a claim that a party illegally disclosed or misappropriated a trade secret, or securing title to an employee- or consultant-developed invention if a dispute arises, is difficult, expensive and time-consuming, and the outcome is unpredictable. In addition, some courts in the United States and certain foreign jurisdictions disfavor or are unwilling to protect trade secrets. Further, if any of our trade secrets were to be lawfully obtained or independently developed by a competitor, we would

have no right to prevent that competitor from using the technology or information to compete with us. If any of our trade secrets were to be disclosed to or independently developed by a competitor, our competitive position would be materially and adversely harmed.

We may be subject to claims that we or our employees or consultants have wrongfully used or disclosed alleged trade secrets or other proprietary information of our employees' or consultants' former employers or their clients.

Many of our employees or consultants and our licensors' employees or consultants were previously employed at universities or biotechnology or biopharmaceutical companies, including our competitors or potential competitors. We may be subject to claims that one or more of these employees or consultants or we have inadvertently or otherwise used or disclosed trade secrets or other proprietary information of former employers. Litigation or arbitration may be necessary to defend against these claims. If we fail in defending such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel or may be enjoined from using such intellectual property. Any such proceedings and possible aftermath would likely divert significant resources from our core business, including distracting our technical and management personnel from their normal responsibilities. A loss of key research personnel or their work product could limit our ability to commercialize, or prevent us from commercializing, our current or future technologies or product candidates, which could materially harm our business. Even if we are successful in defending against any such claims, litigation or arbitration could result in substantial costs and could be a distraction to management.

Obtaining and maintaining our patent protection depends on compliance with various procedural, document submission, fee payment and other requirements imposed by government patent agencies, and our patent protection could be reduced or eliminated for non-compliance with these requirements.

Periodic maintenance fees, renewal fees, annuity fees and various other government fees on patents or applications will be due to be paid to the USPTO and various government patent agencies outside of the United States over the lifetime of our owned and in-licensed patents or applications and any patent rights we may own or in-license in the future. The USPTO and various non-U.S. government patent agencies require compliance with several procedural, documentary, fee payment and other similar provisions during the patent application process. We employ reputable law firms and other professionals to help us comply with these requirements, and we are also dependent on our licensors to take the necessary action to comply with these requirements with respect to our in-licensed intellectual property. In many cases, an inadvertent lapse can be cured by payment of a late fee or by other means in accordance with the applicable rules. There are situations, however, in which non-compliance can result in abandonment or lapse of the patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. In such an event, potential competitors might be able to enter the market with similar or identical products or platforms, which could have a material adverse effect on our business prospects and financial condition.

If our trademarks and trade names are not adequately protected, then we may not be able to build name recognition in our markets of interest and our business may be adversely affected.

Our trademarks or trade names may be challenged, infringed, circumvented, declared generic or determined to be infringing on other marks. We may not be able to protect our rights to these trademarks and trade names or may be forced to stop using these names, which we use for name recognition by potential partners or customers in our markets of interest. If we are unable to

establish name recognition based on our trademarks and trade names, we may not be able to compete effectively and our business may be materially adversely affected.

Intellectual property rights do not necessarily address all potential threats to our business.

The degree of future protection afforded by our intellectual property rights is uncertain because intellectual property rights have limitations, and may not adequately protect our business. The following examples are illustrative:

- § others may be able to make compounds or formulations that are similar to our product candidates, but that are not covered by the claims of any patents that we own, license or control;
- § we or any strategic partners might not have been the first to make the inventions covered by the issued patents or pending patent applications that we own, license or control;
- § we or our licensors might not have been the first to file patent applications covering certain of our owned and in-licensed inventions;
- § others may independently develop the same, similar, or alternative technologies without infringing, misappropriating or violating our owned or in-licensed intellectual property rights;
- § it is possible that our owned or in-licensed pending patent applications will not lead to issued patents;
- § issued patents that we own, in-license, or control may not provide us with any competitive advantages, or may be narrowed or held invalid or unenforceable, including as a result of legal challenges;
- § our competitors might conduct research and development activities in the United States and other countries that provide a safe harbor from patent infringement claims for certain research and development activities, as well as in countries where we do not have patent rights, and may then use the information learned from such activities to develop competitive products for sale in our major commercial markets;
- § we may choose not to file a patent in order to maintain certain trade secrets or know-how, and a third party may subsequently file a patent covering such trade secrets or know-how; and
- § the patents of others may have an adverse effect on our business.

Should any of these events occur, they could have a material adverse impact on our business and financial condition.

Risks Related to Government Regulation

Clinical development includes a lengthy and expensive process with an uncertain outcome, and results of earlier studies and trials may not be predictive of future trial results.

Our only product candidate, ATRC-101, is in preclinical development and its risk of failure is high. It is impossible to predict when or if ATRC-101 or any potential future product candidates will prove effective and safe in humans or will receive regulatory approval. Before obtaining marketing approval from regulatory authorities for the sale of any product candidate, we must complete preclinical studies and then conduct extensive clinical trials to demonstrate the safety and efficacy of that product candidate in humans. Clinical testing is expensive and can take many years to complete, and its outcome is inherently uncertain. Failure can occur at any time during the development process. The results of preclinical studies and early clinical trials of any of our current or potential future product candidates may not be predictive of the results of later-stage clinical trials. Product candidates in later stages of clinical trials may fail to show the desired safety and efficacy traits despite having progressed through preclinical studies and initial clinical trials. A number of

companies in the pharmaceutical industry have suffered significant setbacks in advanced clinical trials due to lack of efficacy or safety profiles, notwithstanding promising results in earlier trials.

We expect to prepare and submit to the FDA an IND for ATRC-101 in late 2019, and we expect to initiate a Phase 1b clinical trial for ATRC-101 in patients with solid tumors in early 2020. Commencing this clinical trial is subject to finalizing the trial design and filing an IND with the FDA. Even after we file our IND, the FDA could disagree that we have satisfied their requirements to commence our clinical trials or disagree with our study design, which may require us to complete additional preclinical studies or amend our protocols or impose stricter conditions on the commencement of clinical trials.

We may experience delays in completing our preclinical studies and initiating or completing clinical trials of ATRC-101 or potential future product candidates. We do not know whether planned preclinical studies and clinical trials will be completed on schedule or at all, or whether planned clinical trials will begin on time, need to be redesigned, enroll patients on time or be completed on schedule, if at all. Our development programs may be delayed for a variety of reasons, including delays related to:

- the FDA or other regulatory authorities requiring us to submit additional data or imposing other requirements before permitting us to initiate a clinical trial;
- obtaining regulatory approval to commence a clinical trial;
- reaching agreement on acceptable terms with prospective CROs and clinical trial sites, the terms of which can be subject to extensive negotiation and may vary significantly among different CROs and clinical trial sites;
- obtaining institutional review board, or IRB, approval at each clinical trial site;
- recruiting suitable patients to participate in a clinical trial;
- having patients complete a clinical trial or return for post-treatment follow-up;
- clinical trial sites deviating from trial protocol or dropping out of a trial;
- adding new clinical trial sites; or
- manufacturing sufficient quantities of our product candidates for use in clinical trials.

Furthermore, we expect to rely on our CROs and clinical trial sites to ensure the proper and timely conduct of our clinical trials and, while we expect to enter into agreements governing their committed activities, we have limited influence over their actual performance.

We could encounter delays if prescribing physicians encounter unresolved ethical issues associated with enrolling patients in clinical trials of our current or potential future product candidates in lieu of prescribing existing treatments that have established safety and efficacy profiles. Further, a clinical trial may be suspended or terminated by us, our partners, the IRBs of the institutions in which such trials are being conducted, the Data Safety Monitoring Board for such trial or by the FDA or other regulatory authorities due to a number of factors, including failure to conduct the clinical trial in accordance with regulatory requirements or our clinical protocols, inspection of the clinical trial operations or trial site by the FDA or other regulatory authorities resulting in the imposition of a clinical hold, unforeseen safety issues or adverse side effects, failure to demonstrate a benefit from using a drug or therapeutic biologic, changes in governmental regulations or administrative actions or lack of adequate funding to continue the clinical trial. If we experience delays in the completion of, or termination of, any clinical trial of any of our current or potential future product candidates, the commercial prospects of such product candidate will be harmed, and our ability to generate product revenue from such product candidates will be delayed. In addition, any delays in completing our clinical trials will increase our costs, slow our product development and approval process and jeopardize our ability to commence product sales and generate revenue. Any of these occurrences

may materially and adversely affect our business, financial condition, results of operations and prospects. In addition, many of the factors that cause, or lead to, a delay in the commencement or completion of clinical trials may also ultimately lead to the denial of regulatory approval of our current or potential future product candidates.

We may be unable to obtain U.S. or foreign regulatory approval and, as a result, be unable to commercialize ATRC-101 or potential future product candidates.

ATRC-101 and any potential future product candidates are subject to extensive governmental regulations relating to, among other things, research, testing, development, manufacturing, safety, efficacy, approval, recordkeeping, reporting, labeling, storage, packaging, advertising and promotion, pricing, marketing and distribution of drugs and therapeutic biologics. Rigorous preclinical testing and clinical trials and an extensive regulatory approval process are required to be successfully completed in the U.S. and in many foreign jurisdictions before a new drug or therapeutic biologic can be marketed. Satisfaction of these and other regulatory requirements is costly, time-consuming, uncertain and subject to unanticipated delays. It is possible that none of the product candidates we may develop will obtain the regulatory approvals necessary for us or our potential future partners to begin selling them.

We have very limited experience in conducting and managing the clinical trials necessary to obtain regulatory approvals, including approval by the FDA. The time required to obtain FDA and other approvals is unpredictable but typically takes many years following the commencement of clinical trials, depending upon the type, complexity and novelty of the product candidate. The standards that the FDA and its foreign counterparts use when regulating us require judgment and can change, which makes it difficult to predict with certainty how they will be applied. Any analysis we perform of data from preclinical and clinical activities is subject to confirmation and interpretation by regulatory authorities, which could delay, limit or prevent regulatory approval. We may also encounter unexpected delays or increased costs due to new government regulations, for example, from future legislation or administrative action, or from changes in FDA policy during the period of product development, clinical trials and FDA regulatory review. It is impossible to predict whether legislative changes will be enacted, or whether FDA or foreign regulations, guidance or interpretations will be changed, or what the impact of such changes, if any, may be.

Because ATRC-101 or potential future product candidates we are developing may work through mechanisms of action or work against targets with which the FDA has limited early experience, the FDA and its foreign counterparts have not yet established any definitive policies, practices or guidelines in relation to these product candidates. While we believe these product candidates are regulated as therapeutic biologics that are subject to requirements for review and approval of a Biologics License Application, or BLA, by the FDA, the lack of policies, practices or guidelines may hinder or slow review by the FDA of any regulatory filings that we may submit. Moreover, the FDA may respond to these submissions by defining requirements we may not have anticipated. Such responses could lead to significant delays in the clinical development of these product candidates, including ATRC-101. In addition, because there may be approved treatments for some of the diseases for which we may seek approval, in order to receive regulatory approval, we may need to demonstrate through clinical trials that the current or potential future product candidates we develop to treat these diseases, if any, are not only safe and effective, but safer or more effective than existing products.

Any delay or failure in obtaining required approvals could have a material and adverse effect on our ability to generate revenue from the particular product candidate for which we are seeking approval. Further, we and our potential future partners may never receive approval to market and commercialize any product candidate. Even if we or a potential future partner obtains regulatory approval, the approval may be for targets, disease indications or patient populations that are not as broad as we intended or desired or may require labeling that includes significant use or distribution restrictions or safety warnings. We or a potential future partner may be subject to post-marketing testing requirements to maintain regulatory approval. If ATRC-101 or any of our potential future product candidates prove to be ineffective, unsafe or commercially unviable, we may have to re-engineer ATRC-101 or our potential future product candidates, and our entire pipeline could have little, if any, value, which could require us to change our focus and approach to antibody discovery and development, which would have a material and adverse effect on our business, financial condition, results of operations and prospects.

We are also subject to numerous foreign regulatory requirements governing, among other things, the conduct of clinical trials, manufacturing and marketing authorization, pricing and third-party reimbursement. The foreign regulatory approval process varies among countries and may include all of the risks associated with FDA approval described above as well as risks attributable to the satisfaction of local regulations in foreign jurisdictions. Moreover, the time required to obtain approval may differ from that required to obtain FDA approval. Approval by the FDA does not ensure approval by regulatory authorities outside the United States and vice versa.

Even if we receive regulatory approval for any of our current or potential future product candidates, we will be subject to ongoing regulatory obligations and continued regulatory review, which may result in significant additional expense. Additionally, our current or potential future product candidates, if approved, could be subject to labeling and other restrictions and market withdrawal and we may be subject to penalties if we fail to comply with regulatory requirements or experience unanticipated problems with our products.

Any regulatory approvals that we or potential future partners obtain for ATRC-101 or any potential future product candidate may also be subject to limitations on the approved indicated uses for which a product may be marketed or to the conditions of approval, or contain requirements for potentially costly post-marketing testing, including "Phase 4" clinical trials, and surveillance to monitor the safety and efficacy of such product candidate. In addition, if the FDA or other regulatory authority approves ATRC-101 or any potential future product candidate, the manufacturing processes, labeling, packaging, distribution, adverse event reporting, storage, import, export, advertising, promotion and recordkeeping for such product will be subject to extensive and ongoing regulatory requirements. These requirements include submissions of safety and other post-marketing information and reports, registration, as well as continued compliance with cGMP and good clinical practices for any clinical trials that we conduct post-approval. Later discovery of previously unknown problems with a product, including adverse events of unanticipated severity or frequency, or with our third-party manufacturers or manufacturing processes, or failure to comply with regulatory requirements, may result in, among other things:

- restrictions on the marketing or manufacturing of the product, withdrawal of the product from the market or voluntary or mandatory product recalls;
- fines, warning letters or holds on clinical trials;
- refusal by the FDA to approve pending applications or supplements to approved applications filed by us or our strategic partners;
- suspension or revocation of product license approvals;

- product seizure or detention or refusal to permit the import or export of products; and
- injunctions or the imposition of civil or criminal penalties.

The FDA's policies may change and additional government regulations may be enacted that could prevent, limit or delay regulatory approval of our product candidates. We cannot predict the likelihood, nature or extent of government regulation that may arise from future legislation or administrative action, either in the United States or abroad. If we are slow or unable to adapt to changes in existing requirements or the adoption of new requirements or policies, or if we are not able to maintain regulatory compliance, we may lose any marketing approval that we may have obtained and we may not achieve or sustain profitability, which would adversely affect our business.

We may attempt to secure approval from the FDA through the use of accelerated registration pathways. If unable to obtain approval under an accelerated pathway, we may be required to conduct additional preclinical studies or clinical trials which could increase the expense of obtaining, reduce the likelihood of obtaining or delay the timing of obtaining, necessary marketing approvals. Even if we receive accelerated approval from the FDA, if our confirmatory trials do not verify clinical benefit, or if we do not comply with rigorous post-marketing requirements, the FDA may seek to withdraw accelerated approval.

We may seek an accelerated approval development pathway for our product candidates, including ATRC-101. Under the accelerated approval provisions of the Federal Food, Drug, and Cosmetic Act, or the FDCA, and the FDA's implementing regulations, the FDA may grant accelerated approval to a product designed to treat a serious or life-threatening condition that provides meaningful therapeutic advantage over available therapies and demonstrates an effect on a surrogate endpoint or intermediate clinical endpoint that is reasonably likely to predict clinical benefit. The FDA considers a clinical benefit to be a positive therapeutic effect that is clinically meaningful in the context of a given disease. For the purposes of accelerated approval, a surrogate endpoint is a marker, such as a laboratory measurement, radiographic image, physical sign or other measure that is thought to predict clinical benefit but is not itself a measure of clinical benefit. An intermediate clinical endpoint is a clinical endpoint that can be measured earlier than an effect on irreversible morbidity or mortality that is reasonably likely to predict an effect on irreversible morbidity or mortality or other clinical benefit. The accelerated approval development pathway may be used in cases in which the advantage of a new drug over available therapy may not be a direct therapeutic advantage, but is a clinically important improvement from a patient and public health perspective. If granted, accelerated approval is contingent on the sponsor's agreement to conduct, in a diligent manner, additional post-approval confirmatory studies to verify and describe the drug's clinical profile or risks and benefits for accelerated approval. The FDA may require that any such confirmatory study be initiated or substantially underway prior to the submission of an application for accelerated approval. If such post-approval studies fail to confirm the drug's clinical profile or risks and benefits, the FDA may withdraw its approval of the drug.

If we choose to pursue accelerated approval, we intend to seek feedback from the FDA or will otherwise evaluate our ability to seek and receive such accelerated approval. There can be no assurance that, after our evaluation of the feedback from the FDA or other factors, we will decide to pursue or submit a BLA for accelerated approval or any other form of expedited development, review or approval. Furthermore, if we submit an application for accelerated approval, there can be no assurance that such application will be accepted or that approval will be granted on a timely basis, or at all. The FDA also could require us to conduct further studies or trials prior to considering our application or granting approval of any type. We might not be able to fulfill the FDA's requirements in a timely manner, which would cause delays, or approval might not be granted because our submission is deemed incomplete by the FDA.

Even if we receive accelerated approval from the FDA, we will be subject to rigorous post-marketing requirements, including the completion of confirmatory post-market clinical trials to verify the clinical benefit of the product, and submission to the FDA of all promotional materials prior to their dissemination. The FDA could seek to withdraw accelerated approval for multiple reasons, including if we fail to conduct any required post-market study with due diligence; a post-market study does not confirm the predicted clinical benefit; other evidence shows that the product is not safe or effective under the conditions of use; or we disseminate promotional materials that are found by the FDA to be false and misleading.

A failure to obtain accelerated approval or any other form of expedited development, review or approval for a product candidate that we may choose to develop would result in a longer time period prior to commercializing such product candidate, could increase the cost of development of such product candidate and could harm our competitive position in the marketplace.

Healthcare legislative reform measures may have a material adverse effect on our business and results of operations.

In the United States, there have been and continue to be a number of legislative initiatives to contain healthcare costs. For example, in March 2010, the Patient Protection and Affordable Care Act, or the ACA, was enacted, which substantially changed the way healthcare is financed by both governmental and private insurers, and significantly impacted the U.S. pharmaceutical industry. Among the provisions of the ACA, of greatest importance to the pharmaceutical and biotechnology industry are the following:

- an annual, nondeductible fee on any entity that manufactures or imports certain specified branded prescription drugs and biologic agents apportioned among these entities according to their market share in some government healthcare programs;
- an increase in the statutory minimum rebates a manufacturer must pay under the Medicaid Drug Rebate Program to 23.1% and 13% of the average manufacturer price for most branded and generic drugs, respectively, and capped the total rebate amount for innovator drugs at 100% of the Average Manufacturer Price (AMP);
- a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for certain drugs and biologics that are inhaled, infused, instilled, implanted or injected;
- extension of manufacturers' Medicaid rebate liability to covered drugs dispensed to individuals who are enrolled in Medicaid managed care organizations;
- expansion of eligibility criteria for Medicaid programs by, among other things, allowing states to offer Medicaid coverage to additional individuals and by adding new mandatory eligibility categories for individuals with income at or below 133% of the federal poverty level, thereby potentially increasing manufacturers' Medicaid rebate liability;
- a new Medicare Part D coverage gap discount program, in which manufacturers must agree to offer 50% (and 70% as of January 1, 2019) point-of-sale discounts off negotiated prices of applicable brand drugs to eligible beneficiaries during their coverage gap period, as a condition for the manufacturer's outpatient drugs to be covered under Medicare Part D;
- expansion of the entities eligible for discounts under the Public Health program;
- a new Patient-Centered Outcomes Research Institute to oversee, identify priorities in, and conduct comparative clinical effectiveness research, along with funding for such research;
- establishment of a Center for Medicare Innovation at CMS to test innovative payment and service delivery models to lower Medicare and Medicaid spending; and
- implementation of the federal physician payment transparency requirements, sometimes referred to as the "Physician Payments Sunshine Act".

Some of the provisions of the ACA have yet to be fully implemented, and there have been legal and political challenges to certain aspects of the ACA. Since January 2017, President Trump has signed two executive orders and other directives designed to delay, circumvent, or loosen certain requirements mandated by the ACA. Concurrently, Congress has considered legislation that would repeal or repeal and replace all or part of the ACA. While Congress has not passed comprehensive repeal legislation, two bills affecting the implementation of certain taxes under the ACA have been signed into law. The Tax Cuts and Jobs Act of 2017, or the Tax Act, includes a provision that repealed, effective January 1, 2019, the tax-based shared responsibility payment imposed by the ACA on certain individuals who fail to maintain qualifying health coverage for all or part of a year, that is commonly referred to as the "individual mandate." Additionally, on January 22, 2018, President Trump signed a continuing resolution on appropriations for fiscal year 2018 that delayed the implementation of certain ACA-mandated fees, including the so-called "Cadillac" tax on certain high cost employer-sponsored insurance plans, the annual fee imposed on certain health insurance providers based on market share, and the medical device excise tax on non-exempt medical devices. Further, the Bipartisan Budget Act of 2018 (BBA), among other things, amended the ACA, effective January 1, 2019, to close the coverage gap in most Medicare drug plans, commonly referred to as the "donut hole." In July 2018, CMS published a final rule permitting further collections and payments to and from certain ACA qualified health plans and health insurance issuers under the ACA risk adjustment program in response to the outcome of federal district court litigation regarding the method CMS uses to determine this risk adjustment. On December 14, 2018, a U.S. District Court Judge in the Northern District of Texas ruled that the individual mandate is an inseverable feature of the ACA, and therefore, because it was repealed as part of the Tax Act, the remaining provisions of the ACA are invalid as well. While the Texas U.S. District Court Judge, as well as the Trump Administration and CMS have stated that the ruling will have no immediate effect, it is unclear how this decision, subsequent appeals, and other efforts to repeal and replace the ACA will impact the ACA and our business.

In addition, other legislative changes have been proposed and adopted in the United States since the ACA was enacted. On August 2, 2011, the Budget Control Act of 2011 among other things, created measures for spending reductions by Congress. A Joint Select Committee on Deficit Reduction, tasked with recommending a targeted deficit reduction of at least $1.2 trillion for the years 2013 through 2021, was unable to reach required goals, thereby triggering the legislation's automatic reduction to several government programs. This includes aggregate reductions of Medicare payments to providers of 2% per fiscal year. These reductions went into effect on April 1, 2013 and, due to subsequent legislative amendments to the statute, will remain in effect through 2027 unless additional Congressional action is taken. On January 2, 2013, the American Taxpayer Relief Act of 2012 was signed into law, which, among other things, further reduced Medicare payments to several types of providers. Additionally, there has been heightened governmental scrutiny recently over the manner in which manufacturers set prices for their marketed products. For example, there have been several recent Congressional inquiries and proposed and enacted federal and state legislation designed to, among other things, bring more transparency to drug pricing, review the relationship between pricing and manufacturer patient programs, and reform government program reimbursement methodologies for drug products. At the federal level, the Trump administration's budget proposal for fiscal year 2019 contains further drug price control measures that could be enacted during the 2019 budget process or in other future legislation, including, for example, measures to permit Medicare Part D plans to negotiate the price of certain drugs under Medicare Part B, to allow some states to negotiate drug prices under Medicaid, and to eliminate cost sharing for generic drugs for low-income patients. Further, the Trump administration released a "Blueprint" to lower drug prices and reduce out of pocket costs of drugs that contains additional proposals to increase manufacturer competition, increase the negotiating power of certain federal healthcare programs, incentivize manufacturers to lower the list price of their products and reduce

the out of pocket costs of drug products paid by consumers. In addition, on January 31, 2019, the HHS Office of Inspector General, proposed modifications to the federal Anti-Kickback Statute discount safe harbor for the purpose of reducing the cost of drug products to consumers which, among other things, if finalized, will affect discounts paid by manufacturers to Medicare Part D plans, Medicaid managed care organizations and pharmacy benefit managers working with these organizations. Although a number of these, and other potential, proposals will require additional authorization to become effective, Congress and the executive branch have each indicated that it will continue to seek new legislative or administrative measures to control drug costs. At the state level, legislatures have increasingly passed legislation and implemented regulations designed to control pharmaceutical and biological product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures and, in some cases, designed to encourage importation from other countries and bulk purchasing. These new laws and initiatives may result in additional reductions in Medicare and other healthcare funding, which could have a material adverse effect on our future customers and accordingly, our financial operations.

We expect that additional state and federal healthcare reform measures will be adopted in the future, any of which could limit the amounts that federal and state governments will pay for healthcare products and services, which could result in reduced demand for our product candidates or additional pricing pressures.

If we or potential future partners, manufacturers or service providers fail to comply with healthcare laws and regulations, we or they could be subject to enforcement actions, which could affect our ability to develop, market and sell our products and may harm our reputation.

Healthcare providers, physicians and third-party payors, among others, will play a primary role in the prescription and recommendation of any product candidates for which we obtain marketing approval. Our current and future arrangements with third-party payors, providers and customers, among others, may expose us to broadly applicable fraud and abuse and other healthcare laws and regulations that may constrain the business or financial arrangements and relationships through which we market, sell and distribute our product candidates for which we obtain marketing approval. Restrictions under applicable federal and state healthcare laws and regulations, include the following:

- the federal Anti-Kickback Statute, which prohibits, among other things, a person or entity from knowingly and willfully soliciting, offering, paying, receiving or providing remuneration, directly or indirectly, in cash or in kind, to induce or reward either the referral of an individual for, or the purchase, lease order, arranging for or recommendation of, any good, facility, item or service, for which payment may be made, in whole or in part, by a federal healthcare program, such as Medicare or Medicaid. A person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation. In addition, a violation of the Anti-Kickback Statute can form the basis for a violation of the federal False Claims Act (discussed below);
- federal civil and criminal false claims laws and civil monetary penalties laws, including the federal False Claims Act, which provides for civil whistleblower or qui tam actions, that impose penalties against individuals or entities for knowingly presenting, or causing to be presented, to the federal government, claims for payment that are false or fraudulent or making a false statement to avoid, decrease or conceal an obligation to pay money to the federal government. In addition, the government may assert that a claim including items and services resulting from a referral made in violation of the federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the False Claims Act;

- HIPAA, which imposes criminal and civil liability for executing a scheme to defraud any healthcare benefit program, or knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false statement in connection with the delivery of or payment for healthcare benefits, items or services. Similar to the federal Anti-Kickback Statute, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation;
- HIPAA, as amended by HITECH, and its implementing regulations, including the Final Omnibus Rule published in January 2013, which impose obligations on certain covered entity healthcare providers, health plans, and healthcare clearinghouses as well as their business associates that perform certain services involving the use or disclosure of individually identifiable health information, including mandatory contractual terms, with respect to safeguarding the privacy, security and transmission of individually identifiable health information, and require notification to affected individuals and regulatory authorities of certain breaches of security of individually identifiable health information;
- the federal false statements statute, which prohibits knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false statement in connection with the delivery of or payment for healthcare benefits, items or services;
- the federal transparency requirements known as the federal Physician Payments Sunshine Act, created as part of ACA, which requires certain manufacturers of drugs, devices, biologics and medical supplies for which payment is available under Medicare, Medicaid or the Children's Health Insurance Program to report annually to CMS information related to payments and other transfers of value made by that entity to physicians and teaching hospitals, as well as ownership and investment interests held by physicians and their immediate family members; and
- analogous local, state and foreign laws and regulations, such as state anti-kickback and false claims laws that may apply to healthcare items or services reimbursed by third party payors, including private insurers; local, state and foreign transparency laws that require manufacturers to report information related to payments and transfers of value to other healthcare providers and healthcare entities, marketing expenditures, or drug pricing; state laws that require pharmaceutical companies to register certain employees engaged in marketing activities in the location and comply with the pharmaceutical industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government; and state and foreign laws governing the privacy and security of health information in certain circumstances, many of which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts.

Ensuring that our future business arrangements with third parties comply with applicable healthcare laws and regulations could involve substantial costs. If our operations are found to be in violation of any such requirements, we may be subject to penalties, including criminal and significant civil monetary penalties, damages, fines, individual imprisonment, disgorgement, contractual damages, reputational harm, exclusion from participation in government healthcare programs, integrity obligations, injunctions, recall or seizure of products, total or partial suspension of production, denial or withdrawal of pre-marketing product approvals, private qui tam actions brought by individual whistleblowers in the name of the government, refusal to allow us to enter into supply contracts, including government contracts, additional reporting requirements and oversight if subject to a corporate integrity agreement or similar agreement to resolve allegations of non-compliance with these laws, and the curtailment or restructuring of our operations, any of which could adversely affect our ability to operate our business and our results of operations. Although effective compliance programs can mitigate the risk of investigation and prosecution for violations of these laws, these risks cannot be entirely eliminated. Any action against us for an alleged or suspected violation could cause us to incur significant legal expenses and could divert our management's attention from the

operation of our business, even if our defense is successful. In addition, achieving and sustaining compliance with applicable laws and regulations may be costly to us in terms of money, time and resources.

If we fail to comply with U.S. and foreign regulatory requirements, regulatory authorities could limit or withdraw any marketing or commercialization approvals we may receive and subject us to other penalties that could materially harm our business.

Even if we receive marketing and commercialization approval of a product candidate, we will be subject to continuing regulatory requirements, including in relation to adverse patient experiences with the product and clinical results that are reported after a product is made commercially available, both in the United States and any foreign jurisdiction in which we seek regulatory approval. The FDA has significant post-market authority, including the authority to require labeling changes based on new safety information and to require post-market studies or clinical trials to evaluate safety risks related to the use of a product or to require withdrawal of the product from the market. The FDA also has the authority to require a Risk Evaluation and Mitigation Strategy, or a REMS, after approval, which may impose further requirements or restrictions on the distribution or use of an approved drug or therapeutic biologic. The manufacturer and manufacturing facilities we use to make a future product, if any, will also be subject to periodic review and inspection by the FDA and other regulatory agencies, including for continued compliance with cGMP requirements. The discovery of any new or previously unknown problems with our third party manufacturers, manufacturing processes or facilities may result in restrictions on the product, manufacturer or facility, including withdrawal of the product from the market. We intend to rely on third-party manufacturers and we will not have control over compliance with applicable rules and regulations by such manufacturers. Any product promotion and advertising will also be subject to regulatory requirements and continuing regulatory review. If we or our existing or future partners, manufacturers or service providers fail to comply with applicable continuing regulatory requirements in the U.S. or foreign jurisdictions in which we seek to market our products, we or they may be subject to, among other things, fines, warning letters, holds on clinical trials, delay of approval or refusal by the FDA to approve pending applications or supplements to approved applications, suspension or withdrawal of regulatory approval, product recalls and seizures, administrative detention of products, refusal to permit the import or export of products, operating restrictions, injunction, civil penalties and criminal prosecution.

Even if we are able to commercialize any product candidate, such product candidate may become subject to unfavorable pricing regulations or third-party coverage and reimbursement policies, which would harm our business.

Our ability to commercialize any products successfully will depend, in part, on the extent to which coverage and adequate reimbursement for these products and related treatments will be available from third-party payors, such as government authorities, private health insurers and health maintenance organizations. Patients who are prescribed medications for the treatment of their conditions generally rely on third-party payors to reimburse all or part of the costs associated with their prescription drugs. Coverage and adequate reimbursement from government healthcare programs, such as Medicare and Medicaid, and private health insurers are critical to new product acceptance. Patients are unlikely to use our future products, if any, unless coverage is provided and reimbursement is adequate to cover a significant portion of the cost.

Cost-containment is a priority in the U.S. healthcare industry and elsewhere. As a result, government authorities and other third party payors have attempted to control costs by limiting coverage and the amount of reimbursement for particular medications. Increasingly, third party payors are requiring that drug companies provide them with predetermined discounts from list prices

and are challenging the prices charged for medical products. Third-party payors also may request additional clinical evidence beyond the data required to obtain marketing approval, requiring a company to conduct expensive pharmacoeconomic studies in order to demonstrate the medical necessity and cost-effectiveness of its product. Commercial third-party payors often rely upon Medicare coverage policy and payment limitations in setting their reimbursement rates, but also have their own methods and approval process apart from Medicare determinations. Therefore, coverage and reimbursement for pharmaceutical products in the U.S. can differ significantly from payor to payor. We cannot be sure that coverage and adequate reimbursement will be available for any product that we commercialize and, if reimbursement is available, that the level of reimbursement will be adequate. Coverage and reimbursement may impact the demand for, or the price of, any product candidate for which we obtain marketing approval. If coverage and reimbursement are not available or are available only at limited levels, we may not be able to successfully commercialize any product candidate for which we obtain marketing approval.

Additionally, the regulations that govern regulatory approvals, pricing and reimbursement for new drugs and therapeutic biologics vary widely from country to country. Some countries require approval of the sale price of a drug or therapeutic biologic before it can be marketed. In many countries, the pricing review period begins after marketing approval is granted. In some foreign markets, prescription pharmaceutical pricing remains subject to continuing governmental control even after initial approval is granted. As a result, we might obtain regulatory approval for a product in a particular country, but then be subject to price regulations that delay our commercial launch of the product, possibly for lengthy time periods, and negatively impact the revenues we are able to generate from the sale of the product in that country. Adverse pricing limitations may hinder our ability to recoup our investment in one or more product candidates, even if our product candidates obtain regulatory approval.

We are subject to U.S. and foreign anti-corruption and anti-money laundering laws with respect to our operations and non-compliance with such laws can subject us to criminal or civil liability and harm our business.

We are subject to the U.S. Foreign Corrupt Practices Act of 1977, as amended, or the FCPA, the U.S. domestic bribery statute contained in 18 U.S.C. § 201, the U.S. Travel Act, the USA PATRIOT Act, and possibly other state and national anti-bribery and anti-money laundering laws in countries in which we conduct activities. Anti-corruption laws are interpreted broadly and prohibit companies and their employees, agents, third-party intermediaries, joint venture partners and collaborators from authorizing, promising, offering or providing, directly or indirectly, improper payments or benefits to recipients in the public or private sector. We interact with officials and employees of government agencies and government-affiliated hospitals, universities and other organizations. In addition, we may engage third-party intermediaries to promote our clinical research activities abroad or to obtain necessary permits, licenses and other regulatory approvals. We can be held liable for the corrupt or other illegal activities of these third party intermediaries, our employees, representatives, contractors, partners and agents, even if we do not explicitly authorize or have actual knowledge of such activities.

In connection with this offering, we have adopted a Code of Business Conduct and Ethics, which will be effective upon the closing of this offering, and expect to prepare and implement policies and procedures to ensure compliance with such code. The Code of Business Conduct and Ethics mandates compliance with the FCPA and other anti-corruption laws applicable to our business throughout the world. However, we cannot assure you that our employees and third-party intermediaries will comply with this code or such anti-corruption laws. Noncompliance with anti-corruption and anti-money laundering laws could subject us to whistleblower complaints,

investigations, sanctions, settlements, prosecution, other enforcement actions, disgorgement of profits, significant fines, damages, other civil and criminal penalties or injunctions, suspension or debarment from contracting with certain persons, the loss of export privileges, reputational harm, adverse media coverage and other collateral consequences. If any subpoenas, investigations or other enforcement actions are launched, or governmental or other sanctions are imposed, or if we do not prevail in any possible civil or criminal litigation, our business, results of operations and financial condition could be materially harmed. In addition, responding to any action will likely result in a materially significant diversion of management's attention and resources and significant defense and compliance costs and other professional fees. In certain cases, enforcement authorities may even cause us to appoint an independent compliance monitor which can result in added costs and administrative burdens.

Comprehensive tax reform bills could adversely affect our business and financial condition.

On December 20, 2017, the U.S. Congress passed the Tax Act, enacting comprehensive tax legislation that includes significant changes to the taxation of business entities. These changes include, among others: a permanent reduction to the corporate income tax rate; a partial limitation on the deductibility of business interest expense; a shift of the U.S. taxation of multinational corporations from a tax on worldwide income to a territorial system (along with certain rules designed to prevent erosion of the U.S. income tax base); and a one-time tax on accumulated offshore earnings held in cash and illiquid assets, with the latter taxed at a lower rate. Notwithstanding the reduction in the corporate income tax rate, the overall impact of this tax reform remains uncertain, and our business and financial condition could be adversely affected. This prospectus does not provide an in-depth discussion of any such tax legislation or the manner in which it might affect purchasers of our Class A common stock. We urge our stockholders to consult with their legal and tax advisors with respect to any such legislation and the potential tax consequences of investing in our Class A common stock.

Risks Related to Our Class A Common Stock and this Offering

Our quarterly operating results may fluctuate significantly or may fall below the expectations of investors or securities analysts, each of which may cause our stock price to fluctuate or decline.

We expect our operating results to be subject to quarterly fluctuations. Our net loss and other operating results will be affected by numerous factors, including:

- variations in the level of expense related to the ongoing development of our product candidates or future development programs;
- results of clinical trials, or the addition or termination of clinical trials or funding support by us or potential future partners;
- our execution of any collaboration, licensing or similar arrangements, and the timing of payments we may make or receive under potential future arrangements or the termination or modification of any such potential future arrangements;
- any intellectual property infringement, misappropriation or violation lawsuit or opposition, interference or cancellation proceeding in which we may become involved;
- additions and departures of key personnel;
- strategic decisions by us or our competitors, such as acquisitions, divestitures, spin-offs, joint ventures, strategic investments or changes in business strategy;
- if any of our product candidates receives regulatory approval, the terms of such approval and market acceptance and demand for such product candidates;
- regulatory developments affecting our product candidates or those of our competitors; and
- changes in general market and economic conditions.

If our quarterly operating results fall below the expectations of investors or securities analysts, the price of our Class A common stock could decline substantially. Furthermore, any quarterly fluctuations in our operating results may, in turn, cause the price of our stock to fluctuate substantially. We believe that quarterly comparisons of our financial results are not necessarily meaningful and should not be relied upon as an indication of our future performance.

Our stock price may be volatile and purchasers of our Class A common stock could incur substantial losses.

Our stock price is likely to be volatile. As a result of this volatility, investors may not be able to sell their Class A common stock at or above the initial public offering price. The market price for our Class A common stock may be influenced by many factors, including the other risks described in this section of the prospectus titled "Risk Factors" and the following:

- our ability to advance ATRC-101 or potential future product candidates into the clinic;
- results of preclinical studies and clinical trials of ATRC-101 or potential future product candidates, or those of our competitors or potential future partners;
- regulatory or legal developments in the United States and other countries, especially changes in laws or regulations applicable to our products;
- the success of competitive products or technologies;
- introductions and announcements of new products by us, our future commercialization partners, or our competitors, and the timing of these introductions or announcements;
- actions taken by regulatory agencies with respect to our products, clinical trials, manufacturing process or sales and marketing terms;
- actual or anticipated variations in our financial results or those of companies that are perceived to be similar to us;
- the success of our efforts to acquire or in-license additional technologies, products or product candidates;
- developments concerning any future collaborations, including, but not limited to, those with our sources of manufacturing supply and our commercialization partners;
- market conditions in the pharmaceutical and biotechnology sectors;
- announcements by us or our competitors of significant acquisitions, strategic partnerships, joint ventures or capital commitments;
- developments or disputes concerning patents or other proprietary rights, including patents, litigation matters and our ability to obtain patent protection for our products;
- our ability or inability to raise additional capital and the terms on which we raise it;
- the recruitment or departure of key personnel;
- changes in the structure of healthcare payment systems;
- actual or anticipated changes in earnings estimates or changes in stock market analyst recommendations regarding our Class A common stock, other comparable companies or our industry generally;
- our failure or the failure of our competitors to meet analysts' projections or guidance that we or our competitors may give to the market;
- fluctuations in the valuation of companies perceived by investors to be comparable to us;
- announcement and expectation of additional financing efforts;
- speculation in the press or investment community;
- trading volume of our Class A common stock;
- sales of our Class A common stock by us or our stockholders;
- the concentrated ownership of our Class A common stock;
- changes in accounting principles;
- terrorist acts, acts of war or periods of widespread civil unrest;

- natural disasters and other calamities; and
- general economic, industry and market conditions.

In addition, the stock markets in general, and the markets for pharmaceutical, biopharmaceutical and biotechnology stocks in particular, have experienced extreme volatility that has been often unrelated to the operating performance of the issuer. These broad market and industry factors may seriously harm the market price of our Class A common stock, regardless of our operating performance.

You will experience immediate and substantial dilution as a result of this offering and may experience additional dilution in the future.

If you purchase Class A common stock in this offering, assuming a public offering price of $17.00 per share, the midpoint of the range set forth on the cover of this prospectus, you will incur immediate and substantial dilution of $8.86 per share, representing the difference between the assumed initial public offering price of $17.00 per share and our pro forma net tangible book value per share as of March 31, 2019 after giving effect to this offering, the conversion of all outstanding shares of our Series A, Series B, and Series C1 convertible preferred stock into Class A common stock immediately upon the closing of this offering, the conversion of all outstanding shares of our Series C2 convertible preferred stock into Class B common stock immediately upon the closing of this offering and the exercise of one warrant subsequent to March 31, 2019. Moreover, we issued options, stock awards and warrants in the past to acquire Class A common stock and securities convertible into Class A common stock at prices significantly below the assumed initial public offering price. As of March 31, 2019, there were 2,587,996 shares of our Class A common stock subject to outstanding options, 49,997 shares of our Series A convertible preferred stock subject to outstanding warrants, 62,936 shares of our Class A common stock subject to an outstanding warrant and no shares of our Class B common stock outstanding. Subsequent to March 31, 2019, we granted options for 657,643 shares of our Class A common stock. To the extent that any of these outstanding securities are ultimately exercised or settled, you will incur further dilution.

The future issuance of equity or of debt securities that are convertible into equity would dilute our share capital.

We may choose to raise additional capital in the future, depending on market conditions, strategic considerations and operational requirements. To the extent that additional capital is raised through the issuance of shares or other securities convertible into shares, our stockholders will be diluted. Future issuances of our Class A common stock or other equity securities, or the perception that such sales may occur, could adversely affect the trading price of our Class A common stock and impair our ability to raise capital through future offerings of shares or equity securities. No prediction can be made as to the effect, if any, that future sales of Class A common stock or the availability of Class A common stock for future sales will have on the trading price of our Class A common stock.

The dual class structure of our common stock and the option of the holder of shares of our Class B common stock to convert into shares of our Class A common stock may limit your ability to influence corporate matters.

Our Class A common stock, which is the stock we are offering in this initial public offering, has one vote per share, while our Class B common stock is non-voting. Nonetheless, each share of our Class B common stock may be converted at any time into one share of Class A common stock at the option of its holder, subject to the limitations provided for in our amended and restated certificate of incorporation to become effective upon the closing of this offering. Consequently, if holders of

Class B common stock following this offering exercise their option to make this conversion, this will have the effect of increasing the relative voting power of those prior holders of our Class B common stock, and correspondingly decrease the voting power of the current holders of our Class A common stock, which may limit your ability to influence corporate matters. Because our Class B common stock is generally non-voting, stockholders who own more than 10% of our common stock overall but 10% or less of our Class A common stock will not be required to report changes in their ownership from transactions in our Class B common stock pursuant to Section 16(a) of the Securities Exchange Act of 1934, as amended, or the Exchange Act, and would not be subject to the short-swing profit provisions of Section 16(b) of the Exchange Act. In addition, acquisitions of Class B common stock would not be subject to notification pursuant to the Hart-Scott-Rodino Antitrust Improvements Act of 1976, as amended.

An active trading market for our Class A common stock may not develop.

Prior to this offering, there has been no public market for our Class A common stock. The initial public offering price for our Class A common stock will be determined through negotiations with the underwriters. Although we intend to apply to list our Class A common stock on The Nasdaq Global Market, an active trading market for our shares may never develop or be sustained following this offering. If an active market for our Class A common stock does not develop, it may be difficult for you to sell shares you purchase in this offering without depressing the market price for the shares or at all.

Because our management will have flexibility in allocating the net proceeds from this offering, you may not agree with how we use them and the proceeds may not be invested successfully.

We intend to use the net proceeds to us from this offering to fund preclinical and clinical development activities, further development of our discovery platform, discover new product candidates, hire additional personnel, make capital expenditures, pay costs of operating as a public company and fund other general purposes. We may also use a portion of the net proceeds from this offering to in-license, acquire or invest in complementary businesses, technologies, products or assets. However, we have no current commitments or obligations to do so. Therefore, our management will have flexibility in allocating the net proceeds from this offering. Accordingly, you will be relying on the judgment of our management with regard to the allocation of these net proceeds, and you will not have the opportunity, as part of your investment decision, to assess whether the proceeds are being allocated appropriately. It is possible that the proceeds will be invested in a way that does not yield a favorable, or any, return for our company.

If securities or industry analysts do not publish research or reports about our company, or if they issue an adverse or misleading opinion regarding our stock, our stock price and trading volume could decline.

The trading market for our Class A common stock will be influenced by the research and reports that industry or securities analysts publish about us or our business. We do not currently have and may never obtain research coverage by securities and industry analysts. If no or few securities or industry analysts commence coverage of our company, the trading price for our Class A common stock would be negatively impacted. In the event we obtain securities or industry analyst coverage, if any of the analysts who cover us issue an adverse or misleading opinion regarding us, our business model, our intellectual property rights or our Class A common stock performance, or if our target studies and operating results fail to meet the expectations of the analysts, our stock price would likely decline. If one or more of these analysts cease coverage of our company or fail to publish

reports on us regularly, we could lose visibility in the financial markets, which in turn could cause our stock price or trading volume to decline.

Our principal stockholders and management own a significant percentage of our stock and will be able to exert significant control over matters subject to stockholder approval.

Based on the beneficial ownership of our capital stock as of March 31, 2019, prior to this offering, our executive officers and directors, together with holders of 5% or more of our capital stock before this offering and their respective affiliates, beneficially owned approximately 70.1% of our Class A and Class B common stock on an as-converted basis without giving effect to any additional purchases by these holders pursuant to their indications of interest to purchase up to approximately $60 million of shares in the offering and assuming no exercise of the underwriters option to purchase additional shares and no exercise of outstanding options. As a result, these stockholders, if acting together, will continue to have significant influence over the outcome of corporate actions requiring stockholder approval, including the election of directors, any merger, consolidation or sale of all or substantially all of our assets and any other significant corporate transaction. In addition, pursuant to a nominating agreement between us and Baker Brothers Life Sciences L.P. and 667, L.P., or together, Baker Brothers, following the closing of this offering and so long as Baker Brothers together with its affiliates beneficially owns at least 3,333,333 shares of our common stock, we will have the obligation to support the nomination of, and to cause our board of directors to include in the slate of nominees recommended to our stockholders for election, two individuals designated by Baker Brothers, each a Baker Designee, subject to customary conditions and exceptions, as well as the obligation to invite two board of directors observer designees of Baker Brothers to attend all meetings of our board of directors and all meetings of the committees of our board of directors as a nonvoting observer, if there is no Baker Designee on our board of directors, subject to customary conditions and exceptions. For more information regarding this agreement, see the section titled "Certain Relationships and Related Person Transactions—Baker Brothers Nominating Agreement." Baker Brothers and its affiliates may therefore have influence over management and control over matters requiring stockholder approval, including the annual election of directors and significant corporate transactions, such as a merger or other sale of our company or its assets, following the closing of this offering and for the foreseeable future.

The interests of these stockholders may not be the same as, and may even conflict with, your interests. For example, these stockholders could delay or prevent a change of control of our company, even if such a change of control would benefit our other stockholders, which could deprive our stockholders of an opportunity to receive a premium for their Class A common stock as part of a sale of our company or our assets and might affect the prevailing market price of our Class A common stock. The significant concentration of stock ownership may adversely affect the trading price of our Class A common stock due to investors' perception that conflicts of interest may exist or arise.

Sales of a substantial number of shares of our Class A or Class B common stock by our existing stockholders in the public market could cause our stock price to fall.

If our existing stockholders sell, or indicate an intention to sell, substantial amounts of our Class A common stock in the public market after the lock-up and other legal restrictions on resale discussed in this prospectus lapse, the trading price of our Class A common stock could decline. Based on 2,123,257 shares of Class A common stock and no shares of Class B common stock outstanding at March 31, 2019, and after giving effect to the conversion of our outstanding Series A, Series B, Series C1 and Series C2 convertible preferred stock, immediately upon the closing of this offering we will have outstanding a total of 22,850,261 shares of Class A common stock and 3,934,191 shares of Class B common stock, assuming exercise of a warrant to purchase

62,936 shares of Class A common stock and no issuance of Class B common stock in connection with this offering. Of these shares, only the shares of Class A common stock sold in this offering by us, plus any shares sold upon exercise of the underwriters' option to purchase additional shares, will be freely tradable without restriction in the public market immediately following this offering.

We expect that the lock-up agreements pertaining to this offering will expire after 180 days from the date of this prospectus. Cowen and Company, LLC, Evercore Group L.L.C. and Stifel, Nicolaus & Company, Incorporated, however, may, in their sole discretion, permit our officers, directors and other stockholders who are subject to these lock-up agreements to sell shares prior to the expiration of the lock-up agreements. In addition, shares of Class A common stock that are either subject to outstanding options or reserved for future issuance under our 2019 Plan, will become eligible for sale in the public market to the extent permitted by the provisions of various vesting schedules, the lock-up agreements and Rule 144 and Rule 701 under the Securities Act of 1933, as amended, or the Securities Act. If these additional shares of Class A common stock are sold, or if it is perceived that they will be sold, in the public market, the trading price of our Class A common stock could decline.

After this offering, the holders of 17,248,259 shares of our Class A common stock (including Class A common stock issuable upon conversion of Class B common stock) at March 31, 2019 will be entitled to rights with respect to the registration of their shares under the Securities Act, subject to the 180-day lock-up agreements described above. See "Description of Capital Stock—Registration Rights". Registration of these shares under the Securities Act would result in the shares becoming freely tradable without restriction under the Securities Act, except for shares held by affiliates, as defined in Rule 144 under the Securities Act. Any sales of securities by these stockholders could have a material adverse effect on the trading price of our Class A common stock.

Future sales and issuances of our Class A or Class B common stock or rights to purchase Class A or Class B common stock, including pursuant to our 2019 Plan, could result in additional dilution of the percentage ownership of our stockholders and could cause our stock price to fall.

We expect that significant additional capital may be needed in the future to continue our planned operations, including further development of our discovery platform, preparing IND filings, conducting clinical trials, commercialization efforts, expanded research and development activities and costs associated with operating a public company. To raise capital, we may sell Class A or Class B common stock, convertible securities or other equity securities in one or more transactions at prices and in a manner we determine from time to time. If we sell Class A or Class B common stock, convertible securities or other equity securities, investors may be materially diluted by subsequent sales. Such sales may also result in material dilution to our existing stockholders, and new investors could gain rights, preferences and privileges senior to the holders of our Class A common stock, including shares of Class A common stock sold in this offering.

Pursuant to our 2019 Plan, our management is authorized to grant stock options to our employees, directors and consultants. Initially, the aggregate number of shares of our Class A common stock that may be issued pursuant to stock awards under our 2019 Plan is 6,141,842 shares. Additionally, the number of shares of our Class A common stock reserved for issuance under our 2019 Plan will automatically increase on January 1 of each year, beginning on January 1, 2020 and continuing through and including January 1, 2029, by 4% of the total number of shares of our capital stock outstanding on December 31 of the preceding calendar year, or a lesser number of shares determined by our board of directors. Unless our board of directors elects not to

increase the number of shares available for future grant each year, our stockholders may experience additional dilution, which could cause our stock price to fall.

We are an "emerging growth company" and our election of reduced reporting requirements applicable to emerging growth companies may make our Class A common stock less attractive to investors.

We are an "emerging growth company" as defined in the Jumpstart Our Business Startups Act, or JOBS Act. For as long as we continue to be an emerging growth company, we may take advantage of exemptions from various reporting requirements that are applicable to other public companies that are not emerging growth companies, including not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act, or Section 404, reduced disclosure obligations regarding executive compensation in this prospectus and our periodic reports and proxy statements and exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved. In addition, as an emerging growth company, we are only required to provide two years of audited financial statements and two years of selected financial data in this prospectus. We could be an emerging growth company for up to five years following the completion of this offering, although circumstances could cause us to lose that status earlier, including if we are deemed to be a "large accelerated filer," which occurs when the market value of our Class A common stock that is held by non-affiliates exceeds $700 million as of the prior June 30, or if we have total annual gross revenue of $1.07 billion or more during any fiscal year before that time, in which cases we would no longer be an emerging growth company as of the following December 31, or if we issue more than $1.0 billion in non-convertible debt during any three-year period before that time, in which case we would no longer be an emerging growth company immediately. Even after we no longer qualify as an emerging growth company, we could still qualify as a "smaller reporting company," which would allow us to take advantage of many of the same exemptions from disclosure requirements including not being required to comply with the auditor attestation requirements of Section 404 and reduced disclosure obligations regarding executive compensation in this prospectus and our periodic reports and proxy statements. We cannot predict if investors will find our Class A common stock less attractive because we may rely on these exemptions. If some investors find our Class A common stock less attractive as a result, there may be a less active trading market for our Class A common stock and our share price may be more volatile.

Under the JOBS Act, emerging growth companies can also delay adopting new or revised accounting standards until such time as those standards apply to private companies. We have elected to avail ourselves of an exemption that allows us to delay adopting new or revised accounting standards until such time as those standards apply to private companies. As a result, we will not be subject to the same new or revised accounting standards as other public companies that comply with the public company effective dates, including but not limited to the new lease accounting standard. We have also elected to take advantage of certain of the reduced disclosure obligations in the registration statement of which this prospectus is a part and may elect to take advantage of other reduced reporting requirements in future filings. As a result of these elections, the information that we provide to our stockholders may be different than you might receive from other public reporting companies. However, if we later decide to opt out of the extended period for adopting new accounting standards, we would need to disclose such decision and it would be irrevocable.

We will incur increased costs as a result of operating as a public company, and our management will be required to devote substantial time to new compliance initiatives and corporate governance practices.

As a public company, and particularly after we are no longer an emerging growth company, we will incur significant legal, accounting and other expenses that we did not incur as a private company. The Sarbanes-Oxley Act, the Dodd-Frank Wall Street Reform and Consumer Protection Act, the listing requirements of Nasdaq and other applicable securities rules and regulations impose various requirements on public companies, including establishment and maintenance of effective disclosure and financial controls and corporate governance practices. Our management and other personnel will need to devote a substantial amount of time to these compliance initiatives. Moreover, these rules and regulations will increase our legal and financial compliance costs and will make some activities more time-consuming and costly. For example, we expect that these rules and regulations may make it more difficult and more expensive for us to obtain director and officer liability insurance, which in turn could make it more difficult for us to attract and retain qualified members of our board of directors. However, these rules and regulations are often subject to varying interpretations, in many cases due to their lack of specificity, and, as a result, their application in practice may evolve over time as new guidance is provided by regulatory and governing bodies. This could result in continuing uncertainty regarding compliance matters and higher costs necessitated by ongoing revisions to disclosure and governance practices.

Our ability to use net operating losses, or NOLs, to offset future taxable income may be subject to certain limitations.

In general, under Section 382 of the Internal Revenue Code of 1986, as amended, or the Code, a corporation that undergoes an "ownership change" is subject to limitations on its ability to utilize its pre-change NOL or tax credits to offset future taxable income. Our existing NOLs or credits may be subject to substantial limitations arising from previous ownership changes, and if we undergo an ownership change our ability to utilize NOLs or credits could be further limited by Section 382 of the Code. In addition, future changes in our stock ownership, many of which are outside of our control, could result in an ownership change under Section 382 of the Code. Our NOLs or credits may also be impaired under state law. Accordingly, we may not be able to utilize a material portion of our NOLs or credits. Furthermore, our ability to utilize our NOLs or credits is conditioned upon our attaining profitability and generating U.S. federal and state taxable income. As described above under "—Risks Related to Business," we have incurred significant net losses since our inception and anticipate that we will continue to incur significant losses for the foreseeable future; thus, we do not know whether or when we will generate the U.S. federal or state taxable income necessary to utilize our NOLs or credits.

We have identified a material weakness in our internal control over financial reporting. If our remediation of the material weakness is not effective, or if we experience additional material weaknesses in the future or otherwise fail to maintain an effective system of internal controls in the future, we may not be able to accurately report our financial condition or results of operations, which may adversely affect investor confidence in us and, as a result, the value of our Class A common stock.

Prior to this offering, we have been a private company with limited accounting personnel and other resources with which to address our internal control over financial reporting. In connection with our preparation and the audits of our financial statements as of and for the years ended December 31, 2017 and 2018, we and our auditor identified a material weakness as defined under the Exchange Act and by the Public Company Accounting Oversight Board (United States) in our internal control over financial reporting. The material weakness related to a lack of application-based

controls inherent in our enterprise resource planning, or ERP, system used for maintaining our financial books and records. A material weakness is a deficiency, or a combination of deficiencies, in internal control over financial reporting such that there is a reasonable possibility that a material misstatement of our financial statements will not be prevented or detected on a timely basis.

We are implementing measures designed to improve our internal control over financial reporting to remediate this material weakness. We have implemented a new ERP system that is our system of record for our financial books and records from January 1, 2019 forward. This new ERP system has application-based controls inherent in its design that provide an internal control infrastructure for financial reporting and for our internal control procedures. With the oversight of senior management and our audit committee, we have begun taking steps to remediate the underlying causes of the material weakness. However, the implementation of these measures may not fully address this material weakness in our internal control over financial reporting, and we may not be able to conclude that it has been fully remedied. Our failure to correct this material weakness or our failure to discover and address any other control deficiencies could result in inaccuracies in our financial statements and could also impair our ability to comply with applicable financial reporting requirements and make related regulatory filings on a timely basis. As a result, our business, financial condition, results of operations and prospects, as well as the trading price and listing of our shares, may be materially and adversely affected. We cannot assure you that all of our existing material weaknesses have been identified, or that we will not in the future identify additional material weaknesses.

We and our auditor were not required to perform an evaluation of our internal control over financial reporting as of December 31, 2017 and 2018 in accordance with the provisions of the Sarbanes-Oxley Act. Accordingly, we cannot provide assurance that we have identified all, or that we will not in the future have additional, material weaknesses. Material weaknesses may still exist when we report on the effectiveness of our internal control over financial reporting as required by reporting requirements under Section 404 after the completion of this offering.

If we fail to remediate the material weakness identified above, our management may conclude that our internal control over financial reporting is not effective. This conclusion could adversely impact the market price of our shares due to a loss of investor confidence in the reliability of our reporting processes. Furthermore, if we fail to establish and maintain effective internal control over financial reporting in the future, our operating results and our ability to operate our business could be harmed.

Because we do not anticipate paying any cash dividends on our capital stock in the foreseeable future, capital appreciation, if any, will be your sole source of gain.

We have never declared or paid cash dividends on our capital stock. We currently intend to retain all of our future earnings, if any, to finance the growth and development of our business. As a result, capital appreciation, if any, of our Class A common stock will be your sole source of gain for the foreseeable future.

We may incur significant costs from class action litigation due to our expected stock volatility.

Our stock price may fluctuate for many reasons, including as a result of public announcements regarding the progress of our development efforts for our discovery platform and our product candidates, the development efforts of future partners or competitors, the addition or departure of our key personnel, variations in our quarterly operating results and changes in market valuations of biopharmaceutical and biotechnology companies. This risk is especially relevant to us because

biopharmaceutical and biotechnology companies have experienced significant stock price volatility in recent years. When the market price of a stock has been volatile as our stock price may be, holders of that stock have occasionally brought securities class action litigation against the company that issued the stock. If any of our stockholders were to bring a lawsuit of this type against us, even if the lawsuit is without merit, we could incur substantial costs defending the lawsuit. The lawsuit could also divert the time and attention of our management.

Anti-takeover provisions in our charter documents and under Delaware law could make an acquisition of our company, which may be beneficial to our stockholders, more difficult and may prevent attempts by our stockholders to replace or remove our current management.

Provisions in our amended and restated certificate of incorporation and our amended and restated bylaws may delay or prevent an acquisition of our company or a change in our management. In addition, these provisions may frustrate or prevent any attempts by our stockholders to replace or remove our current management by making it more difficult for stockholders to replace members of our board of directors. Because our board of directors is responsible for appointing the members of our management team, these provisions could in turn affect any attempt by our stockholders to replace current members of our management team. These provisions include:

- a prohibition on actions by our stockholders by written consent;
- a requirement that special meetings of stockholders, which our company is not obligated to call more than once per calendar year, be called only by the chairman of our board of directors, our chief executive officer, or our board of directors pursuant to a resolution adopted by a majority of the total number of authorized directors;
- advance notice requirements for election to our board of directors and for proposing matters that can be acted upon at stockholder meetings;
- division of our board of directors into three classes, serving staggered terms of three years each; and
- the authority of the board of directors to issue preferred stock with such terms as the board of directors may determine.

Moreover, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporation Law, as amended, which prohibits a person who owns in excess of 15% of our outstanding voting stock from merging or combining with us for a period of three years after the date of the transaction in which the person acquired in excess of 15% of our outstanding voting stock, unless the merger or combination is approved in a prescribed manner. These provisions would apply even if the proposed merger or acquisition could be considered beneficial by some stockholders.

Our amended and restated certificate of incorporation that will be in effect at the closing of this offering will provide that the Court of Chancery of the State of Delaware and, to the extent enforceable, the federal district courts of the United States of America will be the exclusive forums for substantially all disputes between us and our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers, or employees.

Our amended and restated certificate of incorporation that will be in effect at the closing of this offering will provide that the Court of Chancery of the State of Delaware is the exclusive forum for the following types of actions or proceedings under Delaware statutory or common law:

- any derivative action or proceeding brought on our behalf;
- any action asserting a breach of fiduciary duty;

- any action asserting a claim against us or our directors, officers, or employees arising under the Delaware General Corporation Law, our amended and restated certificate of incorporation, or our amended and restated bylaws; and
- any action asserting a claim against us that is governed by the internal-affairs doctrine.

This provision would not apply to suits brought to enforce a duty or liability created by the Exchange Act or any other claim for which the U.S. federal courts have exclusive jurisdiction.

Our amended and restated certificate of incorporation will provide that the federal district courts of the United States of America will be the exclusive forum for resolving any complaint asserting a cause of action arising under the Securities Act, subject to and contingent upon a final adjudication in the State of Delaware of the enforceability of such exclusive forum provision.

These exclusive-forum provisions may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers, or other employees, which may discourage lawsuits against us and our directors, officers, and other employees. If any other court of competent jurisdiction were to find either exclusive-forum provision in our amended and restated certificate of incorporation to be inapplicable or unenforceable, we may incur additional costs associated with resolving the dispute in other jurisdictions, which could seriously harm our business. For example, the Court of Chancery of the State of Delaware recently determined that a provision stating that U.S. federal district courts are the exclusive forum for resolving any complaint asserting a cause of action arising under the Securities Act is not enforceable. However, this decision may be reviewed and ultimately overturned by the Delaware Supreme Court.

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus contains forward-looking statements about us and our industry that involve substantial risks and uncertainties. All statements other than statements of historical facts contained in this prospectus, including statements regarding our future results of operations or financial condition, business strategy and plans and objectives of management for future operations, are forward-looking statements. In some cases, you can identify forward-looking statements because they contain words such as "anticipate," "believe," "contemplate," "continue," "could," "estimate," "expect," "intend," "may," "plan," "potential," "predict," "project," "should," "target," "will" or "would" or the negative of these words or other similar terms or expressions, although not all forward-looking statements contain these words. These forward-looking statements include, but are not limited to, statements concerning the following:

- the initiation, timing, progress and results of our research and development programs, preclinical studies, any clinical trials and IND and other regulatory submissions;
- our expectations regarding the activity of ATRC-101 or potential future product candidates once administered in a human subject;
- our expectations and beliefs regarding the market for cancer therapies and development of the immuno-oncology industry;
- our ability to identify and develop product candidates for treatment of additional disease indications;
- our or a potential future collaborator's ability to obtain and maintain regulatory approval of any of our current or potential future product candidates;
- the rate and degree of market acceptance of any approved product candidates;
- the implementation of our business model and strategic plans for our business, technologies, and current or potential future product candidates;
- our or any potential future collaborator's ability to obtain and maintain intellectual property protection for our discovery platform and current or potential future product candidates and our ability to operate our business without infringing the intellectual property rights of others; and
- our use of net proceeds to us from this offering.

You should not rely on forward-looking statements as predictions of future events. We have based the forward-looking statements contained in this prospectus primarily on our current expectations and projections about future events and trends that we believe may affect our business, financial condition and operating results. The outcome of the events described in these forward-looking statements is subject to risks, uncertainties and other factors described in the section titled "Risk Factors" and elsewhere in this prospectus. Moreover, we operate in a very competitive and rapidly changing environment. New risks and uncertainties emerge from time to time, and it is not possible for us to predict all risks and uncertainties that could have an impact on the forward-looking statements contained in this prospectus. The results, events and circumstances reflected in the forward-looking statements may not be achieved or occur, and actual results, events or circumstances could differ materially from those described in the forward-looking statements. You should read this prospectus and the documents that we reference in this prospectus and have filed as exhibits to the registration statement, of which this prospectus is a part, that we have filed with the SEC with the understanding that our actual future results, levels of activity, performance and achievements may be materially different from what we expect.

In addition, statements that "we believe" and similar statements reflect our beliefs and opinions on the relevant subject. These statements are based on information available to us as of the date of

this prospectus. While we believe that information provides a reasonable basis for these statements, that information may be limited or incomplete. Our statements should not be read to indicate that we have conducted an exhaustive inquiry into, or review of, all relevant information. These statements are inherently uncertain, and investors are cautioned not to unduly rely on these statements.

The forward-looking statements made in this prospectus relate only to events as of the date on which the statements are made. We undertake no obligation to update any forward-looking statements made in this prospectus to reflect events or circumstances after the date of this prospectus or to reflect new information or the occurrence of unanticipated events, except as required by law. We may not actually achieve the plans, intentions or expectations disclosed in our forward-looking statements, and you should not place undue reliance on our forward-looking statements. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, joint ventures or investments. We qualify all of our forward-looking statements by these cautionary statements.

MARKET AND INDUSTRY DATA

This prospectus contains estimates, statistical data and other information concerning our industry and the market in which we operate, including market opportunity and market size, that is based on information on various publicly available sources, including data regarding the estimated size and patient populations of those and related markets, existing therapeutic options and the incidence of certain medical conditions. This industry and market information involves a number of assumptions and limitations, and you are cautioned not to give undue weight to such estimates.

Industry data and other third-party information have been obtained from sources believed to be reliable, but we have not independently verified any third party information. In addition, projections, assumptions and estimates of our future performance and the future performance of the industry in which we operate is necessarily subject to a high degree of uncertainty and risk due to a variety of factors, including those described in the section titled "Risk Factors" and elsewhere in this prospectus. These and other factors could cause results to differ materially from those expressed in the estimates made by third parties and by us.

USE OF PROCEEDS

We estimate that we will receive net proceeds from this initial public offering of approximately $113.8 million (or approximately $131.2 million if the underwriters exercise their option to purchase additional shares of our Class A common stock in full) based on an assumed initial public offering price of $17.00 per share, the midpoint of the estimated price range set forth on the cover page of this prospectus, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.

A $1.00 increase (decrease) in the assumed initial public offering price of $17.00 per share would increase (decrease) the net proceeds to us from this offering by approximately $6.8 million, assuming the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same, and after deducting estimated underwriting discounts and commissions. Similarly, each increase (decrease) of 1.0 million shares in the number of shares of Class A common stock offered by us would increase (decrease) the net proceeds to us from this offering by approximately $15.8 million, assuming the assumed initial public offering price of $17.00 per share remains the same, and after deducting estimated underwriting discounts and commissions.

We currently expect to use the net proceeds from this offering, together with our existing cash and cash equivalents, as follows:

- approximately $45 million to fund the development of ATRC-101 through the dose-escalation portion of our Phase 1b clinical trial and a portion of our currently planned protocol amendments to pursue combination studies and expansion cohorts;
- approximately $65 million to fund our ongoing efforts to develop additional clinical candidates from our discovery platform; and
- the remaining proceeds for continued development and utilization of our discovery platform, hiring of additional personnel, capital expenditures, costs of operating as a public company and other general corporate purposes.

We may also use a portion of the net proceeds from this offering to in-license, acquire or invest in complementary businesses, technologies, products or assets. However, we have no current commitments or obligations to do so.

This expected use of net proceeds from this offering represents our intentions based upon our current plans and business conditions, and significant additional capital will be required to fund development of ATRC-101 through further stages of clinical development, if warranted, including potential Phase 2 and Phase 3 registrational studies. As of the date of this prospectus, we cannot predict with certainty all of the particular uses for the net proceeds to be received upon the closing of this offering or the amounts that we will actually spend on the uses set forth above. We will have broad discretion over how to use the net proceeds to us from this offering. Pending our use of the net proceeds from this offering as described above, we intend to invest these funds in investment-grade, interest-bearing instruments.

DIVIDEND POLICY

We have never declared or paid cash dividends on our capital stock. We currently intend to retain all available funds and future earnings, if any, to fund the development and expansion of our business, and we do not anticipate paying any cash dividends in the foreseeable future. Any future determination regarding the declaration and payment of dividends, if any, will be at the discretion of our board of directors and will depend on then-existing conditions, including our financial condition, operating results, contractual restrictions, capital requirements, business prospects and other factors our board of directors may deem relevant. Our future ability to pay cash dividends on our capital stock may also be limited by the terms of any future debt or preferred securities or future credit facility.

CAPITALIZATION

The following table sets forth our cash and cash equivalents and our capitalization as of March 31, 2019 as follows:

- on an actual basis;
- on a pro forma basis to reflect: the automatic conversion of all outstanding shares of our convertible Series A preferred stock, convertible Series B preferred stock and convertible Series C1 preferred stock into 13,314,068 shares of our Class A common stock immediately upon the closing of this offering; the automatic conversion of all outstanding shares of our convertible Series C2 preferred stock into 3,934,191 shares of our Class B common stock immediately upon the closing of this offering; the issuance of 62,936 shares of Class A common stock upon the exercise of an outstanding warrant in connection with this offering; the automatic reclassification of all of our outstanding warrants to purchase an aggregate of 49,997 shares of our convertible Series A preferred stock into warrants to purchase an equivalent number of shares of our Class A common stock and no exercise of these warrants, the related reclassification of preferred stock warrant liability to stockholders' equity; no exercise of outstanding options to purchase our Class A common stock; and the filing and effectiveness of our amended and restated certificate of incorporation upon the closing of this offering; and
- on a pro forma as adjusted basis to give effect to: the pro forma adjustments set forth above; and the issuance and sale of 7,350,000 shares of Class A common stock in this offering at an assumed initial public offering price of $17.00 per share, the midpoint of the price range set forth on the cover page of this prospectus, after deducting the estimated underwriting discounts and commissions and estimated offering expenses payable by us.

The pro forma and pro forma as adjusted information below is illustrative only, and our capitalization following the completion of this offering will be adjusted based on the actual initial public offering price and other terms of this offering determined at pricing. You should read this information in conjunction with our consolidated financial statements and the related notes included in this prospectus and the "Management's Discussion and Analysis of Financial Condition and Results of Operations" section and other financial information contained in this prospectus.

	March 31, 2019		
	Actual	Pro Forma	Pro Forma as Adjusted(1)
	(in thousands, except share and per share data)		
Cash, cash equivalents and investments	$ 100,661	$ 100,661	$ 214,465
Preferred stock warrant liability	$ 430	$ —	$ —
Capital lease obligations	135	135	135
Convertible Series A preferred stock, $0.0001 par value per share, Convertible Series B preferred stock, $0.0001 par value per share and Convertible Series C1 preferred stock, $0.0001 par value per share; 250,000,000 shares authorized; 13,314,068 shares issued and outstanding, actual; no shares authorized, issued and outstanding, pro forma and pro forma as adjusted	155,054	—	—
Convertible Series C2 preferred stock, $0.0001 par value per share; 50,000,000 shares authorized; 3,934,191 shares issued and outstanding, actual; no shares authorized, issued and outstanding, pro forma and pro forma as adjusted	54,615	—	—
Stockholders' equity (deficit):			
Preferred stock, $0.0001 par value per share: no shares authorized, issued or outstanding, actual; and 300,000,000 shares authorized and no shares issued or outstanding, pro forma and pro forma as adjusted	—	—	—
Class A common stock, $0.0001 par value per share; 650,000,000 shares authorized, 2,123,257 shares issued and outstanding, actual; 650,000,000 shares authorized; pro forma and pro forma as adjusted; 15,500,261 shares issued and outstanding, pro forma; 22,850,261 shares issued and outstanding, pro forma as adjusted	—	2	2
Class B common stock, $0.0001 par value per share; 50,000,000 shares authorized, no shares issued and outstanding, actual; 50,000,000 shares authorized; pro forma and pro forma as adjusted; 3,934,191 shares issued and outstanding, pro forma; 3,934,191 shares issued and outstanding, pro forma as adjusted	—	—	—
Additional paid-in capital	4,382	214,479	328,283
Accumulated other comprehensive income	23	23	23
Accumulated deficit	(110,201)	(110,201)	(110,201)
Total stockholders' equity (deficit)	(105,795)	104,303	218,107
Total capitalization	$ 104,438	$ 104,438	$ 218,242

(1) Each $1.00 increase (decrease) in the assumed initial public offering price of $17.00 per share, the midpoint of the price range set forth on the cover page of this prospectus, would increase (decrease) the pro forma as adjusted amount of each of cash and cash equivalents, total stockholders' deficit and total capitalization by approximately $6.8 million, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. Similarly, each increase (decrease) of 1.0 million shares in the number of shares offered by us would increase (decrease) the pro forma as adjusted amount of each of cash and cash equivalents, total stockholders' deficit and total capitalization by approximately $15.8 million, assuming the assumed initial public offering price of $17.00 per

share remains the same, and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.

The number of shares in the table above assumes no issuance of Class B common stock in connection with this offering and excludes:

- 2,587,996 shares of Class A common stock issuable upon exercise of stock options outstanding as of March 31, 2019 under our 2010 Equity Incentive Plan, or 2010 Plan, with a weighted-average exercise price of $7.08 per share;
- 657,643 shares of Class A common stock issuable upon exercise of stock options granted after March 31, 2019 under our 2010 Plan, with a weighted-average exercise price of $12.30 per share;
- 6,141,842 shares of Class A common stock reserved for future issuance under our 2019 Equity Incentive Plan, or 2019 Plan, which will become effective in connection with this offering, as well as (i) any additional shares of Class A common stock that become available for issuance under the 2019 Plan (including as a result of annual increases) and (ii) any shares of Class A common stock that (A) remain available for issuance under the 2010 Plan as of immediately prior to the time our 2019 Plan becomes effective or (B) that would have otherwise returned to our 2010 Plan in accordance with its terms (which, in each case, will become available for issuance under our 2019 Plan);
- 283,333 shares of Class A common stock reserved for future issuance under our 2019 Employee Stock Purchase Plan, or the ESPP, which will become effective on the business day prior to the public trading date of our Class A common stock, as well as any additional shares of Class A common stock that become available for issuance under our ESPP (including as a result of annual increases); and
- 49,997 shares of Class A common stock issuable upon exercise of outstanding warrants reclassified to purchase our Class A common stock, each with an exercise price of $14.46 per share.

DILUTION

If you invest in our Class A common stock in this offering, your ownership interest will be immediately diluted to the extent of the difference between the initial public offering price per share and the pro forma as adjusted net tangible book value per share of our Class A common stock after this offering.

As of March 31, 2019, we had a historical net tangible book deficit of $105.8 million, or $49.83 per share. Our historical net tangible book deficit per share represents total tangible assets less total liabilities, divided by the number of shares of Class A common stock and Class B common stock outstanding as of March 31, 2019.

As of March 31, 2019, our pro forma net tangible book value was approximately $104.3 million, or $5.37 per share after giving effect to the conversion of all of our outstanding preferred stock into shares of our Class A common stock or Class B common stock, the exercise of one warrant to purchase 62,936 shares of our Class A common stock and the filing and effectiveness of our amended and restated certificate of incorporation, each of which will occur upon the closing of this offering.

After giving further effect to the sale of 7,350,000 shares of Class A common stock in this offering at an assumed initial public offering price of $17.00 per share, the midpoint of the price range set forth on the cover page of this prospectus, and after deducting the estimated underwriting discounts and commissions and estimated offering expenses payable by us, our pro forma as adjusted net tangible book value as of March 31, 2019 would have been approximately $218.1 million, or approximately $8.14 per share. This amount represents an immediate increase in pro forma net tangible book value of $2.77 per share to our existing stockholders and an immediate dilution in pro forma net tangible book value of approximately $8.86 per share to new investors purchasing shares of Class A common stock in this offering.

Dilution per share to new investors is determined by subtracting pro forma as adjusted net tangible book value per share after this offering from the initial public offering price per share paid by new investors. The following table illustrates this dilution (without giving effect to any exercise by the underwriters of their option to purchase additional shares):

Assumed initial public offering price per share		$ 17.00
Historical net tangible book value (deficit) per share as of March 31, 2019	$ (49.83)	
Pro forma increase in historical net tangible book value per share attributable to the pro forma transactions described in the preceding paragraphs	55.19	
Pro forma net tangible book value per share as of March 31, 2019	5.37	
Increase in pro forma net tangible book value per share attributable to this offering		2.77
Pro forma as adjusted net tangible book value per share after this offering		8.14
Dilution per share to new investors in this offering		$ 8.86

Each $1.00 increase (decrease) in the assumed initial public offering price of $17.00 per share, the midpoint of the price range set forth on the cover page of this prospectus, would increase (decrease) the pro forma as adjusted net tangible book value per share after this offering by approximately $0.26, and dilution in pro forma net tangible book value per share to new investors by

approximately $0.26, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same and after deducting the estimated underwriting discounts and commissions and the estimated offering expenses payable by us. Each increase (decrease) of 1.0 million shares in the number of shares offered by us would increase (decrease) our pro forma as adjusted net tangible book value per share after this offering by approximately $0.28 per share and decrease (increase) the dilution to investors participating in this offering by approximately $0.28 per share, assuming that the assumed initial public offering price remains the same, and after deducting the estimated underwriting discounts and commissions and the estimated offering expenses payable by us.

If the underwriters exercise their option to purchase 1,102,500 additional shares of our Class A common stock in full, the pro forma as adjusted net tangible book value after the offering would be $8.45 per share, the increase in pro forma net tangible book value per share to existing stockholders would be $3.08 per share and the dilution per share to new investors would be $8.55 per share, in each case assuming an initial public offering price of $17.00 per share, the midpoint of the price range set forth on the cover page of this prospectus.

The following table summarizes on the pro forma as adjusted basis described above, as of March 31, 2019, the differences between the number of shares purchased from us, the total consideration paid to us in cash and the average price per share paid by existing stockholders for shares issued prior to this offering and the price to be paid by new investors in this offering. The calculation below is based on the assumed initial public offering price of $17.00 per share, the midpoint of the price range set forth on the cover page of the prospectus, before deducting the estimated underwriting discounts and commissions and estimated offering expenses payable by us.

	Shares Purchased		Total Consideration		
	Number	Percent	Amount (in thousands)	Percent	Average Price per Share
Existing stockholders	19,434,452	73%	$ 219,046	64%	$ 11.27
New investors	7,350,000	27	124,950	36	17.00
Total	26,784,452	100%	$ 343,996	100%	$ 12.84

The foregoing tables and calculations assumes no issuance of Class B common stock in connection with this offering and exclude:

- 2,587,996 shares of Class A common stock issuable upon exercise of stock options outstanding as of March 31, 2019 under our 2010 Equity Incentive Plan, or 2010 Plan, with a weighted-average exercise price of $7.08 per share;
- 657,643 shares of Class A common stock issuable upon exercise of stock options granted after March 31, 2019 under our 2010 Plan, with a weighted-average exercise price of $12.30 per share;
- 6,141,842 shares of Class A common stock reserved for future issuance under our 2019 Equity Incentive Plan, or 2019 Plan, which will become effective in connection with this offering, as well as (i) any additional shares of Class A common stock that become available for issuance under the 2019 Plan (including as a result of annual increases) and (ii) any shares of Class A common stock that (A) remain available for issuance under the 2010 Plan as of immediately prior to the time our 2019 Plan becomes effective or (B) that would have otherwise returned to our 2010 Plan in accordance with its terms (which, in each case, will become available for issuance under our 2019 Plan);

- 283,333 shares of Class A common stock reserved for future issuance under our 2019 Employee Stock Purchase Plan, or the ESPP, which will become effective on the business day prior to the public trading date of our Class A common stock, as well as any additional shares of Class A common stock that become available for issuance under our ESPP (including as a result of annual increases); and
- 49,997 shares of Class A common stock issuable upon exercise of outstanding warrants reclassified to purchase our Class A common stock, each with an exercise price of $14.46 per share.

To the extent any other outstanding options or warrants are exercised, there will be further dilution to new investors. If all of such outstanding options and warrants had been exercised as of March 31, 2019, the pro forma as adjusted net tangible book value per share after this offering inclusive of the underwriters over-allotment would be $8.42, and total dilution per share to new investors would be $8.58.

If the underwriters exercise their option to purchase additional shares of our Class A common stock in full and assuming that no existing stockholders purchase shares of our common stock in the offering:

- the percentage of shares of common stock held by existing stockholders will decrease to approximately 70% of the total number of shares of our common stock outstanding after this offering; and
- the number of shares held by new investors will increase to 8,452,500, or approximately 30% of the total number of shares of our common stock outstanding after this offering.

SELECTED CONSOLIDATED FINANCIAL DATA

The following selected consolidated statement of operations data for the years ended December 31, 2017 and 2018 and the consolidated balance sheet data as of December 31, 2017 and 2018 have been derived from our audited consolidated financial statements included elsewhere in this prospectus. The following selected consolidated statement of operations data for the three months ended March 31, 2018 and 2019 and the consolidated balance sheet data as of March 31, 2019 have been derived from our unaudited interim condensed consolidated financial statements included elsewhere in this prospectus. We have prepared the unaudited interim consolidated financial statements on the same basis as the audited financial statements and have included, in our opinion, all adjustments, consisting only of normal recurring adjustments that we consider necessary for a fair statement of the financial information set forth in those statements. Our historical results are not necessarily indicative of the results that may be expected in the future. You should read the consolidated financial data set forth below in conjunction with our consolidated financial statements and the accompanying notes and the information in "Management's Discussion and Analysis of Financial Condition and Results of Operations" contained elsewhere in this prospectus.

	Year Ended December 31,		Three Months Ended March 31,	
	2017	2018	2018	2019
	(in thousands, except share and per share data)			
Consolidated Statements of Operations Data:				
Operating expenses:				
Research and development	$ 24,873	$ 32,513	$ 6,643	$ 11,713
General and administrative	4,562	7,060	1,300	2,518
Total operating expenses	29,435	39,573	7,943	14,231
Operating loss	(29,435)	(39,573)	(7,943)	(14,231)
Interest and other income (expense)				
Other income	1,719	961	213	165
Interest income	152	714	56	545
Interest expense	(14)	(9)	(2)	(2)
Preferred stock warrant liability revaluation	6	(33)	20	(50)
Gain (loss) on disposal of property and equipment	48	(1)	—	(5)
Loss before income tax benefit (expense)	(27,524)	(37,941)	(7,656)	(13,578)
Benefit (expense) from income taxes	(3)	1	—	(1)
Net loss	$ (27,527)	$ (37,940)	$ (7,656)	$ (13,579)
Net loss per share—basic and diluted	$ (13.14)	$ (18.02)	$ (3.66)	$ (6.40)
Weighted average shares used to compute net loss per share—basic and diluted	2,094,795	2,104,861	2,093,413	2,120,925
Pro forma net loss per share—basic and diluted (unaudited)(1)		$ (1.95)		$ (0.70)
Weighted average shares used to compute pro forma net loss per share—basic and diluted (unaudited)(1)		19,416,147		19,432,211

	December 31, 2017	December 31, 2018	March 31, 2019
		(in thousands)	
Consolidated Balance Sheet Data:			
Cash, cash equivalents and investments	$ 30,613	$ 114,504	$ 100,661
Working capital(2)	29,238	112,663	99,219
Total assets	36,112	121,684	109,126
Preferred stock warrant liability	347	380	430
Preferred stock	89,362	209,668	209,668
Total stockholders' deficit	(56,566)	(93,032)	(105,795)

(1) Gives effect to:

- the automatic conversion of all outstanding shares of our convertible Series A preferred stock, convertible Series B preferred stock and convertible Series C1 preferred stock into 13,314,068 shares of our Class A common stock immediately upon the closing of this offering;
- the automatic conversion of all outstanding shares of our convertible Series C2 preferred stock into 3,934,191 shares of our Class B common stock immediately upon the closing of this offering;
- the issuance of 62,936 shares of Class A common stock upon the exercise of an outstanding warrant in connection with this offering, with an exercise price of $0.0006 per share;
- the automatic reclassification of warrants to purchase an aggregate of 49,997 shares of our convertible Series A preferred stock, outstanding as of March 31, 2019, into warrants to purchase an equivalent number of shares of our Class A common stock, and the related reclassification of preferred stock warrant liability to stockholders' equity; and
- the filing and effectiveness of our amended and restated certificate of incorporation and the adoption of our amended and restated bylaws, each of which will occur upon the closing of this offering.

(2) Working capital represents the difference between current assets and current liabilities.

MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

You should read the following discussion and analysis of our financial condition and results of operations together with our financial statements and related notes and other financial information included elsewhere in this prospectus. Some of the information contained in this discussion and analysis or set forth elsewhere in this prospectus, including information with respect to our plans and strategy for our business, includes forward-looking statements that involve risks and uncertainties. See "Special Note Regarding Forward-Looking Statements" and "Risk Factors" for a discussion of forward-looking statements and important factors that could cause actual results to differ materially from the results described in or implied by the forward-looking statements.

Overview

We are a biopharmaceutical company utilizing our differentiated platform to discover and develop novel antibody-based immunotherapeutics to treat a range of solid tumor types. While more traditional oncology drug discovery approaches attempt to generate antibodies against known targets, our approach relies on the human immune system to direct us to unique antibody-target pairs from patients experiencing a clinically meaningful, active immune response against their tumors. These unique antibody-target pairs represent a potentially novel and previously unexplored landscape of immuno-oncology targets. We believe the fact that our approach has the potential to deliver novel, previously unexplored immuno-oncology targets provides us with a significant competitive advantage over traditional approaches which focus on known targets that many companies are aware of and can pursue. We have utilized our drug discovery approach to identify over 1,400 distinct human antibodies that bind preferentially to tumor tissue from patients who are not the source of the antibody. Our lead product candidate, ATRC-101, is a monoclonal antibody with a novel mechanism of action and target derived from an antibody identified using our discovery platform. ATRC-101 reacts *in vitro* with a majority of human ovarian, non-small cell lung, colorectal and breast cancer samples from multiple patients. It has demonstrated robust anti-tumor activity as a single agent in multiple preclinical models, including one model in which PD-1 checkpoint inhibitors typically display limited activity. We anticipate filing an Investigational New Drug, or IND, application for ATRC-101 in late 2019 and initiating a Phase 1b clinical trial in patients with solid tumors in early 2020, subject to U.S. Food and Drug Administration, or FDA, approval of our IND application.

Since commencing operations in 2010, we have devoted substantially all of our resources to research and development, raising capital, building our management team and building our intellectual property portfolio. We do not have any products approved for marketing or sale and have not generated any revenue from product sales. We have funded our operations to date primarily from the sale of convertible preferred stock. We have also received more than $14 million in payments to date under our agreement with the Bill & Melinda Gates Foundation.

We have incurred significant operating losses since our inception. Our ability to generate product revenue sufficient to achieve or sustain profitability will depend on the successful development, regulatory approval and eventual commercialization of one or more of our current or future product candidates. Our net losses were $27.5 million and $37.9 million for the years ended December 31, 2017 and 2018, respectively, and $7.7 million and $13.6 million for the three months ended March 31, 2018 and 2019, respectively. As of March 31, 2019, we had an accumulated deficit of $110.2 million. We anticipate that a substantial portion of our capital resources and efforts in the foreseeable future will be focused on discovering, completing the necessary development, obtaining regulatory approval for and preparing for potential commercialization of our product candidates. As of March 31, 2019, we had cash, cash equivalents and investments of $100.7 million.

We expect to continue to incur significant expenses and increasing operating losses for the foreseeable future. Our net losses may fluctuate significantly from period to period, depending on the timing of our planned preclinical studies and clinical trials and expenditures on other research and development activities. We expect our expenses will increase substantially over time as we:

- continue preclinical studies and initiate clinical trials for ATRC-101 and initiate preclinical studies on any additional product candidates that we may pursue in the future;
- continue research and development to expand our growing library of more than 1,400 antibodies and develop potential future product candidates from that collection;
- continue to invest in advancing our differentiated discovery platform, and the underlying technologies including our Immune Repertoire Capture® technology;
- seek marketing approvals for product candidates that successfully complete clinical trials;
- maintain, protect and expand our portfolio of intellectual property rights, including patents, trade secrets and know-how;
- implement additional operational, financial and management systems; and
- attract, hire and retain additional administrative, clinical, regulatory and research personnel.

Furthermore, following the closing of this offering, we expect to incur additional costs associated with operating as a public company, including significant legal, accounting, insurance, investor relations and other expenses that we have not incurred as a private company.

Financial Operations Overview

Revenue

We have no products approved for marketing or commercial sale and have never generated any revenue from product sales.

Operating Expenses

Research and Development

Research and development expenses represent costs incurred in performing research, development and manufacturing activities in support of our own product development efforts and those of our collaborators, including intellectual property legal expenses, salaries, employee benefits and stock-based compensation for personnel contributing to research and development activities, laboratory supplies, outsourced research and development expenses, professional services and allocated facilities-related costs. We expense both internal and external research and development expenses as they are incurred. We do not currently allocate our costs by research and development program, as our research and development expenses include internal costs and external costs, neither of which are tracked by program. In particular, with respect to internal costs, several of our departments support multiple research and development programs. Non-refundable advance payments for services that will be used in or rendered for future research and development activities are recorded as prepaid expenses and recognized as expenses as the related services are performed.

We expect our research and development expenses to increase substantially for the foreseeable future as we continue to invest in our differentiated discovery platform to expand our pipeline of product candidates, advance our product candidates into and through preclinical studies and clinical trials and pursue regulatory approval of our product candidates. The processes of generating clinical candidates from our discovery platform and conducting the necessary preclinical and clinical research to obtain regulatory approval for those candidates is costly and time-consuming. Clinical trials generally become larger and more costly as they advance into later stages. The actual probability of success for our product candidates may be affected by a variety of factors, such as the

safety and efficacy of our product candidates, early clinical data, investment in our clinical programs, competition, manufacturing capability and commercial viability. We may never succeed in obtaining regulatory approval for any of our product candidates. As a result of the uncertainties discussed above and elsewhere in the prospectus, we are unable to determine the duration and completion costs of our research and development activities or when and to what extent we will generate revenue from the commercialization and sale of our product candidates.

General and Administrative

Our general and administrative expenses consist primarily of personnel costs, allocated facilities costs and other expenses for outside professional services, including legal, human resource, audit and accounting services.

Personnel costs consist of salaries, benefits and stock-based compensation for personnel not directly contributing to research and development activities. We expect to incur additional expenses as a result of operating as a public company, including expenses related to compliance with the rules and regulations of the SEC, Nasdaq and any other securities exchange on which our securities are traded, additional insurance expenses, investor relations activities and other administrative and professional services. We also expect to increase the size of our administrative function to support the growth of our business.

Interest and Other Income (Expense)

Other income (expense) includes other income which represents amounts received from partners for research and discovery services, interest income earned on our cash, cash equivalents and investments, interest expense, revaluation expense resulting from the liability recorded for certain preferred stock warrants and gains or losses on the periodic disposals of property and equipment.

Results of Operations

Comparison of the Years Ended December 31, 2017 and 2018

	Year Ended December 31,		Change	
	2017	2018	$	%
	(in thousands)			
Operating expenses:				
Research and development	$ 24,873	$ 32,513	$ 7,640	31%
General and administrative	4,562	7,060	2,498	55%
Total operating expenses	29,435	39,573	10,138	34%
Operating Loss	(29,435)	(39,573)	(10,138)	34%
Other income (expense), net:				
Other income	1,719	961	(758)	(44)%
Interest income	152	714	562	*
Interest expense	(14)	(9)	5	(36)%
Preferred stock warrant liability revaluation	6	(33)	(39)	*
Gain (loss) on disposal of property and equipment	48	(1)	(49)	*
Total other income (expense), net	1,911	1,632	(279)	(15)%
Income tax benefit (expense)	(3)	1	4	*
Net Loss	$ (27,527)	$ (37,940)	$ (10,413)	38%

* Not meaningful

Research and Development

The following table summarizes our research and development expenses incurred during the respective periods:

	Year Ended December 31,	
	2017	2018
	(in thousands)	
Research and development		
Personnel-related (including stock-based compensation)	$ 9,558	$ 12,250
Product and preclinical contract services	6,195	8,453
Laboratory supplies and equipment	4,132	4,549
Consulting, legal and other services	1,980	3,614
Facility related	1,727	1,757
Other	1,281	1,890
Total research and development expenses	$ 24,873	$ 32,513

Research and development expenses increased by $7.6 million, or 31%, during the year ended December 31, 2018 compared to the same period in 2017. The increase was primarily attributable to higher personnel-related expenses of $2.7 million as a result of additional employee head count, a $2.2 million increase in product and preclinical development costs primarily associated with efforts to advance ATRC-101 towards an IND application in late 2019 and a $1.6 million increase in consulting, legal and other services costs primarily due to increasing legal costs as we work to expand our intellectual property estate around both our differentiated discovery platform and ATRC-101. Substantially all of our research and development expenses during the years ended December 31, 2017 and 2018 related to improving our discovery platform, including our Immune Repertoire Capture® technology, continuing sponsorship of our non-interventional clinical studies to collect blood-based samples and internal and external preclinical development costs associated with ATRC-101, although to date we generally have not allocated research and development expenses to specific projects or research programs.

General and Administrative

General and administrative expenses increased by $2.5 million, or 55%, during the year ended December 2018 compared to the same period in 2017. The increase was primarily due to a $1.9 million increase in personnel-related expenses, including stock-based compensation, as a result of additional employee head count, as well as due to increases in facilities and legal expenses.

Other Income

Other income is comprised of amounts earned from research and discovery services provided to partners and collaborators under service agreements. Other income decreased by $758,000 during the year ended December 31, 2018 as compared to the same period in 2017 due largely to reductions in the level of services being provided to external partners as a result of redirecting resources to internal programs, including ATRC-101.

Interest Income

Interest income increased to $714,000 during the year ended December 31, 2018 as compared to $152,000 during the year ended December 31, 2017 due to increased interest earned on our cash and cash equivalents balances which were significantly higher in 2018 as compared to 2017.

Interest Expense

Interest expense during the years ended December 31, 2017 and 2018 pertained to the interest portion of payments made on capital leases under which we acquired certain property and equipment.

Preferred Stock Warrant Liability Revaluation

Preferred stock warrant liability revaluation recognizes changes in the fair value of the preferred stock warrants. We recognized an expense of $33,000 during the year ended December 31, 2018 primarily as a result of an increase in the estimated fair market value of our company during that period.

Comparison of the Three Months Ended March 31, 2018 and 2019

	Three Months Ended March 31,		Change	
	2018	2019	$	%
	(in thousands)			
Operating expenses:				
Research and development	$ 6,643	$ 11,713	$ 5,070	76%
General and administrative	1,300	2,518	1,218	94%
Total operating expenses	7,943	14,231	6,288	79%
Operating Loss	(7,943)	(14,231)	(6,288)	79%
Other income (expense), net:				
Other income	213	165	(48)	(23)%
Interest income	56	545	489	*
Interest expense	(2)	(2)	—	—%
Preferred stock warrant liability revaluation	20	(50)	(70)	*
Gain (loss) on disposal of property and equipment	—	(5)	(5)	*
Total other income (expense), net	287	653	366	128%
Income tax benefit (expense)	—	(1)	(1)	*
Net Loss	$ (7,656)	$ (13,579)	$ (5,923)	77%

* Not meaningful

Research and Development

The following table summarizes our research and development expenses incurred during the respective periods:

	Three Months Ended March 31,	
	2018	2019
	(in thousands)	
Research and development		
Personnel-related (including stock-based compensation)	$ 2,885	$ 4,574
Product and preclinical contract services	1,049	3,183
Laboratory supplies and equipment	1,142	1,525
Consulting, legal and other services	802	1,275
Facility related	461	1,014
Other	304	142
Total research and development expenses	$ 6,643	$ 11,713

Research and development expenses increased by $5.1 million, or 76%, during the three months ended March 31, 2019 compared to the same period in 2018. The increase was primarily attributable to higher personnel-related expenses of $1.7 million as a result of additional employee head count, a $2.1 million increase in product and preclinical development costs primarily associated with efforts to advance ATRC-101 towards an IND application in late 2019, $553,000 and $383,000 of increases in facility and lab related expenses due to expansion of lab facilities and activities in an additional location, and a $473,000 increase in consulting, legal and other services costs primarily due to increasing legal costs as we work to expand our intellectual property estate around both our differentiated discovery platform and ATRC-101.

General and Administrative

General and administrative expenses increased by $1.2 million, or 94%, during the three months ended March 31, 2019 compared to the same period in 2018. The increase was primarily due to an $816,000 increase in personnel-related expenses, including stock-based compensation, as a result of additional employee head count, as well as due to increases in facilities and legal expenses.

Other Income

Other income is comprised of amounts earned from research and discovery services provided to partners and collaborators under service agreements. Other income decreased by $48,000 during the three months ended March 31, 2019 compared to the same period in 2018 due largely to reductions in the level of services being provided to external partners as a result of redirecting resources to internal programs, including ATRC-101.

Interest Income

Interest income increased to $545,000 during the three months ended March 31, 2019 as compared to $56,000 during the three months ended March 31, 2018 due to increased interest earned on our cash, cash equivalents and investment balances which were significantly higher in 2019 as compared to 2018.

Interest Expense

Interest expense during the three months ended March 31, 2018 and 2019 pertained to the interest portion of payments made on capital leases under which we acquired certain property and equipment.

Preferred Stock Warrant Liability Revaluation

Preferred stock warrant liability revaluation recognizes changes in the fair value of the preferred stock warrants. We recognized an expense of $50,000 during the three months ended March 31, 2019 primarily as a result of an increase in the estimated fair market value of our company during that period.

Liquidity and Capital Resources; Plan of Operations

Liquidity

Due to our significant research and development expenditures, we have generated significant operating losses since inception. We have funded our operations primarily through the sale of convertible preferred stock. We have also received more than $15 million under our agreement with the Bill & Melinda Gates Foundation to date. In September 2018, we issued and sold 8,941,325 shares of Series C1 convertible preferred stock and Series C2 convertible preferred stock for gross proceeds of approximately $125.0 million. In August 2017, we issued and sold an aggregate of 3,001,421 shares of Series B convertible preferred stock for gross proceeds of approximately $35.0 million. As of March 31, 2019, we had available cash, cash equivalents and investments of $100.7 million and an accumulated deficit of $110.2 million.

Funding Requirements

Our primary uses of cash are to fund operating expenses, which consist primarily of funding our research, preclinical and clinical development activities, and related personnel and facilities costs. The timing and amount of future funding requirements depends on many factors, including the following:

- the scope, rate of progress, results and cost of our preclinical studies, clinical trials and other related activities;
- the cost of process development and manufacturing of clinical supplies, and establishing commercial supplies of our product candidates and any products that we may develop;
- the number and characteristics of product candidates that we pursue;
- the cost, timing and outcomes of regulatory approvals;
- the terms and timing of any other collaborative, licensing and other arrangements that we may establish;
- the timing, receipt and amount of sales, profit sharing or royalties, if any, from our potential products;
- the cost of preparing, filing, prosecuting, defending and enforcing any patent claims and other intellectual property rights;
- the extent to which we acquire or invest in businesses, products or technologies, although we currently have no commitments or agreements relating to any of these types of transactions;
- the compliance and administrative costs associated with being a public company; and
- the cost of attracting, hiring and retaining additional administrative, clinical, regulatory and scientific personnel.

Based on our current business plans, we believe that our existing cash, cash equivalents and investments, will be sufficient to fund our planned operations for at least 12 months from the date of this prospectus. Including the net proceeds from this offering, we believe we will have sufficient resources to fund our planned operations through the end of 2021. However, we will require additional funding to complete development of our product candidates and commercialize our products, if approved.

We may seek to raise any necessary additional capital through a combination of public or private equity offerings, debt financings, collaborations, strategic alliances, licensing arrangements and other marketing and distribution arrangements. There can be no assurance that we will be successful in acquiring additional funding at levels sufficient to fund our operations or on terms favorable to us. If we are unable to obtain adequate financing when needed, we may have to delay, reduce the scope of or suspend one or more of our preclinical studies and clinical trials, research and development programs or commercialization efforts. Because of the numerous risks and uncertainties associated with the development and commercialization of our product candidates and the extent to which we may enter into collaborations with third parties to participate in their development and commercialization, we are unable to estimate the amounts of increased capital outlays and operating expenditures associated with our current and anticipated preclinical studies and clinical trials. To the extent that we raise additional capital through collaborations, strategic alliances or licensing arrangements with third parties, we may have to relinquish valuable rights to our product candidates, future revenue streams or research programs or to grant licenses on terms that may not be favorable to us. If we raise additional capital through public or private equity or convertible debt offerings, the ownership interest of our existing stockholders will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect our stockholders' rights. If we raise additional capital through debt financing, we may be subject to

covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends.

Cash Flows

The following table summarizes our cash flows for the periods indicated:

	Year Ended December 31,		Three Months Ended March 31,	
	2017	2018	2018	2019
	(in thousands)			
Cash used in operating activities	$ (25,096)	$ (34,700)	$ (8,097)	$ (12,977)
Cash (used in) provided by investing activities	(8,969)	20,658	7,294	(74,428)
Cash provided by (used in) financing activities	34,289	120,304	(12)	(56)
Net increase (decrease) in cash and cash equivalents and restricted cash	$ 224	$ 106,262	$ (815)	$ (87,461)

Cash Flows from Operating Activities

For the year ended December 31, 2018, cash used in operating activities was $34.7 million, which consisted of a net loss of $37.9 million, partially offset by $2.9 million in non-cash charges and a net change of $378,000 in our net operating assets and liabilities. The non-cash charges primarily consisted of stock-based compensation of $1.4 million and depreciation and amortization of $1.4 million. The change in operating assets and liabilities was primarily due to the net effect of an increase in payables and accruals of $1.8 million and an increase in prepaid expenses and other current assets of $1.4 million resulting from the timing of payments made for research and development activities.

For the year ended December 31, 2017, cash used in operating activities was $25.1 million, which consisted of a net loss of $27.5 million, partially offset by $1.6 million in non-cash charges and a net change of $871,000 in our net operating assets and liabilities. The non-cash charges consisted of depreciation and amortization of $1.2 million and stock-based compensation of $409,000. The change in operating assets and liabilities was primarily due to a decrease in prepaid expenses and other current assets of $596,000 resulting from the timing of payments from service agreements.

For the three months ended March 31, 2019, cash used in operating activities was $13.0 million, which consisted of a net loss of $13.6 million, partially offset by $1.2 million in non-cash charges and a net change of $626,000 in our net operating assets and liabilities. The non-cash charges consisted of depreciation and amortization of $397,000 and stock-based compensation of $776,000. The change in operating assets and liabilities was primarily due to an increase in prepaid expenses and other current assets of $562,000 resulting from the timing of payments from service agreements.

For the three months ended March 31, 2018, cash used in operating activities was $8.1 million, which consisted of a net loss of $7.7 million, partially offset by $419,000 in non-cash charges and a net change of $860,000 in our net operating assets and liabilities. The non-cash charges consisted of depreciation and amortization of $326,000 and stock-based compensation of $113,000. The change in operating assets and liabilities was primarily due to a decrease in accrued expenses of $1.0 million resulting from the payment of annual bonus compensation.

Cash Flows from Investing Activities

For the year ended December 31, 2018, cash provided by investing activities of $20.7 million was primarily attributable to maturities of investments totaling $22.4 million, partially offset by investments in property and equipment of $1.8 million.

For the year ended December 31, 2017, cash used in investing activities of $9.0 million was primarily related to $7.6 million in net purchases of investments along with $1.4 million of investments in property and equipment.

For the three months ended March 31, 2019, cash used in investing activities of $74.4 million was primarily related to $74.3 million in net purchases of investments. For the three months ended March 31, 2018, cash provided by investing activities of $7.3 million was primarily related to $7.4 million in net maturities of investments.

Cash Flows from Financing Activities

For the year ended December 31, 2018, cash provided by financing activities of $120.3 million was related primarily to $125.0 million in cash proceeds received from the September 2018 issuance of our Series C1 convertible preferred stock and our Series C2 convertible preferred stock, net of $4.7 million of issuance costs.

For the year ended December 31, 2017, cash provided by financing activities of $34.3 million was related primarily to $35.0 million in cash proceeds received from the August 2017 issuance of our Series B convertible preferred stock, net of $667,000 of issuance costs.

For the three months ended March 31, 2018 and 2019, cash used in financing activities of $12,000 and $56,000, respectively, primarily related to the payment of lease obligations.

Contractual Obligations and Other Commitments

The following table summarizes our contractual obligations as of March 31, 2019:

	Payments Due by Period				
	Less than 1 Year	1 to 3 Years	4 to 5 Years	More than 5 Years	Total
	(in thousands)				
Contractual obligations:					
Operating lease obligations	$ 3,378	$ 4,500	$ —	$ —	$ 7,878
Capital lease obligations	52	93	—	—	145
Total contractual obligations	$ 3,430	$ 4,593	$ —	$ —	$ 8,023

The operating lease obligations noted above represent operating lease obligations related to our currently occupied premises at 500 Saginaw Drive in Redwood City, California. These leases expire in the first half of 2020 and we are currently evaluating locations for a new corporate headquarters. Additionally, in January 2019, we entered into a commercial lease agreement for an additional 33,000 square feet of office space in a separate facility. The lease term commenced on March 1, 2019 and expires 36 months from the commencement date. The initial base rent is approximately $181,000 per month and represents a total minimum rental commitment under the lease of approximately $6.7 million.

The capital lease obligations noted above represent certain property and equipment we acquired under capital leases. In 2017, we financed purchases of $226,000 in equipment under a capital

lease agreement. Outstanding amounts under the capital lease agreements are generally secured by liens on the related property and equipment.

In addition, we enter into contracts in the normal course of business with contract research organizations for preclinical and clinical studies as well as with contract development manufacturing organizations for the manufacture of materials for those studies. These agreements generally provide for termination at the request of either party with less than one-year notice and are, therefore, cancelable contracts and not reflected in the table above.

Off-Balance Sheet Arrangements

Since inception, we have not engaged in any off-balance sheet arrangements, as defined in the rules and regulations of the SEC.

Quantitative and Qualitative Disclosures about Market Risk

The primary objectives of our investment activities are to ensure liquidity and to preserve capital. We are exposed to market risks in the ordinary course of our business. These risks include interest rate sensitivities. We held cash, cash equivalents and investments of $114.5 million and $100.7 million as of December 31, 2018 and March 31, 2019, respectively. We generally hold our cash in interest-bearing money market accounts. Historical fluctuations in interest rates have not been significant for us. Due to the short-term maturities of our cash equivalents and the low risk profile of our investments, an immediate 100 basis point change in interest rates would not have a material effect on the fair market value of our cash equivalents or investments.

Critical Accounting Policies and Estimates

Our management's discussion and analysis of our financial condition and results of operations is based on our financial statements, which have been prepared in accordance with generally accepted accounting principles. The preparation of these financial statements requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the financial statements, as well as the reported revenue generated, and reported expenses incurred during the reporting periods. Our estimates are based on our historical experience and on various other factors that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying value of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

While our significant accounting policies are described in the notes to our financial statements included elsewhere in this prospectus, we believe that the following critical accounting policies are most important to understanding and evaluating our reported financial results.

Research and Development Expenses and Accrued Research and Development Costs

We expense research and development costs as incurred. Research and development expenses consist of personnel costs for our research and product development employees. Also included are non-personnel costs such as professional fees payable to third parties for preclinical studies, clinical trials and research services, laboratory supplies and equipment maintenance and depreciation, intellectual property licenses and other consulting costs.

We estimate preclinical studies, clinical trials and research expenses based on the services performed, pursuant to contracts with research institutions that conduct and manage preclinical studies, clinical trials and research services on our behalf. We estimate these expenses based on discussions with management and external service providers as to the progress or stage of

completion of services and the contracted fees to be paid for such services. We record the estimated costs of research and development activities based upon the estimated amount services provided but not yet invoiced, and include these costs in development expenses. We accrue for these costs based on factors such as estimates of the work completed and in accordance with agreements established with our third party service provides under the service agreements. We make significant judgments and estimates in determining the accrued liabilities balance in each reporting period. As actual costs become known, we adjust our accrued liabilities. We have not experienced any material differences between accrued costs and actual costs incurred. However, the status and timing of actual services performed may vary from our estimates, resulting in adjustments to expense in future periods. Changes in these estimates that result in material changes to our accruals could materially affect our results of operations. Payments associated with licensing agreements to acquire exclusive license to develop, use, manufacture and commercialize products that have not reached technological feasibility and do not have alternate future use are expensed as incurred.

Payments made to third parties under these arrangements in advance of the performance of the related services by the third parties are recorded as prepaid expenses until the services are rendered. We evaluate these payments for current or long-term classification based on when we expect to receive these services.

Stock-Based Compensation

We maintain a stock-based compensation plan as a long-term incentive for employees, consultants and members of our board of directors. The plan allows for the issuance of non-statutory options, or NSOs, incentive stock options, restricted stock and restricted stock units to employees and NSOs to nonemployees.

Stock-based payments are measured using fair-value-based measurements and recognized as compensation expense over the service period in which the awards are expected to vest. Our fair-value-based measurements of awards to employees and directors as of the grant date utilize the single-option award-valuation approach, and we use the straight-line method for expense attribution. The valuation model used for calculating the estimated fair value of stock awards is the Black-Scholes option-pricing model. The Black-Scholes model requires us to make assumptions and judgments about the variables used in the calculations, including the expected term (weighted-average period of time that the options granted are expected to be outstanding), the expected volatility of our common stock, the related risk-free interest rate and the expected dividend. We have elected to recognize forfeitures of stock-based payment awards as they occur.

For stock-based awards issued to non-employees, we record expense related to stock options based on the fair value of the options calculated using the Black-Scholes option-pricing model over the service performance period.

The Black-Scholes option-pricing model requires the use of highly subjective assumptions which determine the fair value of stock-based awards. These assumptions include:

- *Expected Term.* The expected term represents the period that stock-based awards are expected to be outstanding. The expected term for option grants is determined using the simplified method. The simplified method deems the term to be the average of the time-to-vesting and the contractual life of the stock-based awards.
- *Expected Volatility.* Since we have been privately held and do not have any trading history for our common stock, the expected volatility was estimated based on the average volatility for comparable publicly traded biotechnology companies over a period equal to the

expected term of the stock option grants. The comparable companies were chosen based on their similar size, stage in the life cycle or area of specialty.

- *Risk-Free Interest Rate.* The risk-free interest rate is based on the U.S. Treasury zero coupon issues in effect at the time of grant for periods corresponding with the expected term of option.
- *Expected Dividend.* We have never paid dividends on our common stock and have no plans to pay dividends on our common stock. Therefore, we used an expected dividend yield of zero.

Fair Value of Common Stock

Historically, for all periods prior to this initial public offering, the fair values of the shares of common stock underlying our stock-based awards were determined on each grant date by our board of directors. Given the absence of a public trading market for our common stock, our board of directors exercised reasonable judgment and considered a number of objective and subjective factors to determine the best estimate of the fair value of our common stock, including our stage of development; our actual operating results and financial performance; progress of our research and development efforts; conditions in the industry and economy in general; the rights, preferences and privileges of our convertible preferred stock relative to those of our common stock; the likelihood of achieving a liquidity event for the holders of our common stock, such as an initial public offering or a sale of our company, given prevailing market conditions; equity market conditions affecting comparable public companies; the lack of marketability of our common stock and the results of independent third party valuations. Valuations of our common stock were prepared by an unrelated third party valuation firm in accordance with the guidance provided by the American Institute of Certified Public Accountants 2013 Practice Aid, Valuation of Privately-Held-Company Equity Securities Issued as Compensation.

For our valuations performed prior to August 31, 2018, we used the Option Pricing Model Backsolve method to estimate the fair value of our common stock. In an option pricing method, or OPM, framework, the backsolve method for inferring the equity value implied by a recent financing transaction involves making assumptions for the expected time to liquidity, volatility and risk-free rate and then solving for the value of equity such that value for the most recent financing equals the amount paid. Furthermore, as of each of the valuation dates prior to August 31, 2018, we were at an early stage of development and future liquidity events were difficult to forecast. We applied a discount for lack of marketability to account for a lack of access to an active public market.

For valuations on or after August 31, 2018, we utilized a hybrid approach that primarily relies on the probability-weighted expected return method, or PWERM, an accepted valuation method under the American Institute of Certified Public Accountants Practice Guide, for determining the fair value of our common stock. The PWERM is a scenario-based analysis that estimates the value per share of common stock based on the probability-weighted present value of expected future equity values for the common stock, under various possible future liquidity event scenarios, in light of the rights and preferences of each class of stock, discounted for a lack of marketability. Under our hybrid approach, the Option Pricing Model Backsolve approach was utilized to determine the fair value of our common stock in certain of the scenarios used in the PWERM approach.

After the closing of this offering, our board of directors will determine the fair value of each share of underlying common stock based on the closing price as reported on the date of grant on the primary stock exchange on which our common stock is traded.

The intrinsic value of all outstanding options as of March 31, 2019 was $25.7 million based on $17.00 per share, the midpoint of the price range set forth on the cover page of this prospectus.

On April 5, 2019 and on May 23, 2019, we granted options to purchase an aggregate of 657,643 shares of common stock to our employees, directors and consultants. A majority of these options vest over a four-year period, with the remaining vesting over a three-year period. The total compensation expense for these unvested options is expected to be approximately $6.7 million and recognized over the service term of three to four years.

Recent Accounting Pronouncements

See Note 2 to our audited financial statements included elsewhere in this prospectus for more information.

Internal Control over Financial Reporting

In connection with the audit of our financial statements, we and our independent registered public accounting firm identified a material weakness in our internal control over financial reporting. The material weakness related to a lack of application-based controls inherent in our enterprise resource planning, or ERP, system used for maintaining our financial books and records. A material weakness is a deficiency, or a combination of deficiencies, in internal control over financial reporting such that there is a reasonable possibility that a material misstatement of our financial statements will not be prevented or detected on a timely basis. If we fail to establish and maintain effective internal control over financial reporting in the future, our operating results and our ability to operate our business could be harmed.

We are implementing measures designed to improve our internal control over financial reporting to remediate this material weakness. We have implemented a new ERP system that is our system of record for our financial books and records from January 1, 2019 forward. This new ERP system has strong application-based controls inherent in its design that provide a much stronger internal control infrastructure for financial reporting and for our internal control procedures. With the oversight of senior management and our audit committee, we have begun taking steps to remediate the underlying causes of the material weakness.

We and our independent registered public accounting firm were not required to perform an evaluation of our internal control over financial reporting as of December 31, 2017 and 2018 in accordance with the provisions of the Sarbanes-Oxley Act. Accordingly, we cannot provide assurance that we have identified all, or that we will not in the future have additional, material weaknesses. Material weaknesses may still exist when we report on the effectiveness of our internal control over financial reporting as required by reporting requirements under Section 404 of the Sarbanes-Oxley Act after the completion of this offering.

Emerging Growth Company Status

We are an emerging growth company, as defined in the JOBS Act. Under the JOBS Act, emerging growth companies can delay adopting new or revised accounting standards issued subsequent to the enactment of the JOBS Act until such time as those standards apply to private companies.

We elected to use this extended transition period for complying with new or revised accounting standards, including but not limited to the new lease accounting standard, that have different effective dates for public and private companies until the earlier of the date that we (i) are no longer an emerging growth company or (ii) affirmatively and irrevocably opt out of the extended transition period provided in the JOBS Act. As a result, these financial statements may not be comparable to companies that comply with the new or revised accounting pronouncements as of public company effective dates. We early adopted Accounting Standards Update 2014-09, *Revenue from Contracts*

with Customers (Accounting Standards Codification Topic 606), and Accounting Standards Update 2018-07, *Improvements to Nonemployee Share-Based Payment Accounting (Accounting Standards Codification Topic 718)*, as the JOBS Act does not preclude an emerging growth company from early adopting a new or revised accounting standard earlier than the time that such standard applies to private companies. We expect to use the extended transition period for any other new or revised accounting standards during the period in which we remain an emerging growth company.

We will remain an emerging growth company until the earliest of (i) the last day of our first fiscal year (a) following the fifth anniversary of the completion of this offering, (b) in which we have total annual gross revenues of at least $1.07 billion or (c) in which we are deemed to be a large accelerated filer, which means the market value of our common stock that is held by non-affiliates exceeds $700.0 million as of the prior June 30th and (ii) the date on which we have issued more than $1.0 billion in non-convertible debt securities during the prior three-year period.

BUSINESS

Overview

We are a biopharmaceutical company utilizing our differentiated platform to discover and develop novel antibody-based immunotherapeutics to treat a range of solid tumor types. While more traditional oncology drug discovery approaches attempt to generate antibodies against known targets, our approach relies on the human immune system to direct us to unique antibody-target pairs from patients experiencing a clinically meaningful, active immune response against their tumors. These unique antibody-target pairs represent a potentially novel and previously unexplored landscape of immuno-oncology targets. We believe the fact that our approach has the potential to deliver novel, previously unexplored immuno-oncology targets provides us with a significant competitive advantage over traditional approaches which focus on known targets that many companies are aware of and can pursue. We have utilized our drug discovery approach to identify over 1,400 distinct human antibodies that bind preferentially to tumor tissue from patients who are not the source of the antibody. Our lead product candidate, ATRC-101, is a monoclonal antibody with a novel mechanism of action and target derived from an antibody identified using our discovery platform. ATRC-101 reacts *in vitro* with a majority of human ovarian, non-small cell lung, colorectal and breast cancer samples from multiple patients. It has demonstrated robust anti-tumor activity as a single agent in multiple preclinical models, including one model in which PD-1 checkpoint inhibitors typically display limited activity. We anticipate filing an Investigational New Drug, or IND, application for ATRC-101 in late 2019 and initiating a Phase 1b clinical trial in patients with solid tumors in early 2020, subject to U.S. Food and Drug Administration, or FDA, approval of our IND application.

Our discovery process begins by gathering blood samples, mostly through company-sponsored non-interventional clinical studies, from cancer patients before, during and after they undergo treatment, which can induce an active anti-tumor immune response. Through this process, we have built a broad repository of over 1,200 samples from over 400 donors, representing over 25 different solid tumor types. We identify those patients with clinically meaningful responses to therapy, defined as those that reach validated surrogate endpoints of complete or partial response, stable disease for six months, or long-term progression-free survival. For those patients, we then examine their samples for rare antibody-producing B cells called plasmablasts that are elevated during an active immune response. We believe that these human immune responses, which often occur over an extended period of time, generate antibodies accessible with our platform that would be difficult to obtain through shorter term, non-human immunization or *in vitro* strategies.

If plasmablasts are elevated in a particular sample, we then employ a multi-step process to generate a potential product candidate. We start by isolating single plasmablasts and determining the sequences of the co-expressed antibody genes using our proprietary Immune Repertoire Capture® technology. We analyze these sequences to select antibodies, which we synthesize as recombinant proteins. We then test these antibodies to identify those that bind to tumor tissue from patients who are not the source of the antibody, referred to as non-autologous tumor tissue, preferentially over normal tissue. We then analyze these "hit" antibodies using a number of *in vitro* and *in vivo* assays, and often make structural changes to generate leads. A select number of these leads are refined further using protein engineering to enhance their drug-like properties as we identify and characterize their targets in parallel prior to initiating preclinical development and IND-enabling studies.

Key attributes of our discovery platform

We take an "open-aperture" approach to drug discovery, in which we are not limited by preconceptions of what constitutes a viable antibody or target. We instead allow the human immune system to direct our efforts. We believe this approach provides us access to a broad underexploited

antibody and drug target space. Our approach may lead us to antibodies that are unlikely to have arisen via more traditional approaches with targets that otherwise may not have been discoverable. We believe our approach and discovery platform provide us with the ability to:

- Generate antibodies made by the human immune system.
- Deliver potentially useful antibodies at a high rate and in a scalable fashion.
- Access a potentially large and underexploited tumor target space.
- Identify antibody-target pairs.
- Generate candidates that direct the immune system to attack tumor tissue.
- Develop potential treatments for large populations of patients across multiple tumor types.

Our lead product candidate: ATRC-101

Our lead product candidate, ATRC-101, is a monoclonal antibody derived from an antibody identified using our discovery platform and having robust preclinical anti-tumor activity. ATRC-101 functions through a novel mechanism of action, which we refer to as Driver Antigen Engagement. Driver Antigen Engagement involves systemic delivery of an agent that causes extensive remodeling of the tumor microenvironment and the destruction of tumor cells via both the innate and adaptive immune systems. We believe that the mechanism of action and target of ATRC-101 are unlike those of other anti-tumor antibodies that have been or are currently in clinical development. We have identified the target of ATRC-101 as a ribonucleoprotein (RNP) complex. ATRC-101 binds to target reconstituted *in vitro* using a single recombinant protein, polyadenylate-binding protein 1, and *in vitro* transcribed poly(A) RNA.

ATRC-101, currently our only product candidate, represents one of over 1,400 antibodies that we have identified to date through our discovery platform that may have potential to generate broad anti-tumor activity via a variety of mechanisms of action. While we believe that we will be able to exploit our growing library of novel antibodies in order to develop product candidates with additional distinct and compelling mechanisms of action for tumor destruction, many of these antibodies will likely not yield product candidates for a variety of reasons. For example, we have identified antibodies that can be coupled to T cell-activating domains in a bispecific format to kill tumor cells; others that directly target tumor cells leading to immune cell-mediated killing; and others that internalize upon binding to tumor cells and therefore may be able to deliver coupled toxins, but less than 25% of the antibodies in our hit library demonstrate one of these mechanisms. In addition, in order to be able to develop product candidates from our hit library in certain of these mechanisms, such as bispecific T cell engagers and antibody-drug conjugates, we will need to partner with biotech companies that have developed technologies that enable engineering our antibodies into these formats. We are actively pursuing such collaborative partnerships, and plan to allocate resources to these efforts as part of our shift to focus our drug discovery efforts around building out a proprietary pipeline of clinical candidates.

Our management team and institutional investors

We are led by a highly experienced management team with deep scientific and technical expertise and broad experience in discovering, developing and commercializing antibody therapeutics in oncology. Members of our executive team have founded multiple biopharmaceutical companies and have experience in senior roles at leading oncology firms including Genentech, Merck, Amgen, Pfizer, MedImmune and ARMO Biosciences. The breadth of our team's experience includes leading informatics and computational biology teams at Genentech and Merck, running clinical trials for novel antibody constructs at Amgen and leading the launch and commercialization of multiple products at Relypsa and the BioOncology Business Unit at Genentech. Additionally, members of our team have served as faculty members, established new laboratories or led research

initiatives at institutions including the University of California, Berkeley and the Fred Hutchinson Cancer Research Institute.

Since our founding, we have raised a total of $219 million in equity financing primarily from leading institutional investors including funds managed by Aisling Capital, Boxer Capital of the Tavistock Group, Cormorant Asset Management, EcoR1 Capital, Redmile Group, Samsara BioCapital and Tekla Capital Management. For more information on our investors, see "Principal Stockholders".

Our Strategy

Our goal is to become a leading biopharmaceutical company by utilizing our differentiated platform to discover and develop antibody-based therapeutics against novel targets. In pursuit of that strategy we intend to:

- **Rapidly advance our lead product candidate, ATRC-101, into clinical trials in multiple types of solid tumors.** ATRC-101 is the first candidate identified using our discovery platform that we plan to advance into clinical trials. ATRC-101 displays broad reactivity across a variety of human solid tumor samples and has demonstrated potent single-agent anti-tumor activity in preclinical models via a unique mechanism of action, which we term Driver Antigen Engagement. We intend to file an IND application with the FDA for ATRC-101 in late 2019 and to evaluate this candidate in the clinical setting as both a monotherapy and in combination with other agents in multiple types of solid tumors.

- **Continue efforts to develop a pipeline of antibody-based product candidates for oncology.** While our only product candidate that we are currently moving into clinical development is ATRC-101, we have utilized our differentiated drug discovery approach to identify over 1,400 distinct human antibodies targeting human tumors that can potentially provide the basis for additional product candidates. Our ongoing efforts are focused on identifying, analyzing and refining antibodies to generate clinical candidates that take advantage of various mechanisms of action and novel targets. We engineer some of our antibodies into various drug formats, such as bispecific antibodies, to drive anti-tumor activity. We intend to build out a proprietary pipeline of product candidates addressing large populations of patients across a range of solid tumors. We currently own worldwide rights to the oncology product candidates derived from our platform.

- **Continue to invest in our discovery platform for applications within oncology and potential indications outside of oncology.** A key pillar of our discovery platform is our proprietary sample repository, which includes over 1,200 blood-derived samples sourced from over 400 patients representing over 25 different types of solid tumors. We plan to expand the scope of our repository and enhance other portions of our platform in order to maintain our leadership position in the identification of novel targets in non-autologous tumor tissue and antibodies that bind to them. We also plan to enhance our capabilities to translate these proprietary findings into product candidates. We believe our differentiated approach may have applications across a variety of diseases that involve an active immune response, including some outside of oncology.

- **Selectively enter into collaborations to enhance and expand our product pipeline as well as our drug development capabilities.** We believe that the single agent anti-tumor activity of many of the antibodies discovered using our platform could be enhanced by incorporating potential collaborator technologies. We intend to selectively form collaborations with partners to gain access to complementary technologies and expertise in order to develop product candidates with increased potential for anti-tumor activity. We may

also enter into agreements to extend the reach of our platform outside oncology, such as our existing agreement with the Bill & Melinda Gates Foundation.

- **Continue to expand our intellectual property portfolio to further protect our discovery platform and the novel product candidates it may generate.** The intellectual property surrounding our platform consists of patents and patent applications, trade secrets and know-how, and we plan to expand our intellectual property as we continue to develop our platform. We also intend to protect our product candidates by pursuing composition-of-matter and method-of-use patents typical for antibody-based therapeutics. Furthermore, as our platform identifies novel antibody-target pairs in which a human antibody may bind to a previously underappreciated target in a useful manner, we plan to pursue additional intellectual property supporting our candidates deriving from their interactions with targets.

Our Strengths

We believe that the following key attributes and assets will enable us to execute on our strategy and become a leading biopharmaceutical company:

- Lead immunotherapeutic product candidate directed at potentially large patient populations across multiple oncology indications with a novel mechanism of action and robust preclinical data.
- Strongly differentiated and industrialized discovery platform that accesses a potentially large and underexploited target space to generate product candidates derived from human immune responses targeting tumors.
- Growing library of more than 1,400 human antibodies directed to targets in non-autologous tumor tissue that can be exploited to generate product candidates.
- Deep scientific, research and development and operational expertise supporting the discovery and development of cutting-edge product candidates.
- Leading institutional investors with a long-term outlook and alignment with our management to build a pioneering company.

Background on Cancer and Cancer Immunotherapeutics

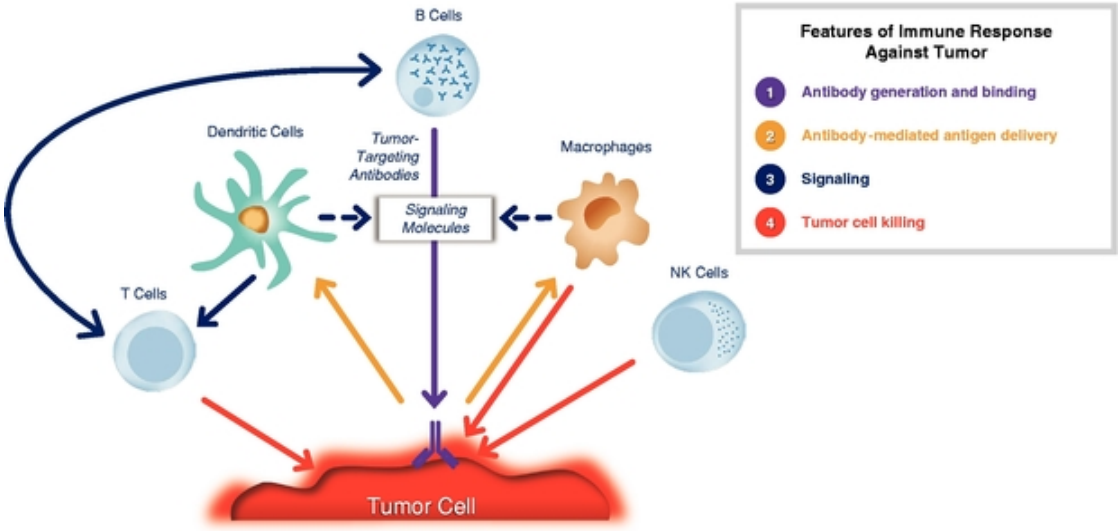
Cancer is a broad group of diseases in which cells divide and grow in an uncontrolled fashion, often spreading and forming malignancies that invade other parts of the body. According to the Centers for Disease Control and Prevention, cancer is the second leading cause of death in the United States with more than 600,000 deaths annually. In 2018, there were an estimated 1.7 million new cases of cancer diagnosed.

The most common methods of treating patients with cancer are surgery, radiation and drug therapy. Among cancer drug therapies, cancer immunotherapy, sometimes referred to broadly as immuno-oncology, is playing an increasingly important role. The goal of cancer immunotherapy is to direct a patient's own immune system to destroy tumor tissue. Though challenges remain, immuno-oncology products have enjoyed substantial commercial success.

The immune system

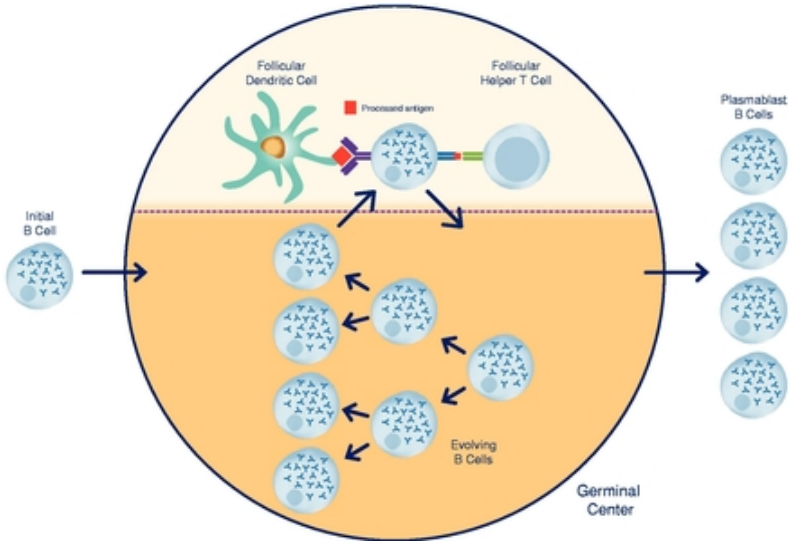
The immune system detects and defends the human body from invading pathogens and identifies and eliminates abnormal cells. It is comprised of two subsystems: the innate and adaptive immune systems. The innate immune system includes cells such as macrophages, dendritic cells and natural killer, or NK, cells. The adaptive immune system provides an evolving defense mechanism and includes B cells, which generate antibodies, and T cells, which are responsible for cell-mediated adaptive immunity.

Immune cells such as T cells, macrophages and NK cells can kill tumor cells directly. Other immune cells are involved in destroying tumor cells more indirectly, via shaping the immune response overall and by influencing and directing these killing cells. Signaling molecules, such as cytokines, which are made by many immune cells, play an important role in shaping immune responses, and some cells, such as dendritic cells and B cells, are involved in instructing T cells via cell-to-cell contacts. The antibodies made by B cells function by binding to the target or antigen they are generated against. Antibodies that bind to tumor cell targets play multiple roles in anti-tumor immune responses: to act as "signposts" for NK cells and macrophages to identify and kill tumor cells, to stimulate macrophages and dendritic cells and to enable them to instruct T cells how to target and kill tumor cells. Various players involved in the adaptive immune system and the innate immune system are illustrated in the figure below:



Affinity maturation and plasmablasts generation. B cells evolve during an active immune response to produce antibodies that bind to their targets with increasing specificity and affinity. Antigens are the targets, or portions of targets, that induce an adaptive immune response. The process through which B cell antibodies become better at recognizing and binding to their antigens is called affinity maturation. Affinity maturation takes place in tissues called germinal centers, which are located in lymph nodes and elsewhere, often near tumors. B cells enter the germinal centers, where they encounter types of dendritic cells and T cells, termed "follicular", that present to them processed antigens, including tumor antigens. The antigen presentation provides signals to drive both division of the B cell and mutation in its antibody protein sequences. The better the binding by its antibody to antigen, the stronger the signal a B cell receives to divide and evolve its antibody sequences. Eventually, through rounds of this process driven by antigen binding, groups of B cells with evolved, related antibodies, or clonal families, are generated and released from the germinal centers as B cells called plasmablasts. These cells can be found in the blood, and elevated numbers

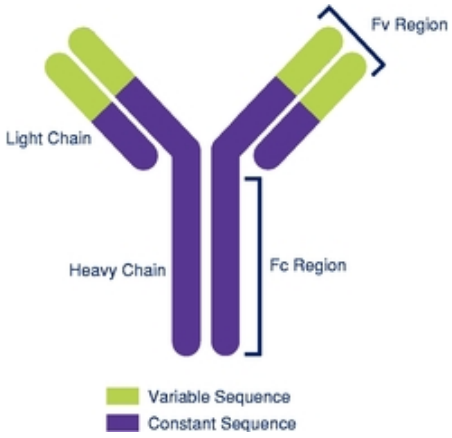
of plasmablasts indicate an active immune response. The affinity maturation process and plasmablast generation are illustrated in the figure below:



Affinity maturation is capable of evolving antibodies that can bind well to antigens of many different molecular types. It is thought that the immune system is capable of generating an antibody that can bind to virtually any antigen. Thus, plasmablasts and their antibodies may, in principle, provide a means to identify the targets of an active immune anti-tumor response.

Components of an antibody. An antibody belongs to one of five classes (IgG, IgM, IgA, IgE or IgD) and, for IgG or IgA, belong to a specific subclass, such as IgG1 and IgG2a. An antibody of the IgG class is a Y-shaped protein made of two copies each of two different protein chains, called the heavy chain and the light chain. The heavy chain and light chain each have variable sequences, tailored typically by affinity maturation, that differ substantially from antibody to antibody, as well as sequences that are nearly constant among IgG antibodies, differing slightly across IgG subclasses. The variable sequences of one heavy chain and one light chain together form a functional region called the variable, or Fv, region, and as a result, each IgG antibody has two Fv regions. The Fv region is the portion of an antibody that binds to its antigen. Because Fv regions are formed from variable sequences, they are typically different across antibodies. Another important functional region of an antibody is formed by the constant sequences of the two heavy chains together and is called the Fc region. The Fc region does not interact with antigens but rather interacts with components of the immune system, including immune system cells. It interacts with these cells through a family of receptors expressed by these cells called IgG Fc receptors, or FcRs. These interactions allow antibodies to generate signals in and to be used by immune cells. Different types of immune system cells typically express different subsets of FcRs. Due to sequence differences, Fc regions differ across species and need to be matched with species-specific FcRs for maximum potency. Fc regions also differ enough in sequence across IgG subclasses within a species to bind with different

potencies to different FcRs. The following is a visual representation of the components that make up an antibody:



Current immunotherapeutic approaches

First-generation immunotherapies included early cancer vaccines, immune stimulants such as interferon-a and interleukin-2, and other cytokine drugs. These early immunotherapies provided important validation of the immune system's potential to treat cancer but were hindered by significant limitations such as low response rates and side effects.

As the field of immuno-oncology has evolved, new cancer immunotherapy approaches have emerged, including cellular and immune cell-engaging therapies, immunomodulators, antigen-directed therapies and checkpoint inhibitors. These approaches have built upon advances in our understanding of immune system function and tumor biology to create sophisticated therapeutic interventions intended to promote and enhance the body's immune response to cancer. Checkpoint inhibitors in particular have shown promising therapeutic effect and have been incorporated into the current standard of care for many types of cancer. Despite this broad adoption, only a minority of patients demonstrate clinical benefit from checkpoint inhibition. For example, a meta-analysis of 12 published well-controlled trials of PD-1 or PD-L1 checkpoint inhibitors found that 2.2% of patients achieved complete responses compared with 0.5% of control patients. Partial responses were seen in 18.9% of treated patients compared to 8.9% of control patients. These results are indicative of a significant treatment gap, representing a large, unmet need for the majority of cancer patients who fail to obtain clinical benefit from currently available therapeutics.

Challenges in cancer immunotherapy drug discovery and development

The development of cancer immunotherapies typically requires the identification of a therapeutic target and generation of a molecule, often an antibody, to interact with that target. Historically, this discovery of targets for cancer immunotherapies has been driven by genetic sequencing and proteomic analysis of tumors as well as by hypotheses regarding how the binding to particular targets by antibodies, among other approaches, might impact disease. Once a target has been established, drug developers generate a human or humanized antibody to engage that target. Today, human antibodies are generated in multiple organisms, including humanized rodents, and in multiple *in vitro* discovery systems.

We believe this process suffers from certain limitations, including:

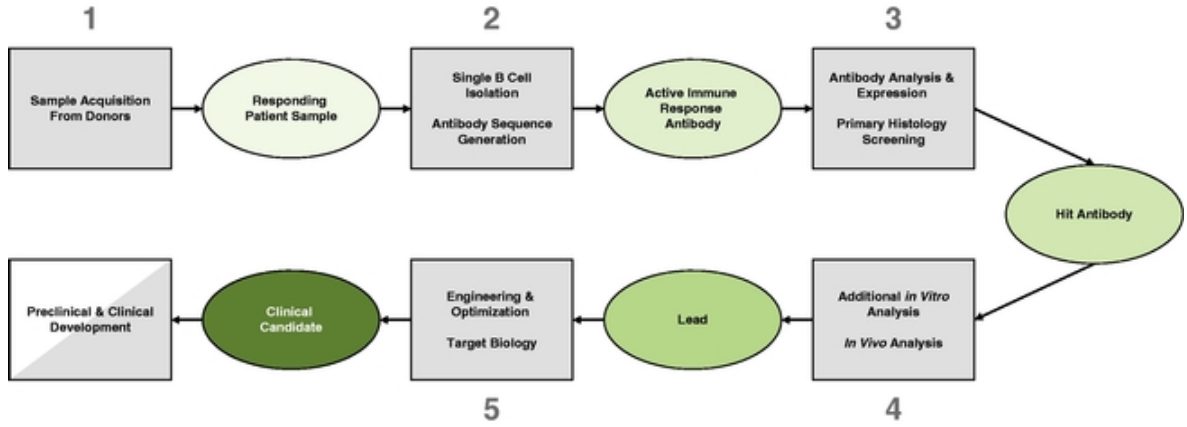
- § focus on a limited set of potential targets relative to the full range of potential targets that exist;

- identifying traditional amino acid-based protein antigens, but generally not other classes of potential tumor targets;
- targets having potentially uncertain therapeutic relevance; and
- generating antibodies relying on non-human systems that interact with targets outside their physiological context over a relatively brief period of time.

Our Solution: The Atreca Drug Discovery Platform

We believe we may be able to address certain key limitations of the current immuno-oncology drug discovery paradigm by focusing on the common phenomenon driving clinical responses in cancer immunotherapy—an active human anti-tumor immune response. Our platform allows us to interrogate an active B cell response within an individual cancer patient to identify novel and relevant antibody-target pairs, which may enable us to develop antibody-based product candidates to treat large populations of patients with solid tumors. The figure below illustrates the overall concept of our drug discovery approach:

We built our discovery platform to enable the pursuit of our open-aperture approach to drug discovery and development. The steps in our process are as follows:



1. Our discovery process begins by gathering blood samples, mostly through company-sponsored non-interventional clinical studies, from cancer patients before, during and after they undergo treatment, which can induce an active anti-tumor immune response. We identify those patients with clinically meaningful responses to therapy, defined as those that reach validated surrogate endpoints of complete or partial response, stable disease for six months, or long-term progression-free survival. For those patients, we then examine their samples for rare antibody-producing B cells called plasmablasts that are elevated during an active immune response. We have built a broad repository of over 1,200 samples from over 400 donors, representing over 25 different solid tumors.

2. If we determine plasmablasts are elevated in a particular sample, we then isolate single plasmablasts and sequence the co-expressed heavy and light chain antibody genes. To do this, we use our proprietary Immune Repertoire Capture® technology, which enables us to accurately reconstruct the original antibody sequences from a single B cell in parallel with other B cells in the sample.

3. We analyze these sequences and select antibodies to synthesize as recombinant proteins for further analysis in the laboratory. We generally select approximately one percent of the identified antibodies for wet-lab analysis. In this group, we identify hit antibodies that bind to tumor tissue from patients who are not the original source of the antibody and bind to tumor tissue preferentially over normal tissue.

4. We analyze the hit antibodies in a series of *in vitro* and *in vivo* assays, including multiple animal models. In some cases, we, alone or in the future with partners, may add, remove, or alter protein or other molecular components as we analyze the antibodies to generate relevant function, such as T cell engagement via a "bispecific" format. We refer to the antibodies or antibody-derived entities that we select for advancement from these assays as leads.

5. Finally, we convert some of these leads into potential clinical candidates by engineering them to enhance their binding, activity, stability, manufacturability and other properties. In parallel, we also conduct analyses to identify and characterize the antibody target.

   For additional information on our drug discovery platform and approach please see the section titled "Business—The Atreca Discovery Platform".

Key Attributes of our Discovery Platform

We believe our approach and discovery platform provide us with the following competitive advantages:

Our leads are derived from antibodies made by the human immune system. The antibodies from which we derive our leads have been generated by fully human immune systems in a fully human biological context. This suggests, and our experience confirms, that our antibodies will generally express well as recombinant proteins. They also have been generated through a process of affinity maturation and therefore typically have good affinity and specificity. Our antibodies are generated in human immune responses typically over many months, which we believe allows us to discover antibodies that would be difficult to obtain through shorter term, non-human immunization or *in vitro* strategies.

Our platform delivers potentially useful antibodies at a high rate and in a scalable fashion. The high rate at which our platform delivers potentially useful hit antibodies allows us to use multiple strategies and formats for generating pipeline assets, and provides the potential for multiple collaborations. This productivity also allows us to focus on the most promising hits and leads. Our hit generation process is also scalable and can continue to be expanded cost-effectively.

We are accessing a potentially large and underexploited tumor target space. Based on our current data as well as our understanding of the immune response, we believe we are accessing a potentially large and underexploited tumor target space. The human immune system recognizes a vast target space, which includes targets generated by phenomena such as variation in usage of parts of genes (exons), attachment of sugars (glycosylation) and other non-protein molecules, molecular complex formation, protein folding, expression and localization. We believe our differentiated platform and approach provide us access to yet-to-be explored opportunities.

Our platform identifies antibody-target pairs. Our discovery platform identifies antibodies binding to particular targets selected by the human immune response that generated the antibodies.

This is differentiated from traditional antibody drug discovery approaches, which require the separate development of an antibody directed to a predetermined target. We believe that our approach may provide an expedited path for discovering novel candidates that are more relevant for treating tumors.

Our platform delivers candidates that direct the immune system to tumor. Our approach is distinct from other strategies that interrupt signaling pathways between immune cells and tumor cells, such as checkpoint inhibitors, as well as other strategies that interrupt growth promoting pathways, such as HER2 and EGFR. We believe that our candidates can direct immune responses against tumors via multiple strategies, with different antigen-target pairs having different utility depending upon the format used.

Our product candidates have the potential to treat large populations of patients across multiple tumor types. In contrast with personalized therapies, our platform delivers candidates that bind to tumor from multiple patients beyond the donor patient. Our data suggest that many of these shared tumor targets will be expressed in multiple solid tumor types, increasing the potential range and utility of our treatments.

We believe that the significant time and capital we have invested in developing, refining and applying our differentiated discovery platform have provided us first-mover advantages and created barriers to entry. For example, establishing our non-interventional clinical studies to obtain patient samples, enabling longitudinal analyses, required approximately 1 to 2 years. We built our bioinformatics expertise in assembling and analyzing our antibodies over seven years of operations. Our hit antibody generation process has been enhanced to deliver hits at a high rate, has already generated over 1,400 hit antibodies and is supported by a growing intellectual property portfolio. Additionally, our investments of capital and time to build industrialized wet-lab and supporting bioinformatics capacity across our platform, including the time required to identify and hire very qualified personnel, were substantial.

Our Multiple Approaches for Drug Development

We classify potential leads based on mechanism of action, rather than by target. We are currently pursuing programs with distinct mechanisms of action, including:

Mechanism of Action	Description	Current Status
Driver Antigen Engagement	Tumor target binding by antibody activates the innate and adaptive immune systems to modify the tumor microenvironment and destroy tumor	ATRC-101 preclinical data demonstrate this mechanism of action and we are working to identify other antibody-target pairs that are active via this mechanism of action
T Cell Engagers	"Bispecifics" link tumor-targeting domains to domains that bind to T cells, simultaneously activating and directing T cells to the tumor for cell killing via T cell-dependent cellular cytotoxicity (TDCC)	Approximately 6% of our hit antibody Fv regions test positive in a single bispecific format in TDCC assays (>375 hit antibodies analyzed)
Directed Killing	With antibody-dependent cellular cytotoxicity (ADCC) or antibody-dependent cellular phagocytosis (ADCP), antibodies direct innate immune cells to kill tumor upon binding to them	Approximately 17% of our hit antibodies test positive in ADCC or ADCP assays (>375 hit antibodies analyzed)
Toxin-Conjugates (ADCs)	Cellular toxins are conjugated to internalizing tumor-targeting antibodies to generate cytotoxicity	Approximately 2% of our hit antibodies test positive in internalization assays (>700 hit antibodies analyzed)

Our Lead Candidate: ATRC-101 for the Treatment of Solid Tumors

Overview

ATRC-101 is a monoclonal antibody derived from an antibody identified using our discovery platform. We believe that ATRC-101 may have broad potential as an immunotherapeutic agent in a range of solid tumors. ATRC-101 reacts *in vitro* with a majority of human ovarian, non-small cell lung, colorectal and breast cancer samples from multiple patients. It has also demonstrated robust anti-tumor activity as a single agent in multiple preclinical syngeneic tumor models, including one model in which PD-1 checkpoint inhibitors typically display limited activity. ATRC-101 has also demonstrated preclinical activity in combination with other immunotherapeutics, including PD-1 checkpoint inhibitors. Both the mechanism of action of ATRC-101, which we refer to as Driver Antigen Engagement, and its target appear unlike those of other anti-tumor antibodies that have been or are currently in clinical development. In histology studies, we did not observe binding above background levels across a range of normal human tissues. Additionally, in repeat-dose safety studies in both mice and non-human primates, we did not observe a safety signal.

Before we can receive marketing approval for ATRC-101 from the FDA or other regulatory authorities, we must complete preclinical studies and then conduct extensive clinical trials to demonstrate the safety and efficacy of ATRC-101 in humans. We anticipate filing an IND for ATRC-101 in late 2019 and launching a Phase 1b clinical trial in patients with solid tumors in early 2020. Assuming we observe an acceptable safety profile, we then anticipate dosing ATRC-101 in combination with a PD-1 checkpoint inhibitor. ATRC-101 demonstrates the ability of our platform to generate antibody candidates with novel targets and mechanisms of action.

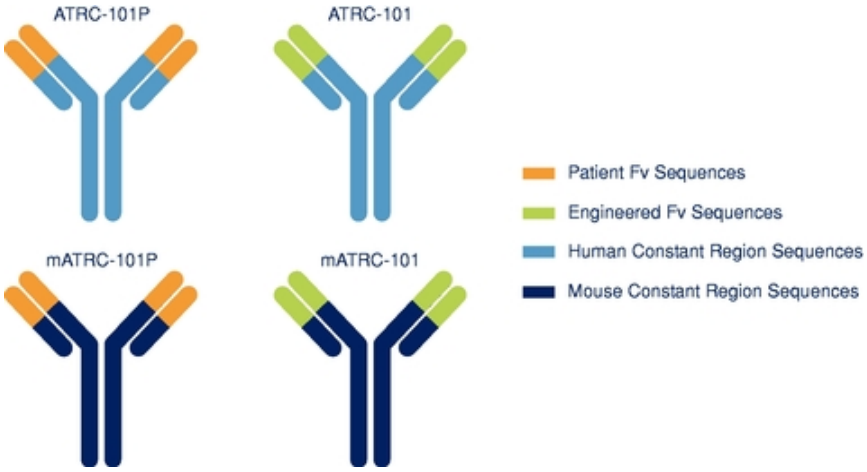
We own worldwide rights to ATRC-101 and have filed multiple U.S. provisional patent applications relating to ATRC-101 and other variants. We intend to submit a nonprovisional patent application in the first quarter of 2020.

Derivation of ATRC-101

ATRC-101 is the product candidate antibody that incorporates engineered versions of the Fv regions of an antibody found through our discovery platform by analyzing a sample from a lung adenocarcinoma patient who had benefited from immunotherapy. In order to generate ATRC-101, we made changes to the protein sequence of the antigen-binding Fv portion of the original patient antibody, and we grafted this modified Fv onto constant region sequences of the IgG1 subclass that have been used in other, successfully developed antibody drugs. We made these changes to the Fv portion to increase the antibody's drug-like qualities, such as stability and manufacturability, to reduce the risk of potential immunogenicity and to enhance its activity. The antibody we generated from these changes is our product candidate, ATRC-101.

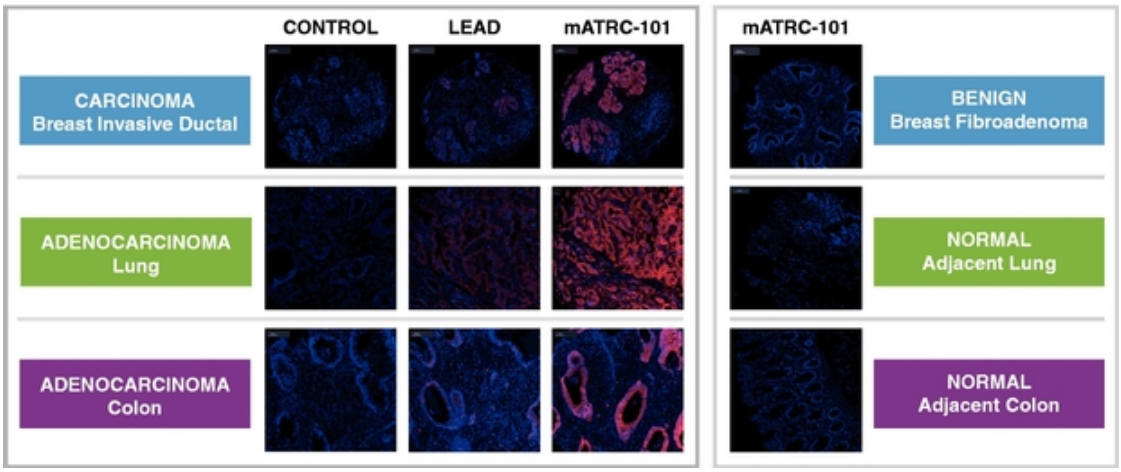
ATRC-101P is a fully human antibody with the patient's original and non-engineered Fv sequences, which was used in certain preclinical studies. Also during preclinical work, versions of ATRC-101 and ATRC-101P were used in which mouse constant region sequences were substituted for human constant region sequences. We refer to these antibodies as mATRC-101 and mATRC-101P. This substitution did not change the function of the Fv region, but it permitted a better evaluation of ATRC-101 and ATRC-101P in preclinical studies. For example, we usually made this substitution for syngeneic mouse tumor model studies, to enable better interaction of the antibody with FcRs on mouse immune cells, and in histological analyses on human tissue, to reduce

background signal. The various versions of the antibody that were used in preclinical studies are illustrated below:



Human tumor reactivity

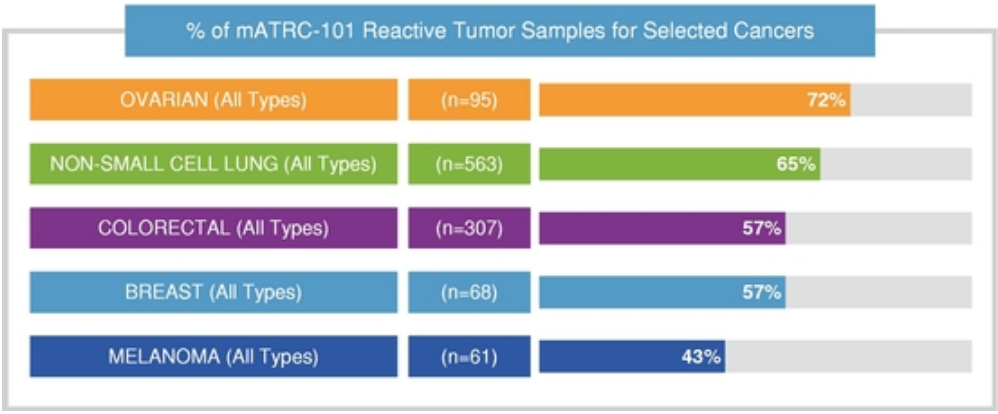
We have tested the ability of ATRC-101 (as mATRC-101) to bind to its target in a range of tumor types derived from many different patients. Within tumors, mATRC-101 binds predominantly to tumor cells and not stroma or immune cells. Additionally, we have not observed binding above background levels in a panel of 30 normal human tissues, as assessed by an independent pathologist. In the following images, the reactivity of mATRC-101P ("Lead"; second column) and mATRC-101 (third column) relative to a control antibody (first column) in multiple types of tumor tissue (carcinoma) is illustrated (red reflects tissue reactivity). Furthermore, the lack of reactivity of mATRC-101 in normal or benign tissues corresponding to those carcinomas is also illustrated.



Example of mATRC-101 reactivity in human tumor and adjacent non-tumor tissue

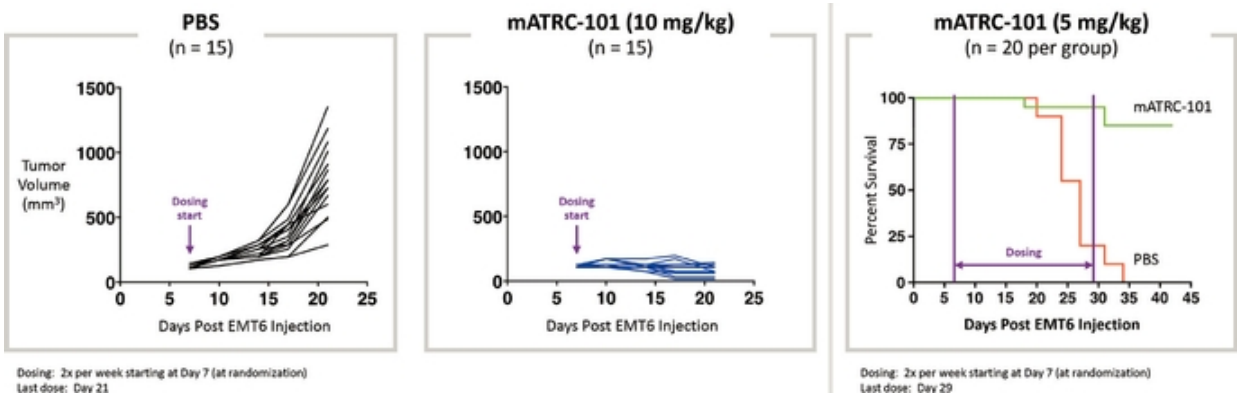
Profiling the reactivity of mATRC-101 has shown that the antibody recognizes a tumor target in non-autologus tumor tissue. mATRC-101 also reacts across multiple tumor types. Across a set of over 1,000 human tumor samples, mATRC-101 had moderate or greater reactivity (score of ^{3} 2 on a scale of 0-4 and with ^{3} 40% of tumor cells positive) to tumors in 72% of all ovarian cancer, 65% of all non-small cell lung cancer, 57% of all colorectal cancer, 57% of all breast cancer and 43% of

all melanoma. Reactivity was higher in particular subsets of these cancers; for example, over 80% of serous cystadenocarcinoma ovarian cancer tumors were reactive.



Activity in tumor models

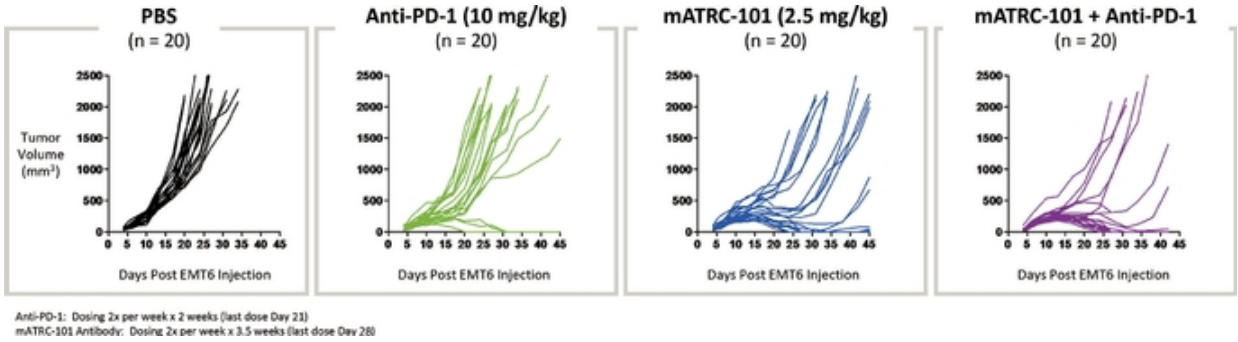
ATRC-101 (as mATRC-101) has demonstrated potent anti-tumor activity in the EMT6 mouse model. In contrast, PD-1 checkpoint inhibitors have only modest efficacy in this model, which is considered a model of the "T cell-excluded" tumor phenotype in patients. In this syngeneic tumor model, in which mice possess fully intact and functional immune systems, cancer cells were injected and tumors were allowed to grow before the mice were dosed with mATRC-101. At a dose of 10 mg/kg twice per week, tumor growth was completely suppressed and the tumors eliminated, with a significant effect on survival at a dose of 5 mg/kg twice per week compared to control (phosphate buffered saline, or PBS). In the first two panels below, the mice were sacrificed on day 21.



Anti-tumor activity and survival benefit of mATRC-101 in EMT6 mouse model

In a direct comparison, mATRC-101 dosed at 2.5 mg/kg twice per week had more anti-tumor activity in the EMT6 model than did an anti-PD-1 antibody dosed at 10 mg/kg twice per week.

Furthermore, dosing an anti-PD-1 (10 mg/kg) antibody with mATRC-101 (2.5 mg/kg) enhanced the anti-tumor activity observed.



mATRC-101 anti-tumor activity is enhanced by dosing with an anti-PD-1 antibody

Additionally, although we have more limited data, we have observed anti-tumor activity following mATRC-101 administration in the CT26 mouse model. In the CT26 model, which is differentiated from the EMT6 model and in which PD-1 and CTLA-4 checkpoint inhibitors can display more anti-tumor activity than in the EMT6 model, tumor growth was significantly suppressed ($p < 0.01$) by dosing with mATRC-101, with statistically significant ($p < 0.01$) positive effects on survival.

Target of ATRC-101

We have identified the target of ATRC-101 as a ribonucleoprotein (RNP) complex. ATRC-101 binds to target reconstituted *in vitro* using a single recombinant protein, polyadenylate-binding protein 1, and *in vitro* transcribed poly(A) RNA. The target components were initially identified through experiments involving immunoprecipitation and mass spectrometry. ATRC-101 appears to bind selectively to its target in tumor tissue despite the fact that the target components are present widely across normal tissues.

Summary of safety studies

Normal tissue binding. In initial studies, we assessed binding of ATRC-101 (using mATRC-101) in a range of normal human tissues using immunohistochemistry. Using a concentration of antibody that readily detected its target in tumor tissue, we did not observe a definitive signal across a range of 30 different normal human tissues, including cerebrum, cerebellum, heart, lung, liver, kidney, pancreas, stomach, spleen and salivary gland.

In vivo *safety assessments.* In initial studies, ATRC-101 was administered in four repeat doses over four weeks to non-human primates. Repeat doses of up to 100 mg/kg were well-tolerated, and no definitive safety signals were observed across a range of parameters including cytokines in the serum, which were not influenced by ATRC-101 dosing. Similarly, in initial studies in tumor-bearing (EMT6 model) and normal mice, repeat dosing of up to 30 mg/kg for five doses over 15 days with both ATRC-101 and mATRC-101 were well-tolerated, with no definitive safety signals observed across a range of parameters, including serum cytokine levels.

In vivo *studies to define cellular mechanism of action*

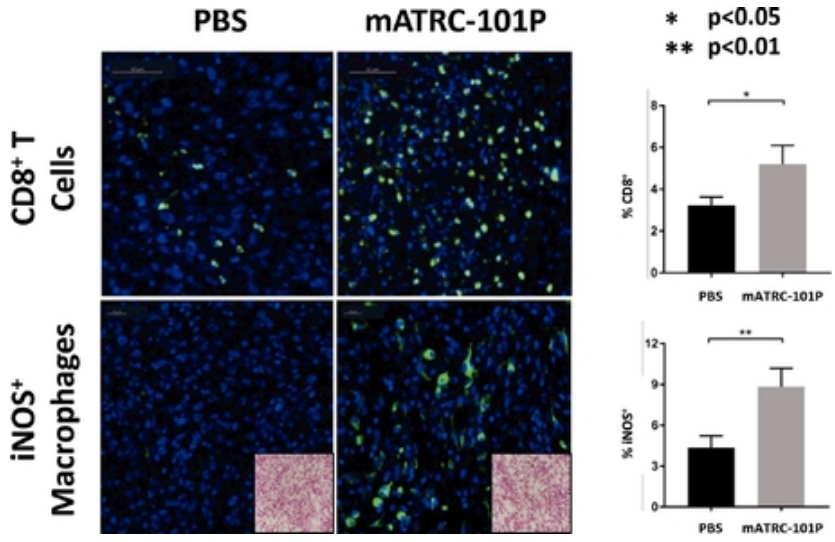
We initially select Fv regions of the antibodies identified from cancer patients using our discovery platform based on their ability to recognize tumor tissue selectively and not based on any

presumption of their targets or mechanisms of action. Our investigations into the mechanism of action of ATRC-101 (as mATRC-101P) revealed that:

- Dosing with mATRC-101P leads to
  - Remodeling of the tumor microenvironment;
  - Destruction of neoplastic cells in tumor tissue; and
  - Induction of an "immune memory" against the tumor.

- Activity of mATRC-101P *in vivo* requires
  - Interactions of its Fc region with innate immune cell FcRs;
  - A functional adaptive immune system; and
  - $CD8^+$ T cells.

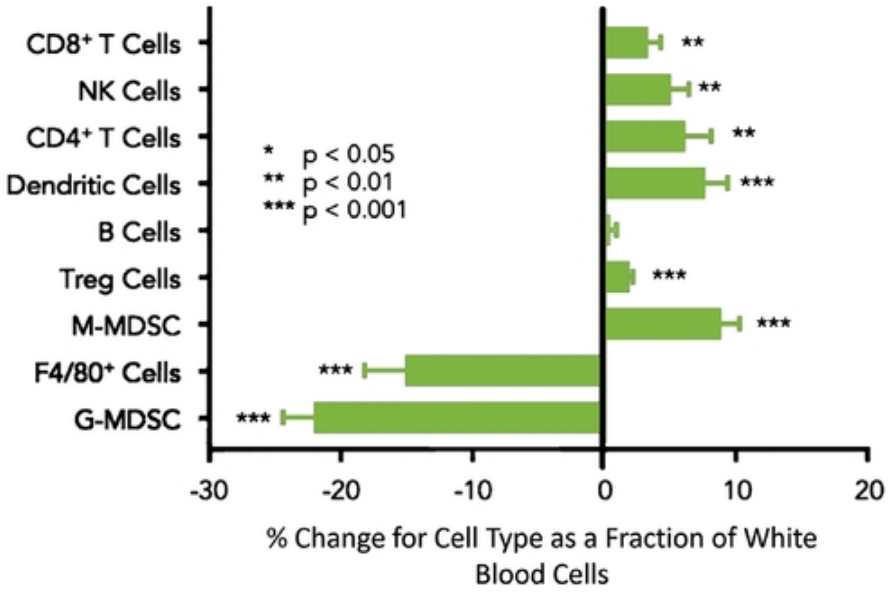
Remodeling of the tumor microenvironment. mATRC-101P leads to a statistically significant increase in $CD8^+$ T cells, also referred to as cytotoxic T cells, and M1-polarized macrophages (as measured by inducible nitric oxide synthase, or iNOS, expression) in tumors from treated animals, as assessed by quantitative immunohistochemistry. This is shown in the image below with mATRC-101P demonstrating increases in $CD8^+$ T cells and M1-polarized macrophages (green) in the tumor microenvironment. The presence of both of these cell types indicates a shift to a more anti-tumorigenic tumor microenvironment. In the figure below, the insets within the lower quadrants are a standard H&E stain of the tumor tissue.



Changes in $CD8^+$ T cell and M1-polarized ($iNOS^+$) macrophages in EMT6 tumor in response to mATRC-101P

We confirmed, using quantitative analysis via flow cytometry of relative levels of different types of immune cells found in tumors from animals treated with mATRC-101P, that mATRC-101P dosing resulted in broad changes to the immune cell population in the tumor microenvironment. In addition to significant increases in $CD8^+$ T cells in tumors relative to the total immune cell population, as was shown in the figure above, there were also increases in the relative levels of other immune cells associated with an anti-tumorigenic microenvironment, such as NK cells, $CD4^+$ T cells as a group, and dendritic cells. Relative increases were also observed in other immune cell types typically viewed as having immunosuppressive roles such as regulatory T cells (Treg) and monocytic myeloid derived suppressor cells (M-MDSCs). The largest changes in the microenvironment caused by

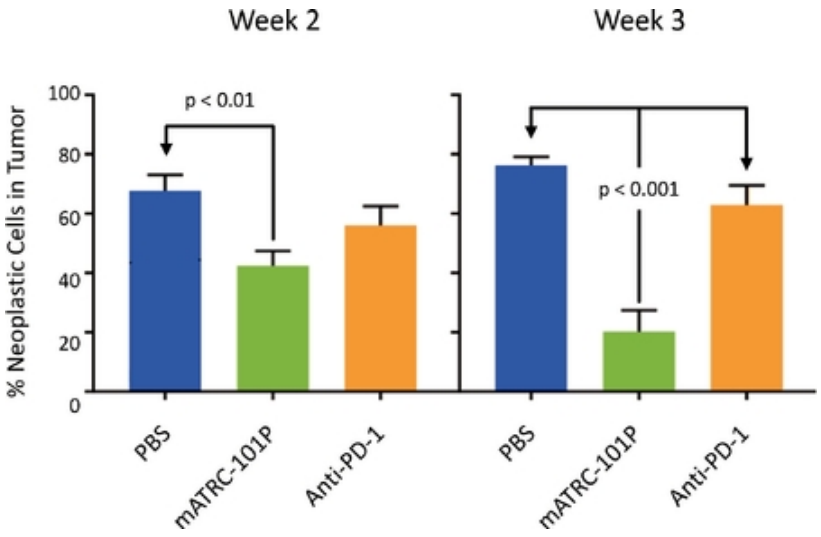
mATRC-101P treatment were significant decreases in the fraction of immune cells represented by F4/80$^+$ cells, also known as tumor-associated macrophages, and granulocytic myeloid derived suppressor cells (G-MDSCs), both of which are thought to be immunosuppressive and pro-tumorigenic. These broad changes involving cells from both the innate and adaptive immune system point to significant shifts in the constitution of immune cells in the tumor microenvironment, which we believe contribute to the activity seen in multiple animal tumor models.



Changes in selected white blood cell populations in EMT6 tumor microenvironment induced by mATRC-101P

Destruction of neoplastic cells in tumor tissue. These changes in the tumor microenvironment are also associated with killing fast-growing (neoplastic) cells, rather than other causes of tumor shrinkage. As shown in the figure below, dosing with mATRC-101P, relative to control (PBS), results in a statistically significant decrease in the percentage of neoplastic cells measured at week 2 in tumors in the EMT6 model. Dosing with mATRC-101P also results in a statistically significant

decrease in the percentage of neoplastic cells measured at week 3, relative to both PBS and dosing with an anti-PD-1 antibody.

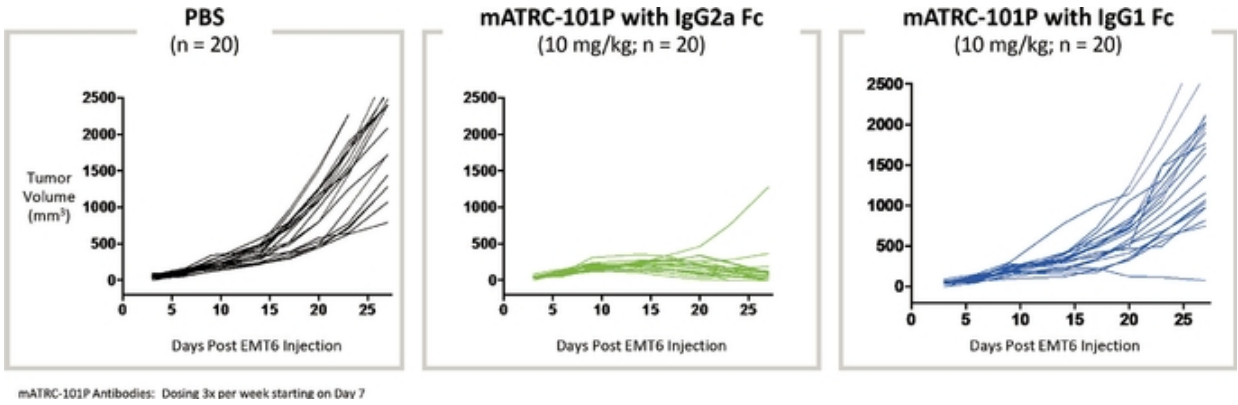


Changes in neoplastic cells in EMT6 tumor in response to treatment with mATRC-101P and anti-PD-1 antibody

Induction of an "immune memory" against the tumor. Mice implanted with EMT6 cells whose tumors had been eliminated following dosing of 5-20 mg/kg with mATRC-101P as a single agent showed resistance to developing new tumors when re-implanted with EMT6 at a different site approximately three weeks after the last dose. This washout period is believed to be sufficient for the levels of mATRC-101P to be reduced to negligible amounts. Of 31 mice re-challenged with EMT6 tumor cells without additional treatment, 30 did not develop tumors over a five-week observation period, compared to the control group where all 20 of the animals did develop tumors during the same time period. These results are consistent with the development of immune memory, a property that arises from active engagement of the adaptive immune system.

Requirement for interactions with innate immune cell FcRs. Activity of mATRC-101P requires interaction of its Fc region with FcRs on innate immune cells (such as dendritic cells and macrophages). First, if a version of the Fc region is used on mATRC-101P that is mutated so that it binds poorly to signaling FcRs on immune cells (N297A), then anti-tumor activity is dramatically decreased. Second, as shown in the diagram below, if we use a mouse IgG1 version of the Fc region, which does not bind well to two types of signaling FcRs found only on innate immune cells is used on mATRC-101P, instead of an IgG2a version, which binds well to these FcRs, then anti-tumor activity is largely eliminated. Thus, the anti-tumor activity is dependent upon the Fc region of the antibody interacting with FcRs on innate immune cells. This mechanism of action is differentiated

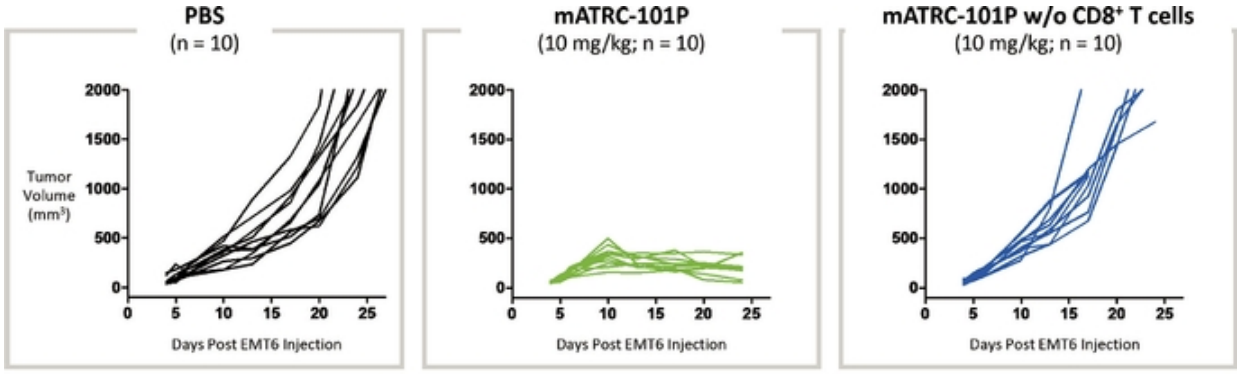
from those of checkpoint inhibitors and related compounds that target receptor-ligand pairs that are involved in the regulation of immune cell activity.



Dependence of anti-tumor activity of mATRC-101P on Fc region

Requirement for a functional adaptive immune system. mATRC-101P does not have activity in the EMT6 model if the mouse strain used has a dysfunctional adaptive immune system. The EMT6 tumor model was run in mice that lacked T cells (nude mice), and which therefore lacked a functional B cell response as well. In other words, these mice lack a functional adaptive immune system but otherwise have an intact innate immune system. Activity of mATRC-101P was not observed in these mice.

Requirement for CD8$^+$ T cells. Further evidence for involvement of the adaptive immune system comes from the dependence of mATRC-101P on cytotoxic CD8$^+$ T cells. Dosing of mATRC-101P in combination with an anti-CD8 antibody, which depletes CD8$^+$ T cells, completely blocks anti-tumor activity in the EMT6 tumor model as shown in the figure below.



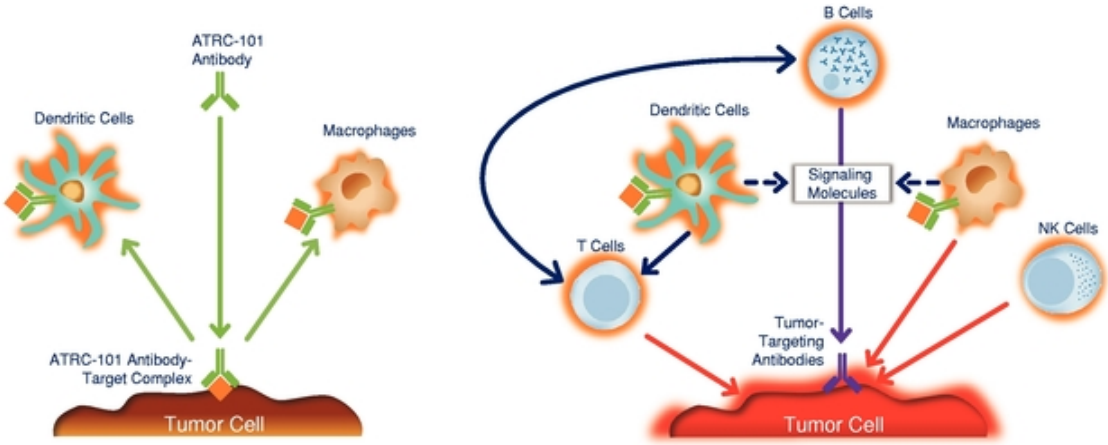
Dependence of anti-tumor activity of mATRC-101P on cytotoxic CD8$^+$ T cells

ATRC-101 mechanism of action: Driver Antigen Engagement

Based on our detailed *in vivo* studies of mATRC-101P, we believe that we have identified a novel mechanism of action for an oncology therapeutic, which we term Driver Antigen Engagement, involving both the innate and adaptive immune systems. Activation of the innate immune system

appears local to the tumor as we observed no significant changes in circulating levels of cytokines. Furthermore, the requirement for an adaptive immune system differentiates the mechanism of ATRC-101 from those of other antibodies that rely on the innate immune system for activity, for example NK cell-mediated ADCC (antibody-dependent cellular cytotoxicity).

Driver Antigen Engagement. After systemic administration, we believe ATRC-101 will find and bind to its tumor-specific target, facilitating the delivery of the target to tumor-resident innate immune cells via their FcRs, which then will activate these cells. Activated innate immune cells are thought to change their behavior and to secrete cytokines and other inflammatory signaling molecules, which together lead to anti-tumorigenic changes in the tumor microenvironment. These activated innate immune cells and the modified tumor microenvironment then will promote an adaptive immune response involving at least cytotoxic $CD8^+$ T cells, which attack and destroy the tumor cells. Thus, this target, a driver antigen, drives a tumor-destroying immune response involving both innate and adaptive arms of the immune system. Driver antigens have been observed in the context of autoimmune disease, in which normal tissues are attacked by the immune system, initially using specific antigens present in healthy tissue (for example, citrullinated proteins in rheumatoid arthritis). The image below depicts ATRC-101's Driver Antigen Engagement mechanism of action:



Step 1: Target recognition and local activation of the innate immune system

Step 2: Activation of the adaptive immune system and tumor killing

Clinical trials

We believe that ATRC-101 has the potential to become an important treatment for solid tumors based on several factors: its broad reactivity across different types of human solid tumor samples; its differentiated mechanism of action; its potent preclinical anti-tumor activity; and its safety profile observed to date in preclinical studies. We intend to file an IND application with the FDA for ATRC-101 in late 2019 and, subject to authorization from the FDA, initiate a Phase 1b clinical trial in patients with solid tumors in early 2020. The FDA has communicated to us that, while it reserves the right to make final determinations upon reviewing our IND application, it is supportive of our proposed approach towards preclinical safety assessments and overall clinical trial design, including starting dose.

We expect our initial trial will be an open-label, dose escalation, monotherapy trial with an adaptive 3+3 design in which we will enroll patients with tumor types limited to those for which ATRC-101 demonstrated a reactivity of at least 50% in preclinical studies, initially: ovarian, non-small cell lung, colorectal and breast cancers. Major objectives for the trial are to determine a maximum

tolerated dose or recommended dose for future studies and to characterize the safety of ATRC-101 in enrolled subjects. Other goals include characterization of potential biomarkers and initial clinical activity. We will retrospectively analyze target expression on subject tumor tissue with a prototype *in vitro* diagnostic test currently under development.

Assuming ATRC-101 can be dosed safely as a single agent, we plan to expand this initial trial to include dosing ATRC-101 in combination with a PD-1 checkpoint inhibitor in patients who do not respond to checkpoint inhibitors.

Our Lead Generation Programs

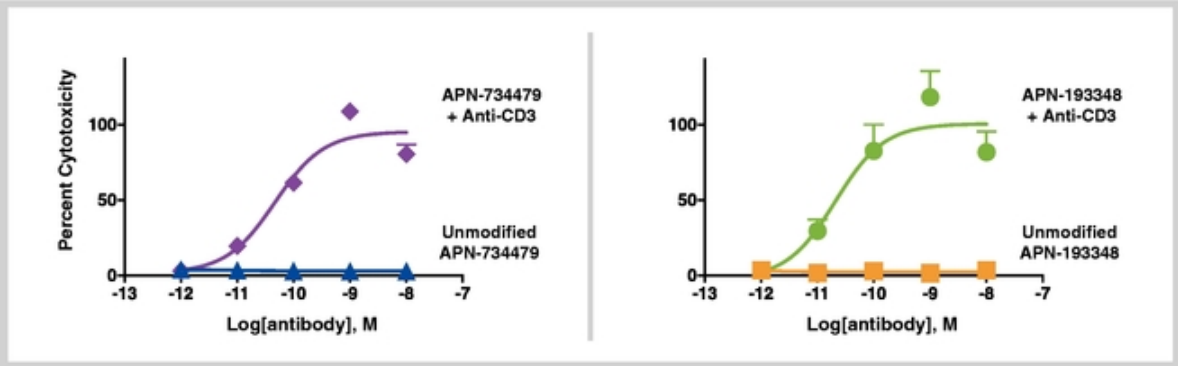
Driver Antigen Engagement

We believe the mechanism of action of ATRC-101 involves systemic delivery of an agent that causes remodeling of the tumor microenvironment and the destruction of tumor cells via both the innate and adaptive immune systems. With our knowledge of the target of ATRC-101, we believe other targets may exist that are capable of driving such activity when bound by an antibody. We are therefore working to discover and develop distinct antibodies binding other targets that utilize this novel mechanism of action.

T cell engagers

Our hit antibodies are defined by their ability to react with non-autologous tumor tissue preferentially over normal adjacent tissue. In principle, therefore, their Fv regions can be used to direct cells of the immune system, such as T cells, to tumor cells. Furthermore, if the T cells can be activated when they are brought to the tumor cell, then tumor cell killing can occur. This "T cell engagement" is a well-validated approach utilized in both approved and clinical stage products. In this approach, tumor-targeting domains derived from antibodies are linked to protein domains that typically bind to a particular protein (CD3) on the surface of T cells, both bringing the T cell to the tumor cell while simultaneously activating it. These antibody-derived biologics are sometimes termed "bispecific", in that they are capable of binding to two different targets: the tumor target and the T cell target.

We are pursuing the discovery and development of bispecifics using our proprietary collection of novel tumor-targeting antibodies. To screen for the potential utility of an antibody-target pair, we first use antibody sequence information to create a bispecific T cell engager in one or more formats. We then test this bispecific for activity *in vitro* in an industry-standard assay for T cell dependent cellular cytotoxicity (TDCC). In this assay, primary human T cells isolated from a patient blood sample are co-incubated with tumor cells. The bispecific, in which the antibody-derived portion from our hit library is known to interact with the tumor cell, is added into the assay, and tumor cell killing is assessed over time. In this assay, a number of our hit antibodies converted into bispecifics display significant tumor cell killing activity. Our current data suggest that, using a single bispecific format, approximately 6% of our hit antibody Fv regions test positive in TDCC assays (>375 hit antibodies analyzed). In the figures below, two antibodies that have been converted into a bispecific T cell engager format display tumor cell killing activity, with approximately 100% cytotoxicity in the assay observed at a low nanomolar concentration of each bispecific, while the unmodified antibodies do not show cytotoxic activity in the assay at any concentrations tested.



Measurement of cytotoxic activity in TDCC assay

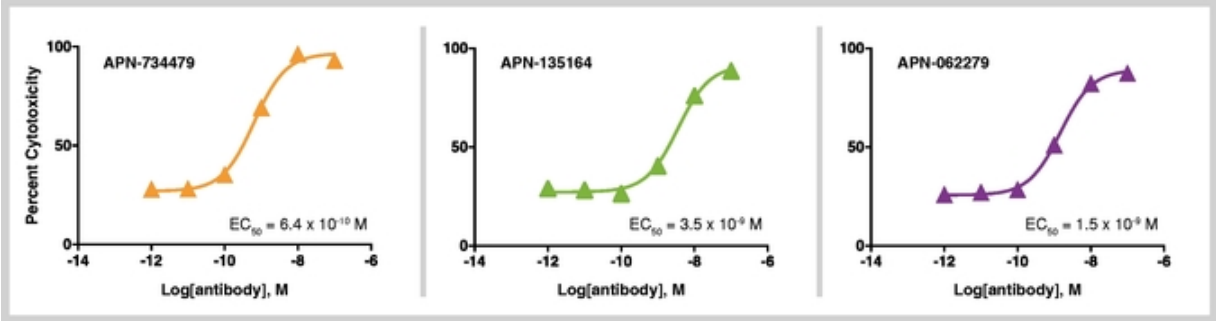
In the future, we may selectively pursue partnerships to access additional bispecific formats, technologies and know-how in order to discover and develop T cell engagers based on novel antibody-target pairs discovered using our platform.

Directed killing

Antibody-Directed Cellular Phagocytosis (ADCP) and Antibody-Directed Cellular Cytotoxicity (ADCC) are two mechanisms of action through which antibodies that bind to tumor cells can direct innate immune system cells to kill them. In both cases, the Fc portion of the antibody interacts with particular FcRs of innate immune system cells to mediate the killing. In ADCP, macrophages/monocytes engulf tumor cells bound by antibodies, while in ADCC, NK cells use particular cellular machinery to kill antibody-bound tumor cells. Both ADCP and ADCC are validated mechanisms of action that contribute to the anti-tumor activity observed for marketed antibody drugs.

We have established *in vitro* assays for ADCC and ADCP activity and use these assays to screen our antibodies for those capable of driving tumor cell killing via ADCC and ADCP mechanisms. In these assays, a number of our hit antibodies display tumor cell killing activity. Our current data suggest that approximately 17% of our hit antibodies test positive in ADCC or ADCP assays (>375 hit antibodies analyzed). In the figure below, cell killing (cytotoxicity) activity in an ADCC assay as a function of antibody concentration is illustrated for three hit antibodies.

Given that ADCC and ADCP are thought to be more effective when a greater number of targets are bound on the surface of a tumor cell, we believe there may be utility in utilizing multiple antibodies from our hit library in combination, as separate entities or in bispecific formats, in order to drive activity via this mechanism of action. In the future, we may pursue partnerships to access particular technologies and know-how to discover and develop candidates with these mechanisms of action.



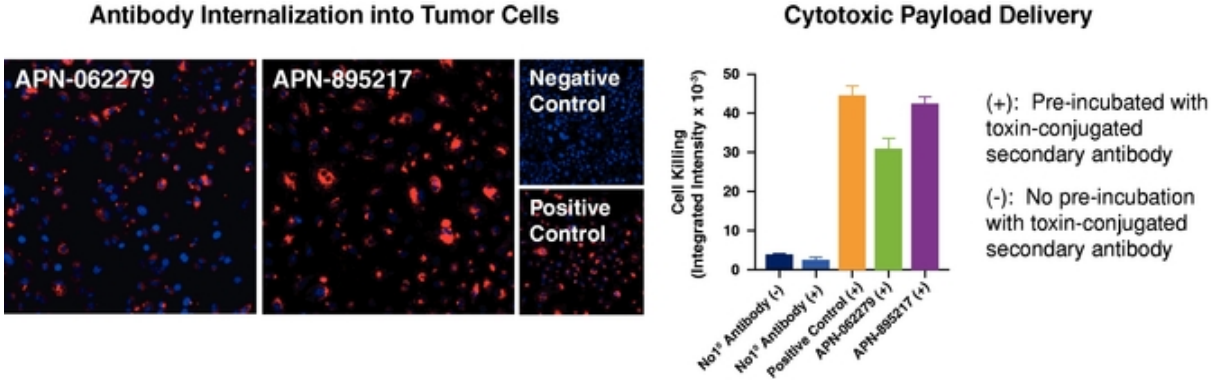
Measurement of Cytotoxic Activity in ADCC Assay

Toxin-conjugates (ADCs)

Cellular toxins can be conjugated to certain antibodies to generate cytotoxicity against tumor cells expressing their targets. Such antibody-drug conjugates (ADCs) require antibodies that internalize upon binding to their target. Once antibodies internalize, they also must be delivered to an intracellular compartment suitable for release of the toxin into the cell.

We have established *in vitro* assays to assess first whether our hit antibodies can internalize once they bind to their targets on tumor cells, and if they internalize, then whether they can deliver a toxin to an internal compartment such that the toxin is released to kill the cells. In our internalization assay, our current data suggest that approximately 2% of hit antibodies test positive (>700 hit antibodies analyzed). Our second assay measures cytotoxicity as driven by release of toxin bound to an internalized antibody (a cytotoxic payload). In this assay, internalizing hit antibodies are pre-incubated with a second antibody that is both capable of binding the internalizing antibody and has a conjugated cytotoxin. The pre-incubated antibody mixture is then incubated with tumor cells for a period of time, and cell killing is measured.

The left portion of the figure below illustrates the activity of two hit antibodies in the internalization assay (red signal), relative to positive and negative control antibodies. These two internalizing hit antibodies can also deliver a cytotoxic payload after internalization, as measured in the cytotoxicity assay, which is illustrated in the right portion of the figure below. The data indicate the amount of cell killing at the end of the period of incubation with tumor cells.



In the future, we are likely to pursue partnerships to access technologies and know-how to discover and develop product candidates with an ADC mechanism of action based on novel antibody-target pairs discovered using our platform.

Future Programs

Given our data in these programs, we believe that we will be able to exploit our growing library of novel antibodies in order to develop product candidates with additional distinct and compelling mechanisms of action for tumor destruction beyond those described above. We intend to continue to build out a pipeline of novel product candidates targeted at a range of solid tumors to advance into clinical development. We are currently pursuing numerous potential partnership opportunities, and anticipate entering into a strategic drug discovery partnership as early as 2020, and to file an IND application for a second product candidate in 2021.

Unmet Need in Solid Tumors Included in the ATRC-101 Phase 1b Clinical Trial

Our tissue profiling data and the unique mechanism of action of ATRC-101 suggest that it has potential to provide therapeutic benefit to patients with a wide range of solid tumors. These tumors include highly prevalent tumors with significant unmet need.

Tumor	Expected New Cases in 2018	Expected Deaths in 2018
Ovarian	22,240	14,070
Lung	234,030	154,050
Colorectal	140,250	50,630
Breast	266,120	40,920

Ovarian cancer

Surgery and cytotoxic chemotherapies are widely used to treat ovarian cancer; however, the five-year survival rate has improved only marginally from 42.2% in 1995 to 47.6% in patients diagnosed between 2009 and 2015. Treatment of patients with advanced, relapsed ovarian cancer with a combination of gemcitabine and carboplatin increased the progression free survival to 8.6 months from 5.8 months with carboplatin alone but had no significant effect on overall survival. Drugs such as olaparib and rucaparib that inhibit poly(ADP-ribose) polymerase, or PARP, have recently been approved based on progression free survival in the maintenance setting of up to 15.5 months. Immuno-oncology therapies, however, have to date had little impact in ovarian cancer.

Lung cancer

Lung cancer is typically divided into two groups based upon the appearance of the tumor cells—non-small cell lung cancer and small cell lung cancer. Non-small cell lung cancer accounts for approximately 80% to 85% of lung cancer cases. The treatment paradigm for non-small cell lung cancer has significantly changed over the past few years. Previously patients were primarily treated with radiation therapy or combinations of cytotoxic drugs. Recent developments have led to the development of targeted therapies based on alteration in the genes for epidermal growth factor receptor, or EGFR, and anaplastic lymphoma kinase gene, or ALK. Up to two thirds of advanced non-small cell lung cancer patients who are ineligible for or resistant to treatment with EGFR or ALK targeted therapies have tumors that express PD-L1 and are candidates for checkpoint inhibitor therapies, which lead to significant improvements in progression free survival and overall survival compared to standard chemotherapy. Despite the availability of these numerous therapies, the prognosis remains poor, with overall five-year survival for all patients diagnosed with non-small cell lung cancer as low as 23%.

Colorectal cancer

Colorectal cancer is the second leading cause of cancer deaths in the United States. Approximately 35% of patients with a new diagnosis of colorectal cancer will die within five years. Treatment of colorectal cancer typically involves the use of cytotoxic chemotherapy and radiation. Treatment with anti-EGFR antibodies, typically in combination with chemotherapy, has been shown to be effective in a subset of colorectal cancer patients; however, over 40% of patients do not respond to anti-EGFR antibody therapies and of those that do, resistance often develops. Pembrolizumab, nivolumab and a combination of nivolumab and ipilimumab have been approved for the treatment of a subset of approximately 3.5% to 5.6% of colorectal cancer patients with mutations that lead to high genetic instability.

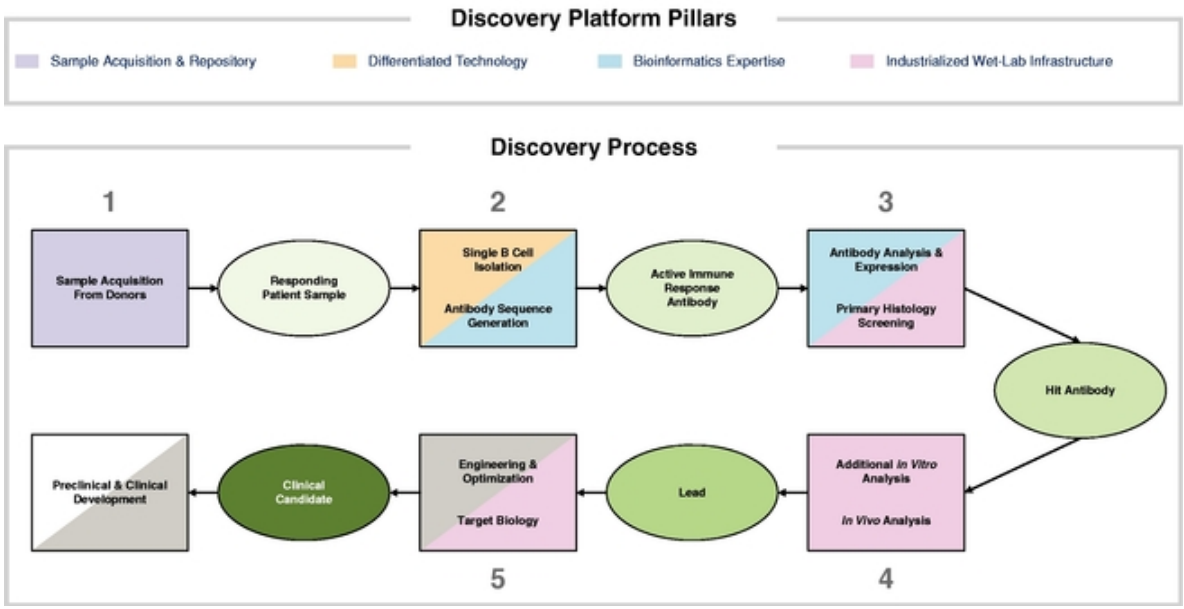
Breast cancer

Breast cancer is the second most common cancer diagnosis for women in the United States. Breast cancer is conventionally divided into three forms, depending on whether the tumor is hormone receptor-positive (HR+), HER2 receptor-positive (HER2+), or neither (triple negative). The percentage of breast cancer patients with HER2+ disease is approximately 17%; triple negative is approximately 12%; and HR+ disease is approximately 83% (note that approximately 12% of patients have overlapping HR+/HER2+ disease). The treatment paradigm for breast cancer depends on the stage of the cancer at presentation (Stage I-IV), and on whether the tumor is HR+, HER2+, or triple negative.

Although some forms of breast cancer are less aggressive and have displayed improving survival rates, there are still highly aggressive forms of disease that represent significant unmet need. For example, triple-negative breast cancer tends to present at a higher grade than other types of breast cancer (often grade 3) and grows, spreads and recurs faster than most other types. Women with triple-negative breast cancer are also more likely to develop metastasis, and typically have a poorer prognosis than other types of breast cancer due to the lack of targeted therapies available for treatment. The FDA recently approved the first immunotherapy regimen in breast cancer, a combination of nab-paclitaxel and an anti-PD-L1 immunotherapy (atezolizumab) for frontline treatment patients with unresectable locally advanced or metastatic PD-L1-positive triple-negative breast cancer. In the clinical trial supporting this approval, the objective response rate for the group of combination-treated patients was 56%.

The Atreca Discovery Platform

There are four fundamental pillars that support and distinguish our platform from other antibody drug discovery approaches. We leverage these pillars via our systematic antibody discovery process to identify, capture and analyze antibodies from patients whose immune systems are already responding to cancer treatment, and thus actively attacking their tumor tissue. Our systematic approach to discovery is scalable and differentiated from traditional discovery approaches. The following diagram shows our discovery platform pillars and discovery process:



The pillars of our discovery platform

The four fundamental pillars of our platform are: our sample acquisition and repository, our differentiated technology, our bioinformatics expertise and our industrialized wet-lab infrastructure.

Sample acquisition and repository. Our discovery approach relies on having a sufficient number of responder patient blood-derived samples. We attempt to source samples from the same patient over time, enabling longitudinal analyses, and from a wide range of tumor types. In order to accomplish this, we sponsor ongoing non-interventional clinical studies conducted at the Palo Alto Medical Foundation and Sarah Cannon Research Institute that yield samples for our growing repository. We also collaborate with academics at leading institutions in order to acquire our samples, including the University of California, San Francisco; Cleveland Clinic; Dana-Farber Cancer Institute; and Baylor Scott & White Health. In addition, we acquire some samples through an internal clinical study and commercially. We have built our current repository of over 1,200 blood-derived samples from over 400 donors, representing over 25 different solid tumor types, over a period of six years.

Differentiated technology. Based upon technology licensed from Stanford University, our proprietary Immune Repertoire Capture® technology generates sequences of natively co-expressed heavy and light chains of antibodies from single cells, with 65% efficiency for input B cells, and moreover, corrects for sequence error and bias that is inherent in the output of section analysis of a group of antibody sequences from a patient sample, which we define as a "repertoire". Without such error and bias correction, robust analyses of repertoires would be very difficult, since such process error is very often of the same order of magnitude as meaningful biological signal. Furthermore, we have built and utilize other differentiated technological expertise in our discovery platform. For example, we have invested heavily in flow cytometry infrastructure, expertise and process development, which enables us to use plasmablasts to focus our analysis on the active immune response in patient samples and to perform certain types of *in vitro* and *in vivo* downstream analyses that would be difficult to implement otherwise.

Bioinformatics expertise. A robust bioinformatics infrastructure and expertise underlies multiple aspects of our discovery platform. For example, in order to operationalize our Immune Repertoire Capture® technology, we have built an enhanced algorithmic pipeline in the cloud, comprising in part

proprietary algorithms, to capture, process and deliver bias- and error-corrected natively paired, heavy and light chain sequences of antibodies expressed by single B cells. Applying the bioinformatics expertise we've developed, we analyze these sequences and their related data, to select antibodies for wet-lab analysis. To extract the most value from our industrialized approach to discovery, we capture our experimental data using a laboratory information management system and analyze data using in-house developed software tools.

Industrialized wet-lab infrastructure. In order to further enhance the analysis of antibodies discovered on our platform, we have increased the capacity of multiple functions, including histology, flow cytometry, *in vitro* functional assays, animal models and others. For example, our primary histology screen, involving analysis of the binding of patient antibodies in primary human tumor tissue, still leaves capacity for generating histological data for other *in vitro* and *in vivo* experiments. In our animal model work, we have validated four different syngeneic mouse tumor models in-house. Our dedicated bioinformatics supports our industrialized experimental infrastructure.

Atreca's discovery process

The major steps in our drug discovery approach that are differentiating and enabled by our discovery platform are sample acquisition, repertoire generation and analysis, hit generation, lead generation and candidate generation.

Sample acquisition

The starting points for our drug discovery efforts are blood samples from patients undergoing cancer therapy. It is critically important, therefore, that we have access to a broad set of high quality samples. Samples from donors in our trials are collected at the initiation of treatment and at multiple points during therapy. We begin by systematically acquiring blood samples from cancer patients at various stages of their treatment and immediately freezing down a particular group of cells isolated from the blood for possible analysis. Blood samples are typically processed to yield the peripheral blood mononuclear cells, or PBMCs, present, which are then frozen and stored pending further processing. All samples for our discovery efforts are collected with Institutional Review Board approval under informed consent that grants us freedom to commercialize products without donor remuneration.

Repertoire generation: plasmablast isolation

We believe that our approach is differentiated in part due to our focus on the active immune response in a patient whose immune system is attacking tumor tissue. Focusing on the plasmablasts in the blood from which we isolate our antibodies is key to our approach. We and others have shown that plasmablasts continue to be generated during states of chronic immune system activation, such as that of a cancer patient whose immune system is attacking tumor tissue over many months.

We isolate plasmablasts from patient blood sample PBMCs using fluorescence activated cell sorting based on the expression of surface markers such as CD19 in combination with other surface markers. Our process allows us to isolate individual cells, and we have developed the expertise and resources that enable us to accomplish this with the potential throughput to process thousands of samples a year.

Repertoire generation: Immune Repertoire Capture®

From the samples of patients who exhibit evidence of clinical benefit from treatment, we generate the sequences of the antibodies expressed by plasmablasts, thus focusing our discovery

efforts on antibodies that we believe may be associated with anti-tumor immune responses to treatment.

In contrast to other approaches that identify antibody heavy and light chains separately and only later attempt to recreate native pairings, we keep these native pairings intact using our Immune Repertoire Capture® technology. During the synthesis of the cDNA from RNA, we attach to the cDNAs specialized nucleotide barcodes that are unique to each cell. These barcodes on the cDNAs of the B cell:

- Link the antibody genes back to a particular sample, and thus to the anti-tumor immune response in a patient at a specific point in the patient's treatment.
- Link heavy and light chain sequences, which are encoded by different cDNAs, from the same cell informationally and recreate native heavy and light chain pairings for individual B cells, further defining those B cells as unique entities.
- Allow for heavy and light chain sequence generation from many B cells simultaneously, creating significant increases in throughput with decreased costs.
- Correct sequence errors and bias generated by the process itself by allowing the use of multiple redundant heavy or light chain sequences known to be generated from the same cell and by allowing normalization of sequence counts on a cell-by-cell basis.
- Provide a means to detect contamination by other heavy and light chain sequences from other cells during the process.

Our process yields error- and bias-corrected, natively paired antibody heavy and light chain sequences that include the signal sequence of the proteins partially into the constant region of the antibody chains. Due to these properties, these sequences are already in a format that enables us to take them directly into antibody expression systems, saving us considerable time and expense. The technology allows us to isolate and identify the precise sequences necessary to ultimately generate B cell antibodies as they arose in a patient.

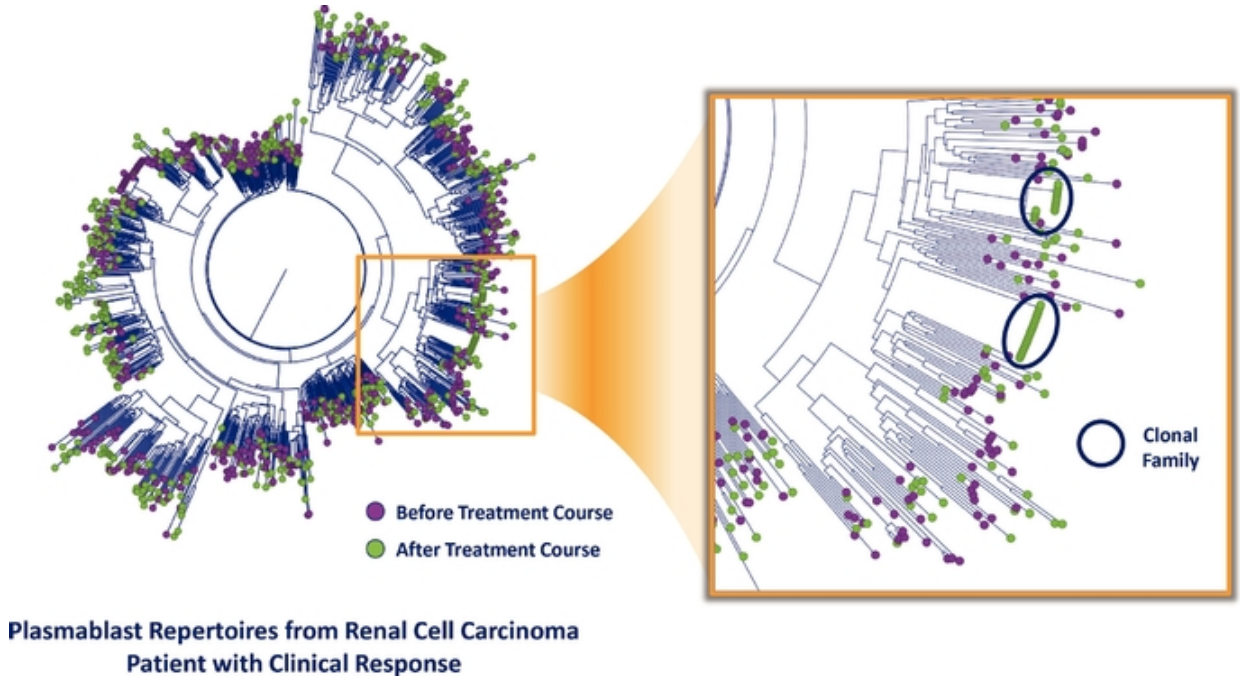
Repertoire analysis

During repertoire analysis, we analyze these collections of sequences to better understand how these antibody sequences relate to each other, both within a single patient sample and across samples. The high quality of our data enables us to perform such analyses.

As a first step, we determine the relatedness among these antibodies. In affinity maturation, lineages of B cells expressing related antibodies, or clonal families, are generated. Additionally, our barcoding technology allows us to track identical antibody sequences that are expressed by different plasmablasts. Using these data, we generate a phylogenetic or family tree in which we depict the relatedness among antibody sequences.

We use these relationships to identify the families of antibodies expressed by plasmablasts that are all related to one another via descent from a single B cell that started the maturation process; *i.e.,* clonal families. Changes in clonal families occur in large part due to the nature of the biological processes that generate antibody diversity in germinal centers. Clonal expansions during an active immune response against tumor tissue indicate the sequences of antibodies that have the potential to be directed toward the patient's tumor. We believe that longitudinal analysis of changes in clonal

families, especially when correlated with changes in disease status, provides information useful for selecting potentially valuable antibodies for further analysis in the laboratory.



Clonal expansions contain antibodies that are related to one another by descent from a single B cell that initiated the affinity maturation process

Furthermore, we can determine the sequence relationships among antibodies in a family. We can use this information to sample the diversity of antibodies in a family generated by a common B cell ancestor. We can also use more sophisticated analyses of antibody sequences, beyond simple sequence alignments, to identify evidence of convergent antibody generation across different patients.

Hit generation

We refer to the process of identifying antibodies that bind to non-autologous tumor tissue preferentially over normal tissue as "hit generation". We select approximately one percent of all antibody sequences in the repertoires that we generate from patient samples for further evaluation.

We convert the sequence information we obtain into antibody protein molecules that can be assessed for their tumor tissue binding properties. We have observed that substantially all of our selected antibodies can be manufactured at laboratory scale. We have developed a robust histology infrastructure as part of our platform that enables us to perform at full capacity a primary screen of hundreds of expressed antibodies per month against human tumor tissue samples and objectively score binding intensity to both the tumor as well as adjacent normal tissue. We have found that out of all of the antibody sequences that we have chosen to test in this manner, approximately 45% bind to non-autologous tumor tissue selectively over normal adjacent tissue. We have, to date, identified over 1,400 distinct antibodies capable of targeting non-autologous tumors preferentially in this primary screen.

Lead generation

We then take these hit antibodies and analyze them in a series of *in vitro* and *in vivo* assays, including multiple animal models, to identify antibodies or antibody-derived entities that show relevant function as leads. In some cases, we, alone or with partners, may add, remove, or alter protein or other molecular components, as we analyze the antibodies to generate relevant function, such as T cell engagement or antibody-directed killing. We perform broader measurements of antibody binding in additional human tumor and normal tissue samples and tumor cell lines via histology and flow cytometry. These analyses, for example, enable us to distinguish whether the antibodies are directly binding to tumor cells or to other cells found in the tumor microenvironment such as stromal cells or immune cells. Because approximately 25% of our antibodies recognize and bind to the mouse version of their human target, we are often able to assess *in vivo* activity in syngeneic mouse tumor models without spending significant time and resources on generating antibodies with surrogate Fv domains.

Candidate generation

The targets for leads are identified via a variety of means, including multiple types of antigen arrays, immunoprecipitation followed by mass-spectrometry (as the target of ATRC-101 was identified), and other techniques under development, followed by validation via standard recombinant methods. Target identification is often a resource-intensive and time-consuming process, and may not be successful in all cases. Leads undergo various protein sequence modifications to eliminate potential liabilities in stability, immunogenicity and manufacturing, and to increase target binding and activity, before being selected as clinical candidates to be taken into preclinical development.

Collaborations

Historically, we have entered into a number of discovery collaborations as we developed our discovery platform. These collaborations have generally focused on identifying novel antibodies in areas of significant unmet medical need.

We are currently engaged in a multi-year research and preclinical collaboration with the Bill & Melinda Gates Foundation to optimize and advance human anti-CSP monoclonal antibodies identified by our proprietary Immune Repertoire Capture® technology with the potential to be developed as prophylactic/therapeutic antibodies for malaria. In addition, we are engaged in a three-year collaboration agreement with Bristol-Myers Squibb to perform research activities in the field of autoimmune diseases and to apply our proprietary Immune Repertoire Capture® technology to patient samples in order to compare the effects of different treatments on the humoral immune response.

While our current and past collaborations have provided support and validation as we have worked to develop our discovery platform, and while we may continue to enter into such collaborative research agreements in the future, we expect our primary focus for future collaborations will be on accelerating advancement of our product pipeline. To that end, we are focusing our business development efforts on potential partners that bring complementary technologies that may allow us to facilitate our generation of product candidates from our large pool of novel antibody-target pairs.

Manufacturing

We use a third-party manufacturer to produce our antibodies and reagents for use in preclinical assessment of product candidates. We do not have, and we do not currently plan to acquire or develop, the infrastructure, facilities or capabilities to manufacture current Good Manufacturing Practices, or cGMP, bulk drug substance or filled drug product for use in human clinical trials. We

intend to continue to utilize third-party manufacturers such as contract development manufacturing organizations, or CDMOs, to produce, test and release cGMP bulk drug substance and drug product for our planned clinical trials. We expect to continue to rely on such third parties to manufacture clinical trial material for the foreseeable future. We currently have a service agreement with a CDMO to develop and manufacture material in support of our IND application and clinical studies.

Our current and expected future contractual CDMOs have a long, successful track record of manufacturing clinical and commercial products for other companies under cGMP compliance and have previously been inspected by regulatory authorities for compliance with cGMP standards.

Competition

We are aware of a number of companies that are developing antibodies for the treatment of cancer. Many of these companies are well-capitalized and, in contrast to us, have significant clinical experience, and may include our potential future partners. In addition, these companies compete with us in recruiting scientific and managerial talent. Our success will partially depend on our ability to obtain, maintain, enforce and defend patents and other intellectual property rights with respect to antibodies that are safer and more effective than competing products. Our commercial opportunity and success will be reduced or eliminated if competing products that are safer, more effective, or less expensive than the antibodies we develop are or become available.

We expect to compete with antibody, biologics and other therapeutic platforms and development companies who are also pursuing a similar discovery approach, including, but not limited to, companies such as Adaptive Biotechnologies Corporation, AIMM Therapeutics B.V., Neurimmune Holding AG, OncoReponse, Inc., and Vir Biotechnology, Inc. In addition, we expect to compete with large, multinational pharmaceutical companies that discover, develop and commercialize antibodies and other therapeutics for use in treating cancer such as AstraZeneca plc, Bristol-Myers Squibb Company, Genentech, Inc. and Merck & Co., Inc. If ATRC-101 or potential future product candidates are eventually approved, they will compete with a range of treatments that are either in development or currently marketed. For example, we expect that ATRC-101 and our potential future product candidates may compete against traditional cancer therapies, such as chemotherapy, as well as cell-based treatments for cancer, such as CAR-T therapies.

Intellectual Property

Our success will significantly depend upon our ability to obtain and maintain patent and other intellectual property and proprietary protection for our novel antibody-based immunotherapeutics to treat a range of solid tumors, as well as patent and other intellectual property and proprietary protection for our discovery platform, novel discoveries, and other important technology inventions and know-how. We rely, for example, on patents, trademarks, trade secrets, confidentiality agreements, and invention assignment agreements to protect our intellectual property and proprietary innovations.

As set out in the "Risk Factors—Risks Related to Our Intellectual Property," our intellectual property and proprietary rights may be challenged, invalidated, circumvented, infringed or misappropriated, or may be insufficient to permit us to preserve or improve our competitive position.

Our intellectual property includes a portfolio of in-licensed and Atreca-owned patents and patent applications, relating to our discovery platform and the novel immunotherapeutic product candidates developed using that platform, including compositions of matter, methods of use, methods of treatment, and kits. Our lead immunotherapeutic product candidate, ATRC-101, is a monoclonal antibody with preclinical anti-tumor activity and is a variant of an antibody identified using our discovery platform. We have filed multiple U.S. provisional patent applications relating to ATRC-101 and other variants and anticipate that we will convert to nonprovisional utility patent applications or PCT applications in the first quarter of 2020.

As of May 23, 2019, we own:

- 2 issued U.S. patents relating to our platform-related technology;
- 1 issued patent in Singapore relating to our platform-related technology;
- 20 pending non-provisional utility patent applications, including 1 allowed U.S. application and 16 foreign patent applications relating to our platform-related technology;
- 5 pending U.S. provisional patent applications relating to ATRC-101 and other variants; and
- 1 pending U.S. provisional patent application relating to our anti-malarial therapeutic antibodies.

As of May 23, 2019, we exclusively license from Stanford University relating to our platform-related technology:

- 44 pending utility patent applications, including 2 pending U.S. non-provisional patent applications, and 42 foreign patent applications inclusive of 1 allowed patent application in Israel; and
- 9 issued foreign patents, 1 in each of the following jurisdictions: Europe (validated in 18 territories), Japan, Korea, Australia, Mexico, New Zealand, Russia, Hong Kong and South Africa.

As of May 23, 2019, we co-own:

- 3 pending international utility patent applications with collaborators relating to anti-HIV antibodies; and
- 3 pending utility patent applications with a collaborator relating to anti-malarial antibodies, including 2 international patent applications and 1 U.S. non-provisional patent application.

Government Regulation

In the United States, biological products are subject to regulation under the Federal Food, Drug, and Cosmetic Act, and the Public Health Service Act, and other federal, state, local and foreign statutes and regulations. These laws and their corresponding regulations govern, among other things, the research, development, clinical trial, testing, manufacturing, safety, efficacy, labeling, packaging, storage, record keeping, distribution, reporting, advertising and other promotional practices involving biological products. FDA approval must be obtained before the marketing of biological products. The process of obtaining regulatory approvals and the subsequent compliance with appropriate federal, state, local and foreign statutes and regulations require the expenditure of substantial time and financial resources.

U.S. biological products development process

The process required by the FDA before a biological product may be marketed in the United States generally involves the following:

- completion of nonclinical laboratory tests and animal studies according to Good Laboratory Practices, or GLP, and applicable requirements for the humane use of laboratory animals or other applicable regulations;
- submission to the FDA of an application for an investigational new drug, or IND, which must become effective before human clinical trials may begin;
- approval of the protocol and related documentation by an independent institutional review board, or IRB, or ethics committee at each clinical trial site before each study may be initiated;
- performance of adequate and well-controlled human clinical trials according to the FDA's regulations commonly referred to as Good Clinical Practices, or GCPs, and any additional requirements for the protection of human research subjects and their health information, to establish the safety and efficacy of the proposed biological product for its intended use;
- submission to the FDA of a Biologics License Application, or BLA, for marketing approval that includes substantive evidence of safety, purity, and potency from results of nonclinical testing and clinical trials;
- payment of user fees for FDA review of the BLA (unless a fee waiver applies);
- a determination by the FDA within 60 days of its receipt of a BLA whether or not to accept the filing for review;
- satisfactory completion of an FDA inspection of the manufacturing facility or facilities where the biological product is produced to assess compliance with current Good Manufacturing Practices, or cGMP, to assure that the facilities, methods and controls are adequate to preserve the biological product's identity, strength, quality and purity;
- potential FDA audit of the clinical trial sites that generated the data in support of the BLA; and
- FDA review and approval, or licensure, including consideration of the views of any FDA advisory committee, of the BLA.

Before testing any biological product candidate in humans, the product candidate enters the preclinical testing stage. Preclinical tests, also referred to as nonclinical studies, include laboratory evaluations of product biological characteristics, chemistry, toxicity and formulation, as well as animal studies to assess the potential safety and activity of the product candidate. The conduct of the preclinical tests must comply with federal regulations and requirements including GLP.

The clinical trial sponsor must submit the results of the preclinical tests, together with manufacturing information, analytical data, any available clinical data or literature and a proposed clinical protocol, to the FDA as part of the IND. Some preclinical testing may continue even after the IND is submitted. An IND is a request for authorization from the FDA to ship an unapproved, investigational product in interstate commerce and to administer it to humans, and must become effective before clinical trials may begin. The IND automatically becomes effective 30 days after receipt by the FDA, unless the FDA places the clinical trial on a clinical hold within that 30-day time period. In such a case, the IND sponsor and the FDA must resolve any outstanding concerns before the clinical trial can begin. The FDA also may impose clinical holds on a biological product candidate at any time before or during clinical trials due to, among other considerations, unreasonable and significant safety risk, inability to assess safety risk, lack of qualified investigators, a misleading or materially incomplete investigator brochure, or study design deficiencies. If the FDA imposes a clinical hold, studies may not recommence without FDA authorization and then only under terms authorized by the FDA. Accordingly, we cannot be sure that submission of an IND will result in the

FDA allowing clinical trials to begin, or that, once begun, issues or circumstances will not arise that delay, suspend or terminate such studies.

Clinical trials involve the administration of the biological product candidate to healthy volunteers or patients under the supervision of qualified investigators, generally physicians not employed by or under the study sponsor's control. Clinical trials are conducted under protocols detailing, among other things, the objectives of the clinical trial, dosing procedures, subject selection and exclusion criteria, and the parameters to be used to monitor subject safety, including stopping rules that assure a clinical trial will be stopped if certain adverse events should occur. Each protocol and any amendments to the protocol must be submitted to the FDA as part of the IND. Clinical trials must be conducted and monitored in accordance with the FDA's regulations comprising the GCP requirements, including the requirement that all research subjects provide informed consent. Further, each clinical trial and its related documentation must be reviewed and approved by an IRB at or servicing each institution at which the clinical trial will be conducted. An IRB is charged with protecting the welfare and rights of study participants and considers such items as whether the risks to individuals participating in the clinical trials are minimized and are reasonable in relation to anticipated benefits. The IRB also approves the form and content of the informed consent that must be signed by each clinical trial subject or his or her legal representative and must monitor the clinical trial until completed.

Clinical trials typically are conducted in three sequential phases that may overlap or be combined:

- *Phase 1*. The biological product is initially introduced into healthy human subjects or patients and assessed for biological activity, side effect tolerability, safety and early signs of efficacy.
- *Phase 2*. The biological product is evaluated in a limited patient population to identify possible adverse effects and safety risks, to preliminarily evaluate the efficacy of the product for specific targeted diseases and to determine dosage tolerance, optimal dosage and dosing schedule.
- *Phase 3*. Clinical trials are undertaken to further evaluate dosage, clinical efficacy, potency, and safety in an expanded patient population at geographically dispersed clinical trial sites. These clinical trials are intended to establish the overall risk/benefit ratio of the product and provide an adequate basis for approval and physician labeling.

Post-approval clinical trials, sometimes referred to as Phase 4 clinical trials, may be conducted after initial marketing approval. These clinical trials are used to gain additional experience from the treatment of patients in the intended therapeutic indication, particularly for long-term safety follow-up.

During all phases of clinical development, the FDA requires extensive monitoring and auditing of all clinical activities, clinical data, and clinical trial investigators. Annual progress reports detailing the results of the clinical trials must be submitted to the FDA. Written IND safety reports must be promptly submitted to the FDA and the investigators for serious and unexpected adverse events, any findings from other studies, tests in laboratory animals or *in vitro* testing that suggest a significant risk for human subjects, or any clinically important increase in the rate of a serious suspected adverse reaction over that listed in the protocol or investigator brochure. The sponsor must submit an IND safety report within 15 calendar days after the sponsor determines that the information qualifies for reporting. The sponsor also must notify the FDA of any unexpected fatal or life-threatening suspected adverse reaction within seven calendar days after the sponsor's initial receipt of the information. Phase 1, Phase 2 and Phase 3 clinical trials may not be completed successfully within any specified period, if at all. The FDA or the sponsor, acting on its own or based on a recommendation from the sponsor's data safety monitoring board, may suspend a clinical trial

at any time on various grounds, including a finding that the research subjects or patients are being exposed to an unacceptable health risk. Similarly, an IRB can suspend or terminate approval of a clinical trial at its institution if the clinical trial is not being conducted in accordance with the IRB's requirements or if the biological product has been associated with unexpected serious harm to patients.

Concurrent with clinical trials, companies usually complete additional animal studies and also must develop additional information about the physical characteristics of the biological product as well as finalize a process for manufacturing the product in commercial quantities in accordance with cGMP requirements. To help reduce the risk of the introduction of adventitious agents with use of biological products, emphasis is placed on the importance of manufacturing control for products whose attributes cannot be precisely defined. The manufacturing process must be capable of consistently producing quality batches of the product candidate and, among other things, the sponsor must develop methods for testing the identity, strength, quality, potency and purity of the final biological product. Additionally, appropriate packaging must be selected and tested and stability studies must be conducted to demonstrate that the biological product candidate does not undergo unacceptable deterioration over its shelf life.

U.S. review and approval processes

After the completion of clinical trials of a biological product, FDA approval of a BLA must be obtained before commercial marketing of the biological product. The BLA must include results of product development, laboratory and animal studies, human studies, information on the manufacture and composition of the product, proposed labeling and other relevant information.

Within 60 days following submission of the application, the FDA reviews a BLA submitted to determine if it is substantially complete before the FDA accepts it for filing. The FDA may refuse to file any BLA that it deems incomplete or not properly reviewable at the time of submission and may request additional information. In this event, the BLA must be resubmitted with the additional information. The resubmitted application also is subject to review before the FDA accepts it for filing. In most cases, the submission of a BLA is subject to a substantial application user fee, although the fee may be waived under certain circumstances. Under the performance goals and policies implemented by the FDA under the Prescription Drug User Fee Act, or PDUFA, for original BLAs, the FDA targets ten months from the filing date in which to complete its initial review of a standard application and respond to the applicant, and six months from the filing date for an application with priority review. The FDA does not always meet its PDUFA goal dates, and the review process is often significantly extended by FDA requests for additional information or clarification. This review in total typically takes twelve months from the date the BLA is submitted to the FDA because the FDA has approximately two months to make a filing decision. The review process and the PDUFA goal date may be extended by three months if the FDA requests or the BLA sponsor otherwise provides additional information or clarification regarding information already provided in the submission within the last three months before the PDUFA goal date.

Once the submission is accepted for filing, the FDA begins an in-depth substantive review of the BLA. The FDA reviews the BLA to determine, among other things, whether the proposed product is safe and potent, or effective, for its intended use, and has an acceptable purity profile, and whether the product is being manufactured in accordance with cGMP to assure and preserve the product's identity, safety, strength, quality, potency and purity. The FDA may refer applications for novel biological products or biological products that present difficult or novel questions of safety or efficacy to an advisory committee, typically a panel that includes clinicians and other experts, for review, evaluation and a recommendation as to whether the application should be approved and under what conditions. The FDA is not bound by the recommendations of an advisory committee, but it considers such recommendations carefully when making decisions. During the biological product

approval process, the FDA also will determine whether a Risk Evaluation and Mitigation Strategy, or REMS, is necessary to assure the safe use of the biological product. If the FDA concludes a REMS is needed, the sponsor of the BLA must submit a proposed REMS; the FDA will not approve the BLA without a REMS, if required.

Before approving a BLA, the FDA typically will inspect the facilities at which the product is manufactured. The FDA will not approve the product unless it determines that the manufacturing processes and facilities are in compliance with cGMP requirements and adequate to assure consistent production of the product within required specifications. Additionally, before approving a BLA, the FDA will typically inspect one or more clinical sites to assure that the clinical trials were conducted in compliance with IND study requirements and GCP requirements. To assure cGMP and GCP compliance, an applicant must incur significant expenditure of time, money and effort in the areas of training, record keeping, production and quality control.

Under the Pediatric Research Equity Act, or PREA, as amended, a BLA or supplement to a BLA for a novel product (*e.g.*, new active ingredient, new indication, etc.) must contain data to assess the safety and effectiveness of the biological product for the claimed indications in all relevant pediatric subpopulations and to support dosing and administration for each pediatric subpopulation for which the product is safe and effective. The FDA may grant deferrals for submission of data or full or partial waivers.

Notwithstanding the submission of relevant data and information, the FDA may ultimately decide that the BLA does not satisfy its regulatory criteria for approval and deny approval. Data obtained from clinical trials are not always conclusive and the FDA may interpret data differently than we interpret the same data. If the FDA decides not to approve the BLA in its present form, the FDA will issue a complete response letter that usually describes all of the specific deficiencies in the BLA identified by the FDA. The deficiencies identified may be minor, for example, requiring labeling changes, or major, for example, requiring additional clinical trials. Additionally, the complete response letter may include recommended actions that the applicant might take to place the application in a condition for approval. If a complete response letter is issued, the applicant may either resubmit the BLA, addressing all of the deficiencies identified in the letter, or withdraw the application.

If a product receives regulatory approval, the approval may be significantly limited to specific diseases and dosages or the indications for use may otherwise be limited, including to subpopulations of patients, which could restrict the commercial value of the product. Further, the FDA may require that certain contraindications, warnings, precautions or drug-drug interactions be included in the product labeling. The FDA may impose restrictions and conditions on product distribution, prescribing, or dispensing in the form of a REMS, or otherwise limit the scope of any approval. In addition, the FDA may require post marketing clinical trials, sometimes referred to as Phase 4 clinical trials, designed to further assess a biological product's safety and effectiveness, and testing and surveillance programs to monitor the safety of approved products that have been commercialized.

Expedited development and review programs

The FDA has various programs, including fast track designation, breakthrough therapy designation, accelerated approval and priority review, that are intended to expedite or simplify the process for the development and FDA review of drugs and biologics that are intended for the treatment of serious or life-threatening diseases or conditions. These programs do not change the standards for approval but may help expedite the development or approval process. To be eligible for fast track designation, new drugs and biological products must be intended to treat a serious or life-threatening condition and demonstrate the potential to address unmet medical needs for the

condition. Fast track designation applies to the combination of the product and the specific indication for which it is being studied. The sponsor of a new drug or biologic may request the FDA to designate the drug or biologic as a fast track product at any time during the clinical development of the product. One benefit of fast track designation, for example, is that the FDA may consider for review sections of the marketing application for a product that has received fast track designation on a rolling basis before the complete application is submitted.

Under the FDA's breakthrough therapy program, products may be eligible for designation as a breakthrough therapy if they are intended, alone or in combination with one or more other drugs or biologics, to treat a serious or life-threatening disease or condition and preliminary clinical evidence demonstrates that such product may have substantial improvement on one or more clinically significant endpoints over existing therapies. The benefits of breakthrough therapy designation include the same benefits as fast track designation plus the FDA will seek to ensure the sponsor of a breakthrough therapy product receives timely advice and interactive communications to help the sponsor design and conduct a development program as efficiently as possible.

Any product is eligible for priority review if it has the potential to provide safe and effective therapy where no satisfactory alternative therapy exists or a significant improvement in the treatment, diagnosis or prevention of a disease compared to marketed products. The FDA will attempt to direct additional resources to the evaluation of an application for a new drug or biological product designated for priority review in an effort to facilitate the review. Under priority review, the FDA's goal is to review an application in six months once it is filed, compared to ten months for a standard review.

Additionally, a product may be eligible for accelerated approval. Drug or biological products studied for their safety and effectiveness in treating serious or life-threatening illnesses and that provide meaningful therapeutic benefit over existing treatments may receive accelerated approval, which means that they may be approved on the basis of adequate and well-controlled clinical trials establishing that the product has an effect on a surrogate endpoint that is reasonably likely to predict a clinical benefit, or on the basis of an effect on an intermediate clinical endpoint other than survival or irreversible morbidity. As a condition of approval, the FDA may require that a sponsor of a drug or biological product receiving accelerated approval perform adequate and well-controlled post-marketing clinical trials. In addition, the FDA currently requires as a condition for accelerated approval pre-approval of promotional materials, which could adversely impact the timing of the commercial launch of the product.

Post-approval requirements

Maintaining substantial compliance with applicable federal, state, and local statutes and regulations requires the expenditure of substantial time and financial resources. Rigorous and extensive FDA regulation of biological products continues after approval, particularly with respect to cGMP. As the manufacturer of our products we are required to comply with applicable requirements in the cGMP regulations, including quality control and quality assurance and maintenance of records and documentation. Other post-approval requirements applicable to biological products include reporting of cGMP deviations that may affect the identity, potency, purity and overall safety of a distributed product, record-keeping requirements, reporting of adverse effects, reporting updated safety and efficacy information, and complying with electronic record and signature requirements. After a BLA is approved, the product also may be subject to official lot release. As part of the manufacturing process, we are required to perform certain tests on each lot of the product before it is released for distribution. If the product is subject to official release by the FDA, we shall submit samples of each lot of product to the FDA together with a release protocol showing a summary of the history of manufacture of the lot and the results of all of the tests performed on the lot. The FDA also may perform certain confirmatory tests on lots of some products, such as viral vaccines, before

releasing the lots for distribution. In addition, the FDA conducts laboratory research related to the regulatory standards on the safety, purity, potency, and effectiveness of biological products.

We also must comply with the FDA's advertising and promotion requirements, such as those related to direct-to-consumer advertising, the prohibition on promoting products for uses or in patient populations that are not described in the product's approved labeling (known as "off-label use"), industry-sponsored scientific and educational activities, and promotional activities involving the internet. Discovery of previously unknown problems or the failure to comply with the applicable regulatory requirements may result in restrictions on the marketing of a product or withdrawal of the product from the market as well as possible civil or criminal sanctions. Failure to comply with the applicable U.S. requirements at any time during the product development process, approval process or after approval may subject an applicant or manufacturer to administrative or judicial actions, civil or criminal sanctions and adverse publicity. FDA sanctions could include refusal to approve pending applications, withdrawal of an approval, license revocation, clinical holds, warning or untitled letters, product recalls, product seizures, total or partial suspension of production or distribution, injunctions, fines, refusals of government contracts, mandated corrective advertising or communications with doctors or other stakeholders, debarment, restitution, disgorgement of profits, or civil or criminal penalties. Any agency or judicial enforcement action could have a material adverse effect on us.

Biological product manufacturers and other entities involved in the manufacture and distribution of approved biological products are required to register their establishments with the FDA and certain state agencies, and are subject to periodic unannounced inspections by the FDA and certain state agencies for compliance with cGMP and other laws. Accordingly, manufacturers must continue to expend time, money, and effort in the area of production and quality control to maintain cGMP compliance. Discovery of problems with a product after approval may result in restrictions on a product, manufacturer, or holder of an approved BLA, including withdrawal of the product from the market. In addition, changes to the manufacturing process or facility generally require prior FDA approval before being implemented and other types of changes to the approved product, such as adding new indications and additional labeling claims, are also subject to further FDA review and approval.

Government regulation outside of the United States

Whether or not we obtain FDA approval for a product, we must obtain the requisite approvals from regulatory authorities in foreign countries prior to the commencement of clinical trials or marketing of the product in those countries. Certain countries outside of the United States have a similar process that requires the submission of a clinical trial application, or CTA, much like the IND prior to the commencement of human clinical trials. In the European Union, for example, a CTA must be submitted for each clinical trial to each country's national health authority and an independent ethics committee, much like the FDA and an IRB, respectively. Once the CTA is approved in accordance with a country's requirements, the corresponding clinical trial may proceed.

The requirements and process governing the conduct of clinical trials, product licensing, pricing and reimbursement vary from country to country. In all cases, the clinical trials must be conducted in accordance with GCP and the applicable regulatory requirements and the ethical principles that have their origin in the Declaration of Helsinki.

Other Healthcare Laws

In addition to FDA restrictions on marketing of pharmaceutical and biological products, several other types of state and federal laws have been applied to restrict certain general business and marketing practices in the biopharmaceutical industry in recent years. These laws include, among

others, anti-kickback statutes, false claims statutes and other healthcare laws and regulations, some of which are described below.

The federal Anti-Kickback Statute prohibits, among other things, knowingly and willfully offering, paying, soliciting or receiving remuneration to induce, or in return for, purchasing, leasing, ordering or arranging for the purchase, lease or order of any healthcare item or service reimbursable under Medicare, Medicaid, or other federally financed healthcare programs. The Patient Protection and Affordable Care Act as amended by the Health Care and Education Reconciliation Act, collectively, the ACA, amended the intent element of the federal statute so that a person or entity no longer needs to have actual knowledge of the statute or specific intent to violate it in order to commit a violation. This statute has been interpreted to apply to arrangements between pharmaceutical manufacturers on the one hand and prescribers, purchasers and formulary managers, among others, on the other. Although there are a number of statutory exceptions and regulatory safe harbors protecting certain common activities from prosecution or other regulatory sanctions, the exceptions and safe harbors are drawn narrowly, and practices that involve remuneration intended to induce prescribing, purchases or recommendations may be subject to scrutiny if they do not qualify for an exception or safe harbor.

Federal civil and criminal false claims laws, including the federal civil False Claims Act, prohibit any person or entity from knowingly presenting, or causing to be presented, a false claim for payment to the federal government, or knowingly making, or causing to be made, a false statement to have a false claim paid. This includes claims made to programs where the federal government reimburses, such as Medicare and Medicaid, as well as programs where the federal government is a direct purchaser, such as when it purchases off the Federal Supply Schedule. Recently, several pharmaceutical and other healthcare companies have been prosecuted under these laws for allegedly inflating drug prices they report to pricing services, which in turn were used by the government to set Medicare and Medicaid reimbursement rates, and for allegedly providing free product to customers with the expectation that the customers would bill federal programs for the product. In addition, certain marketing practices, including off-label promotion, may also violate false claims laws. Additionally, the ACA amended the federal Anti-Kickback Statute such that a violation of that statute can serve as a basis for liability under the federal civil False Claims Act. Most states also have statutes or regulations similar to the federal Anti-Kickback Statute and civil False Claims Act, which apply to items and services reimbursed under Medicaid and other state programs, or, in several states, apply regardless of the payor.

Other federal statutes pertaining to healthcare fraud and abuse include the civil monetary penalties statute, which prohibits, among other things, the offer or payment of remuneration to a Medicaid or Medicare beneficiary that the offeror or payor knows or should know is likely to influence the beneficiary to order a receive a reimbursable item or service from a particular supplier, and the additional federal criminal statutes created by the Health Insurance Portability and Accountability Act of 1996, or HIPAA, which prohibits, among other things, knowingly and willfully executing or attempting to execute a scheme to defraud any healthcare benefit program or obtain by means of false or fraudulent pretenses, representations or promises any money or property owned by or under the control of any healthcare benefit program in connection with the delivery of or payment for healthcare benefits, items or services.

HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act of 2009, or HITECH, and their respective implementing regulations, including the Final Omnibus Rule published on January 25, 2013, impose obligations on certain healthcare providers, health plans, and healthcare clearinghouses, known as covered entities, as well as their business associates that perform certain services involving the storage, use or disclosure of individually identifiable health information, including mandatory contractual terms, with respect to safeguarding

the privacy, security, and transmission of individually identifiable health information, and require notification to affected individuals and regulatory authorities of certain breaches of security of individually identifiable health information. HITECH increased the civil and criminal penalties that may be imposed against covered entities, business associates and possibly other persons, and gave state attorneys general new authority to file civil actions for damages or injunctions in federal courts to enforce the federal HIPAA laws and seek attorneys' fees and costs associated with pursuing federal civil actions. In addition, many state laws govern the privacy and security of health information in certain circumstances, many of which differ from each other in significant ways and may not have the same effect, and often are not pre-empted by HIPAA.

Further, pursuant to the federal Physician Payments Sunshine Act, created as part of the ACA, certain manufacturers of prescription drugs are required to collect and report annually to the Centers for Medicare & Medicaid Services, or CMS, information on certain payments or transfers of value to physicians and teaching hospitals, as well as investment interests held by physicians and their immediate family members. Failure to submit required information may result in civil monetary penalties. Effective January 1, 2022, reporting on transfers of value to physician assistants, nurse practitioners or clinical nurse specialists, certified registered nurse anesthetists, and certified nurse-midwives will also be required.

In addition, several states now require biopharmaceutical manufacturers to report certain expenses relating to the marketing and promotion of drug products and to report gifts and payments to individual healthcare practitioners in these states. Other states prohibit various marketing-related activities, such as the provision of certain kinds of gifts or meals. Still other states require the posting of information relating to clinical studies and their outcomes. Some states require the reporting of certain drug pricing information, including information pertaining to and justifying price increases, or prohibit prescription drug price gouging. In addition, some states require pharmaceutical companies to implement compliance programs or marketing codes. Certain states and local jurisdictions also require the registration of pharmaceutical sales representatives.

Efforts to ensure that business arrangements with third parties comply with applicable healthcare laws and regulations involve substantial costs. If a biopharmaceutical manufacturer's operations are found to be in violation of any such requirements, it may be subject to significant penalties, including civil, criminal and administrative penalties, damages, fines, disgorgement, imprisonment, the curtailment or restructuring of its operations, loss of eligibility to obtain approvals from the FDA, exclusion from participation in government contracting, healthcare reimbursement or other federal or state government healthcare programs, including Medicare and Medicaid, integrity oversight and reporting obligations, and reputational harm. Although effective compliance programs can mitigate the risk of investigation and prosecution for violations of these laws, these risks cannot be entirely eliminated. Any action for an alleged or suspected violation can cause a drug company to incur significant legal expenses and divert management's attention from the operation of the business, even if such action is successfully defended.

U.S. healthcare reform

In the United States there have been, and continue to be, proposals by the federal government, state governments, regulators and third party payors to control or manage the increased costs of healthcare and, more generally, to reform the U.S. healthcare system. The biopharmaceutical industry has been a particular focus of these efforts and has been significantly affected by major legislative initiatives For example, in March 2010, the ACA was enacted, which intended to broaden access to health insurance, reduce or constrain the growth of healthcare spending, enhance remedies against fraud and abuse, add new transparency requirements for the healthcare and health insurance industries, impose new taxes and fees on the health industry and impose additional health policy reforms, substantially changed the way healthcare is financed by both governmental and

private insurers, and significantly impacts the U.S. pharmaceutical industry. The ACA, among other things, (i) subjected therapeutic biologics to potential competition by lower-cost biosimilars by creating a licensure framework for follow-on biologic products, (ii) proscribed a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs and therapeutic biologics that are inhaled, infused, instilled, implanted or injected, (iii) increased the minimum Medicaid rebates owed by manufacturers under the Medicaid Drug Rebate Program and extended the rebate program to individuals enrolled in Medicaid managed care organizations, (iv) established annual nondeductible fees and taxes on manufacturers of certain branded prescription drugs and therapeutic biologics, apportioned among these entities according to their market share in certain government healthcare programs (v) established a new Medicare Part D coverage gap discount program, in which manufacturers must agree to offer 50% (now 70%) point of-sale discounts off negotiated prices of applicable brand drugs and therapeutic biologics to eligible beneficiaries during their coverage gap period, as a condition for the manufacturer's outpatient drugs and therapeutic biologics to be covered under Medicare Part D, (vi) expanded eligibility criteria for Medicaid programs by, among other things, allowing states to offer Medicaid coverage to additional individuals and by adding new mandatory eligibility categories for individuals with income at or below 133% of the federal poverty level, thereby potentially increasing manufacturers' Medicaid rebate liability, (vii) expanded the entities eligible for discounts under the Public Health program (viii) created a new Patient-Centered Outcomes Research Institute to oversee, identify priorities in, and conduct comparative clinical effectiveness research, along with funding for such research, and (ix) established a Center for Medicare Innovation at CMS to test innovative payment and service delivery models to lower Medicare and Medicaid spending, potentially including prescription drug spending.

The Trump administration and Congress have, and we expect they will continue to, seek to modify, repeal, or otherwise invalidate all, or certain provisions of, the ACA. Since January 2017, the Trump administration has issued two executive orders and other directives designed to delay the implementation of certain provisions of the ACA or otherwise circumvent some of the requirements for health insurance mandated by the ACA. For example, on October 12, 2017, the Trump administration issued an executive order that expands the use of association health plans and allows anyone to purchase short-term health plans that provide temporary, limited insurance. This executive order also calls for the halt of federal payments to health insurers for cost-sharing reductions previously available to lower-income Americans to afford coverage. There is still uncertainty with respect to the impact this executive order could have on coverage and reimbursement for healthcare items and services covered by plans that were authorized by the ACA. Concurrently, Congress has considered legislation that would repeal or repeal and replace all or part of the ACA. While Congress has not passed comprehensive repeal legislation, two bills affecting the implementation of certain taxes under the ACA have been signed into law. The Tax Cuts and Jobs Act of 2017, or the Tax Act, among other things, included a provision that repealed, effective January 1, 2019, the tax-based shared responsibility payment imposed by the ACA on certain individuals who fail to maintain qualifying health coverage for all or part of a year that is commonly referred to as the "individual mandate". Additionally, on January 22, 2018, the current U.S. presidential administration signed a continuing resolution on appropriations for fiscal year 2018 that delayed the implementation of certain ACA-mandated fees, including the so-called "Cadillac" tax on certain high cost employer-sponsored insurance plans, the annual fee imposed on certain health insurance providers based on market share, and the medical device excise tax on non-exempt medical devices. Further, the Bipartisan Budget Act of 2018, or the BBA, among other things, amended the ACA, effective January 1, 2019, to increase from 50% to 70% the point-of-sale discount that is owed by pharmaceutical manufacturers who participate in Medicare Part D and to close the coverage gap in most Medicare drug plans, commonly referred to as the "donut hole". More recently, in July 2018, CMS published a final rule permitting further collections and payments to and from certain ACA qualified health plans and health insurance issuers under the ACA risk adjustment program in

response to the outcome of federal district court litigation regarding the method CMS uses to determine this risk adjustment. On December 14, 2018, a Texas U.S. District Court Judge ruled that the ACA is unconstitutional in its entirety because the "individual mandate" was repealed by Congress as part of the Tax Act. While the Texas U.S. District Court Judge, as well as the Trump administration and CMS, have stated that the ruling will have no immediate effect pending appeal of the decision, it is unclear how this decision, subsequent appeals, and other efforts to repeal and replace the ACA will impact the ACA.

In addition, other legislative changes have been proposed and adopted in the United States since the ACA was enacted to reduce healthcare expenditures. On August 2, 2011, the Budget Control Act of 2011 among other things, created measures for spending reductions by Congress. A joint select committee on deficit reduction, tasked with recommending a targeted deficit reduction of at least $1.2 trillion for the years 2013 through 2021, was unable to reach required goals, thereby triggering the legislation's automatic reduction to several government programs. This includes aggregate reductions of Medicare payments to providers of 2% per fiscal year. These reductions went into effect on April 1, 2013 and, due to subsequent legislative amendments to the statute, including the BBA, will remain in effect through 2027 unless additional Congressional action is taken. Moreover, on January 2, 2013, the American Taxpayer Relief Act of 2012 was signed into law, which, among other things, further reduced Medicare payments to several types of providers, including hospitals, imaging centers and cancer treatment centers, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years.

Payment methodologies also may be subject to changes in healthcare legislation and regulatory initiatives. For example, the Medicare Prescription Drug, Improvement, and Modernization Act of 2003, or MMA, changed the way Medicare covers and pays for pharmaceutical products. The legislation expanded Medicare coverage for drug purchases by the elderly and introduced a new reimbursement methodology based on average sales prices for physician-administered drugs. In addition, this legislation provided authority for limiting the number of drugs that will be covered in any therapeutic class. While the MMA only applies to drug benefits for Medicare beneficiaries, private payors often follow Medicare coverage policy and payment limitations in setting their own reimbursement rates. Therefore, any reduction in reimbursement that results from the MMA may result in a similar reduction in payments from private payors.

Recently there has been heightened governmental scrutiny over the manner in which biopharmaceutical manufacturers set prices for their marketed products, which has resulted in several Congressional inquiries and proposed and enacted federal and state legislation designed to, among other things, bring more transparency to product pricing, review the relationship between pricing and manufacturer patient programs, and reform government program reimbursement methodologies for drug products. At the federal level, the Trump administration's budget proposal for fiscal year 2019 contains further drug price control measures that could be enacted during the 2019 budget process or in other future legislation, including, for example, measures to permit Medicare Part D plans to negotiate the price of certain drugs under Medicare Part B, to allow some states to negotiate drug prices under Medicaid, and to eliminate cost sharing for generic drugs for low-income patients. Additionally, on May 11, 2018, the Trump administration laid out the administration's "Blueprint" to reduce the cost of prescription medications while preserving innovation and cures. While the Department of Health and Human Services, or HHS, is soliciting feedback on some of these measures, other actions may be immediately implemented by HHS under existing authority. Further, on January 31, 2019, the HHS Office of Inspector General, proposed modifications to the federal Anti-Kickback Statute discount safe harbor for the purpose of reducing the cost of drug products to consumers which, among other things, if finalized, will affect discounts paid by manufacturers to Medicare Part D plans, Medicaid managed care organizations and pharmacy benefit managers working with these organizations. Although a number of these, and other potential,

proposals will require additional authorization to become effective, Congress and the Trump administration have each indicated that it will continue to seek new legislative or administrative measures to control drug costs. At the state level, legislatures are increasingly passing legislation and implementing regulations designed to control pharmaceutical and biological product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing.

Coverage, pricing and reimbursement

Significant uncertainty exists as to the coverage and reimbursement status of biopharmaceutical products approved by the FDA and other government authorities. Sales of any approved products will depend, in part, on the extent to which the costs of the products will be covered by third-party payors, including government health programs in the United States such as Medicare and Medicaid, commercial health insurers and managed care organizations. The process for determining whether a payor will provide coverage for a product may be separate from the process for setting the price or reimbursement rate that the payor will pay for the product once coverage is approved. Third-party payors are increasingly challenging the prices charged, examining the medical necessity and reviewing the cost-effectiveness of medical products and services and imposing controls to manage costs. Third-party payors may also limit coverage to specific products on an approved list, or formulary, which might not include all of the approved products for a particular indication.

In the United States, no uniform policy of coverage and reimbursement for products exists among third-party payors. Third-party payors often rely upon Medicare coverage policy and payment limitations in setting their reimbursement rates, but also have their own methods and approval process apart from Medicare determinations. Therefore, coverage and reimbursement for products in the United States can differ significantly from payor to payor. In order to secure coverage and reimbursement for any biological product that is approved for sale, a biopharmaceutical manufacturer may need to conduct expensive pharmacoeconomic studies in order to demonstrate the medical necessity and cost-effectiveness of the product. A payor's decision to provide coverage for a drug or biological product does not imply that an adequate reimbursement rate will be approved. Third-party reimbursement may not be sufficient to maintain price levels high enough to realize an appropriate return on investment in product development.

The containment of healthcare costs also has become a priority of federal, state and foreign governments and the prices of drugs have been a focus in this effort. Governments have shown significant interest in implementing cost-containment programs, including price controls, restrictions on reimbursement and requirements for substitution of generic products. Adoption of price controls and cost-containment measures, and adoption of more restrictive policies in jurisdictions with existing controls and measures, could further limit a company's revenue generated from the sale of any approved drug or biological product. Coverage policies and third-party reimbursement rates may change at any time. Even if favorable coverage and reimbursement status is attained for one or more drug or biological products for which a company or its collaborators receive marketing approval, less favorable coverage policies and reimbursement rates may be implemented in the future.

Employees

As of March 31, 2019, we had 85 full-time employees, 71 of whom were primarily engaged in research and development activities and 42 of whom had an M.D. or Ph.D. degree. None of our employees are represented by a labor union or covered by a collective bargaining agreement.

Facilities

We occupy approximately 41,124 square feet of office and laboratory space in Redwood City, California, under leases that expire in the first half of 2020, which we use for our corporate headquarters as well as certain of our research and development activities. In January 2019, we entered into a commercial lease agreement for an additional 33,000 square feet of office space in a separate facility in South San Francisco, California.

Legal Proceedings

From time to time, we may become involved in litigation relating to claims arising from the ordinary course of business. Our management believes that there are currently no claims or actions pending against us, the ultimate disposition of which would have a material adverse effect on our results of operations, financial condition or cash flows.

MANAGEMENT

Executive Officers and Directors

The following table sets forth information for our executive officers and directors as of March 31, 2019:

Name	Age	Position
Executive Officers		
John A. Orwin	54	President, Chief Executive Officer and Director
Herbert Cross	47	Chief Financial Officer
Tito A. Serafini, Ph.D.	55	Chief Strategy Officer and Director
Norman Michael Greenberg, Ph.D.	59	Chief Scientific Officer
Guy Cavet, Ph.D.	45	Chief Technical Officer
Non-Employee Directors		
Brian Atwood(1)(2)	66	Chairman of the Board and Director
Franklin Berger(1)(3)	69	Director
David Lacey, M.D.(2)(3)	66	Director
William H. Robinson, M.D., Ph.D.(1)	51	Director
Lawrence Steinman, M.D.(2)(3)	71	Director

(1) Member of the audit committee
(2) Member of the compensation committee
(3) Member of the nominating and corporate governance committee

Executive Officers

John A. Orwin. Mr. Orwin has served as our President and Chief Executive Officer and a member of our board of directors since April 2018. Prior to joining Atreca, from June 2013 through June 2017, Mr. Orwin served as Chief Executive Officer of Relypsa, Inc. and from June 2013 through March 2017 also served as President of Relypsa and served on its board of directors from June 2013 until Relypsa's acquisition by the Galenica Group in September 2016. Prior to Relypsa, Mr. Orwin served as President and Chief Operating Officer of Affymax, Inc., a biotechnology company, from April 2010 to January 2011, and as Affymax's Chief Executive Officer and a member of the board of directors from February 2011 to May 2013. From 2005 to April 2010, Mr. Orwin served as Vice President and then Senior Vice President of the BioOncology Business Unit at Genentech, Inc. (now a member of the Roche Group), a biotechnology company. From 2001 to 2005, Mr. Orwin served in various executive-level positions at Johnson & Johnson, a life sciences company. Prior to such roles, Mr. Orwin held senior marketing and sales positions at various life sciences and pharmaceutical companies, including Alza Corporation (acquired by Johnson & Johnson), Sangstat Medical Corporation (acquired by Genzyme), Rhone-Poulenc Rorer Pharmaceuticals, Inc. (merged with Sanofi-Aventis) and Schering-Plough Corporation (merged with Merck). Mr. Orwin currently serves as a member of the board of directors of Retrophin, Inc., Array BioPharma Inc., a biopharmaceutical company and Seattle Genetics, Inc., a biotechnology company. In addition to previously serving as a member of the board of directors of Relypsa and Affymax, Mr. Orwin also served on the board of directors of NeurogesX, Inc., a biopharmaceutical company, from November 2009 until July 2013. Mr. Orwin received a B.A. in Economics from Rutgers University and an M.B.A. from the New York University Leonard M. Stern School of Business. We believe that Mr. Orwin's perspective and deep experience in the biopharmaceutical industry qualifies him to serve on our board of directors.

Herbert Cross. Mr. Cross has served as our Chief Financial Officer since February 2019. Prior to joining Atreca, from November 2017 to June 2018, Mr. Cross served as Chief Financial Officer of ARMO Biosciences, Inc., a biotechnology company. From February 2016 to November 2017, Mr. Cross served as Chief Financial Officer of Balance Therapeutics, Inc., a biotechnology company, where he led all investor relations, strategic finance and administrative functions. From October 2013 to November 2015, Mr. Cross served as Chief Financial Officer of KaloBios Pharmaceuticals, Inc., a biotechnology company, and interim Chief Executive Officer from January 2015 to November 2015. In December 2015, KaloBios filed a voluntary petition for relief under Chapter 11 of the Bankruptcy Code. KaloBios emerged from Chapter 11 in July 2016. From November 2010 to June 2013, Mr. Cross served as Chief Financial Officer of Affymax, Inc., a biotechnology company. Mr. Cross received a B.S. in Business Administration from the University of California, Berkeley and is a certified public accountant, currently inactive, in the state of California.

Tito A Serafini, Ph.D. Dr. Serafini is one of our principal founders and has served as a member of our board of directors since June 2010 and as our Chief Strategy Officer, with responsibility for the non-clinical research, development and technical organization, since April 2018. From June 2010 to April 2018, Dr. Serafini served as our President and Chief Executive Officer. Dr. Serafini received a B.S. in biochemistry from Case Western Reserve University and a Ph.D. in biochemistry from Stanford University School of Medicine. Dr. Serafini performed postdoctoral research at the University of California, San Francisco, and he was afterward an award-winning faculty member in the Department of Molecular and Cell Biology at the University of California, Berkeley, where he co-founded the university's Functional Genomics Laboratory. Dr. Serafini left academia to co-found and serve as an executive officer of Renovis, Inc., eventually a publicly held company. He subsequently held the position of Chief Scientific Officer at Nuon Therapeutics, Inc., before founding Atreca. Dr. Serafini was selected to serve on our board of directors because of his scientific knowledge and acumen as well as the experience he brings as our founder and former Chief Executive Officer.

Norman Michael Greenberg, Ph.D. Dr. Greenberg has served as our Chief Scientific Officer since May 2016. Prior to joining Atreca, from February 2015 until May 2016, Dr. Greenberg served as Senior Vice President of Translational Medicine at Checkmate Pharmaceuticals, LLC. From April 2014 until May 2016, Dr. Greenberg served as Chief Executive Officer and President of NMG Scientific Consulting, USA. From August 2011 until March 2014, Dr. Greenberg was Vice President of Global Research, Oncology, at MedImmune (AstraZeneca), where he spearheaded global research activities for immune-mediated and tumor-targeted therapies. He previously has served as Senior Director of Research in Oncology, at Pfizer, as a Full Member of the Fred Hutchinson Cancer Research Center and as a tenured Associate Professor at Baylor College of Medicine. Dr. Greenberg is the inventor of the TRAMP prostate cancer research models and has authored over 130 peer-reviewed scientific research articles. He currently sits on the Scientific Advisory Board for Machavert Pharmaceuticals. Dr. Greenberg received a B.Sc. in microbiology and immunology from the University of Toronto and a Ph.D. in microbiology and immunology from the University of British Columbia. Dr. Greenberg performed postdoctoral research at Baylor College of Medicine in Houston.

Guy Cavet, Ph.D. Dr. Cavet is one of our co-founders and has served as our Chief Technical Officer since July 2014. Prior to joining Atreca, Dr. Cavet was Chief Information Officer and Head of Computational Sciences at Nodality Inc., a life sciences company, from March 2013 until July 2014. From June 2012 until February 2013, Dr. Cavet served as Vice President, Life Sciences at Kaggle, Inc., where he focused on application of machine learning in healthcare and biomedical research. From March 2008 until June 2012, Dr. Cavet built the computational and statistical teams at Crescendo Bioscience, Inc., most recently as Vice President, Informatics. From February 2005 until March 2008, Dr. Cavet served as Senior Scientist at Genentech, Inc., building and leading a

team applying computational biology to diagnostics and cancer genomics. From January 2002 until February 2005, Dr. Cavet served as Group Leader, Computational Genomics at Merck & Co., Inc. after that company acquired Rosetta Inpharmatics, Inc., where Dr. Cavet held positions of increasing responsibility in computational biology from December 1999. Dr. Cavet received B.S. and Ph.D. degrees in Biochemistry from Cambridge University, and he performed postdoctoral research at Stanford University.

Non-Employee Directors

Brian Atwood. Mr. Atwood has served as the Chairman of our Board since December 2013. From December 2015 until February 2018, he served as President and Chief Executive Officer and was a co-founder of Cell Design Labs, Inc., a biotechnology company focused on developing human cell engineering technology for the treatment of multiple diseases, including cancer. In 1999, he co-founded and currently serves as a Managing Director for Versant Ventures, a healthcare-focused venture capital firm. Mr. Atwood serves on the board of directors of Clovis Oncology, Inc. He also served on the board of directors of Immune Design Corp., from May 2008 until June 2016, Veracyte, Inc., from its founding until December 2016, OpGen Inc., from July 2007 until December 2017, Five Prime Therapeutics, from 2002 until March 2016, Cadence Pharmaceuticals, Inc. from March 2006 until its acquisition in March 2014, Helicos Biosciences from 2003 until September 2011, Pharmion Corporation from 2000 until its acquisition in March 2008 and Trius Therapeutics, Inc. from February 2007 until its acquisition in September 2013. Mr. Atwood holds a B.S. in biological sciences from the University of California, Irvine, a M.S. in ecology from the University of California, Davis, and an M.B.A. from Harvard Business School. Mr. Atwood was selected to serve on our board of directors because of his experience in the venture capital industry, his years of business and leadership experience and his financial sophistication and expertise.

Franklin Berger. Mr. Berger has served as a member of our board of directors since October 2014. Mr. Berger is a consultant to biotechnology industry participants, including major biopharmaceutical firms, mid-capitalization biotechnology companies, specialist asset managers and venture capital companies, providing business development, strategic, financing, partnering, and royalty acquisition advice. Mr. Berger is also a biotechnology industry analyst with over 25 years of experience in capital markets and financial analysis. Mr. Berger worked at Sectoral Asset Management Inc. as a founder of the small-cap focused NEMO Fund from 2007 through June 2008. From May 1998 to March 2003, he served at J.P. Morgan Securities LLC, most recently as Managing Director, Equity Research and Senior Biotechnology Analyst. Previously, Mr. Berger served in similar capacities at Salomon Smith Barney Inc. and Josephthal & Co. Mr. Berger also serves on the board of directors of BELLUS Health, Inc., ESSA Pharma Inc., Proteostasis Therapeutics, Inc., Tocagen, Inc. Kezar Life Sciences, Inc. and Five Prime Therapeutics, Inc., each of which is a public biotechnology company. Mr. Berger previously served as a member of the board of directors of BioTime, Inc., from May 2013 until March 2014, and Seattle Genetics, Inc., from June 2004 until May 2014, each of which was a public company during Mr. Berger's service as a director. Mr. Berger received a B.A. in International Relations and an M.A. in International Economics, both from Johns Hopkins University, and an M.B.A. from Harvard Business School. Mr. Berger was selected to serve on our board of directors because of his financial background and experience as an equity analyst in the biotechnology industry combined with his experience serving on the boards of directors of multiple public companies.

David Lacey, M.D. Dr. Lacey has served as a member of our board of directors since May 2016. Dr. Lacey is a biopharmaceutical consultant at David L. Lacey LLC, where he advises academic institutions, biotechnology companies and venture capital firms, a position he has held since July 2011. He currently serves as a director of Inbiomotion SL, Argenx SE, Nurix, Inc. and Unity Biotherapeutics and additionally as a scientific advisor to a number of early-stage

biotechnology companies. From 1994 until his retirement in 2011, he held various positions, including Senior Vice President of Discovery Research, at Amgen Inc., where he oversaw research encompassing oncology, inflammation, metabolic disorders and neuroscience, and he played a fundamental scientific role in the discovery of the OPG/RANKL/RANK pathway, which led to the development of the anti-RANKL human monoclonal antibody denosumab, for both osteoporosis (Prolia®) and cancer-related bone diseases (XGEVA®). Dr. Lacey received a B.A. degree in biology and an M.D. degree from the University of Colorado School of Medicine. Dr. Lacey was selected to serve on our board of directors because of his experience both in leading drug discovery and as an advisor to companies in the healthcare industry.

William H. Robinson, M.D., Ph.D. Dr. Robinson is one of our principal founders and has served as a member of our board of directors since March 2011. Dr. Robinson is a Professor of Medicine in the Division of Immunology and Rheumatology of the Department of Medicine at Stanford University. At Stanford, he is Director of the Stanford Osteoarthritis Initiative. He co-founded the Stanford Human Immune Monitoring Center, serves on the editorial boards of several journals, and serves on the Board of Directors of the American College of Rheumatology and the Federation of Clinical Immunology Societies (FOCiS). In 2010, Dr. Robinson was elected to the American Society of Clinical Investigation and the Henry Kunkel Society. He was a co-founder Bayhill Therapeutics. The foundational technology for Atreca's Immune Repertoire Capture® technology was developed in his academic laboratory. Dr. Robinson received his B.S., M.D. and Ph.D. degrees from Stanford University and completed his clinical training in internal medicine at the University of California, San Francisco. Dr. Robinson was selected to serve on our board of directors because of his expertise and his experience as a founder of and an advisor to various companies in the healthcare industry.

Lawrence Steinman, M.D. Dr. Steinman is one of our principal founders and has served as a member of our board of directors since June 2010. Dr. Steinman is the George A. Zimmermann Professor of Neurology and Neurological Sciences and Pediatrics in the Stanford University School of Medicine. From 2002 until 2011, he served as Chairman of Stanford University Program in Immunology. Dr. Steinman is an elected member of the National Academy of Sciences and the National Academy of Medicine, and he also chairs the Research Advisory Committee on Gulf War Veterans' Illnesses for the Veterans Administration. Dr. Steinman served as a director of and headed the scientific advisory board at Centocor, Inc. from 1991 until its acquisition in 1999. Dr. Steinman also co-founded and served as a director of Neurocrine Biosciences. Dr. Steinman co-founded and currently serves as a director of several privately held companies including Tolerion, Inc. and Katexco Pharmaceuticals Corp. Dr. Steinman received a B.A. from Dartmouth College and an M.D. from Harvard Medical School. Dr. Steinman was selected to serve on our board of directors because of his expertise and his experience as a founder of and advisor to various companies in the healthcare industry.

Family Relationships

There are no family relationships among any of our directors or executive officers.

Composition of Our Board of Directors

Our business and affairs are managed under the direction of our board of directors. We currently have ten authorized board seats with seven directors currently serving as members of our board of directors. No stockholders have any special rights regarding the election or designation of members of our board of directors. Our current directors will continue to serve as directors until their resignation, removal or successor is duly elected.

On September 5, 2018, we entered into a nominating agreement, or the Baker Brothers Nominating Agreement, with Baker Brothers Life Sciences L.P. and 667, L.P., or together, Baker Brothers. Pursuant to the Baker Brothers Nominating Agreement, during the period beginning at the closing of this offering until when Baker Brothers, together with its affiliates, no longer beneficially own at least 3,333,333 shares of our common stock (subject to adjustment for stock splits, combinations, recapitalizations and similar transactions), or the Nominating Agreement Period, we will have the obligation to support the nomination of, and to cause our board of directors to include in the slate of nominees recommended to our stockholders for election, two individuals designated by Baker Brothers, each a Baker Designee, unless a majority of our disinterested directors reasonably and in good faith determines that a Baker Designee would not be qualified to serve as our director under law, rules of the stock exchange on which our shares are listed, our amended and restated bylaws, or any of our company policies. If a Baker Designee resigns his or her seat on our board of directors or is removed or does not become a director for any reason, the vacancy will be filled by the election or appointment of another designee of Baker Brothers as soon as reasonably practicable, subject to compliance with applicable laws, rules and regulations. Furthermore, during the Nominating Agreement Period, if there is no Baker Designee on our board of directors, we will have the obligation to invite two board of directors observer designees of Baker Brothers, or the Baker Observers, to attend all meetings of our board of directors and all meetings of the committees of our board of directors as a nonvoting observer, subject to the Baker Observers' agreement to hold in confidence the information they receive as observers of our board of directors and committee meetings, as well as subject to their exclusion from our board of directors meetings to preserve our attorney-client privilege, to avoid conflicts of interest, if Bakers Brothers is determined by our board of directors to be a competitor, or other customary conditions. The Baker Brothers Nominating Agreement automatically terminates upon the earlier of when Baker Brothers together with its affiliates no longer beneficially own at least 3,333,333 shares of our common stock or the consummation of our acquisition in a change of control transaction as such terms are defined in our amended and restated certificate of incorporation.

Our amended and restated certificate of incorporation and amended and restated bylaws to become effective upon the closing of this offering will permit our board of directors to establish the authorized number of directors from time to time by resolution. Each director serves until the expiration of the term for which such director was elected or appointed, or until such director's earlier death, resignation or removal. In accordance with our amended and restated certificate of incorporation that will be in effect upon the closing of this offering, our board of directors will be divided into three classes with staggered three-year terms. At each annual general meeting of stockholders, the successors to directors whose terms then expire will be elected to serve from the time of election and qualification until the third annual meeting following election. Our directors will be divided among the three classes as follows:

- the Class I directors will be David Lacey and Lawrence Steinman, and their terms will expire at our first annual meeting of stockholders following this offering;
- the Class II directors will be Brian Atwood, William H. Robinson and Tito A. Serafini, and their terms will expire at our second annual meeting of stockholders following this offering; and
- the Class III directors will be Franklin Berger and John A. Orwin, and their terms will expire at our third annual meeting of stockholders following this offering.

We expect that any additional directorships resulting from an increase in the number of directors will be distributed among the three classes so that, as nearly as possible, each class will consist of one third of the directors. The division of our board of directors into three classes with staggered three-year terms may delay or prevent a change of our management or a change in control.

Our board of directors meets on a regular basis and additionally as required. The members of our current board of directors were elected in compliance with the provisions of our amended and restated certificate of incorporation and an amended and restated voting agreement among certain of our stockholders. The amended and restated voting agreement will terminate on the date of the closing of this offering, and following the closing of this offering none of our stockholders will have any special rights regarding the election or designation of members of our board of directors.

Director Independence

Applicable Nasdaq rules require a majority of a listed company's board of directors to be comprised of independent directors within one year of listing. In addition, Nasdaq rules require that, subject to specified exceptions, each member of a listed company's audit, compensation and nominating and corporate governance committees be independent and that audit committee members also satisfy independence criteria set forth in Rule 10A-3 under the Exchange Act of 1934, as amended, or the Exchange Act. The Nasdaq independence definition includes a series of objective tests, such as that the director is not, and has not been for at least three years, one of our employees, that neither the director nor any of his family members has engaged in various types of business dealings with us and that the director is not associated with the holders of more than 5% of our common stock. In addition, under applicable Nasdaq rules, a director will only qualify as an "independent director" if, in the opinion of the listed company's board of directors, that person does not have a relationship that would interfere with the exercise of independent judgment in carrying out the responsibilities of a director.

Our board of directors has undertaken a review of the independence of each director. Based on information provided by each director concerning her or his background, employment and affiliations, our board of directors has determined that three of our directors, Mr. Atwood, Mr. Berger and Dr. Lacey, do not have relationships that would interfere with the exercise of independent judgment in carrying out the responsibilities of a director and that each of these directors is "independent" as that term is defined under the listing standards of Nasdaq. In making such determination, our board of directors considered the relationships that each such non-employee director has with our company and all other facts and circumstances that our board of directors deemed relevant in determining his independence, including the beneficial ownership of our capital stock by each non-employee director. We intend to rely on phase-in periods under Nasdaq rules with respect to director independence, which allow us to have less than a majority of independent directors upon the date of listing of our Class A common stock, so long as our board has a majority of independent directors within one year of the date of listing. Accordingly, we plan to have a board of directors comprised of a majority of independent directors within one year of the date of listing.

Board Leadership Structure and Board's Role in Risk Oversight

Brian Atwood is the current chairman of our board of directors and John A. Orwin is our current chief executive officer, hence the roles of chairman of our board of directors and chief executive officer are separated. We believe that separating these positions allows our chief executive officer to focus on our day-to-day business, while allowing the chairman of our board to lead the board of directors in its fundamental role of providing advice to and independent oversight of management. Our board of directors recognizes the time, effort and energy that the chief executive officer is required to devote to his position in the current business environment, as well as the commitment required to serve as our chairman of our board of directors, particularly as the board of directors' oversight responsibilities continue to grow. While our amended and restated bylaws and corporate governance guidelines do not require that our chairman and chief executive officer positions be separate, our board of directors believes that having separate positions is the appropriate leadership structure for us at this time and demonstrates our commitment to good corporate governance.

Risk is inherent with every business, and how well a business manages risk can ultimately determine its success. We face a number of risks, including risks relating to our financial condition, development and commercialization activities, operations, strategic direction and intellectual property as more fully discussed in the section titled "Risk Factors" appearing elsewhere in this prospectus. Management is responsible for the day-to-day management of risks we face, while our board of directors, as a whole and through its committees, has responsibility for the oversight of risk management. In its risk oversight role, our board of directors has the responsibility to satisfy itself that the risk management processes designed and implemented by management are adequate and functioning as designed.

The role of the board of directors in overseeing the management of our risks is conducted primarily through committees of the board of directors, as disclosed in the descriptions of each of the committees below and in the charters of each of the committees. The full board of directors (or the appropriate board committee in the case of risks that are under the purview of a particular committee) discusses with management our major risk exposures, their potential impact on us, and the steps we take to manage them. When a board committee is responsible for evaluating and overseeing the management of a particular risk or risks, the chairman of the relevant committee reports on the discussion to the full board of directors during the committee reports portion of the next board meeting. This enables the board of directors and its committees to coordinate the risk oversight role, particularly with respect to risk interrelationships.

Committees of Our Board of Directors

Our board of directors has established an audit committee, a compensation committee, and a nominating and corporate governance committee. The composition and responsibilities of each committee of our board of directors are described below. Members serve on these committees until their resignation or until otherwise determined by our board of directors. Our board of directors may establish other committees as it deems necessary or appropriate from time to time.

Audit Committee

Our audit committee consists of Mr. Atwood, Mr. Berger and Dr. Robinson. Our board of directors has determined that each of Mr. Atwood and Mr. Berger satisfy the independence requirements under the listing standards of Nasdaq and Rule 10A-3(b)(1) of the Exchange Act. We intend to comply with the listing requirement of Nasdaq regarding the composition of our audit committee within the transition period for newly public companies. The chair of our audit committee is Mr. Berger, who our board of directors has determined is an "audit committee financial expert" within the meaning of SEC regulations. Dr. Robinson is not "independent" due to his service and compensation received as a consultant to us within the past three years, and we are relying on the phase-in schedules set forth in Nasdaq listing rule 5615(b)(1) with respect to Dr. Robinson's service on the audit committee. Each member of our audit committee can read and understand fundamental financial statements in accordance with applicable requirements. In arriving at these determinations, our board of directors has examined each audit committee member's scope of experience and the nature of their employment in the corporate finance sector.

The primary purpose of the audit committee is to discharge the responsibilities of our board of directors with respect to our corporate accounting and financial reporting processes, systems of internal control and financial statement audits, and to oversee our independent registered public accounting firm. Specific responsibilities of our audit committee include:

- § helping our board of directors oversee our corporate accounting and financial reporting processes;

- managing the selection, engagement, qualifications, independence and performance of a qualified firm to serve as the independent registered public accounting firm to audit our financial statements;
- discussing the scope and results of the audit with the independent registered public accounting firm, and reviewing, with management and the independent accountants, our interim and year-end operating results;
- developing procedures for employees to submit concerns anonymously about questionable accounting or audit matters;
- reviewing related person transactions;
- establishing insurance coverage for the Company's officers and directors;
- overseeing the preparation of the Company's annual proxy statement, reviewing with management the Company's financial statements to be included the Company's quarterly reports to be filed with the SEC, and reviewing with management the "Risk Factors" and "Management's Discussion and Analysis of Financial Condition and Results of Operations" disclosures in the Company's periodic reports filed with the SEC;
- obtaining and reviewing a report by the independent registered public accounting firm at least annually that describes our internal quality control procedures, any material issues with such procedures and any steps taken to deal with such issues when required by applicable law; and
- approving or, as permitted, pre-approving, audit and permissible non-audit services to be performed by the independent registered public accounting firm.

Our audit committee will operate under a written charter, which will be effective upon the completion of this offering, that satisfies the applicable listing standards of Nasdaq.

Compensation Committee

Our compensation committee consists of Mr. Atwood, Dr. Lacey and Dr. Steinman. The chair of our compensation committee is Mr. Atwood. Our board of directors has determined that each of Mr. Atwood and Dr. Lacey is independent under the listing standards of Nasdaq, a "non-employee director" as defined in Rule 16b-3 promulgated under the Exchange Act and an "outside director" as defined in Section 162(m) of the Internal Revenue Code of 1986, as amended, or the Code. Dr. Steinman is not "independent" due to his service and compensation received as a consultant to us within the past three years and we are relying on the phase-in schedules set forth in Nasdaq listing rule 5615(b)(1) with respect to Dr. Steinman's service on the compensation committee. We are permitted to phase in our compliance with the independent compensation committee requirements set forth by Nasdaq listing standards as follows: (1) one independent member at the time of listing, (2) a majority of independent members within 90 days of listing and (3) all independent members within one year of listing. We intend to comply with the listing requirement of Nasdaq regarding the composition of our compensation committee within the transition period for newly public companies. Within one year of our listing on The Nasdaq Global Market, we expect that Dr. Steinman will have resigned from our compensation committee and that each new director added to the compensation committee will be independent under Nasdaq listing rules, a non-employee director, as defined in Rule 16b-3 promulgated under the Exchange Act, and an "outside director," as defined pursuant to Section 162(m) of the Code.

The primary purpose of our compensation committee is to discharge the responsibilities of our board of directors in overseeing our compensation policies, plans and programs and to review and

determine the compensation to be paid to our executive officers, directors and other senior management, as appropriate. Specific responsibilities of our compensation committee include:

- reviewing and approving the compensation of our chief executive officer, other executive officers and senior management;
- reviewing and recommending to our board of directors the compensation paid to our directors;
- administering our equity incentive plans and other benefit programs;
- reviewing, adopting, amending and terminating incentive compensation and equity plans, severance agreements, profit sharing plans, bonus plans, change-of-control protections and any other compensatory arrangements for our executive officers and other senior management; and
- reviewing and establishing general policies relating to compensation and benefits of our employees, including our overall compensation philosophy.

Our compensation committee will operate under a written charter, which will be effective upon the completion of this offering, that satisfies the applicable listing standards of Nasdaq.

Nominating and Corporate Governance Committee

Our nominating and corporate governance committee consists of Mr. Berger, Dr. Lacey and Dr. Steinman. The chair of our nominating and corporate governance committee is Dr. Lacey. Our board of directors has determined that Mr. Berger and Dr. Lacey are "independent" as defined under the applicable Nasdaq listing standards and SEC rules and regulations. Dr. Steinman is not "independent" due to his service and compensation received as a consultant to us within the past three years and we are relying on the phase-in schedules set forth in Nasdaq listing rule 5615(b)(1) with respect to Dr. Steinman's service on the nominating and corporate governance committee. We are permitted to phase in our compliance with the independent nominating and corporate governance committee requirements set forth by the Nasdaq listing standards as follows: (1) one independent member at the time of listing, (2) a majority of independent members within 90 days of listing and (3) all independent members within one year of listing. Within one year of our listing on the Nasdaq Global Market, we expect that Dr. Steinman will have resigned from our nominating and corporate governance committee and that any new directors added to the nominating and corporate governance committee will be independent under Nasdaq listing rules.

Specific responsibilities of our nominating and corporate governance committee include:

- identifying and evaluating candidates, including the nomination of incumbent directors for reelection and nominees recommended by stockholders, to serve on our board of directors;
- considering and making recommendations to our board of directors regarding the composition and chairmanship of the committees of our board of directors;
- instituting plans or programs for the continuing education of our board of directors and orientation of new directors;
- developing and making recommendations to our board of directors regarding corporate governance guidelines and matters; and
- overseeing periodic evaluations of the board of directors' performance, including committees of the board of directors.

Our nominating and corporate governance committee will operate under a written charter, which will be effective upon the completion of this offering, that satisfies the applicable listing standards of Nasdaq.

Code of Business Conduct and Ethics

We have adopted a written code of business conduct and ethics, which will be effective upon the closing of this offering that applies to our directors, officers and employees, including our principal executive officer, principal financial officer, principal accounting officer or controller, or persons performing similar functions. Upon the closing of this offering, our code of business conduct and ethics will be available under the Corporate Governance section of our website at www.atreca.com. In addition, we intend to post on our website all disclosures that are required by law or the listing standards of the Nasdaq concerning any amendments to, or waivers from, any provision of the code. The reference to our website address does not constitute incorporation by reference of the information contained at or available through our website, and you should not consider it to be a part of this prospectus.

Compensation Committee Interlocks and Insider Participation

None of the members of the compensation committee is currently or has been at any time one of our officers or employees. None of our executive officers currently serves, or has served during the last year, as a member of the board of directors or compensation committee of any entity that has one or more executive officers serving as a member of our board of directors or compensation committee.

Non-Employee Director Compensation

We do not currently have a formal non-employee director compensation program, and non-employee directors are compensated for their service as non-employee directors as determined on an individual basis by our board of directors. In connection with this offering, we have adopted a non-employee director compensation policy, which will be effective upon the closing of this offering. Under this non-employee director compensation policy, our non-employee directors will be eligible to receive compensation for service on our board of directors and committees of our board of directors.

Pursuant to this non-employee director compensation policy, non-employee directors will be paid annual cash compensation of $35,000. In addition, non-employee directors will be paid $7,500 annually for serving on the audit committee ($15,000 annually for the chairperson), $5,000 annually for serving on the compensation committee ($10,000 annually for the chairperson), and $4,000 annually for serving on the nominating and governance committee ($8,000 annually for the chairman). Furthermore, our lead independent director, if any, will be paid an additional $35,000 annually for service as our lead independent director, and the chairperson of our board of directors will be paid an additional $35,000 annually for service as the chairperson of our board of directors. Non-employee directors will be reimbursed for their reasonable out-of-pocket expenses to cover attendance at and participation in meetings of our board of directors.

Our non-employee directors will be granted initial and/or annual option grants under our 2019 Equity Incentive Plan. Newly appointed or newly elected directors will be granted an option to purchase 24,000 shares of our Class A common stock. The initial option grant will vest in equal annual installments over three years from the date of grant, subject to the non-employee director's continuous service on each applicable vesting date. At the close of business on the date of each annual meeting of our stockholders, each individual who is then a non-employee director will be granted an option to purchase 12,000 shares of our Class A common stock. The annual option grant will vest upon the earlier of the one year anniversary of the date of grant or the day prior to our next annual meeting of our stockholders occurring after the grant date, subject to the non-employee director's continuous service on each applicable vesting date. All options granted under our director compensation policy will be granted with an exercise price equal to the fair market value of our Class A common stock on the grant date. The vesting of all options will cease upon a non-employee

director's cessation of service, unless otherwise determined pursuant to our 2019 Equity Incentive Plan or by agreement. All unvested options will vest in full immediately prior to a change in control (as defined in our 2019 Equity Incentive Plan Plan), subject to the non-employee director's continuous service as of immediately prior to the closing of such change in control.

The following table sets forth information regarding the compensation earned or paid to our non-employee directors during the year ended December 31, 2018. John A. Orwin, our President and Chief Executive Officer, and Tito A. Serafini, our Chief Strategy Officer, are also members of our board of directors, but did not receive any additional compensation for service as a director. The compensation of Mr. Orwin and Dr. Serafini as named executive officers is set forth below under "Executive Compensation—Summary Compensation Table."

Name	Fees Earned or Paid in Cash	All Other Compensation	Total
Brian Atwood	$ 35,000	$ —	$ 35,000
Franklin Berger	25,000	—	25,000
David Lacey, M.D.	25,000	—	25,000
William H. Robinson, M.D., Ph.D.(1)	—	250,000	250,000
Lawrence Steinman, M.D.(2)	—	150,000	150,000

(1) Dr. Robinson entered into an amended and restated consulting agreement with us, effective as of January 1, 2017, by which Dr. Robinson provides consulting services to us in the field of research and development of diagnostics, biologic therapeutics and paired diagnostics and biologic therapeutics and receives an annual consulting fee of $250,000, payable in quarterly installments.

(2) Dr. Steinman entered into an amended and restated consulting agreement with us on October 3, 2017, by which Dr. Steinman provides consulting services to us in the field of research and development of diagnostics, biologic therapeutics and paired diagnostics and biologic therapeutics and receives an annual consulting fee of $150,000, payable in quarterly installments. This amended and restated consulting agreement was amended and restated in January 2019 to increase the annual consulting fee to $175,000, among other things, and shall terminate on December 31, 2019.

EXECUTIVE COMPENSATION

Our named executive officers, as of December 31, 2018, were:

- John A. Orwin, who was appointed as our President and Chief Executive Officer in April 2018;
- Tito A. Serafini, Chief Strategy Officer, who previously served as our President and Chief Executive Officer until April 2018;
- Susan Berland, who served as our Chief Financial Officer until her retirement in March 2019; and
- Norman Michael Greenberg, our Chief Scientific Officer.

Summary Compensation Table

The following table sets forth information concerning the compensation of our named executive officers during the fiscal year ended December 31, 2018:

Name and Principal Position	Year	Salary ($)	Option Awards ($)	Non-Equity Incentive Plan Compensation ($)(1)	All Other Compensation ($)(2)	Total ($)
John A. Orwin *President and Chief Executive Officer*	2018	318,750	4,294,637	—	2,145	4,615,532
Tito A. Serafini *Chief Strategy Officer and Former President and Chief Executive Officer*	2018	413,170	2,019,627	158,000	5,658	2,596,455
Susan Berland *Chief Financial Officer*	2018	330,000	117,723	105,000	6,327	559,050
Norman Michael Greenberg *Chief Scientific Officer*	2018	393,225	177,421	128,625	101,418	800,689

(1) The amounts disclosed represent the applicable named executive officer's total performance bonus earned for the fiscal year ended December 31, 2018, as described below under "—Non-Equity Incentive Plan Compensation."

(2) The amounts disclosed for each of our named executive officers (other than Dr. Greenberg) represent the life insurance premiums paid by us for each such named executive officer. For Dr. Greenberg, the amounts disclosed represent (i) $76,802 of housing and other living expenses provided for the officer's residence, (ii) $18,965 for commuting expenses, and (iii) $5,651 for life insurance premiums paid by us.

Nonqualified Deferred Compensation

Our named executive officers did not participate in, or earn any benefits under, a non-qualified deferred compensation plan sponsored by us during 2018.

Non-Equity Incentive Plan Compensation

In addition to base salaries, our named executive officers are eligible to receive performance-based cash bonuses, which are designed to provide appropriate incentives to our executives to achieve defined performance goals and to reward our executives for individual achievement towards these goals. The performance-based cash bonus each executive officer is eligible to receive is generally based on the extent to which we achieve the corporate goals and the extent to which our

executives achieve their individual goals that our board or compensation committee establishes at the beginning of each year and is paid annually.

For the fiscal year ended December 31, 2018: (i) Mr. Orwin was eligible to receive a bonus at an annual target of 45% of his base salary based on our achievement of our 2018 corporate goals related to the generation of additional immuno-oncology pipeline assets, acquiring oncology patient samples and fundraising of $125 million pursuant to equity sales, and his bonus was also based on his personal goals of managing our business in terms of overall strategy, pipeline development, business and partnership development, leading our financing initiatives and initiatives related to this offering; (ii) Dr. Serafini was eligible to receive a bonus at an annual target of 40% of his base salary based on our achievement of our 2018 corporate goals described above and his personal goals of collecting and screening patient samples, advancing the development of ATRC-101 and recruiting a new chief executive officer; (iii) Ms. Berland was eligible to receive a bonus at an annual target of 35% of her base salary based on our achievement of our 2018 corporate goals described above and her personal goals of managing our facilities, operations, strategy and corporate development, positioning the company for a successful equity funding effort, increasing standards of company finance and administrative processes and delivering spending transparency and (iv) Dr. Greenberg was eligible to receive a bonus at an annual target of 35% of his base salary based on our achievement of our 2018 corporate goals described above and his personal goals of managing our therapeutic research and preclinical development, expanding our pipeline and value of antibody assets, support our IND filings, establishing scientific biomarkers and framework for protecting therapeutic-focused intellectual property. All bonuses for the fiscal year ended December 31, 2018 were paid in cash in 2019.

Agreements with our Named Executive Officers & Potential Payments Upon Termination or Change of Control

Below are descriptions of our employment agreements and offer letter agreements with our named executive officers. The agreements generally provide for at-will employment and set forth the named executive officer's initial base salary, eligibility for employee benefits and severance benefits upon a qualifying termination of employment. Furthermore, each of our named executive officers has executed a form of our standard proprietary information and inventions assignment agreement. The key terms of the employment agreements with our named executive officers, including potential payments upon termination or change of control, are described below. Following completion of our initial public offering, management expects to recommend to the compensation committee of our board of directors changes in compensation for certain of our named executive officers to better align their compensation with that of executives at a peer group of life-science public companies identified by the compensation committee. Based upon an analysis prepared by a third-party compensation consultant, management currently anticipates recommending changes for certain named executive officers including: (i) increases in base compensation by 5% to 10%, (ii) increases in incentive bonus target compensation by 5% to 10% and (iii) increases in severance payment periods by as much as 3 to 6 months in certain instances of termination without cause. Changes, if any, to executive officer compensation will be determined in the sole discretion of the compensation committee.

John A. Orwin

In March 2018, we entered into an executive employment agreement with John A. Orwin, or the Orwin Employment Agreement, which provides for his at-will employment as our President and Chief Executive Officer, with no specific term. The Orwin Employment Agreement provides for an annual base salary of $450,000 and an annual discretionary bonus of up to 45% of his base salary, the amount of which will be decided in the sole discretion of our board of directors based upon our and

Mr. Orwin's achievement of objectives and milestones determined on an annual basis by our board of directors. Pursuant to the Orwin Employment Agreement, Mr. Orwin was granted an initial option to purchase a number of shares representing 5.5% of our Class A common stock on a fully diluted basis, which share number represented 695,832 shares as of the grant date. This initial option grant vests over a four-year period during which 25% of the shares subject to this option grant vest on the one-year anniversary of Mr. Orwin's date of employment and the remaining shares subject to this option grant vest in 36 equal monthly installments thereafter, in each case, subject to Mr. Orwin's continued service with the Company. Mr. Orwin is also entitled to receive an additional option to purchase shares of our Class A common stock if his percentage owned of our capital stock drops below 4% (on a fully-diluted, as converted to Class A common stock basis) upon the earliest to occur of (A) the date of the first issuance of our capital stock to the public pursuant to a firmly underwritten public offering pursuant to an effective registration statement, (B) a change of control of our company, or (C) three years after March 21, 2018, such that after such grant Mr. Orwin's percentage owned of our capital stock will equal 4%. Mr. Orwin has also executed our standard form of employee confidential information and inventions assignment agreement, whereby he agrees to maintain confidentiality regarding any confidential information regarding the company and assigns to the Company all intellectual property pertaining to our company.

The Orwin Employment Agreement provides for payments to be made to Mr. Orwin upon certain qualifying terminations of his employment, including in connection with a Change of Control of the Company (as such term is defined in the Orwin Employment Agreement and summarized below). Pursuant to the Orwin Employment Agreement, if Mr. Orwin (i) is terminated without Cause (as such term is defined in the Orwin Employment Agreement and summarized below) and other than as a result of death or disability or (ii) resigns for Good Reason (as such term is defined in the Orwin Employment Agreement and summarized below), then, provided that Mr. Orwin signs, and does not subsequently revoke, a separation agreement and release of claims in favor of our company, Mr. Orwin will receive the following: (i) a severance payment equal to one year of his base salary to be paid in a lump sum on the 60th day following his termination of employment, (ii) subject to Mr. Orwin's timely election of continued coverage under the Consolidated Omnibus Budget Reconciliation Act of 1985, as amended, or COBRA, payment by us of Mr. Orwin's COBRA premiums for Mr. Orwin and eligible dependents for a period of up to 12 months following his termination of employment, or, if our company determines that it cannot pay these COBRA premiums without a substantial risk of violating applicable law, we may pay to Mr. Orwin a taxable monthly payment in an amount equal to the monthly COBRA premium that Mr. Orwin would be required to pay to continue his group health coverage in effect on the date of Mr. Orwin's termination of employment for a period of up to 12 months following his termination of employment, and (iii) only if such termination or resignation occurs within the 30-day period prior to or within the 12-month period following a Change of Control, the acceleration of vesting of all unvested equity awards held by Mr. Orwin. In addition, if Mr. Orwin's employment with the Company terminates as a result of death or disability, then the vesting on 50% of the outstanding unvested equity awards held by Mr. Orwin on his last day of employment will be accelerated.

For the purposes of the Orwin Employment Agreement, "Cause" means Mr. Orwin's (a) commission of any felony or crime involving dishonesty; (b) participation in any fraud against our company; (c) material breach of his duties to our company; (d) intentional damage to any property of our company; (e) misconduct, or other violation of our policy that causes harm; (f) breach of any written agreement with our company; and (g) conduct which in the good faith and reasonable determination of our board of directors demonstrates gross unfitness to serve.

For the purposes of the Orwin Employment Agreement, "Good Reason" means (a) a material reduction in Mr. Orwin's base salary, which the parties agree is a reduction of at least 10% of

Mr. Orwin's base salary (unless pursuant to a salary reduction program applicable generally to our company's similarly situated employees); (b) a material reduction in Mr. Orwin's duties (including responsibilities or authorities); provided, however, that, solely following a change of control, a change in job position (including a change in title) shall not be deemed a "material reduction" in and of itself unless Mr. Orwin's new duties are materially reduced from his prior duties; or (c) a relocation of Mr. Orwin's principal place of employment to a place that increases Mr. Orwin's one-way commute by more than 50 miles as compared to Mr. Orwin's then-current principal place of employment immediately prior to such relocation.

For the purposes of the Orwin Employment Agreement, "Change of Control" means (i) any consolidation or merger by us with or into any other entity other than any consolidation or merger in which the shares of our capital stock immediately prior the consolidation or merger continue to represent a majority of the voting power of the surviving entity immediately after the consolidation or merger or (ii) any transaction or series of related transactions to which we are a party and in which more than 50% of our voting power is transferred, provided that a Change of Control does not include any transaction or series of transactions principally for bona fide equity financing purposes where we receive cash or in which any of our indebtedness is cancelled.

Tito A. Serafini

In June 2018, we entered into an amended and restated executive employment agreement with Tito Serafini, or the Serafini Employment Agreement, which provides for his at-will employment as our Chief Strategy Officer and continued service on our board of directors, subject to the provisions of our amended and restated certificate of incorporation and our amended and restated voting agreement, each as amended from time to time. The Serafini Employment Agreement provides for an annual base salary of $413,170 and an annual discretionary bonus of up to 40% of his base salary, the amount of which will be decided in the sole discretion of our board of directors based upon our and Dr. Serafini's achievement of objectives and milestones determined on an annual basis by our board of directors. Pursuant to the Serafini Employment Agreement, Dr. Serafini was granted a new option to purchase 99,999 shares of our Class A common stock on April 28, 2018, of which 24,999 options were vested as of the grant date, and the remainder of the options are scheduled to vest monthly over the four-year period beginning on April 16, 2018, subject to Dr. Serafini's continued service with the Company. Dr. Serafini is also entitled to receive an additional option to purchase shares of our Class A common stock, or the Make-up Option, if his percentage owned of our capital stock drops below 3.4% (on a fully-diluted, as converted to Class A common stock basis) upon the earliest to occur of (A) the date of the first issuance of our capital stock to the public pursuant to a firmly underwritten public offering pursuant to an effective registration statement, (B) a change of control of our company, or (C) three years after June 26, 2018, such that after such grant Dr. Serafini's percentage owned of our capital stock will equal 3.4%. Dr. Serafini has also executed the Company's standard form of employee confidential information and inventions assignment agreement, whereby he agrees to maintain confidentiality regarding any confidential information regarding the company and assigns to the Company all intellectual property pertaining to the Company.

The Serafini Employment Agreement provides for payments to be made to Dr. Serafini upon certain qualifying terminations of his employment, including in connection with a Change of Control of the Company (as such term is defined in the Serafini Employment Agreement and summarized below). Pursuant to the Serafini Employment Agreement, if Dr. Serafini (A) is terminated without Cause (as such term is defined in the Serafini Employment Agreement and summarized below) and other than as a result of death or disability or (B) resigns for Good Reason (as such term is defined in the Serafini Employment Agreement and summarized below), in either case (1) prior to the 60-day period prior to or more than 12 months following a Change of Control or (2) on any date following

April 16, 2019, then, provided that Dr. Serafini signs, and does not subsequently revoke, a separation agreement and release of claims in favor of our company, Dr. Serafini will receive the following: (i) a severance payment equal to nine months of his base salary to be paid in a lump sum on the 60th day following his termination of employment and (ii) subject to Dr. Serafini's timely election of continued coverage under COBRA, payment by us of Dr. Serafini's COBRA premiums for Dr. Serafini and eligible dependents for a period of up to nine months following his termination of employment, or, if our company determines that it cannot pay these COBRA premiums without a substantial risk of violating applicable law, we may pay to Dr. Serafini a taxable monthly payment in an amount equal to the monthly COBRA premium that Dr. Serafini would be required to pay to continue his group health coverage in effect on the date of Dr. Serafini's termination of employment for a period of up to nine months following his termination of employment. If such termination or resignation occurs within the 60-day period prior to or within the 12-month period following a Change of Control, in addition to the above-described severance benefits, Dr. Serafini would also be entitled to the acceleration of vesting of all unvested equity awards held by Dr. Serafini.

If Dr. Serafini is (A) terminated without Cause (as such term is defined in the Serafini Employment Agreement and summarized below) and other than as a result of death or disability or (B) resigns for Good Reason (as such term is defined in the Serafini Employment Agreement and summarized below), in either case, on any date prior to April 16, 2019, then, provided that Dr. Serafini signs, and does not subsequently revoke, a separation agreement and release of claims in favor of the Company, Dr. Serafini will receive the following: (i) a severance payment equal to 15 months of his base salary, (ii) subject to Dr. Serafini's timely election of continued coverage under COBRA, payment by us of Dr. Serafini's COBRA premiums for Dr. Serafini and eligible dependents for a period of up to 15 months following his termination of employment, or, if our company determines that it cannot pay these COBRA premiums without a substantial risk of violating applicable law, we may pay to Dr. Serafini a taxable monthly payment to in an amount equal to the monthly COBRA premium that Dr. Serafini would be required to pay to continue his group health coverage in effect on the date of Dr. Serafini's termination of employment for a period up to 15 months following his termination of employment, (iii) the acceleration of vesting of all equity awards held by Dr. Serafini prior to April 1, 2018, and (iv) if Dr. Serafini is terminated without Cause (as such term is defined in the Serafini Employment Agreement and summarized below) or resigns without Good Reason (as such term is defined in the Serafini Employment Agreement and summarized below), the vesting on 25% of 99,999 shares of outstanding then-unvested new equity awards held by Dr. Serafini granted to him in connection with the Serafini Employment Agreement and on 25% of the unvested portion of the Make-up Option, if any are outstanding as of that time.

If Dr. Serafini is terminated due to his death or disability, then as of the termination date, (i) Dr. Serafini's then-unvested equity awards shall cease to vest, (ii) all unearned compensation payments to Dr. Serafini will terminate immediately and (iii) Dr. Serafini will not be entitled to any severance benefits, including any cash severance, payment by us of his COBRA premiums or special cash payments.

For the purposes of the Serafini Employment Agreement, "Cause" means Dr. Serafini's (a) commission of any felony or crime involving dishonesty; (b) willful participation in any fraud against our company; (c) willful breach of his material duties to our company; (d) willful and material damage to any property of our company; (e) willful misconduct or other violation of our policy that causes material harm to our company; (f) willful and material breach of any written agreement with our company; and (g) willful conduct which in the good faith and reasonable determination of our board of directors demonstrates gross unfitness to serve.

For the purposes of the Serafini Employment Agreement, "Good Reason" means (a) a material reduction in Dr. Serafini's base salary, which the parties agree is a reduction of at least 10% of Dr. Serafini's base salary (unless pursuant to a salary reduction program applicable generally to our company's similarly situated employees); (b) a material reduction in Dr. Serafini's duties (including responsibilities or authorities); provided, however, that a change in job position (including a change in title) shall not be deemed a "material reduction" in and of itself unless Dr. Serafini's new duties are materially reduced from his prior duties; (c) a material breach by our company of any written agreement between Dr. Serafini and our company; or (d) a relocation of Dr. Serafini's principal place of employment to a place that increases Dr. Serafini's one-way commute by more than 50 miles as compared to Dr. Serafini's then-current principal place of employment immediately prior to such relocation.

The Serafini Employment Agreement defines "Change of Control" in a manner similar to the Orwin Employment Agreement (as described above).

Susan Berland

In April 2016, we entered into an executive employment agreement with Susan Berland, or the Berland Employment Agreement, which provides for her at-will employment as our EVP and Chief Financial Officer. The Berland Employment Agreement provides for an annual base salary of $285,000 and an annual discretionary bonus of up to 35% of her base salary, the amount of which was decided in the sole discretion of our board of directors based upon our and Ms. Berland's achievement of objectives and milestones determined on an annual basis by our board of directors. Ms. Berland has also executed the Company's standard form of employee confidential information and inventions assignment agreement, whereby she agrees to maintain confidentiality regarding any confidential information regarding the company and assigns to the Company all intellectual property pertaining to the Company. Ms. Berland retired from all employment positions with us in March 2019.

The Berland Employment Agreement provides for payments to be made to Ms. Berland upon certain qualifying terminations of her employment, including in connection with a Change of Control of the Company (as such term is defined in the Berland Employment Agreement and summarized below). Pursuant to the Berland Employment Agreement, if Ms. Berland (i) is terminated without Cause (as such term is defined in the Berland Employment Agreement and summarized below) and other than as a result of death or disability or (ii) resigns for Good Reason (as such term is defined in the Berland Employment Agreement and summarized below), in either case prior to the 30-day period prior to the closing of a Change of Control or more than 12 months following the closing of a Change in Control, then, provided that Ms. Berland signs, and does not subsequently revoke, a separation agreement and release of claims in favor of our company, Ms. Berland will receive the following: (i) a severance payment equal to six months of her base salary to be paid in a lump sum on the 60th day following her termination of employment, (ii) subject to Ms. Berland's timely election of continued coverage under COBRA, payment by us of Ms. Berland's COBRA premiums for Ms. Berland and eligible dependents for a period of up to 6 months following her termination of employment, or, if our company determines that it cannot pay these COBRA premiums without a substantial risk of violating applicable law, we may pay to Ms. Berland a taxable monthly payment in an amount equal to the monthly COBRA premium that Ms. Berland would be required to pay to continue her group health coverage in effect on the date of Ms. Berland's termination of employment for a period of up to 6 months following her termination of employment, or the Berland COBRA Payments, and (iii) only if such termination or resignation occurs within the 30-day period prior to or within the 12-month period following a Change of Control, the acceleration of vesting of all unvested equity awards held by Ms. Berland.

If Ms. Berland was terminated due to her death or disability, then as of the termination date, (i) Ms. Berland's then-unvested equity awards shall cease to vest, (ii) all unearned compensation payments to Ms. Berland will terminate immediately and (iii) Ms. Berland will not be entitled to any severance benefits, including any cash severance, payment by us of her COBRA premiums or special cash payments.

For the purposes of the Berland Employment Agreement, "Cause" means Ms. Berland's (a) commission of any felony or crime involving dishonesty; (b) participation in any fraud against our company; (c) material breach of her duties to our company; (d) persistent unsatisfactory performance of job duties after written notice from our board of directors and a reasonable opportunity to cure (if curable), (e) intentional damage to any property of our company; (e) misconduct or other violation of our policy that causes harm to our company; (f) misconduct or other violation of Company policy that causes harm, (g) breach of any written agreement with our company; and (h) conduct which in the good faith and reasonable determination of our board of directors demonstrates gross unfitness to serve.

For the purposes of the Berland Employment Agreement, "Good Reason" means (a) a material reduction in Ms. Berland's base salary, which the parties agree is a reduction of at least 10% of Ms. Berland's base salary (unless pursuant to a salary reduction program applicable generally to our company's similarly situated employees); (b) a material reduction in Ms. Berland's duties (including responsibilities or authorities); provided, however, that a change in job position (including a change in title) shall not be deemed a "material reduction" in and of itself unless Ms. Berland's new duties are materially reduced from her prior duties; or (c) a relocation of Ms. Berland's principal place of employment to a place that increases Ms. Berland's one-way commute by more than 50 miles as compared to Ms. Berland's then-current principal place of employment immediately prior to such relocation.

The Berland Employment Agreement defines "Change of Control" in a manner similar to the Orwin Employment Agreement (as described above).

In April 2019, we entered into a separation agreement with Ms. Berland, or the Berland Separation Agreement, pursuant to which Ms. Berland will provide to us certain transition consulting services, including providing strategic advice and counseling, from March 31, 2019 until December 31, 2019. The Berland Separation Agreement provides for (i) severance pay, equivalent to six months of Ms. Berland's base salary in effect as of the separation date, (ii) the COBRA Payments, (iii) continued vesting of Ms. Berland's outstanding stock options on the same terms and conditions through December 31, 2019 and (v) payment of $350 per hour of work for us for a maximum of 170 hours per month.

Norman Michael Greenberg

In March 2016, we entered into an executive employment agreement with Norman Michael Greenberg, or the Greenberg Employment Agreement, which provides for his at-will employment as our Senior Vice President and Chief Scientific Officer. The Greenberg Employment Agreement provides for an annual base salary of $350,000 and an annual discretionary bonus of up to 35% of his base salary, the amount of which will be decided in the sole discretion of our board of directors based upon our and Dr. Greenberg's achievement of objectives and milestones determined on an annual basis by our board of directors. Pursuant to the Greenberg Employment Agreement, Dr. Greenberg was granted an initial option to purchase 122,201 shares of our Class A common stock. This initial option grant vests over a four-year period during which 25% of the options vested on the one-year anniversary of Dr. Greenberg's date of employment and the remaining options vest in 36 equal monthly installments thereafter, in each case, subject to Dr. Greenberg's continued

service with the Company. Pursuant to the Greenberg Employment Agreement, Dr. Greenberg also received a sign-on advance bonus of $50,000, which was considered earned in March 2017 following the completion of his one-year anniversary of continuous service with the Company. Additionally, pursuant to the Greenberg Employment Agreement, Dr. Greenberg was entitled to (A) the reimbursement of reasonable expenditures incurred by Dr. Greenberg during the first 12 months of his employment with us for temporary housing (up to $4,000 per month) and for up to two trips per month of travel between the San Francisco Bay Area and his then-primary residence (up to $1,300 per month), (B) the reimbursement of up to $50,000 for relocation expenses incurred not later than August 31, 2017 and (C) tax gross-up assistance with respect to any portion of the above-described relocation benefit amounts that were taxable to Dr. Greenberg without a full corresponding deduction. Dr. Greenberg has also executed the Company's standard form of employee confidential information and inventions assignment agreement, whereby he agrees to maintain confidentiality regarding any confidential information regarding the company and assigns to the Company all intellectual property pertaining to the Company.

The Greenberg Employment Agreement provides for payments to be made to Dr. Greenberg upon certain qualifying terminations of his employment, including in connection with a Change of Control of the Company (as such term is defined in the Greenberg Employment Agreement and summarized below). Pursuant to the Greenberg Employment Agreement, if Dr. Greenberg (i) is terminated without Cause (as such term is defined in the Greenberg Employment Agreement and summarized below) and other than as a result of death or disability or (ii) resigns for Good Reason (as such term is defined in the Greenberg Employment Agreement and summarized below), in either case prior to the 30-day period prior to the closing of a Change of Control or more than 12 months following the closing of a Change in Control, then, provided that Dr. Greenberg signs, and does not subsequently revoke, a separation agreement and release of claims in favor of our company, Dr. Greenberg will receive the following: (i) a severance payment equal to six months of his base salary to be paid in a lump sum on the 60th day following his termination of employment, (ii) subject to Dr. Greenberg's timely election of continued coverage under COBRA, payment by us of Dr. Greenberg's COBRA premiums for Dr. Greenberg and eligible dependents for a period of up to 6 months following her termination of employment, or, if our company determines that it cannot pay these COBRA premiums without a substantial risk of violating applicable law, we may pay to Dr. Greenberg a taxable monthly payment in an amount equal to the monthly COBRA premium that Dr. Greenberg would be required to pay to continue his group health coverage in effect on the date of Dr. Greenberg's termination of employment for a period of up to 6 months following her termination of employment, and (iii) only if such termination or resignation occurs within the 30-day period prior to or within the 12-month period following a Change of Control, the acceleration of vesting of all unvested equity awards held by Dr. Greenberg.

If Dr. Greenberg is terminated due to his death or disability, then as of the termination date, (i) Dr. Greenberg's then-unvested equity awards shall cease to vest, (ii) all unearned compensation payments to Dr. Greenberg will terminate immediately and (iii) Dr. Greenberg will not be entitled to any severance benefits, including any cash severance, payment by us of his COBRA premiums or special cash payments.

For the purposes of the Greenberg Employment Agreement, "Cause" means Dr. Greenberg's (a) commission of any felony or crime involving dishonesty; (b) participation in any fraud against our company; (c) material breach of his duties to our company; (d) persistent unsatisfactory performance of job duties after written notice from our board of directors and a reasonable opportunity to cure (if curable), (e) intentional damage to any property of our company; (e) misconduct or other violation of our policy that causes harm to our company; (f) misconduct or other violation of Company policy that causes harm, (g) breach of any written agreement with our company; and (g) conduct which in the good faith and reasonable determination of our board of directors demonstrates gross unfitness to serve.

For the purposes of the Greenberg Employment Agreement, "Good Reason" means (a) a material reduction in Dr. Greenberg's base salary, which the parties agree is a reduction of at least 10% of Dr. Greenberg's base salary (unless pursuant to a salary reduction program applicable generally to our company's similarly situated employees); (b) a material reduction in Dr. Greenberg's duties (including responsibilities or authorities); provided, however, that a change in job position (including a change in title) shall not be deemed a "material reduction" in and of itself unless in Dr. Greenberg's new duties are materially reduced from his prior duties; or (c) a relocation of Dr. Greenberg's principal place of employment to a place that increases Dr. Greenberg's one-way commute by more than 50 miles as compared to Dr. Greenberg's then-current principal place of employment immediately prior to such relocation.

The Greenberg Employment Agreement defines "Change of Control" in a manner similar to the Orwin Employment Agreement (as described above).

In the event that the severance and other benefits payable to Mr. Orwin, Dr. Serafini, Ms. Berland or Dr. Greenberg constitute "parachute payments" under Section 280G of the U.S. tax code and would be subject to the applicable excise tax under Section 4999 of the Code, such severance and other benefits will be either (A) delivered in full or (B) delivered to such lesser extent which would result in no portion of such severance and other benefits being subject to the excise tax, whichever results in the receipt on an after-tax basis of the greatest amount of benefits.

Outstanding Equity Awards as of December 31, 2018

The following table presents the outstanding equity incentive plan awards held by each named executive officer as of December 31, 2018.

		Option Awards			
		Number of securities underlying unexercised options		Option exercise price	Option expiration date
Name	Grant Date	(#) exercisable	(#) unexercisable	($)	
John A. Orwin	4/28/2018(1)	695,832	—	$ 5.16	4/27/2028
	10/30/2018(2)	6,197	142,556	$ 10.02	10/29/2028
	11/15/2018(2)	1,229	57,766	$ 10.02	11/14/2028
Tito A. Serafini	2/3/2016(3)	33,332	—	$ 4.56	2/2/2026
	4/28/2018(4)	99,999	—	$ 5.16	4/27/2028
	10/30/2018(2)	5,891	135,503	$ 10.02	10/29/2028
	11/15/2018(2)	1,044	49,101	$ 10.02	11/14/2028
Susan Berland	5/1/2015(5)	5,784	—	$ 0.66	4/30/2025
	2/3/2016(1)	40,347	—	$ 4.56	2/2/2026
	4/28/2018(3)	33,332	—	$ 5.16	4/27/2028
Norman Michael Greenberg	5/10/2016(1)	122,201	—	$ 4.56	5/9/2026
	4/28/2018(3)	49,999	—	$ 5.16	4/27/2028

(1) 25% of the total shares subject to this option will vest one year after the vesting commencement date and 1/48th of the shares subject to this option will vest monthly thereafter subject to continued service to us through the applicable vesting date. If applicable, vesting accelerates as provided in, and subject to the terms and conditions of, that executive employment agreement, as may be amended from time to time. The option is subject to an early exercise provision and is immediately exercisable for restricted shares subject to the same vesting provisions.

(2) 1/48th of the total shares subject to this option will vest monthly measured from the vesting commencement date subject to continued service to us through the applicable vesting date. If applicable, vesting accelerates as provided in, and subject to the terms and conditions of, that executive employment agreement, as may be amended from time to time.

(3) 1/48th of the total shares subject to this option will vest monthly measured from the vesting commencement date subject to continued service to us through the applicable vesting date. If applicable, vesting accelerates as provided in, and subject to the terms and conditions of, that executive employment agreement, as may be amended from time to time. The option is subject to an early exercise provision and is immediately exercisable for restricted shares subject to the same vesting provisions.

(4) 25% of the total shares subject to this option vested on the vesting commencement date and 1/48th of the unvested shares will vest monthly thereafter subject to continued service to us through the applicable vesting date. If applicable, vesting accelerates as provided in, and subject to the terms and conditions of, that executive employment agreement, as may be amended from time to time. The option is subject to an early exercise provision and is immediately exercisable for restricted shares subject to the same vesting provisions.

(5) 31.25% of the total shares subject to this option will vest on the 15 month anniversary of the vesting commencement date and 1/48th of the shares subject to this option will vest monthly thereafter subject to continued service to us through the applicable vesting date. If applicable, vesting accelerates as provided in, and subject to the terms and conditions of, that executive employment agreement, as may be amended from time to time. The option is subject to an early exercise provision and is immediately exercisable for restricted shares subject to the same vesting provisions.

Employee Benefit and Stock Plans

2019 Equity Incentive Plan

Our board of directors adopted and our stockholders approved our 2019 Equity Incentive Plan, or the 2019 Plan, on June 2, 2019, and June 7, 2019, respectively. The 2019 Plan will become effective, and no stock awards may be granted under the 2019 Plan, until, the execution of the underwriting agreement related to this offering. Once the 2019 Plan is effective, no further grants will be made under the 2010 Plan. The purpose of the 2019 Plan, through the grant of stock awards, is to help us secure and retain the services of eligible award recipients, provide incentives for such persons to exert maximum efforts for our success and that of our affiliates, and provide a means by which the eligible recipients may benefit from increases in value of our Class A common stock.

Awards. The 2019 Plan provides for the grant of incentive stock options, or ISOs, within the meaning of Section 422 of the Code, nonstatutory stock options, or NSOs, stock appreciation rights, restricted stock awards, restricted stock unit awards, performance-based stock awards, and other forms of equity compensation, which are collectively referred to as stock awards. ISOs may be granted only to our employees and to any of our parent or subsidiary corporation's employees. All other awards may be granted to employees, including officers, and to non-employee directors and consultants of ours and any of our affiliates.

Share Reserve. Initially, the aggregate number of shares of our Class A common stock that may be issued pursuant to stock awards under the 2019 Plan is the sum of (1) 2,416,666 shares plus (2) the number of shares remaining available for issuance under our 2010 Plan at the time our 2019 Plan becomes effective and (3) the number of shares subject to stock options or other stock awards granted under our 2010 Plan that would have otherwise returned to our 2010 Plan in accordance with its terms (such as upon the expiration or termination of a stock award prior to vesting or to cover the payment of any withholding tax or any applicable exercise price). The number of shares of our Class A common stock reserved for issuance under our 2019 Plan will automatically increase on January 1 of each year, beginning on January 1, 2020 and continuing through and including January 1, 2029, by 4% of the total number of shares of our capital stock outstanding on December 31 of the preceding calendar year, or a lesser number of shares determined by our board of directors. The maximum number of shares that may be issued upon the exercise of ISOs under our 2019 Plan is 6,141,842 shares.

If a stock award granted under the 2019 Plan expires or otherwise terminates without being exercised in full, or is settled in cash, the shares of our Class A common stock not acquired pursuant to the stock award again will become available for subsequent issuance under the 2019 Plan. In addition, the following types of shares under the 2019 Plan may become available for the grant of new stock awards under the 2019 Plan: (1) shares that are forfeited to or repurchased by us prior to becoming fully vested; (2) shares withheld to satisfy income or employment withholding taxes; or (3) shares used to pay the exercise or purchase price of a stock award. Shares issued under the 2019 Plan may be previously unissued shares or reacquired shares bought by us on the open market.

The maximum number of shares of Class A common stock subject to stock awards granted under the 2019 Plan or otherwise during any one calendar year to any non-employee director, taken together with any cash fees paid by us to such non-employee director during such calendar year for service on the board of directors, will not exceed $750,000 in total value (calculating the value of any such stock awards based on the grant date fair value of such stock awards for financial reporting purposes), or, with respect to the calendar year in which a non-employee director is first appointed or elected to our board of directors, $1,000,000.

Administration. Our board of directors, or a duly authorized committee thereof, has the authority to administer the 2019 Plan. Our board of directors may also delegate to one or more of our officers the authority to (1) designate employees (other than officers) to be recipients of certain stock awards, (2) determine the number of shares of common stock to be subject to such stock awards and (3) to the extent permitted by applicable law, specify the other terms applicable to such awards. Subject to the terms of the 2019 Plan, our board of directors or the authorized committee, referred to as the plan administrator, determines recipients, dates of grant, the numbers and types of stock awards to be granted, and the terms and conditions of the stock awards, including the period of their exercisability and the vesting schedule applicable to a stock award. Subject to the limitations set forth below, the plan administrator will also determine the exercise price, strike price, or purchase price of stock awards granted and the types of consideration to be paid for the stock award.

The plan administrator has the authority to modify outstanding stock awards under our 2019 Plan. Subject to the terms of our 2019 Plan, the plan administrator has the authority, without stockholder approval, to reduce the exercise, purchase, or strike price of any outstanding stock award, cancel any outstanding stock award in exchange for new stock awards, cash, or other consideration, or take any other action that is treated as a repricing under generally accepted accounting principles, with the consent of any adversely affected participant.

Stock Options. ISOs and NSOs are evidenced by stock option agreements adopted by the plan administrator. The plan administrator determines the exercise price for a stock option, within the terms and conditions of the 2019 Plan, provided that the exercise price of a stock option generally cannot be less than 100% of the fair market value of our common stock on the date of grant. Options granted under the 2019 Plan vest at the rate specified by the plan administrator.

The plan administrator determines the term of stock options granted under the 2019 Plan, up to a maximum of 10 years. Unless the terms of an option holder's stock option agreement provide otherwise, if an option holder's service relationship with us, or any of our affiliates, ceases for any reason other than disability, death, or cause, the option holder may generally exercise any vested options for a period of three months following the cessation of service. The option term will automatically be extended in the event that exercise of the option following such a termination of service is prohibited by applicable securities laws or our insider trading policy. If an option holder's service relationship with us or any of our affiliates ceases due to disability or death, or an option holder dies within a certain period following cessation of service, the option holder or a beneficiary

may generally exercise any vested options for a period of 12 months in the event of disability and 18 months in the event of death. In the event of a termination for cause, options generally terminate immediately. In no event may an option be exercised beyond the expiration of its term.

Acceptable consideration for the purchase of Class A common stock issued upon the exercise of a stock option will be determined by the plan administrator and may include (1) cash, check, bank draft or money order, (2) a broker-assisted cashless exercise, (3) a net exercise of the option if it is an NSO and (4) other legal consideration approved by the plan administrator.

Unless the plan administrator provides otherwise, options generally are not transferable except by will, the laws of descent and distribution, or pursuant to a domestic relations order. An option holder may designate a beneficiary, however, who may exercise the option following the option holder's death.

Tax Limitations on ISOs. The aggregate fair market value, determined at the time of grant, of our Class A common stock with respect to ISOs that are exercisable for the first time by an option holder during any calendar year under all of our stock plans may not exceed $100,000. Options or portions thereof that exceed such limit will be treated as NSOs. No ISOs may be granted to any person who, at the time of the grant, owns or is deemed to own stock possessing more than 10% of our total combined voting power or that of any of our parent or subsidiary corporations, unless (1) the option exercise price is at least 110% of the fair market value of the stock subject to the option on the date of grant and (2) the term of the ISO does not exceed five years from the date of grant.

Restricted Stock Awards. Restricted stock awards are evidenced by restricted stock award agreements adopted by the plan administrator. Restricted stock awards may be granted in consideration for (1) cash, check, bank draft, or money order, (2) services rendered to us or our affiliates, or (3) any other form of legal consideration. Class A common stock acquired under a restricted stock award may, but need not, be subject to a share repurchase option in our favor in accordance with a vesting schedule as determined by the plan administrator. Rights to acquire shares under a restricted stock award may be transferred only upon such terms and conditions as set by the plan administrator. Except as otherwise provided in the applicable award agreement, restricted stock awards that have not vested will be forfeited upon the participant's cessation of continuous service for any reason.

Restricted Stock Unit Awards. Restricted stock unit awards are evidenced by restricted stock unit award agreements adopted by the plan administrator. Restricted stock unit awards may be granted in consideration for any form of legal consideration or for no consideration. A restricted stock unit award may be settled by cash, delivery of stock, a combination of cash and stock as deemed appropriate by the plan administrator, or in any other form of consideration set forth in the restricted stock unit award agreement. Additionally, dividend equivalents may be credited in respect of shares covered by a restricted stock unit award. Rights under a restricted stock unit award may be transferred only upon such terms and conditions as set by the plan administrator. Restricted stock unit awards may be subject to vesting as determined by the plan administrator. Except as otherwise provided in the applicable award agreement, restricted stock units that have not vested will be forfeited upon the participant's cessation of continuous service for any reason.

Stock Appreciation Rights. Stock appreciation rights are evidenced by stock appreciation grant agreements adopted by the plan administrator. The plan administrator determines the strike price for a stock appreciation right, which generally cannot be less than 100% of the fair market value of our common stock on the date of grant. Upon the exercise of a stock appreciation right, we will pay the participant an amount in cash or stock equal to (1) the excess of the per share fair market value of

our common stock on the date of exercise over the strike price, multiplied by (2) the number of shares of common stock with respect to which the stock appreciation right is exercised. A stock appreciation right granted under the 2019 Plan vests at the rate specified in the stock appreciation right agreement as determined by the plan administrator.

The plan administrator determines the term of stock appreciation rights granted under the 2019 Plan, up to a maximum of 10 years. Unless the terms of a participant's stock appreciation right agreement provides otherwise, if a participant's service relationship with us or any of our affiliates ceases for any reason other than cause, disability, or death, the participant may generally exercise any vested stock appreciation right for a period of three months following the cessation of service. The stock appreciation right term will be further extended in the event that exercise of the stock appreciation right following such a termination of service is prohibited by applicable securities laws. If a participant's service relationship with us, or any of our affiliates, ceases due to disability or death, or a participant dies within a certain period following cessation of service, the participant or a beneficiary may generally exercise any vested stock appreciation right for a period of 12 months in the event of disability and 18 months in the event of death. In the event of a termination for cause, stock appreciation rights generally terminate immediately upon the occurrence of the event giving rise to the termination of the individual for cause. In no event may a stock appreciation right be exercised beyond the expiration of its term.

Unless the plan administrator provides otherwise, stock appreciation rights generally are not transferable except by will, the laws of descent and distribution, or pursuant to a domestic relations order. A stock appreciation right holder may designate a beneficiary, however, who may exercise the stock appreciation right following the holder's death.

Performance Awards. Our 2019 Plan permits the grant of performance-based stock and cash awards. The performance goals that may be selected include one or more of the following: earnings (including earnings per share and net earnings); earnings before interest, taxes, and depreciation; earnings before interest, taxes, depreciation, and amortization; total stockholder return; return on equity or average stockholder's equity; return on assets, investment, or capital employed; stock price; margin (including gross margin); income (before or after taxes); operating income; operating income after taxes; pre-tax profit; operating cash flow; sales or revenue targets; increases in revenue or product revenue; expenses and cost reduction goals; improvement in or attainment of working capital levels; economic value added (or an equivalent metric); market share; cash flow; cash flow per share; share price performance; debt reduction; customer satisfaction; stockholders' equity; capital expenditures; debt levels; operating profit or net operating profit; workforce diversity; growth of net income or operating income; billings; implementation or completion of projects or processes; financing; regulatory milestones; stockholder liquidity; corporate governance and compliance; product commercialization; intellectual property; personnel matters; progress of internal research or clinical programs; progress of partnered programs; partner satisfaction; budget management; clinical achievements; completing phases of a clinical study (including the treatment phase); announcing or presenting preliminary or final data from clinical studies; in each case, whether on particular timelines or generally; timely completion of clinical trials; submission of Device Master File(s) and other regulatory achievements; partner or collaborator achievements; internal controls, including those related to the Sarbanes-Oxley Act of 2002; research progress, including the development of programs; investor relations, analysts and communication; manufacturing achievements (including obtaining particular yields from manufacturing runs and other measurable objectives related to process development activities); strategic partnerships or transactions (including in-licensing and out-licensing of intellectual property); establishing relationships with commercial entities with respect to the marketing, distribution and sale of our products and services (including with group purchasing organizations, distributors and other vendors); supply chain achievements (including establishing

relationships with manufacturers, suppliers and other services providers of the our products and services); co-development, co-marketing, profit sharing, joint venture, or other similar arrangements; individual performance goals; corporate development and planning goals; and other measures of performance selected by our board of directors or any committee thereof.

The performance goals may be based on company-wide performance or performance of one or more business units, divisions, affiliates, or business segments, and may be either absolute or relative to the performance of one or more comparable companies or the performance of one or more relevant indices. Unless specified otherwise in the award agreement at the time the award is granted or in such other document setting forth the performance goals at the time the goals are established, we will appropriately make adjustments in the method of calculating the attainment of performance goals as follows: to exclude restructuring or other nonrecurring charges; to exclude exchange rate effects; to exclude the effects of changes to generally accepted accounting principles; to exclude the effects of any statutory adjustments to corporate tax rates; to exclude the effects of any items that are unusual in nature or occur infrequently as determined under generally accepted accounting principles; to exclude the dilutive effects of acquisitions or joint ventures; to assume that any business divested by us achieved performance objectives at targeted levels during the balance of a performance period following such divestiture; to exclude the effect of any change in the outstanding shares of our common stock by reason of any stock dividend or split, stock repurchase, reorganization, recapitalization, merger, consolidation, spin-off, combination or exchange of shares or other similar corporate change, or any distributions to common stockholders other than regular cash dividends; to exclude the effects of stock-based compensation and the award of bonuses under our bonus plans; to exclude costs incurred in connection with potential acquisitions or divestitures that are required to be expensed under generally accepted accounting principles; to exclude the goodwill and intangible asset impairment charges that are required to be recorded under generally accepted accounting principles; and to exclude the effect of any other unusual, nonrecurring gain or loss or other extraordinary item. In addition, we retain the discretion to adjust or eliminate the compensation or economic benefit due upon attainment of the goals. The performance goals may differ from participant to participant and from award to award.

Other Stock Awards. The plan administrator may grant other awards based in whole or in part by reference to our Class A common stock. The plan administrator will set the number of shares under the stock award and all other terms and conditions of such awards.

Changes to Capital Structure. In the event that there is a specified type of change in our capital structure, such as a stock split or recapitalization, appropriate adjustments will be made to (1) the class and maximum number of shares reserved for issuance under the 2019 Plan, (2) the class and maximum number of shares by which the share reserve may increase automatically each year, (3) the class and number of shares that may be issued upon the exercise of ISOs and (4) the class and number of shares and exercise price, strike price, or purchase price, if applicable, of all outstanding stock awards.

Corporate Transactions. In the event of certain specified significant corporate transactions, the plan administrator has the discretion to take any of the following actions with respect to stock awards:

- arrange for the assumption, continuation, or substitution of a stock award by a surviving or acquiring entity or parent company;
- arrange for the assignment of any reacquisition or repurchase rights held by us to the surviving or acquiring entity or parent company;
- accelerate the vesting of the stock award and provide for its termination prior to the effective time of the corporate transaction;

- arrange for the lapse of any reacquisition or repurchase right held by us;
- cancel or arrange for the cancellation of the stock award in exchange for such cash consideration, if any, as our board of directors may deem appropriate; or
- make a payment equal to the excess of (1) the value of the property the participant would have received upon exercise of the stock award over (2) the exercise price or strike price otherwise payable in connection with the stock award.

Our plan administrator is not obligated to treat all stock awards, even those that are of the same type, in the same manner.

Under the 2019 Plan, a significant corporate transaction is generally the consummation of (1) a sale or other disposition of all or substantially all of our consolidated assets, (2) a sale or other disposition of more than 50% of our outstanding securities, (3) a merger, consolidation or similar transaction following which we are not the surviving corporation or (4) a merger, consolidation, or similar transaction following which we are the surviving corporation but the shares of our common stock outstanding immediately prior to such transaction are converted or exchanged into other property by virtue of the transaction.

Change in Control. The plan administrator may provide, in an individual award agreement or in any other written agreement between a participant and us, that the stock award will be subject to additional acceleration of vesting and exercisability or settlement in the event of a change in control. Under the 2019 Plan, a change in control is generally (1) the acquisition by a person or entity of more than 50% of our combined voting power other than by merger, consolidation or similar transaction, (2) a consummated merger, consolidation, or similar transaction immediately after which our stockholders do not own more than 50% of the combined voting power of the surviving entity (or its parent company), (3) a consummated sale, lease or exclusive license or other disposition of all or substantially all of our consolidated assets and (4) certain changes in the board of directors.

Amendment and Termination. Our board of directors has the authority to amend, suspend, or terminate our 2019 Plan, provided that such action does not materially impair the existing rights of any participant without such participant's written consent and provided further that certain types of amendments will require the approval of our stockholders. No ISOs may be granted after the tenth anniversary of the date our board of directors adopts our 2019 Plan.

2019 Employee Stock Purchase Plan

Our board of directors adopted the 2019 Employee Stock Purchase Plan, or the ESPP, on June 2, 2019, and our stockholders approved the ESPP on June 7, 2019. The ESPP will become effective upon the date of and contingent to the effectiveness of the underwriting agreement related to this offering. The purpose of the ESPP is to secure the services of new employees, to retain the services of existing employees and to provide incentives for such individuals to exert maximum efforts toward our success and that of our affiliates. The ESPP is intended to qualify as an "employee stock purchase plan" within the meaning of Section 423 of the Code.

Share Reserve. Following this offering, the ESPP will authorize the issuance of 283,333 shares of our Class A common stock pursuant to purchase rights granted to our employees or to employees of any of our designated affiliates. The number of shares of our Class A common stock reserved for issuance will automatically increase on January 1 of each calendar year, from January 1, 2020 (assuming the ESPP becomes effective in 2019) through January 1, 2029, by the lesser of (1) 1% of the total number of shares of our Class A common stock outstanding on December 31 of the preceding calendar year, and (2) 416,666 shares; *provided*, that prior to the

date of any such increase, our board of directors may determine that such increase will be less than the amount set forth in clauses (1) and (2).

Administration. Our board of directors intends to delegate concurrent authority to administer the ESPP to our compensation committee. The ESPP is implemented through a series of offerings under which eligible employees are granted purchase rights to purchase shares of our Class A common stock on specified dates during such offerings. Under the ESPP, we may specify offerings with durations of not more than 27 months, and may specify shorter purchase periods within each offering. Each offering will have one or more purchase dates on which shares of our Class A common stock will be purchased for employees participating in the offering. An offering under the ESPP may be terminated under certain circumstances.

Payroll Deductions. Generally, all regular employees, including executive officers, employed by us or by any of our designated affiliates, may participate in the ESPP and may contribute, normally through payroll deductions, up to 15% of their earnings (as defined in the ESPP) for the purchase of our Class A common stock under the ESPP. Unless otherwise determined by our board of directors, Class A common stock will be purchased for the accounts of employees participating in the ESPP at a price per share equal to the lower of (a) 85% of the fair market value of a share of our Class A common stock on the first date of an offering or (b) 85% of the fair market value of a share of our Class A common stock on the date of purchase.

Limitations. Employees may have to satisfy one or more of the following service requirements before participating in the ESPP, as determined by our board of directors, including: (1) being customarily employed for more than 20 hours per week; (2) being customarily employed for more than five months per calendar year; or (3) continuous employment with us or one of our affiliates for a period of time (which such period may not be equal to or greater than two years). No employee may purchase shares under the ESPP at a rate in excess of $25,000 worth of our Class A common stock based on the fair market value per share of our Class A common stock at the beginning of an offering for each year such a purchase right is outstanding. Finally, no employee will be eligible for the grant of any purchase rights under the ESPP if immediately after such rights are granted, such employee has voting power over 5% or more of our outstanding capital stock measured by vote or value pursuant to Section 424(d) of the Code.

Changes to Capital Structure. In the event that there occurs a change in our capital structure through such actions as a stock split, merger, consolidation, reorganization, recapitalization, reincorporation, stock dividend, dividend in property other than cash, large nonrecurring cash dividend, liquidating dividend, combination of shares, exchange of shares, change in corporate structure, or similar equity restructuring transaction, the board of directors will make appropriate adjustments to (1) the class and maximum number of shares reserved under the ESPP, (2) the class and maximum number of shares by which the share reserve may increase automatically each year, (3) the class and number of shares and purchase price of all outstanding purchase rights, and (4) the class and number of shares that are subject to purchase limits under ongoing offerings.

Corporate Transactions. In the event of certain significant corporate transactions, including (1) a sale of all or substantially all of our assets, (2) the sale or disposition of 50% of our outstanding securities, (3) the consummation of a merger or consolidation where we do not survive the transactions, and (4) the consummation of a merger or consolidation where we do survive the transaction but the shares of our Class A common stock outstanding immediately prior to such transaction are converted or exchanged into other property by virtue of the transaction, any then-outstanding rights to purchase our stock under the ESPP may be assumed, continued, or substituted for by any surviving or acquiring entity (or its parent company). If the surviving or acquiring entity (or its parent company) elects not to assume, continue, or substitute for such purchase rights, then the participants' accumulated payroll contributions will be used to purchase

shares of our Class A common stock within 10 business days prior to such corporate transaction, and such purchase rights will terminate immediately after such purchase.

ESPP Amendments, Termination. Our board of directors has the authority to amend, suspend, or terminate our ESPP, provided that except in certain circumstances such amendment or termination may not materially impair any outstanding purchase rights without the holder's consent. We will obtain stockholder approval of any amendment to our ESPP, as required by applicable law or listing requirements.

2010 Equity Incentive Plan

Our board of directors and certain of our stockholders approved in September 2010 the 2010 Plan, which became effective in September 2010. Our 2010 Plan has been periodically amended, most recently in May 2019 when the amendment was approved by our board of directors and certain of our stockholders. Our 2010 Plan will be terminated prior to the closing of this offering, and thereafter we will not grant any additional awards under our 2010 Plan. However, our 2010 Plan will continue to govern the terms and conditions of the outstanding awards previously granted thereunder, which include options and restricted stock awards.

As of March 31, 2019, a total of 3,540,114 shares of our Class A common stock were reserved for issuance under the 2010 Plan. As of March 31, 2019, 2,587,996 shares of our Class A common stock were subject to outstanding option awards and 517,035 shares of our Class A common stock remained available for future issuance. The 2010 Plan will expire in September 2020 unless earlier terminated by our board of directors. Following the effectiveness of the 2019 Plan, no additional awards will be granted under the 2010 Plan.

Administration. The board of directors administers the 2010 Plan. Subject to the terms and conditions of the 2010 Plan, the board of directors has the authority to select the persons to whom awards are to be made, to determine the type or types of awards to be granted to each person, determine the number of awards to grant, determine the number of shares to be subject to such awards, determine the fair market value applicable to certain stock awards, and the terms and conditions of such awards, and make all other determinations and decisions and to take all other actions necessary or advisable for the administration of the 2010 Plan. The board of directors is also authorized to establish, adopt, amend or revise rules relating to administration of the 2010 Plan, subject to certain restrictions.

Eligibility. Options may be granted to individuals who are then our employees, consultants and members of our board of directors. Only employees may be granted ISOs.

Awards. The 2010 Plan permits the award of ISOs, NSOs, stock appreciation rights, restricted stock awards and restricted stock units. Only stock options have been granted under the 2010 Plan to date. Each award is set forth in a separate agreement with the person receiving the award and indicates the type, terms and conditions of the award.

- NSOs provide for the right to purchase shares of our Class A common stock at a specified price which may not be less than the fair market value of a share of stock on the date of grant, and usually will become exercisable (at the discretion of our board of directors) in one or more installments after the grant date, subject to the participant's continued employment or service with us or subject to the satisfaction of performance targets established by our compensation committee (or the board of directors, in the case of awards to non-employee directors). NSOs may be granted for any term specified by our compensation committee (or the board of directors, in the case of awards to non-employee directors), but the term may not exceed ten years.

- ISOs are designed to comply with the provisions of the Internal Revenue Code and are subject to specified restrictions contained in the Internal Revenue Code applicable to ISOs. Among such restrictions, ISOs must have an exercise price of not less than the fair market value of a share of Class A common stock on the date of grant, may only be granted to employees, must expire within a specified period of time following the optionee's termination of employment, and must be exercised within the ten years after the date of grant. In the case of an ISO granted to an individual who owns (or is deemed to own) more than 10% of the total combined voting power of all classes of our capital stock on the date of grant, the 2010 Plan provides that the exercise price must be at least 110% of the fair market value of a share of Class A common stock on the date of grant and the ISO must expire on the fifth anniversary of the date of its grant.

As of the date hereof, all of our non-employee directors, officers, other employees and certain current and former consultants participate in our 2010 Plan.

Corporate Transactions. In the event of certain specified significant corporate transactions, the plan administrator has the discretion to take any of the following actions with respect to stock awards:

- arrange for the assumption, continuation, or substitution of a stock award by a surviving or acquiring entity or parent company;
- arrange for the assignment of any reacquisition or repurchase rights held by us to the surviving or acquiring entity or parent company;
- accelerate the vesting of the stock award and provide for its termination prior to the effective time of the corporate transaction;
- arrange for the lapse of any reacquisition or repurchase right held by us;
- cancel or arrange for the cancellation of the stock award in exchange for such cash consideration, if any, as our board of directors may deem appropriate; or
- make a payment equal to the excess of (1) the value of the property the participant would have received upon exercise of the stock award over (2) the exercise price or strike price otherwise payable in connection with the stock award.

Our plan administrator is not obligated to treat all stock awards, even those that are of the same type, in the same manner.

Under the 2010 Plan, a significant corporate transaction is generally the consummation of (1) a sale or other disposition of all or substantially all of our consolidated assets, (2) a sale or other disposition of at least 90% of our outstanding securities, (3) a merger, consolidation or similar transaction following which we are not the surviving corporation or (4) a merger, consolidation, or similar transaction following which we are the surviving corporation but the shares of our common stock outstanding immediately prior to such transaction are converted or exchanged into other property by virtue of the transaction.

Change in Control. The plan administrator may provide, in an individual award agreement or in any other written agreement between a participant and us, that the stock award will be subject to additional acceleration of vesting and exercisability or settlement in the event of a change in control. Under the 2010 Plan, a change in control is generally (1) the acquisition by a person or entity of more than 50% of our combined voting power other than by merger, consolidation or similar transaction, (2) a consummated merger, consolidation, or similar transaction immediately after which our stockholders do not own more than 50% of the combined voting power of the surviving entity (or its parent company), and (3) a consummated sale, lease or exclusive license or other disposition of all or substantially all of our consolidated assets.

Amendment or Termination of the 2010 Plan. Our board of directors may terminate, suspend, or amend the 2010 Plan, provided that such action does not materially impair the existing rights of any participant without such participant's written consent and provided further that certain types of amendments will require the approval of our stockholders. Unless sooner terminated by the board, the 2010 Plan automatically terminates on the day before the 10th anniversary of the earlier of (i) the date the 2010 Plan is adopted by the board, or (ii) the date the 2010 Plan is approved by our stockholders.

401(k) Plan

We maintain a safe harbor 401(k) plan that provides eligible U.S. employees with an opportunity to save for retirement on a tax advantaged basis. Eligible employees are able to defer eligible compensation up to certain limits of the Internal Revenue Code of 1986, as amended, or the Code, which are updated annually. We have the ability to make matching and discretionary contributions to the 401(k) plan. Currently, we do not make matching contributions or discretionary contributions to the 401(k) plan. The 401(k) plan is intended to be qualified under Section 401(a) of the Code, with the related trust intended to be tax exempt under Section 501(a) of the Code. As a tax-qualified retirement plan, contributions to the 401(k) plan are deductible by us when made, and contributions and earnings on those amounts are not generally taxable to the employees until withdrawn or distributed from the 401(k) plan.

Limitations of Liability and Indemnification Matters

On the completion of this offering, our amended and restated certificate of incorporation will contain provisions that limit the liability of our current and former directors for monetary damages to the fullest extent permitted by Delaware law. Delaware law provides that directors of a corporation will not be personally liable for monetary damages for any breach of fiduciary duties as directors, except liability for:

- any breach of the director's duty of loyalty to the corporation or its stockholders;
- any act or omission not in good faith or that involves intentional misconduct or a knowing violation of law;
- unlawful payments of dividends or unlawful stock repurchases or redemptions; or
- any transaction from which the director derived an improper personal benefit.

Such limitation of liability does not apply to liabilities arising under federal securities laws and does not affect the availability of equitable remedies such as injunctive relief or rescission.

Our amended and restated certificate of incorporation that will be in effect upon the closing of this offering will authorize us to indemnify our directors, officers, employees and other agents to the fullest extent permitted by Delaware law. Our amended and restated bylaws that will be in effect upon the closing of this offering will provide that we are required to indemnify our directors and officers to the fullest extent permitted by Delaware law and may indemnify our other employees and agents. Our amended and restated bylaws that will be in effect upon the closing of this offering will also provide that, on satisfaction of certain conditions, we will advance expenses incurred by a director or officer in advance of the final disposition of any action or proceeding, and permit us to secure insurance on behalf of any officer, director, employee or other agent for any liability arising out of his or her actions in that capacity regardless of whether we would otherwise be permitted to indemnify him or her under the provisions of Delaware law. We have entered and expect to continue to enter into agreements to indemnify our directors, executive officers and other employees as determined by the board of directors. With certain exceptions, these agreements provide for indemnification for related expenses including attorneys' fees, judgments, fines and settlement

amounts incurred by any of these individuals in any action or proceeding. We believe that these amended and restated certificate of incorporation and amended and restated bylaw provisions and indemnification agreements are necessary to attract and retain qualified persons as directors and officers. We also maintain customary directors' and officers' liability insurance.

The limitation of liability and indemnification provisions in our amended and restated certificate of incorporation and amended and restated bylaws may discourage stockholders from bringing a lawsuit against our directors for breach of their fiduciary duty. They may also reduce the likelihood of derivative litigation against our directors and officers, even though an action, if successful, might benefit us and other stockholders. Further, a stockholder's investment may be adversely affected to the extent that we pay the costs of settlement and damage awards against directors and officers as required by these indemnification provisions.

Insofar as indemnification for liabilities arising under the Securities Act may be permitted for directors, executive officers or persons controlling us, we have been informed that, in the opinion of the SEC, such indemnification is against public policy as expressed in the Securities Act and is therefore unenforceable.

CERTAIN RELATIONSHIPS AND RELATED PERSON TRANSACTIONS

Other than compensation arrangements for our directors and executive officers, which are described elsewhere in this prospectus, below we describe transactions since January 1, 2016 to which we were a party or will be a party, in which:

- the amounts involved exceeded or will exceed $120,000; and
- any of our directors, executive officers or holders of more than 5% of our capital stock, or any member of the immediate family of, or person sharing the household with, the foregoing persons, had or will have a direct or indirect material interest.

Preferred Stock Financings

In September 2018, we issued an aggregate of 5,007,134 shares of our Series C1 preferred stock at a purchase price of $13.98 per share for an aggregate purchase price of $70.0 million. In September 2018, we issued an aggregate of 3,934,191 shares of our Series C2 preferred stock at a purchase price of $13.98 per share for an aggregate purchase price of $55.0 million. In August 2017, we issued an aggregate of 3,001,421 shares of our Series B preferred stock at a purchase price of $11.661 per share for an aggregate purchase price of $35.0 million. The following table summarizes purchases of preferred stock by our directors and by holders of more than five percent of our capital stock and their affiliated entities. One of our executive officers purchased shares of preferred stock.

Name	Series B Preferred Stock(1)	Series C1 Preferred Stock(1)	Series C2 Preferred Stock(1)	Aggregate Purchase Price
Entities affiliated with Baker Brothers Life Sciences L.P.(2)	1,010,239	—	3,934,191	$ 66,780,400
Boxer Capital, LLC(3)	—	1,072,960	—	14,999,999
Hadley Harbor Master Investors (Cayman) II L.P.(4)	1,039,783	894,472	—	24,629,633
Brian Atwood(5)	4,287	—	—	49,998
Franklin Berger	26,115	13,164	—	488,570
Tito A. Serafini(6)	6,431	—	—	74,999
William H. Robinson	4,287	—	—	49,998

(1) Immediately upon the closing of this offering, each share of our Series B preferred stock and Series C1 preferred stock will convert into one share of Class A common stock and each share of our Series C2 preferred stock will convert into one share of Class B common stock. For a description of the material rights and privileges of the preferred stock, see Note 9 to our audited consolidated financial statements included elsewhere in this prospectus.

(2) Includes shares of preferred stock purchased by 667 L.P.

(3) Includes shares of preferred stock purchased by MVA Investors, LLC.

(4) All shares registered in the name of Waveform, Inc. Wellington Management Company LLP is the investment adviser to this entity. Wellington Management Company LLP is an investment adviser registered under the Investment Advisers Act of 1940, as amended, and is an indirect subsidiary of Wellington Management Group LLP. Wellington Management Company LLP and Wellington Management Group LLP may each be deemed to share beneficial ownership (within the meaning of Rule 13d-3 promulgated under the Exchange Act) of the shares indicated in the table, all of which are held of record by the entity named in the table or a nominee on its behalf. The business address of the entity named in the table is c/o Wellington Management Company LLP, 280 Congress Street, Boston, Massachusetts 02210. The business address of Wellington Management Company LLP and Wellington Management Group LLP is 280 Congress Street, Boston, Massachusetts 02210.

(5) Includes shares of preferred stock purchased by Atwood-Edminster Trust dtd 4/2/00.

(6) Includes shares of preferred stock purchased by Tito A. Serafini and Marya A. Postner Trustees of Successor Trustee, of the Serafini/Postner Revocable Trust U/A/D 2/8/98.

Baker Brothers Nominating Agreement

On September 5, 2018, we entered into a nominating agreement, or the Baker Brothers. Nominating Agreement, with Baker Brothers Life Sciences L.P. and 667, L.P., or together, the Baker Brothers. Pursuant to the Baker Brothers Nominating Agreement, during the period beginning at the closing of this offering until when Baker Brothers no longer beneficially own at least 3,333,333 shares of our common stock (subject to adjustment for stock splits, combinations, recapitalizations and similar transactions), or the Nominating Agreement Period, we will have the obligation to support the nomination of, and to cause our board of directors to include in the slate of nominees recommended to our stockholders for election, two individuals designated by Baker Brothers, each a Baker Brothers Designee, unless a majority of our disinterested directors reasonably and in good faith determines that a Baker Designee would not be qualified to serve as our director under law, rules of the stock exchange on which our shares are listed, our amended and restated bylaws, or any of our company policies. If a Baker Designee resigns his or her seat on our board of directors or is removed or does not become a director for any reason, the vacancy will be filled by the election or appointment of another designee of Baker Brothers as soon as reasonably practicable, subject to compliance with applicable laws, rules and regulations. Furthermore, during the Nominating Agreement Period, if there is no Baker Designee on our board of directors, we will have the obligation to invite two board of directors observer designees of Baker Brothers, or the Baker Observers, to attend all meetings of our board of directors and all meetings of the committees of our board of directors as a nonvoting observer, subject to Baker Observers' agreement to hold in confidence the information they receive as observers of our board of directors and committee meetings, as well as subject to their exclusion from our board of directors' meetings to preserve our attorney-client privilege, to avoid conflicts of interest, if Baker Brothers is determined by our board of directors to be a competitor or other customary conditions. The Baker Brothers Nominating Agreement automatically terminates upon the earlier of when Baker Brothers, together with its affiliates, no longer beneficially owns at least 3,333,333 shares of our common stock or the consummation of our acquisition in a change of control transaction, as such terms are defined in our amended and restated certificate of incorporation.

Bill & Melinda Gates Foundation Master Services Agreement

On February 1, 2013, we entered into a master services agreement, or the Gates Foundation Services Agreement, with the Bill & Melinda Gates Foundation, or the Gates Foundation. Pursuant to the Gates Foundation Services Agreement, we are currently engaged in a multi-year agreement to optimize and advance human anti-CSP monoclonal antibodies with the potential to be developed as prophylactic/therapeutic antibodies. We received income of approximately $2.8 million, $1.0 million, $892,000 and $165,000 under the Gates Foundation Service Agreement in 2016, 2017, 2018 and the three months ended March 31, 2019, respectively.

Director Consulting Agreements

We entered into an amended and restated consulting agreement, effective as of January 1, 2017, with Dr. William H. Robinson, who is a member of our board of directors, by which Dr. Robinson provides consulting services to us in the field of research and development of diagnostics, biologic therapeutics and paired diagnostics and biologic therapeutics and receives an annual consulting fee of $250,000, payable in quarterly installments. Dr. Robinson received approximately $250,000 from us in both 2017 and 2018 and $62,500 in the three months ended March 31, 2019.

We entered into an amended and restated consulting agreement as of October 3, 2017, with Dr. Lawrence Steinman, who is a member of our board of directors, by which Dr. Steinman provides consulting services to us in the field of research and development of diagnostics, biologic

therapeutics and paired diagnostics and biologic therapeutics and received an annual consulting fee of $150,000, payable in quarterly installments. This amended and restated consulting agreement was amended and restated in January 2019 to increase the annual consulting fee to $175,000, among other things, and shall terminate on December 31, 2019. Dr. Steinman received approximately $150,000 from us in both 2017 and 2018 and $43,750 in the three months ended March 31, 2019.

Investors' Rights Agreement

We are party to an amended and restated investors' rights agreement, or IRA, with certain holders of our preferred stock, including entities affiliated with Baker Brothers Life Sciences L.P., entities affiliated with Boxer Capital, LLC, Hadley Harbor Master Investors (Cayman) I L.P. and the Bill & Melinda Gates Foundation. The IRA provides the holders of our preferred stock with certain registration rights, including the right to demand that we file a registration statement or request that their shares be covered by a registration statement that we are otherwise filing, and also the right to obligate us to an agreement to provide for additional rights to demand that we file a registration statement or request that their shares be covered by a registration statement that we have filed and maintain as effective. The IRA also provides these stockholders with information rights, which will terminate on the completion of this offering, and a right of first refusal with regard to certain issuances of our capital stock, which will not apply to, and will terminate on, the completion of, this offering. In connection with this offering, the holders of 17,248,259 shares of our Class A common stock issuable on conversion of outstanding shares of our preferred stock (including Class A common stock issuable upon conversion of Class B common stock) will be entitled to rights with respect to the registration of their shares of Class A common stock (including Class A common stock issuable upon conversion of Class B common stock) under the Securities Act under this agreement. For a description of these registration rights, see the section titled "Description of Capital Stock—Registration Rights".

Indemnification Agreements

Our amended and restated certificate of incorporation that will be in effect upon the closing of this offering will contain provisions limiting the liability of directors, and our amended and restated bylaws that will be in effect upon the closing of this offering will provide that we will indemnify each of our directors and officers to the fullest extent permitted under Delaware law. Our amended and restated certificate of incorporation and amended and restated bylaws that will be in effect upon the closing of this offering will also provide our board of directors with discretion to indemnify our employees and other agents when determined appropriate by the board. In addition, we have entered into an indemnification agreement with each of our directors and executive officers, which requires us to indemnify them. For more information regarding these agreements, see the section titled "Executive Compensation—Limitations of Liability and Indemnification Matters."

Participation in This Offering

In addition, certain existing stockholders have indicated an interest in purchasing up to approximately $60 million of shares of our common stock in this offering at the initial public offering price. However, because these indications of interest are not binding agreements or commitments to purchase, the underwriters may determine to sell more, less or no shares in this offering to any or all of these entities, or any or all of these entities may determine to purchase more, less or no shares in this offering. The underwriters will receive the same underwriting discount on any shares purchased by these entities as they will on any other shares sold to the public in this offering. To the extent shares of common stock offered hereby are purchased by entities affiliated with Baker Brothers Life Sciences L.P., such shares will initially be issued in the form of Class B common stock that will be convertible into an equivalent number of shares of our Class A common stock. The

public offering price of and underwriting discount on such shares of Class B common stock will be identical to the shares of Class A common stock otherwise offered hereby. References to Class A common stock being offered hereby include the shares of Class A common stock into which shares of our Class B common stock purchased in this offering are convertible.

Other Transactions

We have engaged the law firm Cooley LLP, or Cooley, to provide legal services to the Company. An immediate family member of Tito A. Serafini, one of our directors and our Chief Strategy Officer, is a partner of Cooley. During the years ended December 31, 2016, 2017 and 2018, we incurred and recorded approximately $231,000, $407,000 and $541,000, respectively, of legal expenses for services performed by Cooley. We anticipate that the value of services to be performed by Cooley during the current fiscal year will exceed $900,000 and we incurred and recorded $370,000 of legal expenses for services performed by Cooley in the three months ended March 31, 2019. In August 2015, we issued to Cooley a warrant to purchase 62,936 shares of our Class A common stock, which is expected to be exercised in connection with this offering.

We have engaged the law firm Kilpatrick Townsend & Stockton LLP, or Kilpatrick Townsend, to provide legal services to the Company. An immediate family member of Tito A. Serafini, one of our directors and our Chief Strategy Officer, is a partner of Kilpatrick Townsend. During the years ended December 31, 2016, 2017 and 2018, we incurred and recorded approximately $432,000, $487,000 and approximately $1.1 million, respectively, of legal expenses for services performed by Kilpatrick Townsend. We anticipate that the value of services to be performed by Kilpatrick Townsend during the current fiscal year will exceed $1.4 million and we incurred and recorded $381,000 of legal expenses for services performed by Kilpatrick Townsend in the three months ended March 31, 2019.

Policies and Procedures for Related Person Transactions

Our board of directors will adopt written related person transaction policy, to be effective upon the closing of this offering, setting forth the policies and procedures for the review and approval or ratification of related-person transactions. This policy will cover, with certain exceptions set forth in Item 404 of Regulation S-K under the Securities Act, any transaction, arrangement or relationship, or any series of similar transactions, arrangements or relationships in which we were or are to be a participant, where the amount involved exceeds $120,000 and a related person had or will have a direct or indirect material interest, including, without limitation, purchases of goods or services by or from the related person or entities in which the related person has a material interest, indebtedness, guarantees of indebtedness and employment by us of a related person. In reviewing and approving any such transactions, our audit committee is tasked to consider all relevant facts and circumstances, including, but not limited to, whether the transaction is on terms comparable to those that could be obtained in an arm's length transaction and the extent of the related person's interest in the transaction. All of the transactions described in this section occurred prior to the adoption of this policy.

PRINCIPAL STOCKHOLDERS

The following table sets forth information with respect to the beneficial ownership of our capital stock as of March 31, 2019 by:

- each of our named executive officers;
- each of our directors;
- all of our executive officers and directors as a group; and
- each person or group of affiliated persons known by us to beneficially own more than 5% of our Class A common stock or Class B common stock.

We have determined beneficial ownership in accordance with the rules and regulations of the SEC, and the information is not necessarily indicative of beneficial ownership for any other purpose. Except as indicated by the footnotes below, we believe, based on information furnished to us, that the persons and entities named in the table below have sole voting and sole investment power with respect to all shares that they beneficially own, subject to applicable community property laws.

Certain existing stockholders have indicated an interest in purchasing up to approximately $60 million shares of our common stock in this offering at the initial public offering price. However, because these indications of interest are not binding agreements or commitments to purchase, the underwriters may determine to sell more, less or no shares in this offering to any or all of these entities, or any or all of these entities may determine to purchase more, less or no shares in this offering. The following table does not reflect any potential purchases by these stockholders, which purchases, if any, will increase the percentage of shares owned after the offering of such stockholders from that set forth in the table below. The underwriters will receive the same underwriting discount on any shares purchased by these entities as they will on any other shares sold to the public in this offering. To the extent shares of common stock offered hereby are purchased by entities affiliated with Baker Brothers Life Sciences L.P., such shares will initially be issued in the form of Class B common stock that will be convertible into an equivalent number of shares of our Class A common stock. The public offering price of and underwriting discount on such shares of Class B common stock will be identical to the shares of Class A common stock otherwise offered hereby.

Applicable percentage ownership before the offering is based on 15,500,261 shares of Class A common stock and 3,934,191 shares of Class B common stock outstanding as of March 31, 2019, assuming (i) the automatic conversion of all outstanding shares of our convertible Series A preferred stock, convertible Series B preferred stock and convertible Series C1 preferred stock into shares of Class A common stock, (ii) the automatic conversion of all outstanding shares of our convertible Series C2 preferred stock into shares of Class B common stock and (iii) the issuance of 62,936 shares of Class A common stock upon the exercise of an outstanding warrant. Applicable percentage ownership after the offering is based on 22,850,261 shares of Class A common stock and 3,934,191 shares of Class B common stock outstanding immediately after the completion of this offering, assuming no exercise by the underwriters of their option to purchase additional shares of Class A common stock from us. In computing the number of shares beneficially owned by a person and the percentage ownership of such person, we deemed to be outstanding all shares subject to options held by the person that are currently exercisable, or exercisable or would vest based on service-based vesting conditions within 60 days of March 31, 2019. However, except as described above, we did not deem such shares outstanding for the purpose of computing the percentage ownership of any other person.

Unless otherwise indicated, the address of each beneficial owner listed below is c/o Atreca, Inc., 500 Saginaw Drive, Redwood City, CA 94063. We believe, based on information provided to us, that each of the stockholders listed below has sole voting and investment power with respect to the shares beneficially owned by the stockholder unless noted otherwise, subject to community property laws where applicable.

Name of Beneficial Owner	Number of Shares Beneficially Owned		Percentage of Shares Beneficially Owned Before the Offering		Percentage of Shares Beneficially Owned After the Offering	
	Class A Common Stock	Class B Common Stock	Class A Common Stock	Class B Common Stock	Class A Common Stock	Class B Common Stock
5% Stockholders						
Entities affiliated with Baker Brothers Life Sciences L.P.(1)	3,532,760	3,934,191	22.8%	100.0%	15.5%	100%
Boxer Capital, LLC(2)	1,072,960	—	6.9	—	4.7	
Hadley Harbor Master Investors (Cayman) II L.P.(3)	1,934,255	—	12.5	—	8.5	
Bill & Melinda Gates Foundation	1,396,644	—	9.0	—	6.1	
Directors and Named Executive Officers						
John A. Orwin(4)	724,898	—	4.5	—	3.1	
Herbert Cross	—	—	—	—	—	
Tito A. Serafini, Ph.D.(5)	603,385	—	3.9	—	2.6	
Susan Berland(6)	98,503	—	*	—	*	
Norman Michael Greenberg(7)	175,325	—	1.1	—	*	
Brian Atwood(8)	62,154	—	*	—	*	
Franklin Berger	97,808	—	*	—	*	
David Lacey, M.D.(9)	20,366	—	*	—	*	
William H. Robinson, M.D., Ph.D.(10)	461,214	—	3.0	—	2.0	
Lawrence Steinman, M.D.(11)	266,738	—	1.7	—	1.2	
All directors and executive officers as a group (10 persons)(12)	2,588,394	—	15.5		10.8	

* Represents beneficial ownership of less than 1%.

(1) Consists of 3,223,030 shares of Class A common stock and 3,540,107 shares of Class B common stock held of record by Baker Brothers Life Sciences L.P. and 309,730 shares of Class A common stock and 394,084 shares of Class B common stock held of record by 667, L.P.

(2) Consists of 1,033,583 shares held of record by Boxer Capital, LLC and 39,377 shares held of record by MVA Investors, LLC.

(3) All shares registered in the name of Waveform, Inc. Wellington Management Company LLP is the investment adviser to this entity. Wellington Management Company LLP is an investment adviser registered under the Investment Advisers Act of 1940, as amended, and is an indirect subsidiary of Wellington Management Group LLP. Wellington Management Company LLP and Wellington Management Group LLP may each be deemed to share beneficial ownership (within the meaning of Rule 13d-3 promulgated under the Exchange Act) of the shares indicated in the table, all of which are held of record by the entity named in the table or a nominee on its behalf. The business address of the entity named in the table is c/o Wellington Management Company LLP, 280 Congress Street, Boston, Massachusetts 02210. The business address of Wellington Management Company LLP and Wellington Management Group LLP is 280 Congress Street, Boston, Massachusetts 02210.

(4) All 724,898 shares are issuable pursuant to stock options exercisable within 60 days after March 31, 2019.

(5) Includes (a) 443,167 shares held of record by Tito A. Serafini and Marya A. Postner Trustees or Successor Trustee, of the Serafini/Postner Revocable Trust U/A/D 2/8/98 and (b) 160,218 shares issuable pursuant to stock options exercisable within 60 days after March 31, 2019.

(6) Includes (a) 19,040 shares held of record by Susan D. Berland Trust and (b) 79,463 shares issuable pursuant to a stock option exercisable within 60 days after March 31, 2019.

(7) All 175,325 shares are issuable pursuant to stock options exercisable within 60 days after March 31, 2019.

(8) Includes (a) 49,654 shares held of record by Atwood-Edminster Trust dtd 4/2/00 and (b) 12,500 shares issuable pursuant to a stock option exercisable within 60 days after March 31, 2019.

(9) All 20,366 shares are issuable pursuant to a stock option exercisable within 60 days after March 31, 2019.

(10) Includes (a) 444,548 shares and (b) 16,666 shares issuable pursuant to a stock option exercisable within 60 days after March 31, 2019.

(11) Includes (a) 258,405 shares and (b) 8,333 shares issuable pursuant to a stock option exercisable within 60 days after March 31, 2019.

(12) Includes (a) 1,401,340 shares and (b) 1,187,054 shares issuable pursuant to stock options exercisable within 60 days after March 31, 2019.

DESCRIPTION OF CAPITAL STOCK

General

Following the completion of this offering, our authorized capital stock will consist of 650,000,000 shares of Class A common stock, $0.0001 par value per share, 50,000,000 shares of Class B common stock, $0.0001 par value per share and 300,000,000 shares of preferred stock, $0.0001 par value per share. Our outstanding capital stock was held by 191 stockholders of record as of March 31, 2019.

The following is a summary of the rights of our Class A common stock, Class B common stock and preferred stock and some of the provisions of our amended and restated certificate of incorporation and amended and restated bylaws, which will each become effective upon the closing of this offering, the investors' rights agreement and relevant provisions of Delaware General Corporation Law. Because it is only a summary, it does not contain all the information that may be important to you. For a complete description you should refer to our amended and restated certificate of incorporation, amended and restated bylaws and investors' rights agreement, copies of which have been filed as exhibits to the registration statement of which this prospectus is a part, as well as the relevant provisions of Delaware General Corporation Law.

Class A Common Stock and Class B Common Stock

As of March 31, 2019, there were 15,500,261 shares of our Class A common stock outstanding and held of record by 192 stockholders and 3,934,191 shares of our Class B common stock outstanding, presuming (i) the automatic conversion of all outstanding shares of our convertible Series A preferred stock, convertible Series B preferred stock and convertible Series C1 preferred stock into shares of Class A common stock, (ii) the automatic conversion of all outstanding shares of our convertible Series C2 preferred stock into shares of Class B common stock and (iii) the issuance of 62,936 shares of Class A common stock upon the exercise of an outstanding warrant to purchase 62,936 shares of our Class A common stock in connection with this offering.

Holders of our Class A common stock and our Class B common stock have identical rights, provided that, (i) except as otherwise expressly provided in our amended and restated certificate of incorporation or as required by applicable law, on any matter that is submitted to a vote by our stockholders, holders of our Class A common stock are entitled to one vote per share of Class A common stock, and holders of our Class B common stock are not entitled to any votes per share of Class B common stock, including for the election of directors, and (ii) holders of our Class A common stock have no conversion rights, while holders of our Class B common stock shall have the right to convert each share of our Class B common stock into one share of Class A common stock at such holder's election, provided that as a result of such conversion, such holder would not beneficially own in excess of 4.99% of any class of our securities registered under the Exchange Act, unless otherwise as expressly provided for in our amended and restated certificate of incorporation. However, this ownership limitation may be increased or decreased to any other percentage designated by such holder of Class B common stock upon 61 days' notice to us. Our Class A common stock and Class B common stock do not have cumulative voting rights. Accordingly, the holders of a majority of the outstanding shares of Class A common stock entitled to vote in any election of directors can elect all of the directors standing for election, if they so choose, other than any directors that holders of any preferred stock we may issue may be entitled to elect. Subject to preferences that may be applicable to any then outstanding preferred stock, holders of our Class A common stock and Class B common stock are entitled to receive ratably those dividends, if any, as may be declared by the board of directors out of legally available funds. In the event of our liquidation, dissolution or winding up, the holders of our Class A common stock and

Class B common stock will be entitled to share ratably in the assets legally available for distribution to stockholders after the payment of or provision for all of our debts and other liabilities, subject to the prior rights of any preferred stock then outstanding. Holders of our Class A common stock and Class B common stock have no preemptive rights or other subscription rights and there are no redemption or sinking funds provisions applicable to our Class A common stock and Class B common stock. All outstanding shares of our Class A common stock and Class B common stock are, and the Class A common stock and Class B common stock to be outstanding immediately prior to the closing of this offering will be, duly authorized, validly issued, fully paid and nonassessable. The rights, preferences and privileges of holders of our Class A common stock and Class B common stock are subject to and may be adversely affected by the rights of the holders of shares of any series of preferred stock that we may designate and issue in the future.

Preferred Stock

As of March 31, 2019, there were 13,314,068 shares of our convertible Series A preferred stock, Series B preferred stock and Series C1 preferred stock outstanding, and 3,934,191 shares of our Series C2 preferred stock outstanding. Upon completion of this offering, all of our previously outstanding shares of convertible Series A preferred stock, Series B preferred stock and Series C1 preferred stock will have been converted into Class A common stock, all of our previously outstanding shares of convertible Series C2 preferred stock will have been converted into Class B common stock, there will be no authorized shares of our previously convertible preferred stock and we will have no shares of preferred stock outstanding. Under the terms of our amended and restated certificate of incorporation, which will become effective upon the closing of this offering, our board of directors has the authority, without further action by our stockholders, to issue up to shares of preferred stock in one or more series, to establish from time to time the number of shares to be included in each such series, to fix the dividend, voting and other rights, preferences and privileges of the shares of each wholly unissued series and any qualifications, limitations or restrictions thereon, and to increase or decrease the number of shares of any such series, but not below the number of shares of such series then outstanding.

Our board of directors may authorize the issuance of preferred stock with voting or conversion rights that could adversely affect the voting power or other rights of the holders of the Class A common stock. The issuance of preferred stock, while providing flexibility in connection with possible acquisitions and other corporate purposes, could, among other things, have the effect of delaying, deferring or preventing a change in our control and may adversely affect the market price of the Class A common stock and the voting and other rights of the holders of Class A common stock. We have no current plans to issue any shares of preferred stock.

Options

As of March 31, 2019, options to purchase 2,587,996 shares of our Class A common stock were outstanding under our 2010 Plan, of which 552,256 were vested and exercisable as of that date.

Warrants

As of March 31, 2019, 62,936 shares of our Class A common stock were issuable upon exercise of an outstanding warrant to purchase Class A common stock with an exercise price of $0.0006 per share. We expect this warrant to purchase shares of Class A common stock to be exercised in connection with the completion of this offering.

As of March 31, 2019, 49,997 shares of our Series A preferred stock were issuable upon exercise of outstanding warrants to purchase our Series A preferred stock, all with an exercise price of $14.46 per share.

Registration Rights

We are party to an amended and restated investors' rights agreement that provides that certain holders of our convertible preferred stock, including certain holders of at least 5% of our capital stock, have certain registration rights as set forth below. The registration of shares of our Class A common stock by the exercise of registration rights described below would enable the holders to sell these shares without restriction under the Securities Act when the applicable registration statement is declared effective. We will pay the registration expenses, other than underwriting discounts and commissions, of the shares registered by the demand, piggyback and Form S-3 registrations described below.

Generally, in an underwritten offering, the managing underwriter, if any, has the right, subject to specified conditions, to limit the number of shares such holders may include. The demand, piggyback and Form S-3 registration rights described below will expire three years after the closing of this offering, of which this prospectus is a part, or with respect to any particular stockholder, such time after the closing of this offering that such stockholder can sell all of its shares entitled to registration rights under Rule 144 of the Securities Act during any 90-day period.

Demand Registration Rights

After this offering, the holders of an aggregate of 17,248,259 shares of our Class A common stock (including Class A common stock issuable upon conversion of Class B common stock) will be entitled to certain demand registration rights. At any time beginning 180 days after the completion of this offering, the holders of a majority of these shares may, on not more than one occasion, request that we register all or a portion of their shares. Such request for registration must cover shares with an anticipated aggregate offering price, net of underwriting discounts and commissions, of at least $15.0 million.

Piggyback Registration Rights

In connection with this offering, the holders of an aggregate of 17,248,259 shares of our Class A common stock including Class A common stock issuable upon conversion of Class B common stock were entitled to, and the necessary percentage of holders waived, their rights to notice of this offering and to include their shares of registrable securities in this offering. After this offering, in the event that we propose to register any of our securities under the Securities Act, either for our own account or for the account of other security holders, the holders of these shares will be entitled to certain piggyback registration rights allowing the holder to include their shares in such registration, subject to certain marketing and other limitations. As a result, whenever we propose to file a registration statement under the Securities Act, other than with respect to a demand registration or a registration statement on Forms S-4 or S-8, the holders of these shares are entitled to notice of the registration and have the right to include their shares in the registration, subject to limitations that the underwriters may impose on the number of shares included in the offering.

Form S-3 Registration Rights

After this offering, the holders of an aggregate of 17,248,259 shares of Class A common stock (including Class A common stock issuable upon conversion of Class B common stock), will be entitled to certain Form S-3 registration rights. The holders of these shares can make a request that we register their shares on Form S-3 if we are qualified to file a registration statement on Form S-3 and if the reasonably anticipated aggregate gross proceeds of the shares offered would equal or

exceed $3.0 million. We will not be required to effect more than two registrations on Form S-3 within any 12-month period.

Registration Rights Agreement

After this offering, any holder who holds at least 85,900 shares of our Class A common stock issued upon conversion of our Series B preferred stock and any holder who holds at least 321,883 shares of our Class A common stock or our Class B common stock issued upon conversion of our Series C1 preferred stock or our Series C2 preferred stock, respectively, will be entitled to bind us into entering into a registration rights agreement, through which, following the expiration of the 180-day-lockup period related to this offering, these holders who enter into the agreement with us would be, subject to certain limitations, entitled to certain registration rights. These registration rights include the right to demand that we file with the SEC a Form S-3 registration statement covering the registration of their Class A common stock for resale, subject to certain conditions, as well as rights to be permitted one underwritten public offering per calendar year, but no more than three underwritten public offering in total, to effect the sale of their Class A common stock for sale. This registration rights agreement requires us to pay expenses relating to such registrations and indemnify these holders against certain liabilities. Our registration obligations under this registration rights agreement would continue in effect until the earliest of (i) up to ten years after the date we enter into the agreement, (ii) when the applicable registrable securities have been resold by the holders pursuant to an effective registration statement, (iii) when the applicable registrable securities have been resold pursuant to Rule 144 or (iv) when the applicable registrable securities may be resold pursuant to Rule 144 without limitations as to volume or manner of sale.

Anti-Takeover Effects of Delaware Law and Our Certificate of Incorporation and Bylaws

Some provisions of Delaware law, our amended and restated certificate of incorporation and our amended and restated bylaws contain provisions that could make the following transactions more difficult: an acquisition of us by means of a tender offer; an acquisition of us by means of a proxy contest or otherwise; or the removal of our incumbent officers and directors. It is possible that these provisions could make it more difficult to accomplish or could deter transactions that stockholders may otherwise consider to be in their best interest or in our best interests, including transactions which provide for payment of a premium over the market price for our shares.

These provisions, summarized below, are intended to discourage coercive takeover practices and inadequate takeover bids. These provisions are also designed to encourage persons seeking to acquire control of us to first negotiate with our board of directors. We believe that the benefits of the increased protection of our potential ability to negotiate with the proponent of an unfriendly or unsolicited proposal to acquire or restructure us outweigh the disadvantages of discouraging these proposals because negotiation of these proposals could result in an improvement of their terms.

Stockholder Meetings

Our amended and restated bylaws provide that a special meeting of stockholders may be called only by our chairman of the board, chief executive officer or president, or by a resolution adopted by a majority of our board of directors.

Requirements for Advance Notification of Stockholder Nominations and Proposals

Our amended and restated bylaws establish advance notice procedures with respect to stockholder proposals to be brought before a stockholder meeting and the nomination of candidates for election as directors, other than nominations made by or at the direction of the board of directors or a committee of the board of directors.

Elimination of Stockholder Action by Written Consent

Our amended and restated certificate of incorporation and amended and restated bylaws eliminate the right of stockholders to act by written consent without a meeting.

Staggered Board

Our board of directors is divided into three classes. The directors in each class will serve for a three-year term, one class being elected each year by our stockholders. For more information on the classified board, see "Management—Board Composition and Election of Directors." This system of electing and removing directors may tend to discourage a third party from making a tender offer or otherwise attempting to obtain control of us, because it generally makes it more difficult for stockholders to replace a majority of the directors.

Removal of Directors

Our amended and restated certificate of incorporation provides that no member of our board of directors may be removed from office by our stockholders except for cause and, in addition to any other vote required by law, upon the approval of not less than two thirds of the total voting power of all of our outstanding voting stock then entitled to vote in the election of directors.

Stockholders Not Entitled to Cumulative Voting

Our amended and restated certificate of incorporation does not permit stockholders to cumulate their votes in the election of directors. Accordingly, the holders of a majority of the outstanding shares of our Class A common stock entitled to vote in any election of directors can elect all of the directors standing for election, if they choose, other than any directors that holders of our preferred stock may be entitled to elect.

Delaware Anti-Takeover Statute

We are subject to Section 203 of the Delaware General Corporation Law, which prohibits persons deemed to be "interested stockholders" from engaging in a "business combination" with a publicly held Delaware corporation for three years following the date these persons become interested stockholders unless the business combination is, or the transaction in which the person became an interested stockholder was, approved in a prescribed manner or another prescribed exception applies. Generally, an "interested stockholder" is a person who, together with affiliates and associates, owns, or within three years prior to the determination of interested stockholder status did own, 15% or more of a corporation's voting stock. Generally, a "business combination" includes a merger, asset or stock sale, or other transaction resulting in a financial benefit to the interested stockholder. The existence of this provision may have an anti-takeover effect with respect to transactions not approved in advance by the board of directors.

Choice of Forum

Our amended and restated certificate of incorporation provides that the Court of Chancery of the State of Delaware will be the exclusive forum for the following types of actions or proceedings under Delaware statutory or common law: (i) any derivative action or proceeding brought on our behalf; (ii) any action asserting a breach of fiduciary duty; (iii) any action asserting a claim against us or our directors, officers, or employees arising under the Delaware General Corporation Law, our amended and restated certificate of incorporation or our amended and restated bylaws; and (iv) any action asserting a claim against us that is governed by the internal affairs doctrine. The provisions would not apply to suits brought to enforce a duty or liability created by the Exchange Act. Our amended and restated certificate of incorporation further provides that the federal district courts of the United States of America will be the exclusive forum for resolving any complaint asserting a cause of action

arising under the Securities Act, subject to and contingent upon a final adjudication in the State of Delaware of the enforceability of such exclusive forum provision.

Amendment of Charter Provisions

The amendment of any of the above provisions, except for the provision making it possible for our board of directors to issue preferred stock, would require approval by holders of at least two thirds of the total voting power of all of our outstanding voting stock.

The provisions of Delaware law, our amended and restated certificate of incorporation and our amended and restated bylaws could have the effect of discouraging others from attempting hostile takeovers and, as a consequence, they may also inhibit temporary fluctuations in the market price of our Class A common stock that often result from actual or rumored hostile takeover attempts. These provisions may also have the effect of preventing changes in the composition of our board and management. It is possible that these provisions could make it more difficult to accomplish transactions that stockholders may otherwise deem to be in their best interests.

Transfer Agent and Registrar

The transfer agent and registrar for our Class A common stock and Class B common stock will be Computershare Trust Company, N.A.. The transfer agent's address is 250 Royall Street, Canton, Massachusetts 02021-1011.

Exchange Listing

Our Class A common stock is currently not listed on any securities exchange. We have applied to have our Class A common stock listed on the Nasdaq Global Market under the symbol "BCEL".

SHARES ELIGIBLE FOR FUTURE SALE

Immediately prior to this offering, there was no public market for our Class A common stock. Future sales of substantial amounts of Class A common stock in the public market, or the perception that such sales may occur, could adversely affect the market price of our Class A common stock. Although we intend to apply to have our Class A common stock listed on the Nasdaq Global Market, we cannot assure you that there will be an active public market for our Class A common stock.

Following the closing of this offering, based on the number of shares of our Class A common stock outstanding as of March 31, 2019 and assuming: (i) the issuance of shares in this offering; (ii) the automatic conversion of all outstanding shares of our convertible Series A preferred stock, convertible Series B preferred stock and convertible Series C1 preferred stock into shares of Class A common stock; (iii) the automatic conversion of all outstanding shares of our convertible Series C2 preferred stock into shares of Class B common stock; (iv) the issuance of 62,936 shares of Class A common stock upon the exercise of an outstanding warrant in connection with this offering; (v) the automatic reclassification of all of our outstanding warrants to purchase Series A preferred stock into warrants to purchase 49,997 shares of Class A common stock, each with an exercise price of $14.46 per share, immediately upon the closing of this offering and no exercise of these warrants; (vi) no exercise of outstanding options to purchase our Class A common stock; (vii) no exercise of the underwriters' option to purchase additional shares of Class A common stock; and (viii) no issuance of Class B common stock in connection with this offering, we will have outstanding an aggregate of approximately 22,850,261 shares of Class A common stock.

Of these shares, all shares of Class A common stock sold in this offering will be freely tradable without restriction or further registration under the Securities Act, except for any shares purchased by our "affiliates," as that term is defined in Rule 144 under the Securities Act. Shares purchased by our affiliates would be subject to the Rule 144 resale restrictions described below, other than the holding period requirement.

The remaining shares of our Class A common stock and all shares of our Class B common stock outstanding after this offering will be "restricted securities," as that term is defined in Rule 144 under the Securities Act. These restricted securities are eligible for public sale only if they are registered under the Securities Act or if they qualify for an exemption from registration under Rule 144 or 701 under the Securities Act, each of which is summarized below. We expect that substantially all of these shares will be subject to the 180-day lock-up period under the lock-up agreements described below.

Additionally, shares of common stock that are either subject to outstanding options or warrants or reserved for future issuance under our equity incentive plans will become eligible for sale in the public market to the extent permitted by the provisions of various vesting schedules, the lock-up agreements described below and Rules 144 and 701 under the Securities Act.

Lock-Up Agreements

We, along with our directors, executive officers and substantially all of our other stockholders, optionholders and warrantholders, have agreed with the underwriters that for a period of 180 days, after the date of this prospectus, subject to specified exceptions, we or they will not offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to sale of, or otherwise dispose of or transfer any shares of Class A common stock or any securities convertible into or exercisable or exchangeable for shares of Class A common stock (including shares of our Class B common stock), request or demand that

we file a registration statement related to our Class A common stock or enter into any swap or other agreement that transfers to another, in whole or in part, directly or indirectly, the economic consequence of ownership of the Class A common stock or any securities convertible into or exercisable or exchangeable for shares of Class A common stock (including shares of our Class B common stock). Upon expiration of the lock-up period, certain of our stockholders and warrantholders will have the right to require us to register their shares under the Securities Act. See "—Registration Rights" below and "Description of Capital Stock—Registration Rights."

Upon the expiration of the lock-up period, substantially all of the shares subject to such lock-up restrictions will become eligible for sale, subject to the limitations discussed above.

Rule 144

Affiliate Resales of Restricted Securities

In general, beginning 90 days after the effective date of the registration statement of which this prospectus is a part, a person who is an affiliate of ours, or who was an affiliate at any time during the 90 days before a sale, who has beneficially owned shares of our Class A common stock for at least six months would be entitled to sell in "broker's transactions" or certain "riskless principal transactions" or to market makers, a number of shares within any three-month period that does not exceed the greater of:

- 1% of the number of shares of our Class A common stock then outstanding, which will equal approximately 228,502 shares immediately after this offering; or
- the average weekly trading volume in our Class A common stock on the Nasdaq Global Market during the four calendar weeks preceding the filing of a notice on Form 144 with respect to such sale.

Affiliate resales under Rule 144 are also subject to the availability of current public information about us. In addition, if the number of shares being sold under Rule 144 by an affiliate during any three-month period exceeds 5,000 shares or has an aggregate sale price in excess of $50,000, the seller must file a notice on Form 144 with the Securities and Exchange Commission and the Nasdaq Global Market concurrently with either the placing of a sale order with the broker or the execution of a sale directly with a market maker.

Non-Affiliate Resales of Restricted Securities

In general, beginning 90 days after the effective date of the registration statement of which this prospectus is a part, a person who is not an affiliate of ours at the time of sale, and has not been an affiliate at any time during the three months preceding a sale, and who has beneficially owned shares of our Class A common stock for at least six months but less than a year, is entitled to sell such shares subject only to the availability of current public information about us. If such person has held our shares for at least one year, such person can resell under Rule 144(b)(1) without regard to any Rule 144 restrictions, including the 90-day public company requirement and the current public information requirement.

Non-affiliate resales are not subject to the manner of sale, volume limitation or notice filing provisions of Rule 144.

Rule 701

In general, under Rule 701 of the Securities Act, any of our employees, directors, officers, consultants or advisors who purchases shares from us in connection with a compensatory stock or option plan or other written agreement before the effective date of a registration statement under the

Securities Act is entitled to sell such shares 90 days after such effective date in reliance on Rule 144. Securities issued in reliance on Rule 701 are restricted securities and, subject to the contractual restrictions described above, beginning 90 days after the date of this prospectus, may be sold by persons other than "affiliates," as defined in Rule 144, subject only to the manner of sale provisions of Rule 144 and by "affiliates" under Rule 144 without compliance with its one-year minimum holding period requirement. However, substantially all Rule 701 shares are subject to lock-up agreements as described above and will become eligible for sale upon the expiration of the restrictions set forth in those agreements.

Equity Plans

We intend to file one or more registration statements on Form S-8 under the Securities Act to register all shares of Class A common stock subject to outstanding stock options and Class A common stock issued or issuable under the 2010 Plan, the 2019 Plan and the ESPP. We expect to file the registration statement covering shares offered pursuant to these stock plans shortly after the date of this prospectus, permitting the resale of such shares by non-affiliates in the public market without restriction under the Securities Act and the sale by affiliates in the public market subject to compliance with the resale provisions of Rule 144.

Registration Rights

As of March 31, 2019, certain holders of shares of our Class A common stock, which includes all of the shares of Class A common stock issuable upon the automatic conversion of our convertible preferred stock (including Class A common stock issuable upon conversion of our Class B common stock) immediately upon the closing of this offering, or their transferees will be entitled to various rights with respect to the registration of these shares under the Securities Act upon the completion of this offering. Registration of these shares under the Securities Act would result in these shares becoming fully tradable without restriction under the Securities Act immediately upon the effectiveness of the registration, except for shares purchased by affiliates. See "Description of Capital Stock—Registration Rights" for additional information. Shares covered by a registration statement will be eligible for sale in the public market upon the expiration or release from the terms of the lock-up agreement.

MATERIAL U.S. FEDERAL INCOME TAX CONSEQUENCES TO NON-U.S. HOLDERS OF OUR CLASS A COMMON STOCK

The following summary describes the material U.S. federal income tax consequences of the acquisition, ownership and disposition of our Class A common stock acquired in this offering by Non-U.S. Holders (as defined below). This discussion is not a complete analysis of all potential U.S. federal income tax consequences relating thereto, and does not deal with foreign, state and local consequences that may be relevant to Non-U.S. Holders in light of their particular circumstances, nor does it address U.S. federal tax consequences (such as gift and estate taxes) other than income taxes. Special rules different from those described below may apply to certain Non-U.S. Holders that are subject to special treatment under the Internal Revenue Code of 1986, as amended, or the Code, such as financial institutions, insurance companies, tax-exempt organizations, broker-dealers and traders in securities, U.S. expatriates, "controlled foreign corporations," "passive foreign investment companies," corporations that accumulate earnings to avoid U.S. federal income tax, corporations organized outside of the United States, any state thereof or the District of Columbia that are nonetheless treated as U.S. taxpayers for U.S. federal income tax purposes, persons that hold our Class A common stock as part of a "straddle," "hedge," "conversion transaction," "synthetic security" or integrated investment or other risk reduction strategy, persons who acquire our Class A common stock through the exercise of an option or otherwise as compensation, persons subject to the alternative minimum tax or federal Medicare contribution tax on net investment income, persons subject to special tax accounting rules under Section 451(b) of the Code, "qualified foreign pension funds" as defined in Section 897(l)(2) of the Code and entities all of the interests of which are held by qualified foreign pension funds, partnerships and other pass-through entities or arrangements, and investors in such pass-through entities or arrangements. Such Non-U.S. Holders are urged to consult their own tax advisors to determine the U.S. federal, state, local and other tax consequences that may be relevant to them. Furthermore, the discussion below is based upon the provisions of the Code, and Treasury Regulations, rulings and judicial decisions thereunder as of the date hereof, and such authorities may be repealed, revoked or modified, perhaps retroactively, so as to result in U.S. federal income tax consequences different from those discussed below. We have not requested a ruling from the U.S. Internal Revenue Service, or IRS, with respect to the statements made and the conclusions reached in the following summary, and there can be no assurance that the IRS will agree with such statements and conclusions. This discussion assumes that the Non-U.S. Holder holds our Class A common stock as a "capital asset" within the meaning of Section 1221 of the Code (generally, property held for investment).

This discussion is for informational purposes only and is not tax advice. Persons considering the purchase of our Class A common stock pursuant to this offering should consult their own tax advisors concerning the U.S. federal income, estate and other tax consequences of acquiring, owning and disposing of our Class A common stock in light of their particular situations as well as any consequences arising under the laws of any other taxing jurisdiction, including any state, local or foreign tax consequences.

For the purposes of this discussion, a "Non-U.S. Holder" is, for U.S. federal income tax purposes, a beneficial owner of Class A common stock that is neither a U.S. Holder, nor a partnership (or other entity treated as a partnership for U.S. federal income tax purposes regardless of its place of organization or formation). A "U.S. Holder" means a beneficial owner of our Class A common stock that is for U.S. federal income tax purposes any of the following:

- an individual who is a citizen or resident of the United States;
- a corporation or other entity treated as a corporation for U.S. federal income tax purposes created or organized in or under the laws of the United States, any state thereof or the District of Columbia;

- an estate the income of which is subject to U.S. federal income taxation regardless of its source; or
- a trust if it (1) is subject to the primary supervision of a court within the United States and one or more U.S. persons have the authority to control all substantial decisions of the trust or (2) has a valid election in effect under applicable U.S. Treasury Regulations to be treated as a U.S. person.

Distributions

Distributions, if any, made on our Class A common stock to a Non-U.S. Holder to the extent made out of our current or accumulated earnings and profits (as determined under U.S. federal income tax principles) generally will constitute dividends for U.S. tax purposes and will be subject to withholding tax at a 30% rate or such lower rate as may be specified by an applicable income tax treaty, subject to the discussions below regarding effectively connected income, backup withholding and foreign accounts. To obtain a reduced rate of withholding under a treaty, a Non-U.S. Holder generally will be required to provide us with a properly executed IRS Form W-8BEN (in the case of individuals) or IRS Form W-8BEN-E (in the case of entities), or other appropriate form, certifying the Non-U.S. Holder's entitlement to benefits under that treaty. This certification must be provided to us or our paying agent prior to the payment of dividends and must be updated periodically. In the case of a Non-U.S. Holder that is an entity, Treasury Regulations and the relevant tax treaty provide rules to determine whether, for purposes of determining the applicability of a tax treaty, dividends will be treated as paid to the entity or to those holding an interest in that entity. If a Non-U.S. Holder holds stock through a financial institution or other agent acting on the holder's behalf, the holder will be required to provide appropriate documentation to such agent. The holder's agent will then be required to provide certification to us or our paying agent, either directly or through other intermediaries. If you are eligible for a reduced rate of U.S. federal withholding tax under an income tax treaty and you do not timely file the required certification, you may be able to obtain a refund or credit of any excess amounts withheld by timely filing an appropriate claim for a refund with the IRS.

We generally are not required to withhold tax on dividends paid to a Non-U.S. Holder that are effectively connected with the Non-U.S. Holder's conduct of a trade or business within the United States (and, if required by an applicable income tax treaty, are attributable to a permanent establishment or fixed base that such holder maintains in the United States) if a properly executed IRS Form W-8ECI, stating that the dividends are so connected, is furnished to us (or, if stock is held through a financial institution or other agent, to such agent). In general, such effectively connected dividends will be subject to U.S. federal income tax, on a net income basis at the regular rates applicable to U.S. residents. A corporate Non-U.S. Holder receiving effectively connected dividends may also be subject to an additional "branch profits tax," which is imposed, under certain circumstances, at a rate of 30% (or such lower rate as may be specified by an applicable treaty) on the corporate Non-U.S. Holder's effectively connected earnings and profits, subject to certain adjustments. Non-U.S. Holders should consult their tax advisors regarding any applicable income tax treaties that may provide for different rules.

To the extent distributions on our Class A common stock, if any, exceed our current and accumulated earnings and profits, they will first reduce the Non-U.S. Holder's adjusted basis in our Class A common stock, but not below zero, and then will be treated as gain to the extent of any excess amount distributed, and taxed in the same manner as gain realized from a sale or other disposition of Class A common stock as described in the next section.

Gain on Disposition of Our Class A Common Stock

Subject to the discussions below regarding backup withholding and foreign accounts, a Non-U.S. Holder generally will not be subject to U.S. federal income tax with respect to gain realized on a sale or other disposition of our Class A common stock unless (a) the gain is effectively connected with a trade or business of such holder in the United States (and, if required by an applicable income tax treaty, is attributable to a permanent establishment or fixed base that such holder maintains in the United States), (b) the Non-U.S. Holder is a nonresident alien individual and is present in the United States for 183 or more days in the taxable year of the disposition and certain other conditions are met or (c) we are or have been a "United States real property holding corporation" within the meaning of Code Section 897(c)(2) at any time within the shorter of the five-year period preceding such disposition or such holder's holding period. In general, we would be a United States real property holding corporation if our interests in U.S. real estate comprise (by fair market value) at least half of our business assets. We believe that we have not been and we are not, and do not anticipate becoming, a United States real property holding corporation. Even if we are treated as a United States real property holding corporation, gain realized by a Non-U.S. Holder on a disposition of our Class A common stock will not be subject to U.S. federal income tax so long as (1) the Non-U.S. Holder owned, directly, indirectly and constructively, no more than 5% of our Class A common stock at all times within the shorter of (i) the five-year period preceding the disposition or (ii) the holder's holding period and (2) our Class A common stock is regularly traded on an established securities market. There can be no assurance that our Class A common stock will continue to qualify as regularly traded on an established securities market. If any gain on your disposition is taxable because we are a United States real property holding corporation and your ownership of our Class A common stock exceeds 5%, you will be taxed on such disposition generally in the manner as gain that is effectively connected with the conduct of a U.S. trade or business (subject to the provisions under an applicable income tax treaty), except that the branch profits tax generally will not apply.

If you are a Non-U.S. Holder described in (a) above, you will be required to pay tax on the net gain derived from the sale at regular U.S. federal income tax rates, and corporate Non-U.S. Holders described in (a) above may be subject to the additional branch profits tax at a 30% rate or such lower rate as may be specified by an applicable income tax treaty. Gain described in (b) above will be subject to U.S. federal income tax at a flat 30% rate or such lower rate as may be specified by an applicable income tax treaty, which gain may be offset by certain U.S.-source capital losses (even though you are not considered a resident of the United States), provided that the Non-U.S. Holder has timely filed U.S. federal income tax returns with respect to such losses.

Information Reporting Requirements and Backup Withholding

Generally, we must report information to the IRS with respect to any dividends we pay on our Class A common stock (even if the payments are exempt from withholding), including the amount of any such dividends, the name and address of the recipient, and the amount, if any, of tax withheld. A similar report is sent to the holder to whom any such dividends are paid. Pursuant to tax treaties or certain other agreements, the IRS may make its reports available to tax authorities in the recipient's country of residence.

Dividends paid by us (or our paying agents) to a Non-U.S. Holder may also be subject to U.S. backup withholding. U.S. backup withholding generally will not apply to a Non-U.S. Holder who provides a properly executed IRS Form W-8BEN, IRS Form W-8BEN-E, or IRS Form W-ECI, or otherwise establishes an exemption. Notwithstanding the foregoing, backup withholding may apply if the payor has actual knowledge, or reason to know, that the holder is a U.S. person who is not an exempt recipient.

U.S. information reporting and backup withholding requirements generally will apply to the proceeds of a disposition of our Class A common stock effected by or through a U.S. office of any broker, U.S. or foreign, except that information reporting and such requirements may be avoided if the holder provides a properly executed IRS Form W-8BEN or IRS Form W-8BEN-E or otherwise meets documentary evidence requirements for establishing non-U.S. person status or otherwise establishes an exemption. Generally, U.S. information reporting and backup withholding requirements will not apply to a payment of disposition proceeds to a Non-U.S. Holder where the transaction is effected outside the United States through a non-U.S. office of a non-U.S. broker. Information reporting and backup withholding requirements may, however, apply to a payment of disposition proceeds if the broker has actual knowledge, or reason to know, that the holder is, in fact, a U.S. person. For information reporting purposes, certain brokers with substantial U.S. ownership or operations will generally be treated in a manner similar to U.S. brokers.

Backup withholding is not an additional tax. Any amounts withheld under the backup withholding rules may be credited against the tax liability of persons subject to backup withholding, provided that the required information is timely furnished to the IRS.

Foreign Accounts

Sections 1471 through 1474 of the Code (commonly referred to as FATCA) impose a U.S. federal withholding tax of 30% on certain payments, including dividends paid on, and the gross proceeds of a disposition of, our Class A common stock paid to a foreign financial institution (as specifically defined by applicable rules) unless such institution enters into an agreement with the U.S. government to withhold on certain payments and to collect and provide to the U.S. tax authorities substantial information regarding U.S. account holders of such institution (which includes certain equity holders of such institution, as well as certain account holders that are foreign entities with U.S. owners). FATCA also generally imposes a federal withholding tax of 30% on certain payments, including dividends paid on, and the gross proceeds of a disposition of, our Class A common stock to a non-financial foreign entity unless such entity provides the withholding agent with either a certification that it does not have any substantial direct or indirect U.S. owners or provides information regarding substantial direct and indirect U.S. owners of the entity. An intergovernmental agreement between the United States and an applicable foreign country may modify those requirements. The withholding tax described above will not apply if the foreign financial institution or non-financial foreign entity otherwise qualifies for an exemption from the rules.

The withholding provisions described above currently apply to payments of dividends, and, subject to the recently released proposed Treasury Regulations described below, will apply to payments of gross proceeds from a sale or other disposition of Class A common stock on or after January 1, 2019.

The U.S. Treasury Department recently released proposed regulations which, if finalized in their present form, would eliminate the federal withholding tax of 30% applicable to the gross proceeds of a disposition of our Class A common stock. In its preamble to such proposed regulations, the U.S. Treasury Department stated that taxpayers may generally rely on the proposed regulations until final regulations are issued. Holders are encouraged to consult with their own tax advisors regarding the possible implications of FATCA on their investment in our Class A common stock.

EACH PROSPECTIVE INVESTOR SHOULD CONSULT ITS OWN TAX ADVISOR REGARDING THE TAX CONSEQUENCES OF PURCHASING, HOLDING AND DISPOSING OF OUR CLASS A COMMON STOCK, INCLUDING THE CONSEQUENCES OF ANY RECENT OR PROPOSED CHANGE IN APPLICABLE LAW.

UNDERWRITING

We and the underwriters for the offering named below have entered into an underwriting agreement with respect to the Class A common stock being offered. Subject to the terms and conditions of the underwriting agreement, each underwriter has severally agreed to purchase from us the number of shares of our Class A common stock set forth opposite its name below. Cowen and Company, LLC, Evercore Group L.L.C. and Stifel, Nicolaus & Company, Incorporated are the representatives of the underwriters.

Underwriter	Number of Shares
Cowen and Company, LLC	
Evercore Group L.L.C.	
Stifel, Nicolaus & Company, Incorporated	
Canaccord Genuity LLC	
Brookline Capital Markets, a division of Arcadia Securities, LLC	
Total	7,350,000

The underwriting agreement provides that the obligations of the underwriters are subject to certain conditions precedent and that the underwriters have agreed, severally and not jointly, to purchase all of the shares sold under the underwriting agreement if any of these shares are purchased, other than those shares covered by the overallotment option described below. If an underwriter defaults, the underwriting agreement provides that the purchase commitments of the non-defaulting underwriters may be increased or the underwriting agreement may be terminated.

We have agreed to indemnify the underwriters against specified liabilities, including liabilities under the Securities Act, and to contribute to payments the underwriters may be required to make in respect thereof.

The underwriters are offering the shares, subject to prior sale, when, as and if issued to and accepted by them, subject to approval of legal matters by their counsel and other conditions specified in the underwriting agreement. The underwriters reserve the right to withdraw, cancel or modify offers to the public and to reject orders in whole or in part.

Overallotment Option to Purchase Additional Shares. We have granted to the underwriters an option to purchase up to 1,102,500 additional shares of Class A common stock at the public offering price, less the underwriting discount. This option is exercisable for a period of 30 days. The underwriters may exercise this option solely for the purpose of covering overallotments, if any, made in connection with the sale of Class A common stock offered hereby. To the extent that the underwriters exercise this option, the underwriters will purchase additional shares from us in approximately the same proportion as shown in the table above.

Discounts and Commissions. The following table shows the public offering price, underwriting discount and proceeds, before expenses, to us. These amounts are shown assuming both no exercise and full exercise of the underwriters' option to purchase additional shares.

We estimate that the total expenses of the offering, excluding underwriting discounts, will be approximately $2.4 million and are payable by us. We have also agreed to reimburse the

underwriters for expenses of up to $35,000 related to the clearance of this offering with the Financial Industry Regulatory Authority, Inc.

		Total	
	Per Share	Without Overallotment	With Overallotment
Public offering price	$	$	$
Underwriting discount			
Proceeds, before expenses, to us	$	$	$

The underwriters propose to offer the shares of Class A common stock to the public at the public offering price set forth on the cover of this prospectus. The underwriters may offer the shares of Class A common stock to securities dealers at the public offering price less a concession not in excess of $ per share. If all of the shares are not sold at the public offering price, the underwriters may change the offering price and other selling terms.

Discretionary Accounts. The underwriters do not intend to confirm sales of the shares to any accounts over which they have discretionary authority.

Market Information. Prior to this offering, there has been no public market for shares of our Class A common stock. The initial public offering price will be determined by negotiations between us and the representatives of the underwriters. In addition to prevailing market conditions, the factors to be considered in these negotiations will include:

- the history of, and prospects for, our company and the industry in which we compete;
- our past and present financial information;
- an assessment of our management;
- our past and present operations, and the prospects for, and timing of, our future revenues;
- the present state of our development; and
- the above factors in relation to market values and various valuation measures of other companies engaged in activities similar to ours.

An active trading market for the shares may not develop. It is also possible that after the offering the shares will not trade in the public market at or above the initial public offering price.

We have applied for the quotation of our Class A common stock on the Nasdaq Global Market under the symbol "BCEL".

Stabilization. In connection with this offering, the underwriters may engage in stabilizing transactions, overallotment transactions, syndicate covering transactions, penalty bids and purchases to cover positions created by short sales.

- Stabilizing transactions permit bids to purchase shares of Class A common stock so long as the stabilizing bids do not exceed a specified maximum, and are engaged in for the purpose of preventing or retarding a decline in the market price of the Class A common stock while the offering is in progress.
- Overallotment transactions involve sales by the underwriters of shares of Class A common stock in excess of the number of shares the underwriters are obligated to purchase. This creates a syndicate short position which may be either a covered short position or a naked short position. In a covered short position, the number of shares over-allotted by the underwriters is not greater than the number of shares that they may purchase in the

overallotment option. In a naked short position, the number of shares involved is greater than the number of shares in the overallotment option. The underwriters may close out any short position by exercising their overallotment option or purchasing shares in the open market.

- Syndicate covering transactions involve purchases of Class A common stock in the open market after the distribution has been completed in order to cover syndicate short positions. In determining the source of shares to close out the short position, the underwriters will consider, among other things, the price of shares available for purchase in the open market as compared with the price at which they may purchase shares through exercise of the overallotment option. If the underwriters sell more shares than could be covered by exercise of the overallotment option and, therefore, have a naked short position, the position can be closed out only by buying shares in the open market. A naked short position is more likely to be created if the underwriters are concerned that after pricing there could be downward pressure on the price of the shares in the open market that could adversely affect investors who purchase in the offering.
- Penalty bids permit the representatives to reclaim a selling concession from a syndicate member when the Class A common stock originally sold by that syndicate member is purchased in stabilizing or syndicate covering transactions to cover syndicate short positions.

These stabilizing transactions, syndicate covering transactions and penalty bids may have the effect of raising or maintaining the market price of our Class A common stock or preventing or retarding a decline in the market price of our Class A common stock. As a result, the price of our Class A common stock in the open market may be higher than it would otherwise be in the absence of these transactions. Neither we nor the underwriters make any representation or prediction as to the effect that the transactions described above may have on the price of our Class A common stock. These transactions may be effected on The Nasdaq Global Market, in the over-the-counter market or otherwise and, if commenced, may be discontinued at any time.

Lock-Up Agreements. Pursuant to certain "lock-up" agreements, we and our executive officers, directors and substantially all of our other stockholders, have agreed, subject to certain exceptions, not to offer, sell, assign, transfer, pledge, contract to sell, or otherwise dispose of or announce the intention to otherwise dispose of, or enter into any swap, hedge or similar agreement or arrangement that transfers, in whole or in part, the economic consequence of ownership of, directly or indirectly, or make any demand or request or exercise any right with respect to the registration of, or file with the SEC a registration statement under the Securities Act relating to, any Class A common stock or securities convertible into or exchangeable or exercisable for any Class A common stock, including shares of our Class B common stock, without the prior written consent of the representatives, for a period of 180 days after the date of the pricing of the offering.

This lock-up provision applies to Class A common stock and to securities convertible into or exchangeable or exercisable for Class A common stock, including shares of our Class B common stock. It also applies to Class A and Class B common stock owned now or acquired later by the person executing the agreement or for which the person executing the agreement later acquires the power of disposition. The exceptions permit us, among other things and subject to restrictions, to: (a) issue Class A common stock or options pursuant to employee benefit plans, (b) issue Class A common stock upon exercise of outstanding options or warrants or (c) file registration statements on Form S-8.

The exceptions permit our executive officers, directors and shareholders, as parties to the "lock-up" agreements, among other things and subject to restrictions, to (a) make certain gifts,

(b) make transfers by will or intestate succession, (c) if the party is a corporation, partnership, limited liability company or other business entity, make transfers to any stockholders, partners, members of, or owners of similar equity interests in, the party, or to an affiliate of the party, if such transfer is not for value, (d) if the party is a corporation, partnership, limited liability company or other business entity, make transfers in connection with the sale or transfer of all of the party's capital stock, partnership interests, membership interests or other similar equity interests, as the case may be, or all or substantially all of the party's assets, in any such case not undertaken for the purpose of avoiding the restrictions imposed by the "lock-up" agreement, (e) enter into transactions relating to shares of Class A common stock acquired in open market transactions after completion of this offering, provided that no public announcement or filing is made regarding such transaction during the 180-day lock-up period, (f) enter into a 10b5-1 trading plan, provided that such plan does not permit the sale of any Class A common stock during the 180-day lock-up period and no public announcement or filing is made regarding such plan during the 180-day lock-up period, (g) make transfers to us to satisfy tax withholding obligations pursuant to our equity incentive plans disclosed in this prospectus, (h) if the party is a trust, make transfers to a trust, trustee or beneficiary of the trust or to the estate of a trustor, trustee or beneficiary of such trust, provided that no public announcement or filing is made regarding such transaction during the 180-day lock-up period, (i) make transfers pursuant to a divorce settlement, qualified domestic or other court order, (j) make transfers to us pursuant to any right to repurchase shares or any right of first refusal with respect to transfers of shares and (k) make transfers pursuant to a bona fide third-party tender offer, merger, consolidation or other similar transaction.

The representatives, in their sole discretion, may release our Class A common stock and other securities subject to the lock-up agreements described above in whole or in part at any time. When determining whether or not to release our Class A common stock and other securities from lock-up agreements, the representatives will consider, among other factors, the holder's reasons for requesting the release, the number of shares for which the release is being requested and market conditions at the time of the request. In the event of such a release or waiver for one of our directors or officers, the representatives shall provide us with notice of the impending release or waiver at least three business days before the effective date of such release or waiver and we will announce the impending release or waiver by issuing a press release at least two business days before the effective date of the release or waiver.

Canada. The Class A common stock may be sold only to purchasers purchasing, or deemed to be purchasing, as principal that are accredited investors, as defined in National Instrument 45-106 *Prospectus Exemptions* or subsection 73.3(1) of the *Securities Act* (Ontario), and are permitted clients, as defined in National Instrument 31-103 *Registration Requirements, Exemptions and Ongoing Registrant Obligations*. Any resale of the Class A common stock must be made in accordance with an exemption from, or in a transaction not subject to, the prospectus requirements of applicable securities laws.

Securities legislation in certain provinces or territories of Canada may provide a purchaser with remedies for rescission or damages if this prospectus (including any amendment thereto) contains a misrepresentation, provided that the remedies for rescission or damages are exercised by the purchaser within the time limit prescribed by the securities legislation of the purchaser's province or territory. The purchaser should refer to any applicable provisions of the securities legislation of the purchaser's province or territory for particulars of these rights or consult with a legal advisor.

Pursuant to section 3A.3 of National Instrument 33-105 *Underwriting Conflicts* (NI 33-105), the underwriters are not required to comply with the disclosure requirements of NI 33-105 regarding underwriter conflicts of interest in connection with this offering.

United Kingdom. Each of the underwriters has represented and agreed that:

- it has not made or will not make an offer of the securities to the public in the United Kingdom within the meaning of section 102B of the Financial Services and Markets Act 2000 (as amended) (FSMA) except to legal entities which are authorized or regulated to operate in the financial markets or, if not so authorized or regulated, whose corporate purpose is solely to invest in securities or otherwise in circumstances which do not require the publication by us of a prospectus pursuant to the Prospectus Rules of the Financial Services Authority (FSA);
- it has only communicated or caused to be communicated and will only communicate or cause to be communicated an invitation or inducement to engage in investment activity
(within the meaning of section 21 of FSMA) to persons who have professional experience in matters relating to investments falling within Article 19(5) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005 or in circumstances in which section 21 of FSMA does not apply to us; and
- it has complied with and will comply with all applicable provisions of FSMA with respect to anything done by it in relation to the securities in, from or otherwise involving the United Kingdom.

Switzerland. The securities will not be offered, directly or indirectly, to the public in Switzerland and this prospectus does not constitute a public offering prospectus as that term is understood pursuant to article 652a or 1156 of the Swiss Federal Code of Obligations.

European Economic Area. In relation to each Member State of the European Economic Area (the "EEA") which has implemented the European Prospectus Directive (each, a "Relevant Member State"), an offer of our shares may not be made to the public in a Relevant Member State other than:

- to any legal entity which is a qualified investor, as defined in the European Prospectus Directive;
- to fewer 150 natural or legal persons (other than qualified investors as defined in the European Prospectus Directive), subject to obtaining the prior consent of the relevant dealer or dealers nominated by us for any such offer; or
- in any other circumstances falling within Article 3(2) of the European Prospectus Directive,

provided that no such offer of our shares shall require us or any underwriter to publish a prospectus pursuant to Article 3 of the European Prospectus Directive or supplement prospectus pursuant to Article 16 of the European Prospectus Directive and each person who initially acquires any shares or to whom any offer is made will be deemed to have represented, acknowledged and agreed to and with each of the underwriters and with us that it is a "qualified investor" within the meaning of the law in that Relevant Member State implementing Article 2(1)(e) of the European Prospectus Directive.

In the case of any shares being offered to a financial intermediary as that term is used in Article 3(2) of the European Prospectus Directive, each such financial intermediary will be deemed to have represented, acknowledged and agreed that the shares acquired by it in the offer have not been acquired on a non-discretionary basis on behalf of, nor have they been acquired with a view to their offer or resale to, persons in circumstances which may give rise to an offer or any shares to the public other than their offer or resale in a Relevant Member State to qualified investors as so defined or in circumstances in which the prior consent of the representatives has been obtained to each such proposed offer or resale.

For the purposes of this description, the expression an "offer to the public" in relation to the securities in any Relevant Member State means the communication in any form and by any means of sufficient information on the terms of the offer and the securities to be offered so as to enable an investor to decide to purchase or subscribe for the securities, as the expression may be varied in that Relevant Member State by any measure implementing the European Prospectus Directive in that member state, and the expression "European Prospectus Directive" means Directive 2003/71/EC (and amendments hereto, including the 2010 PD Amending Directive, to the extent implemented in the Relevant Member State) and includes any relevant implementing measure in each Relevant Member State. The expression 2010 PD Amending Directive means Directive 2010/73/EU.

Israel. In the State of Israel this prospectus shall not be regarded as an offer to the public to purchase shares of Class A common stock under the Israeli Securities Law, 5728-1968, which requires a prospectus to be published and authorized by the Israel Securities Authority, if it complies with certain provisions of Section 15 of the Israeli Securities Law, 5728-1968, including, inter alia, if: (i) the offer is made, distributed or directed to not more than 35 investors, subject to certain conditions (the "Addressed Investors"); or (ii) the offer is made, distributed or directed to certain qualified investors defined in the First Addendum of the Israeli Securities Law, 5728-1968, subject to certain conditions (the "Qualified Investors"). The Qualified Investors shall not be taken into account in the count of the Addressed Investors and may be offered to purchase securities in addition to the 35 Addressed Investors. The company has not and will not take any action that would require it to publish a prospectus in accordance with and subject to the Israeli Securities Law, 5728-1968. We have not and will not distribute this prospectus or make, distribute or direct an offer to subscribe for our Class A common stock to any person within the State of Israel, other than to Qualified Investors and up to 35 Addressed Investors.

Qualified Investors may have to submit written evidence that they meet the definitions set out in of the First Addendum to the Israeli Securities Law, 5728-1968. In particular, we may request, as a condition to be offered Class A common stock, that Qualified Investors will each represent, warrant and certify to us or to anyone acting on our behalf: (i) that it is an investor falling within one of the categories listed in the First Addendum to the Israeli Securities Law, 5728-1968; (ii) which of the categories listed in the First Addendum to the Israeli Securities Law, 5728-1968 regarding Qualified Investors is applicable to it; (iii) that it will abide by all provisions set forth in the Israeli Securities Law, 5728-1968 and the regulations promulgated thereunder in connection with the offer to be issued Class A common stock; (iv) that the shares of Class A common stock that it will be issued are, subject to exemptions available under the Israeli Securities Law, 5728-1968, (a) for its own account; (b) for investment purposes only; and (c) not issued with a view to resale within the State of Israel, other than in accordance with the provisions of the Israeli Securities Law, 5728-1968; and (v) that it is willing to provide further evidence of its Qualified Investor status. Addressed Investors may have to submit written evidence in respect of their identity and may have to sign and submit a declaration containing, inter alia, the Addressed Investor's name, address and passport number or Israeli identification number.

We have not authorized and do not authorize the making of any offer of securities through any financial intermediary on our behalf, other than offers made by the underwriters and their respective affiliates, with a view to the final placement of the securities as contemplated in this document. Accordingly, no purchaser of the shares, other than the underwriters, is authorized to make any further offer of shares on our behalf or on behalf of the underwriters.

Electronic Offer, Sale and Distribution of Shares. A prospectus in electronic format may be made available on the websites maintained by one or more of the underwriters or selling group members, if any, participating in this offering and one or more of the underwriters participating in this

offering may distribute prospectuses electronically. The representatives may agree to allocate a number of shares to underwriters and selling group members for sale to their online brokerage account holders. Internet distributions will be allocated by the underwriters and selling group members that will make internet distributions on the same basis as other allocations. Other than the prospectus in electronic format, the information on these websites is not part of this prospectus or the registration statement of which this prospectus forms a part, has not been approved or endorsed by us or any underwriter in its capacity as underwriter, and should not be relied upon by investors.

Other Relationships. Certain of the underwriters and their affiliates have provided, and may in the future provide, various investment banking, commercial banking and other financial services for us and our affiliates for which they have received, and may in the future receive, customary fees.

LEGAL MATTERS

The validity of the shares of Class A common stock and Class B common stock being offered by this prospectus will be passed upon for us by Cooley LLP, Palo Alto, California. The underwriters are being represented by Davis Polk & Wardwell LLP, Menlo Park, California.

EXPERTS

The consolidated financial statements as of December 31, 2017 and 2018 included in this prospectus have been so included in reliance on the report of OUM & Co. LLP, an independent registered public accounting firm, given on the authority of said firm as experts in auditing and accounting.

CHANGES IN INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

Dismissal of Independent Registered Public Accounting Firm

We dismissed Frank, Rimerman + Co. LLP, or Frank, Rimerman, as our independent registered public accounting firm on November 13, 2017. The decision to dismiss Frank, Rimerman was approved by our board of directors.

The report of Frank, Rimerman on the financial statements for 2016 contained no adverse opinion or a disclaimer of opinion, and was not qualified or modified as to uncertainty, audit scope or accounting principle. Frank, Rimerman did not perform an audit of our 2017 financial statements.

During 2016, and the subsequent period through November 13, 2017, (1) there were no disagreements (as that term is used in Item 304(a)(1)(iv) of Regulation S-K and the related instructions) between us and Frank, Rimerman on any matter of accounting principles or practices, financial statement disclosure, or auditing scope or procedure, which disagreements, if not resolved to the satisfaction of Frank, Rimerman, would have caused Frank, Rimerman to make reference thereto in its report on our financial statements for the year ended December 31, 2016, and (2) there were no "reportable events" as such term is defined in Item 304(a)(1)(v) of Regulation S-K.

We have provided Frank, Rimerman with a copy of the disclosures set forth under the heading "Changes in Independent Registered Public Accounting Firm" included in this prospectus and have requested that Frank, Rimerman furnish a letter addressed to the SEC stating whether or not Frank, Rimerman agrees with statements related to them made by us under the heading "Change in Independent Registered Public Accounting Firm" in this prospectus. A copy of that letter is filed as Exhibit 16.1 to the registration statement of which this prospectus forms a part.

Newly Appointed Independent Registered Public Accounting Firm

We engaged OUM & Co. LLP, or OUM, as our independent registered public accounting firm on November 13, 2017 to audit our financial statements for 2016, 2017 and 2018. The decision to change our principal independent registered public accounting firm was approved by our board of directors.

During 2016, and the subsequent period preceding our engagement of OUM as our independent registered public accounting firm, we did not consult with OUM on matters that involved the application of accounting principles to a specified transaction, the type of audit opinion that might be

rendered on our financial statements or any other matter that was either the subject of a disagreement or reportable event.

WHERE YOU CAN FIND MORE INFORMATION

We have filed with the SEC a registration statement on Form S-1, including exhibits and schedules, under the Securities Act, with respect to the shares of Class A common stock being offered by this prospectus. This prospectus, which constitutes part of the registration statement, does not contain all of the information in the registration statement and its exhibits. For further information with respect to us and the Class A common stock offered by this prospectus, we refer you to the registration statement and its exhibits. Statements contained in this prospectus as to the contents of any contract or any other document referred to are not necessarily complete, and in each instance, we refer you to the copy of the contract or other document filed as an exhibit to the registration statement. Each of these statements is qualified in all respects by this reference.

You can read our SEC filings, including the registration statement, over the Internet at the SEC's website at www.sec.gov.

Upon the completion of this offering, we will be subject to the information reporting requirements of the Securities Exchange Act of 1934 and we will file reports, proxy statements and other information with the SEC. These reports, proxy statements and other information will be available at the web site of the SEC referred to above. We also maintain a website at www.atreca.com, at which, following the completion of this offering, you may access these materials free of charge as soon as reasonably practicable after they are electronically filed with, or furnished to, the SEC. Information contained on or accessible through our website is not a part of this prospectus, and the inclusion of our website address in this prospectus is an inactive textual reference only.

CONSOLIDATED FINANCIAL STATEMENTS ATRECA, INC.
Index to Consolidated Financial Statements

Audited financial statements for the years ended December 31, 2017 and 2018

Unaudited financial statements for the three months ended March 31, 2018 and 2019

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

Stockholders and Board of Directors
Atreca, Inc.
Redwood City, California

Opinion on the Financial Statements

We have audited the accompanying consolidated financial statements of Atreca, Inc., which comprise the consolidated balance sheets as December 31, 2017 and 2018, and the related consolidated statements of operations, comprehensive loss, convertible preferred stock and stockholders' equity and cash flows for each of the two years in the period ended December 31, 2018, and the related notes (collectively referred to as the financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2017 and 2018, and the results of its operations and its cash flows for the years then ended in conformity with accounting principles generally accepted in the United States of America.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's consolidated financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) ("PCAOB") and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

Our audits included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ OUM & CO. LLP
San Francisco, California
March 5, 2019, except for Note 14, as to which the date is April 23, 2019 and except for the effects of the reverse stock split as described, under the heading *Reverse Stock Split,* as to which the date is June 10, 2019.
We have served as the Company's auditor since 2017.

Atreca, Inc.
Consolidated Balance Sheets
(in thousands, except share and per share data)

	December 31,		Pro Forma December 31, 2018 (unaudited)
	2017	2018	
ASSETS			
Current Assets			
Cash and cash equivalents	$ 8,242	$ 114,504	
Investments	22,371	—	
Prepaid expenses and other current assets	1,369	2,721	
Total current assets	31,982	117,225	
Property and equipment, net	3,790	4,143	
Deposits and other	340	316	
Total assets	$ 36,112	$ 121,684	
LIABILITIES, CONVERTIBLE PREFERRED STOCK AND STOCKHOLDERS' EQUITY (DEFICIT)			
Current Liabilities			
Accounts payable	$ 609	$ 1,307	$ 1,307
Accrued expenses	2,084	3,208	3,208
Capital lease obligations, current portion	51	47	47
Total current liabilities	2,744	4,562	4,562
Capital lease obligations, net of current portion	144	100	100
Deferred rent	81	6	6
Preferred stock warrant liability	347	380	—
Total liabilities	3,316	5,048	4,668
Commitments and Contingencies (Note 8)			
Series A convertible preferred stock, $0.0001 par value, 32,133,287 shares authorized; 5,305,513 shares issued and outstanding (aggregate liquidation preference of $58,892), no shares issued and outstanding, pro forma (unaudited)	55,030	55,030	—
Series B convertible preferred stock, $0.0001 par value, 18,008,749 shares authorized (18,550,000 shares at 2017); 3,001,421 shares issued and outstanding (aggregate liquidation preference of $35,000), no shares issued and outstanding, pro forma (unaudited)	34,333	34,333	—
Series C1 convertible preferred stock, $0.0001 par value, 54,189,549 shares authorized (none at 2017); 5,007,134 shares issued and outstanding (aggregate liquidation preference of $70,000), no shares issued and outstanding, pro forma (unaudited)	—	65,691	—
Series C2 convertible preferred stock, $0.0001 par value, 23,605,150 shares authorized (none at 2017); 3,934,191 shares issued and outstanding (aggregate liquidation preference of $55,000), no shares issued and outstanding, pro forma (unaudited)	—	54,615	—
Stockholders' equity (deficit)			
Class A common stock, $0.0001 par value, 191,398,492 shares authorized (77,520,000 shares of single class common stock at 2017), 2,119,872 shares issued and outstanding (2,092,040 shares of single class common stock at 2017) 15,433,940 shares issued and outstanding, pro forma (unaudited)	—	—	2
Class B common stock, $0.0001 par value, 23,605,150 shares authorized (none at 2017), none issued and outstanding 3,934,191 shares issued and outstanding, pro forma (unaudited)	—	—	—
Additional paid-in capital	2,129	3,593	213,640
Accumulated other comprehensive loss	(14)	(4)	(4)
Accumulated deficit	(58,682)	(96,622)	(96,622)
Total stockholders' equity (deficit)	(56,566)	(93,032)	117,016
Total liabilities, convertible preferred stock and stockholders' equity (deficit)	$ 36,112	$ 121,684	$ 121,684

The accompanying Notes are an integral part of these consolidated financial statements.

Atreca, Inc.
Consolidated Statements of Operations
(in thousands, except share and per share data)

	Year Ended December 31,	
	2017	2018
Operating Expenses		
Research and development	$ 24,873	$ 32,513
General and administrative	4,562	7,060
Total operating expenses	29,435	39,573
Operating loss	(29,435)	(39,573)
Interest and other income (expense)		
Other income	1,719	961
Interest income	152	714
Interest expense	(14)	(9)
Preferred stock warrant liability revaluation	6	(33)
Gain (loss) on disposal of property and equipment	48	(1)
Loss before income tax benefit (expense)	(27,524)	(37,941)
Income tax benefit (expense)	(3)	1
Net loss	$ (27,527)	$ (37,940)
Net loss per share, basic and diluted	$ (13.14)	$ (18.02)
Weighted-average shares used in computing net loss per share, basic and diluted	2,094,795	2,104,861
Pro forma net loss per share, basic and diluted (unaudited)		$ (2.86)
Weighted-average shares used in computing pro forma net loss per share, basic and diluted (unaudited)		13,277,996

The accompanying Notes are an integral part of these consolidated financial statements.

Atreca, Inc.
Consolidated Statements of Comprehensive Loss
(in thousands)

	Year Ended December 31,	
	2017	2018
Net loss	$ (27,527)	$ (37,940)
Other comprehensive income (loss):		
Unrealized gain (loss) on fair value of investments	(31)	26
Unrealized gain (loss) on currency translation	34	(16)
Comprehensive loss	$ (27,524)	$ (37,930)

The accompanying Notes are an integral part of these consolidated financial statements.

Atreca, Inc.
Consolidated Statements of Convertible Preferred Stock and Stockholders' Deficit
Years Ended December 31, 2018 and 2017
(in thousands, except share data)

	Convertible Preferred Stock		Common Stock		Additional Paid-In Capital	Accumulated Other Comprehensive Loss	Accumulated Deficit	Total Stockholders' Deficit
	Shares	Amount	Shares	Amount				
Balances at December 31, 2016	5,305,513	$ 55,029	2,099,437	$ 1	$ 1,700	$ (17)	$ (31,155)	$ (29,471)
Issuance of Series B convertible preferred stock, net of issuance costs of $667	3,001,421	34,333	—	—	—	—	—	—
Issuance of common stock upon exercise of options	—	—	9,632	—	16	—	—	16
Vesting of early exercised stock options	—	—	—	—	4	—	—	4
Repurchase of unvested shares	—	—	(17,029)	—	—	—	—	—
Stock-based compensation	—	—	—	—	409	—	—	409
Unrealized loss in fair value of investments	—	—	—	—	—	(31)	—	(31)
Unrealized currency exchange gain	—	—	—	—	—	34	—	34
Net loss	—	—	—	—	—	—	(27,527)	(27,527)
Balances at December 31, 2017	8,306,934	89,362	2,092,040	1	2,129	(14)	(58,682)	(56,566)
Issuance of Series C1 convertible preferred stock net of issuance costs of $4,309	5,007,134	65,691	—	—	—	—	—	—
Issuance of Series C2 convertible preferred stock net of issuance costs of $385	3,934,191	54,615	—	—	—	—	—	—
Issuance of common stock upon exercise of options	—	—	27,832	—	45	—	—	45
Stock-based compensation	—	—	—	—	1,419	—	—	1,419
Unrealized gain on fair value of investments	—	—	—	—	—	26	—	26
Unrealized currency exchange loss	—	—	—	—	—	(16)	—	(16)
Net loss	—	—	—	—	—	—	(37,940)	(37,940)
Balances at December 31, 2018	17,248,259	$ 209,668	2,119,872	$ 1	$ 3,593	$ (4)	$ (96,622)	$ (93,032)

The accompanying Notes are an integral part of these consolidated financial statements.

Atreca, Inc.
Consolidated Statements of Cash Flows
(in thousands)

	Year Ended December 31,	
	2017	2018
Cash Flows from Operating Activities		
Net loss	$ (27,527)	$ (37,940)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	1,205	1,409
(Gain) loss on disposal of property and equipment	(48)	1
Stock-based compensation	409	1,419
Preferred stock warrant liability revaluation	(6)	33
Changes in operating assets and liabilities:		
Prepaid expenses and other current assets	596	(1,370)
Accounts payable	136	698
Accrued expenses	152	1,085
Deferred rent	(13)	(35)
Net cash used in operating activities	(25,096)	(34,700)
Cash Flows from Investing Activities		
Purchase of property and equipment	(1,377)	(1,764)
Purchase of investments	(29,780)	—
Proceeds from maturities of investments	22,176	22,398
Change in deposits	12	24
Net cash provided by (used in) investing activities	(8,969)	20,658
Cash Flows from Financing Activities		
Proceeds from issuance of convertible preferred stock, net	34,333	120,306
Proceeds from exercise of stock options	16	46
Principal payments on capital lease obligations	(60)	(48)
Net cash provided by financing activities	34,289	120,304
Net change in cash and cash equivalents	224	106,262
Cash and cash equivalents, beginning of period	8,018	8,242
Cash and cash equivalents, end of period	$ 8,242	$ 114,504
Supplemental Disclosure of Cash Flow Information:		
Cash paid for interest	$ 14	$ 9
Cash paid for income taxes	$ 3	$ (1)
Supplemental Schedule of Non-Cash Investing and Financing Activities:		
Vesting of early exercised common stock options	$ 4	$ —
Equipment returned under capital lease obligation	$ (43)	$ —

The accompanying Notes are an integral part of these consolidated financial statements.

Atreca, Inc.
Notes to Consolidated Financial Statements

1. Nature of Business and Management's Plans Regarding Financing of Future Operations

Nature of Business

Atreca, Inc. (the Company) was incorporated in the State of Delaware on June 11, 2010 (inception date), and is located in Redwood City, California. In April 2016, the Company formed a wholly owned subsidiary, Atreca Pte. Ltd., in Singapore. The Company is a biopharmaceutical company utilizing its differentiated platform to discover and develop novel antibody-based immunotherapeutics to treat a range of solid tumor types. The Company's lead product candidate, ATRC-101, is a monoclonal antibody in preclinical development with a novel mechanism of action and target derived from an antibody identified using its discovery platform. The Company operates in a single segment. Since inception, the Company has been primarily engaged in research and development, raising capital, building its management team and building its intellectual property portfolio.

Liquidity

Management evaluates whether there are relevant conditions and events that in the aggregate raise substantial doubt about the entity's ability to continue as a going concern and to meet its obligations as they become due within one year from the date that the financial statements are issued.

The Company is subject to risks and uncertainties common to early-stage companies in the biotechnology industry, including, but not limited to, development by competitors of new technological innovations, dependence on key personnel, protection of proprietary technology, compliance with government regulations and the ability to secure additional capital to fund operations. Identification and development of product candidates will require significant additional research and development efforts, including extensive preclinical and clinical testing and regulatory approval prior to commercialization. These efforts require significant amounts of additional capital, adequate personnel and infrastructure and extensive compliance-reporting capabilities. Even if the Company's drug development efforts are successful, it is uncertain when, if ever, the Company will realize significant revenue from product sales.

2. Summary of Significant Accounting Policies

Principles of Consolidation

The consolidated financial statements include accounts of the Company and its wholly owned subsidiary. All significant intercompany accounts and transactions are eliminated upon consolidation.

Use of Estimates

The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, disclosure of contingent assets and liabilities, and reported amounts of income and expenses in the consolidated financial statements and accompanying notes. Actual results could differ from those estimates. Key estimates in the consolidated financial statements include estimated useful lives of property and equipment, impairment of long-lived assets, accrued expenses, valuation of deferred income tax assets, fair value of warrants issued to purchasers of shares of preferred stock and common stock and fair value of options granted under the Company's stock option plan.

Atreca, Inc.
Notes to Consolidated Financial Statements (Continued)

2. Summary of Significant Accounting Policies (Continued)

Other Income

Other income is comprised of amounts earned from services performed under service agreements. Beginning January 1, 2018, the Company follows the provisions of Accounting Standards Update 2014-09 Accounting Standards Codification (ASC) Topic 606, *Revenue from Contracts with Customers* (Topic 606). The guidance provides a unified model to determine how income is recognized.

In determining the appropriate amount of other income to be recognized as it fulfills its obligations under the agreements, the Company performs the following steps: (i) identifies the promised goods or services in the contract; (ii) determines whether the promised goods or services are performance obligations including whether they are distinct in the context of the contract; (iii) measures the transaction price, including the constraint on variable consideration; (iv) allocates the transaction price to the performance obligations based on estimated selling prices; and (v) recognizes other income when (or as) the Company satisfies each performance obligation.

Upon adoption of Topic 606, there was no change to the units of accounting previously identified with respect to existing service agreements under legacy Generally Accepted Accounting Principles (GAAP), which are now considered performance obligations under Topic 606, and there was no change to the revenue recognition pattern for the performance obligations. Accordingly, the adoption of the new standard resulted in no cumulative effect change to the Company's opening accumulated deficit balance.

The Company generally allocates the transaction price to distinct performance obligations at their stand-alone selling prices, determined by their estimated costs plus some margin. Performance obligations are generally delivered over time and recognized based upon observable inputs as the related research services are performed, which are recorded as research and development expenses. Amounts due under service agreements are generally billed monthly as services are delivered and do not generally result in contract liabilities or assets. Receivables under service agreements of $37,000 and $282,000 are included in prepaid expenses and other current assets as of December 31, 2017 and 2018, respectively. The Company has received an advance payment of $200,000 for services to be performed under a service agreement. This represents the sole contract liability under Topic 606 and is included in other accrued expenses as of December 31, 2017 and 2018.

Collaboration and Service Arrangements

In March 2016, the Company entered into a research collaboration agreement with Genome Institute of Singapore (GIS) for the development of a high-throughput microfluidic droplet system for single cell phenotyping and genotyping. Under the agreement, the Company contributes reimbursement of research expenses and certain reagents and other consumables to GIS. The Company accounts for the collaboration agreement with GIS in accordance with ASC 808—*Collaborative Arrangements.* The Company recognized $280,000 and $522,000 of research and development expenses in 2017 and 2018, respectively under the collaboration agreement, including wind-down costs. The Company exercised its right to early terminate the collaboration agreement in December 2018.

Atreca, Inc.
Notes to Consolidated Financial Statements (Continued)

2. Summary of Significant Accounting Policies (Continued)

The Company provides antibody sequencing and related repertoire analysis services to the Bill and Melinda Gates Foundation under a services agreement entered into in February 2013. Generally, services are billed as they are delivered, and service revenue is recognized in other income in accordance with Topic 606.

In December 2018, the Company entered into a service agreement with Bristol-Myers Squibb to provide antibody sequencing and related repertoire analysis services. As of December 31, 2018, services provided under the agreement were not material. Service revenue will be recognized in other income in accordance with Topic 606.

Unaudited Pro Forma Financial Information

The unaudited pro forma balance sheet information as of December 31, 2018, assumes the conversion of all outstanding shares of convertible preferred stock into 17,248,259 shares of the Company's common stock immediately prior to completion of the Company's planned initial public offering (IPO). Shares of common stock issued in the IPO and any related net proceeds are excluded from the pro forma information.

Unaudited pro forma net loss per share is computed using the weighted-average number of common shares outstanding after giving effect to the conversion of all convertible preferred stock into shares of common stock, as if such conversion had occurred at the beginning of the period presented, or the date of original issuance, if later. The conversion of convertible preferred stock has been reflected assuming shares of convertible preferred stock convert into shares of fully paid common stock at the applicable conversion ratios.

Cash and Cash Equivalents

Cash and cash equivalents include all cash balances and highly liquid investments purchased with an original maturity of three months or less.

Investments

The Company considers securities purchased with original maturities greater than three months to be investments. The Company's policy is to protect the value of its investment portfolio and minimize principal risk by earning returns based on current interest rates. The Company's intent is to convert all investments into cash to be used for operations and has classified them as available for sale. For purposes of determining realized gains and losses, the cost of securities sold is based on specific identification. There were no realized gains or losses on investments through December 31, 2018. Net unrealized holding losses on investments, which are included in accumulated other comprehensive loss, were $26,000 and $0 at December 31, 2017 and 2018, respectively. The Company's investments at December 31, 2017, consisted primarily of U.S. Treasury securities that are reported at fair value based on quoted prices in active markets.

Risks and Uncertainties

The Company is subject to a number of risks associated with companies at a similar stage, including dependence on key individuals, competition from similar services and larger companies, volatility of the industry, ability to obtain regulatory clearance, ability to obtain adequate financing to

Atreca, Inc.
Notes to Consolidated Financial Statements (Continued)

2. Summary of Significant Accounting Policies (Continued)

support growth, the ability to attract and retain additional qualified personnel to manage the anticipated growth of the Company and general economic conditions.

Concentration of Credit Risk

Financial instruments that potentially subject the Company to concentration of credit risk consist of cash and cash equivalents, investments and other receivables. Cash and cash equivalents are held at one financial institution and were in excess of the Federal Deposit Insurance Corporation insurable limit at December 31, 2017 and 2018. Additionally, cash, cash equivalents and investments are maintained at a brokerage firm for which amounts are insured by the Securities Investor Protection Corporation subject to legal limits. The Company has not experienced any losses on its deposits to date.

The Company does not require collateral or other security for other receivables; however, credit risk is mitigated by the Company's ongoing evaluations of its debtors' credit worthiness. The Company recognized $0 and $7,000 of credit losses in 2017 and 2018, respectively.

Property and Equipment

Property and equipment are stated at cost less depreciation. Depreciation is computed using the straight-line method with the estimated useful lives of the assets ranging from two to five years. Leasehold improvements are amortized over the estimated useful life of the asset, or the remaining lease term, whichever is shorter. Expenditures for repairs and maintenance, which do not extend the useful life of the property and equipment, are expensed as incurred.

Accounting for Impairment of Long-Lived Assets

Long-lived assets consist of property and equipment. The Company reviews its long-lived assets for impairment whenever events or changes in circumstances indicate the carrying amount of an asset may not be recoverable. Recoverability of assets held and used is measured by comparison of the carrying amount of an asset to future net cash flows expected to be generated by the asset. If such assets are considered to be impaired, the impairment to be recognized is measured by the amount by which the carrying amount of the assets exceeds the fair value of the assets. The Company has not recorded any impairment of long-lived assets in 2017 or 2018.

Intellectual Property

The legal and professional costs incurred by the Company to maintain its patent rights have been expensed as part of research and development costs since inception. As of December 31, 2017 and 2018, the Company has determined that these expenses have not met the criteria to be capitalized. Intellectual property-related expenses for the years ended December 31, 2017 and 2018 were $487,000 and $1.1 million, respectively.

Deferred Rent

The Company has entered into lease agreements for its laboratory and office facilities. These leases qualify as and are accounted for as operating leases. Rent expense is recognized on a straight-line basis over the term of the lease and, accordingly, the Company records the difference between cash rent payments and the recognition of rent expense as a deferred rent liability.

Atreca, Inc.
Notes to Consolidated Financial Statements (Continued)

2. Summary of Significant Accounting Policies (Continued)

Research and Development Costs

Research and development costs are expensed as incurred. Research and development costs consist primarily of salaries and benefits, consultant fees, stock-based compensation, certain facility costs, legal costs and other costs associated with preclinical development.

A substantial portion of the Company's ongoing research and development activities are conducted by third-party service providers in connection with preclinical development activities and contract manufacturing organizations in connection with the production of materials for clinical trials. At the end of the reporting period, the Company compares payments made to third-party service providers to the estimated progress toward completion of the research or development objectives. Such estimates are subject to change as additional information becomes available. Depending on the timing of payments to the service providers and the progress that the Company estimates has been made as a result of the service provided, the Company may record net prepaid or accrued expense relating to these costs.

Stock-Based Compensation

The Company generally grants stock options to its employees for a fixed number of shares with an exercise price equal to the fair value of the underlying shares at the date of grant. The Company accounts for stock option grants using the fair value method. The fair value of options is calculated using the Black-Scholes option pricing model. Stock-based compensation is recognized as the underlying options vest using the straight-line attribution approach, and forfeitures are recorded as they occur.

Beginning January 1, 2018, the Company follows the provisions of ASU 2018-07, *Improvements to Nonemployee Share-Based Payment Accounting* (Topic 718). The standard expands the scope of Topic 718 to include share-based payment transactions for acquiring goods and services from nonemployees. Consequently, the accounting for share-based payments to nonemployees and employees is substantially aligned.

Preferred Stock Warrant Liability

The Company accounts for outstanding warrants to purchase shares of the Company's convertible preferred stock in accordance with Financial Accounting Standards Board (FASB) ASC Topic 480, *Distinguishing Liabilities from Equity* (ASC Topic 480). Under ASC Topic 480, freestanding warrants for shares that are contingently redeemable are classified as liabilities on the consolidated balance sheets and are measured at their inception date fair value and subsequently re-measured to fair value at each reporting period (Note 9).

Fair Value of Financial Instruments:

The Company uses a three-level hierarchy, which prioritizes, within the measurement of fair value, the use of market-based information over entity-specific information for fair value measurements based on the nature of inputs used in the valuation of an asset or liability as of the measurement date. Fair value focuses on an exit price and is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market

Atreca, Inc.
Notes to Consolidated Financial Statements (Continued)

2. Summary of Significant Accounting Policies (Continued)

participants at the measurement date. The inputs or methodology used for valuing financial instruments are not necessarily an indication of the risk associated with those financial instruments.

The three-level hierarchy for fair value measurements is defined as follows:

Level 1: Inputs to the valuation methodology are quoted prices (unadjusted) for identical assets or liabilities in active markets.

Level 2: Inputs to the valuation methodology include quoted prices for similar assets and liabilities in active markets, and inputs that are observable for the asset or liability, either directly or indirectly, for substantially the full term of the financial instrument.

Level 3: Inputs to the valuation methodology are unobservable and significant to the fair value measurement.

An asset or liability's categorization within the valuation hierarchy is based upon the lowest level of input that is significant to the fair value measurement.

Income Taxes

The Company accounts for income taxes using the asset and liability method. Under this method, deferred income tax assets and liabilities are recorded based on the estimated future tax effects of differences between the financial statement and income tax basis of existing assets and liabilities. A valuation allowance is provided against the Company's deferred income tax assets when realization is not reasonably assured.

Net Loss Per Share

The Company computes basic loss per share by dividing the net loss available to common stockholders by the weighted average number of common shares outstanding for the period, without consideration for common stock equivalents. Diluted net loss assumes the conversion, exercise or issuance of all potential common stock equivalents, unless the effect of inclusion would be anti-dilutive. For purposes of this calculation, common stock equivalents include the Company's stock options, common stock warrants, convertible preferred stock warrants and convertible preferred stock, which are convertible into shares of the Company's common stock. No shares related to the convertible preferred stock were included in the diluted net loss calculation for the years ended December 31, 2017 or 2018 because the inclusion of such shares would have had an anti-dilutive effect. The shares to be issued upon exercise of certain outstanding stock options were also excluded from the diluted net loss calculation for the years ended December 31, 2017 and 2018 because such shares are anti-dilutive.

Atreca, Inc.
Notes to Consolidated Financial Statements (Continued)

2. Summary of Significant Accounting Policies (Continued)

Historical outstanding anti-dilutive securities not included in the diluted net loss per share calculation include the following:

	Year Ended December 31,	
	2017	2018
Convertible preferred stock (as converted)	8,306,934	17,248,259
Common stock options	567,319	2,136,291
Common stock warrants	62,936	62,936
Convertible preferred stock warrants	49,997	49,997
	8,487,186	19,497,483

Unaudited Pro Forma Net Loss Per Share

The following table summarizes the Company's unaudited pro forma net loss per share (in thousands, except share and per share data):

	Year Ended December 31, 2018
Numerator:	
Net loss attributable to common stockholders	$ 37,940
Denominator:	
Shares used to compute net loss per share, basic and diluted	2,104,861
Pro forma adjustments to reflect assumed weighted-average effect of conversion of convertible preferred stock	11,173,135
Shares used to compute pro forma net loss per share, basic and diluted	13,227,996
Pro forma net loss per share, basic and diluted	$ (2.86)

Foreign Currency

The U.S. dollar is the functional currency of the Company and the functional currency of its subsidiary is Singapore dollars. For consolidation purposes, assets and liabilities of its subsidiary are translated into U.S. dollars at exchange rates in effect at the balance sheet date. Revenue and expenses are translated at average exchange rates in effect during the period. Gains and losses from transactions denominated in foreign currency are included in the accumulated other comprehensive loss component of stockholders' equity. Translation adjustments are not included in earnings unless they are realized through a sale or upon a complete or substantially complete liquidation of the Company's net investment in its foreign operations.

Reverse stock split

In June 2019, the Company's board of directors and its stockholders approved an amendment and restatement of the Company's amended and restated certificate of incorporation to effect a reverse split of shares of the common stock and convertible preferred stock on a 1-for-6 basis (the "Reverse Stock Split"). The par value and the authorized shares of the common stock and convertible preferred stock were not adjusted as a result of the Reverse Stock Split though the

Atreca, Inc.
Notes to Consolidated Financial Statements (Continued)

2. Summary of Significant Accounting Policies (Continued)

Company concurrently authorized additional shares of common stock and convertible preferred stock. All issued and outstanding convertible preferred stock and common stock, stock options, warrants and related per share amounts contained in the financial statements have been retroactively adjusted to reflect this Reverse Stock Split for all periods presented. The Reverse Stock Split was effected on June 7, 2019.

Recent Accounting Pronouncements

In May 2014, the FASB issued ASU 2014-09, *Revenue from Contracts with Customers* (Topic 606). This accounting standard outlines a single comprehensive model for entities to use in accounting for revenue arising from contracts with customers to reflect the consideration to which the entity expects to be entitled to in exchange for goods and services.

The Company adopted Topic 606 as of January 1, 2018 using the modified retrospective method of adoption. Results for reporting periods beginning after January 1, 2018 are presented under the guidelines of Topic 606, while prior period amounts have not been adjusted and continue to be reported under the accounting standards in effect for those periods. Upon adoption of Topic 606, the Company did not recognize a cumulative effect adjustment of initially applying the standard as no material adjustments to contracts not completed as of the date of adoption were identified. The adoption of Topic 606 did not materially impact the amount of revenue recognized or any other financial statement line item as of and for the year ended December 31, 2018.

In June 2018, the FASB issued ASU 2018-07, *Improvements to Nonemployee Share-Based Payment Accounting* (Topic 718). The standard expands the scope of Topic 718 to include share-based payment transactions for acquiring goods and services from nonemployees. An entity should apply the requirements of Topic 718 to nonemployee awards except for certain specified exemptions. The early adoption of this new guidance, effective January 1, 2018, had no material impact on the Company's consolidated financial statements.

In November 2016, the FASB issued ASU 2016-18, *Statement of Cash Flows: Restricted Cash* (Topic 230), to address the diversity in the classification and presentation of changes in restricted cash in the statement of cash flows by requiring entities to combine the changes in cash and cash equivalents and restricted cash in one line. As a result, entities will no longer present transfers between cash and cash equivalents and restricted cash in the statement of cash flows. Additionally, if more than one line item is recorded on the balance sheet for cash and cash equivalents and restricted cash, a reconciliation between the statement of cash flows and balance sheet is required. The Company adopted the standard effective January 1, 2018 using the retrospective transition method. The adoption of the guidance did not have an impact on the Company's consolidated balance sheets or statements of cash flows.

In January 2016, the FASB issued ASU 2016-01, *Recognition and Measurement of Financial Assets and Financial Liabilities* (Subtopic 825-10), which amends the guidance on the recognition, measurement, presentation and disclosure of financial instruments. Subtopic 825-10 is effective for annual and interim reporting periods beginning after December 15, 2017. The adoption of this update had no material effect on the Company's consolidated financial statements.

Atreca, Inc.
Notes to Consolidated Financial Statements (Continued)

2. Summary of Significant Accounting Policies (Continued)

In February 2016, the FASB issued ASU 2016-02, *Leases* (Topic 842), which modifies the accounting by lessees for all leases with a term greater than 12 months. This standard will require lessees to recognize on the balance sheet the assets and liabilities for the rights and obligations created by those leases. Topic 842 is effective for the Company as of January 1, 2020. Early adoption is permitted. The Company's most significant lease is its operating lease for its corporate headquarters, and, while the Company has not yet estimated the amounts by which its financial statements will be affected by the adoption of this guidance, it expects that the overall recognition of expense will be similar to current guidance, but that there will be a significant change in the balance sheet due to the recognition of right of use assets and the corresponding lease liabilities.

In August 2016, the FASB issued ASU 2016-15, *Statement of Cash Flows: Classification of Certain Cash Receipts and Cash Payments* (Topic 230). The standard clarifies how certain cash receipts and cash payments will be presented and classified in the statement of cash flows. Topic 230 is effective for the Company as of January 1, 2019. Early adoption is permitted. The Company does not expect the amended guidance to have a material impact on its financial statements.

3. Fair Value of Financial Instruments

The Company's financial assets and liabilities subject to fair value measurements on a recurring basis and the level of inputs used for such measurements were as follows:

	December 31, 2017			
Assets	**Level 1**	**Level 2**	**Level 3**	**Total**
Money market funds	$ 218	$ —	$ —	$ 218
U.S. Treasury securities	—	22,371	—	22,371
Total	$ 218	$ 22,371	$ —	$ 22,589
Liabilities				
Warrant liability	$ —	$ —	$ 347	$ 347
Total	$ —	$ —	$ 347	$ 347

	December 31, 2018			
Assets	**Level 1**	**Level 2**	**Level 3**	**Total**
Money market funds	$ 109,630	$ —	$ —	$ 109,630
Total	$ 109,630	$ —	$ —	$ 109,630
Liabilities				
Warrant liability	$ —	$ —	$ 380	$ 380
Total	$ —	$ —	$ 380	$ 380

Atreca, Inc.
Notes to Consolidated Financial Statements (Continued)

3. Fair Value of Financial Instruments (Continued)

The fair value of the warrants were calculated using the Black-Scholes option pricing model and is revalued to fair value at the end of each reporting period until the earlier of the exercise or expiration of the warrants (Note 9). The liability was valued using the following assumptions:

	2017	2018
Exercise price(1)	$ 14.46	$ 14.46
Stock price(2)	$ 11.64	$ 13.20
Time to maturity (in years)	4.64	3.64
Volatility(3)	81.3%	83.7%
Risk-free interest rate(4)	2.15%	2.50%
Expected dividend	$ —	$ —

(1) Based upon terms provided in the warrant agreement.
(2) Based upon an independently prepared valuation as of December 31, 2018 and upon the most recent preferred share purchase price as of December 31, 2017.
(3) Based upon the historical daily volatility of a group of peer public company closing prices.
(4) Based upon interest rate for U.S. Treasury Bonds, as published by the U.S. Federal Reserve.

4. Cash, Cash Equivalents and Investments

The fair value and the amortized cost of cash, cash equivalents and available-for-sale investments by major security type consist of the following (in thousands):

	December 31, 2017			
Cash, cash equivalents and investments	**Amortized Cost**	**Gross Unrealized Gains**	**Gross Unrealized Losses**	**Estimated Fair Value**
Cash and money market funds	$ 8,242	$ —	$ —	$ 8,242
U.S. Treasury securities	22,401	—	(30)	22,371
Total	30,643	—	(30)	30,613
Less amounts classified as cash and cash equivalents	(8,242)	—	—	(8,242)
Total available-for-sale investments	$ 22,401	$ —	$ (30)	$ 22,371

	December 31, 2018			
Cash, cash equivalents and investments	**Amortized Cost**	**Gross Unrealized Gains**	**Gross Unrealized Losses**	**Estimated Fair Value**
Cash and money market funds	$ 114,504	$ —	$ —	$ 114,504
Total	114,504	—	—	114,504
Less amounts classified as cash and cash equivalents	(114,504)	—	—	(114,504)
Total available-for-sale investments	$ —	$ —	$ —	$ —

Atreca, Inc.
Notes to Consolidated Financial Statements (Continued)

5. Prepaid Expenses and Other Current Assets

Prepaid expenses and other current assets consist of the following (in thousands):

	December 31, 2017	December 31, 2018
Vendor prepayments and deposits	$ 1,039	$ 2,045
Prepaid rent	292	394
Non-trade receivables	38	282
Total prepaid expenses and other current assets	$ 1,369	$ 2,721

6. Property and Equipment, net

Property and equipment consists of the following (in thousands):

	December 31, 2017	December 31, 2018
Laboratory equipment	$ 6,052	$ 7,561
Furniture and fixtures	385	386
Computer hardware and software	370	580
Leasehold improvements	196	236
	7,003	8,763
Less accumulated depreciation and amortization	(3,213)	(4,620)
Total property and equipment, net	$ 3,790	$ 4,143

Depreciation expense was $1.2 million and $1.4 million in 2017 and 2018, respectively.

The net book value of property and equipment under capital leases was $192,000 and $142,000 at December 31, 2017 and 2018, respectively.

7. Accrued Expenses

Accrued expenses consist of the following (in thousands):

	December 31, 2017	December 31, 2018
Accrued compensation and related benefits	$ 1,604	$ 2,568
Other accruals	480	640
Total accrued expenses	$ 2,084	$ 3,208

8. Commitments and Contingencies

Leases

The Company leases its office facilities under non-cancellable operating lease agreements that expire at various dates through April 2020. Under the terms of the leases, the Company is responsible for certain insurance, property taxes and maintenance expenses. The office facilities

Atreca, Inc.
Notes to Consolidated Financial Statements (Continued)

8. Commitments and Contingencies (Continued)

lease agreements contain scheduled increases over the lease term. The related rent expense is calculated on a straight-line basis with the difference recorded as deferred rent. Rent expense was $1.2 million and $1.3 million in 2017 and 2018, respectively.

The Company leases certain property and equipment under capital leases. In 2017, the Company financed purchases of $226,000 under a capital lease agreement. Outstanding amounts under the capital lease agreements are generally secured by liens on the related property and equipment.

Future minimum lease payments under non-cancelable operating and capital lease agreements consist of the following at December 31, 2018 (in thousands):

	Capital Leases	Operating Leases
Year ending December 31:		
2019	$ 53	$ 1,325
2020	51	205
2021	51	—
2022	4	—
Total minimum lease payments	159	$ 1,530
Less: amount representing interest	(12)	
Present value of capital lease obligation	147	
Less: current portion	(47)	
Non-current portion	$ 100	

Litigation

The Company is not aware of any asserted or unasserted claims against it where it believes that an unfavorable resolution would have an adverse material impact on the operations or financial position of the Company.

9. Capital Stock

Convertible Preferred Stock

The classes of preferred stock the Company was authorized to issue, and the amounts issued and outstanding as of December 31, 2017 and 2018 were as follows:

		December 31, 2017		December 31, 2018	
	Par Value	Authorized	Issued & Outstanding	Authorized	Issued & Outstanding
Series A	$ 0.0001	32,133,287	5,305,513	32,133,287	5,305,513
Series B	$ 0.0001	18,550,000	3,001,421	18,008,749	3,001,421
Series C1	$ 0.0001	—	—	54,189,549	5,007,134
Series C2	$ 0.0001	—	—	23,605,150	3,934,191

Atreca, Inc.
Notes to Consolidated Financial Statements (Continued)

9. Capital Stock (Continued)

The rights, preferences, privileges and restrictions relating to Series A, Series B, Series C1 and Series C2 (together, the Series Preferred) are as set forth below:

Dividends

The holders of the Series Preferred are entitled to receive non-cumulative dividends prior to and in preference to any declaration or payment of dividends on common stock. In the event dividends are paid on any share of common stock, the Company will also pay a dividend on all outstanding shares of preferred stock in a per share amount equal to the amount paid or set aside for each share of common stock, on an as if converted to common stock basis. No dividends have been declared or paid as of December 31, 2018.

Voting

The holders of the Series Preferred are entitled to voting rights equal to the number of shares of common stock into which each share of preferred stock could be converted, except that Series C2 is not entitled to vote on the election of directors at any time.

The holders of Class A common stock, voting as a separate class, are entitled to elect three members of the Board of Directors. The remaining members of the Company's board of directors will be elected by the holders of the Series Preferred, except Series C2, and Class A common stock, voting together as a single class and on an as-converted basis.

Liquidation

In the event of any liquidation, dissolution or winding up of the Company, either voluntary or involuntary, the holders of the Series Preferred are entitled to be paid, out of the available funds and assets, and prior and in preference to any payment or distribution of any such funds on any shares of common stock, an amount per share equal to the original issue price for the Series Preferred, plus all accrued and declared but unpaid dividends. The original per share issue price is equal to $11.10 for Series A, $11.661 for Series B and $13.98 for Series C1 and Series C2. If assets are insufficient to permit such payment, payment will be distributed ratably among the holders of outstanding preferred stock in proportion to the amount owned by each holder. After the liquidation preference of the holders of the Series Preferred has been satisfied, the remaining assets of the Company will be distributed ratably among the holders of outstanding common stock in proportion to the amount owned by each holder.

Conversion

Each share of Series Preferred is convertible into shares of Class A common stock, at the option of the holder, at any time after the date of issuance, except that Series C2 is convertible into shares of Class B common stock. Each share of Series Preferred automatically converts into the number of shares of common stock determined in accordance with the conversion rate upon the earlier of (i) the date specified by election of the holders of a majority of the shares of Series Preferred or (ii) the closing of a public offering of common stock resulting in aggregate gross proceeds of at least $75,000,000 and having a price per share to the public of at least $17.475 adjusted for splits, recapitalizations and the like. At December 31, 2018, the conversion price for each share of Series A is $11.10, Series B is $11.661 and Series C1 and Series C2 is $13.98.

Atreca, Inc.
Notes to Consolidated Financial Statements (Continued)

9. Capital Stock (Continued)

The Company recorded all convertible preferred stock issuances at fair value on the dates of issuance. The Company classifies the convertible preferred stock outside of stockholders' deficit in temporary equity because the shares contain contingent liquidation features that are not solely within its control. During the years ended December 31, 2017 and 2018, the Company did not adjust the carrying values of the convertible preferred stock to the deemed redemption values of such shares since a liquidation event was not probable. Subsequent adjustments to increase the carrying values to the ultimate redemption values will be made only when it becomes probable that such a liquidation event will occur.

Redemption

The Series Preferred is not redeemable at the option of the holder.

Protective Provisions

The holders of Series Preferred have certain protective provisions. As long as at least 2,083,333 shares of Series Preferred remain outstanding, the Company cannot, without the approval of at least two-thirds of the holders of Series Preferred, take any action that (i) adversely changes the rights, preferences or privileges of Series Preferred; (ii) increases or decreases the authorized number of shares of preferred stock; (iii) creates or authorizes any capital stock having the rights, preferences or privileges senior or on a parity with preferred stock; (iv) results in redemption, repurchase, payment or declaration of dividends or other distributions with respect to shares of preferred stock or common stock other than permitted repurchases and dividends; (v) consummates a liquidation, dissolution or winding up of the Company; (vi) increases or decreases the authorized members of the Company's board of directors; (vii) sells, assigns, licenses, pledges or encumbers the intellectual property of the Company; or (viii) enters into any inbound license or acquisition by merger or asset transfer or similar corporate strategic relationship, in each case involving the Company's assets having a value (as determined by the Company's board of directors in good faith) greater than $500,000.

As long as at least 750,000 Series B remain outstanding, the Company cannot, without the approval of at least two-thirds of the holders of Series B, take any action that (i) adversely changes the rights, preferences or privileges of Series B; or (ii) increases or decreases the authorized number of shares of Series B.

As long as at least 1,666,666 Series C1 and Series C2 remain outstanding, the Company cannot, without the approval of at least two-thirds of the holders of Series C1 and Series C2, take any action that (i) adversely changes the rights, preferences or privileges of Series C1 and Series C2; or (ii) increases or decreases the authorized number of shares of Series C1 and Series C2.

Classification of Convertible Preferred Stock

The deemed liquidation preference provisions of the convertible preferred stock are considered contingent redemption provisions that are not solely within the Company's control. Accordingly, the convertible preferred stock has been presented outside of permanent equity in the mezzanine section of the consolidated balance sheets.

Atreca, Inc.
Notes to Consolidated Financial Statements (Continued)

9. Capital Stock (Continued)

Convertible Preferred Stock Warrants

In connection with the issuance of Series A in August 2015, the Company issued warrants to purchase an aggregate of 49,997 shares of Series A at $14.46 per share. The warrants were immediately exercisable and expire, if not exercised, in August 2022. At issuance, the fair value of the warrants was determined to be $382,765 using the Black-Scholes pricing model and was recorded as a Series A issuance cost and a preferred stock warrant liability (Note 2). The liability was valued using the following assumptions at issuance: expected life of 7 years, fair value of Series A of $11.10 per share, risk-free interest rate of 1.79%, volatility of 80% and no expected dividends. At December 31, 2018, the warrants remain outstanding.

Class A and Class B Common Stock

In connection with the issuance of Series C1 and C2 in 2018, the Company authorized two classes of common stock, Class A and Class B common stock. Each holder of Class A common stock and Class B common stock is entitled to one vote per share, except that Class B common stock is not entitled to vote on the election of directors at any time. The holders of Class A common stock, voting as a separate class, are entitled to elect three members of the Company's board of directors. All shares of common stock outstanding as of the authorization of two classes of common stock in September 2018 became shares of Class A common stock. As of December 31, 2018, the Company is authorized to issue 191,398,492 shares of Class A common stock and 23,605,150 of Class B common stock with a par value of $0.0001 per share. As of December 31, 2018, the Company had 2,119,872 shares issued of Class A common stock outstanding. As of December 31, 2017, the Company was authorized to issue 77,520,000 shares of single class common stock with a par value of $0.0001 per share. As of December 31, 2017, the Company had 2,092,040 shares single class common stock outstanding.

In June 2012, the Company issued 118,534 shares of common stock to a founder of the Company through the 2010 Equity Incentive Plan (Note 10). The founder entered into a restricted stock purchase agreement with the Company, which allows the Company to repurchase the shares of common stock from the founder at the original issuance price if the founder ceases providing services to the Company. The Company's right to repurchase the stock lapses over 48 months. At December 31, 2018 and 2017, all shares of common stock were vested and no longer subject to repurchase.

The Company has also allowed certain option holders to exercise unvested options to purchase shares of common stock. Shares received from such early exercises are subject to a right of repurchase at the issuance price. The Company's repurchase right lapses over the same period the options vest. In June 2017, the Company repurchased 17,026 unvested shares at $0.42 per share from a terminated option holder. At December 31, 2018, 658 shares at a weighted-average price of $0.66 per share were subject to repurchase. At December 31, 2018, the proceeds received for unvested shares of common stock subject to repurchase of $435 were recorded within accrued expenses. There were no shares subject to repurchase at December 31, 2017.

Common Stock Warrant

In connection with the issuance of Series A in August 2015, the Company issued a warrant to purchase an aggregate of 62,936 shares of common stock at $0.0006 per share. The warrant was

Atreca, Inc.
Notes to Consolidated Financial Statements (Continued)

9. Capital Stock (Continued)

immediately exercisable and expires, if not exercised, in August 2025. At issuance, the fair value of the warrant was determined to be $41,509, which was recorded as a Series A issuance cost and additional paid-in capital. At December 31, 2018, the warrant remains outstanding.

10. Stock Option Plan

In September 2010, the Company adopted the 2010 Equity Incentive Plan (the Plan) under which 3,540,114 shares of the Company's common stock have been reserved for issuance to employees, directors and consultants.

Under the Plan, the Company's board of directors may grant incentive stock options or non-statutory stock options. Incentive stock options may only be granted to Company employees. The exercise price of incentive stock options and non-statutory stock options will be no less than 100% of the fair value per share of the Company's common stock on the grant date. If an individual owns capital stock representing more than 10% of the outstanding shares, the price of each share will be at 110% of the fair value. Fair value is determined by the Company's board of directors. Options expire after ten years (five years for stockholders owning greater than 10% of all classes of stock). The Company's board of directors determines the period over which options vest and become exercisable. The Company has a repurchase option exercisable upon the voluntary or involuntary termination of the purchaser's employment with the Company for any reason. 3,108,393 shares of the Company's common stock are reserved for future issuance under the Plan as of December 31, 2018.

The Company recognized $409,000 and $1.4 million of stock-based compensation expense related to options granted to employees and non-employees in 2017 and 2018, respectively. The compensation expense is allocated on a departmental basis, based on the classification of the option holder as follows (in thousands):

	Year Ended December 31,	
	2017	2018
Research and development	$ 272	$ 631
General and administrative	137	788
	$ 409	$ 1,419

No income tax benefits have been recognized in the statements of operations for stock-based compensation arrangements and no stock-based compensation costs have been capitalized as property and equipment as of December 31, 2018 (in thousands, except share and per share data).

Atreca, Inc.
Notes to Consolidated Financial Statements (Continued)

10. Stock Option Plan (Continued)

Stock option activity under the Plan is as follows:

	Options Outstanding			
	Number of Shares	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Life (Years)	Aggregate Intrinsic Value
Balances, December 31, 2016	469,358	$3.72	8.7	$ 432
Granted	115,662	4.74		
Exercised	(9,632)	1.68		
Cancelled	(8,069)	4.56		
Balances, December 31, 2017	567,319	3.96	8.1	$ 694
Granted	1,609,086	6.66		
Exercised	(27,832)	1.68		
Cancelled	(12,282)	4.92		
Balances, December 31, 2018	2,136,291	$6.06	8.9	$12,881
Vested and expected to vest at December 31, 2018	2,136,291	$6.06	8.9	$12,881
Exerciseable at December 31, 2018	1,592,838	$4.86	8.6	$11,489
Vested at December 31, 2018	468,329	$4.32	7.4	$ 3,633

Additional information regarding the Company's stock options outstanding and vested and exercisable as of December 31, 2018 is summarized below:

	Options Outstanding			Options Exercisable	
Exercise Prices	Number of Stock Options Outstanding	Weighted-Average Remaining Contractual Life (Years)	Weighted-Average Exercise Price per Share	Shares Subject to Stock Options	Weighted-Average Exercise Price per Share
Up to $0.66	68,200	4.3	$ 0.24	68,032	$ 0.24
$4.56—5.16	1,563,295	8.8	$ 4.98	1,508,039	$ 4.98
$10.02—$10.02	504,796	9.8	$10.02	16,767	$10.02
	2,136,291	8.9	$ 6.06	1,592,838	$ 4.86

The weighted-average grant date fair value of options granted to employees and non-employees in 2017 and 2018 was $3.48 per share and $5.16 per share, repectively. The fair value of each

Atreca, Inc.
Notes to Consolidated Financial Statements (Continued)

10. Stock Option Plan (Continued)

option is estimated on the date of grant using the Black-Scholes option pricing model, assuming no expected dividends and the following weighted average assumptions:

	Year Ended December 31,	
	2017	2018
Expected life (in years)	7.06	6.01
Volatility	82.8%	78.3%
Risk-free interest rate	2.17%	2.88%

Expected volatility is based on volatilities of public companies operating in the Company's industry. The expected life of the options is estimated using the simplified method detailed in SEC Staff Accounting Bulletin No. 107. The simplified method calculates the expected term as the mid-point between the weighted-average time to vesting and the contractual maturity. The risk-free rate is based on the U.S. Treasury yield curve in effect at the time of grant. The Company has elected to account for forfeitures as they occur, rather than estimate expected forfeitures.

Unrecognized estimated compensation expense totaled $7.8 million related to non-vested stock options with a remaining requisite service period of 3.4 years.

11. Income Taxes

The Company applies the provisions set forth in FASB ASC Topic 740, *Income Taxes*, to account for the uncertainty in income taxes. In the preparation of income tax returns in federal, foreign and state jurisdictions, the Company asserts certain income tax positions based on its understanding and interpretation of income tax laws. The taxing authorities may challenge such positions, and the resolution of such matters could result in recognition of income tax expense in the Company's consolidated financial statements. Management believes it has used reasonable judgments and conclusions in the preparation of its income tax returns.

The Company uses the "more likely than not" criterion for recognizing the income tax benefit of uncertain income tax positions and establishing measurement criteria for income tax benefits. The Company has evaluated the impact of these positions and has reserved an unrecognized tax benefit of $915,000 and $1.4 million as of December 31, 2017 and 2018, respectively. The increase in the unrecognized tax benefit in 2018 is primarily additions based on tax positions related to 2018. In the event the Company should need to recognize interest and penalties related to unrecognized income tax liabilities, this amount will be recorded as an accrued liability and an increase to income tax expense. No amounts of interest or penalties were recognized in the Company's consolidated financial statements for 2017 or 2018. The Company is not currently under examination by income tax authorities in federal, state or other foreign jurisdictions. The Company does not anticipate any significant changes within 12 months of this reporting date of its uncertain tax positions.

Atreca, Inc.
Notes to Consolidated Financial Statements (Continued)

11. Income Taxes (Continued)

A reconciliation of the federal statutory income tax rate and the Company's effective income tax rate is as follows:

	December 31, 2017	December 31, 2018
Tax computed at federal statutory rate	34.0%	21.0%
State income taxes, net of federal benefit	—	—
Other	(2.1)%	0.8%
Tax reform rate change	(24.8)%	0.4%
Change in valuation allowance	(7.1)%	(22.2)%
Effective income tax rate	0.0%	0.0%

Deferred income taxes result from the tax effect of transactions that are recognized in different periods for financial statement and income tax reporting purposes, as well as operating loss and tax credit carryforwards. Significant components of the Company's deferred income tax assets and liabilities are as follows (in thousands):

	December 31, 2017	December 31, 2018
Deferred tax assets:		
Net operating loss carryforward	$ 10,987	$ 18,636
Tax credits	2,530	4,121
Intangibles	1,785	1,554
Other	160	366
Total deferred tax assets	15,462	24,677
Deferred tax liabilities:		
Fixed assets	96	133
Total deferred tax liabilities	96	133
Valuation allowance	(15,366)	(24,544)
Total	$ —	$ —

The net increase in the valuation allowance was $2.6 million and $9.2 million in 2017 and 2018, respectively.

At December 31, 2018, the Company has federal and state net operating loss carryforwards of $46.5 million and $14.9 million, respectively, which begin to expire in 2030 and $36.8 million of federal net operating loss carryforwards which do not expire but are subject to the 80% taxable income limitation. Additionally, the Company had federal tax credits totaling $1.9 million and $3.2 million at December 31, 2017 and 2018, respectively, and state tax credits totaling $1.8 million and $2.9 million, at December 31, 2017 and 2018, respectively. The federal tax credits begin to expire in 2032. The state tax credits may be carried forward indefinitely.

Atreca, Inc.
Notes to Consolidated Financial Statements (Continued)

11. Income Taxes (Continued)

Section 382 of the Internal Revenue Code of 1986, as amended (the Code), limits the use of net operating losses and income tax credit carryforwards in certain situations where changes occur in stock ownership of a company. If the Company should have an ownership change of more than 50% of the value of the Company's capital stock, utilization of the carryforwards could be restricted.

The Company files income tax returns in the U.S. federal jurisdiction, various state jurisdictions and Singapore. The U.S. federal and state tax years from 2010 to 2018 remain open to examination due to the carryover of unused net operating loss carryforwards and tax credits.

In December 2017, the 2017 Tax Cuts and Jobs Act (2017 Tax Act) was enacted and includes a broad range of provisions, many of which differ significantly from those contained in previous U.S. tax law. Changes in tax law are accounted for in the period of enactment. As such, the Company's financial statements as of December 31, 2017 reflect the impact of this 2017 Tax Act, which primarily consisted of measuring the Company's deferred tax assets and valuation allowance using the newly enacted U.S. corporate tax rate. As a result, at December 31, 2017, the Company recognized a tax expense of $6.8 million from revaluing U.S net deferred tax assets which was offset by a corresponding change in the Company's valuation allowance.

In January 2018, the FASB released guidance on the accounting for tax on the global intangible low-taxed income (GILTI) provisions of the 2017 Tax Act. The GILTI provisions subject certain U.S. entities to current tax on GILTI earned by certain foreign subsidiaries. The Company has considered these new provisions as they are effective for tax years starting after December 31, 2017 and determined that none will likely apply for the year ended December 31, 2018.

12. 401(k) Plan

The Company has a 401(k) plan that qualifies as a deferred compensation arrangement under Section 401 of the Code. Eligible employees may elect to defer a portion of their pretax earnings subject to certain statutory limits. The Company has not made any matching contributions to date.

13. Related Party Transactions

The Company recorded other income of $1.0 million and $892,000 under service contracts with a stockholder of the Company in 2017 and 2018, respectively. The Company had a receivable from the stockholder at December 31, 2017 and 2018 of $7,000 and $89,000, respectively.

The Company paid intellectual property related legal fees of $487,000 and $1.1 million in 2017 and 2018, respectively, to a related party. The Company owed $70,000 and $134,000 to the related party at December 31, 2017 and 2018, respectively.

The Company paid legal fees of $407,000 and $541,000 in 2017 and 2018, respectively, to a related party. The Company owed $79,000 and $40,000 to the related party at December 31, 2017 and 2018, respectively.

The Company recorded research and development expense of $400,000 and $400,000 under consulting agreements with two members of the Company's board of directors in 2017 and 2018, respectively.

Atreca, Inc.
Notes to Consolidated Financial Statements (Continued)

14. Subsequent Events

Subsequent events have been evaluated through the date referenced in the independent auditors' report.

In January 2019, the Company entered into a commercial lease agreement for an additional 33,000 square feet of office space. The 36-month lease commences March 1, 2019. The initial base rent is approximately $181,000 per month and the total minimum rental commitment under this lease is approximately $6.7 million.

Atreca, Inc.
Condensed Consolidated Balance Sheets
(in thousands, except share and per share data)

	December 31, 2018	March 31, 2019 (Unaudited)	Pro Forma March 31, 2019 (Unaudited)
ASSETS			
Current Assets			
Cash and cash equivalents	$ 114,504	$ 26,319	
Investments	—	74,342	
Prepaid expenses and other current assets	2,721	3,291	
Total current assets	117,225	103,952	
Property and equipment, net	4,143	3,906	
Deposits and other	316	1,268	
Total assets	$ 121,684	$ 109,126	
LIABILITIES AND STOCKHOLDERS' EQUITY			
Current Liabilities			
Accounts payable	$ 1,307	$ 2,099	$ 2,099
Accrued expenses	3,008	2,162	2,162
Other current liabilities	200	425	425
Capital lease obligations, current portion	47	47	47
Total current liabilities	4,562	4,733	4,733
Capital lease obligations, net of current portion	100	88	88
Deferred rent	6	2	2
Preferred stock warrant liability	380	430	—
Total liabilities	5,048	5,253	4,823
Commitments and contingencies (Note 8)			
Series A convertible preferred stock, $0.0001 par value, 32,133,287 shares authorized; 5,305,513 shares issued and outstanding (aggregate liquidation preference of $58,892), no shares issued and outstanding, pro forma (unaudited)	55,030	55,030	—
Series B convertible preferred stock, $0.0001 par value, 18,008,749 shares authorized; 3,001,421 shares issued and outstanding (aggregate liquidation preference of $35,000), no shares issued and outstanding, pro forma (unaudited)	34,333	34,333	—
Series C1 convertible preferred stock, $0.0001 par value, 54,184,549 shares authorized; 5,007,134 shares issued and outstanding (aggregate liquidation preference of $70,000), no shares issued and outstanding, pro forma (unaudited)	65,691	65,691	—
Series C2 convertible preferred stock, $0.0001 par value, 23,605,150 shares authorized; 3,934,191 shares issued and outstanding (aggregate liquidation preference of $55,000), no shares issued and outstanding, pro forma (unaudited)	54,615	54,615	—
Stockholders' equity			
Class A common stock, $0.0001 par value, 191,398,492 shares authorized; 2,119,872 and 2,123,257 shares issued and outstanding at December 31, 2018 and March 31, 2019 (unaudited), respectively; 15,437,325 shares issued and outstanding, pro forma (unaudited)	—	—	2
Class B common stock, $0.0001 par value, 23,605,150 shares authorized; none issued and outstanding; 3,934,191 shares issued and outstanding, pro forma (unaudited)	—	—	—
Additional paid-in capital	3,593	4,382	214,479
Accumulated other comprehensive loss	(4)	23	23
Accumulated deficit	(96,622)	(110,201)	(110,201)
Total stockholders' equity	(93,032)	(105,795)	104,303
Total liabilities and stockholders' equity	$ 121,684	$ 109,126	$ 109,126

Atreca, Inc.
Condensed Consolidated Statements of Operations
(in thousands, except share and per share data)
(unaudited)

	Three Months Ended March 31,	
	2018	2019
Operating Expenses		
Research and development	$ 6,643	$ 11,713
General and administrative	1,300	2,518
Total operating expenses	7,943	14,231
Operating loss	(7,943)	(14,231)
Interest and other income (expense)		
Other income	213	165
Interest income	56	545
Interest expense	(2)	(2)
Preferred stock warrant liability revaluation	20	(50)
Loss on disposal of property and equipment	—	(5)
Loss before income tax expense	(7,656)	(13,578)
Income tax expense	—	(1)
Net loss	$ (7,656)	$ (13,579)
Net loss per share, basic and diluted	$ (3.66)	$ (6.40)
Weighted-average shares used in computing net loss per share, basic and diluted	2,093,413	2,120,925
Pro forma net loss per shares, basic and diluted (unaudited)		$ (0.70)
Weighted-average shares used in computing pro forma net loss per share, basic and diluted (unaudited)		19,369,275

Atreca, Inc.
Condensed Consolidated Statements of Comprehensive Loss
(in thousands)
(unaudited)

	Three Months Ended March 31,	
	2018	2019
Net loss	$ (7,656)	$ (13,579)
Other comprehensive income (loss);		
Unrealized gain on fair value of investments	5	28
Unrealized loss on currency translation	(7)	(1)
Comprehensive loss	$ (7,658)	$ (13,552)

Atreca, Inc.
Condensed Consolidated Statements of Convertible Preferred Stock and Stockholders' Deficit
(in thousands, except share data)
(unaudited)

	Convertible Preferred Stock		Common Stock		Additional Paid-In Capital	Accumulated Other Comprehensive Loss	Accumulated Deficit	Total Stockholders' Equity
	Shares	Amount	Shares	Amount				
Balances at December 31, 2017	8,306,934	$ 89,362	2,092,040	$ 1	$ 2,129	$ (14)	$ (58,682)	$ (56,566)
Issuance of common stock upon exercise of options	—	—	1,433	—	—	—	—	—
Stock-based compensation	—	—	—	—	113	—	—	113
Unrealized gain on fair value of investments	—	—	—	—	—	5	—	5
Unrealized currency exchange loss	—	—	—	—	—	(7)	—	(7)
Net loss	—	—	—	—	—	—	(7,656)	(7,656)
Balances at March 31, 2018	8,306,934	$ 89,362	2,093,473	$ 1	$ 2,242	$ (16)	$ (66,338)	$ (64,111)
Balances at December 31, 2018	17,248,259	$209,668	2,119,872	$ 1	$ 3,593	$ (4)	$ (96,622)	$ (93,032)
Issuance of common stock upon exercise of options	—	—	3,385	—	13	—	—	13
Stock-based compensation	—	—	—	—	776	—	—	776
Unrealized gain on fair value of investments	—	—	—	—	—	28	—	28
Unrealized currency exchange loss	—	—	—	—	—	(1)	—	(1)
Net loss	—	—	—	—	—	—	(13,579)	(13,579)
Balances at March 31, 2019	17,248,259	$209,668	2,123,257	$ 1	$ 4,382	$ 23	$ (110,201)	$ (105,795)

Atreca, Inc.
Condensed Consolidated Statements of Cash Flows
(in thousands)
(unaudited)

	Three Months Ended March 31,	
	2018	2019
Cash Flows from Operating Activities		
Net loss	$ (7,656)	$ (13,579)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	326	397
Loss on disposal of property and equipment	—	5
Stock-based compensation	113	776
Preferred stock warrant liability revaluation	(20)	50
Changes in operating assets and liabilities:		
Prepaid expenses and other current assets	(122)	(562)
Accounts payable	249	716
Accrued expenses	(1,013)	(993)
Other current liabilities	—	225
Deferred rent	26	(12)
Net cash used in operating activities	(8,097)	(12,977)
Cash Flows from Investing Activities		
Purchase of property and equipment	(152)	(166)
Purchase of investments	—	(74,314)
Proceeds from maturities of investments	7,445	—
Change in deposits	1	52
Net cash provided by (used in) investing activities	7,294	(74,428)
Cash Flows from Financing Activities		
Proceeds from exercise of stock options	—	13
Principal payments on capital lease obligations	(12)	(12)
Payments of deferred offering costs	—	(57)
Net cash used in financing activities	(12)	(56)
Net change in cash, cash equivalents and restricted cash	(815)	(87,461)
Cash, cash equivalents and restricted cash, beginning of period	8,242	114,504
Cash, cash equivalents and restricted cash, end of period	$ 7,427	$ 27,043
Supplemental Disclosure of Cash Flow Information		
Cash paid for interest	$ 2	$ 2
Cash paid for income taxes	$ —	$ 1
Supplemental Schedule of Non-Cash Investing and Financing Activities		
Deferred offering costs included in accounts payable and accrued expenses	$ —	$ 223

Notes to Unaudited Interim Condensed Consolidated Financial Statements

1. Nature of Business and Management's Plans Regarding Financing of Future Operations

Nature of Business

Atreca, Inc. (the Company) was incorporated in the State of Delaware on June 11, 2010 (inception date), and is located in Redwood City, California. In April 2016, the Company formed a wholly owned subsidiary, Atreca Pte. Ltd., in Singapore. The Company is a biopharmaceutical company utilizing its differentiated platform to discover and develop novel antibody-based immunotherapeutics to treat a range of solid tumor types. The Company's lead product candidate, ATRC-101, is a monoclonal antibody in preclinical development with a novel mechanism of action and target derived from an antibody identified using its discovery platform. The Company operates in a single segment. Since inception, the Company has been primarily engaged in research and development, raising capital, building its management team and building its intellectual property portfolio.

Liquidity

Management evaluates whether there are relevant conditions and events that in the aggregate raise substantial doubt about the entity's ability to continue as a going concern and to meet its obligations as they become due within one year from the date that the financial statements are issued.

The Company is subject to risks and uncertainties common to early-stage companies in the biotechnology industry, including, but not limited to, development by competitors of new technological innovations, dependence on key personnel, protection of proprietary technology, compliance with government regulations and the ability to secure additional capital to fund operations. Identification and development of product candidates will require significant additional research and development efforts, including extensive preclinical and clinical testing and regulatory approval prior to commercialization. These efforts require significant amounts of additional capital, adequate personnel and infrastructure and extensive compliance-reporting capabilities. Even if the Company's drug development efforts are successful, it is uncertain when, if ever, the Company will realize significant revenue from product sales.

2. Summary of Significant Accounting Policies

Principles of Consolidation

The condensed consolidated financial statements include accounts of the Company and its wholly owned subsidiary. All significant intercompany accounts and transactions are eliminated upon consolidation.

Use of Estimates

The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, disclosure of contingent assets and liabilities, and reported amounts of income and expenses in the consolidated financial statements and accompanying notes. Actual results could differ from those estimates. Key estimates in the consolidated financial statements include estimated useful lives of property and equipment, impairment of long-lived assets, accrued expenses, valuation of deferred income tax assets, fair value of warrants issued to purchasers of shares of preferred stock and common stock and fair value of options granted under the Company's stock option plan.

Notes to Unaudited Interim Condensed Consolidated Financial Statements (Continued)

2. Summary of Significant Accounting Policies (Continued)

Unaudited Interim Condensed Financial Statements

The accompanying condensed consolidated financial statements are unaudited. The unaudited interim condensed financial statements have been prepared on the same basis as the annual consolidated financial statements and reflect, in the opinion of management, all adjustments of a normal and recurring nature that are necessary for the fair statement of the Company's financial position as of March 31, 2019 and its results of operations and cash flows for the three months ended March 31, 2018 and 2019. The financial data and the other financial information contained in these notes to the condensed consolidated financial statements related to the three-month periods are also unaudited. The condensed results of operations for the three months ended March 31, 2019 are not necessarily indicative of the results to be expected for the year ending December 31, 2019 or for any other future annual or interim period. The condensed consolidated balance sheet as of December 31, 2018 included herein was derived from the audited consolidated financial statements as of that date. These interim condensed financial statements should be read in conjunction with the Company's audited consolidated financial statements included elsewhere in this prospectus.

Other Income

Other income is comprised of amounts earned from services performed under service agreements. Beginning January 1, 2018, the Company follows the provisions of Accounting Standards Update 2014-09 Accounting Standards Codification (ASC) Topic 606, *Revenue from Contracts with Customers (Topic 606).* The guidance provides a unified model to determine how income is recognized.

In determining the appropriate amount of other income to be recognized as it fulfills its obligations under the agreements, the Company performs the following steps: (i) identifies the promised goods or services in the contract; (ii) determines whether the promised goods or services are performance obligations including whether they are distinct in the context of the contract; (iii) measures the transaction price, including the constraint on variable consideration; (iv) allocates the transaction price to the performance obligations based on estimated selling prices; and (v) recognizes other income when (or as) the Company satisfies each performance obligation.

Upon adoption of Topic 606, there was no change to the units of accounting previously identified with respect to existing service agreements under legacy Generally Accepted Accounting Principles (GAAP), which are now considered performance obligations under Topic 606, and there was no change to the revenue recognition pattern for the performance obligations. Accordingly, the adoption of the new standard resulted in no cumulative effect change to the Company's opening accumulated deficit balance.

The Company generally allocates the transaction price to distinct performance obligations at their stand-alone selling prices, determined by their estimated costs plus some margin. Performance obligations are generally delivered over time and recognized based upon observable inputs as the related research services are performed, which are recorded as research and development expenses. Amounts due under service agreements are generally billed monthly as services are delivered and do not generally result in contract liabilities or assets. Receivables under service agreements of $282,000 and $361,000 are included in prepaid expenses and other current assets as of December 31, 2018 and March 31, 2019, respectively. Contract liabilities of $200,000 and

Notes to Unaudited Interim Condensed Consolidated Financial Statements (Continued)

2. Summary of Significant Accounting Policies (Continued)

$425,000 are included in other current liabilities as of December 31, 2018 and March 31, 2019, respectively.

Collaboration and Service Arrangements

In March 2016, the Company entered into a research collaboration agreement with Genome Institute of Singapore (GIS) for the development of a high-throughput microfluidic droplet system for single cell phenotyping and genotyping. Under the agreement, the Company contributes reimbursement of research expenses and certain reagents and other consumables to GIS. The Company accounts for the collaboration agreement with GIS in accordance with ASC 808—*Collaborative Arrangements*. The Company recognized $19,000 and $36,000 of research and development expenses for the three months ended March 31, 2018 and 2019, respectively, under the collaboration agreement, including wind-down costs. The Company exercised its right to early terminate the collaboration agreement in December 2018.

The Company provides antibody sequencing and related repertoire analysis services to the Bill and Melinda Gates Foundation under a services agreement entered into in February 2013. Generally, services are billed as they are delivered, and service revenue is recognized in other income in accordance with Topic 606.

In December 2018, the Company entered into a service agreement with Bristol-Myers Squibb to provide antibody sequencing and related repertoire analysis services. As of March 31, 2019, services provided under the agreement were not material. Service revenue will be recognized in other income in accordance with Topic 606.

Unaudited Pro Forma Financial Information

The unaudited pro forma balance sheet information as of March 31, 2019, assumes the conversion of all outstanding shares of convertible preferred stock into 17,248,259 shares of the Company's common stock immediately prior to completion of the Company's planned initial public offering (IPO). Shares of common stock issued in the IPO and any related net proceeds are excluded from the pro forma information.

Unaudited pro forma net loss per share is computed using the weighted-average number of common shares outstanding after giving effect to the conversion of all convertible preferred stock into shares of common stock, as if such conversion had occurred at the beginning of the period presented, or the date of original issuance, if later. The conversion of convertible preferred stock has been reflected assuming shares of convertible preferred stock convert into shares of fully paid common stock at the applicable conversion ratios.

Cash, Cash Equivalents and Restricted Cash

Cash and cash equivalents include all cash balances and highly liquid investments purchased with an original maturity of three months or less.

The Company maintained restricted cash of zero and $724,000 as of December 31, 2018 and March 31, 2019, respectively. This amount as of March 31, 2019 is included in deposits and other in the accompanying condensed consolidated balance sheets and is comprised solely of a letter of

Notes to Unaudited Interim Condensed Consolidated Financial Statements (Continued)

2. Summary of Significant Accounting Policies (Continued)

credit required pursuant a lease for Company facilities entered into in January 2019 as discussed in Note 8.

The following table provides a reconciliation of cash, cash equivalents and restricted cash reported within the condensed consolidated balance sheets that sum to the total of the same amounts shown in the condensed consolidated statements of cash flows.

	December 31, 2018	March 31, 2019
Cash and cash equivalents	$ 114,504	$ 26,319
Restricted cash	—	724
Cash, cash equivalents and restricted cash shown in the condensed consolidated statements of cash flows	$ 114,504	$ 27,043

Investments

The Company considers securities purchased with original maturities greater than three months to be investments. The Company's policy is to protect the value of its investment portfolio and minimize principal risk by earning returns based on current interest rates. The Company's intent is to convert all investments into cash to be used for operations and has classified them as available for sale. For purposes of determining realized gains and losses, the cost of securities sold is based on specific identification. There were no realized gains or losses on investments through March 31, 2019. Net unrealized holding losses on investments, which are included in accumulated other comprehensive loss, were $0 and $28,000 at December 31, 2018 and March 31, 2019, respectively. The Company's investments at March 31, 2019 consisted primarily of U.S. Treasury securities that are reported at fair value based on quoted prices in active markets.

Risks and Uncertainties

The Company is subject to a number of risks associated with companies at a similar stage, including dependence on key individuals, competition from similar services and larger companies, volatility of the industry, ability to obtain regulatory clearance, ability to obtain adequate financing to support growth, the ability to attract and retain additional qualified personnel to manage the anticipated growth of the Company and general economic conditions.

Concentration of Credit Risk

Financial instruments that potentially subject the Company to concentration of credit risk consist of cash, cash equivalents, investments and other receivables. Cash and cash equivalents are held at one financial institution and were in excess of the Federal Deposit Insurance Corporation insurable limit at December 31, 2018 and March 31, 2019. Additionally, cash and cash equivalents and investments are maintained at a brokerage firm for which amounts are insured by the Securities Investor Protection Corporation subject to legal limits. The Company has not experienced any losses on its deposits to date.

The Company does not require collateral or other security for other receivables; however, credit risk is mitigated by the Company's ongoing evaluations of its debtors' credit worthiness.

Notes to Unaudited Interim Condensed Consolidated Financial Statements (Continued)

2. Summary of Significant Accounting Policies (Continued)

Property and Equipment

Property and equipment are stated at cost less depreciation. Depreciation is computed using the straight-line method with the estimated useful lives of the assets ranging from two to five years. Leasehold improvements are amortized over the estimated useful life of the asset, or the remaining lease term, whichever is shorter. Expenditures for repairs and maintenance, which do not extend the useful life of the property and equipment, are expensed as incurred.

Accounting for Impairment of Long-Lived Assets

Long-lived assets consist of property and equipment. The Company reviews its long-lived assets for impairment whenever events or changes in circumstances indicate the carrying amount of an asset may not be recoverable. Recoverability of assets held and used is measured by comparison of the carrying amount of an asset to future net cash flows expected to be generated by the asset. If such assets are considered to be impaired, the impairment to be recognized is measured by the amount by which the carrying amount of the assets exceeds the fair value of the assets. The Company has not recorded any impairment of long-lived assets for the three months ended March 31, 2018 or 2019.

Intellectual Property

The legal and professional costs incurred by the Company to maintain its patent rights have been expensed as part of research and development costs since inception. As of December 31, 2018, and March 31, 2019, the Company has determined that these expenses have not met the criteria to be capitalized. Intellectual property-related expenses for the three months ended March 31, 2018 and 2019 were $296,000 and $464,000, respectively.

Deferred Rent

The Company has entered into lease agreements for its laboratory and office facilities. These leases qualify as and are accounted for as operating leases. Rent expense is recognized on a straight-line basis over the term of the lease and, accordingly, the Company records the difference between cash rent payments and the recognition of rent expense as a deferred rent liability.

Research and Development Costs

Research and development costs are expensed as incurred. Research and development costs consist primarily of salaries and benefits, consultant fees, stock-based compensation, certain facility costs, legal costs and other costs associated with preclinical development.

A substantial portion of the Company's ongoing research and development activities are conducted by third-party service providers in connection with preclinical development activities and contract manufacturing organizations in connection with the production of materials for clinical trials. At the end of the reporting period, the Company compares payments made to third-party service providers to the estimated progress toward completion of the research or development objectives. Such estimates are subject to change as additional information becomes available. Depending on the timing of payments to the service providers and the progress that the Company estimates has been made as a result of the service provided, the Company may record net prepaid or accrued expense relating to these costs.

Notes to Unaudited Interim Condensed Consolidated Financial Statements (Continued)

2. Summary of Significant Accounting Policies (Continued)

Stock-Based Compensation

The Company generally grants stock options to its employees for a fixed number of shares with an exercise price equal to the fair value of the underlying shares at the date of grant. The Company accounts for stock option grants using the fair value method. The fair value of options is calculated using the Black-Scholes option pricing model. Stock-based compensation is recognized as the underlying options vest using the straight-line attribution approach, and forfeitures are recorded as they occur.

Beginning January 1, 2018, the Company follows the provisions of ASU 2018-07, *Improvements to Nonemployee Share-Based Payment Accounting* (Topic 718). The standard expands the scope of Topic 718 to include share-based payment transactions for acquiring goods and services from nonemployees. Consequently, the accounting for share-based payments to nonemployees and employees is substantially aligned.

Preferred Stock Warrant Liability

The Company accounts for outstanding warrants to purchase shares of the Company's convertible preferred stock in accordance with Financial Accounting Standards Board (FASB) ASC Topic 480, *Distinguishing Liabilities from Equity* (ASC Topic 480). Under ASC Topic 480, freestanding warrants for shares that are contingently redeemable are classified as liabilities on the consolidated balance sheets and are measured at their inception date fair value and subsequently re-measured to fair value at each reporting period.

Fair Value of Financial Instruments:

The Company uses a three-level hierarchy, which prioritizes, within the measurement of fair value, the use of market-based information over entity-specific information for fair value measurements based on the nature of inputs used in the valuation of an asset or liability as of the measurement date. Fair value focuses on an exit price and is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The inputs or methodology used for valuing financial instruments are not necessarily an indication of the risk associated with those financial instruments.

The three-level hierarchy for fair value measurements is defined as follows:

Level 1: Inputs to the valuation methodology are quoted prices (unadjusted) for identical assets or liabilities in active markets.

Level 2: Inputs to the valuation methodology include quoted prices for similar assets and liabilities in active markets, and inputs that are observable for the asset or liability, either directly or indirectly, for substantially the full term of the financial instrument.

Level 3: Inputs to the valuation methodology are unobservable and significant to the fair value measurement.

An asset or liability's categorization within the valuation hierarchy is based upon the lowest level of input that is significant to the fair value measurement.

Notes to Unaudited Interim Condensed Consolidated Financial Statements (Continued)

2. Summary of Significant Accounting Policies (Continued)

Net Loss Per Share

The Company computes basic loss per share by dividing the net loss available to common stockholders by the weighted average number of common shares outstanding for the period, without consideration for common stock equivalents. Diluted net loss assumes the conversion, exercise or issuance of all potential common stock equivalents, unless the effect of inclusion would be anti-dilutive. For purposes of this calculation, common stock equivalents include the Company's stock options, common stock warrants, convertible preferred stock warrants and convertible preferred stock, which are convertible into shares of the Company's common stock. No shares related to the convertible preferred stock were included in the diluted net loss calculation for the three months ended March 31, 2018 or 2019 because the inclusion of such shares would have had an anti-dilutive effect. The shares to be issued upon exercise of certain outstanding stock options were also excluded from the diluted net loss calculation for the three months ended March 31, 2018 and 2019 because such shares are anti-dilutive.

Historical outstanding anti-dilutive securities not included in the diluted net loss per share calculation include the following:

	Three Months Ended March 31,	
	2018	2019
Convertible preferred stock (as converted)	8,306,934	17,248,259
Common stock options	579,852	2,587,996
Common stock warrants	62,936	62,936
Convertible preferred stock warrants	49,997	49,997
	8,999,719	19,949,188

Unaudited Pro Forma Net Loss Per Share

The following table summarizes the Company's unaudited pro forma net loss per share (in thousands, except share and per share data):

	Three Months Ended March 31, 2019
Numerator:	
Net loss attributable to common stockholders	$ 13,579
Denominator:	
Shares used to compute net loss per share, basic and diluted	2,120,925
Pro forma adjustments to reflect assumed weighted-average effect of conversion of convertible preferred stock	17,248,259
Shares used to compute pro forma net loss per share, basic and diluted	19,369,275
Pro forma net loss per share, basic and diluted	$ (0.70)

Notes to Unaudited Interim Condensed Consolidated Financial Statements (Continued)

2. Summary of Significant Accounting Policies (Continued)

Foreign Currency

The U.S. dollar is the functional currency of the Company and the functional currency of its subsidiary is Singapore dollars. For consolidation purposes, assets and liabilities of its subsidiary are translated into U.S. dollars at exchange rates in effect at the balance sheet date. Revenue and expenses are translated at average exchange rates in effect during the period. Gains and losses from transactions denominated in foreign currency are included in the accumulated other comprehensive loss component of stockholders' equity. Translation adjustments are not included in earnings unless they are realized through a sale or upon a complete or substantially complete liquidation of the Company's net investment in its foreign operations.

Reverse stock split

In June 2019, the Company's board of directors and its stockholders approved an amendment and restatement of the Company's amended and restated certificate of incorporation to effect a reverse split of shares of the common stock and convertible preferred stock on a 1-for-6 basis (the "Reverse Stock Split"). The par value and the authorized shares of the common stock and convertible preferred stock were not adjusted as a result of the Reverse Stock Split though the Company concurrently authorized additional shares of common stock and convertible preferred stock. All issued and outstanding convertible preferred stock and common stock, stock options, warrants and related per share amounts contained in the financial statements have been retroactively adjusted to reflect this Reverse Stock Split for all periods presented. The Reverse Stock Split was effected on June 7, 2019.

Recent Accounting Pronouncements

In February 2016, the FASB issued ASU 2016-02, *Leases (Topic 842),* which modifies the accounting by lessees for all leases with a term greater than 12 months. This standard will require lessees to recognize on the balance sheet the assets and liabilities for the rights and obligations created by those leases. Topic 842 is effective for the Company as of January 1, 2020. Early adoption is permitted. The Company's most significant lease is its operating lease for its corporate headquarters, and, while the Company has not yet estimated the amounts by which its financial statements will be affected by the adoption of this guidance, it expects that the overall recognition of expense will be similar to current guidance, but that there will be a significant change in the balance sheet due to the recognition of right of use assets and the corresponding lease liabilities.

In August 2016, the FASB issued ASU 2016-15, *Statement of Cash Flows: Classification of Certain Cash Receipts and Cash Payments* (Topic 230). The standard clarifies how certain cash receipts and cash payments will be presented and classified in the statement of cash flows. Topic 230 is effective for the Company as of January 1, 2019. The adoption of this update had no material effect on the Company's consolidated financial statements.

Notes to Unaudited Interim Condensed Consolidated Financial Statements (Continued)

3. Fair Value of Financial Instruments

The Company's financial assets and liabilities subject to fair value measurements on a recurring basis and the level of inputs used for such measurements were as follows:

	December 31, 2018			
Assets	**Level 1**	**Level 2**	**Level 3**	**Total**
Money market funds	$ 109,630	$ —	$ —	$ 109,630
Total	$ 109,630	$ —	$ —	$ 109,630
Liabilities				
Warrant liability	$ —	$ —	$ 380	$ 380
Total	$ —	$ —	$ 380	$ 380

	March 31, 2019			
Assets	**Level 1**	**Level 2**	**Level 3**	**Total**
Money market funds	$ 8,554	$ —	$ —	$ 8,554
U.S. Treasury securities	—	74,342	—	74,342
Total	$ 8,554	$ 74,342	$ —	$ 82,896
Liabilities				
Warrant liability	$ —	$ —	$ 430	$ 430
Total	$ —	$ —	$ 430	$ 430

The fair value of the warrants were calculated using the Black-Scholes option pricing model and is revalued to fair value at the end of each reporting period until the earlier of the exercise or expiration of the warrants. The liability was valued using the following assumptions:

	December 31, 2018	March 31, 2019
Exercise price(1)	$ 14.46	$ 14.46
Stock price(2)	$ 13.20	$ 14.94
Time to maturity (in years)	3.64	3.39
Volatility(3)	83.7%	82.3%
Risk-free interest rate(4)	2.50%	2.21%
Expected dividend	$ —	$ —

(1) Based upon terms provided in the warrant agreement.
(2) Based upon an independently prepared valuation as of December 31, 2018. The Company considered the independently prepared valuation as of December 31, 2018 and estimated offering price in an IPO in determining the estimated fair value as of March 31, 2018.
(3) Based upon the historical daily volatility of a group of peer public company closing prices.
(4) Based upon interest rate for U.S. Treasury Bonds, as published by the U.S. Federal Reserve.

Notes to Unaudited Interim Condensed Consolidated Financial Statements (Continued)

4. Cash, Cash Equivalents and Investments

The fair value and the amortized cost of cash, cash equivalents and available-for-sale investments by major security type consist of the following (in thousands):

	As of December 31, 2018			
Cash, cash equivalents and investments	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Estimated Fair Value
Cash and money market funds	$ 114,504	$ —	$ —	$ 114,504
Total	114,504	—	—	114,504
Less amounts classified as cash and cash equivalents	(114,504)	—	—	(114,504)
Total available-for-sale investments	$ —	$ —	$ —	$ —

	As of March 31, 2019			
Cash, cash equivalents and investments	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Estimated Fair Value
Cash and money market funds	$ 26,319	$ —	$ —	$ 26,319
U.S. Treasury securities	74,314	28	—	74,342
Total	100,633	28	—	100,661
Less amounts classified as cash and cash equivalents	(26,319)	—	—	(26,319)
Total available-for-sale investments	$ 74,314	$ 28	$ —	$ 74,342

5. Prepaid Expenses and Other Current Assets

Prepaid expenses and other current assets consist of the following (in thousands):

	December 31, 2018	March 31, 2019
Vendor prepayments and deposits	$ 2,045	$ 2,243
Prepaid rent	394	687
Non-trade receivables	282	361
	$ 2,721	$ 3,291

Notes to Unaudited Interim Condensed Consolidated Financial Statements (Continued)

6. Property and Equipment, net

Property and equipment consists of the following (in thousands):

	December 31, 2018	March 31, 2019
Laboratory equipment	$ 7,561	$ 7,678
Furniture and fixtures	386	389
Computer hardware and software	580	617
Leasehold improvements	236	236
	8,763	8,920
Less accumulated depreciation and amortization	(4,620)	(5,014)
	$ 4,143	$ 3,906

Depreciation expense was $326,000 and $397,000 for the three months ended March 31, 2018 and 2019, respectively.

The net book value of property and equipment under capital leases was $142,000 and $129,000 at December 31, 2018 and March 31, 2019, respectively.

7. Accrued Expenses

Accrued expenses consist of the following (in thousands):

	December 31, 2018	March 31, 2019
Compensation and related benefits	$ 2,568	$ 1,224
Professional fees	183	360
Contract research fees	43	278
Other	214	300
Total accrued expenses	$ 3,008	$ 2,162

8. Commitments and Contingencies

Leases

The Company leases its office facilities under non-cancellable operating lease agreements that expire at various dates through April 2022. Under the terms of the leases, the Company is responsible for certain insurance, property taxes and maintenance expenses. The office facilities lease agreements contain scheduled increases over the lease term. The related rent expense is calculated on a straight-line basis with the difference recorded as deferred rent. Rent expense was $313,000 and $385,000 for the three months ended March 31, 2018 and 2019, respectively.

The Company leases certain property and equipment under capital leases. In 2017, the Company financed purchases of $226,000 under a capital lease agreement. Outstanding amounts under the capital lease agreements are generally secured by liens on the related property and equipment.

Notes to Unaudited Interim Condensed Consolidated Financial Statements (Continued)

8. Commitments and Contingencies (Continued)

Future minimum lease payments under non-cancelable operating and capital lease agreements consist of the following at December 31, 2018 (in thousands):

	Capital Leases	Operating Leases
Years ending December 31:		
2019 (remaining 9 months)	$ 39	$ 2,628
2020	51	2,436
2021	51	2,310
2022	4	504
Total minimum lease payments	145	$ 7,878
Less: amount representing interest	(10)	
Present value of capital lease obligation	135	
Less: current portion	(47)	
Non-current portion	$ 88	

Litigation

The Company is not aware of any asserted or unasserted claims against it where it believes that an unfavorable resolution would have an adverse material impact on the operations or financial position of the Company.

9. Capital Stock

Convertible Preferred Stock

The classes of preferred stock the Company was authorized to issue, and the amounts issued and outstanding as of December 31, 2018 and March 31, 2019 were as follows:

	Par Value	Authorized	Issued & Outstanding
Series A	$ 0.0001	32,133,287	5,305,513
Series B	$ 0.0001	18,550,000	3,001,421
Series C1	$ 0.0001	54,189,549	5,007,134
Series C2	$ 0.0001	23,605,150	3,934,191

The rights, preferences, privileges and restrictions relating to Series A, Series B, Series C1 and Series C2 (together, the Series Preferred) are as set forth below:

Dividends

The holders of the Series Preferred are entitled to receive non-cumulative dividends prior to and in preference to any declaration or payment of dividends on common stock. In the event dividends are paid on any share of common stock, the Company will also pay a dividend on all outstanding shares of preferred stock in a per share amount equal to the amount paid or set aside for each share of common stock, on an as if converted to common stock basis. No dividends have been declared or paid as of March 31, 2019.

Notes to Unaudited Interim Condensed Consolidated Financial Statements (Continued)

9. Capital Stock (Continued)

Voting

The holders of the Series Preferred are entitled to voting rights equal to the number of shares of common stock into which each share of preferred stock could be converted, except that Series C2 is not entitled to vote on the election of directors at any time.

The holders of Class A common stock, voting as a separate class, are entitled to elect three members of the Board of Directors. The remaining members of the Company's board of directors will be elected by the holders of the Series Preferred, except Series C2, and Class A common stock, voting together as a single class and on an as-converted basis.

Liquidation

In the event of any liquidation, dissolution or winding up of the Company, either voluntary or involuntary, the holders of the Series Preferred are entitled to be paid, out of the available funds and assets, and prior and in preference to any payment or distribution of any such funds on any shares of common stock, an amount per share equal to the original issue price for the Series Preferred, plus all accrued and declared but unpaid dividends. The original per share issue price is equal to $11.10 for Series A, $11.661 for Series B and $13.98 for Series C1 and Series C2. If assets are insufficient to permit such payment, payment will be distributed ratably among the holders of outstanding preferred stock in proportion to the amount owned by each holder. After the liquidation preference of the holders of the Series Preferred has been satisfied, the remaining assets of the Company will be distributed ratably among the holders of outstanding common stock in proportion to the amount owned by each holder.

Conversion

Each share of Series Preferred is convertible into shares of Class A common stock, at the option of the holder, at any time after the date of issuance, except that Series C2 is convertible into shares of Class B common stock. Each share of Series Preferred automatically converts into the number of shares of common stock determined in accordance with the conversion rate upon the earlier of (i) the date specified by election of the holders of a majority of the shares of Series Preferred or (ii) the closing of a public offering of common stock resulting in aggregate gross proceeds of at least $75,000,000 and having a price per share to the public of at least $17.475 adjusted for splits, recapitalizations and the like. At March 31, 2019, the conversion price for each share of Series A is $11.10, Series B is $11.661 and Series C1 and Series C2 is $13.98.

The Company recorded all convertible preferred stock issuances at fair value on the dates of issuance. The Company classifies the convertible preferred stock outside of stockholders' deficit in temporary equity because the shares contain contingent liquidation features that are not solely within its control. The Company has elected not to adjust the carrying values of the convertible preferred stock to the deemed redemption values of such shares since a liquidation event was not probable. Subsequent adjustments to increase the carrying values to the ultimate redemption values will be made only when it becomes probable that such a liquidation event will occur.

Redemption

The Series Preferred is not redeemable at the option of the holder.

Notes to Unaudited Interim Condensed Consolidated Financial Statements (Continued)

9. Capital Stock (Continued)

Protective Provisions

The holders of Series Preferred have certain protective provisions. As long as at least 2,083,333 shares of Series Preferred remain outstanding, the Company cannot, without the approval of at least two-thirds of the holders of Series Preferred, take any action that (i) adversely changes the rights, preferences or privileges of Series Preferred; (ii) increases or decreases the authorized number of shares of preferred stock; (iii) creates or authorizes any capital stock having the rights, preferences or privileges senior or on a parity with preferred stock; (iv) results in redemption, repurchase, payment or declaration of dividends or other distributions with respect to shares of preferred stock or common stock other than permitted repurchases and dividends; (v) consummates a liquidation, dissolution or winding up of the Company; (vi) increases or decreases the authorized members of the Company's board of directors; (vii) sells, assigns, licenses, pledges or encumbers the intellectual property of the Company; or (viii) enters into any inbound license or acquisition by merger or asset transfer or similar corporate strategic relationship, in each case involving the Company's assets having a value (as determined by the Company's board of directors in good faith) greater than $500,000.

As long as at least 750,000 Series B remain outstanding, the Company cannot, without the approval of at least two-thirds of the holders of Series B, take any action that (i) adversely changes the rights, preferences or privileges of Series B; or (ii) increases or decreases the authorized number of shares of Series B.

As long as at least 1,666,666 Series C1 and Series C2 remain outstanding, the Company cannot, without the approval of at least two-thirds of the holders of Series C1 and Series C2, take any action that (i) adversely changes the rights, preferences or privileges of Series C1 and Series C2; or (ii) increases or decreases the authorized number of shares of Series C1 and Series C2.

Classification of Convertible Preferred Stock

The deemed liquidation preference provisions of the convertible preferred stock are considered contingent redemption provisions that are not solely within the Company's control. Accordingly, the convertible preferred stock has been presented outside of permanent equity in the mezzanine section of the consolidated balance sheets.

Convertible Preferred Stock Warrants

In connection with the issuance of Series A in August 2015, the Company issued warrants to purchase an aggregate of 49,997 shares of Series A at $14.46 per share. The warrants were immediately exercisable and expire, if not exercised, in August 2022. At issuance, the fair value of the warrants was determined to be $382,765 using the Black-Scholes pricing model and was recorded as a Series A issuance cost and a preferred stock warrant liability (Note 2). The liability was valued using the following assumptions at issuance: expected life of 7 years, fair value of Series A of $11.10 per share, risk-free interest rate of 1.79%, volatility of 80% and no expected dividends. At March 31, 2019, the warrants remain outstanding.

Class A and Class B Common Stock

In connection with the issuance of Series C1 and C2 in 2018, the Company authorized two classes of common stock, Class A and Class B common stock. Each holder of Class A common

Notes to Unaudited Interim Condensed Consolidated Financial Statements (Continued)

9. Capital Stock (Continued)

stock and Class B common stock is entitled to one vote per share, except that Class B common stock is not entitled to vote on the election of directors at any time. The holders of Class A common stock, voting as a separate class, are entitled to elect three members of the Company's board of directors. All shares of common stock outstanding as of the authorization of two classes of common stock in September 2018 became shares of Class A common stock. As of December 31, 2018 and March 31, 2019, the Company is authorized to issue 191,398,492 shares of Class A common stock and 23,605,150 of Class B common stock with a par value of $0.0001 per share. As of March 31, 2019, the Company had 2,123,257 shares issued of Class A common stock outstanding.

In June 2012, the Company issued 118,534 shares of common stock to a founder of the Company through the 2010 Equity Incentive Plan (Note 10). The founder entered into a restricted stock purchase agreement with the Company, which allows the Company to repurchase the shares of common stock from the founder at the original issuance price if the founder ceases providing services to the Company. The Company's right to repurchase the stock lapses over 48 months. At December 31, 2018 and March 31, 2019, all shares of common stock were vested and no longer subject to repurchase.

The Company has also allowed certain option holders to exercise unvested options to purchase shares of common stock. Shares received from such early exercises are subject to a right of repurchase at the issuance price. The Company's repurchase right lapses over the same period the options vest. In June 2017, the Company repurchased 17,026 unvested shares at $0.42 per share from a terminated option holder. At December 31, 2018, 658 shares at a weighted-average price of $0.66 per share were subject to repurchase. At December 31, 2018, the proceeds received for unvested shares of common stock subject to repurchase of $435 were recorded within accrued expenses. There were no shares subject to repurchase at March 31, 2019.

Common Stock Warrant

In connection with the issuance of Series A in August 2015, the Company issued a warrant to purchase an aggregate of 62,936 shares of common stock at $0.0001 per share. The warrant was immediately exercisable and expires, if not exercised, in August 2025. At issuance, the fair value of the warrant was determined to be $41,509, which was recorded as a Series A issuance cost and additional paid-in capital. At March 31, 2019, the warrant remains outstanding.

10. Stock Option Plan

In September 2010, the Company adopted the 2010 Equity Incentive Plan (the Plan) under which 3,540,114 shares of the Company's common stock have been reserved for issuance to employees, directors and consultants.

Under the Plan, the Company's board of directors may grant incentive stock options or non-statutory stock options. Incentive stock options may only be granted to Company employees. The exercise price of incentive stock options and non-statutory stock options will be no less than 100% of the fair value per share of the Company's common stock on the grant date. If an individual owns capital stock representing more than 10% of the outstanding shares, the price of each share will be at 110% of the fair value. Fair value is determined by the Company's board of directors. Options expire after ten years (five years for stockholders owning greater than 10% of all classes of stock). The Company's board of directors determines the period over which options vest and

Notes to Unaudited Interim Condensed Consolidated Financial Statements (Continued)

10. Stock Option Plan (Continued)

become exercisable. The Company has a repurchase option exercisable upon the voluntary or involuntary termination of the purchaser's employment with the Company for any reason. 3,105,031 shares of the Company's common stock are reserved for future issuance under the Plan as of March 31, 2019.

The Company recognized $113,000 and $776,000 of stock-based compensation expense related to options granted to employees and non-employees for the three months ended March 31, 2018 and 2019, respectively. The compensation expense is allocated on a departmental basis, based on the classification of the option holder as follows (in thousands):

	Three Months Ended March 31,	
	2018	2019
Research and development	$ 77	$ 419
General and administrative	36	357
	$ 113	$ 776

No income tax benefits have been recognized in the statements of operations for stock-based compensation arrangements and no stock-based compensation costs have been capitalized as property and equipment as of March 31, 2019.

Stock option activity under the Plan is as follows (in thousands, except share and per share data):

	Options Outstanding			
	Number of Shares	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Life (years)	Aggregate Intrinsic Value
Balances, December 31, 2018	2,136,291	$ 6.06	8.9	$ 12,881
Granted	461,390	12.06		
Exercised	(3,385)	3.78		
Cancelled	(6,300)	9.60		
Balances, March 31, 2019	2,587,996	$ 7.08	8.9	$ 12,837
Vested and expected to vest at March 31, 2019	2,587,996	$ 7.08	8.9	$ 12,837
Exerciseable at March 31, 2019	1,633,014	$ 4.98	8.4	$ 11,579
Vested at March 31, 2019	552,256	$ 4.74	7.4	$ 4,039

The weighted-average grant date fair value of options granted to employees and non-employees in the three months ended March 31, 2018 and 2019 was $3.54 and $8.46, respectively. The fair

Notes to Unaudited Interim Condensed Consolidated Financial Statements (Continued)

10. Stock Option Plan (Continued)

value of each option is estimated on the date of grant using the Black-Scholes option pricing model, assuming no expected dividends and the following weighted average assumptions:

	Three Months Ended March 31,	
	2018	2019
Expected life (in years)	5.96	6.02
Volatility	78.7%	80.8%
Risk-free interest rate	2.56%	2.46%

Expected volatility is based on volatilities of public companies operating in the Company's industry. The expected life of the options is estimated using the simplified method detailed in SEC Staff Accounting Bulletin No. 107. The simplified method calculates the expected term as the mid-point between the weighted-average time to vesting and the contractual maturity. The risk-free rate is based on the U.S. Treasury yield curve in effect at the time of grant. The Company has elected to account for forfeitures as they occur, rather than estimate expected forfeitures.

Unrecognized estimated compensation expense totaled $10.8 million related to non-vested stock options with a remaining requisite service period of 3.4 years.

11. 401(k) Plan

The Company has a 401(k) plan that qualifies as a deferred compensation arrangement under Section 401 of the Code. Eligible employees may elect to defer a portion of their pretax earnings subject to certain statutory limits. The Company has not made any matching contributions to date.

12. Related Party Transactions

The Company recorded other income of $148,000 and $165,000 under service contracts with a stockholder of the Company for the three months ended March 31, 2018 and 2019, respectively. The Company had a receivable from the stockholder at December 31, 2018 and March 31, 2019 of $89,000 and $20,000, respectively.

The Company paid intellectual property related legal fees of $288,000 and $381,000 for the three months ended March 31, 2018 and 2019, respectively, to a related party. The Company owed $134,000 and $394,000 to the related party at December 31, 2018 and March 31, 2019, respectively.

The Company paid legal fees of $110,000 and $370,000 for the three months ended March 31, 2018 and 2019, respectively, to a related party. The Company owed $40,000 and $349,000 to the related party at December 31, 2018 and March 31, 2019, respectively.

The Company recorded research and development expense of $100,000 and $106,000 under consulting agreements with two members of the Company's board of directors for the three months ended March 31, 2018 and 2019, respectively.

Notes to Unaudited Interim Condensed Consolidated Financial Statements (Continued)

13. Subsequent Events

The Company has evaluated subsequent events that may require adjustments to or disclosure in the unaudited interim condensed consolidated financial statements through May 24, 2019, the date on which the unaudited interim condensed consolidated financial statements were available to be issued, and, with respect to the reverse stock split and increase in authorized shares described below, through June 10, 2019.

In June 2019, the Company's board of directors and its stockholders approved an amendment and restatement of the Company's amended and restated certificate of incorporation to effect a reverse split of shares of the common stock and convertible preferred stock on a 1-for-6 basis (the "Reverse Stock Split"). The par value and the authorized shares of the common stock and convertible preferred stock were not adjusted as a result of the Reverse Stock Split though the Company concurrently authorized additional shares of common stock and convertible preferred stock. All issued and outstanding convertible preferred stock and common stock, stock options, warrants and related per share amounts contained in the financial statements have been retroactively adjusted to reflect this Reverse Stock Split for all periods presented. The Reverse Stock Split was effected on June 7, 2019.

Subsequent to the original issuance of these financial statements, in June 2019, the Company amended and restated its certificate of incorporation to increase the total number of authorized shares of all classes of capital stock to 1,000,000,000 from 342,935,376, of which 700,000,000 are designated as common stock and 300,000,000 are designated as convertible preferred stock.

7,350,000 Shares

Class A Common Stock

PROSPECTUS

Cowen **Evercore ISI** **Stifel**

Canaccord Genuity

Brookline Capital Markets

, 2019

Through and including , 2019 (the 25th day after the date of this prospectus), all dealers effecting transactions in these securities, whether or not participating in this offering, may be required to deliver a prospectus. This is in addition to a dealer's obligation to deliver a prospectus when acting as an underwriter and with respect to an unsold allotment or subscription.

Part II

INFORMATION NOT REQUIRED IN PROSPECTUS

Item 13. Other Expenses of Issuance and Distribution.

The following table indicates the expenses to be incurred in connection with the offering described in this registration statement, other than underwriting discounts and commissions, all of which will be paid by us. All amounts are estimated except the Securities and Exchange Commission registration fee, the Financial Industry Regulatory Authority, Inc., or FINRA, filing fee and the exchange listing fee.

	Amount
Securities and Exchange Commission registration fee	$ 18,440
FINRA filing fee	24,000
Nasdaq listing fee	150,000
Accountants' fees and expenses	250,000
Legal fees and expenses	1,625,000
Blue Sky fees and expenses	—
Transfer Agent's fees and expenses	11,000
Printing and engraving expenses	300,000
Miscellaneous	
Total expenses	$ 2,378,440

Item 14. Indemnification of Directors and Officers.

Section 145 of the Delaware General Corporation Law authorizes a court to award, or a corporation's board of directors to grant, indemnity to directors and officers in terms sufficiently broad to permit such indemnification under certain circumstances for liabilities, including reimbursement for expenses incurred, arising under the Securities Act. Our amended and restated certificate of incorporation that will be in effect on the completion of this offering permits indemnification of our directors, officers, employees and other agents to the maximum extent permitted by the Delaware General Corporation Law, and our amended and restated bylaws that will be in effect on the completion of this offering provide that we will indemnify our directors and officers and permit us to indemnify our employees and other agents, in each case to the maximum extent permitted by the Delaware General Corporation Law.

We have entered into indemnification agreements with our directors and officers, whereby we have agreed to indemnify our directors and officers to the fullest extent permitted by law, including indemnification against expenses and liabilities incurred in legal proceedings to which the director or officer was, or is threatened to be made, a party by reason of the fact that such director or officer is or was a director, officer, employee or agent of Atreca, Inc., provided that such director or officer acted in good faith and in a manner that the director or officer reasonably believed to be in, or not opposed to, the best interest of Atreca, Inc. At present, there is no pending litigation or proceeding involving a director or officer of Atreca, Inc. regarding which indemnification is sought, nor is the registrant aware of any threatened litigation that may result in claims for indemnification.

We maintain insurance policies that indemnify our directors and officers against various liabilities arising under the Securities Act and the Securities Exchange Act of 1934, as amended, that might be incurred by any director or officer in his capacity as such.

Item 15. Recent Sales of Unregistered Securities.

The following sets forth information regarding all unregistered securities sold since January 1, 2016.

Sales of Preferred Stock

(1) In August 2017, we sold an aggregate of 3,001,421, shares of Series B preferred stock to a total of 71 accredited investors at a purchase price per share of $11.661 for an aggregate purchase price of $35,000,003.97.

(2) In September 2018, we sold an aggregate of 5,007,134, shares of Series C1 preferred stock to a total of 41 accredited investors at a purchase price per share of $13.98 for an aggregate purchase price of $69,999,980.30.

(3) In September 2018, we sold an aggregate of 3,934,191, shares of Series C2 preferred stock to a total of 2 accredited investors at a purchase price per share of $13.98 for an aggregate purchase price of $54,999,999.50.

Option and Common Stock Issuances

(1) From February 3, 2016 through June 6, 2019, we granted to certain employees, consultants and directors options to purchase an aggregate of 3,221,091 shares of Class A common stock under our 2010 Plan, at exercise prices ranging from $4.56 to $12.66 per share.

(2) From January 29, 2016 through June 6, 2019, we issued and sold an aggregate of 128,335 shares of Class A common stock upon the exercise of options under our 2010 Plan at exercise prices ranging from $0.06 to $12.06, per share, for an aggregate exercise price of $315,147.51.

None of the foregoing transactions involved any underwriters, underwriting discounts or commissions, or any public offering. Unless otherwise specified above, we believe these transactions were exempt from registration under the Securities Act in reliance on Section 4(a)(2) of the Securities Act (and Regulation D or Regulation S promulgated thereunder) or Rule 701 promulgated under Section 3(b) of the Securities Act as transactions by an issuer not involving any public offering or under benefit plans and contracts relating to compensation as provided under Rule 701. The recipients of the securities in each of these transactions represented their intentions to acquire the securities for investment only and not with a view to or for sale in connection with any distribution thereof, and appropriate legends were placed on the share certificates issued in these transactions. All recipients had adequate access, through their relationships with us, to information about us. The sales of these securities were made without any general solicitation or advertising.

Item 16. Exhibits and Financial Statement Schedules.

(a) Exhibits.

Exhibit Index

Exhibit Number	Description of Exhibit
1.1	Form of Underwriting Agreement.
3.1	Amended and Restated Certificate of Incorporation, as currently in effect.
3.2+	Bylaws, as currently in effect.
3.3	Form of Amended and Restated Certificate of Incorporation, to be effective upon the closing of this offering.
3.4	Form of Amended and Restated Bylaws, to be effective upon the closing of this offering.
4.1+	Amended and Restated Investors' Rights Agreement, dated as of September 5, 2018, by and among the Registrant and certain of its stockholders.
4.2+	Form of Warrant to Purchase Shares of Series A Preferred Stock, dated as of August 21, 2015, by and between the Registrant and Warrant holders of the Registrant.
5.1	Opinion of Cooley LLP.
10.1#+	Atreca, Inc. 2010 Equity Incentive Plan, as amended, and forms of agreements thereunder.
10.2#	Atreca, Inc. 2019 Equity Incentive Plan and forms of agreements thereunder.
10.3#	Atreca, Inc. 2019 Employee Stock Purchase Plan.
10.4#+	Form of Indemnity Agreement entered into by and between Atreca, Inc. and each director and executive officer.
10.5+	Lease, dated as of June 6, 2014, by and between the Registrant and HCP LS Redwood City, LLC.
10.6#+	Executive Employment Agreement, dated as of March 21, 2018, by and between the Registrant and John A. Orwin.
10.7#+	Amended and Restated Executive Employment Agreement, dated as of June 26, 2018, by and between the Registrant and Tito A. Serafini.
10.8#+	Executive Employment Agreement, dated as of February 1, 2019, by and between the Registrant and Herb Cross.
10.9#+	Executive Employment Agreement, dated as of March 25, 2016, by and between the Registrant and Norman Michael Greenberg.
10.10#+	Executive Employment Agreement, dated as of April 30, 2016, by and between the Registrant and Guy Cavet.
10.11#+	Executive Employment Agreement, dated as of April 19, 2016, by and between the Registrant and Susan Berland.
10.12+	Sublease, dated as of March 22, 2016, by and between the Registrant and CardioDx, Inc.
10.13+	First Amendment to Sublease, dated as of August 25, 2017, by and between the Registrant and CardioDx, Inc.
10.14†	Letter Agreement, dated as of August 21, 2015, by and between the Registrant and the Bill & Melinda Gates Foundation.

Exhibit Number	Description of Exhibit
10.15†	Nominating Agreement, dated as of September 5, 2018, by and among the Registrant, Baker Brothers Life Sciences, L.P. and 667, L.P.
10.16†	Exclusive (Equity) Agreement, dated as of June 28, 2012, by and between the Registrant and The Board of Trustees of the Leland Stanford Junior University.
10.17	Amendment to the Exclusive (Equity) Agreement, dated as of May 24, 2018, by and between the Registrant and The Board of Trustees of the Leland Stanford Junior University.
16.1+	Letter from Frank, Rimerman + Co. LLP, the Company's former certifying public accountant.
21.1+	Subsidiaries of the Registrant.
23.1	Consent of OUM & Co. LLP, independent registered public accounting firm.
23.2	Consent of Cooley LLP (included in Exhibit 5.1).
24.1+	Power of Attorney (included on page II-6 of the original filing of this registration statement on Form S-1).

† Portions of this exhibit (indicated by asterisks) have been omitted as the Registrant has determined that (i) the omitted information is not material and (ii) the omitted information would likely cause competitive harm if publicly disclosed.
# Indicates management contract or compensatory plan.
+ Previously filed.

(b) Financial Statement Schedules.

All financial statement schedules are omitted because the information required to be set forth therein is not applicable or is shown in the consolidated financial statements or the notes thereto.

Item 17. Undertakings.

The undersigned registrant hereby undertakes to provide to the underwriters at the closing specified in the underwriting agreement certificates in such denominations and registered in such names as required by the underwriters to permit prompt delivery to each purchaser.

Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers and controlling persons of the registrant under the foregoing provisions or otherwise, the registrant has been advised that in the opinion of the SEC such indemnification is against public policy as expressed in the Securities Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the registrant of expenses incurred or paid by a director, officer or controlling person of the registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Securities Act and will be governed by the final adjudication of such issue.

The undersigned registrant hereby undertakes that:

(1) For purposes of determining any liability under the Securities Act, the information omitted from the form of prospectus filed as part of this registration statement in reliance on Rule 430A and contained in a form of prospectus filed by the registrant under Rule 424(b)(1) or (4) or 497(h) under the Securities Act will be deemed to be part of this registration statement as of the time it was declared effective.

(2) For the purpose of determining any liability under the Securities Act of 1933, each post-effective amendment that contains a form of prospectus will be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time will be deemed to be the initial bona fide offering thereof.

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the registrant has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in Redwood City, State of California, on June 10, 2019.

ATRECA, INC.

/s/ JOHN A. ORWIN

By: John A. Orwin
President and Chief Executive Officer

Pursuant to the requirements of the Securities Act of 1933, this registration statement has been signed by the following persons in the capacities and on the dates indicated.

Signature	Title	Date
/s/ JOHN A. ORWIN John A. Orwin	President, Chief Executive Officer and Director (Principal Executive Officer)	June 10, 2019
/s/ HERBERT CROSS Herbert Cross	Chief Financial Officer (Principal Financial and Accounting Officer)	June 10, 2019
* Brian Atwood	Chairman of the Board of Directors	June 10, 2019
* Franklin Berger	Director	June 10, 2019
* David Lacey, M.D.	Director	June 10, 2019
* William H. Robinson, M.D., Ph.D.	Director	June 10, 2019
/s/ TITO A. SERAFINI, PH.D. Tito A. Serafini, Ph.D.	Director and Chief Strategy Officer	June 10, 2019
* Lawrence Steinman, M.D.	Director	June 10, 2019

* Pursuant to the Power of Attorney

By: /s/ JOHN A. ORWIN
John A. Orwin
Attorney-in-Fact

Exhibit 1.1

[·] Shares

Atreca, Inc.

Common Stock

UNDERWRITING AGREEMENT

June **[·]**, 2019

COWEN AND COMPANY, LLC
EVERCORE GROUP L.L.C.
STIFEL, NICOLAUS & COMPANY, INCORPORATED
As Representatives of the several Underwriters

c/o Cowen and Company, LLC
599 Lexington Avenue
New York, New York 10022

c/o Evercore Group L.L.C.
55 East 52nd Street
New York, New York 10055

c/o Stifel, Nicolaus & Company, Incorporated
787 Seventh Avenue, 11th Floor
New York, New York 10019

Dear Sirs and Madams:

1. *INTRODUCTORY*. Atreca, Inc., a Delaware corporation (the "***Company***"), proposes to sell, pursuant to the terms of this Agreement (this "***Agreement***"), to the several underwriters named in Schedule A hereto (the "***Underwriters***," or, each, an "***Underwriter***"), an aggregate of **[·]** shares of either Class A common stock, $0.0001 par value per share, of the Company ("***Class A common stock***") or, to the extent shares are purchased by entities affiliated with Baker Brothers Life Sciences L.P., Class B common stock, $0.0001 par value per share, of the Company ("***Class B common stock***," and together with the Class A common stock, the "***Common Stock***"). The aggregate of **[·]** shares of Common Stock so proposed to be sold is hereinafter referred to as the "***Firm Stock***". The Company also proposes to sell to the Underwriters, upon the terms and conditions set forth in Section 3 hereof, up to an additional **[·]** shares of Class A common stock (the "***Optional Stock***"). The Firm Stock and the Optional Stock are hereinafter collectively referred to as the "***Stock***". Cowen and Company, LLC, Evercore Group L.L.C. and Stifel, Nicolaus & Company, Incorporated are acting as representatives of the several Underwriters and in such capacity are hereinafter referred to as the "***Representatives***."

2. *REPRESENTATIONS AND WARRANTIES OF THE COMPANY*

The Company represents and warrants to the several Underwriters as of the date hereof and as of each Closing Date (as defined below), and agrees with the several Underwriters, that:

(a) Registration Statement. A registration statement of the Company on Form S-1 (File No. 333-231770) (including all amendments thereto, the "***Initial Registration Statement***") in respect of the Stock has been filed with the Securities and Exchange Commission (the "***Commission***"). The Initial Registration Statement and any post-effective amendment thereto, each in the form

heretofore delivered to the Representatives, and, excluding exhibits thereto, to the Representatives for each of the other Underwriters, have been declared effective by the Commission in such form and meet the requirements of the Securities Act of 1933, as amended (the "***Securities Act***"), and the rules and regulations of the Commission thereunder (the "***Rules and Regulations***"). Other than (i) the Initial Registration Statement, (ii) a registration statement, if any, increasing the size of the offering filed pursuant to Rule 462(b) under the Securities Act and the Rules and Regulations (a "***Rule 462(b) Registration Statement***"), (iii) any Preliminary Prospectus (as defined below), (iv) the Prospectus (as defined below) contemplated by this Agreement to be filed pursuant to Rule 424(b) of the Rules and Regulations in accordance with Section 4(a) hereof and (v) any Issuer Free Writing Prospectus (as defined below), no other document with respect to the offer and sale of the Stock has heretofore been filed with the Commission. No stop order suspending the effectiveness of the Initial Registration Statement, any post-effective amendment thereto or the Rule 462(b) Registration Statement, if any, has been issued and no proceeding for that purpose or pursuant to Section 8A of the Securities Act has been initiated or, to the Company's knowledge, threatened by the Commission (any preliminary prospectus included in the Initial Registration Statement or filed with the Commission pursuant to Rule 424 of the Rules and Regulations is hereinafter called a "***Preliminary Prospectus***"). The Initial Registration Statement including all exhibits thereto and including the information contained in the Prospectus filed with the Commission pursuant to Rule 424(b) of the Rules and Regulations and deemed by virtue of Rule 430A under the Securities Act to be part of the Initial Registration Statement at the time it became effective is hereinafter collectively called the "***Registration Statement***." If the Company has filed a Rule 462(b) Registration Statement, then any reference herein to the term "Registration Statement" shall be deemed to include such Rule 462(b) Registration Statement. The final prospectus, in the form filed pursuant to and within the time limits described in Rule 424(b) under the Rules and Regulations, is hereinafter called the "***Prospectus***."

(b) General Disclosure Package. As of the Applicable Time (as defined below) and as of the Closing Date or the Option Closing Date (as defined below), as the case may be, neither (i) the General Use Free Writing Prospectus(es) (as defined below) issued at or prior to the Applicable Time, the Pricing Prospectus (as defined below) and the information included on Schedule C hereto, all considered together (collectively, the "***General Disclosure Package***"), nor (ii) any individual Limited Use Free Writing Prospectus (as defined below), nor (iii) the bona fide electronic roadshow (as defined in Rule 433(h)(5) of the Rules and Regulations); nor (iv) any individual Written Testing-the-Waters Communication (as defined below), when considered together with the General Disclosure Package, included or will include any untrue statement of a material fact or omitted or will omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading; *provided*, *however*, that the Company makes no representations or warranties as to information contained in or omitted from the Pricing Prospectus, any individual Written Testing-the-Waters Communication or any Issuer Free Writing Prospectus (as defined below), in reliance upon, and in conformity with, written information furnished to the Company through the Representatives by or on behalf of any Underwriter specifically for inclusion therein, which information the parties hereto agree is limited to the Underwriter's Information (as defined in Section 19). As used in this paragraph (b) and elsewhere in this Agreement:

"***Applicable Time***" means **[·]** [A/P].M., New York time, on the date of this Agreement or such other time as agreed to by the Company and the Representatives.

"***Exchange Act***" means the Securities Exchange Act of 1934, as amended.

"***Pricing Prospectus***" means the Preliminary Prospectus relating to the Stock that is included in the Registration Statement immediately prior to the Applicable Time.

"***Issuer Free Writing Prospectus***" means any "issuer free writing prospectus," as defined in Rule 433 of the Rules and Regulations relating to the Stock in the form filed or required to be filed with the Commission or, if not required to be filed, in the form retained in the Company's records pursuant to Rule 433(g) of the Rules and Regulations.

"***General Use Free Writing Prospectus***" means any Issuer Free Writing Prospectus that is identified on Schedule B to this Agreement.

"***Limited Use Free Writing Prospectuses***" means any Issuer Free Writing Prospectus that is not a General Use Free Writing Prospectus.

"***Written Testing-the-Waters Communication***" means any Testing-the-Waters Communication (as defined below) that is a written communication within the meaning of Rule 405 of the Rules and Regulations.

(c) No Stop Orders; No Material Misstatements. No order preventing or suspending the use of any Preliminary Prospectus, any Issuer Free Writing Prospectus or the Prospectus relating to the proposed offering of the Stock has been issued by the Commission, and no proceeding for that purpose or pursuant to Section 8A of the Securities Act has been instituted or, to the Company's knowledge, threatened by the Commission, and each Preliminary Prospectus, at the time of filing thereof, conformed in all material respects to the requirements of the Securities Act and the Rules and Regulations, and did not contain an untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading; *provided, however*, that the Company makes no representations or warranties as to information contained in or omitted from any Preliminary Prospectus, in reliance upon, and in conformity with, written information furnished to the Company through the Representatives by or on behalf of any Underwriter specifically for inclusion therein, which information the parties hereto agree is limited to the Underwriter's Information.

(d) Registration Statement and Prospectus Contents. At the respective times the Registration Statement and any amendments thereto became or become effective as to the Underwriters and at each Closing Date, the Registration Statement and any amendments thereto conformed and will conform in all material respects to the requirements of the Securities Act and the Rules and Regulations and did not and will not contain any untrue statement of a material fact or omit to state any material fact required to be stated therein or necessary to make the statements therein not misleading; and the Prospectus and any amendments or supplements thereto, at the time the Prospectus or any amendment or supplement thereto was issued and at each Closing Date, conformed and will conform in all material respects to the requirements of the Securities Act and the Rules and Regulations and did not and will not contain an untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in light of the circumstances under which they were made, not misleading; *provided*, *however*, that the foregoing representations and warranties in this paragraph (d) shall not apply to information contained in or omitted from the Registration Statement or the Prospectus, or any amendment or supplement thereto, in reliance upon, and in conformity with, written information furnished to the Company through the Representatives by or on behalf of any Underwriter specifically for inclusion therein, which information the parties hereto agree is limited to the Underwriter's Information.

(e) Issuer Free Writing Prospectus. Each Issuer Free Writing Prospectus, as of its issue date and at all subsequent times through the completion of the public offer and sale of the Stock or until any earlier date that the Company notified or notifies the Representatives as described in Section 4(f), did not, does not and will not include any information that conflicted, conflicts or will conflict with the information contained in the Registration Statement, Pricing Prospectus or the Prospectus, or included or would include an untrue statement of a material fact or omitted or would omit to state a material fact required to be stated therein or necessary in order to make the statements therein, in

the light of the circumstances under which they were made, not misleading *provided, however*, that the foregoing representations and warranties in this paragraph (e) shall not apply to information contained in or omitted from the Registration Statement or the Prospectus, or any amendment or supplement thereto, in reliance upon, and in conformity with, written information furnished to the Company through the Representatives by or on behalf of any Underwriter specifically for inclusion therein, which information the parties hereto agree is limited to the Underwriter's Information.

(f) Distribution of Offering Materials. The Company has not, directly or indirectly, distributed and will not distribute any offering material in connection with the offering and sale of the Stock other than any Preliminary Prospectus, the Prospectus and other materials, if any, permitted under the Securities Act and consistent with Section 4(b) below. The Company will file with the Commission all Issuer Free Writing Prospectuses (other than a "road show" as described in Rule 433(d)(8) of the Rules and Regulations) in the time and manner required under Rules 163(b)(2) and 433(d) of the Rules and Regulations.

(g) Emerging Growth Company. From the time of the initial confidential submission of the Registration Statement to the Commission (or, if earlier, the first date on which the Company engaged directly or through any person authorized to act on its behalf in any Testing-the-Waters Communications) through the date hereof, the Company has been and is an "emerging growth company," as defined in Section 2(a) of the Securities Act (an "***Emerging Growth Company***"). "***Testing-the-Waters Communication***" means any oral or written communication with potential investors undertaken in reliance on Section 5(d) of the Securities Act.

(h) Not an Ineligible Issuer. At the time of filing the Initial Registration Statement, any Rule 462(b) Registration Statement and any post-effective amendments thereto, and at the date hereof, the Company was not, and the Company currently is not, an "ineligible issuer," as defined in Rule 405 of the Rules and Regulations.

(i) Testing the Waters Communications. The Company (a) has not alone engaged in any Testing-the-Waters Communication other than Testing-the-Waters Communications with the consent of the Representatives with entities that are qualified institutional buyers within the meaning of Rule 144A under the Securities Act or institutions that are accredited investors within the meaning of Rule 501 under the Securities Act and (b) has not authorized anyone other than the Representatives to engage in Testing-the-Waters Communications. The Company reconfirms that the Representatives have been authorized to act on its behalf in undertaking Testing-the-Waters Communications. The Company has not distributed any Written Testing-the-Waters Communications.

(j) Organization and Good Standing. The Company and each of its subsidiaries (as defined in Section 16) have been duly organized and are validly existing as corporations or other legal entities in good standing (or the foreign equivalent thereof) under the laws of their respective jurisdictions of organization. The Company and each of its subsidiaries are duly qualified to do business and are in good standing as foreign corporations or other legal entities in each jurisdiction in which their respective ownership or lease of property or the conduct of their respective businesses requires such qualification and have all power and authority (corporate or other) necessary to own or hold their respective properties and to conduct the businesses in which they are engaged, except where the failure to so qualify or have such power or authority would not (i) reasonably be likely to have a material adverse effect on the business, properties, management, financial position, stockholders' equity, results of operations or prospects of the Company and its subsidiaries taken as a whole, or (ii) impair in any material respect the ability of the Company to issue and sell the Stock under this Agreement (any such effect as described in clauses (i) or (ii), a "***Material Adverse Effect***"). The Company does not own or control, directly or indirectly, any corporation, association or other entity other than the subsidiaries listed in Exhibit 21.1 to the Registration Statement.

(k) Underwriting Agreement. This Agreement has been duly authorized, executed and delivered by the Company.

(l) The Stock. The Stock to be issued and sold by the Company to the Underwriters hereunder has been duly and validly authorized and, when issued and delivered against payment therefor as provided herein, will be duly and validly issued, fully paid and non-assessable and will conform to the descriptions thereof in the Registration Statement, the General Disclosure Package and the Prospectus; and the issuance of the Stock is not subject to any preemptive, rights of first refusal or similar rights.

(m) Capitalization. The Company has an authorized capitalization as set forth under the heading "Capitalization" in the Pricing Prospectus, and all of the issued shares of capital stock of the Company have been duly and validly authorized and issued, are fully paid and non-assessable, have been issued in compliance with federal and state securities laws, and (assuming conversion of all outstanding shares of convertible preferred stock of the Company in connection with the transactions contemplated hereby) conform to the description thereof contained in the General Disclosure Package and the Prospectus. All of the Company's options, warrants and other rights to purchase or exchange any securities for shares of the Company's capital stock have been duly authorized and validly issued and were issued in compliance with federal and state securities laws other than those which have been waived or satisfied. None of the outstanding shares of Common Stock was issued in violation of any preemptive rights, rights of first refusal or other similar rights to subscribe for or purchase securities of the Company. As of the date set forth in the General Disclosure Package, there were no authorized or outstanding shares of capital stock, options, warrants, preemptive rights, rights of first refusal or other rights to purchase, or equity or debt securities convertible into or exchangeable or exercisable for, any capital stock of the Company or any of its subsidiaries other than those described above or accurately described in the General Disclosure Package. Since such date, the Company has not issued any securities other than Common Stock issued pursuant to the exercise of warrants or upon the exercise of stock options or other awards outstanding under the Company's stock option plans, options or other securities granted or issued pursuant to the Company's existing equity compensation plans or other plans, and the issuance of Common Stock pursuant to employee stock purchase plans. The description of the Company's stock option, stock bonus and other stock plans or arrangements, and the options or other rights granted thereunder, as described in the General Disclosure Package and the Prospectus, accurately and fairly present in all material respects the information required to be shown with respect to such plans, arrangements, options and rights.

(n) Capitalization of Subsidiaries. All the outstanding shares of capital stock (if any) of each subsidiary of the Company have been duly authorized and validly issued, are fully paid and nonassessable and, except to the extent set forth in the General Disclosure Package or the Prospectus, are owned by the Company directly or indirectly through one or more wholly-owned subsidiaries, free and clear of any claim, lien, encumbrance, security interest, restriction upon voting or transfer or any other claim of any third party.

(o) No Conflicts. The execution, delivery and performance of this Agreement by the Company, the issue and sale of the Stock by the Company and the consummation of the transactions contemplated hereby will not (with or without notice or lapse of time or both) (i) conflict with or result in a breach or violation of any of the terms or provisions of, constitute a default or a Debt Repayment Triggering Event (as defined below) under, or result in the creation or imposition of any lien, encumbrance, security interest, claim or charge upon any property or assets of the Company or any subsidiary pursuant to, any indenture, mortgage, deed of trust, loan agreement or other agreement or instrument to which the Company or any of its subsidiaries is a party or by which the Company or any of its subsidiaries is bound or to which any of the property or assets of the Company or any of its subsidiaries is subject, (ii) result in any violation of the provisions of the charter or by-laws (or analogous governing instruments, as applicable) of the Company or any of

its subsidiaries or (iii) result in the violation of any law, statute, rule, regulation, judgment, order or decree of any court or governmental or regulatory agency or body, domestic or foreign, having jurisdiction over the Company or any of its subsidiaries or any of their properties or assets except, in the case of clauses (i) and (iii) above, for any such conflict, breach, violation or default that would not, individually or in the aggregate, have a Material Adverse Effect. A "***Debt Repayment Triggering Event***" means any event or condition that gives, or with the giving of notice or lapse of time would give the holder of any note, debenture or other evidence of indebtedness (or any person acting on such holder's behalf) the right to require the repurchase, redemption or repayment of all or a portion of such indebtedness by the Company of any of its subsidiaries.

(p) No Consents Required. Except for the registration of the Stock under the Securities Act, and applicable state securities laws, and such consents, approvals, authorizations, orders and registrations or qualifications as may be required by the Financial Industry Regulatory Authority ("***FINRA***") and The Nasdaq Global Market in connection with the purchase and distribution of the Stock by the Underwriters and the listing of the Stock on The Nasdaq Global Market, no consent, approval, authorization or order of, or filing, qualification or registration (each an "***Authorization***") with, any court, governmental or regulatory agency or body, foreign or domestic, which has not been made, obtained or taken and is not in full force and effect, is required for the execution, delivery and performance of this Agreement by the Company, the issuance and sale of the Stock or the consummation of the transactions contemplated hereby; and no event has occurred that allows or results in, or after notice or lapse of time or both would allow or result in, revocation, suspension, termination or invalidation of any such Authorization or any other impairment of the rights of the holder or maker of any such Authorization.

(q) Independent Auditors. OUM & Co. LLP, who have certified certain financial statements of the Company and its subsidiaries included in the Registration Statement, the General Disclosure Package and the Prospectus, and have audited the Company's internal control over financial reporting and management's assessment thereof, is an independent registered public accounting firm with respect to the Company and its subsidiaries within the meaning of Article 2-01 of Regulation S-X and the Public Company Accounting Oversight Board (United States) (the "***PCAOB***").

(r) Financial Statements. The financial statements, together with the related notes, included in the General Disclosure Package, the Prospectus and in the Registration Statement fairly present the financial position and the results of operations and changes in financial position of the Company and its consolidated subsidiaries at the respective dates or for the respective periods therein specified. Such statements and related notes have been prepared in accordance with the generally accepted accounting principles in the United States ("***GAAP***") applied on a consistent basis throughout the periods involved except as may be set forth in the related notes included in the General Disclosure Package and provided, that unaudited interim financial statements, which are subject to normal year-end adjustments, may not contain certain footnotes, as permitted by the rules of the Commission. The financial statements, together with the related notes, included in the General Disclosure Package and the Prospectus comply in all material respects with Regulation S-X. No other financial statements or supporting schedules or exhibits are required by Regulation S-X to be described or included in the Registration Statement, the General Disclosure Package or the Prospectus. The summary and selected financial data included in the General Disclosure Package, the Prospectus and the Registration Statement fairly present in all material respects the information shown therein as at the respective dates and for the respective periods specified and are derived from the consolidated financial statements set forth in the Registration Statement, the Pricing Prospectus and the Prospectus and other financial information.

(s) No Material Adverse Change. Neither the Company nor any of its subsidiaries has sustained, since the date of the latest audited financial statements included in the General Disclosure Package, (i) any material loss or interference with its business from fire, explosion, flood or other calamity,

whether or not covered by insurance, or from any labor dispute or action, order or decree of any court or governmental or regulatory authority, otherwise than as set forth or contemplated in the General Disclosure Package; (ii) any change in the capital stock (other than the issuance of shares of Common Stock upon exercise of stock options and warrants described as outstanding in, and the grant of options and awards under existing equity incentive plans described in, the Registration Statement, the General Disclosure Package and the Prospectus) or long-term debt of the Company or any of its subsidiaries, or any dividend or distribution of any kind declared, set aside for payment, paid or made by the Company on any class of capital stock, or any material adverse changes, or any development involving a prospective material adverse change, in or affecting the business, properties, assets, general affairs, management, financial position, prospects, stockholders' equity or results of operations of the Company and its subsidiaries taken as a whole, otherwise than as set forth or contemplated in the General Disclosure Package.

(t) Legal Proceedings. Except as set forth in the General Disclosure Package, there is no legal or governmental proceeding to which the Company or any of its subsidiaries is a party or of which any property or assets of the Company or any of its subsidiaries is the subject, including any proceeding before the United States Food and Drug Administration of the U.S. Department of Health and Human Services ("***FDA***") or comparable federal, state, local or foreign governmental bodies (it being understood that the interaction between the Company and the FDA and such comparable governmental bodies relating to the development and product approval process shall not be deemed proceedings for purposes of this representation), which is required to be described in the Registration Statement, the General Disclosure Package or the Prospectus and is not described therein, or which, singularly or in the aggregate, if determined adversely to the Company or any of its subsidiaries, could reasonably be expected to have a Material Adverse Effect; and no such proceedings are threatened or, to the Company's knowledge after reasonable investigation and due diligence inquiry ("***Knowledge***"), contemplated by governmental or regulatory authorities or threatened by others. The Company is in compliance with all applicable federal, state, local and foreign laws, regulations, orders and decrees governing its business as prescribed by the FDA, or any other federal, state or foreign agencies or bodies engaged in the regulation of pharmaceuticals or biohazardous substances or materials, except where noncompliance would not, singularly or in the aggregate, have a Material Adverse Effect. All studies, tests, and preclinical and clinical studies conducted by or on behalf of the Company to support approval for commercialization of the Company's product candidates have been conducted by the Company, or to the Company's Knowledge by third parties, in compliance with all applicable federal, state or foreign laws, rules, orders and regulations, except for such failure or failures to be in compliance as could not reasonably be expected to have, singularly or in the aggregate, a Material Adverse Effect. Neither the Company nor any of its subsidiaries is a party to any corporate integrity agreements, monitoring agreements, consent decrees, settlement orders, or similar agreements with or imposed by any governmental or regulatory authority. Additionally, neither the Company, any of its subsidiaries nor any of their respective employees, officers, directors, or agents has been excluded, suspended or debarred from participation in any U.S. federal health care program or human clinical research or, to the knowledge of the Company, is subject to a governmental inquiry, investigation, proceeding, or other similar action that could reasonably be expected to result in debarment, suspension, or exclusion.

(u) No Violation or Default. Neither the Company nor any of its subsidiaries is (i) in violation of its charter or by-laws (or analogous governing instrument, as applicable), (ii) in default in any respect, and no event has occurred which, with notice or lapse of time or both, would constitute such a default, in the due performance or observance of any term, covenant or condition contained in any indenture, mortgage, deed of trust, loan agreement, lease or other agreement or instrument to which it is a party or by which it is bound or to which any of its property or assets is subject or (iii) in violation of any law, ordinance, governmental rule, regulation or court order, decree or judgment to which it or its property or assets may be subject (including, without limitation, those

administered by the FDA or by any foreign, federal, state or local governmental or regulatory authority performing functions similar to those performed by the FDA) except, in the case of clauses (ii) and (iii) above, for any such violation or default that would not, singularly or in the aggregate, have a Material Adverse Effect.

(v) Licenses or Permits. The Company and each of its subsidiaries possess all licenses, certificates, authorizations and permits issued by, and have made all declarations and filings with, the appropriate local, state, federal or foreign governmental or regulatory agencies or bodies (including, without limitation, those administered by the FDA or by any foreign, federal, state or local governmental or regulatory authority performing functions similar to those performed by the FDA) that are necessary for the ownership or lease of their respective properties or the conduct of their respective businesses as described in the General Disclosure Package and the Prospectus (collectively, the "***Governmental Permits***") except where any failures to possess or make the same would not, singularly or in the aggregate, reasonably be expected to have a Material Adverse Effect. The Company and its subsidiaries are in compliance with all such Governmental Permits, except where any noncompliance would not have a Material Adverse Effect; all such Governmental Permits are valid and in full force and effect, except where the validity or failure to be in full force and effect would not reasonably be expected to, singularly or in the aggregate, have a Material Adverse Effect. Neither the Company nor any subsidiary has received notification of any revocation, modification, suspension, termination or invalidation (or proceedings related thereto) of any such Governmental Permit and the Company has no reason to believe that any such Governmental Permit will not be renewed.

(w) Regulatory Matters. The studies, tests and preclinical or clinical trials conducted by or on behalf of the Company that are described in the General Disclosure Package and the Prospectus (the "***Company Studies and Trials***") were and, if still pending, are being, conducted in all material respects in accordance with experimental protocols, procedures and controls pursuant to, where applicable, accepted professional scientific standards; the descriptions of the results of the Company Studies and Trials contained in the General Disclosure Package and Prospectus are accurate in all material respects; the Company has no Knowledge of any other studies or trials not described in the General Disclosure Package and the Prospectus, the results of which are inconsistent with or call into question the results described or referred to in the General Disclosure Package and the Prospectus; and the Company has not received any notices or correspondence from the FDA or any foreign, state or local governmental body exercising comparable authority requiring the termination, suspension or material modification of any Company Studies or Trials that would reasonably be expected to have a Material Adverse Effect and, to the Company's Knowledge, there are no reasonable grounds for the same. The Company has obtained (or caused to be obtained) informed consent by or on behalf of each human subject who participated in the Company Studies and Trials. In using or disclosing patient information received by the Company in connection with the Company Studies and Trials, the Company has complied in all material respects with all applicable laws and regulatory rules or requirements, including, without limitation, the Health Insurance Portability and Accountability Act of 1996 and the rules and regulations thereunder. To the Company's Knowledge, none of the Company Studies and Trials involved any investigator who has been disqualified as a clinical investigator or has been found by the FDA to have engaged in scientific misconduct. To the Company's Knowledge, the manufacturing facilities and operations of its suppliers are operated in compliance in all material respects with all applicable statutes, rules, regulations and policies of the FDA and comparable regulatory agencies outside of the United States to which the Company is subject.

(x) Investment Company Act. Neither the Company nor any of its subsidiaries is or, after giving effect to the offering of the Stock and the application of the proceeds thereof as described in the General Disclosure Package and the Prospectus, will be required to register as an "investment company" or an entity "controlled" by an "investment company" within the meaning of the

Investment Company Act of 1940, as amended, and the rules and regulations of the Commission thereunder.

(y) No Stabilization. Neither the Company nor, to the Company's Knowledge, any of its officers, directors or affiliates has taken or will take, directly or indirectly, any action designed or intended to stabilize or manipulate the price of any security of the Company, or which caused or resulted in, or which might in the future reasonably be expected to cause or result in, stabilization or manipulation of the price of any security of the Company.

(z) Intellectual Property. The Company and its subsidiaries own or possess the valid right to use all valid and enforceable patents, patent applications, trademarks, trademark registrations, service marks, service mark registrations, Internet domain name registrations, copyrights, copyright registrations, licenses, inventions, software, works of authorships, trade names, databases, formulae, know how, and other intellectual property (including trade secrets and other unpatented and/or unpatentable proprietary or confidential information, systems, or procedures) (collectively, "***Intellectual Property Rights***") necessary to conduct their respective businesses as currently conducted, and as proposed to be conducted and described in the General Disclosure Package and the Prospectus. The Company and its subsidiaries, collectively, exclusively own all right, title and interest in and to the Intellectual Property Rights owned by them or described as owned by them in the General Disclosure Package or the Prospectus. The Company and its subsidiaries have not received any opinion from their legal counsel concluding that any activities of their respective businesses infringe, misappropriate, or otherwise violate, valid and enforceable Intellectual Property Rights of any other person, and have not received written notice of any challenge, which to the Company's Knowledge, is still pending, by any other person to the rights of the Company and its subsidiaries with respect to any Intellectual Property Rights owned or used by the Company or its subsidiaries. The Intellectual Property Rights owned by or, to the Company's Knowledge, licensed to Company and its subsidiaries has not been adjudged invalid or unenforceable by a court of competent jurisdiction or applicable government agency, in whole or in part. To the Company's Knowledge, the Company and its subsidiaries' respective businesses have not given, and do not and will not give, rise to any infringement of, any misappropriation of, or other violation of, any valid and enforceable Intellectual Property Rights of any other person. All agreements for the development, license or use of the Intellectual Property Rights described in the General Disclosure Package and the Prospectus are valid, binding upon, and enforceable by or against the parties thereto in accordance to its terms. The Company has complied in all material respects with, and is not in breach nor has received any asserted or threatened claim of breach of any such agreement, and the Company has no knowledge of any breach or anticipated breach by any other person to any such agreement. No claim has been made against the Company alleging the infringement by the Company of any patent, trademark, service mark, trade name, copyright, trade secret, license in or other intellectual property right or franchise right of any person. The Company has taken all reasonable steps to protect, maintain and safeguard its Intellectual Property Rights, including the execution of appropriate nondisclosure and confidentiality agreements. The employment or engagement by the Company of each current and former employee and contractor, and their activities thereunder, has not and does not violate any prior or current employment agreement of such employee or contractor except where violations would not, singularly or in the aggregate, have a Material Adverse Effect. Each such employee and contractor has signed an invention assignment agreement giving the Company and its subsidiaries sole and exclusive rights to any Intellectual Property Rights developed by such person in connection with his or her employment or engagement, as applicable, with the Company or its subsidiaries. No government funding, facilities or resources of a university, college, other educational institution or research center or funding from third parties was used in the development of any Intellectual Property Rights that are owned or purported to be owned by the Company or any of its subsidiaries and no governmental agency or body, university, college, other educational institution or research center has any claim or right in or to any such Intellectual Property Rights, other than as described in the General Disclosure

Package and the Prospectus. The consummation of the transactions contemplated by this Agreement will not result in the loss or impairment of or payment of any additional amounts with respect to, nor require the consent of any other person in respect of, the Company's right to own, use, or hold for use any of the Intellectual Property Rights as owned, used or held for use in the conduct of the business as currently conducted. With respect to the use of the software in the Company's business as it is currently conducted, the Company has not experienced any material defects in such software, including any material error or omission in the processing of any transactions other than defects which have been corrected, and to the Company's Knowledge, no such software contains any device or feature designed to disrupt, disable, or otherwise impair the functioning of any software or is subject to the terms of any "open source" or other similar license that provides for the source code of the software to be publicly distributed or dedicated to the public.

(aa) Privacy Laws. The Company and its subsidiaries are, and take all necessary actions to be, in material compliance with all internal and external privacy policies, industry standards, all applicable statutes, judgments, orders, rules, regulations of any court or arbitrator or other governmental or regulatory entity, any other legal obligations, and applicable data privacy and security laws and regulations, including, without limitation, the Health Insurance Portability and Accountability Act ("***HIPAA***"), as amended by the Health Information Technology for Economic and Clinical Health Act (the "***HITECH Act***") (42 U.S.C. Section 17921 et seq.); the California Consumer Privacy Act ("***CCPA***"); the European Union General Data Protection Regulation ("***GDPR")*** (EU 2016/679) (collectively, "***Privacy Laws***") and any other applicable contractual obligation, in each case relating to the collection, use, transfer, import, export, storage, protection, disposal and disclosure by the Company or any of its subsidiaries of personal, personally identifiable, household, sensitive, confidential or regulated data ("***Data Security Obligations***"). To ensure compliance with the Data Security Obligations, the Company and its subsidiaries have in place, comply with, and take appropriate steps reasonably designed to ensure compliance in all material respects with their policies and procedures relating to data privacy and security and the collection, storage, use, disclosure, handling and analysis of Personal Data (the "***Policies***"). The Company provides accurate notice of its Policies to its customers, employees, third party vendors and representatives. The Policies provide accurate and sufficient notice of the Company's then-current privacy practices relating to its subject matter and such Policies do not contain any material omissions of the Company's then-current privacy practices. "***Personal Data***" means (i) a natural persons' name, street address, telephone number, email address, photograph, social security number, bank information, or customer or account number; (ii) any information which would qualify as "personally identifying information" under the Federal Trade Commission Act, as amended; (iii) Protected Health Information as defined by HIPAA; (iv) "personal data" as defined by GDPR; and (v) any other piece of information that allows the identification of such natural person, or his or her family, or permits the collection or analysis of any data related to an identified person's health or sexual orientation. None of such disclosures made or contained in any of the Policies have been inaccurate, misleading, deceptive or in violation of any Privacy Laws or Policies in any material respect. The execution, delivery and performance of this Agreement or any other agreement referred to in this Agreement will not result in a breach of any Privacy Laws or Policies. Neither the Company nor any of its subsidiaries, (i) has received notice of any actual or potential liability under or relating to, or actual or potential violation of, any of the Privacy Laws, and has no knowledge of any event or condition that would reasonably be expected to result in any such notice; (ii) is currently conducting or paying for, in whole or in part, any investigation, remediation or other corrective action pursuant to any Privacy Law; (iii) is a party to any order, decree, or agreement that imposed any obligation or liability under any Privacy Law or (iv) is a party to any action, suit or proceeding by or before any court or governmental agency, authority or body pending or threatened alleging non-compliance with any Data Security Obligation.

(bb) IT Systems. (i)(x) There has been no security breach or attack or other compromise of or relating to any of the Company's and its subsidiaries' information technology and computer

systems, networks, hardware, software, data (including confidential information, trade secrets or other data of the Company or any of its subsidiaries or their respective customers, employees, suppliers, vendors, patient data, data from preclinical studies and any third party data maintained by or on behalf of them), equipment or technology ("***IT Systems and Data***"), and (y) the Company and its subsidiaries have not been notified of, and have no knowledge of any event or condition that would reasonably be expected to result in any security breach, attack or compromise to their IT Systems and Data, (ii) the Company and its subsidiaries have complied, and are presently in compliance with, all applicable laws, statutes or any judgment, order, rule or regulation of any court or arbitrator or governmental or regulatory authority and all industry guidelines, standards, internal policies, contractual obligations relating to the privacy and security of IT Systems and Data and to the protection of such IT Systems and Data from unauthorized use, access, misappropriation or modification and (iii) the Company and its subsidiaries have used reasonable efforts to establish and maintain, and have established, maintained, implemented, and complied with, reasonable information technology, information security, cyber security and data protection controls, policies and procedures, including oversight, access controls, encryption, technological and physical safeguards and business continuity/disaster recovery and security plans that are designed to protect against and prevent breach, destruction, loss, unauthorized distribution, use, access, disablement, misappropriation or modification, or other compromise or misuse of or relating to the IT Systems and Data.

(cc) Title to Real and Personal Property. The Company and each of its subsidiaries have good and marketable title in and (in the case of real property) to, or have valid and marketable rights to lease or otherwise use, all items of real or personal property which are material to the business of the Company and its subsidiaries taken as a whole, in each case free and clear of all liens, encumbrances, security interests, claims and defects that (i) do not, singularly or in the aggregate, materially affect the value of such property and do not materially interfere with the use made and proposed to be made of such property by the Company or any of its subsidiaries or (ii) could not reasonably be expected, singularly or in the aggregate, to have a Material Adverse Effect.

(dd) No Labor Dispute. There is (A) no significant unfair labor practice complaint pending against the Company, or any of its subsidiaries, nor to the Company's Knowledge, threatened against it or any of its subsidiaries, before the National Labor Relations Board, any state or local labor relation board or any foreign labor relations board, and no significant grievance or significant arbitration proceeding arising out of or under any collective bargaining agreement is so pending against the Company or any of its subsidiaries, or, to the Company's Knowledge, threatened against it and (B) no labor disturbance by or dispute with, employees of the Company or any of its subsidiaries exists or, to the Company's Knowledge, is contemplated or threatened, and the Company is not aware of any existing or imminent labor disturbance by the employees of any of its or its subsidiaries' principal suppliers, manufacturers, customers or contractors, that could reasonably be expected, singularly or in the aggregate, to have a Material Adverse Effect. The Company is not aware that any key employee or significant group of employees of the Company or any subsidiary plans to terminate employment with the Company or any such subsidiary.

(ee) Compliance with ERISA. No "prohibited transaction" (as defined in Section 406 of the Employee Retirement Income Security Act of 1974, as amended, including the regulations and published interpretations thereunder ("***ERISA***"), or Section 4975 of the Internal Revenue Code of 1986, as amended from time to time (the "***Code***")) or "accumulated funding deficiency" (as defined in Section 302 of ERISA) or any of the events

set forth in Section 4043(b) of ERISA (other than events with respect to which the thirty (30)-day notice requirement under Section 4043 of ERISA has been waived) has occurred or could reasonably be expected to occur with respect to any employee benefit plan of the Company or any of its subsidiaries which could, singularly or in the aggregate, reasonably be expected to have a Material Adverse Effect. Each employee benefit plan of the Company or any of its subsidiaries is in compliance in all material respects with applicable

law, including ERISA and the Code. The Company and its subsidiaries have not incurred and could not reasonably be expected to incur material liability under Title IV of ERISA with respect to the termination of, or withdrawal from, any pension plan (as defined in ERISA). Each pension plan for which the Company or any of its subsidiaries would have any liability that is intended to be qualified under Section 401(a) of the Code is so qualified, and to the Company's Knowledge, nothing has occurred, whether by action or by failure to act, which could, singularly or in the aggregate, reasonably be expected to cause the loss of such qualification.

(ff) Environmental Laws and Hazardous Materials. The Company and its subsidiaries are in compliance in all material respects with all foreign, federal, state and local rules, laws and regulations relating to the use, treatment, storage and disposal of hazardous or toxic substances or waste and protection of health and safety or the environment which are applicable to their businesses ("***Environmental Laws***"). There has been no storage, generation, transportation, handling, treatment, disposal, discharge, emission, or other release of any kind of toxic or other wastes or other hazardous substances by, due to, or caused by the Company or any of its subsidiaries (or, to the Company's Knowledge, any other entity for whose acts or omissions the Company or any of its subsidiaries is or may otherwise be liable) upon any of the property now or previously owned or leased by the Company or any of its subsidiaries, or upon any other property, in violation of any law, statute, ordinance, rule, regulation, order, judgment, decree or permit or which would, under any law, statute, ordinance, rule (including rule of common law), regulation, order, judgment, decree or permit, give rise to any liability that could reasonably be expected to have a Material Adverse Effect; and there has been no disposal, discharge, emission or other release of any kind onto such property or into the environment surrounding such property of any toxic or other wastes or other hazardous substances with respect to which the Company or any of its subsidiaries has knowledge.

(gg) Taxes. The Company and its subsidiaries each (i) have timely filed all necessary federal, state, local and foreign tax returns, and all such returns were true, complete and correct in all material respects, (ii) have paid all federal, state, local and foreign taxes, for which it is liable, including, without limitation, all sales and use taxes and all taxes which the Company or any of its subsidiaries is obligated to withhold from amounts owing to employees, creditors and third parties, and (iii) do not have any tax deficiency or claims outstanding or assessed or, to its Knowledge, proposed against any of them, except those, in each of the cases described in clauses (i), (ii) and (iii) above, that would not reasonably be expected to, singularly or in the aggregate, have a Material Adverse Effect.

(hh) Insurance. The Company and each of its subsidiaries carry, or are covered by, insurance in such amounts and covering such risks as the Company reasonably believes is adequate for the conduct of their respective businesses and the value of their respective properties. Neither the Company nor any of its subsidiaries has any reason to believe that it will not be able to renew its existing insurance coverage as and when such coverage expires or to obtain similar coverage from similar insurers as may be necessary to continue its business at a cost that would not have a Material Adverse Effect. Neither the Company nor any of its subsidiaries has received written notice from any insurer, agent of such insurer or the broker of the Company or any of its subsidiaries that any material capital improvements or any other material expenditures (other than premium payments) are required or necessary to be made in order to continue such insurance.

(ii) Accounting Controls. The Company and each of its subsidiaries maintains a system of "internal control over financial reporting" (as such term is defined in Rule 13a-15(f) of the General Rules and Regulations under the Exchange Act (the "***Exchange Act Rules***")) that complies with the requirements of the Exchange Act and has been designed by their respective principal executive and principal financial officers, or under their supervision, to provide reasonable assurances that (i) transactions are executed in accordance with management's general or specific authorizations; (ii) transactions are recorded as necessary to permit preparation of financial statements in conformity

with GAAP and to maintain accountability for assets; (iii) access to assets is permitted only in accordance with management's general or specific authorization; (iv) the recorded accountability for assets is compared with existing assets at reasonable intervals and appropriate action is taken with respect to any differences and (v) interactive data in eXtensible Business Reporting Language included or incorporated by reference in the Registration Statement fairly presents the Commission's rules and guidelines applicable thereto. The Company's internal control over financial reporting is effective. Except as described in the General Disclosure Package, since the end of the Company's most recent audited fiscal year, there has been (A) no material weakness in the Company's internal control over financial reporting (whether or not remediated) and (B) no change in the Company's internal control over financial reporting that has materially affected, or is reasonably likely to materially affect, the Company's internal control over financial reporting.

(jj) Disclosure Controls. The Company and its subsidiaries maintain disclosure controls and procedures (as such term is defined in Rule 13a-15(e) of the Exchange Act Rules) that comply with the requirements of the Exchange Act; such disclosure controls and procedures have been reasonably designed to ensure that information required to be disclosed by the Company and its subsidiaries in reports that they file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the Commission's rules and forms, including controls and procedures designed to ensure that such information is accumulated and communicated to the Company's management to allow timely decisions regarding disclosures. The Company and its subsidiaries have conducted evaluations of the effectiveness of their disclosure controls as required by Rule 13a-15 of the Exchange Act.

(kk) Minute Books. The minute books of the Company and each of its subsidiaries have been made available to the Underwriters and counsel for the Underwriters, and such books (i) contain a complete summary of all meetings and actions of the board of directors (including each board committee) and stockholders of the Company (or analogous governing bodies and interest holders, as applicable), and each of its subsidiaries since the time of its respective incorporation or organization through the date of the latest meeting and action, and (ii) accurately in all material respects reflect all transactions referred to in such minutes.

(ll) No Undisclosed Relationships. No relationship, direct or indirect, exists between or among the Company or any of its subsidiaries on the one hand, and the directors, officers, stockholders (or analogous interest holders), customers or suppliers of the Company or any of its affiliates on the other hand, which is required to be described in the General Disclosure Package and the Prospectus and which is not so described.

(mm) No Registration Rights. No person or entity has the right to require registration of shares of Common Stock or other securities of the Company or any of its subsidiaries because of the filing or effectiveness of the Registration Statement or otherwise, except for persons and entities who have expressly waived such right in writing or who have been given timely and proper written notice and have failed to exercise such right within the time or times required under the terms and conditions of such right. Except as described in the General Disclosure Package, there are no persons with registration rights or similar rights to have any securities registered by the Company or any of its subsidiaries under the Securities Act.

(nn) Margin Rules. The application of the proceeds received by the Company from the issuance, sale and delivery of the Stock as described in the General Disclosure Package and the Prospectus will not violate Regulation T, U or X of the Board of Governors of the Federal Reserve system or any other regulation of such Board of Governors.

(oo) No Broker's Fees. Neither the Company nor any of its subsidiaries is a party to any contract, agreement or understanding with any person (other than this Agreement) that would give rise to a valid claim against the Company or any of its subsidiaries or the Underwriters for a brokerage commission, finder's fee or like payment in connection with the offering and sale of the Stock or

any transaction contemplated by this Agreement, the Registration Statement, the General Disclosure Package or the Prospectus.

(pp) No Restrictions on Subsidiaries. Except as described in the General Disclosure Package and the Prospectus, no subsidiary of the Company is currently prohibited, directly or indirectly, under any agreement or other instrument to which it is a party or is subject, from paying any dividends to the Company, from making any other distribution on such subsidiary's capital stock, from repaying to the Company any loans or advances to such subsidiary from the Company or from transferring any of such subsidiary's properties or assets to the Company or any other subsidiary of the Company.

(qq) Forward-Looking Statements. No forward-looking statement (within the meaning of Section 27A of the Securities Act and Section 21E of the Exchange Act) contained in either the General Disclosure Package or the Prospectus has been made or reaffirmed without a reasonable basis or has been disclosed other than in good faith.

(rr) Listing. The Stock has been approved for listing subject to notice of issuance on The Nasdaq Global Market (the "***Exchange***"). A registration statement has been filed on Form 8-A pursuant to Section 12 of the Exchange Act, which registration statement complies in all material respects with the Exchange Act.

(ss) Sarbanes-Oxley Act. There is and has been no failure on the part of the company or, to the Company's Knowledge, any of the Company's officers or directors, in their capacities as such, to comply with any provision of the Sarbanes-Oxley Act of 2002 and the rules and regulations promulgated in connection therewith (the "***Sarbanes-Oxley Act***"), including Section 402 related to loans and Sections 302 and 906 related to certifications.

(tt) No Unlawful Payments. Neither the Company nor any of its subsidiaries nor, to the Company's Knowledge, any directory, officer, employee, agent, affiliate or other person acting on behalf of the Company or any subsidiary, has (i) used any corporate funds for unlawful contributions, gifts, entertainment or other unlawful expenses relating to political activity, (ii) made any direct or indirect unlawful payment to foreign or domestic government officials or employees, political parties or campaigns, political party officials, or candidates for political office from corporate funds, (iii) violated or is in violation of any provision of the U.S. Foreign Corrupt Practices Act of 1977, as amended, or any applicable anti-corruption laws, rules, or regulation of any other jurisdiction in which the Company or any subsidiary conducts business, or (iv) made any other unlawful bribe, rebate, payoff, influence payment, kickback, or other unlawful payment to any person.

(uu) Statistical and Market Data. The statistical and market related data included in the Registration Statement, the General Disclosure Package and the Prospectus are based on or derived from sources that the Company believes to be reliable and accurate, and such data agree with the sources from which they are derived.

(vv) Compliance with Money Laundering Laws. The operations of the Company and its subsidiaries are and have been conducted at all times in compliance with all applicable financial recordkeeping and reporting requirements, including those of the U.S. Bank Secrecy Act, as amended by Title III of the Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism Act of 2001 (USA PATRIOT Act), and the applicable anti-money laundering statutes of jurisdictions where the Company and its subsidiaries conduct business, the rules and regulations thereunder and any related or similar rules, regulations or guidelines, issued, administered or enforced by any governmental agency (collectively, the "***Anti-Money Laundering Laws***"), and no action, suit or proceeding by or before any court or governmental agency, authority or body or any arbitrator involving the Company or any of its subsidiaries with respect to the Anti-Money Laundering Laws is pending or, to the knowledge of the Company, threatened.

(ww) Compliance with OFAC.

(A) Neither the Company nor any of its subsidiaries, nor any director, officer or employee thereof, nor, to the Company's knowledge, any agent, affiliate, representative or other person acting on behalf of the Company or any of its subsidiaries, is an individual or entity ("***Person***") that is, or is owned or controlled by a Person that is: (i) the subject of any sanctions administered or enforced by the U.S. Department of Treasury's Office of Foreign Assets Control ("***OFAC***"), the United Nations Security Council ("***UNSC***"), the European Union ("***EU***"), Her Majesty's Treasury ("***HMT***"), or other relevant sanctions authority (collectively, "***Sanctions***"), nor (ii) located, organized or resident in a country or territory that is the subject of a U.S. government embargo (including, without limitation, Cuba, Iran, North Korea, Syria and the Crimea).

(B) The Company will not, directly or indirectly, use the proceeds of the offering, or lend, contribute or otherwise make available such proceeds to any subsidiary, joint venture partner or other Person: (i) to fund or facilitate any activities or business of or with any Person that, at the time of such funding or facilitation, is the subject of Sanctions, or in any country or territory that, at the time of such funding or facilitation, is the subject of a U.S. government embargo; or (ii) in any other manner that will result in a violation of Sanctions by any Person (including any Person participating in the offering, whether as underwriter, advisor, investor or otherwise).

(C) For the past five (5) years, the Company and its subsidiaries have not knowingly engaged in, are not now knowingly engaged in, and will not engage in, any direct or indirect dealings or transactions with any Person that at the time of the dealing or transaction is or was the subject of Sanctions or any country or territory that, at the time of the dealing or transaction is or was the subject of a U.S. government embargo.

(xx) No Associated Persons; FINRA Matters. Neither the Company nor any of its affiliates (within the meaning of FINRA Rule 5121(f)(1)) directly or indirectly controls, is controlled by, or is under common control with, or is an associated person (within the meaning of Article I, Section 1(ee) of the By-laws of FINRA) of, any member firm of FINRA other than as described on Schedule D hereof.

(yy) Certification Regarding Beneficial Owners. The Company has delivered to the Representatives a properly completed and executed Certification Regarding Beneficial Owners of Legal Entity Customers, and, if required, copies of identifying documentation.

Any certificate signed by or on behalf of the Company and delivered to the Representatives or to counsel for the Underwriters shall be deemed to be a representation and warranty by the Company to each Underwriter as to the matters covered thereby.

3. *PURCHASE, SALE AND DELIVERY OF OFFERED SECURITIES.* On the basis of the representations, warranties and agreements herein contained, but subject to the terms and conditions herein set forth, the Company agrees to sell to the Underwriters, and the Underwriters agree, severally and not jointly, to purchase from the Company the respective numbers of shares of Firm Stock set forth opposite the names of the Underwriters in Schedule A hereto.

The purchase price per share to be paid by the Underwriters to the Company for the Stock will be $[·] per share (the "***Purchase Price***").

The Company will deliver the Firm Stock to the Representatives for the respective accounts of the several Underwriters, through the facilities of The Depository Trust Company, issued in such names and in such denominations as the Representatives may direct by notice in writing to the Company given at or prior to 12:00 Noon, New York time, on the second (2nd) full business day preceding the Closing Date against payment of the aggregate Purchase Price therefor by wire transfer in federal (same day) funds to an account at a bank specified by the Company payable to the order of the Company for the Firm Stock sold by them

all at the offices of Davis Polk & Wardwell LLP, 1600 El Camino Real, Menlo Park, California 94025. Time shall be of the essence, and delivery at the time and place specified pursuant to this Agreement is a further condition of the obligations of each Underwriter hereunder. The time and date of the delivery and closing shall be at 10:00 A.M., New York time, on [·], 2019, in accordance with Rule 15c6-1 of the Exchange Act. The time and date of such payment and delivery are herein referred to as the "***Closing Date***". The Closing Date and the location of delivery of, and the form of payment for, the Firm Stock may be varied by agreement between the Company and the Representatives.

For the purpose of covering any over-allotments in connection with the distribution and sale of the Firm Stock as contemplated by the Prospectus, the Underwriters may purchase all or less than all of the Optional Stock. The price per share to be paid for the Optional Stock shall be the Purchase Price. The Company agrees to sell to the Underwriters the number of shares of Optional Stock specified in the written notice delivered by the Representatives to the Company described below and the Underwriters agree, severally and not jointly, to purchase such shares of Optional Stock. Such shares of Optional Stock shall be purchased from the Company for the account of each Underwriter in the same proportion as the number of shares of Firm Stock set forth opposite such Underwriter's name on Schedule A bears to the total number of shares of Firm Stock (subject to adjustment by the Representatives to eliminate fractions). The option granted hereby may be exercised as to all or any part of the Optional Stock at any time, and from time to time, *provided however*, that notice of such exercise must be delivered not more than thirty (30) days subsequent to the date of this Agreement. No Optional Stock shall be sold and delivered unless the Firm Stock previously has been, or simultaneously is, sold and delivered. The right to purchase the Optional Stock or any portion thereof may be surrendered and terminated at any time upon notice by Representatives to the Company.

The option granted hereby shall be exercised by written notice being given to the Company by the Representatives setting forth the number of shares of the Optional Stock to be purchased by the Underwriters and the date and time for delivery of and payment for the Optional Stock. Each date and time for delivery of and payment for the Optional Stock (which may be the Closing Date, but not earlier) is herein called the "***Option Closing Date***" and shall in no event be earlier than two (2) business days nor later than five (5) business days after written notice is given. The Option Closing Date and the Closing Date are herein called the "***Closing Dates***."

The Company will deliver the Optional Stock to the Representatives for the respective accounts of the several Underwriters through the facilities of The Depository Trust Company, issued in such names and in such denominations as the Representatives may direct by notice in writing to the Company given at or prior to 12:00 Noon, New York time, on the second (2nd) full business day preceding the Option Closing Date against payment of the aggregate Purchase Price therefor by wire transfer in federal (same day) funds to an account at a bank acceptable to the Representatives payable to the order of the Company all at the offices of Davis Polk & Wardwell LLP, 1600 El Camino Real, Menlo Park, California 94025. Time shall be of the essence, and delivery at the time and place specified pursuant to this Agreement is a further condition of the obligations of each Underwriter hereunder. The Option Closing Date and the location of delivery of, and the form of payment for, the Optional Stock may be varied by agreement between the Company and the Representatives.

The several Underwriters propose to offer the Stock for sale upon the terms and conditions set forth in the Prospectus.

4. *FURTHER AGREEMENTS OF THE COMPANY*

The Company agrees with the several Underwriters:

(a) Required Filings; Amendments or Supplements; Notice to the Representatives. To prepare the Rule 462(b) Registration Statement, if necessary, in a form approved by the Representatives and file such Rule 462(b) Registration Statement with the Commission by 10:00 P.M., New York time, on the date hereof, and the Company shall at the time of filing either pay to the Commission the

filing fee for the Rule 462(b) Registration Statement or give irrevocable instructions for the payment of such fee pursuant to Rule 111(b) under the Rules and Regulations; to prepare the Prospectus in a form approved by the Representatives containing information previously omitted at the time of effectiveness of the Registration Statement in reliance on Rule 430A of the Rules and Regulations and to file such Prospectus pursuant to Rule 424(b) of the Rules and Regulations not later than the second (2nd) business day following the execution and delivery of this Agreement or, if applicable, such earlier time as may be required by the Securities Act; to notify the Representatives immediately of the Company's intention to file or prepare any supplement or amendment to the Registration Statement or to the Prospectus and to make no amendment or supplement to the Registration Statement, the General Disclosure Package or to the Prospectus to which the Representatives shall reasonably object in a timely manner by notice to the Company after a reasonable period to review; to advise the Representatives, promptly after it receives notice thereof, of the time when any amendment to the Registration Statement has been filed or becomes effective or any supplement to the General Disclosure Package or the Prospectus or any amended Prospectus or any Issuer Free Writing Prospectus or any Written Testing-the-Waters Communication has been filed and to furnish the Underwriters with copies thereof; to file promptly all material required to be filed by the Company with the Commission pursuant to Rules 433(d) or 163(b)(2) of the Rules and Regulations, as the case may be; to advise the Representatives, promptly after it receives notice thereof, of the issuance by the Commission of any stop order or of any order preventing or suspending the use of any Preliminary Prospectus, any Issuer Free Writing Prospectus, the Prospectus or any Written Testing-the-Waters Communication, of the suspension of the qualification of the Stock for offering or sale in any jurisdiction, of the initiation or, to the Company's Knowledge, threatening of any proceeding for any such purpose, or of any request by the Commission for the amending or supplementing of the Registration Statement, the General Disclosure Package or the Prospectus or for additional information including, but not limited to, any request for information concerning any Testing-the-Waters Communication; and, in the event of the issuance of any stop order or of any order preventing or suspending the use of any Preliminary Prospectus, any Issuer Free Writing Prospectus or the Prospectus or suspending any such qualification, and promptly to use its best efforts to obtain the withdrawal of such order.

(b) Emerging Growth Company. The Company will promptly notify the Representatives if the Company ceases to be an Emerging Growth Company at any time prior to the later of (a) the completion of the distribution of the Firm Stock within the meaning of the Securities Act and (b) completion of the Lock-Up Period (as defined below).

If at any time following the distribution of any Written Testing-the-Waters Communication there occurred or occurs an event or development as a result of which such Written Testing-the-Waters Communication included or would include an untrue statement of a material fact or omitted or would omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances existing at that subsequent time, not misleading, the Company will promptly notify the Representatives and will promptly amend or supplement, at its own expense, such Written Testing-the-Waters Communication to eliminate or correct such untrue statement or omission.

(c) Permitted Free Writing Prospectus. The Company represents and agrees that, unless it obtains the prior consent of the Representatives, and each Underwriter represents and agrees that, unless it obtains the prior consent of the Company and the Representatives, it has not made and will not, make any offer relating to the Stock that would constitute a "free writing prospectus" as defined in Rule 405 of the Rules and Regulations unless the prior written consent of the Representatives has been received (each, a "***Permitted Free Writing Prospectus***"); *provided* that the prior written consent of the Representatives hereto shall be deemed to have been given in respect of the Issuer Free Writing Prospectuses included in Schedule B hereto. The Company represents that it has treated and agrees that it will treat each Permitted Free Writing Prospectus as an Issuer Free Writing

Prospectus, comply with the requirements of Rules 164 and 433 of the Rules and Regulations applicable to any Issuer Free Writing Prospectus, including the requirements relating to timely filing with the Commission, legending and record keeping and will not take any action that would result in an Underwriter or the Company being required to file with the Commission pursuant to Rule 433(d) of the Rules and Regulations a free writing prospectus prepared by or on behalf of such Underwriter that such Underwriter otherwise would not have been required to file thereunder. The Company will satisfy the condition in Rule 433 of the Rules and Regulations to avoid a requirement to file with the Commission any electronic road show.

(d) Ongoing Compliance. If at any time prior to the date when a prospectus relating to the Stock is required to be delivered (or in lieu thereof, the notice referred to in Rule 173(a) under the Securities Act) any event occurs or condition exists as a result of which the Prospectus as then amended or supplemented would include any untrue statement of a material fact, or omit to state any material fact necessary to make the statements therein, in light of the circumstances under which they were made when the Prospectus is delivered (or in lieu thereof, the notice referred to in Rule 173(a) of the Rules and Regulations), not misleading, or if it is necessary at any time to amend or supplement the Registration Statement or the Prospectus to comply with the Securities Act, that the Company will promptly notify the Representatives thereof and upon their request will prepare an appropriate amendment or supplement in form and substance reasonably satisfactory to the Representatives which will correct such statement or omission or effect such compliance and will use its reasonable best efforts to have any amendment to the Registration Statement declared effective as soon as possible. The Company will furnish without charge to each Underwriter and to any dealer in securities as many copies as the Representatives may from time to time reasonably request of such amendment or supplement. In case any Underwriter is required to deliver a prospectus (or in lieu thereof, the notice referred to in Rule 173(a) of the Rules and Regulations) relating to the Stock, the Company upon the request of the Representatives will prepare promptly an amended or supplemented Prospectus as may be necessary to permit compliance with the requirements of Section 10(a)(3) of the Securities Act and deliver to such Underwriter as many copies as such Underwriter may reasonably request of such amended or supplemented Prospectus complying with Section 10(a)(3) of the Securities Act.

(e) Amendment to General Disclosure Package. If the General Disclosure Package is being used to solicit offers to buy the Stock at a time when the Prospectus is not yet available to prospective purchasers and any event shall occur as a result of which, in the judgment of the Company or in the reasonable opinion of the Underwriters, it becomes necessary to amend or supplement the General Disclosure Package in order to make the statements therein, in the light of the circumstances then prevailing, not misleading, or to make the statements therein not conflict with the information contained in the Registration Statement then on file and not superseded or modified, or if it is necessary at any time to amend or supplement the General Disclosure Package to comply with any law, the Company promptly will prepare, file with the Commission (if required) and furnish to the Underwriters and any dealers an appropriate amendment or supplement to the General Disclosure Package.

(f) Amendment to Issuer Free Writing Prospectus. If at any time following issuance of an Issuer Free Writing Prospectus there occurred or occurs an event or development as a result of which such Issuer Free Writing Prospectus conflicted or will conflict with the information contained in the Registration Statement, Pricing Prospectus or Prospectus and not superseded or modified or included or would include an untrue statement of a material fact or omitted or would omit to state a material fact required to be stated therein or necessary in order to make the statements therein, in the light of the circumstances prevailing at the subsequent time, not misleading, the Company has promptly notified or will promptly notify the Representatives so that any use of the Issuer Free Writing Prospectus may cease until it is amended or supplemented and has promptly amended or will promptly amend or supplement, at its own expense, such Issuer Free Writing Prospectus to

eliminate or correct such conflict, untrue statement or omission. The foregoing sentence does not apply to statements in or omissions from any Issuer Free Writing Prospectus in reliance upon, and in conformity with, written information furnished to the Company through the Representatives by or on behalf of any Underwriter specifically for inclusion therein, which information the parties hereto agree is limited to the Underwriter's Information.

(g) Delivery of Registration Statement. To the extent not available on the Commission's Electronic Data Gathering, Analysis and Retrieval system or any successor system ("***EDGAR***"), upon the request of the Representatives, to furnish promptly to the Representatives and to counsel for the Underwriters a signed copy of the Registration Statement as originally filed with the Commission, and of each amendment thereto filed with the Commission, including all consents and exhibits filed therewith.

(h) Delivery of Copies. Upon request of the Representatives, to the extent not available on EDGAR, to deliver promptly to the Representatives in New York City such number of the following documents as the Representatives shall reasonably request: (i) conformed copies of the Registration Statement as originally filed with the Commission (in each case excluding exhibits), (ii) each Preliminary Prospectus, (iii) any Issuer Free Writing Prospectus, (iv) the Prospectus (the delivery of the documents referred to in clauses (i), (ii), (iii) and (iv) of this paragraph (h) to be made not later than 10:00 A.M., New York time, on the business day following the execution and delivery of this Agreement), (v) conformed copies of any amendment to the Registration Statement (excluding exhibits) and (vi) any amendment or supplement to the General Disclosure Package or the Prospectus (the delivery of the documents referred to in clauses (v) and (vi) of this paragraph (h) to be made not later than 10:00 A.M., New York City time, on the business day following the date of such amendment or supplement).

(i) Earnings Statement. To make generally available to its stockholders as soon as practicable, but in any event not later than sixteen (16) months after the effective date of the Registration Statement (as defined in Rule 158(c) of the Rules and Regulations), an earnings statement of the Company and its subsidiaries (which need not be audited) complying with Section 11(a) of the Securities Act (including, at the option of the Company, Rule 158); and to furnish to its stockholders as soon as practicable after the end of each fiscal year an annual report (including a balance sheet and statements of income, stockholders' equity and cash flows of the Company and its consolidated subsidiaries certified by independent public accountants) and as soon as possible after each of the first three fiscal quarters of each fiscal year (beginning with the first fiscal quarter after the effective date of such Registration Statement), consolidated summary financial information of the Company and its subsidiaries for such quarter in reasonable detail, provided, that so long as the Company is subject to the reporting requirements of Section 13 or Section 15(d) of the Exchange Act and is timely filing reports with the Commission on EDGAR, it shall be deemed to be in compliance with the foregoing requirement to furnish such annual reports and quarterly financial information to its stockholders.

(j) Blue Sky Compliance. To take promptly from time to time such actions as the Representatives may reasonably request to qualify the Stock for offering and sale under the securities or Blue Sky laws of such jurisdictions (domestic or foreign) as the Representatives may reasonably designate and to continue such qualifications in effect, and to comply with such laws, for so long as required to permit the offer and sale of Stock in such jurisdictions; *provided* that the Company and its subsidiaries shall not be obligated to (i) qualify as foreign corporations in any jurisdiction in which they are not so qualified, (ii) file a general consent to service of process in any jurisdiction or (iii) subject itself to taxation in any such jurisdiction if it is not otherwise so subject.

(k) Reports. Upon request, during the period of three (3) years from the date hereof, to deliver to each of the Underwriters, (i) as soon as they are available, copies of all reports or other communications (financial or other) furnished to stockholders, and (ii) as soon as they are available,

copies of any reports and financial statements furnished or filed with the Commission or any national securities exchange on which the Stock is listed. However, so long as the Company is subject to the reporting requirements of either Section 13 or Section 15(d) of the Exchange Act and is timely filing reports with the Commission on EDGAR, it is not required to furnish such reports or statements to the Underwriters.

(l) Lock-Up. During the period commencing on and including the date hereof and ending on and including the 180th day following the date of this Agreement, (the "***Lock-Up Period***") the Company will not, without the prior written consent of the Representatives (which consent may be withheld at the sole discretion of the Representatives), directly or indirectly offer, sell (including, without limitation, any short sale), assign, transfer, pledge, contract to sell, establish an open "put equivalent position" within the meaning of Rule 16a-1(h) under the Exchange Act, or otherwise dispose of, or announce the offering of, or file any registration statement under the Securities Act in respect of, any Common Stock, options, rights or warrants to acquire Common Stock or securities exchangeable or exercisable for or convertible into Common Stock (including shares of the Company's Class B common stock and other than is contemplated by this Agreement with respect to the Stock) or publicly announce any intention to do any of the foregoing; *provided*, *however*, that the Company may (i) issue the shares of Stock to be sold hereunder; (ii) issue Common Stock and options and other equity awards to purchase Common Stock, shares of Common Stock underlying options and other equity awards granted and other securities convertible into, exchangeable for or that represent the right to receive share of Common Stock, each pursuant to any director or employee stock option plan, stock ownership plan or dividend reinvestment plan of the Company in effect on the date hereof and described in the General Disclosure Package; (iii) issue Common Stock pursuant to the conversion of securities or the exercise (including net exercise) of warrants, which securities or warrants are outstanding on the date hereof and described in the General Disclosure Package; (iv) adopt a new equity incentive plan, and file a registration statement on Form S-8 or a successor form thereto under the Securities Act to register the offer and sale of securities to be issued pursuant to such new equity incentive plan, and issue securities pursuant to such new equity incentive plan (including, without limitation, the issuance of shares of Common Stock upon the exercise of options or other securities issued pursuant to such new equity incentive plan), provided that (1) such new equity incentive plan satisfies the transaction requirements of General Instruction A.1 of Form S-8 under the Securities Act and (2) this clause (iv) shall not be available unless each recipient of shares of Common Stock, or securities exchangeable or exercisable for or convertible into Common Stock, pursuant to such new equity incentive plan shall be contractually prohibited from selling, offering, disposing of or otherwise transferring any such shares or securities during the remainder of the Lock-Up Period; and (v) enter into an agreement providing for the issuance of Common Stock or securities convertible into or exercisable for shares of Common Stock in connection with any acquisition, joint venture, collaboration, licensing, commercial relationship or other strategic transaction or any debt financing transaction, and the issuance of any such securities pursuant to any such agreement, provided that the aggregate number of shares of Common Stock, or any securities convertible into or exercisable or exchangeable for Common Stock, that the Company may issue or agree to issue pursuant to this clause (v) shall not exceed 5% of the total outstanding shares of Common Stock immediately following the completion of the transactions contemplated by this Agreement, and provided further, th*at* the recipient of any such shares of Common Stock or securities issued pursuant to this clause (v) during the 180-day restricted period described above shall enter into an agreement substantially in the form of Exhibit I hereto; and provided, that the recipient, to the extent they're an officer or director of the Company, of any such shares of Common Stock or securities issued pursuant to clauses (ii) and (iii) during the 180-day restricted period described above shall enter into an agreement,

substantially in the form of Exhibit I hereto. The Company will cause each officer, director, stockholder, optionholder and warrantholder as requested by the Representatives to furnish to the Representatives, prior to the Closing Date, a "lock-up" agreement, substantially in the form of Exhibit I hereto. In addition, the Company will direct the transfer agent to place stop transfer restrictions upon any such securities of the Company that are bound by such "lock-up" agreements.

(m) Release of Lock-Up. If the Representatives, in their sole discretion, agree to release or waive the restrictions set forth in a "lock-up" agreement described in Section 4(l) hereof for an officer or director of the Company and provide the Company with notice of the impending release or waiver at least three business days before the effective date of the release or waiver, the Company agrees to announce the impending release or waiver by a press release substantially in the form of Exhibit II hereto through a major news service at least two business days before the effective date of the release or waiver.

(n) Delivery of SEC Correspondence. To supply the Underwriters with copies of all correspondence to and from, and all documents issued to and by, the Commission in connection with the registration of the Stock under the Securities Act or any of the Registration Statement, any Preliminary Prospectus or the Prospectus, or any amendment or supplement thereto.

(o) Press Releases. Prior to the Closing Date, not to issue any press release or other communication directly or indirectly or hold any press conference with respect to the Company, its condition, financial or otherwise, or earnings, business affairs or business prospects (except for routine oral marketing communications in the ordinary course of business and consistent with the past practices of the Company and of which the Representatives are notified), without the prior consent of the Representatives (which consent shall not be unreasonably withheld or delayed), unless in the judgment of the Company and its counsel, and after notification to the Representatives, such press release or communication is required by law.

(p) Compliance with Regulation M. Until the Underwriters shall have notified the Company of the completion of the resale of the Stock, that the Company will not, and will use its reasonable best efforts to cause its affiliated purchasers (as defined in Regulation M under the Exchange Act) not to, either alone or with one or more other persons, bid for or purchase, for any account in which it or any of its affiliated purchasers has a beneficial interest, any Stock, or attempt to induce any person to purchase any Stock; and not to, and to use its reasonable best efforts to cause its affiliated purchasers not to, make bids or purchase for the purpose of creating actual, or apparent, active trading in or of raising the price of the Stock.

(q) Registrar and Transfer Agent. To maintain, at its expense, a registrar and transfer agent for the Stock.

(r) Use of Proceeds. To apply the net proceeds from the sale of the Stock as set forth in the Registration Statement, the General Disclosure Package and the Prospectus under the heading "Use of Proceeds," and except as disclosed in the General Disclosure Package, the Company does not intend to use any of the proceeds from the sale of the Stock hereunder to repay any outstanding debt owed to any affiliate of any Underwriter.

(s) Exchange Listing. To use its reasonable best efforts to list for quotation the Stock on the Nasdaq Global Market.

(t) Performance of Covenants and Satisfaction of Conditions. To use its reasonable best efforts to do and perform all things required to be done or performed under this Agreement by the Company prior to each Closing Date and to satisfy all conditions precedent to the delivery of the Firm Stock

and the Optional Stock.

5. *PAYMENT OF EXPENSES*. The Company agrees to pay, or reimburse if paid by any Underwriter, whether or not the transactions contemplated hereby are consummated or this Agreement is terminated: (a) the costs incident to the authorization, issuance, sale, preparation and delivery of the Stock and any taxes payable in that connection; (b) the costs incident to the registration of the Stock under the Securities Act and the Exchange Act; (c) the costs incident to the preparation, printing and distribution of the

Registration Statement, any Preliminary Prospectus, any Issuer Free Writing Prospectus, the General Disclosure Package, the Prospectus, any amendments, supplements and exhibits thereto and the costs of printing, reproducing and distributing the "Agreement Among Underwriters" between the Representatives and the Underwriters, the Master Selected Dealers' Agreement, the Underwriters' Questionnaire, this Agreement and any closing documents by mail, telex or other means of communications; (d) the fees and expenses (including reasonable related fees and expenses of counsel for the Underwriters) incurred in connection with securing any required review by FINRA of the terms of the sale of the Stock and any filings made with FINRA; (e) any applicable listing or other fees; (f) the fees and expenses (including reasonable related fees and expenses of counsel to the Underwriters) of qualifying the Stock under the securities laws of the several jurisdictions as provided in Section 4(j)) and of preparing, printing and distributing wrappers, Blue Sky Memoranda and Legal Investment Surveys (*provided*, *that*, the amount payable by the Company with respect to fees and disbursements of counsel to the Underwriters pursuant to subsection (d) and (f) shall not exceed $35,000 in the aggregate); (g) the cost of preparing and printing stock certificates; (h) all fees and expenses of the registrar and transfer agent of the Stock; (i) the costs and expenses of the Company relating to investor presentations on any "road show" undertaken in connection with the marketing of the offering of the Stock, including, without limitation, expenses associated with the preparation or dissemination of any electronic road show, expenses associated with the production of road show slides and graphics, fees and expenses of any consultants engaged in connection with the road show presentations with the prior approval of the Company, travel and lodging expenses of the officers of the Company and such consultants and fifty (50) percent of the cost of any aircraft chartered in connection with the road show with prior consent of the Company and (j) all other costs and expenses of the Company incident to the offering of the Stock or the performance of the obligations of the Company under this Agreement (including, without limitation, the fees and expenses of the Company's counsel and the Company's independent accountants); *provided* that, except to the extent otherwise provided in this Section 5 and in Sections 9 and 10, the Underwriters shall pay their own costs and expenses, including the fees and expenses of their counsel not contemplated herein, any transfer taxes on the resale of any Stock by them and the expenses of advertising any offering of the Stock made by the Underwriters.

6. *CONDITIONS OF UNDERWRITERS' OBLIGATIONS.* The respective obligations of the several Underwriters hereunder are subject to the accuracy, when made and as of the Applicable Time and on each Closing Date, of the representations and warranties of the Company contained herein, to the accuracy of the statements of the Company made in any certificates pursuant to the provisions hereof, to the performance by the Company of its obligations hereunder, and to each of the following additional terms and conditions:

(a) Registration Compliance; No Stop Orders. The Registration Statement has become effective under the Securities Act, and no stop order suspending the effectiveness of the Registration Statement or any part thereof, preventing or suspending the use of any Preliminary Prospectus, the Prospectus or any Permitted Free Writing Prospectus or any part thereof shall have been issued and no proceedings for that purpose or pursuant to Section 8A under the Securities Act shall have been initiated or threatened by the Commission, and all requests for additional information on the part of the Commission (to be included in the Registration Statement or the Prospectus or otherwise) shall have been complied with to the reasonable satisfaction of the Representatives; the Rule 462(b) Registration Statement, if any, each Issuer Free Writing Prospectus and the Prospectus shall have been filed with, the Commission within the applicable time period prescribed for such filing by, and in compliance with, the Rules and Regulations and in accordance with Section 4(a), and the Rule 462(b) Registration Statement, if any, shall have become effective immediately upon its filing with the Commission; and FINRA shall have raised no unresolved objection to the fairness and reasonableness of the terms of this Agreement or the transactions contemplated hereby.

(b) No Material Misstatements. None of the Underwriters shall have discovered and disclosed to the Company on or prior to such Closing Date that the Registration Statement or any amendment

or supplement thereto contains an untrue statement of a fact which, in the reasonable opinion of counsel for the Underwriters, is material or omits to state any fact which, in the reasonable opinion of such counsel, is material and is required to be stated therein or is necessary to make the statements therein not misleading, or that the General Disclosure Package, any Issuer Free Writing Prospectus or the Prospectus or any amendment or supplement thereto contains an untrue statement of fact which, in the reasonable opinion of such counsel, is material or omits to state any fact which, in the reasonable opinion of such counsel, is material and is necessary in order to make the statements, in the light of the circumstances in which they were made, not misleading.

(c) Corporate Proceedings. All corporate proceedings incident to the authorization, form and validity of each of this Agreement, the Stock, the Registration Statement, the General Disclosure Package, each Issuer Free Writing Prospectus and the Prospectus and the transactions contemplated hereby shall be reasonably satisfactory in all material respects to counsel for the Underwriters, and the Company shall have furnished to such counsel all documents and information that they may reasonably request to enable them to pass upon such matters.

(d) Opinion and 10b-5 Statement of Counsel for the Company. Cooley LLP shall have furnished to the Representatives such counsel's written opinion and 10b-5 Statement, as counsel to the Company, addressed to the Underwriters and dated such Closing Date, in form and substance reasonably satisfactory to the Representatives.

(e) Opinion and 10b-5 Statement of Intellectual Property Counsel for the Company. Kilpatrick Townsend & Stockton LLP shall have furnished to the Representatives such counsel's written opinion, as intellectual property counsel to the Company, addressed to the Underwriters and dated such Closing Date, in form and substance reasonably satisfactory to the Representatives.

(f) Opinion and 10b-5 Statement of Counsel for the Underwriters. The Representatives shall have received from Davis Polk & Wardwell LLP, counsel for the Underwriters, such opinion or opinions and 10b-5 Statement, dated such Closing Date, with respect to such matters as the Underwriters may reasonably require, and the Company shall have furnished to such counsel such documents as they request for enabling them to pass upon such matters.

(g) Comfort Letter. At the time of the execution of this Agreement, the Representatives shall have received from OUM & Co. LLP a letter, addressed to the Underwriters, executed and dated such date, in form and substance satisfactory to the Representatives (i) confirming that they are an independent registered accounting firm with respect to the Company and its subsidiaries within the meaning of the Securities Act and the Rules and Regulations and PCAOB and (ii) stating the conclusions and findings of such firm, of the type ordinarily included in accountants' "comfort letters" to underwriters, with respect to the financial statements and certain financial information contained or incorporated by reference in the Registration Statement, the General Disclosure Package and the Prospectus.

(h) Bring Down Comfort. On the effective date of any post-effective amendment to the Registration Statement and on such Closing Date, the Representatives shall have received a letter (the "***bring-down letter***") from OUM & Co. LLP addressed to the Underwriters and dated such Closing Date confirming, as of the date of the bring-down letter (or, with respect to matters involving changes or developments since the respective dates as of which specified financial information is given in the General Disclosure Package and the Prospectus, as the case may be, as of a date not more than three (3) business days prior to the date of the bring-down letter), the conclusions and findings of such firm, of the type ordinarily included in accountants' "comfort letters" to underwriters, with respect to the financial information and other matters covered by its letter delivered to the Representatives concurrently with the execution of this Agreement pursuant to paragraph (g) of this Section 6.

(i) Officer's Certificate. The Company shall have furnished to the Representatives a certificate, dated such Closing Date, of its Chairman of the Board or President and its Chief Financial Officer

stating in their respective capacities as officers of the Company on behalf of the Company that (i) no stop order suspending the effectiveness of the Registration Statement (including, for avoidance of doubt, any Rule 462(b) Registration Statement), or any post-effective amendment thereto, shall be in effect and no proceedings for such purpose shall have been instituted or, to their knowledge, threatened by the Commission, (ii) for the period from and including the date of this Agreement through and including such Closing Date, there has not occurred any Material Adverse Effect, (iii) to their knowledge, after reasonable investigation, as of such Closing Date, the representations and warranties of the Company in this Agreement are true and correct and the Company has complied with all agreements and satisfied all conditions on its part to be performed or satisfied hereunder at or prior to such Closing Date, and (iv) there has not been, subsequent to the date of the most recent audited financial statements included in the General Disclosure Package, any Material Adverse Effect in the financial position or results of operations of the Company, or any change or development that, singularly or in the aggregate, would reasonably be expected to involve a Material Adverse Effect, except as set forth in the General Disclosure Package and the Prospectus.

(j) No Material Adverse Effect. Since the date of the latest audited financial statements included in the General Disclosure Package, (i) neither the Company nor any of its subsidiaries shall have sustained any loss or interference with its business from fire, explosion, flood or other calamity, whether or not covered by insurance, or from any labor dispute or court or governmental action, order or decree, otherwise than as set forth in the General Disclosure Package, and (ii) there shall not have been any change in the capital stock or long-term debt of the Company or any of its subsidiaries, or any change, or any development involving a prospective change, in or affecting the business, general affairs, management, financial position, stockholders' equity or results of operations of the Company and its subsidiaries, otherwise than as set forth in the General Disclosure Package, the effect of which, in any such case described in clause (i) or (ii) of this paragraph (j), is, in the reasonable judgment of the Representatives, so material and adverse as to make it impracticable or inadvisable to proceed with the sale or delivery of the Stock on the terms and in the manner contemplated in the General Disclosure Package.

(k) No Legal Impediment to Issuance. No action shall have been taken and no law, statute, rule, regulation or order shall have been enacted, adopted or issued by any governmental or regulatory agency or body which would prevent the issuance or sale of the Stock; and no injunction, restraining order or order of any other nature by any federal or state court of competent jurisdiction shall have been issued which would prevent the issuance or sale of the Stock or materially and adversely affect or potentially materially and adversely affect the business or operations of the Company.

(l) No Downgrade. Subsequent to the execution and delivery of this Agreement (i) no downgrading shall have occurred in the Company's corporate credit rating or the rating accorded the Company's debt securities by any "nationally recognized statistical rating organization," as that term is defined by the Commission for purposes of Rule 436(g)(2) of the Rules and Regulations and (ii) no such organization shall have publicly announced that it has under surveillance or review (other than an announcement with positive implications of a possible upgrading), the Company's corporate credit rating or the rating of any of the Company's debt securities.

(m) Market Conditions. Subsequent to the execution and delivery of this Agreement there shall not have occurred any of the following: (i) trading in any of the Company's securities shall have been suspended or materially limited by the Commission or the Exchange, or trading in securities generally on the New York Stock Exchange, Nasdaq Global Select Market, Nasdaq Global Market, Nasdaq Capital Market or the NYSE MKT LLC or in the over-the-counter market, or trading in any securities of the Company on any exchange or in the over-the-counter market, shall have been suspended or materially limited, or minimum or maximum prices or maximum range for prices shall have been established on any such exchange or such market by the Commission, by such exchange or market or by any other regulatory body or governmental authority having jurisdiction, (ii) a banking moratorium shall have been declared by Federal or state authorities or a material

disruption has occurred in commercial banking or securities settlement or clearance services in the United States, (iii) the United States shall have become engaged in hostilities, or the subject of an act of terrorism, or there shall have been an outbreak of or escalation in hostilities involving the United States, or there shall have been a declaration of a national emergency or war by the United States that makes it impracticable or inadvisable to proceed with the offering or (iv) there shall have occurred such a material adverse change in general economic, political or financial conditions (or the effect of international conditions on the financial markets in the United States shall be such) as to make it, in the reasonable judgment of the Representatives, impracticable or inadvisable to proceed with the sale or delivery of the Stock on the terms and in the manner contemplated in the General Disclosure Package and the Prospectus.

(n) Exchange Listing. The Exchange shall have approved the Stock for listing therein, subject only to official notice of issuance and evidence of satisfactory distribution.

(o) Good Standing. The Representatives shall have received on and as of such Closing Date satisfactory evidence of the good standing of the Company and its subsidiaries in their respective jurisdictions of organization and their good standing as foreign entities in such other jurisdictions as the Representatives may reasonably request, in each case in writing or any standard form of telecommunication from the appropriate governmental authorities of such jurisdictions.

(p) Lock-Up Agreements. The Representatives shall have received the written agreements, substantially in the form of Exhibit I hereto, of the officers, directors, stockholders, optionholders and warrantholders of the Company as requested by the Representatives.

(q) Secretary's Certificate. The Company shall have furnished to the Representatives a Secretary's Certificate of the Company, in form and substance reasonably satisfactory to counsel for the Underwriters and customary for the type of offering contemplated by this Agreement.

(r) [Chief Financial Officer Certificate. The Company shall have furnished to the Representatives a certificate, dated such Closing Date, of its Chief Financial Officer, substantially in the form of Exhibit III hereto] [1].

(s) Additional Documents. On or prior to such Closing Date, the Company shall have furnished to the Representatives such further certificates and documents as the Representatives may reasonably request.

All opinions, letters, evidence and certificates mentioned above or elsewhere in this Agreement shall be deemed to be in compliance with the provisions hereof only if they are in form and substance reasonably satisfactory to counsel for the Underwriters.

7. *INDEMNIFICATION AND CONTRIBUTION.*

(a) Indemnification of Underwriters by the Company. The Company shall indemnify and hold harmless:

each Underwriter, its affiliates, directors, officers, managers, members, employees, representatives and agents and each person, if any, who controls any Underwriter within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act (collectively the "***Underwriter Indemnified Parties***," and each an "***Underwriter Indemnified Party***") against any loss, claim, damage, expense or liability whatsoever (or any action, investigation or proceeding in respect thereof), joint or several, to which such Underwriter Indemnified Party may become subject, under the Securities Act or otherwise, insofar as such loss, claim, damage, expense, liability, action, investigation or proceeding

[1] NTD: To remove if not needed.

arises out of or is based upon (A) any untrue statement or alleged untrue statement of a material fact contained in any Written Testing-the-Waters Communication, any Preliminary Prospectus, any Issuer Free Writing Prospectus, any "issuer information" filed or required to be filed pursuant to Rule 433(d) of the Rules and Regulations, the Registration Statement, the Prospectus, or in any amendment or supplement thereto or in any materials or information provided to investors by, or with the approval of, the Company in connection with the marketing of the offering of the Common Stock, including any roadshow or investor presentations made to investors by the Company (whether in person or electronically) ("***Marketing Materials***") or (B) the omission or alleged omission to state in any Written Testing-the-Waters Communication, any Preliminary Prospectus, any Issuer Free Writing Prospectus, any "issuer information" filed or required to be filed pursuant to Rule 433(d) of the Rules and Regulations, the Registration Statement or the Prospectus, or in any amendment or supplement thereto or in any Marketing Materials, a material fact required to be stated therein or necessary to make the statements therein not misleading, and shall reimburse each Underwriter Indemnified Party promptly upon demand for any documented legal fees or other expenses reasonably incurred by that Underwriter Indemnified Party in connection with investigating, or preparing to defend, or defending against, or appearing as a third party witness in respect of, or otherwise incurred in connection with, any such loss, claim, damage, expense, liability, action, investigation or proceeding, as such fees and expenses are incurred; *provided*, *however*, that the Company shall not be liable in any such case to the extent that any such loss, claim, damage, expense or liability arises out of or is based upon an untrue statement or alleged untrue statement in, or omission or alleged omission from any Preliminary Prospectus, the Registration Statement or the Prospectus, or any such amendment or supplement thereto, any Issuer Free Writing Prospectus or any Marketing Materials made in reliance upon and in conformity with written information furnished to the Company through the Representatives by or on behalf of any Underwriter specifically for use therein, which information the parties hereto agree is limited to the Underwriter's Information.

Each indemnity agreement in this Section 7(a) is not exclusive and is in addition to each other indemnity agreement in this Section 7(a) and each other liability which the Company might have under this Agreement or otherwise, and shall not limit any rights or remedies which may otherwise be available under this Agreement, at law or in equity to any Underwriter Indemnified Party.

(b) Indemnification of Company by the Underwriters. Each Underwriter, severally and not jointly, shall indemnify and hold harmless the Company and its directors, its officers who signed the Registration Statement and each person, if any, who controls the Company within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act (collectively the "***Company Indemnified Parties***" and each a "***Company Indemnified Party***") against any loss, claim, damage, expense or liability whatsoever (or any action, investigation or proceeding in respect thereof), joint or several, to which such Company Indemnified Party may become subject, under the Securities Act or otherwise, insofar as such loss, claim, damage, expense, liability, action, investigation or proceeding arises out of or is based upon (i) any untrue statement or alleged untrue statement of a material fact contained in any Preliminary Prospectus, any Issuer Free Writing Prospectus, any "issuer information" filed or required to be filed pursuant to Rule 433(d) of the Rules and Regulations, the Registration Statement or the Prospectus, or in any amendment or supplement thereto, or (ii) the omission or alleged omission to state in any Preliminary Prospectus, any Issuer Free Writing Prospectus, any "issuer information" filed or required to be filed pursuant to Rule 433(d) of the Rules and Regulations, the Registration Statement or the Prospectus, or in any amendment or supplement thereto, a material fact required to be stated therein or necessary to make the statements therein not misleading, but in each case only to the extent that the untrue statement or alleged untrue statement or omission or alleged omission was made in reliance upon and in conformity with written information furnished to the Company through the Representatives by or

on behalf of that Underwriter specifically for use therein, which information the parties hereto agree is limited to the Underwriter's Information, and shall reimburse the Company Indemnified Parties for any legal or other expenses reasonably incurred by such party in connection with investigating or preparing to defend or defending against or appearing as third party witness in connection with any such loss, claim, damage, liability, action, investigation or proceeding, as such fees and expenses are incurred. This indemnity agreement is not exclusive and will be in addition to any liability which the Underwriters might otherwise have and shall not limit any rights or remedies which may otherwise be available under this Agreement, at law or in equity to the Company Indemnified Parties.

(c) Promptly after receipt by an indemnified party under this Section 7 of notice of the commencement of any action, the indemnified party shall, if a claim in respect thereof is to be made against an indemnifying party under this Section 7, notify such indemnifying party in writing of the commencement of that action; *provided*, *however,* that the failure to notify the indemnifying party shall not relieve it from any liability which it may have under this Section 7 except to the extent it has been materially prejudiced by such failure; and, *provided, further,* that the failure to notify an indemnifying party shall not relieve it from any liability which it may have to an indemnified party otherwise than under this Section 7. If any such action shall be brought against an indemnified party, and it shall notify the indemnifying party thereof, the indemnifying party shall be entitled to participate therein and, to the extent that it wishes, jointly with any other similarly notified indemnifying party, to assume the defense of such action with counsel reasonably satisfactory to the indemnified party (which counsel shall not, except with the written consent of the indemnified party, be counsel to the indemnifying party). After notice from the indemnifying party to the indemnified party of its election to assume the defense of such action, except as provided herein, the indemnifying party shall not be liable to the indemnified party under Section 7 for any legal or other expenses subsequently incurred by the indemnified party in connection with the defense of such action other than reasonable costs of investigation; *provided, however,* that any indemnified party shall have the right to employ separate counsel in any such action and to participate in the defense of such action but the fees and expenses of such counsel (other than reasonable costs of investigation) shall be at the expense of such indemnified party unless (i) the employment thereof has been specifically authorized in writing by the Company in the case of a claim for indemnification under Section 7(a) or the Representatives in the case of a claim for indemnification under Section 7(b), (ii) such indemnified party shall have been advised by its counsel that there may be one or more legal defenses available to it which are different from or additional to those available to the indemnifying party or (iii) the indemnifying party has failed to assume the defense of such action and employ counsel reasonably satisfactory to the indemnified party within a reasonable period of time after notice of the commencement of the action or the indemnifying party does not diligently defend the action after assumption of the defense, in which case, if such indemnified party notifies the indemnifying party in writing that it elects to employ separate counsel at the expense of the indemnifying party, the indemnifying party shall not have the right to assume the defense of (or, in the case of a failure to diligently defend the action after assumption of the defense, to continue to defend) such action on behalf of such indemnified party and the indemnifying party shall be responsible for legal or other expenses subsequently incurred by such indemnified party in connection with the defense of such action; *provided*, *however*, that the indemnifying party shall not, in connection with any one such action or separate but substantially similar or related actions in the same jurisdiction arising out of the same general allegations or circumstances, be liable for the reasonable fees and expenses of more than one separate firm of attorneys at any time for all such indemnified parties (in addition to any local counsel), which firm shall be designated in writing by the Representatives if the indemnified parties under this Section 7 consist of any Underwriter Indemnified Party or by the Company if the indemnified parties under this Section 7 consist of any Company Indemnified Parties. Subject to this Section 7(c), the amount payable by an indemnifying party under Section 7 shall include, but

not be limited to, (x) reasonable legal fees and expenses of counsel to the indemnified party and any other expenses in investigating, or preparing to defend or defending against, or appearing as a third party witness in respect of, or otherwise incurred in connection with, any action, investigation, proceeding or claim, and (y) all amounts paid in settlement of any of the foregoing. No indemnifying party shall, without the prior written consent of the indemnified parties, settle or compromise or consent to the entry of judgment with respect to any pending or threatened action or any claim whatsoever, in respect of which indemnification or contribution could be sought under this Section 7 (whether or not the indemnified parties are actual or potential parties thereto), unless such settlement, compromise or consent (i) includes an unconditional release of each indemnified party in form and substance reasonably satisfactory to such indemnified party from all liability arising out of such action or claim and (ii) does not include a statement as to or an admission of fault, culpability or a failure to act by or on behalf of any indemnified party. Subject to the provisions of the following sentence, no indemnifying party shall be liable for settlement of any pending or threatened action or any claim whatsoever that is effected without its written consent (which consent shall not be unreasonably withheld or delayed), but if settled with its written consent, if its consent has been unreasonably withheld or delayed or if there be a judgment for the plaintiff in any such matter, the indemnifying party agrees to indemnify and hold harmless any indemnified party from and against any loss or liability by reason of such settlement or judgment. In addition, if at any time an indemnified party shall have requested that an indemnifying party reimburse the indemnified party for fees and expenses of counsel, such indemnifying party agrees that it shall be liable for any settlement of the nature contemplated by this Section 7(c) effected without its written consent if (i) such settlement is entered into more than forty-five (45) days after receipt by such indemnifying party of the request for reimbursement, (ii) such indemnifying party shall have received notice of the terms of such settlement at least thirty (30) days prior to such settlement being entered into and (iii) such indemnifying party shall not have reimbursed such indemnified party in accordance with such request prior to the date of such settlement.

(d) If the indemnification provided for in this Section 7 is unavailable or insufficient to hold harmless an indemnified party under Section 7(a) or 7(b), then each indemnifying party shall, in lieu of indemnifying such indemnified party, contribute to the amount paid, payable or otherwise incurred by such indemnified party as a result of such loss, claim, damage, expense or liability (or any action, investigation or proceeding in respect thereof), as incurred, (i) in such proportion as shall be appropriate to reflect the relative benefits received by the Company on the one hand and the Underwriters on the other from the offering of the Stock, or (ii) if the allocation provided by clause (i) of this Section 7(d) is not permitted by applicable law, in such proportion as is appropriate to reflect not only the relative benefits referred to in clause (i) of this Section 7(d) but also the relative fault of the Company on the one hand and the Underwriters on the other with respect to the statements, omissions, acts or failures to act which resulted in such loss, claim, damage, expense or liability (or any action, investigation or proceeding in respect thereof) as well as any other relevant equitable considerations. The relative benefits received by the Company on the one hand and the Underwriters on the other with respect to such offering shall be deemed to be in the same proportion as the total net proceeds from the offering of the Stock purchased under this Agreement (before deducting expenses) received by the Company bear to the total underwriting discounts and commissions received by the Underwriters with respect to the Stock purchased under this Agreement, in each case as set forth in the table on the cover page of the Prospectus. The relative fault of the Company on the one hand and the Underwriters on the other shall be determined by reference to, among other things, whether the untrue or alleged untrue statement of a material fact or the omission or alleged omission to state a material fact relates to information supplied by the Company on the one hand or the Underwriters on the other, the intent of the parties and their relative knowledge, access to information and opportunity to correct or prevent such untrue statement, omission, act or failure to act; *provided* that the parties hereto agree that the written information furnished to the Company through the Representatives by or on behalf

of the Underwriters for use in the Preliminary Prospectus, the Registration Statement or the Prospectus, or in any amendment or supplement thereto, consists solely of the Underwriter's Information.

(e) The Company and the Underwriters agree that it would not be just and equitable if contributions pursuant to Section 7(d) above were to be determined by pro rata allocation or by any other method of allocation which does not take into account the equitable considerations referred to Section 7(d) above. The amount paid or payable by an indemnified party as a result of the loss, claim, damage, expense, liability, action, investigation or proceeding referred to in Section 7(d) above shall be deemed to include, subject to the limitations set forth above, any legal or other expenses reasonably incurred by such indemnified party in connection with investigating, preparing to defend or defending against or appearing as a third party witness in respect of, or otherwise incurred in connection with, any such loss, claim, damage, expense, liability, action, investigation or proceeding. Notwithstanding the provisions of this Section 7, no Underwriter shall be required to contribute any amount in excess of the amount by which the total underwriting discounts and commissions received by such Underwriter with respect to the offering of the Stock exceeds the amount of any damages which the Underwriter has otherwise paid or become liable to pay by reason of any untrue or alleged untrue statement, omission or alleged omission, act or alleged act or failure to act or alleged failure to act. No person guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) shall be entitled to contribution from any person who was not guilty of such fraudulent misrepresentation. The Underwriters' obligations to contribute as provided in this Section 7 are several in proportion to their respective underwriting obligations and not joint.

8. *TERMINATION*. The obligations of the Underwriters hereunder may be terminated by the Representatives, in their absolute discretion by notice given to the Company prior to delivery of and payment for the Firm Stock if, prior to that time, any of the events described in Sections 6(j), 6(l) or 6(m) have occurred or if the Underwriters shall decline to purchase the Stock for any reason permitted under this Agreement.

9. *REIMBURSEMENT OF UNDERWRITERS' EXPENSES*. Notwithstanding anything to the contrary in this Agreement, if (a) this Agreement shall have been terminated pursuant to Section 8 or 10, (b) the Company shall fail to tender the Stock for delivery to the Underwriters for any reason not permitted under this Agreement, (c) the Underwriters shall decline to purchase the Stock for any reason permitted under this Agreement or (d) the sale of the Stock is not consummated because any condition to the obligations of the Underwriters set forth herein is not satisfied or because of the refusal, inability or failure on the part of the Company to perform any agreement herein or to satisfy any condition or to comply with the provisions hereof, then in addition to the payment of amounts in accordance with Section 5, the Company shall reimburse the Underwriters for the reasonable fees and expenses of Underwriters' counsel and for such other out-of-pocket expenses as shall have been reasonably incurred by them in connection with this Agreement and the proposed purchase of the Stock, including, without limitation, travel and lodging expenses of the Underwriters, and upon demand the Company shall pay the full amount thereof to the Representatives; *provided* that if this Agreement is terminated pursuant to Section 10 by reason of the default of one or more Underwriters, the Company shall not be obligated to reimburse any defaulting Underwriter on account of expenses to the extent incurred by such defaulting Underwriter; *provided further* that the foregoing shall not limit any reimbursement obligation of the Company to any non-defaulting Underwriter under this Section 9.

10. *SUBSTITUTION OF UNDERWRITERS*. If any Underwriter or Underwriters shall default in its or their obligations to purchase shares of Stock hereunder on any Closing Date and the aggregate number of shares which such defaulting Underwriter or Underwriters agreed but failed to purchase does not exceed ten percent (10%) of the total number of shares to be purchased by all Underwriters on such Closing Date, the other Underwriters shall be obligated severally, in proportion to their respective commitments hereunder, to purchase the shares which such defaulting Underwriter or Underwriters agreed but failed to purchase on

such Closing Date. If any Underwriter or Underwriters shall so default and the aggregate number of shares with respect to which such default or defaults occur is more than ten percent (10%) of the total number of shares to be purchased by all Underwriters on such Closing Date and arrangements satisfactory to the Representatives and the Company for the purchase of such shares by other persons are not made within forty-eight (48) hours after such default, this Agreement shall terminate.

If the remaining Underwriters or substituted Underwriters are required hereby or agree to take up all or part of the shares of Stock of a defaulting Underwriter or Underwriters on such Closing Date as provided in this Section 10, (i) the Company shall have the right to postpone such Closing Date for a period of not more than five (5) full business days in order that the Company may effect whatever changes may thereby be made necessary in the Registration Statement or the Prospectus, or in any other documents or arrangements, and the Company agrees promptly to file any amendments to the Registration Statement or supplements to the Prospectus which may thereby be made necessary, and (ii) the respective numbers of shares to be purchased by the remaining Underwriters or substituted Underwriters shall be taken as the basis of their underwriting obligation for all purposes of this Agreement. Nothing herein contained shall relieve any defaulting Underwriter of its liability to the Company or the other Underwriters for damages occasioned by its default hereunder. Any termination of this Agreement pursuant to this Section 10 shall be without liability on the part of any non-defaulting Underwriter or the Company, except that the representations, warranties, covenants, indemnities, agreements and other statements set forth in Section 2, the obligations with respect to expenses to be paid or reimbursed pursuant to Sections 5 and 9 and the provisions of Section 7 and Sections 11 through 21, inclusive, shall not terminate and shall remain in full force and effect.

11. *ABSENCE OF FIDUCIARY RELATIONSHIP.* The Company acknowledges and agrees that:

(a) each Underwriter's responsibility to the Company is solely contractual in nature, the Representatives have been retained solely to act as underwriters in connection with the sale of the Stock and no fiduciary, advisory or agency relationship between the Company and the Representatives has been created in respect of any of the transactions contemplated by this Agreement, irrespective of whether any of the Representatives has advised or is advising the Company on other matters;

(b) the price of the Stock set forth in this Agreement was established by the Company following discussions and arms-length negotiations with the Representatives, and the Company is capable of evaluating and understanding, and understands and accepts, the terms, risks and conditions of the transactions contemplated by this Agreement;

(c) it has been advised that the Representatives and their affiliates are engaged in a broad range of transactions which may involve interests that differ from those of the Company and that the Representatives have no obligation to disclose such interests and transactions to the Company by virtue of any fiduciary, advisory or agency relationship; and

(d) it waives, to the fullest extent permitted by law, any claims it may have against the Representatives for breach of fiduciary duty or alleged breach of fiduciary duty and agrees that the Representatives shall have no liability (whether direct or indirect) to the Company in respect of such a fiduciary duty claim or to any person asserting a fiduciary duty claim on behalf of or in right of the Company, including stockholders, employees or creditors of the Company.

12. *SUCCESSORS; PERSONS ENTITLED TO BENEFIT OF AGREEMENT*. This Agreement shall inure to the benefit of and be binding upon the several Underwriters, the Company and their respective successors and assigns. Nothing expressed or mentioned in this Agreement is intended or shall be construed to give any person, other than the persons mentioned in the preceding sentence, any legal or equitable right, remedy or claim under or in respect of this Agreement, or any provisions herein contained, this Agreement and all conditions and provisions hereof being intended to be and being for the sole and exclusive benefit of such persons and for the benefit of no other person; except that the representations, warranties, covenants, agreements and indemnities of the Company contained in this Agreement shall also be for the benefit of the Underwriter Indemnified Parties, and the indemnities of the several Underwriters shall be for the benefit

of the Company Indemnified Parties. It is understood that each Underwriter's responsibility to the Company is solely contractual in nature and the Underwriters do not owe the Company, or any other party, any fiduciary duty as a result of this Agreement. No purchaser of any of the Stock from any Underwriter shall be deemed to be a successor or assign by reason merely of such purchase.

13. *SURVIVAL OF INDEMNITIES, REPRESENTATIONS, WARRANTIES, ETC.* The respective indemnities, covenants, agreements, representations, warranties and other statements of the Company and the several Underwriters, as set forth in this Agreement or made by them respectively, pursuant to this Agreement, shall remain in full force and effect, regardless of any investigation made by or on behalf of any Underwriter, the Company or any person controlling any of them and shall survive delivery of and payment for the Stock. Notwithstanding any termination of this Agreement, including without limitation any termination pursuant to Section 8 or Section 10, the indemnities, covenants, agreements, representations, warranties and other statements forth in Sections 2, 5, 7 and 9 and Sections 11 through 21, inclusive, of this Agreement shall not terminate and shall remain in full force and effect at all times.

14. *RECOGNITION OF THE U.S. SPECIAL RESOLUTION REGIMES*

(a) In the event that any Underwriter that is a Covered Entity becomes subject to a proceeding under a U.S. Special Resolution Regime, the transfer from such Underwriter of this Agreement, and any interest and obligation in or under this Agreement, will be effective to the same extent as the transfer would be effective under the U.S. Special Resolution Regime if this Agreement, and any such interest and obligation, were governed by the laws of the United States or a state of the United States.

(b) In the event that any Underwriter that is a Covered Entity or a BHC Act Affiliate of such Underwriter becomes subject to a proceeding under a U.S. Special Resolution Regime, Default Rights under this Agreement that may be exercised against such Underwriter are permitted to be exercised to no greater extent than such Default Rights could be exercised under the U.S. Special Resolution Regime if this Agreement were governed by the laws of the United States or a state of the United States.

15. *NOTICES*. All statements, requests, notices and agreements hereunder shall be in writing, and:

(a) if to the Underwriters, shall be given to the Representatives c/o Cowen and Company, LLC, Attention: Head of Equity Capital Markets, Fax: 646-562-1249 with a copy to the General Counsel, Fax: 646-562-1124; c/o Evercore Group L.L.C., 55 East 52nd Street, New York, New York

10055, Attention: General Counsel; and c/o Stifel, Nicolaus & Company, Incorporated, One Montgomery Street, Suite 3700, San Francisco, California 94104 (fax no.: (415) 364-2799); Attention: Keith Lister, Syndicate;

(b) if to the Company shall be delivered or sent by mail, telex, facsimile transmission or email to Atreca, Inc., 500 Saginaw Drive, First Floor, Redwood City, California 94063, Attention: Chief Financial Officer, Fax: (650) 453-2410, email: hcross@atreca.com; with a copy to (which shall not constitute notice): Cooley LLP, 3175 Hanover Street, Palo Alto, California 94304, Attention: Barbara Kosacz and Danielle E. Naftulin, , Fax: (650 849-7400, email: bkosacz@cooley.com and dnaftulin@cooley.com.

provided, however, that any notice to an Underwriter pursuant to Section 7 shall be delivered or sent by mail, or facsimile transmission to such Underwriter at its address set forth in its acceptance telex to the Representatives, which address will be supplied to any other party hereto by the Representatives upon request. Any such statements, requests, notices or agreements shall take effect at the time of receipt thereof.

16. *DEFINITION OF CERTAIN TERMS.* For purposes of this Agreement, (a) "***affiliate***" has the meaning set forth in Rule 405 under the Securities Act; (b) "***business day***" means any day on which the New York Stock Exchange, Inc. is open for trading; (c) "***subsidiary***" has the meaning set forth in Rule 405 of the Rules and Regulations; (d) "***BHC Act Affiliate***" has the meaning assigned to the term "affiliate" in, and shall be interpreted in accordance with, 12 U.S.C. § 1841(k); (e) "***Covered Entity***" means any of the following: (i)

a "covered entity" as that term is defined in, and interpreted in accordance with, 12 C.F.R. § 252.82(b), (ii) a "covered bank" as that term is defined in, and interpreted in accordance with, 12 C.F.R. § 47.3(b) or (iii) a "covered FSI" as that term is defined in, and interpreted in accordance with, 12 C.F.R. § 382.2(b); (f) "***Default Right***" has the meaning assigned to that term in, and shall be interpreted in accordance with, 12 C.F.R. §§ 252.81, 47.2 or 382.1, as applicable and (g) "***U.S. Special Resolution Regime***" means each of (i) the Federal Deposit Insurance Act and the regulations promulgated thereunder and (ii) Title II of the Dodd-Frank Wall Street Reform and Consumer Protection Act and the regulations promulgated thereunder.

17. ***GOVERNING LAW***. **This Agreement shall be governed by and construed in accordance with the laws of the State of New York, including without limitation Section 5-1401 of the New York General Obligations.** The Company irrevocably (a) submits to the exclusive jurisdiction of the Federal and state courts in the Borough of Manhattan in The City of New York for the purpose of any suit, action or other proceeding arising out of this Agreement or the transactions contemplated by this Agreement, the Registration Statement and any Preliminary Prospectus or the Prospectus, (b) agrees that all claims in respect of any such suit, action or proceeding may be heard and determined by any such court, (c) waives to the fullest extent permitted by applicable law, any immunity from the jurisdiction of any such court or from any legal process, (d) agrees not to commence any such suit, action or proceeding other than in such courts, and (e) waives, to the fullest extent permitted by applicable law, any claim that any such suit, action or proceeding is brought in an inconvenient forum.

18. *TRIAL BY JURY.* The Company and each of the Underwriters hereby irrevocably waives, to the fullest extent permitted by applicable law, any and all right to trial by jury in any legal proceeding arising out of or relating to this Agreement.

19. *UNDERWRITER'S INFORMATION*. The parties hereto acknowledge and agree that, for all purposes of this Agreement, the Underwriter's Information consists solely of the following information in the Prospectus: (i) the last paragraph on the front cover page concerning the terms of the offering by the Underwriters; and (ii) the statements concerning the Underwriters contained in the [·] paragraphs under the heading "Underwriting."

20. *AUTHORITY OF THE REPRESENTATIVES.* In connection with this Agreement, the Representatives will act for and on behalf of the several Underwriters, and any action taken under this Agreement by the Representatives, will be binding on all the Underwriters.

21. *PARTIAL UNENFORCEABILITY*. The invalidity or unenforceability of any section, paragraph, clause or provision of this Agreement shall not affect the validity or enforceability of any other section, paragraph, clause or provision hereof. If any section, paragraph, clause or provision of this Agreement is for any reason determined to be invalid or unenforceable, there shall be deemed to be made such minor changes (and only such minor changes) as are necessary to make it valid and enforceable.

22. *GENERAL*. This Agreement constitutes the entire agreement of the parties to this Agreement and supersedes all prior written or oral and all contemporaneous oral agreements, understandings and negotiations with respect to the subject matter hereof. In this Agreement, the masculine, feminine and neuter genders and the singular and the plural include one another. The section headings in this Agreement are for the convenience of the parties only and will not affect the construction or interpretation of this Agreement. This Agreement may be amended or modified, and the observance of any term of this Agreement may be waived, only by a writing signed by the Company and the Representatives.

23. *COUNTERPARTS*. This Agreement may be signed in any number of counterparts, each of which shall be an original, with the same effect as if the signatures thereto and hereto were upon the same instrument. Counterparts may be delivered via facsimile, electronic mail (including pdf or any electronic signature complying with the U.S. federal ESIGN Act of 2000, e.g., www.docusign.com) or other transmission method and any counterpart so delivered shall be deemed to have been duly and validly delivered and be valid and effective for all purposes.

[Remainder of this page left blank]

If the foregoing is in accordance with your understanding please indicate your acceptance of this Agreement by signing in the space provided for that purpose below.

Very truly yours,

ATRECA, INC.

By: _____
Name:
Title:

Accepted as of the date first above written:
COWEN AND COMPANY, LLC
EVERCORE GROUP L.L.C.
STIFEL, NICOLAUS & COMPANY, INCORPORATED

Acting on their own behalf and as Representatives of several Underwriters listed on Schedule A to this Agreement.

By: COWEN AND COMPANY, LLC

By: _____
Name:
Title:

By: EVERCORE GROUP L.L.C.

By: _____
Name:
Title:

By: STIFEL, NICOLAUS & COMPANY, INCORPORATED

By: _____
Name:
Title:

SCHEDULE A

Name	Number of Shares of Firm Stock to be Purchased	Number of Shares of Optional Stock to be Purchased
Cowen and Company, LLC		
Evercore Group L.L.C.		
Stifel, Nicolaus & Company, Incorporated		
Canaccord Genuity LLC		
Brookline Capital Markets, a division of Arcadia Securities, LLC		
Total		

SCHEDULE B

[General Use Free Writing Prospectuses]

[None].

SCHEDULE C

Pricing Information

Firm Stock to be Sold: [ ] shares

Offering Price: $[ ] per share

Underwriting Discounts and Commissions: [ ]%

Estimated Net Proceeds to the Company (after underwriting discounts and commissions, but before transaction expenses): $[ ]

SCHEDULE D

FINRA Associated Persons

[None]

Exhibit I

[Form of Lock-Up Agreement]

Atreca, Inc.

, 2019

COWEN AND COMPANY, LLC
EVERCORE GROUP L.L.C.
STIFEL, NICOLAUS & COMPANY, INCORPORATED
As Representatives of the several Underwriters

c/o Cowen and Company, LLC
599 Lexington Avenue
New York, New York 10022

c/o Evercore Group L.L.C.
55 East 52nd Street
New York, New York 10055

c/o Stifel, Nicolaus & Company, Incorporated
787 Seventh Avenue, 11th Floor
New York, New York 10019

Re: ATRECA, INC. — Registration Statement on Form S-1 for Shares of Common Stock

Ladies and Gentlemen:

This Agreement is being delivered to you in connection with the proposed Underwriting Agreement (the "Underwriting Agreement") between Atreca, Inc., a Delaware corporation (the "Company") and Cowen and Company, LLC, Evercore Group L.L.C. and Stifel, Nicolaus & Company, Incorporated as representatives (the "Representatives") of a group of underwriters (collectively, the "Underwriters"), to be named therein, and the other parties thereto (if any), relating to the proposed public offering of shares of the Class A common stock, par value $0.0001 per share (the "Common Stock") of the Company (the "Offering").

In order to induce you and the other Underwriters to enter into the Underwriting Agreement, and in light of the benefits that the Offering of the Common Stock will confer upon the undersigned in its capacity as a securityholder and/or an officer, director or employee of the Company, and for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the undersigned agrees with each Underwriter that, during the period beginning on the date hereof through and including the date that is the 180th day after the date the Underwriting Agreement is executed (the "Lock-Up Period"), the undersigned will not, without the prior written consent of the Representatives, directly or indirectly, (i) offer, sell, assign, transfer, pledge, contract to sell, or otherwise dispose of, or announce the intention to otherwise dispose of, any shares of Common Stock (including, without limitation, Common Stock which

may be deemed to be beneficially owned by the undersigned in accordance with the rules and regulations promulgated under the Securities Act of 1933, as the same may be amended or supplemented from time to time (such shares, the "Beneficially Owned Shares")) or securities convertible into or exercisable or exchangeable for Common Stock, (ii) enter into any swap, hedge or similar agreement or arrangement that transfers in whole or in part, the economic risk of ownership of the Beneficially Owned Shares or securities convertible into or exercisable or exchangeable for Common Stock, whether now owned or hereafter acquired by the undersigned or with respect to which the undersigned has or hereafter acquires the power of disposition, or (iii) engage in any short selling of the Common Stock or securities convertible into or exercisable or exchangeable for Common Stock.

If the undersigned is an officer or director of the Company, the undersigned further agrees that the foregoing provisions shall be equally applicable to any issuer directed shares of Common Stock the undersigned may purchase in the Offering.

If the undersigned is an officer or director of the Company, (i) the Representatives agree that, at least three business days before the effective date of any release or waiver of the foregoing restrictions in connection with a transfer of shares of Common Stock, the Representatives will notify the Company of the impending release or waiver, and (ii) the Company has agreed in the Underwriting Agreement to announce the impending release or waiver by press release through a major news service at least two business days before the effective date of the release or waiver. Any release or waiver granted by the Representatives hereunder to any such officer or director shall only be effective two business day after the publication date of such press release. The provisions of this paragraph will not apply if (a) the release or waiver is effected solely to permit a transfer not for consideration and (b) the transferee has agreed in writing to be bound by the same terms described in this letter to the extent and for the duration that such terms remain in effect at the time of the transfer.

The restrictions set forth in the second and third paragraphs of this agreement shall not apply to:

(1) if the undersigned is a natural person, any transfers made by the undersigned (a) as a bona fide gift to any member of the immediate family (as defined below) of the undersigned or to a trust the beneficiaries of which are exclusively the undersigned or members of the undersigned's immediate family, (b) by will or intestate succession upon the death of the undersigned or (c) as a bona fide gift to a charity or educational institution,

(2) if the undersigned is a corporation, partnership, limited liability company or other business entity, any transfers to any stockholder, partner or member of, or owner of a similar equity interest in, the undersigned, as the case may be, if, in any such case, such transfer is not for value,

(3) if the undersigned is a corporation, partnership, limited liability company or other business entity, any transfer made by the undersigned (a) in connection with the sale or other bona fide transfer in a single transaction of all or substantially all of the undersigned's capital stock, partnership interests, membership interests or other similar equity interests, as the case may be, or all or substantially all of the undersigned's assets, in any such case not undertaken for the purpose of avoiding the restrictions imposed by this agreement or (b) to another corporation, partnership, limited liability company or other business entity so long as the transferee is an affiliate (as defined below) of the undersigned and such transfer is not for value,

(4) transactions relating to Common Stock or other securities convertible into or exercisable or exchangeable for Common Stock acquired [in the Offering or][2] in open market transactions after completion of the Offering[,]/[provided that no such transaction is required to be, or is, publicly announced (whether on Form 4, Form 5 or otherwise) during the Lock-Up Period,] /[provided that no filing under Section 16(a) of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), reporting a reduction in beneficial ownership of shares of Common Stock shall be required or voluntarily made during the Lock-Up Period in connection with such transactions,][3]

(5) the entry, by the undersigned, at any time on or after the date of the Underwriting Agreement, of any trading plan providing for the sale of Common Stock by the undersigned, which trading plan meets the requirements of Rule 10b5-1(c) under the Exchange Act, provided, however, that such plan does not provide for, or permit, the sale of any Common Stock during the Lock-up Period and no public announcement or filing is voluntarily made or required regarding such plan during the Lock-Up Period,

(6) any transfers made by the undersigned to the Company to satisfy tax withholding obligations pursuant to the Company's equity incentive plans or arrangements disclosed in the Prospectus (as defined in the Underwriting Agreement),

(7) if the undersigned is a trust, any transfer to a trust, trustee or beneficiary of the trust or to the estate of a trustor, trustee or beneficiary of such trust and such transfer is not for value, provided that no voluntary disclosure related to such transaction shall be made, and provided further that no person subject to reporting obligations under Section 16 of the Exchange Act shall make such a transfer if a filing under Section 16 of the Exchange Act or other public announcement would be required in connection with such transfer during the Lock-Up Period,

(8) the transfer of Common Stock or any security convertible into or exercisable or exchangeable for Common Stock (or the economic consequences of ownership of Common Stock) that occurs pursuant to a settlement agreement related to the distribution of assets in connection with the dissolution of a marriage or civil union, by operation of law pursuant to a qualified domestic order in connection with a divorce settlement or pursuant to any other court order,

(9) to the Company pursuant to the undersigned's employment agreement or agreements governed by the Company's equity incentive plans described in the Prospectus under which the Company has the option to repurchase such shares or a right of first refusal with respect to transfers of such shares upon termination of service of the undersigned,

(10) the transfer of shares of Common Stock or any security convertible into or exercisable or exchangeable for Common Stock pursuant to a bona fide third-party tender offer, merger, consolidation or other similar transaction made to all holders of the Company's securities involving a change of control of the Company [that is approved by the board of directors of the Company]/[(including, without limitation, entering into any lock-up, voting or similar agreement that does not transfer the economic risk of ownership pursuant to which the undersigned may agree to transfer, sell, tender or otherwise dispose of Common Stock or such other securities in connection

[2] *To be included in the lock-up agreements of certain stockholders.*

[3] *Alternative language to be included in the lock-up agreements of certain stockholders.*

with any such transaction, or vote any securities in favor of any such transaction)][4], provided, however, that in the event that such tender offer, merger, consolidation or other such transaction is not completed, such securities held by the undersigned shall remain subject to the restrictions on transfer set forth in this Agreement,

(11) the conversion or reclassification of the outstanding preferred shares or other securities of the Company into Common Stock in connection with the consummation of the Offering as described in the Prospectus, provided, however, that any such Common Stock received upon such conversion or reclassification shall be subject to the restrictions contained in this Agreement, and

(12) transactions pursuant to the Underwriting Agreement; and

provided, however, that (A) in the case of any transfer described in clause (1), (2), (3), (7) or (8) above, it shall be a condition to the transfer that the transferee executes and delivers to the Representatives, acting on behalf of the Underwriters, not later than one business day prior to such transfer, a written agreement, in substantially the form of this agreement (it being understood that any references to "immediate family" in the agreement executed by such transferee shall expressly refer only to the immediate family of the undersigned and not to the immediate family of the transferee) and otherwise satisfactory in form and substance to the Representatives, and (B) in the case of any transfer described in clause (1), (2), (3), (6), (8) or (9) above, if the undersigned is required to file a report under Section 16(a) of the Exchange Act, reporting a reduction in beneficial ownership of shares of Common Stock or Beneficially Owned Shares or any securities convertible into or exercisable or exchangeable for Common Stock or Beneficially Owned Shares during the Lock-Up Period, the undersigned shall include a statement in such report to the effect that, (A) in the case of any transfer pursuant to clause (1) above, such transfer is being made as a gift or by will or intestate succession, (B) in the case of any transfer pursuant to clause (2) above, such transfer is being made to a stockholder, partner or member of, or owner of a similar equity interest in, the undersigned and is not a transfer for value, (C) in the case of any transfer pursuant to clause (3) above, such transfer is being made either (a) in connection with the sale or other bona fide transfer in a single transaction of all or substantially all of the undersigned's capital stock, partnership interests, membership interests or other similar equity interests, as the case may be, or all or substantially all of the undersigned's assets or (b) to another corporation, partnership, limited liability company or other business entity that is an affiliate of the undersigned and such transfer is not for value, (D) in the case of any transfer pursuant to clause (6) above, such transfer is being made to satisfy tax withholding obligations, (E) in the case of any transfer pursuant to clause (8) above, such transfer is being made by operation of law, court order or in connection with a divorce settlement, (F) in the case of any transfer pursuant to clause (9) above, such transfer is being made pursuant to a right of repurchase or right of first refusal by the Company. For the purposes of clause (10), "change of control" shall mean the transfer (whether by tender offer, merger, consolidation or other similar transaction), in one transaction or a series of related transactions, to a person or group of affiliated persons (other than an Underwriter pursuant to the Offering), of the Company's voting securities if, after such transfer, such person or group of affiliated persons would hold more than [90%]/[50%][5] of the outstanding voting securities of the Company (or the surviving entity). For purposes of this paragraph, "immediate family" shall mean a spouse, child, grandchild or other lineal descendant (including by adoption), father,

[4] *Alternative language to be included in the lock-up agreements of certain stockholders.*

[5] *Alternative language to be included in the lock-up agreements of certain stockholders.*

mother, brother or sister of the undersigned; and "affiliate" shall have the meaning set forth in Rule 405 under the Securities Act of 1933, as amended.

For avoidance of doubt, nothing in this Agreement prohibits the undersigned from exercising any options or warrants to purchase Common Stock (which exercises may be effected on a cashless basis to the extent the instruments representing such options or warrants permit exercises on a cashless basis), it being understood that any Common Stock issued upon such exercises will be subject to the restrictions of this Agreement.

In order to enable this covenant to be enforced, the undersigned hereby consents to the placing of legends or stop transfer instructions with the Company's transfer agent with respect to any Common Stock or securities convertible into or exercisable or exchangeable for Common Stock.

The undersigned further agrees that it will not, during the Lock-Up Period, make any demand or request for or exercise any right with respect to the registration under the Securities Act of 1933, as amended, of any shares of Common Stock or other Beneficially Owned Shares or any securities convertible into or exercisable or exchangeable for Common Stock or other Beneficially Owned Shares.

[By accepting the obligations of the undersigned contained herein, each of the Representatives on behalf of the Underwriters hereby agrees that if any (i) director of the Company, (ii) officer of the Company subject to Section 16(a) of the Exchange Act, or (iii) any stockholder of the Company subject to a lock-up in connection with the Offering (the persons identified in clauses (i), (ii), and (iii), collectively, the "Restricted Parties") is formally or informally released or waived from any or all of its obligations thereunder (the "Released Party"), the undersigned will be similarly and contemporaneously released or waived from its obligations hereunder (which for the avoidance of doubt will include a release or waiver of the same percentage of its securities as was granted to the Released Party) and each of the Representatives on behalf of the Underwriters agrees to use commercially reasonable efforts to provide notice thereof to the Company within three business days thereof; provided that the failure to give such notice shall not give rise to any claim or liability against the Underwriters. The provisions of this paragraph shall not apply (1) if the aggregate number of shares of Common Stock affected by such releases or waivers to such Released Parties (whether in one or multiple releases or waivers) is less than or equal to 1% of the total number of outstanding Common Stock (assuming a conversion of all preferred stock of the Company into Common Stock and calculated as of the date of such release or waiver); provided that, in the case of officers or directors, a release or waiver shall only be granted due to financial hardship as determined by the Representatives, (2) if the release or waiver is effected solely to permit a transfer not involving a disposition for value and such transferee agrees in writing to be bound by the same terms described in this Lock-Up Agreement to the extent and for the duration that such terms remain in effect at the time of transfer, or (3) if the waiver is granted to a Restricted Party in connection with a follow-on public offering of the Company's securities pursuant to a registration statement on Form S-1 that is filed with the Commission, provided that such waiver shall only apply with respect to such holder's participation in such follow-on public sale.][6]

This Agreement and all authority herein conferred are irrevocable and shall survive the death or incapacity of the undersigned and shall be binding upon the heirs, personal representatives, successors and assigns of the undersigned.

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[6] *To be included in the lock-up agreements of certain stockholders.*

The undersigned hereby represents and warrants that the undersigned has full power and authority to enter into this agreement and that this agreement has been duly authorized (if the undersigned is not a natural person), executed and delivered by the undersigned and is a valid and binding agreement of the undersigned.

This Agreement shall be governed by and construed in accordance with the internal laws of the State of New York applicable to agreements made and to be performed in such state.

If (i) the Company notifies the Representatives in writing that it does not intend to proceed with the Offering, (ii) the Underwriting Agreement is not executed by December 31, 2019, or (iii) the Underwriting Agreement (other than the provisions thereof which survive termination) shall terminate or be terminated for any reason prior to payment for and delivery of any Common Stock to be sold thereunder, then this Agreement shall immediately be terminated and the undersigned shall automatically be released from all of his, her or its obligations under this Agreement. The undersigned acknowledges and agrees that whether or not any public offering of Common Stock actually occurs depends on a number of factors, including market conditions.

[Signature page follows]

Very truly yours,

IF AN INDIVIDUAL:

_____

(duly authorized signature)

Name: _____

(please print full name)

Address:

_____

_____

E-mail: _____

IF AN ENTITY:

_____

(please print complete name of entity)

By: _____

(duly authorized signature)

Name: _____

(please print full name)

Title: _____

(please print full title)

Address:

_____

_____

E-mail: _____

Exhibit II

Atreca, Inc.

[Date]

Atreca, Inc. (the “Company”) announced today that Cowen and Company, LLC, Evercore Group L.L.C. and Stifel, Nicolaus & Company, Incorporated, the lead book-running managers in the Company’s recent public sale of [ ] shares of the Company’s Class A and Class B common stock, are [waiving] [releasing] a lock-up restriction with respect to [ ] shares of the Company’s Class A common stock held by [certain officers or directors][an officer or director] of the Company. The [waiver][release] will take effect on , 20 , and the shares may be sold on or after such date.

This press release is not an offer for sale of the securities in the United States or in any other jurisdiction where such offer is prohibited, and such securities may not be offered or sold in the United States absent registration or exemption from registration under the United States Securities Act of 1933, as amended.

Exhibit III

[Form of Chief Financial Officer Certificate]

Exhibit 3.1

AMENDED AND RESTATED
CERTIFICATE OF INCORPORATION
OF
ATRECA, INC.

Atreca, Inc., a corporation organized and existing under and by virtue of the provisions of the Delaware General Corporation Law (the "***DGCL***"), hereby certifies that:

ONE: The date of filing the original Certificate of Incorporation of this corporation with the Secretary of State of the State of Delaware was June 11, 2010.

TWO: John Orwin is the duly elected and acting President of Atreca, Inc., a Delaware corporation.

THREE: The Board duly adopted resolutions proposing to amend and restate the Certificate of Incorporation of this corporation, declaring said amendment and restatement to be advisable and in the best interests of this corporation and its stockholders, and authorizing the appropriate officers of this corporation to solicit the consent of the stockholders therefor, which resolution setting forth the proposed amendment and restatement is as follows:

RESOLVED: that the Amended and Restated Certificate of Incorporation of this corporation is hereby amended and restated in its entirety to read as follows:

I.

The name of this corporation is **ATRECA, INC. (**the "***Company***"**)**.

II.

The address of the registered office of the Company in the State of Delaware is 160 Greentree Drive, Suite 101, City of Dover, County of Kent, 19904, and the name of the registered agent of the Company in the State of Delaware at such address is National Registered Agents, Inc.

III.

The purpose of this Company is to engage in any lawful act or activity for which a corporation may be organized under the DGCL.

IV.

A. Effective upon the filing of this Amended and Restated Certificate of Incorporation (the "***Restated Certificate***"), a six-for-one reverse stock split of the outstanding capital stock of the Company shall be effected, whereby (i) each one share of the Company's Class A Common Stock (as defined below) then outstanding shall become, automatically and without any further action by the holder thereof, 1/6th of one share of Class A Common Stock, (ii) each one share of the Company's Class B Common Stock (as defined below) then outstanding shall become, automatically and without any further action by the holder thereof, 1/6th of one share of Class B

Common Stock; (iii) each one share of the Company's Series A Preferred (as defined below) then outstanding shall become, automatically and without any further action by the holder thereof, 1/6th of one share of Series A Preferred; (iv) each one share of the Company's Series B Preferred (as defined below) then outstanding shall become, automatically and without any further action by the holder thereof, 1/6th of one share of Series B Preferred; (v) each one share of the Company's Series C1 Preferred (as defined below) then outstanding shall become, automatically and without any further action by the holder thereof, 1/6th of one share of Series C1 Preferred; and (vi) each one share of the Company's Series C2 Preferred then outstanding shall become, automatically and without any further action by the holder thereof, 1/6th of one share of Series C2 Preferred (collectively, the "***Reverse Stock Split***"); *provided*, *however*, that if the Reverse Stock Split would result in any fractional share, the Company shall, in lieu of issuing any such fractional share, pay the holder thereof an amount in cash equal to the fair market value, as determined by the Board of Directors of the Company, of such fractional share on the effective date of the Reverse Stock Split. The Reverse Stock Split shall occur whether or not the certificates representing such shares of Common Stock (as defined below) or Preferred Stock (as defined below) are surrendered to the Company or its transfer agent; *provided*, *however*, that the Company shall not be obligated to issue certificates evidencing the shares resulting from the Reverse Stock Split unless either the certificates evidencing such shares of Common Stock or Preferred Stock are delivered to the Company or its transfer agent, or the holder notifies the Company or its transfer agent that such certificates have been lost, stolen or destroyed and executes an agreement satisfactory to the Company to indemnify the Company from any loss incurred by it in connection with such certificates. Notwithstanding the foregoing, the par value of each share of the Company's outstanding Common Stock and Preferred Stock will not be adjusted in connection with the Reverse Stock Split. Except as otherwise provided, all share numbers and dollars amounts herein are set forth on a post-Reverse Stock Split basis.

The Company is authorized to issue two classes of stock to be designated, respectively, "Common Stock" and "Preferred Stock." The total number of shares that the Company is authorized to issue is 1,000,000,000 shares, 700,000,000 shares of which shall be Common Stock (the "***Common Stock***") and 300,000,000 shares of which shall be Preferred Stock (the "***Preferred Stock***"). The Preferred Stock shall have a par value of one-hundredth of one cent ($0.0001) per share and the Common Stock shall have a par value of one-hundredth of one cent ($0.0001) per share.

B. The number of authorized shares of Common Stock and Preferred Stock may be increased or decreased (but not below the number of shares of Common Stock or Preferred Stock then outstanding) by the affirmative vote of the holders of a majority of the stock of the Company entitled to vote (voting together as a single class on an as-if-converted basis).

C. (1) 650,000,000 of the authorized shares of Common Stock are hereby designated "Class A Common Stock" (the "***Class A Common Stock***"), and 50,000,000 of the authorized shares of Common Stock are hereby designated "Class B Common Stock" (the "***Class B Common Stock***"). (2) 100,000,000 of the authorized shares of Preferred Stock are hereby designated "Series A Preferred Stock" (the "***Series A Preferred***"), 100,000,000 of the authorized shares of Preferred Stock are hereby designated "Series B Preferred Stock" (the "***Series B Preferred***"), 50,000,000 of the authorized shares of Preferred Stock are hereby designated "Series C1 Preferred Stock" (the "***Series C1 Preferred***" and together with the Series A Preferred and the Series B Preferred, the

"***Voting Series Preferred***"), and 50,000,000 of the authorized shares of Preferred Stock are hereby designated "Series C2 Preferred Stock" (the "***Series C2 Preferred***," and together with the Voting Series Preferred, the "***Series Preferred***"). The Series C1 Preferred and Series C2 Preferred are referred to herein collectively as the "***Series C Preferred***".

D. The rights, preferences, privileges, restrictions and other matters relating to the Series Preferred are as follows:

1. DIVIDEND RIGHTS.

(a) Holders of Series Preferred shall be entitled to receive, on a *pari passu* basis among each other but only out of funds that are legally available therefor, cash dividends on each outstanding share of Series Preferred only when, as and if declared by the Board of Directors (the "***Board***") and any such dividends shall be non-cumulative.

(b) The "***Original Issue Price***" shall mean (i) $11.10 per share for the Series A Preferred (as adjusted for any stock dividends, combinations, splits, recapitalizations and the like with respect to such shares after the filing date hereof), (ii) $11.6610 per share for the Series B Preferred (as adjusted for any stock dividends, combinations, splits, recapitalizations and the like with respect to such shares after the filing date hereof) and (iii) $13.98 per share for the Series C Preferred (as adjusted for any stock dividends, combinations, splits, recapitalizations and the like with respect to such shares after the filing date hereof).

(c) In the event dividends are paid on any share of Common Stock, the Company shall pay a dividend on all outstanding shares of Series Preferred in a per share amount equal (on an as-if-converted to Common Stock basis) to the amount paid or set aside for each share of Common Stock.

(d) The provisions of Sections 1(c) shall not apply to a dividend payable solely in Common Stock to which the provisions of Section 4(f) hereof are applicable, or any repurchase of any outstanding securities of the Company that is approved by (i) the Board and (ii) the Series Preferred as may be required by this Amended and Restated Certificate of Incorporation (the "***Restated Certificate***").

(e) For purposes of Section 500 of the California Corporations Code (to the extent applicable), in connection with any repurchase of shares of Common Stock permitted under this Restated Certificate from employees, officers, directors or consultants of the Company in connection with a termination of employment or services pursuant to agreements or arrangements approved by the Board of Directors (in addition to any other consent required under this Certificate of Incorporation), such repurchase may be made without regard to any "preferential dividends arrears amount" or "preferential rights amount" (as those terms are defined in Section 500 of the California Corporations Code). Accordingly, for purposes of making any calculation under California Corporations Code Section 500 in connection with such repurchase, the amount of any "preferential dividends arrears amount" or "preferential rights amount" (as those terms are defined therein) shall be deemed to be zero (0).

2. VOTING RIGHTS.

(a) General Rights. Except as otherwise set forth herein, each holder of shares of the Series Preferred shall be entitled to the number of votes equal to the number of shares of the applicable type of Common Stock into which such shares of Series Preferred could be converted (pursuant to Section 4 hereof) immediately after the close of business on the record date fixed for such meeting or the effective date of such written consent and shall have voting rights and powers equal to the voting rights and powers of the applicable type of Common Stock into which such shares of Series Preferred could be converted (pursuant to Section 4 hereof) and shall be entitled to notice of any stockholders' meeting in accordance with the bylaws of the Company. Except as otherwise provided herein or as required by law, the Series Preferred shall vote together with the Common Stock at any annual or special meeting of the stockholders and not as a separate class, and may act by written consent in the same manner as the Common Stock. Each share of Class A Common Stock is entitled to one (1) vote on all matters upon which the holders of Common Stock are entitled to vote. Each share of Class B Common Stock is entitled to one (1) vote on all matters upon which the holders of Class B Common Stock are entitled to vote. Class B Common Stock (i) shall not be entitled to vote on the election of directors at any time and (ii) following the closing of the first firmly underwritten public offering of the Company's securities pursuant to an effective registration statement under the Securities Act of 1933, as amended (the "***Securities Act***"), covering the offer and sale of Common Stock for the account of the Company, shall be non-voting except as may be required by law.

(b) Separate Vote of Series Preferred. For so long as at least 2,083,333 shares of Series Preferred (as adjusted for any stock dividends, combinations, splits, recapitalizations and the like with respect to such shares after the filing date hereof) remain outstanding, in addition to any other vote or consent required herein or by law, the vote or written consent of the holders of at least sixty-six and two-thirds percent (66-2/3%) of the outstanding Series Preferred (voting or consenting (as the case may be) together as a single class, on an as-converted basis) shall be necessary for the Company to effect or validate the following actions (whether by merger, recapitalization or otherwise), and the Company shall not permit any direct or indirect subsidiary of the Company to effect or validate such actions *mutatis mutanda* without such vote or written consent, and any such actions entered into without such vote or consent shall be null and void ab initio, and of no force or effect:

(i) Any reclassification or recapitalization of the Series Preferred, or any amendment, alteration or repeal of any provision of this Restated Certificate, that adversely changes the rights, preferences or privileges of the Series Preferred;

(ii) Any increase or decrease in the authorized number of shares of any series of Series Preferred or the Preferred Stock in general;

(iii) Any authorization or any designation, whether by reclassification or otherwise, of any new class or series of stock or any other securities convertible into equity securities of the Company senior to the Series Preferred in right of redemption, liquidation preference, voting or dividend rights;

(iv) Any redemption, repurchase, payment or declaration of dividends or other distributions with respect to Common Stock or Preferred Stock other than dividends required pursuant to Section 1 hereof, except (A) repurchases of stock from employees

or consultants in the event of termination of service of such employees or consultants and/or the exercise of a contractual right of first refusal, (B) dividends or other distributions payable on the Common Stock solely in the form of additional shares of Common Stock and/or (C) dividends addressed by Section 4(f) hereof);

(v) Any voluntary dissolution, liquidation or winding up of the Company or any deemed Liquidation Event (as defined below);

(vi) Any increase or decrease in the size of the Board of Directors;

(vii) Any sale, assignment, licensing, pledge or encumbrance of material technology or intellectual property of the Company or any of its wholly owned subsidiaries, other than licenses granted by the Company or such subsidiaries in the ordinary course of business; or

(viii) Enter into any inbound license or acquisition by merger or asset transfer or similar corporate strategic relationship, in each case involving Company assets having a value (as determined by the Board in good faith) greater than $500,000.

(c) Separate Vote of Series B Preferred. For so long as at least 750,000 shares of Series B Preferred (as adjusted for any stock dividends, combinations, splits, recapitalizations and the like with respect to such shares after the filing date hereof) remain outstanding, in addition to any other vote or consent required herein or by law, the vote or written consent of the holders of at least sixty-six and two-thirds percent (66-2/3%) of the outstanding Series B Preferred (voting or consenting (as the case may be) as a separate class) shall be necessary for effecting or validating the following actions (whether by merger, recapitalization or otherwise), and any such actions entered into without such vote or consent shall be null and void ab initio, and of no force or effect:

(i) Any reclassification or recapitalization of the Series B Preferred, or any amendment, alteration or repeal of any provision of this Restated Certificate, that adversely changes the rights, preferences or privileges of the Series B Preferred in a manner different than such amendment, alteration or repeal changes the rights of the other Series Preferred (provided that the addition of a *pari passu* or senior security shall not alone require a vote pursuant to this provision); or

(ii) Any increase or decrease in the authorized number of shares of Series B Preferred.

(d) Separate Vote of Series C Preferred. For so long as at least 1,666,667 shares of Series C Preferred (as adjusted for any stock dividends, combinations, splits, recapitalizations and the like with respect to such shares after the filing date hereof) remain outstanding, in addition to any other vote or consent required herein or by law, the vote or written consent of the holders of at least sixty-six and two-thirds percent (66-2/3%) of the outstanding Series C Preferred (voting or consenting (as the case may be) as a separate class) shall be necessary for effecting or validating the following actions (whether by merger, recapitalization or otherwise),

and any such actions entered into without such vote or consent shall be null and void ab initio, and of no force or effect:

(i) Any reclassification or recapitalization of the Series C Preferred, or any amendment, alteration or repeal of any provision of this Restated Certificate, that adversely changes the rights, preferences or privileges of the Series C Preferred in a manner different than such amendment, alteration or repeal changes the rights of the other Series Preferred (provided that the addition of a *pari passu* or senior security shall not alone require a vote pursuant to this provision); or

(ii) Any increase or decrease in the authorized number of shares of Series C Preferred.

(e) Election of Board of Directors.

(i) The holders of Class A Common Stock, voting as a separate class, shall be entitled to elect 3 members of the Board at each meeting or pursuant to each consent of the Company's stockholders for the election of directors, and to remove from office such directors in accordance with applicable law and to fill any vacancy caused by the resignation, death or removal of such directors.

(ii) The holders of Class A Common Stock and Voting Series Preferred, voting together as a single class on an as-if-converted basis, shall be entitled to elect all remaining members of the Board at each meeting or pursuant to each consent of the Company's stockholders for the election of directors, and to remove from office such directors in accordance with applicable law and to fill any vacancy caused by the resignation, death or removal of such directors. For clarity, and notwithstanding any other provision of this Restated Certificate, under no circumstances shall the holders of Class B Common Stock or Series C2 Preferred have any vote for the election of any directors as to such shares.

(iii) Notwithstanding the provisions of Section 223(a)(1) and 223(a)(2) of the DGCL, any vacancy, including newly created directorships resulting from any increase in the authorized number of directors or amendment of this Restated Certificate, and vacancies created by removal or resignation of a director, may be filled by a majority of the directors then in office, though less than a quorum, or by a sole remaining director, and the directors so chosen shall hold office until the next annual election and until their successors are duly elected and shall qualify, unless sooner displaced; provided, however, that where such vacancy occurs among the directors elected by the holders of a class or series of stock, the holders of shares of such class or series may override the Board of Directors' action to fill such vacancy by (i) voting for their own designee to fill such vacancy at a meeting of the Company's stockholders or (ii) written consent, if the consenting stockholders hold a sufficient number of shares to elect their designee at a meeting of the stockholders in which all members of such class or series are present and voted. Any director may be removed during his or her term of office without cause, by, and only by, the affirmative vote of the holders of the shares of the class or series of stock entitled to elect such director or directors, given either at a special meeting of such stockholders duly called for that purpose or pursuant to a written consent of stockholders, and any vacancy thereby created may be filled by the holders of that class or series of stock represented at

the meeting or pursuant to written consent. At any meeting held for the purpose of electing a director, the presence in person or by proxy of the holders of a majority of the outstanding shares of the class or series entitled to elect such director shall constitute a quorum for the purpose of electing such director.

(iv) No person entitled to vote at an election for directors may cumulate votes to which such person is entitled unless required by applicable law at the time of such election. During such time or times that applicable law requires cumulative voting, every stockholder entitled to vote at an election for directors may cumulate such stockholder's votes and give one candidate a number of votes equal to the number of directors to be elected multiplied by the number of votes to which such stockholder's shares are otherwise entitled, or distribute the stockholder's votes on the same principle among as many candidates as such stockholder desires. No stockholder, however, shall be entitled to so cumulate such stockholder's votes unless (A) the names of such candidate or candidates have been placed in nomination prior to the voting and (B) the stockholder has given notice at the meeting, prior to the voting, of such stockholder's intention to cumulate such stockholder's votes. If any stockholder has given proper notice to cumulate votes, all stockholders may cumulate their votes for any candidates who have been properly placed in nomination. Under cumulative voting, the candidates receiving the highest number of votes, up to the number of directors to be elected, are elected.

3. LIQUIDATION RIGHTS.

(a) Upon any liquidation, dissolution, or winding up of the Company, whether voluntary or involuntary (a "***Liquidation Event***"), on a *pari passu* basis among each other and before any distribution or payment shall be made to the holders of any Common Stock, the holders of Series Preferred shall be entitled to be paid out of the assets of the Company legally available for distribution (or the consideration received by the Company or its stockholders in an Acquisition (as defined below)) for each share of Series Preferred held by them, an amount per share of Series Preferred equal to the applicable Original Issue Price for such share of Series Preferred, plus all declared and unpaid dividends on such share of Series Preferred. If, upon any such Liquidation Event, the assets of the Company shall be insufficient to make payment in full to all holders of Series Preferred of the liquidation preference set forth in this Section 3(a), then such assets (or consideration) shall be distributed among the holders of Series Preferred at the time outstanding, ratably in proportion to the full amounts to which they would otherwise be respectively entitled.

(b) After the payment of the full liquidation preference of the Series Preferred as set forth in Section 3(a) above, the remaining assets of the Company legally available for distribution (or the consideration received by the Company or its stockholders in an Acquisition), if any, shall be distributed ratably to the holders of the Common Stock.

(c) An Asset Transfer or Acquisition (each as defined below) shall be deemed a Liquidation Event for purposes of this Section 3.

(i) For the purposes of this Section 3: (i) "***Acquisition***" shall mean (A) any consolidation or merger of the Company with or into any other corporation or other entity or person, or any other corporate reorganization, other than any such consolidation, merger

or reorganization in which the shares of capital stock of the Company immediately prior to such consolidation, merger or reorganization, continue to represent a majority of the voting power of the surviving entity (or, if the surviving entity is a wholly owned subsidiary, its parent) immediately after such consolidation, merger or reorganization, (provided that, for the purpose of this 3(c), all shares of Common Stock issuable upon exercise of options outstanding immediately prior to such consolidation or merger or upon conversion of Convertible Securities (as defined below) outstanding immediately prior to such merger or consolidation shall be deemed to be outstanding immediately prior to such merger or consolidation and, if applicable, converted or exchanged in such merger or consolidation on the same terms as the actual outstanding shares of capital stock are converted or exchanged); or (B) any transaction or series of related transactions to which the Company is a party in which in excess of fifty percent (50%) of the Company's voting power is transferred; provided that an Acquisition shall not include any transaction or series of transactions principally for bona fide equity financing purposes in which cash is received by the Company or any successor or indebtedness of the Company is cancelled or converted or a combination thereof; and (ii) "***Asset Transfer***" shall mean a sale, lease, exclusive license or other disposition of all or substantially all of the assets of the Company and its subsidiaries in a single transaction or a series of related transactions.

(ii) In any Acquisition or Asset Transfer, if the consideration to be received is securities of a corporation or other property other than cash, its value will be deemed its fair market value as determined in good faith by the Board on the date such determination is made.

(iii) The Company shall not have the power to effect an Acquisition or Asset Transfer unless the definitive agreement for such transaction (the "***Agreement***") provides that the consideration payable to the stockholders of the Company in connection therewith shall be allocated among the holders of capital stock of the Company in accordance with this Section 3. For the purpose of this Section 3, any Acquisition or Asset Transfer may be deemed not to be a Liquidation Event, and such transaction not subject to this Section 3, upon the vote or written consent of the holders of at least sixty-six and two-thirds percent (66-2/3%) of the outstanding shares of the Series Preferred (voting or consenting (as the case may be) together as a single class, on an as-converted basis).

(d) In the event of a Liquidation Event (including an Acquisition or Asset Transfer), if any portion of the consideration payable to the stockholders of the Company is placed into escrow and/or is payable to the stockholders of the Company subject to contingencies, the Agreement shall provide that (x) the portion of such consideration that is not placed in escrow and not subject to any contingencies (the "***Initial Consideration***") shall be allocated among the holders of capital stock of the Company in accordance with Sections 3(a) and 3(b) as if the Initial Consideration were the only consideration payable in connection with such Acquisition or Asset Transfer and (y) any additional consideration that becomes payable to the stockholders of the Company upon release from escrow or satisfaction of contingencies shall be allocated among the holders of capital stock of the Company in accordance with Sections 3(a) and 3(b) after taking into account the previous payment of the Initial Consideration as part of the same transaction.

(e) **Deemed Conversion**. Notwithstanding Sections 3(a) and 3(b) above, for purposes of determining the amount each holder of shares of Series Preferred is entitled

to receive with respect to any voluntary or involuntary liquidation, dissolution or winding up of the Company or deemed Liquidation Event, each such holder of shares of a series of Series Preferred shall be deemed to have converted (regardless of whether such holder actually converted) such holder's shares of such series of Series Preferred into shares of Common Stock immediately prior to such voluntary or involuntary liquidation, dissolution or winding up of the Company or deemed Liquidation Event if, as a result of an actual conversion, such holder would receive, in the aggregate, an amount greater than the amount that would be distributed to such holder if such holder did not convert such series of Series Preferred into shares of Common Stock. If any such holder shall be deemed to have converted shares of a series of Series Preferred into Common Stock pursuant to this Section 3(e), then such holder shall not be entitled to receive any distribution in accordance with Subsection 3(a) that would otherwise be made to holders of such series of Series Preferred that have not converted (or have not been deemed to have converted) into shares of Common Stock.

4. CONVERSION RIGHTS — SERIES PREFERRED INTO COMMON STOCK.

The holders of the Series Preferred shall have the following rights with respect to the conversion of the Series Preferred into shares of Common Stock:

(a) Optional Conversion. Subject to and in compliance with the provisions of this Section 4, (i) any shares of Voting Series Preferred may, at the option of the holder, be converted at any time into fully-paid and nonassessable shares of Class A Common Stock and (ii) any shares of Series C2 Preferred may, at the option of the holder, be converted at any time into fully-paid and nonassessable shares of Class B Common Stock. The number of shares of the applicable type of Common Stock to which a holder of Series Preferred shall be entitled upon conversion pursuant to this Section 4 shall be the product obtained by multiplying the applicable "Series Preferred Conversion Rate" then in effect (determined as provided in Section 4(b)) by the number of shares of Series Preferred being converted. References in this Section 4 to "Common Stock" shall mean the applicable type of Common Stock depending upon the context, unless otherwise specified therein.

(b) Series Preferred Conversion Rate. The conversion rate in effect at any time for conversion of a series of Series Preferred (the applicable "***Series Preferred Conversion Rate***") shall be the quotient obtained by dividing the Original Issue Price of such series of Series Preferred by the applicable "Series Preferred Conversion Price," calculated as provided in Section 4(c).

(c) Series Preferred Conversion Price. The conversion price for a series of Series Preferred shall initially be the Original Issue Price of such series of Series Preferred (the applicable "***Series Preferred Conversion Price***"). Such initial Series Preferred Conversion Price shall be adjusted from time to time in accordance with this Section 4. All references to the Series Preferred Conversion Price herein shall mean the applicable Series Preferred Conversion Price as so adjusted.

(d) Mechanics of Optional Conversion. Each holder of Series Preferred who desires to convert the same into shares of Common Stock pursuant to this Section 4 shall surrender the certificate or certificates therefor, duly endorsed, at the office of the Company

or any transfer agent for the Series Preferred, and shall give written notice to the Company at such office that such holder elects to convert the same. Such notice shall state the number of shares of Series Preferred being converted. Thereupon, the Company shall promptly issue and deliver at such office to such holder a certificate or certificates for the number of shares of the applicable type of Common Stock to which such holder is entitled and a certificate for the number (if any) of the shares of Series Preferred represented by the surrendered certificate that were not converted into such type of Common Stock and shall promptly pay (i) in cash or, to the extent sufficient funds are not then legally available therefor, in the applicable type of Common Stock (at such Common Stock's fair market value determined by the Board as of the date of such conversion), any declared and unpaid dividends on the shares of Series Preferred being converted and (ii) in cash (at the applicable type of Common Stock's fair market value determined by the Board as of the date of conversion) the value of any fractional share of the applicable type of Common Stock otherwise issuable to any holder of Series Preferred. Such conversion shall be deemed to have been made at the close of business on the date of such surrender of the certificates representing the shares of Series Preferred to be converted, and the person entitled to receive the shares of the applicable type of Common Stock issuable upon such conversion shall be treated for all purposes as the record holder of such shares of such applicable type of Common Stock on such date.

(e) Adjustment for Stock Splits and Combinations. If at any time or from time to time on or after the date that the first share of Series C Preferred is issued (the "***Original Issue Date***") the Company effects a subdivision of the outstanding Common Stock, each Series Preferred Conversion Price in effect immediately before that subdivision shall be proportionately decreased. Conversely, if at any time or from time to time after the Original Issue Date the Company combines the outstanding shares of Common Stock into a smaller number of shares, each Series Preferred Conversion Price in effect immediately before the combination shall be proportionately increased. Any adjustment under this Section 4(e) shall become effective at the close of business on the date the subdivision or combination becomes effective.

(f) Adjustment for Common Stock Dividends and Distributions. If at any time or from time to time on or after the Original Issue Date the Company pays to holders of Common Stock a dividend or other distribution in additional shares of Common Stock, each Series Preferred Conversion Price then in effect shall be decreased as of the time of such issuance, as provided below:

(i) Each Series Preferred Conversion Price shall be adjusted by multiplying such Series Preferred Conversion Price then in effect by a fraction:

(A) the numerator of which is the total number of shares of Common Stock issued and outstanding immediately prior to the time of such issuance, and

(B) the denominator of which is the total number of shares of Common Stock issued and outstanding immediately prior to the time of such issuance plus the number of shares of Common Stock issuable in payment of such dividend or distribution;

(ii) If the Company fixes a record date to determine which holders of Common Stock are entitled to receive such dividend or other distribution, each Series Preferred Conversion Price shall be adjusted as of the close of business on such record date and

the number of shares of Common Stock shall be calculated immediately prior to the close of business on such record date; and

(iii) If such record date is fixed and such dividend is not fully paid or if such distribution is not fully made on the date fixed therefor, the Series Preferred Conversion Price shall be recomputed accordingly as of the close of business on such record date and thereafter the Series Preferred Conversion Price shall be adjusted pursuant to this Section 4(f) to reflect the actual payment of such dividend or distribution.

(g) Adjustment for Reclassification, Exchange, Substitution, Reorganization, Merger or Consolidation. If at any time or from time to time on or after the Original Issue Date the Common Stock issuable upon the conversion of any Series Preferred is changed into the same or a different number of shares of any class or classes of stock, whether by recapitalization, reclassification, merger, consolidation or otherwise (other than an Acquisition as defined in Section 3 or a subdivision or combination of shares or stock dividend provided for elsewhere in this Section 4), in any such event each share such of Series Preferred shall thereafter be convertible in lieu of the Common Stock into which it was convertible prior to such event into the kind and amount of securities, cash or other property that a holder of the number of shares of Common Stock of the Company issuable upon conversion of one share of such Series Preferred immediately prior to such recapitalization, reclassification, merger, consolidation or other transaction would have been entitled to receive pursuant to such transaction, all subject to further adjustment as provided herein or with respect to such other securities or property by the terms thereof. In any such case, appropriate adjustment shall be made in the application of the provisions of this Section 4 with respect to the rights of the holders of the affected Series Preferred after the capital reorganization to the end that the provisions of this Section 4 (including adjustment of each applicable Series Preferred Conversion Price then in effect and the number of shares issuable upon conversion of such Series Preferred) shall be applicable after that event and be as nearly equivalent as practicable.

(h) Sale of Shares Below Series Preferred Conversion Price.

(i) If at any time or from time to time on or after the Original Issue Date the Company issues or sells, or is deemed by the express provisions of this Section 4(h) to have issued or sold, Additional Shares of Common Stock (as defined below), other than as provided in Section 4(e), 4(f) or 4(g) above, for an Effective Price (as defined below) less than the then effective Series Preferred Conversion Price applicable to any series of Series Preferred (a "***Qualifying Dilutive Issuance***"), then and in each such case, the then existing Series Preferred Conversion Price of such Series Preferred shall be reduced, as of the opening of business on the date of such issue or sale, to a price determined by multiplying such Series Preferred Conversion Price in effect immediately prior to such issuance or sale by a fraction:

(A) the numerator of which shall be (A) the number of shares of Common Stock deemed outstanding (as determined below) immediately prior to such issue or sale, plus (B) the number of shares of Common Stock that the Aggregate Consideration (as defined below) received or deemed received by the Company for the total number of Additional Shares of Common Stock so issued would purchase at such then-existing Series Preferred Conversion Price, and

(B) the denominator of which shall be the number of shares of Common Stock deemed outstanding (as determined below) immediately prior to such issue or sale plus the total number of Additional Shares of Common Stock so issued.

For the purposes of the preceding sentence, the number of shares of Common Stock deemed to be outstanding as of a given date shall be the sum of (A) the number of shares of Common Stock outstanding, (B) the number of shares of Common Stock into which the then outstanding shares of Series Preferred could be converted if fully converted on the day immediately preceding the given date, and (C) the number of shares of Common Stock that are issuable upon the exercise or conversion of all other rights, options and convertible securities outstanding on the day immediately preceding the given date.

(ii) No adjustment shall be made to any Series Preferred Conversion Price in an amount less than one percent (1%) of the applicable Series Preferred Conversion Price then in effect. Any adjustment otherwise required by this Section 4(h) that is not required to be made due to the first sentence of this subsection (ii) shall be included in any subsequent adjustment to the applicable Series Preferred Conversion Price. Any adjustment required by this Section 4(h) shall be rounded to the first decimal for which such rounding represents less than one percent (1%) of the applicable Series Preferred Conversion Price in effect after such adjustment.

(iii) For the purpose of making any adjustment required under this Section 4(h), the aggregate consideration received by the Company for any issue or sale of securities (the "***Aggregate Consideration***") shall be defined as: (A) to the extent it consists of cash, the gross amount of cash received by the Company before deduction of any underwriting or similar commissions, compensation or concessions paid or allowed by the Company in connection with such issue or sale and without deduction of any expenses payable by the Company, (B) to the extent it consists of property other than cash, the fair market value of that property as determined in good faith by the Board, and (C) if Additional Shares of Common Stock, Convertible Securities (as defined below) or rights or options to purchase either Additional Shares of Common Stock or Convertible Securities are issued or sold together with other stock or securities or other assets of the Company for a consideration that covers both, the portion of the consideration so received that may be reasonably determined in good faith by the Board to be allocable to such Additional Shares of Common Stock, Convertible Securities or rights or options.

(iv) For the purpose of the adjustment required under this Section 4(h), if the Company issues or sells (x) Preferred Stock or other stock, options, warrants, purchase rights or other securities exercisable for or convertible into, Additional Shares of Common Stock (such convertible stock or securities being herein referred to as "***Convertible Securities***") or (y) rights or options for the purchase of Additional Shares of Common Stock or Convertible Securities and if the Effective Price of such Additional Shares of Common Stock is less than a particular Series Preferred Conversion Price, in each case the Company shall be deemed to have issued at the time of the issuance of such rights or options or Convertible Securities the maximum number of Additional Shares of Common Stock issuable upon exercise or conversion thereof and to have received as consideration for the issuance of such shares an amount equal to the total amount of the consideration, if any, received by the Company for the issuance of such rights or options or Convertible Securities plus:

(A) in the case of such rights or options, the minimum amounts of consideration, if any, payable to the Company upon the exercise of such rights or options; and

(B) in the case of Convertible Securities, the minimum amounts of consideration, if any, payable to the Company upon the conversion thereof (other than by cancellation of liabilities or obligations evidenced by such Convertible Securities); *provided* that if the minimum amounts of such consideration cannot be ascertained, but are a function of antidilution or similar protective clauses, the Company shall be deemed to have received the minimum amounts of consideration without reference to such clauses.

(C) If the minimum amount of consideration payable to the Company upon the exercise or conversion of rights, options or Convertible Securities is reduced over time or on the occurrence or non-occurrence of specified events other than by reason of antidilution adjustments, the Effective Price shall be recalculated using the figure to which such minimum amount of consideration is reduced; *provided further,* that if the minimum amount of consideration payable to the Company upon the exercise or conversion of such rights, options or Convertible Securities is subsequently increased, the Effective Price shall be again recalculated using the increased minimum amount of consideration payable to the Company upon the exercise or conversion of such rights, options or Convertible Securities.

(D) No further adjustment of any Series Preferred Conversion Price, as adjusted upon the issuance of such rights, options or Convertible Securities, shall be made as a result of the actual issuance of Additional Shares of Common Stock or the exercise of any such rights or options or the conversion of any such Convertible Securities. If any such rights or options or the conversion privilege represented by any such Convertible Securities shall expire without having been exercised, the applicable Series Preferred Conversion Price as adjusted upon the issuance of such rights, options or Convertible Securities shall be readjusted to the applicable Series Preferred Conversion Price that would have been in effect had an adjustment been made on the basis that the only Additional Shares of Common Stock so issued were the Additional Shares of Common Stock, if any, actually issued or sold on the exercise of such rights or options or rights of conversion of such Convertible Securities, and such Additional Shares of Common Stock, if any, were issued or sold for the consideration actually received by the Company upon such exercise, plus the consideration, if any, actually received by the Company for the granting of all such rights or options, whether or not exercised, plus the consideration received for issuing or selling the Convertible Securities actually converted, plus the consideration, if any, actually received by the Company (other than by cancellation of liabilities or obligations evidenced by such Convertible Securities) on the conversion of such Convertible Securities, *provided* that such readjustment shall not apply to prior conversions of Series Preferred.

(v) For the purpose of making any adjustment to any Conversion Price of the Series Preferred required under this Section 4(h), "***Additional Shares of Common Stock***" shall mean all shares of Common Stock issued by the Company or deemed to be issued pursuant to this Section 4(h) (including shares of Common Stock subsequently reacquired or retired by the Company), other than (collectively as to all such shares issued or deemed issued, "***Exempted Securities***"):

(A) as to any series of Series Preferred shares of Common Stock issued as a dividend or distribution on, or upon conversion of, such series of Series Preferred;

(B) shares of Common Stock issued after the Original Issue Date to employees, officers or directors of, or consultants or advisors to the Company or any subsidiary pursuant to stock purchase or stock option plans or other arrangements that are approved by the Board, subject to the Option Pool Cap (as defined below); provided, however, that any shares of Common Stock (i) not issued pursuant to rights, agreements, options or warrants ("***Unexercised Options***") as a result of the termination of such Unexercised Options or (ii) reacquired by the Company from employees, directors or consultants at no more than cost pursuant to agreements that permit the Company to repurchase such shares upon termination of services to the Company shall not be counted toward such maximum number unless and until such shares are regranted as shares of Common Stock and/or options, warrants or other Common Stock purchase rights;

(C) shares of Common Stock issued pursuant to the exercise or conversion of Convertible Securities outstanding as of the Original Issue Date provided such issuance is pursuant to the terms of such Convertible Securities;

(D) shares of Common Stock or Convertible Securities issued for consideration other than cash pursuant to a merger, consolidation, acquisition, strategic alliance or similar business combination approved by the Board, subject to the Dilution Cap (as defined below);

(E) shares of Common Stock or Convertible Securities issued pursuant to any equipment loan or leasing arrangement, real property leasing arrangement or debt financing from a bank or similar financial or lending institution approved by the Board, subject to the Dilution Cap;

(F) shares of Common Stock or Convertible Securities issued to third-party service providers in exchange for or as partial consideration for services rendered to the Company as approved by the Board, subject to the Dilution Cap;

(G) shares of Common Stock or Convertible Securities issued in connection with strategic transactions involving the Company and other entities approved by the Board, including without limitation research collaboration, technology licensing, OEM, joint ventures, manufacturing, marketing, distribution, technology transfer or development arrangements, subject to the Dilution Cap;

(H) with respect to the Series A Preferred, shares of Common Stock or Convertible Securities that the holders of a majority of the outstanding shares of Series A Preferred elect in writing to exclude from the definition of "Additional Shares of Common Stock" for purposes of this Section 4;

(I) with respect to the Series B Preferred, shares of Common Stock or Convertible Securities that the holders of at least sixty-six and two-thirds

percent (66-2/3%) of the outstanding shares of Series B Preferred elect in writing to exclude from the definition of "Additional Shares of Common Stock" for purposes of this Section 4;

(J) with respect to the Series C Preferred, shares of Common Stock or Convertible Securities that the holders of at least sixty-six and two-thirds percent (66-2/3%) of the outstanding shares of Series C Preferred elect in writing to exclude from the definition of "Additional Shares of Common Stock".

For the purpose of making any adjustment to any Conversion Price of the Series Preferred required under this Section 4(h), shares of Common Stock issued by the Company or deemed to be issued in accordance with this Section 4(h), pursuant to Sections 4(h)(v)(D) — 4(h)(v)(G) shall not be deemed "Additional Shares of Common Stock" unless and until the actual aggregate issuance of shares of Common Stock (or shares of Common Stock issuable upon conversion of any shares of Preferred Stock) pursuant to Sections 4(h)(v)(D) — 4(h)(v)(G) exceeds 10% of the Fully Diluted Outstanding Common Stock (as defined below) of the Company as of the date of determination (the "***Dilution Cap***") and *provided, further*, shares of Common Stock issued by the Company or deemed to be issued in accordance with this Section 4(h), pursuant to Section 4(h)(v)(B) shall not be deemed "Additional Shares of Common Stock" unless and until the actual aggregate issuance of shares of Common Stock pursuant to Section 4(h)(v)(B) exceeds 9% of the Fully Diluted Outstanding Common Stock of the Company as of the date of determination (the "***Option Pool Cap***"). For the purpose of this Section 4(h), "***Fully Diluted Outstanding Common Stock***" means the sum of (i) the outstanding Common Stock of the Company, (ii) the number of shares of Common Stock into which the then outstanding shares of Preferred Stock could be converted if fully converted on the day immediately preceding the date of determination, (iii) the number of shares of Common Stock that are issuable upon the exercise or conversion of all other rights, options and convertible securities outstanding or reserved for issuance on the day immediately preceding the date of determination.

References to Common Stock in the subsections of this clause (v) above shall mean all shares of Common Stock issued by the Company or deemed to be issued pursuant to this Section 4(h). The "***Effective Price***" of Additional Shares of Common Stock shall mean the quotient determined by dividing the total number of Additional Shares of Common Stock issued or sold, or deemed to have been issued or sold by the Company under this Section 4(h), into the Aggregate Consideration received, or deemed to have been received by the Company for such issue under this Section 4(h), for such Additional Shares of Common Stock. In the event that the number of shares of Additional Shares of Common Stock or the Effective Price cannot be ascertained at the time of issuance, such Additional Shares of Common Stock shall be deemed issued immediately upon the occurrence of the first event that makes such number of shares or the Effective Price, as applicable, ascertainable.

(vi) In the event that the Company issues or sells, or is deemed to have issued or sold, Additional Shares of Common Stock in a Qualifying Dilutive Issuance (the "***First Dilutive Issuance***"), then in the event that the Company issues or sells, or is deemed to have issued or sold, Additional Shares of Common Stock in a Qualifying Dilutive Issuance other than the First Dilutive Issuance as a part of the same transaction or series of related transactions as the First Dilutive Issuance (a "***Subsequent Dilutive Issuance***"), then and in each such case upon a Subsequent Dilutive Issuance the applicable Series Preferred Conversion Price shall be reduced to

the applicable Series Preferred Conversion Price that would have been in effect had the First Dilutive Issuance and each Subsequent Dilutive Issuance all occurred on the closing date of the First Dilutive Issuance.

(i) Certificate of Adjustment. In each case of an adjustment or readjustment of any Series Preferred Conversion Price for the number of shares of Common Stock or other securities issuable upon conversion of the Series Preferred, if the Series Preferred is then convertible pursuant to this Section 4, the Company, at its expense, shall compute such adjustment or readjustment in accordance with the provisions hereof and shall, upon request, prepare a certificate showing such adjustment or readjustment, and shall mail such certificate, by first class mail, postage prepaid, to each registered holder of Series Preferred so requesting at the holder's address as shown in the Company's books. The certificate shall set forth such adjustment or readjustment, showing in detail the facts upon which such adjustment or readjustment is based, including a statement of (i) the consideration received or deemed to be received by the Company for any Additional Shares of Common Stock issued or sold or deemed to have been issued or sold, (ii) the applicable Series Preferred Conversion Price at the time in effect, (iii) the number of Additional Shares of Common Stock and (iv) the type and amount, if any, of other property that at the time would be received upon conversion of the Series Preferred. Failure to request or provide such notice shall have no effect on any such adjustment.

(j) Notices of Record Date. Upon (i) any taking by the Company of a record of the holders of any class of securities for the purpose of determining the holders thereof who are entitled to receive any dividend or other distribution, or (ii) any Acquisition (as defined in Section 3) or other capital reorganization of the Company, any reclassification or recapitalization of the capital stock of the Company, any merger or consolidation of the Company with or into any other corporation, or any Asset Transfer (as defined in Section 3), or any voluntary or involuntary dissolution, liquidation or winding up of the Company, the Company shall mail to each holder of Series Preferred at least ten (10) days prior to (x) the record date, if any, specified therein; or (y) if no record date is specified, the date upon which such action is to take effect (or, in either case, such shorter period approved by the holders of a majority of the outstanding Series Preferred, voting together as a single class on an as-converted basis) a notice specifying (A) the date on which any such record is to be taken for the purpose of such dividend or distribution and a description of such dividend or distribution, (B) the date on which any such Acquisition, reorganization, reclassification, transfer, consolidation, merger, Asset Transfer, dissolution, liquidation or winding up is expected to become effective, and (C) the date, if any, that is to be fixed as to when the holders of record of Common Stock (or other securities) shall be entitled to exchange their shares of Common Stock (or other securities) for securities or other property deliverable upon such Acquisition, reorganization, reclassification, transfer, consolidation, merger, Asset Transfer, dissolution, liquidation or winding up.

(k) Automatic Conversion.

(i) Each share of Voting Series Preferred shall automatically be converted into shares of Class A Common Stock and each share of Series C2 Preferred shall automatically be converted into shares of Class B Common Stock, in each case based on the then-effective applicable Series Preferred Conversion Price, (A) at any time, but subject to any applicable premerger notification and waiting period requirements of the Hart-Scott-Rodino

Antitrust Improvements Act of 1976, as amended, and the rules and regulations promulgated thereunder (collectively, the "***HSR Act***"), upon the affirmative election of the holders of at least sixty-six and two-thirds percent (66-2/3%) of the outstanding shares of the Series Preferred, voting together as a single class on an as-converted basis, or (B) immediately upon the closing of a firmly underwritten public offering pursuant to an effective registration statement under the Securities Act covering the offer and sale of Common Stock for the account of the Company in which the gross cash proceeds to the Company (before underwriting discounts, commissions and fees) are at least $75,000,000, and having a price per share to the public equal to greater than $17.4750 (as adjusted for any stock dividends, combinations, splits, recapitalizations and the like with respect to shares of Common Stock after the filing date hereof) (such offering, a "***Qualified IPO***"). Upon such automatic conversion, any declared and unpaid dividends shall be paid in accordance with the provisions of Section 4(d).

(ii) Upon the occurrence of either of the events specified in Section 4(k)(i) above, the outstanding shares of Series Preferred shall be converted automatically without any further action by the holders of such shares and whether or not the certificates representing such shares are surrendered to the Company or its transfer agent; *provided*, *however*, that the Company shall not be obligated to issue certificates evidencing the shares of the applicable type of Common Stock issuable upon such conversion unless the certificates evidencing such shares of Series Preferred are either delivered to the Company or its transfer agent as provided below, or the holder notifies the Company or its transfer agent that such certificates have been lost, stolen or destroyed and executes an agreement satisfactory to the Company to indemnify the Company from any loss incurred by it in connection with such certificates. Upon the occurrence of such automatic conversion of the Series Preferred, the holders of Series Preferred shall surrender the certificates representing such shares at the office of the Company or any transfer agent for the Series Preferred. Thereupon, there shall be issued and delivered to such holder promptly at such office and in its name as shown on such surrendered certificate or certificates, a certificate or certificates for the number of shares of the applicable type of Common Stock into which the shares of Series Preferred surrendered were convertible on the date on which such automatic conversion occurred, and (A) any declared and unpaid dividends shall be paid in accordance with the provisions of Section 4(d) and (B) the value of any fractional share of the applicable type of Common Stock otherwise issuable to any holder of Series Preferred shall be paid in accordance with the provisions of Section 4(l).

(l) Fractional Shares. No fractional shares of Common Stock shall be issued upon conversion of Series Preferred. All shares of Common Stock (including fractions thereof) issuable upon conversion of more than one share of Series Preferred by a holder thereof shall be aggregated for purposes of determining whether the conversion would result in the issuance of any fractional share. If after the aforementioned aggregation the conversion would result in the issuance of any fractional share, the Company shall, in lieu of issuing any fractional share, pay cash equal to the product of such fraction multiplied by the fair market value of one share of Common Stock (as determined by the Board) on the date of conversion.

(m) Reservation of Stock Issuable Upon Conversion. The Company shall at all times reserve and keep available out of its authorized but unissued shares of Common Stock, solely for the purpose of effecting the conversion of the shares of the Series Preferred, such number of its shares of Common Stock as shall from time to time be sufficient to effect the

conversion of all outstanding shares of the Series Preferred. If at any time the number of authorized but unissued shares of Common Stock shall not be sufficient to effect the conversion of all then outstanding shares of the Series Preferred, the Company will take such corporate action as may be necessary to increase its authorized but unissued shares of Common Stock to such number of shares as shall be sufficient for such purpose.

5. CONVERSION RIGHTS — SERIES C2 PREFERRED INTO SERIES C1 PREFERRED. Subject to the provisions of Section 7 below, the holders of shares of Series C2 Preferred shall have the right to convert each share of Series C2 Preferred held by them into one (1) share of Series C1 Preferred at such holder's election. Any such conversion shall be made upon written notice to the Company as provided in Section 4(a) above, *mutatis mutandis*.

6. CONVERSION RIGHTS — CLASS B COMMON STOCK INTO CLASS A COMMON STOCK. Subject to the provisions of Section 7 below, each holder of shares of Class B Common Stock shall have the right to convert each share of Class B Common Stock held by such holder into one (1) share of Class A Common Stock at such holder's election. Any such conversion shall be made upon written notice to the Company as provided in Section 4(a) above, *mutatis mutandis*.

7. CERTAIN LIMITATIONS. The limitations set forth in this Section 7 apply notwithstanding any other provision of this Restated Certificate:

(a) The Company shall not issue shares of Class B Common Stock other than upon conversion of shares of Series C2 Preferred.

(b) The Company shall not issue in excess of 5,096,567 shares of Series C1 Preferred (as adjusted for any stock dividends, combinations, splits, recapitalizations and the like with respect to such shares after the filing date hereof) other than upon conversion of shares of Series C2 Preferred.

(c) Following the closing of the first firmly underwritten public offering of the Company's securities pursuant to an effective registration statement under the Securities Act covering the offer and sale of Common Stock for the account of the Company, the shares of Class B Common Stock may only be converted into shares of Class A Common Stock during such time or times as immediately prior to or as a result of such conversion would not result in the holder(s) thereof beneficially owning (for purposes of Section 13(d) of the Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder (collectively, the "***Exchange Act***")), when aggregated with affiliates with whom such holder is required to aggregate beneficial ownership for purposes of Section 13(d) of the Exchange Act, in excess of the Beneficial Ownership Limitation. The "***Beneficial Ownership Limitation***" means initially 4.99% of any class of securities of the Company registered under the Exchange Act, which percentage may be increased or decreased to such other percentage as any holder of outstanding shares of Class B Common Stock may designate in writing upon 61 days' notice (delivered as provided in Section 9 below) to the Company, *provided, however,* that no holder may make such an election to change the percentage unless all holders managed by the same investment advisor as such electing holder make the same election.

(d) The effectiveness of any conversion of (x) any shares of Series C2 Preferred into shares of Series C1 Preferred or (y) any shares of Class B Common Stock into shares of Class A Common Stock is subject to the expiration or early termination of any applicable premerger notification and waiting period requirements of the HSR Act.

(e) The Company shall not give effect to (i) any stock split, stock dividend, stock combination or similar event affecting the Class A Common Stock or Class B Common Stock without effecting the same such stock split, stock dividend, stock combination or similar event for the Class B Common Stock or Class A Common Stock, respectively, or (ii) any stock split, stock dividend, stock combination or similar event affecting the Series C1 Preferred or Series C2 Preferred without effecting the same such stock split, stock dividend, stock combination or similar event for the Series C2 Preferred or Series C1 Preferred, respectively.

8. NOTICES. Any notice required by the provisions of this Restated Certificate shall be in writing and shall be deemed effectively given: (i) upon personal delivery to the party to be notified, (ii) when sent by electronic transmission in compliance with the provisions of the DGCL if sent during normal business hours of the recipient; if not, then on the next business day, (iii) five (5) days after having been sent by registered or certified mail, return receipt requested, postage prepaid, or (iv) one (1) day after deposit with a nationally recognized overnight courier, specifying next day delivery, with verification of receipt. All notices shall be addressed to each holder of record at the address of such holder appearing on the books of the Company.

9. PAYMENT OF TAXES. The Company will pay all taxes (other than taxes based upon income) and other governmental charges that may be imposed with respect to the issue or delivery of shares of Common Stock or Preferred Stock, as applicable, upon conversion of shares of Series Preferred, excluding any tax or other charge imposed in connection with any transfer involved in the issue and delivery of shares of Common Stock or Preferred Stock, as applicable, in a name other than that in which the shares of Series Preferred so converted were registered.

10. NO REISSUANCE OF SERIES PREFERRED OR CLASS B COMMON STOCK.

Any shares or shares of Series Preferred and/or Class B Common Stock redeemed, purchased, converted or exchanged by the Company shall be cancelled and retired and shall not be reissued or transferred.

V.

A. The liability of the directors of the Company for monetary damages shall be eliminated to the fullest extent under applicable law.

B. To the fullest extent permitted by applicable law, the Company is authorized to provide indemnification of (and advancement of expenses to) directors, officers and agents of the Company (and any other persons to which applicable law permits the Company to provide indemnification) through Bylaw provisions, agreements with such agents or other persons, vote of stockholders or disinterested directors or otherwise in excess of the indemnification and advancement otherwise permitted by such applicable law. If applicable law is amended after approval by the stockholders of this Article V to authorize corporate action further eliminating or

limiting the personal liability of directors, then the liability of a director to the Company shall be eliminated or limited to the fullest extent permitted by applicable law as so amended.

C. Any repeal or modification of this Article V shall only be prospective and shall not affect the rights or protections or increase the liability of any director under this Article V in effect at the time of the alleged occurrence of any act or omission to act giving rise to liability or indemnification.

VI.

For the management of the business and for the conduct of the affairs of the Company, and in further definition, limitation and regulation of the powers of the Company, of its directors and of its stockholders or any class thereof, as the case may be, it is further *provided* that:

A. The management of the business and the conduct of the affairs of the Company shall be vested in its Board. The number of directors that shall constitute the whole Board shall be fixed by the Board in the manner provided in the Bylaws, subject to any restrictions which may be set forth in this Restated Certificate.

B. The Board of Directors is expressly empowered to adopt, amend or repeal the Bylaws of the Company, subject to any restrictions that may be set forth in this Restated Certificate. The stockholders shall also have the power to adopt, amend or repeal the Bylaws of the Company, subject to any restrictions that may be set forth in this Restated Certificate.

C. The directors of the Company need not be elected by written ballot unless the Bylaws so provide.

* * * *

FOUR: This Amended and Restated Certificate of Incorporation has been duly approved by the Board of Directors of the Company.

FIVE: This Amended and Restated Certificate of Incorporation was approved by the holders of the requisite number of shares of said corporation in accordance with Section 228 of the DGCL. This Amended and Restated Certificate of Incorporation has been duly adopted in accordance with the provisions of Sections 242 and 245 of the DGCL by the stockholders of the Company.

[THIS SPACE INTENTIONALLY LEFT BLANK]

IN WITNESS WHEREOF, Atreca, Inc. has caused this Amended and Restated Certificate of Incorporation to be signed by a duly authorized officer of this corporation on June 7, 2019.

ATRECA, INC.

By: /s/ John Orwin
Name: John Orwin
Title: President and Chief Executive Officer

[Signature Page to Atreca, Inc. Amended and Restated Certificate of Incorporation]

Exhibit 3.3

AMENDED AND RESTATED
CERTIFICATE OF INCORPORATION
OF
ATRECA, INC.

The undersigned, John A. Orwin, hereby certifies that:

ONE: The original name of this corporation is Atreca, Inc. and the date of filing the original Certificate of Incorporation of this corporation with the Secretary of State of the State of Delaware was June 11, 2010.

TWO: He is the duly elected and acting President and Chief Executive Officer of Atreca, Inc., a Delaware corporation.

THREE: The Amended and Restated Certificate of Incorporation, as amended, of this corporation is hereby amended and restated to read as follows:

I.

The name of this corporation is **ATRECA, INC.** (the "***Company***").

II.

The address of the registered office of this Company in the State of Delaware is 160 Greentree Drive, Suite 101, City of Dover, County of Kent 19904, and the name of the registered agent of this corporation in the State of Delaware at such address is National Registered Agents, Inc.

III.

The purpose of the Company is to engage in any lawful act or activity for which a corporation may be organized under the Delaware General Corporation Law ("***DGCL***").

IV.

A. This Company is authorized to issue two classes of stock to be designated, respectively, "***Common Stock***" and "***Preferred Stock***." The total number of shares which the Company is authorized to issue is one billion (1,000,000,000) shares. Seven hundred million (700,000,000) shares shall be Common Stock, having a par value per share of $0.0001. Three hundred million (300,000,000) shares shall be Preferred Stock, having a par value per share of $0.0001. Six hundred fifty million (650,000,000) shares of Common Stock are hereby designated "***Class A Common Stock***") and Fifty million (50,000,000) shares of Common Stock are hereby designated "***Class B Common Stock***".

B. The Preferred Stock may be issued from time to time in one or more series. The Board of Directors of the Company (the "***Board of Directors***") is hereby expressly authorized to provide for the issue of all or any of the shares of the Preferred Stock in one or more series, and to

fix the number of shares and to determine or alter for each such series, such voting powers, full or limited, or no voting powers, and such designation, preferences, and relative, participating, optional, or other rights and such qualifications, limitations, or restrictions thereof, as shall be stated and expressed in the resolution or resolutions adopted by the Board of Directors providing for the issuance of such shares and as may be permitted by the DGCL. The Board of Directors is also expressly authorized to increase or decrease the number of shares of any series subsequent to the issuance of shares of that series, but not below the number of shares of such series then outstanding. In case the number of shares of any series shall be decreased in accordance with the foregoing sentence, the shares constituting such decrease shall resume the status that they had prior to the adoption of the resolution originally fixing the number of shares of such series. The number of authorized shares of Preferred Stock may be increased or decreased (but not below the number of shares thereof then outstanding) by the affirmative vote of the holders of a majority of the voting power of the stock of the Company entitled to vote thereon, without a separate vote of the holders of the Preferred Stock, or of any series thereof, unless a vote of any such holders is required pursuant to the terms of any certificate of designation filed with respect to any series of Preferred Stock.

C. Each outstanding share of Class A Common Stock shall entitle the holder thereof to one vote on each matter properly submitted to the stockholders of the Company for their vote; provided, however, that, except as otherwise required by law, holders of Class A Common Stock shall not be entitled to vote on any amendment to this Amended and Restated Certificate of Incorporation (including any certificate of designation filed with respect to any series of Preferred Stock) that relates solely to the terms of one or more outstanding series of Preferred Stock if the holders of such affected series are entitled, either separately or together as a class with the holders of one or more other such series, to vote thereon by law or pursuant to this Amended and Restated Certificate of Incorporation (including any certificate of designation filed with respect to any series of Preferred Stock). Class B Common Stock (i) shall be non-voting except as may be required by law and (ii) shall not be entitled to vote on the election of directors at any time.

D. CONVERSION OF CLASS B COMMON STOCK.

1. Each holder of shares of Class B Common Stock shall have the right to convert each share of Class B Common Stock held by such holder into one (1) share of Class A Common Stock at such holder's election; *provided*, *however*, that such shares of Class B Common Stock may only be converted into shares of Class A Common Stock during such time or times as immediately prior to or as a result of such conversion would not result in the holder(s) thereof beneficially owning (for purposes of Section 13(d) of the Securities Exchange Act of 1934, as amended and the rules and regulations promulgated thereunder (collectively, the "***Exchange Act***")), when aggregated with affiliates with whom such holder is required to aggregate beneficial ownership for purposes of Section 13(d) of the Exchange Act, in excess of the Beneficial Ownership Limitation. The "***Beneficial Ownership Limitation***" means initially 4.99% of any class of securities of the Company registered under the Exchange Act, which percentage may be increased or decreased to such other percentage as any holder of outstanding shares of Class B Common Stock may designate in writing upon 61 days' notice to the Company, *provided*, *however*, that no holder may make such an election to change the percentage unless all holders managed by the same investment advisor as such electing holder make the same election.

2. The effectiveness of any conversion of any shares of Class B Common Stock into shares of Class A Common Stock is subject to the expiration or early termination of any applicable premerger notification and waiting period requirements of the Hart-Scott-Rodino Antitrust Improvements Act of 1976, as amended, and the rules and regulations promulgated thereunder.

V.

For the management of the business and for the conduct of the affairs of the Company, and in further definition, limitation and regulation of the powers of the Company, of its directors and of its stockholders or any class thereof, as the case may be, it is further provided that:

A. MANAGEMENT OF BUSINESS. The management of the business and the conduct of the affairs of the Company shall be vested in its Board of Directors. The number of directors which shall constitute the Board of Directors shall be fixed exclusively by resolutions adopted by a majority of the authorized number of directors constituting the Board of Directors.

B. BOARD OF DIRECTORS. Subject to the rights of the holders of any series of Preferred Stock to elect additional directors under specified circumstances, upon the filing of this Amended and Restated Certificate of Incorporation, the directors shall be divided into three classes designated as Class I, Class II and Class III, respectively. The Board of Directors is authorized to assign members of the Board of Directors already in office to such classes at the time the classification becomes effective. At the first annual meeting of stockholders following the initial classification of the Board of Directors, the term of office of the Class I directors shall expire and Class I directors shall be elected for a full term of three years. At the second annual meeting of stockholders following such initial classification, the term of office of the Class II directors shall expire and Class II directors shall be elected for a full term of three years. At the third annual meeting of stockholders following such initial classification, the term of office of the Class III directors shall expire and Class III directors shall be elected for a full term of three years. At each succeeding annual meeting of stockholders, directors shall be elected for a full term of three years to succeed the directors of the class whose terms expire at such annual meeting.

Notwithstanding the foregoing provisions of this section, each director shall serve until his or her successor is duly elected and qualified or until his or her earlier death, resignation or removal. No decrease in the number of directors constituting the Board of Directors shall shorten the term of any incumbent director.

C. REMOVAL OF DIRECTORS.

1. Subject to the rights of any series of Preferred Stock to elect additional directors under specified circumstances, neither the Board of Directors nor any individual director may be removed without cause.

2. Subject to any limitation imposed by applicable law, any individual director or directors may be removed with cause by the affirmative vote of the holders of at least sixty-six and two-thirds percent (66-2/3%) of the voting power of all then-outstanding shares of capital stock of the Company entitled to vote generally at an election of directors.

D. **VACANCIES**. Subject to any limitations imposed by applicable law and subject to the rights of the holders of any series of Preferred Stock, any vacancies on the Board of Directors resulting from death, resignation, disqualification, removal or other causes and any newly created directorships resulting from any increase in the number of directors, shall, unless the Board of Directors determines by resolution that any such vacancies or newly created directorships shall be filled by the stockholders and except as otherwise provided by applicable law, be filled only by the affirmative vote of a majority of the directors then in office, even though less than a quorum of the Board of Directors, and not by the stockholders. Any director elected in accordance with the preceding sentence shall hold office for the remainder of the full term of the director for which the vacancy was created or occurred and until such director's successor shall have been elected and qualified.

E. **BYLAW AMENDMENTS**.

1. The Board of Directors is expressly empowered to adopt, amend or repeal the Bylaws of the Company. Any adoption, amendment or repeal of the Bylaws of the Company by the Board of Directors shall require the approval of a majority of the authorized number of directors. The stockholders shall also have power to adopt, amend or repeal the Bylaws of the Company; provided, however, that, in addition to any vote of the holders of any class or series of stock of the Company required by law or by this Amended and Restated Certificate of Incorporation, such action by stockholders shall require the affirmative vote of the holders of at least sixty-six and two-thirds percent (66-2/3%) of the voting power of all of the then-outstanding shares of the capital stock of the Company entitled to vote generally in the election of directors, voting together as a single class (for clarification, the holders of Class B common are not entitled to vote in the election of directors and should not be included in the calculation of such percentage of the voting power).

2. The directors of the Company need not be elected by written ballot unless the Bylaws so provide.

3. No action shall be taken by the stockholders of the Company except at an annual or special meeting of stockholders called in accordance with the Bylaws, and no action shall be taken by the stockholders by written consent or electronic transmission.

4. Advance notice of stockholder nominations for the election of directors and of business to be brought by stockholders before any meeting of the stockholders of the Company shall be given in the manner provided in the Bylaws of the Company.

VI.

A. The liability of the directors for monetary damages shall be eliminated to the fullest extent under applicable law.

B. To the fullest extent permitted by applicable law, the Company is authorized to provide indemnification of (and advancement of expenses to) directors, officers and agents of the Company (and any other persons to which applicable law permits the Company to provide indemnification) through Bylaw provisions, agreements with such agents or other persons, vote of stockholders or disinterested directors or otherwise in excess of the indemnification and

advancement otherwise permitted by such applicable law. If applicable law is amended after approval by the stockholders of this Article VI to authorize corporate action further eliminating or limiting the personal liability of directors, then the liability of a director to the Company shall be eliminated or limited to the fullest extent permitted by applicable law as so amended.

C. Any repeal or modification of this Article VI shall only be prospective and shall not affect the rights or protections or increase the liability of any director under this Article VI in effect at the time of the alleged occurrence of any act or omission to act giving rise to liability or indemnification.

VII.

Unless the Company consents in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware (or, if and only if the Court of Chancery of the State of Delaware lacks subject matter jurisdiction, any state court located within the State of Delaware or, if and only if all such state courts lack subject matter jurisdiction, the federal district court for the District of Delaware) shall be the sole and exclusive forum for the following types of actions or proceedings under Delaware statutory or common law: (A) any derivative action or proceeding brought on behalf of the Company; (B) any action asserting a claim of breach of a fiduciary duty owed by any director, officer or other employee of the Company to the Company or the Company's stockholders; (C) any action asserting a claim against the Company or any director or officer or other employee of the Company arising pursuant to any provision of the DGCL, this Amended and Restated Certificate of Incorporation or the Bylaws of the Company; or (D) any action asserting a claim against the Company or any director or officer or other employee of the Company governed by the internal affairs doctrine. This Article VII shall not apply to suits brought to enforce a duty or liability created by the Exchange Act or any other claim for which the federal courts have exclusive jurisdiction.

Unless the Company consents in writing to the selection of an alternative forum, the federal district courts of the United States of America shall be the exclusive forum for the resolution of any complaint asserting a cause of action arising under the Securities Act of 1933, as amended, subject to and contingent upon a final adjudication in the State of Delaware of the enforceability of such exclusive forum provision.

Any person or entity purchasing or otherwise acquiring any interest in shares of capital stock of the Company shall be deemed to have notice of and to have consented to the provisions of this Article VII.

VIII.

A. The Company reserves the right to amend, alter, change or repeal any provision contained in this Amended and Restated Certificate of Incorporation, in the manner now or hereafter prescribed by statute, except as provided in paragraph B. of this Article VIII, and all rights conferred upon the stockholders herein are granted subject to this reservation.

B. Notwithstanding any other provisions of this Amended and Restated Certificate of Incorporation or any provision of applicable law which might otherwise permit a lesser vote or no vote, but in addition to any affirmative vote of the holders of any particular class or series of the

capital stock of the Company required by law or by this Amended and Restated Certificate of Incorporation or any certificate of designation filed with respect to a series of Preferred Stock, the affirmative vote of the holders of at least sixty-six and two-thirds percent (66-2/3%) of the voting power of all of the then outstanding shares of capital stock of the Company entitled to vote generally in the election of directors, voting together as a single class, shall be required to alter, amend or repeal Articles V, VI, VII and VIII.

* * * *

FOUR: This Amended and Restated Certificate of Incorporation has been duly approved by the Board of Directors of the Company.

FIVE: This Amended and Restated Certificate of Incorporation was approved by the holders of the requisite number of shares of the Company in accordance with Section 228 of the DGCL. This Amended and Restated Certificate of Incorporation has been duly adopted in accordance with the provisions of Sections 242 and 245 of the DGCL by the stockholders of the Company.

IN WITNESS WHEREOF, Atreca, Inc. has caused this **AMENDED AND RESTATED CERTIFICATE OF INCORPORATION** to be signed by its President and Chief Executive Officer this __ day of _____, 2019.

ATRECA, INC.

By: _____
Name: John A. Orwin
Title: President and Chief Executive Officer

SIGNATURE PAGE TO AMENDED AND RESTATED CERTIFICATE OF INCORPORATION

Exhibit 3.4

AMENDED AND RESTATED BYLAWS

OF

ATRECA, INC.
(A DELAWARE CORPORATION)

_____, 2019

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(continued)

AMENDED AND RESTATED BYLAWS

OF

ATRECA, INC.
(A DELAWARE CORPORATION)

_____, 2019

ARTICLE I

OFFICES

Section 1. Registered Office. The registered office of Atreca, Inc. (the "***Corporation***") in the State of Delaware shall be 160 Greentree Drive, Suite 101, City of Dover, County of Kent, 19904.

Section 2. Other Offices. The Corporation shall also have and maintain an office or principal place of business at such place as may be fixed by the board of directors of the Corporation (the "***Board of Directors***"), and may also have offices at such other places, both within and without the State of Delaware, as the Board of Directors may from time to time determine or the business of the Corporation may require.

ARTICLE II

CORPORATE SEAL

Section 3. Corporate Seal. The Board of Directors may adopt a corporate seal. If adopted, the corporate seal shall consist of a die bearing the name of the Corporation and the inscription, "Corporate Seal-Delaware." Said seal may be used by causing it or a facsimile thereof to be impressed or affixed or reproduced or otherwise.

ARTICLE III

STOCKHOLDERS' MEETINGS

Section 4. Place of Meetings. Meetings of the stockholders of the Corporation may be held at such place, either within or without the State of Delaware, as may be determined from time to time by the Board of Directors. The Board of Directors may, in its sole discretion, determine that the meeting shall not be held at any place, but may instead be held solely by means of remote communication as provided under the Delaware General Corporation Law ("***DGCL***").

Section 5. Annual Meetings.

(a) The annual meeting of the stockholders of the Corporation, for the purpose of election of directors and for such other business as may properly come before it, shall be held on such date and at such time as may be designated from time to time by the Board of Directors. Nominations of persons for election to the Board of Directors of the Corporation and the proposal of business to be considered by the stockholders may be made at an annual meeting of stockholders: (i) pursuant to the Corporation's notice of meeting of stockholders (with respect to business other than nominations); (ii) brought specifically by or at the direction of the Board of Directors; or (iii) by any stockholder of the Corporation who was a stockholder of record at the time of giving the stockholder's notice provided for in Section 5(b) below, who is entitled to vote at the meeting and who complied with the notice procedures set forth in Section 5. For the avoidance of doubt, clause (iii) above shall be the exclusive means for a stockholder to make nominations and submit other business (other than matters properly included in the Corporation's notice of meeting of stockholders and proxy statement under Rule 14a-8 under the Securities Exchange Act of 1934, as amended, and the rules and regulations thereunder (the "***1934 Act***")) before an annual meeting of stockholders.

(b) At an annual meeting of the stockholders, only such business shall be conducted as is a proper matter for stockholder action under Delaware law and as shall have been properly brought before the meeting.

(i) For nominations for the election to the Board of Directors to be properly brought before an annual meeting by a stockholder pursuant to clause (iii) of Section 5(a) of these Amended and Restated Bylaws (these "***Bylaws***"), the stockholder must deliver written notice to the Secretary of the Corporation at the principal executive offices of the Corporation on a timely basis as set forth in Section 5(b)(iii) and must update and supplement such written notice on a timely basis as set forth in Section 5(c). Such stockholder's notice shall set forth: (A) as to each nominee such stockholder proposes to nominate at the meeting: (1) the name, age, business address and residence address of such nominee; (2) the principal occupation or employment of such nominee; (3) the class and number of shares of each class of capital stock of the Corporation which are owned of record and beneficially by such nominee; (4) the date or dates on which such shares were acquired and the investment intent of such acquisition; (5) a statement whether such nominee, if elected, intends to tender, promptly following such person's failure to receive the required vote for election or re-election at the next meeting at which such person would face election or re-election, an irrevocable resignation effective upon acceptance of such resignation by the Board of Directors; and (6) such other information concerning such nominee as would be required to be disclosed in a proxy statement soliciting proxies for the election of such nominee as a director in an election contest (even if an election contest is not involved), or that is otherwise required to be disclosed pursuant to Section 14 of the 1934 Act and the rules and regulations promulgated thereunder (including such person's written consent to being named as a nominee and to serving as a director if elected); and (B) the information required by Section 5(b)(iv). The Corporation may require any proposed nominee to furnish such other information as it may reasonably require to determine the eligibility of such proposed nominee to serve as an independent director of the Corporation or that could be material to a reasonable stockholder's understanding of the independence, or lack thereof, of such proposed nominee.

(ii) Other than proposals sought to be included in the Corporation's proxy materials pursuant to Rule 14a-8 under the 1934 Act, for business other than nominations for the election to the Board of Directors to be properly brought before an annual meeting by a stockholder pursuant to clause (iii) of Section 5(a) of these Bylaws, the stockholder must deliver written notice to the Secretary of the Corporation at the principal executive offices of the Corporation on a timely basis as set forth in Section 5(b)(iii), and must update and supplement such written notice on a timely basis as set forth in Section 5(c). Such stockholder's notice shall set forth: (A) as to each matter such stockholder proposes to bring before the meeting, a brief description of the business desired to be brought before the meeting, the reasons for conducting such business at the meeting, and any material interest (including any anticipated benefit of such business to any Proponent (as defined below) other than solely as a result of its ownership of the Corporation's capital stock, that is material to any Proponent individually, or to the Proponents in the aggregate) in such business of any Proponent; and (B) the information required by Section 5(b)(iv).

(iii) To be timely, the written notice required by Section 5(b)(i) or 5(b)(ii) must be received by the Secretary of the Corporation at the principal executive offices of the Corporation not later than the close of business on the ninetieth (90th) day nor earlier than the close of business on the one hundred twentieth (120th) day prior to the first anniversary of the preceding year's annual meeting; *provided, however,* that, subject to the last sentence of this Section 5(b)(iii), in the event that no annual meeting was held during the preceding year or the date of the annual meeting is advanced more than thirty (30) days prior to or delayed by more than thirty (30) days after the anniversary of the preceding year's annual meeting, notice by the stockholder to be timely must be so received not earlier than the close of business on the one hundred twentieth (120th) day prior to such annual meeting and not later than the close of business on the later of the ninetieth (90th) day prior to such annual meeting or the closing of business on the tenth (10th) day following the day on which public announcement of the date of such meeting is first made. In no event shall an adjournment or a postponement of an annual meeting for which notice has been given, or the public announcement thereof has been made, commence a new time period (or extend any time period) for the giving of a stockholder's notice as described above.

(iv) The written notice required by Section 5(b)(i) or 5(b)(ii) shall also set forth, as of the date of the notice and as to the stockholder giving the notice and the beneficial owner, if any, on whose behalf the nomination or proposal is made (each, a "***Proponent***" and collectively, the "***Proponents***"): (A) the name and address of each Proponent, as they appear on the Corporation's books; (B) the class, series and number of shares of the Corporation that are owned beneficially and of record by each Proponent; (C) a description of any agreement, arrangement or understanding (whether oral or in writing) with respect to such nomination or proposal between or among any Proponent and any of its affiliates or associates, and any others (including their names) acting in concert, or otherwise under the agreement, arrangement or understanding, with any of the foregoing; (D) a representation that the Proponents are holders of record or beneficial owners, as the case may be, of shares of the Corporation entitled to vote at the meeting and intend to appear in person or by proxy duly authorized at the meeting to nominate the person or persons specified in the notice (with respect to a notice under Section 5(b)(i)) or to propose the business that is specified in the notice (with respect to a notice under Section 5(b)(ii)); (E) a representation as to whether the Proponents intend to deliver a proxy

statement and form of proxy to holders of a sufficient number of holders of the Corporation's voting shares to elect such nominee or nominees (with respect to a notice under Section 5(b)(i)) or to carry such proposal (with respect to a notice under Section 5(b)(ii)); (F) to the extent known by any Proponent, the name and address of any other stockholder supporting the proposal on the date of such stockholder's notice; and (G) a description of all Derivative Transactions (as defined below) by each Proponent during the previous twelve (12) month period, including the date of the transactions and the class, series and number of securities involved in, and the material economic terms of, such Derivative Transactions.

(c) A stockholder providing written notice required by Section 5(b)(i) or (ii) shall update and supplement such notice in writing, if necessary, so that the information provided or required to be provided in such notice is true and correct in all material respects as of (i) the record date for the meeting and (ii) the date that is five (5) business days prior to the meeting and, in the event of any adjournment or postponement thereof, five (5) business days prior to such adjourned or postponed meeting. In the case of an update and supplement pursuant to clause (i) of this Section 5(c), such update and supplement shall be received by the Secretary of the Corporation at the principal executive offices of the Corporation not later than five (5) business days after the record date for the meeting. In the case of an update and supplement pursuant to clause (ii) of this Section 5(c), such update and supplement shall be received by the Secretary of the Corporation at the principal executive offices of the Corporation not later than two (2) business days prior to the date for the meeting, and, in the event of any adjournment or postponement thereof, two (2) business days prior to such adjourned or postponed meeting.

(d) Notwithstanding anything in Section 5(b)(iii) to the contrary, in the event that the number of directors in an Expiring Class (as defined below) is increased and there is no public announcement of the appointment of a director to such class, or, if no appointment was made, of the vacancy in such class, made by the Corporation at least ten (10) days before the last day a stockholder may deliver a notice of nomination in accordance with Section 5(b)(iii), a stockholder's notice required by this Section 5 and which complies with the requirements in Section 5(b)(i), other than the timing requirements in Section 5(b)(iii), shall also be considered timely, but only with respect to nominees for any new positions in such Expiring Class created by such increase, if it shall be received by the Secretary of the Corporation at the principal executive offices of the Corporation not later than the close of business on the tenth (10th) day following the day on which such public announcement is first made by the Corporation. For purposes of this section, an "***Expiring Class***" shall mean a class of directors whose term shall expire at the next annual meeting of stockholders.

(e) A person shall not be eligible for election or re-election as a director unless the person is nominated either in accordance with clause (ii) of Section 5(a), or in accordance with clause (iii) of Section 5(a). Except as otherwise required by law, the chairperson of the meeting shall have the power and duty to determine whether a nomination or any business proposed to be brought before the meeting was made, or proposed, as the case may be, in accordance with the procedures set forth in these Bylaws and, if any proposed nomination or business is not in compliance with these Bylaws, or the Proponent does not act in accordance with the representations in Sections 5(b)(iv)(D) and 5(b)(iv)(E), to declare that such proposal or nomination shall not be presented for stockholder action at the meeting and shall be disregarded, notwithstanding that proxies in respect of such nominations or such business may have been solicited or received.

(f) Notwithstanding the foregoing provisions of this Section 5, in order to include information with respect to a stockholder proposal in the proxy statement and form of proxy for a stockholders' meeting, a stockholder must also comply with all applicable requirements of the 1934 Act and the rules and regulations thereunder. Nothing in these Bylaws shall be deemed to affect any rights of stockholders to request inclusion of proposals in the Corporation's proxy statement pursuant to Rule 14a-8 under the 1934 Act; *provided*, *however*, that any references in these Bylaws to the 1934 Act or the rules and regulations thereunder are not intended to and shall not limit the requirements applicable to proposals and/or nominations to be considered pursuant to Section 5(a)(iii) of these Bylaws.

(g) For purposes of Sections 5 and 6,

(i) "***affiliates***" and "***associates***" shall have the meanings set forth in Rule 405 under the Securities Act of 1933, as amended (the "***1933 Act***");

(ii) "***Derivative Transaction***" means any agreement, arrangement, interest or understanding entered into by, or on behalf or for the benefit of, any Proponent or any of its affiliates or associates, whether record or beneficial:

(w) the value of which is derived in whole or in part from the value of any class or series of shares or other securities of the Corporation,

(x) which otherwise provides any direct or indirect opportunity to gain or share in any gain derived from a change in the value of securities of the Corporation,

(y) the effect or intent of which is to mitigate loss, manage risk or benefit of security value or price changes, or

(z) which provides the right to vote or increase or decrease the voting power of, such Proponent, or any of its affiliates or associates, with respect to any securities of the Corporation,

which agreement, arrangement, interest or understanding may include, without limitation, any option, warrant, debt position, note, bond, convertible security, swap, stock appreciation right, short position, profit interest, hedge, right to dividends, voting agreement, performance-related fee or arrangement to borrow or lend shares (whether or not subject to payment, settlement, exercise or conversion in any such class or series), and any proportionate interest of such Proponent in the securities of the Corporation held by any general or limited partnership, or any limited liability company, of which such Proponent is, directly or indirectly, a general partner or managing member: and

(iii) "***public announcement***" shall mean disclosure in a press release reported by the Dow Jones News Service, Associated Press, Business Wire, GlobeNewswire or comparable national news service or in a document publicly filed by the Corporation with the Securities and Exchange Commission pursuant to Section 13, 14 or 15(d) of the 1934 Act.

Section 6. Special Meetings.

(a) Special meetings of the stockholders of the Corporation may be called, for any purpose as is a proper matter for stockholder action under Delaware law, by (i) the Chairperson of the Board of Directors, (ii) the Chief Executive Officer or the President if the Chairperson of the Board of Directors is unavailable, or (iii) the Board of Directors pursuant to a resolution adopted by a majority of the total number of authorized directors (whether or not there exist any vacancies in previously authorized directorships at the time any such resolution is presented to the Board of Directors for adoption).

(b) For a special meeting of the stockholders of the Corporation called pursuant to Section 6(a), the Board of Directors shall determine the time and place, if any, of such special meeting. Upon determination of the time and place, if any, of the meeting, the Secretary of the Corporation shall cause a notice of meeting to be given to the stockholders entitled to vote, in accordance with the provisions of Section 7 of these Bylaws. No business may be transacted at such special meeting other than as specified in the notice of meeting.

(c) Nominations of persons for election to the Board of Directors may be made at a special meeting of stockholders at which directors are to be elected (i) by or at the direction of the Board of Directors or (ii) by any stockholder of the Corporation who is a stockholder of record at the time of giving notice provided for in this paragraph, who shall be entitled to vote at the meeting and who delivers written notice to the Secretary of the Corporation setting forth the information required by Section 5(b)(i). In the event the Corporation calls a special meeting of stockholders for the purpose of electing one or more directors to the Board of Directors, any such stockholder of record may nominate a person or persons (as the case may be), for election to such position(s) as specified in the Corporation's notice of meeting, if written notice setting forth the information required by Section 5(b)(i) of these Bylaws shall be received by the Secretary of the Corporation at the principal executive offices of the Corporation not later than the close of business on the later of the ninetieth (90^{th}) day prior to such meeting or the tenth (10^{th}) day following the day on which public announcement is first made of the date of the special meeting and of the nominees proposed by the Board of Directors to be elected at such meeting. The stockholder shall also update and supplement such information as required under Section 5(c). In no event shall an adjournment or a postponement of a special meeting for which notice has been given, or the public announcement thereof has been made, commence a new time period for the giving of a stockholder's notice as described above.

(d) Notwithstanding the foregoing provisions of this Section 6, a stockholder must also comply with all applicable requirements of the 1934 Act and the rules and regulations thereunder with respect to matters set forth in this Section 6. Nothing in these Bylaws shall be deemed to affect any rights of stockholders to request inclusion of proposals in the Corporation's proxy statement pursuant to Rule 14a-8 under the 1934 Act; *provided*, *however*, that any references in these Bylaws to the 1934 Act or the rules and regulations thereunder are not intended to and shall not limit the requirements applicable to nominations for the election to the Board of Directors to be considered pursuant to Section 6(c) of these Bylaws.

Section 7. Notice of Meetings. Except as otherwise provided by law, notice, given in writing or by electronic transmission, of each meeting of stockholders shall be given not less

than ten (10) nor more than sixty (60) days before the date of the meeting to each stockholder entitled to vote at such meeting, such notice to specify the place, if any, date and hour, in the case of special meetings, the purpose or purposes of the meeting, and the means of remote communications, if any, by which stockholders and proxy holders may be deemed to be present in person and vote at any such meeting. If mailed, notice is given when deposited in the United States mail, postage prepaid, directed to the stockholder at such stockholder's address as it appears on the records of the Corporation. If sent via electronic transmission, notice is given as of the sending time recorded at the time of transmission. Notice of the time, place, if any, and purpose of any meeting of stockholders (to the extent required) may be waived in writing, signed by the person entitled to notice thereof, or by electronic transmission by such person, either before or after such meeting, and will be waived by any stockholder by his or her attendance thereat in person, by remote communication, if applicable, or by proxy duly authorized, except when the stockholder attends a meeting for the express purpose of objecting, at the beginning of the meeting, to the transaction of any business because the meeting is not lawfully called or convened. Any stockholder so waiving notice of such meeting shall be bound by the proceedings of any such meeting in all respects as if due notice thereof had been given.

Section 8. Quorum. At all meetings of stockholders, except where otherwise provided by statute or by the Amended and Restated Certificate of Incorporation, or by these Bylaws, the presence, in person, by remote communication, if applicable, or by proxy duly authorized, of the holders of a majority of the voting power of the outstanding shares of stock entitled to vote shall constitute a quorum for the transaction of business. In the absence of a quorum, any meeting of stockholders may be adjourned, from time to time, either by the chairperson of the meeting or by vote of the holders of a majority of the voting power of the shares represented thereat, but no other business shall be transacted at such meeting. The stockholders present at a duly called or convened meeting, at which a quorum is present, may continue to transact business until adjournment, notwithstanding the withdrawal of enough stockholders to leave less than a quorum. Except as otherwise provided by statute, by the Amended and Restated Certificate of Incorporation or these Bylaws, or by applicable stock exchange rules, in all matters other than the election of directors, the affirmative vote of the holders of a majority of the voting power of the shares present in person, by remote communication, if applicable, or represented by proxy duly authorized at the meeting and entitled to vote generally on the subject matter shall be the act of the stockholders. Except as otherwise provided by statute, by the Amended and Restated Certificate of Incorporation or these Bylaws, or by applicable stock exchange rules, directors shall be elected by a plurality of the votes of the shares present in person, by remote communication, if applicable, or represented by proxy duly authorized at the meeting and entitled to vote generally on the election of directors. Where a separate vote by a class or classes or series is required, except where otherwise provided by statute, by the Amended and Restated Certificate of Incorporation or these Bylaws, or by applicable stock exchange rules, a majority of the voting power of the outstanding shares of such class or classes or series, present in person, by remote communication, if applicable, or represented by proxy duly authorized, shall constitute a quorum entitled to take action with respect to that vote on that matter. Except as otherwise provided by statute, by the Amended and Restated Certificate of Incorporation or these Bylaws, or by applicable stock exchange rules, the affirmative vote of the holders of a majority (plurality, in the case of the election of directors) of shares of such class or classes or series present in person, by remote communication, if applicable, or represented by proxy duly authorized at the meeting shall be the act of such class or classes or series.

Section 9. Adjournment and Notice of Adjourned Meetings. Any meeting of stockholders, whether annual or special, may be adjourned from time to time either by the chairperson of the meeting or by the vote of the holders of a majority of the voting power of the shares present in person, by remote communication, if applicable, or represented by proxy duly authorized at the meeting. When a meeting is adjourned to another time or place, if any, notice need not be given of the adjourned meeting if the time and place, if any, thereof are announced at the meeting at which the adjournment is taken. At the adjourned meeting, the Corporation may transact any business that might have been transacted at the original meeting. If the adjournment is for more than thirty (30) days or if after the adjournment a new record date is fixed for the adjourned meeting, a notice of the adjourned meeting shall be given to each stockholder of record entitled to vote at the meeting.

Section 10. Voting Rights. For the purpose of determining those stockholders entitled to vote at any meeting of the stockholders, except as otherwise provided by law, only persons in whose names shares stand on the stock records of the Corporation on the record date, as provided in Section 12 of these Bylaws, shall be entitled to vote at any meeting of stockholders. Every person entitled to vote shall have the right to do so either in person, by remote communication, if applicable, or by an agent or agents authorized by a proxy granted in accordance with Delaware law. An agent so appointed need not be a stockholder. No proxy shall be voted after three (3) years from its date of creation unless the proxy provides for a longer period.

Section 11. Joint Owners of Stock. If shares or other securities having voting power stand of record in the names of two (2) or more persons, whether fiduciaries, members of a partnership, joint tenants, tenants in common, tenants by the entirety, or otherwise, or if two (2) or more persons have the same fiduciary relationship respecting the same shares, unless the Secretary of the Corporation is given written notice to the contrary and is furnished with a copy of the instrument or order appointing them or creating the relationship wherein it is so provided, their acts with respect to voting shall have the following effect: (a) if only one (1) votes, his or her act binds all; (b) if more than one (1) votes, the act of the majority so voting binds all; (c) if more than one (1) votes, but the vote is evenly split on any particular matter, each faction may vote the securities in question proportionally, or may apply to the Delaware Court of Chancery for relief as provided in the DGCL, Section 217(b). If the instrument filed with the Secretary of the Corporation shows that any such tenancy is held in unequal interests, a majority or even-split for the purpose of subsection (c) of this Section 11 shall be a majority or even-split in interest.

Section 12. List of Stockholders. The Secretary of the Corporation shall prepare and make, at least ten (10) days before every meeting of stockholders, a complete list of the stockholders entitled to vote at said meeting, arranged in alphabetical order, showing the address of each stockholder and the number and class of shares registered in the name of each stockholder. Such list shall be open to the examination of any stockholder, for any purpose germane to the meeting, (a) on a reasonably accessible electronic network, provided that the information required to gain access to such list is provided with the notice of the meeting, or (b) during ordinary business hours, at the principal place of business of the Corporation. In the event that the Corporation determines to make the list available on an electronic network, the

Corporation may take reasonable steps to ensure that such information is available only to stockholders of the Corporation. The list shall be open to examination of any stockholder during the time of the meeting as provided by law.

Section 13. Action Without Meeting. Unless otherwise provided in the Amended and Restated Certificate of Incorporation, no action shall be taken by the stockholders of the Corporation except at an annual or special meeting of stockholders called in accordance with these Bylaws, and no action of the stockholders of the Corporation shall be taken by written consent or electronic transmission.

Section 14. Organization.

(a) At every meeting of stockholders, the Chairperson of the Board of Directors, or, if a Chairperson has not been appointed or is absent, the Chief Executive Officer, or if no Chief Executive Officer is then serving or is absent, the President, or, if the President is absent, a chairperson of the meeting chosen by a majority in interest of the stockholders entitled to vote, present in person or by proxy duly authorized, shall act as chairperson. The Chairperson of the Board may appoint the Chief Executive Officer as chairperson of the meeting. The Secretary of the Corporation, or, in his or her absence, an Assistant Secretary of the Corporation or other officer or other person directed to do so by the chairperson of the meeting, shall act as secretary of the meeting.

(b) The Board of Directors of the Corporation shall be entitled to make such rules or regulations for the conduct of meetings of stockholders as it shall deem necessary, appropriate or convenient. Subject to such rules and regulations of the Board of Directors, if any, the chairperson of the meeting shall have the right and authority to prescribe such rules, regulations and procedures and to do all such acts as, in the judgment of such chairperson, are necessary, appropriate or convenient for the proper conduct of the meeting, including, without limitation, establishing an agenda or order of business for the meeting, rules and procedures for maintaining order at the meeting and the safety of those present, limitations on participation in such meeting to stockholders of record of the Corporation and their duly authorized and constituted proxies and such other persons as the chairperson shall permit, restrictions on entry to the meeting after the time fixed for the commencement thereof, limitations on the time allotted to questions or comments by participants and regulation of the opening and closing of the polls for balloting on matters which are to be voted on by ballot. The date and time of the opening and closing of the polls for each matter upon which the stockholders will vote at the meeting shall be announced at the meeting. Unless and to the extent determined by the Board of Directors or the chairperson of the meeting, meetings of stockholders shall not be required to be held in accordance with rules of parliamentary procedure.

ARTICLE IV

DIRECTORS

Section 15. Number and Term of Office. The authorized number of directors of the Corporation shall be fixed in accordance with the Amended and Restated Certificate of Incorporation. Directors need not be stockholders unless so required by the Amended and

Restated Certificate of Incorporation. If for any cause, the directors shall not have been elected at an annual meeting, they may be elected as soon thereafter as convenient at a special meeting of the stockholders called for that purpose in the manner provided in these Bylaws.

Section 16. Powers. The business and affairs of the Corporation shall be managed by or under the direction of the Board of Directors, except as may be otherwise provided by statute or by the Amended and Restated Certificate of Incorporation.

Section 17. Classes of Directors. Subject to the rights of the holders of any series of Preferred Stock to elect additional directors under specified circumstances, following the closing of the initial public offering pursuant to an effective registration statement under the 1933 Act, covering the offer and sale of Class A Common Stock of the Corporation to the public (the "***Initial Public Offering***"), the directors shall be divided into three classes designated as Class I, Class II and Class III, respectively. The Board of Directors is authorized to assign members of the Board of Directors already in office to such classes at the time the classification becomes effective. At the first annual meeting of stockholders following the closing of the Initial Public Offering, the term of office of the Class I directors shall expire and Class I directors shall be elected for a full term of three years. At the second annual meeting of stockholders following the closing of the Initial Public Offering, the term of office of the Class II directors shall expire and Class II directors shall be elected for a full term of three years. At the third annual meeting of stockholders following the closing of the Initial Public Offering, the term of office of the Class III directors shall expire and Class III directors shall be elected for a full term of three years. At each succeeding annual meeting of stockholders, directors shall be elected for a full term of three years to succeed the directors of the class whose terms expire at such annual meeting.

Notwithstanding the foregoing provisions of this Section 17, each director shall serve until his or her successor is duly elected and qualified or until his or her earlier death, resignation or removal. No decrease in the number of directors constituting the Board of Directors shall shorten the term of any incumbent director.

Section 18. Vacancies. Unless otherwise provided in the Amended and Restated Certificate of Incorporation, and subject to the rights of the holders of any series of Preferred Stock or as otherwise provided by applicable law, any vacancies on the Board of Directors resulting from death, resignation, disqualification, removal or other causes and any newly created directorships resulting from any increase in the number of directors shall, unless the Board of Directors determines by resolution that any such vacancies or newly created directorships shall be filled by stockholders, be filled only by the affirmative vote of a majority of the directors then in office, even though less than a quorum of the Board of Directors, or by a sole remaining director, and not by the stockholders, *provided, however*, that whenever the holders of any class or classes of stock or series thereof are entitled to elect one or more directors by the provisions of the Amended and Restated Certificate of Incorporation, vacancies and newly created directorships of such class or classes or series shall, unless the Board of Directors determines by resolution that any such vacancies or newly created directorships shall be filled by stockholders, be filled by a majority of the directors elected by such class or classes or series thereof then in office, or by a sole remaining director so elected, and not by the stockholders. Any director elected in accordance with the preceding sentence shall hold office for the remainder of the full term of the director for which the vacancy was created or occurred and until

such director's successor shall have been elected and qualified. A vacancy in the Board of Directors shall be deemed to exist under this Bylaw in the case of the death, removal or resignation of any director.

Section 19. Resignation. Any director may resign at any time by delivering his or her notice in writing or by electronic transmission to the Secretary of the Corporation, such resignation to specify whether it will be effective at a particular time. If no such specification is made, the Secretary of the Corporation, in his or her discretion, may either (a) require confirmation from the director prior to deeming the resignation effective, in which case the resignation will be deemed effective upon receipt of such confirmation, or (b) deem the resignation effective at the time of delivery of the resignation to the Secretary of the Corporation. When one or more directors shall resign from the Board of Directors, effective at a future date, a majority of the directors then in office, including those who have so resigned, shall have power to fill such vacancy or vacancies, the vote thereon to take effect when such resignation or resignations shall become effective, and each director so chosen shall hold office for the unexpired portion of the term of the director whose place shall be vacated and until his or her successor shall have been duly elected and qualified.

Section 20. Removal. Subject to any limitation imposed by applicable law, any individual director or directors may be removed from office with cause by the affirmative vote of the holders of at least sixty-six and two-thirds percent (66 2/3%) of the voting power of all then outstanding shares of capital stock of the Corporation entitled to vote generally at an election of directors, voting together as a single class.

Section 21. Meetings.

(a) Regular Meetings. Unless otherwise restricted by the Amended and Restated Certificate of Incorporation, regular meetings of the Board of Directors may be held at any time or date and at any place within or without the State of Delaware which has been designated by the Board of Directors and publicized among all directors, either orally or in writing, by telephone, including a voice-messaging system or other system designed to record and communicate messages, facsimile, telegraph or telex, or by electronic mail or other electronic means. No further notice shall be required for regular meetings of the Board of Directors.

(b) Special Meetings. Unless otherwise restricted by the Amended and Restated Certificate of Incorporation, special meetings of the Board of Directors may be held at any time and place within or without the State of Delaware whenever called by the Chairperson of the Board, the Chief Executive Officer or a majority of the total number of authorized directors.

(c) Meetings by Electronic Communications Equipment. Any member of the Board of Directors, or of any committee thereof, may participate in a meeting by means of conference telephone or other communications equipment by means of which all persons participating in the meeting can hear each other, and participation in a meeting by such means shall constitute presence in person at such meeting.

(d) **Notice of Special Meetings.** Notice of the time and place of all special meetings of the Board of Directors shall be orally or in writing, by telephone, including a voice messaging system or other system or technology designed to record and communicate messages, facsimile, telegraph or telex, or by electronic mail or other electronic means, during normal business hours, at least twenty-four (24) hours before the date and time of the meeting. If notice is sent by U.S. mail, it shall be sent by first class mail, postage prepaid, at least three (3) days before the date of the meeting. Notice of any meeting may be waived in writing, or by electronic transmission, at any time before or after the meeting and will be waived by any director by attendance thereat, except when the director attends the meeting for the express purpose of objecting, at the beginning of the meeting, to the transaction of any business because the meeting is not lawfully called or convened.

(e) **Waiver of Notice.** The transaction of all business at any meeting of the Board of Directors, or any committee thereof, however called or noticed, or wherever held, shall be as valid as though it had been transacted at a meeting duly held after regular call and notice, if a quorum be present and if, either before or after the meeting, each of the directors not present who did not receive notice shall sign a written waiver of notice or shall waive notice by electronic transmission. All such waivers shall be filed with the corporate records or made a part of the minutes of the meeting.

Section 22. **Quorum and Voting.**

(a) Unless the Amended and Restated Certificate of Incorporation requires a greater number, and except with respect to questions related to indemnification arising under Section 44 for which a quorum shall be one-third of the exact number of directors fixed from time to time, a quorum of the Board of Directors shall consist of a majority of the exact number of directors fixed from time to time by the Board of Directors in accordance with the Amended and Restated Certificate of Incorporation; *provided, however,* at any meeting whether a quorum be present or otherwise, a majority of the directors present may adjourn from time to time until the time fixed for the next regular meeting of the Board of Directors, without notice other than by announcement at the meeting.

(b) At each meeting of the Board of Directors at which a quorum is present, all questions and business shall be determined by the affirmative vote of a majority of the directors present, unless a different vote be required by law, the Amended and Restated Certificate of Incorporation or these Bylaws.

Section 23. **Action Without Meeting.** Unless otherwise restricted by the Amended and Restated Certificate of Incorporation or these Bylaws, any action required or permitted to be taken at any meeting of the Board of Directors or of any committee thereof may be taken without a meeting, if all members of the Board of Directors or committee, as the case may be, consent thereto in writing or by electronic transmission, and such writing or writings or transmission or transmissions are filed with the minutes of proceedings of the Board of Directors or committee. Such filing shall be in paper form if the minutes are maintained in paper form and shall be in electronic form if the minutes are maintained in electronic form.

Section 24. Fees and Compensation. Directors shall be entitled to such compensation for their services as may be approved by the Board of Directors, including, if so approved, by resolution of the Board of Directors, a fixed sum and expenses of attendance, if any, for attendance at each regular or special meeting of the Board of Directors and at any meeting of a committee of the Board of Directors. Nothing herein contained shall be construed to preclude any director from serving the Corporation in any other capacity as an officer, agent, employee, or otherwise and receiving compensation therefor.

Section 25. Committees.

(a) Executive Committee. The Board of Directors may appoint an Executive Committee to consist of one (1) or more members of the Board of Directors. The Executive Committee, to the extent permitted by law and provided in the resolution of the Board of Directors shall have and may exercise all the powers and authority of the Board of Directors in the management of the business and affairs of the Corporation, and may authorize the seal of the Corporation to be affixed to all papers which may require it; but no such committee shall have the power or authority in reference to (i) approving or adopting, or recommending to the stockholders, any action or matter (other than the election or removal of directors) expressly required by the DGCL to be submitted to stockholders for approval, or (ii) adopting, amending or repealing any Bylaw of the Corporation.

(b) Other Committees. The Board of Directors may, from time to time, appoint such other committees as may be permitted by law. Such other committees appointed by the Board of Directors shall consist of one (1) or more members of the Board of Directors and shall have such powers and perform such duties as may be prescribed by the resolution or resolutions creating such committees, but in no event shall any such committee have the power or authority denied to the Executive Committee in these Bylaws.

(c) Term. The Board of Directors, subject to any requirements of any outstanding series of Preferred Stock and the provisions of subsections (a) or (b) of this Section 25, may at any time increase or decrease the number of members of a committee or terminate the existence of a committee. The membership of a committee member shall terminate on the date of his or her death or voluntary resignation from the committee or from the Board of Directors. The Board of Directors may at any time for any reason remove any individual committee member and the Board of Directors may fill any committee vacancy created by death, resignation, removal or increase in the number of members of the committee. The Board of Directors may appoint one or more directors as alternate members of any committee, who may replace any absent or disqualified member at any meeting of the committee, and, in addition, in the absence or disqualification of any member of a committee, the member or members thereof present at any meeting and not disqualified from voting, whether or not he, she or they constitute a quorum, may unanimously appoint another member of the Board of Directors to act at the meeting in the place of any such absent or disqualified member.

(d) Meetings. Unless the Board of Directors shall otherwise provide, regular meetings of the Executive Committee or any other committee appointed pursuant to this Section 25 shall be held at such times and places as are determined by the Board of Directors, or by any such committee, and when notice thereof has been given to each member of such

committee, no further notice of such regular meetings need be given thereafter. Special meetings of any such committee may be held at any place which has been determined from time to time by such committee, and may be called by any director who is a member of such committee, upon notice to the members of such committee of the time and place of such special meeting given in the manner provided for the giving of notice to members of the Board of Directors of the time and place of special meetings of the Board of Directors. Notice of any special meeting of any committee may be waived in writing or by electronic transmission at any time before or after the meeting and will be waived by any director by attendance thereat, except when the director attends such special meeting for the express purpose of objecting, at the beginning of the meeting, to the transaction of any business because the meeting is not lawfully called or convened. Unless otherwise provided by the Board of Directors in the resolutions authorizing the creation of the committee, a majority of the authorized number of members of any such committee shall constitute a quorum for the transaction of business, and the act of a majority of those present at any meeting at which a quorum is present shall be the act of such committee. Unless the Board of Directors shall otherwise provide, each committee shall conduct its business in the same manner as the Board of Directors conducts its business pursuant to Article IV of these Bylaws.

Section 26. Duties of Chairperson of the Board of Directors and Lead Independent Director.

(a) The Chairperson of the Board of Directors, if appointed and when present, shall preside at all meetings of the stockholders and the Board of Directors. The Chairperson of the Board of Directors shall perform other duties commonly incident to the office and shall also perform such other duties and have such other powers, as the Board of Directors shall designate from time to time.

(b) The Chairperson of the Board of Directors, or if the Chairperson is not an independent director, one of the independent directors, may be designated by the Board of Directors as lead independent director to serve until replaced by the Board of Directors (the "***Lead Independent Director***"). The Lead Independent Director will, with the Chiarperson of the Board of Directors and the Chief Executive Officer, establish the agenda for regular Board of Directors meetings and serve as chairperson of the Board of Directors meetings in the absence of the Chairperson of the Board of Directors; establish the agenda for meetings of the independent directors and preside over such meetings; coordinate with the committee chairs regarding meeting agendas and informational requirements; preside over any portions of meetings of the Board of Directors at which the evaluation or compensation of the Chief Executive Officer is presented or discussed; preside over any portions of any meetings of the Board of Directors at which the performance of the Board of Directors is presented or discussed; and perform such other duties as may be established or delegated by the Board of Directors.

Section 27. Organization. At every meeting of the directors, the Chairperson of the Board of Directors, or, if a Chairperson has not been appointed or is absent, the Lead Independent Director, or if the Lead Independent Director has not been appointed or is absent, the Chief Executive Officer (if a director), or, if a Chief Executive Officer is absent, the President (if a director), or if the President is absent, the most senior Vice President (if a director), or, in the absence of any such person, a chairperson of the meeting chosen by a

majority of the directors present, shall preside over the meeting. The Secretary of the Corporation, or in his or her absence, any Assistant Secretary of the Corporation or other officer, director or other person directed to do so by the person presiding over the meeting, shall act as secretary of the meeting.

ARTICLE V

OFFICERS

Section 28. Officers Designated. The officers of the Corporation shall include, if and when designated by the Board of Directors, the Chief Executive Officer, the President, one or more Vice Presidents, the Secretary, the Chief Financial Officer and the Treasurer. The Board of Directors may also appoint one or more Assistant Secretaries and Assistant Treasurers and such other officers and agents with such powers and duties as it shall deem necessary. The Board of Directors may assign such additional titles to one or more of the officers as it shall deem appropriate. Any one person may hold any number of offices of the Corporation at any one time unless specifically prohibited therefrom by law. The salaries and other compensation of the officers of the Corporation shall be fixed by or in the manner designated by the Board of Directors or a committee thereof to which the Board of Directors has delegated such responsibility.

Section 29. Tenure and Duties of Officers.

(a) General. All officers shall hold office at the pleasure of the Board of Directors and until their successors shall have been duly elected and qualified, unless sooner removed. Any officer elected or appointed by the Board of Directors may be removed at any time by the Board of Directors. If the office of any officer becomes vacant for any reason, the vacancy may be filled by the Board of Directors.

(b) Duties of Chief Executive Officer. The Chief Executive Officer shall preside at all meetings of the stockholders and at all meetings of the Board of Directors (if a director), unless the Chairperson of the Board of Directors or the Lead Independent Director has been appointed and is present. Unless an officer has been appointed Chief Executive Officer of the Corporation, the President shall be the chief executive officer of the Corporation and shall, subject to the control of the Board of Directors, have general supervision, direction and control of the business and officers of the Corporation. To the extent that a Chief Executive Officer has been appointed and no President has been appointed, all references in these Bylaws to the President shall be deemed references to the Chief Executive Officer. The Chief Executive Officer shall perform other duties commonly incident to the office and shall also perform such other duties and have such other powers, as the Board of Directors shall designate from time to time.

(c) Duties of President. The President shall preside at all meetings of the stockholders and at all meetings of the Board of Directors (if a director), unless the Chairperson of the Board of Directors, the Lead Independent Director or the Chief Executive Officer has been appointed and is present. Unless another officer has been appointed Chief Executive Officer of the Corporation, the President shall be the chief executive officer of the Corporation and shall,

subject to the control of the Board of Directors, have general supervision, direction and control of the business and officers of the Corporation. The President shall perform other duties commonly incident to the office and shall also perform such other duties and have such other powers, as the Board of Directors shall designate from time to time.

(d) Duties of Vice Presidents. A Vice President may assume and perform the duties of the President in the absence or disability of the President or whenever the office of President is vacant. A Vice President shall perform other duties commonly incident to their office and shall also perform such other duties and have such other powers as the Board of Directors or the Chief Executive Officer, or, if the Chief Executive Officer has not been appointed or is absent, the President shall designate from time to time.

(e) Duties of Secretary. The Secretary of the Corporation shall attend all meetings of the stockholders and of the Board of Directors and shall record all acts and proceedings thereof in the minute book of the Corporation. The Secretary of the Corporation shall give notice in conformity with these Bylaws of all meetings of the stockholders and of all meetings of the Board of Directors and any committee thereof requiring notice. The Secretary of the Corporation shall perform all other duties provided for in these Bylaws and other duties commonly incident to the office and shall also perform such other duties and have such other powers, as the Board of Directors shall designate from time to time. The Chief Executive Officer, or if no Chief Executive Officer is then serving, the President may direct any Assistant Secretary of the Corporation or other officer to assume and perform the duties of the Secretary in the absence or disability of the Secretary, and each Assistant Secretary of the Corporation shall perform other duties commonly incident to the office and shall also perform such other duties and have such other powers as the Board of Directors or the Chief Executive Officer, or if no Chief Executive Officer is then serving, the President shall designate from time to time.

(f) Duties of Chief Financial Officer. The Chief Financial Officer shall keep or cause to be kept the books of account of the Corporation in a thorough and proper manner and shall render statements of the financial affairs of the Corporation in such form and as often as required by the Board of Directors or the Chief Executive Officer, or if no Chief Executive officer is then serving, the President. The Chief Financial Officer, subject to the order of the Board of Directors, shall have the custody of all funds and securities of the Corporation. The Chief Financial Officer shall perform other duties commonly incident to the office and shall also perform such other duties and have such other powers as the Board of Directors or the Chief Executive Officer, or if no Chief Executive Officer is then serving, the President shall designate from time to time. To the extent that a Chief Financial Officer has been appointed and no Treasurer has been appointed, all references in these Bylaws to the Treasurer shall be deemed references to the Chief Financial Officer. The President may direct the Treasurer, if any, or any Assistant Treasurer, or the controller or any assistant controller to assume and perform the duties of the Chief Financial Officer in the absence or disability of the Chief Financial Officer, and each Treasurer and Assistant Treasurer and each controller and assistant controller shall perform other duties commonly incident to the office and shall also perform such other duties and have such other powers as the Board of Directors or the Chief Executive Officer, or if no Chief Executive Officer is then serving, the President shall designate from time to time.

(g) Duties of Treasurer. Unless another officer has been appointed Chief Financial Officer of the Corporation, the Treasurer shall be the chief financial officer of the Corporation and shall keep or cause to be kept the books of account of the Corporation in a thorough and proper manner and shall render statements of the financial affairs of the Corporation in such form and as often as required by the Board of Directors or the Chief Executive Officer, or if no Chief Executive Officer is then serving, the President, and, subject to the order of the Board of Directors, shall have the custody of all funds and securities of the Corporation. The Treasurer shall perform other duties commonly incident to the office and shall also perform such other duties and have such other powers as the Board of Directors or the Chief Executive Officer, or if no Chief Executive Officer is then serving, the President and the Chief Financial Officer (if not Treasurer) shall designate from time to time.

Section 30. Delegation of Authority. The Board of Directors may from time to time delegate the powers or duties of any officer to any other officer or agent, notwithstanding any provision hereof.

Section 31. Resignations. Any officer may resign at any time by giving notice in writing or by electronic transmission to the Board of Directors or to the Chief Executive Officer, or if no Chief Executive Officer is then serving, the President or to the Secretary of the Corporation. Any such resignation shall be effective when received by the person or persons to whom such notice is given, unless a later time is specified therein, in which event the resignation shall become effective at such later time. Unless otherwise specified in such notice, the acceptance of any such resignation shall not be necessary to make it effective. Any resignation shall be without prejudice to the rights, if any, of the Corporation under any contract with the resigning officer.

Section 32. Removal. Any officer may be removed from office at any time, either with or without cause, by the affirmative vote of a majority of the directors in office at the time, or by the unanimous written consent of the directors in office at the time, or by any committee or by the Chief Executive Officer or by other superior officers upon whom such power of removal may have been conferred by the Board of Directors.

ARTICLE VI

EXECUTION OF CORPORATE INSTRUMENTS AND VOTING OF SECURITIES OWNED BY THE CORPORATION

Section 33. Execution of Corporate Instruments. The Board of Directors may, in its discretion, determine the method and designate the signatory officer or officers, or other person or persons, to execute on behalf of the Corporation any corporate instrument or document, or to sign on behalf of the Corporation the corporate name without limitation, or to enter into contracts on behalf of the Corporation, except where otherwise provided by law or these Bylaws, and such execution or signature shall be binding upon the Corporation.

All checks and drafts drawn on banks or other depositaries on funds to the credit of the Corporation or in special accounts of the Corporation shall be signed by such person or persons as the Board of Directors shall authorize so to do.

Unless authorized or ratified by the Board of Directors or within the agency power of an officer, no officer, agent or employee shall have any power or authority to bind the Corporation by any contract or engagement or to pledge its credit or to render it liable for any purpose or for any amount.

Section 34. Voting of Securities Owned By the Corporation. All stock and other securities of other Corporations owned or held by the Corporation for itself, or for other parties in any capacity, shall be voted, and all proxies with respect thereto shall be executed, by the person authorized so to do by resolution of the Board of Directors, or, in the absence of such authorization, by the Chairperson of the Board of Directors, the Chief Executive Officer, the President, or any Vice President.

ARTICLE VII

SHARES OF STOCK

Section 35. Form and Execution of Certificates. The shares of the Corporation shall be represented by certificates, or shall be uncertificated if so provided by resolution or resolutions of the Board of Directors. Certificates for the shares of stock, if any, shall be in such form as is consistent with the Amended and Restated Certificate of Incorporation and applicable law. Every holder of stock in the Corporation represented by certificate shall be entitled to have a certificate signed by or in the name of the Corporation by any two authorized officers of the Corporation, including but not limited to, the Chief Executive Officer, the President, the Chief Financial Officer, any Vice President, the Treasurer or Assistant Treasurer or the Secretary or Assistant Secretary, certifying the number of shares owned by him in the Corporation. Any or all of the signatures on the certificate may be facsimiles. In case any officer, transfer agent, or registrar who has signed or whose facsimile signature has been placed upon a certificate shall have ceased to be such officer, transfer agent, or registrar before such certificate is issued, it may be issued with the same effect as if he or she were such officer, transfer agent, or registrar at the date of issue.

Section 36. Lost Certificates. A new certificate or certificates shall be issued in place of any certificate or certificates theretofore issued by the Corporation alleged to have been lost, stolen, or destroyed, upon the making of an affidavit of that fact by the person claiming the certificate of stock to be lost, stolen, or destroyed. The Corporation may require, as a condition precedent to the issuance of a new certificate or certificates, the owner of such lost, stolen, or destroyed certificate or certificates, or the owner’s legal representative, to agree to indemnify the Corporation in such manner as it shall require or to give the Corporation a surety bond in such form and amount as it may direct as indemnity against any claim that may be made against the Corporation with respect to the certificate alleged to have been lost, stolen, or destroyed.

Section 37. Transfers.

(a) Transfers of record of shares of stock of the Corporation shall be made only upon its books by the holders thereof, in person or by attorney duly authorized, and, in the case of stock represented by certificate, upon the surrender of a properly endorsed certificate or certificates for a like number of shares.

(b) The Corporation shall have power to enter into and perform any agreement with any number of stockholders of any one or more classes of stock of the Corporation to restrict the transfer of shares of stock of the Corporation of any one or more classes owned by such stockholders in any manner not prohibited by the DGCL.

Section 38. Fixing Record Dates.

(a) In order that the Corporation may determine the stockholders entitled to notice of or to vote at any meeting of stockholders or any adjournment thereof, the Board of Directors may fix a record date, which record date shall not precede the date upon which the resolution fixing the record date is adopted by the Board of Directors, and which record date shall, subject to applicable law, not be more than sixty (60) nor less than ten (10) days before the date of such meeting. If no record date is fixed by the Board of Directors, the record date for determining stockholders entitled to notice of or to vote at a meeting of stockholders shall be at the close of business on the day next preceding the day on which notice is given, or if notice is waived, at the close of business on the day next preceding the day on which the meeting is held. A determination of stockholders of record entitled to notice of or to vote at a meeting of stockholders shall apply to any adjournment of the meeting; *provided*, *however,* that the Board of Directors may fix a new record date for the adjourned meeting.

(b) In order that the Corporation may determine the stockholders entitled to receive payment of any dividend or other distribution or allotment of any rights or the stockholders entitled to exercise any rights in respect of any change, conversion or exchange of stock, or for the purpose of any other lawful action, the Board of Directors may fix, in advance, a record date, which record date shall not precede the date upon which the resolution fixing the record date is adopted, and which record date shall be not more than sixty (60) days prior to such action. If no record date is fixed, the record date for determining stockholders for any such purpose shall be at the close of business on the day on which the Board of Directors adopts the resolution relating thereto.

Section 39. Registered Stockholders. The Corporation shall be entitled to recognize the exclusive right of a person registered on its books as the owner of shares to receive dividends, and to vote as such owner, and shall not be bound to recognize any equitable or other claim to or interest in such share or shares on the part of any other person whether or not it shall have express or other notice thereof, except as otherwise provided by the laws of Delaware.

ARTICLE VIII

OTHER SECURITIES OF THE CORPORATION

Section 40. Execution of Other Securities. All bonds, debentures and other corporate securities of the Corporation, other than stock certificates (covered in Section 35), may be signed by the Chief Executive Officer, the President or any Vice President, or such other person as may be authorized by the Board of Directors, and if such securities require it, the corporate seal may be impressed thereon or a facsimile of such seal may be imprinted thereon and attested by the signature of the Secretary of the Corporation or an Assistant Secretary of the Corporation, or the Chief Financial Officer or Treasurer or an Assistant Treasurer; *provided*, *however,* that where

any such bond, debenture or other corporate security shall be authenticated by the manual signature, or where permissible facsimile signature, of a trustee under an indenture pursuant to which such bond, debenture or other corporate security shall be issued, the signatures of the persons signing and attesting the corporate seal on such bond, debenture or other corporate security may be the imprinted facsimile of the signatures of such persons. Interest coupons appertaining to any such bond, debenture or other corporate security, authenticated by a trustee as aforesaid, shall be signed by the Treasurer or an Assistant Treasurer of the Corporation or such other person as may be authorized by the Board of Directors, or bear imprinted thereon the facsimile signature of such person. In case any officer who shall have signed or attested any bond, debenture or other corporate security, or whose facsimile signature shall appear thereon or on any such interest coupon, shall have ceased to be such officer before the bond, debenture or other corporate security so signed or attested shall have been delivered, such bond, debenture or other corporate security nevertheless may be adopted by the Corporation and issued and delivered as though the person who signed the same or whose facsimile signature shall have been used thereon had not ceased to be such officer of the Corporation.

ARTICLE IX

DIVIDENDS

Section 41. Declaration of Dividends. Dividends upon the capital stock of the Corporation, subject to the provisions of the Amended and Restated Certificate of Incorporation and applicable law, if any, may be declared by the Board of Directors pursuant to law at any regular or special meeting. Dividends may be paid in cash, in property, or in shares of the capital stock, subject to the provisions of the Amended and Restated Certificate of Incorporation and applicable law.

Section 42. Dividend Reserve. Before payment of any dividend, there may be set aside out of any funds of the Corporation available for dividends such sum or sums as the Board of Directors from time to time, in their absolute discretion, think proper as a reserve or reserves to meet contingencies, or for equalizing dividends, or for repairing or maintaining any property of the Corporation, or for such other purpose as the Board of Directors shall think conducive to the interests of the Corporation, and the Board of Directors may modify or abolish any such reserve in the manner in which it was created.

ARTICLE X

FISCAL YEAR

Section 43. Fiscal Year. The fiscal year of the Corporation shall be fixed by resolution of the Board of Directors.

ARTICLE XI

INDEMNIFICATION

Section 44. Indemnification of Directors, Executive Officers, Other Officers, Employees and Other Agents.

(a) Directors and Executive Officers. The Corporation shall indemnify its directors and executive officers (for the purposes of this Article XI, "***executive officers***" shall have the meaning defined in Rule 3b-7 promulgated under the 1934 Act) to the extent not prohibited by the DGCL or any other applicable law; *provided, however,* that the Corporation may modify the extent of such indemnification by individual contracts with its directors and executive officers; and, *provided, further,* that the Corporation shall not be required to indemnify any director or executive officer in connection with any proceeding (or part thereof) initiated by such person unless (i) such indemnification is expressly required to be made by law, (ii) the proceeding was authorized by the Board of Directors of the Corporation, (iii) such indemnification is provided by the Corporation, in its sole discretion, pursuant to the powers vested in the Corporation under the DGCL or any other applicable law or (iv) such indemnification is required to be made under subsection (d).

(b) Other Officers, Employees and Other Agents. The Corporation shall have power to indemnify (including the power to advance expenses in a manner consistent with subsection (c) of this Bylaw) its other officers, employees and other agents as set forth in the DGCL or any other applicable law. The Board of Directors shall have the power to delegate the determination of whether indemnification shall be given to any such person except executive officers to such officers or other persons as the Board of Directors shall determine.

(c) Expenses. The Corporation shall advance to any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative, by reason of the fact that such person is or was a director or executive officer, of the Corporation, or is or was serving at the request of the Corporation as a director or executive officer of another Corporation, partnership, joint venture, trust or other enterprise, prior to the final disposition of the proceeding, promptly following request therefor, all expenses incurred by any director or executive officer in connection with such proceeding provided, however, that if the DGCL requires, an advancement of expenses incurred by a director or executive officer in his or her capacity as a director or executive officer (and not in any other capacity in which service was or is rendered by such indemnitee, including, without limitation, service to an employee benefit plan) shall be made only upon delivery to the Corporation of an undertaking (hereinafter an "***undertaking***"), by or on behalf of such indemnitee, to repay all amounts so advanced if it shall ultimately be determined by final judicial decision from which there is no further right to appeal (hereinafter a "***final adjudication***") that such indemnitee is not entitled to be indemnified for such expenses under this section or otherwise.

Notwithstanding the foregoing, unless otherwise determined pursuant to paragraph (e) of this section, no advance shall be made by the Corporation to an executive officer of the Corporation (except by reason of the fact that such executive officer is or was a director of the

Corporation in which event this paragraph shall not apply) in any action, suit or proceeding, whether civil, criminal, administrative or investigative, if a determination is reasonably and promptly made (i) by a majority vote of directors who were not parties to the proceeding, even if not a quorum, or (ii) by a committee of such directors designated by a majority vote of such directors, even though less than a quorum, or (iii) if there are no such directors, or such directors so direct, by independent legal counsel in a written opinion, that the facts known to the decision-making party at the time such determination is made demonstrate clearly and convincingly that such person acted in bad faith or in a manner that such person did not believe to be in or not opposed to the best interests of the Corporation.

(d) Enforcement. Without the necessity of entering into an express contract, all rights to indemnification and advances to directors and executive officers under this Bylaw shall be deemed to be contractual rights and be effective to the same extent and as if provided for in a contract between the Corporation and the director or executive officer. Any right to indemnification or advances granted by this section to a director or executive officer shall be enforceable by or on behalf of the person holding such right in any court of competent jurisdiction if (i) the claim for indemnification or advances is denied, in whole or in part, or (ii) no disposition of such claim is made within ninety (90) days of request therefor. To the extent permitted by law, the claimant in such enforcement action, if successful in whole or in part, shall be entitled to be paid also the expense of prosecuting the claim. In connection with any claim for indemnification, the Corporation shall be entitled to raise as a defense to any such action that the claimant has not met the standards of conduct that make it permissible under the DGCL or any other applicable law for the Corporation to indemnify the claimant for the amount claimed. In connection with any claim by an executive officer of the Corporation (except in any action, suit or proceeding, whether civil, criminal, administrative or investigative, by reason of the fact that such executive officer is or was a director of the Corporation) for advances, the Corporation shall be entitled to raise a defense as to any such action clear and convincing evidence that such person acted in bad faith or in a manner that such person did not believe to be in or not opposed to the best interests of the Corporation, or with respect to any criminal action or proceeding that such person acted without reasonable cause to believe that his or her conduct was lawful. Neither the failure of the Corporation (including its Board of Directors, independent legal counsel or its stockholders) to have made a determination prior to the commencement of such action that indemnification of the claimant is proper in the circumstances because he or she has met the applicable standard of conduct set forth in the DGCL or any other applicable law, nor an actual determination by the Corporation (including its Board of Directors, independent legal counsel or its stockholders) that the claimant has not met such applicable standard of conduct, shall be a defense to the action or create a presumption that claimant has not met the applicable standard of conduct. In any suit brought by a director or executive officer to enforce a right to indemnification or to an advancement of expenses hereunder, the burden of proving that the director or executive officer is not entitled to be indemnified, or to such advancement of expenses, under this section or otherwise shall be on the Corporation.

(e) Non-Exclusivity of Rights. The rights conferred on any person by this Bylaw shall not be exclusive of any other right which such person may have or hereafter acquire under any applicable statute, provision of the Amended and Restated Certificate of Incorporation, Bylaws, agreement, vote of stockholders or disinterested directors or otherwise, both as to action in his or her official capacity and as to action in another capacity while holding

office. The Corporation is specifically authorized to enter into individual contracts with any or all of its directors, officers, employees or agents respecting indemnification and advances, to the fullest extent not prohibited by the DGCL, or by any other applicable law.

(f) Survival of Rights. The rights conferred on any person by this Bylaw shall continue as to a person who has ceased to be a director or executive officer, or other officer, employee or other agent and shall inure to the benefit of the heirs, executors and administrators of such a person.

(g) Insurance. To the fullest extent permitted by the DGCL or any other applicable law, the Corporation, upon approval by the Board of Directors, may purchase insurance on behalf of any person required or permitted to be indemnified pursuant to this section.

(h) Amendments. Any repeal or modification of this section shall only be prospective and shall not affect the rights under this Bylaw in effect at the time of the alleged occurrence of any action or omission to act that is the cause of any proceeding against any agent of the Corporation.

(i) Saving Clause. If this Bylaw or any portion hereof shall be invalidated on any ground by any court of competent jurisdiction, then the Corporation shall nevertheless indemnify each director and executive officer to the full extent not prohibited by any applicable portion of this section that shall not have been invalidated, or by any other applicable law. If this section shall be invalid due to the application of the indemnification provisions of another jurisdiction, then the Corporation shall indemnify each director and executive officer to the full extent under any other applicable law.

(j) Certain Definitions. For the purposes of this Bylaw, the following definitions shall apply:

(i) The term "***proceeding***" shall be broadly construed and shall include, without limitation, the investigation, preparation, prosecution, defense, settlement, arbitration and appeal of, and the giving of testimony in, any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative.

(ii) The term "***expenses***" shall be broadly construed and shall include, without limitation, court costs, attorneys' fees, witness fees, fines, amounts paid in settlement or judgment and any other costs and expenses of any nature or kind incurred in connection with any proceeding.

(iii) The term the "***Corporation***" shall include, in addition to the resulting corporation, any constituent corporation (including any constituent of a constituent) absorbed in a consolidation or merger which, if its separate existence had continued, would have had power and authority to indemnify its directors, officers, and employees or agents, so that any person who is or was a director, officer, employee or agent of such constituent corporation, or is or was serving at the request of such constituent corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise, shall stand in the same position under the provisions of this section with respect to the resulting or surviving corporation as he or she would have with respect to such constituent corporation if its separate existence had continued.

(iv) References to a "***director***," "***executive officer***," "***officer***," "***employee***," or "***agent***" of the Corporation shall include, without limitation, situations where such person is serving at the request of the Corporation as, respectively, a director, executive officer, officer, employee, trustee or agent of another Corporation, partnership, joint venture, trust or other enterprise.

(v) References to "***other enterprises***" shall include employee benefit plans; references to "***fines***" shall include any excise taxes assessed on a person with respect to an employee benefit plan; and references to "***serving at the request of the Corporation***" shall include any service as a director, officer, employee or agent of the Corporation which imposes duties on, or involves services by, such director, officer, employee, or agent with respect to an employee benefit plan, its participants, or beneficiaries; and a person who acted in good faith and in a manner such person reasonably believed to be in the interest of the participants and beneficiaries of an employee benefit plan shall be deemed to have acted in a manner "***not opposed to the best interests of the Corporation***" as referred to in this section.

ARTICLE XII

NOTICES

Section 45. Notices.

(a) Notice to Stockholders. Written notice to stockholders of stockholder meetings shall be given as provided in Section 7 herein. Without limiting the manner by which notice may otherwise be given effectively to stockholders under any agreement or contract with such stockholder, and except as otherwise required by law, written notice to stockholders for purposes other than stockholder meetings may be sent by U.S. mail or nationally recognized overnight courier, or by facsimile, telegraph or telex or by electronic mail or other electronic means.

(b) Notice to Directors. Any notice required to be given to any director may be given by the method stated in subsection (a), or as otherwise provided in these Bylaws, with notice other than one which is delivered personally to be sent to such address as such director shall have filed in writing with the Secretary of the Corporation, or, in the absence of such filing, to the last known address of such director.

(c) Affidavit of Mailing. An affidavit of mailing, executed by a duly authorized and competent employee of the Corporation or its transfer agent appointed with respect to the class of stock affected, or other agent, specifying the name and address or the names and addresses of the stockholder or stockholders, or director or directors, to whom any such notice or notices was or were given, and the time and method of giving the same, shall in the absence of fraud, be prima facie evidence of the facts therein contained.

(d) Methods of Notice. It shall not be necessary that the same method of giving notice be employed in respect of all recipients of notice, but one permissible method may

be employed in respect of any one or more, and any other permissible method or methods may be employed in respect of any other or others.

(e) Notice to Person With Whom Communication is Unlawful. Whenever notice is required to be given, under any provision of law or of the Amended and Restated Certificate of Incorporation or Bylaws of the Corporation, to any person with whom communication is unlawful, the giving of such notice to such person shall not be required and there shall be no duty to apply to any governmental authority or agency for a license or permit to give such notice to such person. Any action or meeting which shall be taken or held without notice to any such person with whom communication is unlawful shall have the same force and effect as if such notice had been duly given. In the event that the action taken by the Corporation is such as to require the filing of a certificate under any provision of the DGCL, the certificate shall state, if such is the fact and if notice is required, that notice was given to all persons entitled to receive notice except such persons with whom communication is unlawful.

(f) Notice to Stockholders Sharing an Address. Except as otherwise prohibited under DGCL, any notice given under the provisions of DGCL, the Amended and Restated Certificate of Incorporation or these Bylaws shall be effective if given by a single written notice to stockholders who share an address if consented to by the stockholders at that address to whom such notice is given. Such consent shall have been deemed to have been given if such stockholder fails to object in writing to the Corporation within sixty (60) days of having been given notice by the Corporation of its intention to send the single notice. Any consent shall be revocable by the stockholder by written notice to the Corporation.

ARTICLE XIII

AMENDMENTS

Section 46. Amendments. Subject to the limitations set forth in Section 44(h) of these Bylaws or the provisions of the Amended and Restated Certificate of Incorporation, the Board of Directors is expressly empowered to adopt, amend or repeal these Bylaws of the Corporation. Any adoption, amendment or repeal of these Bylaws of the Corporation by the Board of Directors shall require the approval of a majority of the authorized number of directors. The stockholders also shall have power to adopt, amend or repeal these Bylaws of the Corporation; *provided, however,* that, in addition to any vote of the holders of any class or series of stock of the Corporation required by law or by the Amended and Restated Certificate of Incorporation, such action by stockholders shall require the affirmative vote of the holders of at least sixty-six and two-thirds percent (66-2/3%) of the voting power of all of the then-outstanding shares of the capital stock of the Corporation entitled to vote generally in the election of directors, voting together as a single class.

ARTICLE XIV

LOANS TO OFFICERS

Section 47. Loans to Officers. Except as otherwise prohibited by applicable law, the Corporation may lend money to, or guarantee any obligation of, or otherwise assist any officer or

other employee of the Corporation or of its subsidiaries, including any officer or employee who is a director of the Corporation or its subsidiaries, whenever, in the judgment of the Board of Directors, such loan, guarantee or assistance may reasonably be expected to benefit the Corporation. The loan, guarantee or other assistance may be with or without interest and may be unsecured, or secured in such manner as the Board of Directors shall approve, including, without limitation, a pledge of shares of stock of the Corporation. Nothing in these Bylaws shall be deemed to deny, limit or restrict the powers of guaranty or warranty of the Corporation at common law or under any statute.

CERTIFICATION OF AMENDED AND RESTATED BYLAWS
OF
ATRECA, INC.

a Delaware Corporation

I, [Herbert Cross], certify that I am the Secretary of Atreca, Inc., a Delaware corporation (the "**Corporation**"), that I am duly authorized to make and deliver this certification, and that the attached Amended and Restated Bylaws are a true and complete copy of the Amended and Restated Bylaws of the Corporation in effect as of the date of this certificate.

Dated: _____, 2019

Herbert Cross, Secretary

Exhibit 5.1

Cooley

Danielle E. Naftulin
+1 650 849 7118
dnaftulin@cooley.com

June 10, 2019

Atreca, Inc.
500 Saginaw Drive
Redwood City, CA 94063

Ladies and Gentlemen:

We have acted as counsel to Atreca, Inc., a Delaware corporation (the "***Company***"), in connection with the filing by the Company of a Registration Statement (No. 333-231770) on Form S-1 (the "***Registration Statement***") with the Securities and Exchange Commission, including a related prospectus filed with the Registration Statement (the "***Prospectus***"), covering an underwritten public offering of up to 8,452,500 shares of the Company's Class A common stock, par value $0.0001 ("***Class A common stock***") or, to the extent shares are purchased by entities affiliated with Baker Brothers Life Sciences L.P., Class B common stock, par value $0.0001 ("***Class B common stock***" and together with the Class A common stock, the "***Shares***"), including up to 1,102,500 Shares that may be sold by the Company upon exercise of an over-allotment option to be granted to the underwriters.

In connection with this opinion, we have (i) examined and relied upon (a) the Registration Statement and Prospectus, (b) the Company's Amended and Restated Certificate of Incorporation, as amended, and Bylaws, each in effect as of the date hereof, (c) the forms of the Company's Amended and Restated Certificate of Incorporation and Amended and Restated Bylaws, filed as Exhibits 3.3 and 3.4 to the Registration Statement, respectively, each of which is to be in effect immediately prior to the closing of the offering contemplated by the Registration Statement, and (d) originals or copies certified to our satisfaction of such records, documents, certificates, memoranda and other instruments as in our judgment are necessary or appropriate to enable us to render the opinion expressed below and (ii) assumed the Board of Directors of the Company or a duly authorized committee thereof has taken action to set the sale price of the Shares. We have assumed the genuineness and authenticity of all documents submitted to us as originals, and the conformity to originals of all documents submitted to us as copies and the due execution and delivery, other than by the Company, of all documents where due execution and delivery are a prerequisite to the effectiveness thereof. As to certain factual matters, we have relied upon a certificate of an officer of the Company and have not sought independently to verify such matters.

Our opinion is expressed only with respect to the General Corporation Law of the State of Delaware. We express no opinion to the extent that any other laws are applicable to the subject matter hereof and express no opinion and provide no assurance as to compliance with any federal or state securities law, rule or regulation.

On the basis of the foregoing, and in reliance thereon, we are of the opinion that the Shares, when sold and issued against payment therefore as described in with the Registration Statement and the Prospectus, will be validly issued, fully paid and non-assessable.

We consent to the reference to our firm under the caption "Legal Matters" in the Prospectus included in the Registration Statement and to the filing of this opinion as an exhibit to the Registration Statement.

Sincerely,

Cooley LLP

By: /s/ Danielle E. Naftulin
Danielle E. Naftulin

ATRECA, INC.

2019 EQUITY INCENTIVE PLAN

ADOPTED BY THE BOARD OF DIRECTORS: JUNE 2, 2019
APPROVED BY THE STOCKHOLDERS: JUNE 7, 2019
IPO DATE/EFFECTIVE DATE: [DATE]

1. GENERAL.

(a) Successor to and Continuation of Prior Plan. The Plan is the successor to and continuation of the Atreca, Inc. 2010 Equity Incentive Plan (the "***Prior Plan***"). From and after 12:01 a.m. Pacific time on the Effective Date, no additional stock awards will be granted under the Prior Plan. All Stock Awards granted on or after 12:01 a.m. Pacific Time on the Effective Date will be granted under this Plan. All stock awards granted under the Prior Plan will remain subject to the terms of the Prior Plan.

(i) Any shares that would otherwise remain available for future grants under the Prior Plan as of 12:01 a.m. Pacific Time on the Effective Date (the "***Prior Plan's Available Reserve***") will cease to be available under the Prior Plan at such time. Instead, that number of shares of Common Stock equal to the Prior Plan's Available Reserve will be added to the Share Reserve (as further described in Section 3(a) below) and will be immediately available for grants and issuance pursuant to Stock Awards hereunder, up to the maximum number set forth in Section 3(a) below.

(ii) In addition, from and after 12:01 a.m. Pacific Time on the Effective Date, with respect to the aggregate number of shares of Common Stock subject, at such time, to outstanding stock awards granted under the Prior Plan that (1) expire or terminate without having been exercised in full; (2) are settled in cash (*i.e.*, the holder of the stock award receives cash rather than stock); (3) are forfeited back to the Company because of the failure to meet a contingency or condition required to vest such shares; or (4) are reaquired by the Company by being withheld (or not issued) to satisfy a tax withholding obligation or as consideration for the exercise of a stock option (such shares the "***Returning Shares***" and each such share a "***Returning Share***")) will immediately be added to the Share Reserve as shares of Common Stock (as further described in Section 3(a) below) as and when such a share becomes a Returning Share, up to the maximum number set forth in Section 3(a) below.

(b) Eligible Stock Award Recipients. Employees, Directors and Consultants are eligible to receive Stock Awards.

(c) Available Stock Awards. The Plan provides for the grant of the following Stock Awards: (i) Incentive Stock Options, (ii) Nonstatutory Stock Options, (iii) Stock Appreciation Rights (iv) Restricted Stock Awards, (v) Restricted Stock Unit Awards, (vi) Performance Stock Awards, and (vii) Other Stock Awards.

(d) Purpose. The Plan, through the grant of Stock Awards, is intended to help the Company secure and retain the services of eligible award recipients, provide incentives for such persons to exert maximum efforts for the success of the Company and any Affiliate, and provide a means by which the eligible recipients may benefit from increases in value of the Common Stock.

2. ADMINISTRATION.

(a) Administration by Board. The Board will administer the Plan. The Board may delegate administration of the Plan to a Committee or Committees, as provided in Section 2(c).

(b) Powers of Board. The Board will have the power, subject to, and within the limitations of, the express provisions of the Plan:

(i) To determine: (A) who will be granted Stock Awards; (B) when and how each Stock Award will be granted; (C) what type of Stock Award will be granted; (D) the provisions of each Stock Award (which need not be identical), including when a person will be permitted to exercise or otherwise receive cash or Common Stock under the Stock Award; (E) the number of shares of Common Stock subject to, or the cash value of, a Stock Award; and (F) the Fair Market Value applicable to a Stock Award.

(ii) To construe and interpret the Plan and Stock Awards granted under it, and to establish, amend and revoke rules and regulations for administration of the Plan and Stock Awards. The Board, in the exercise of these powers, may correct any defect, omission or inconsistency in the Plan or in any Stock Award Agreement, in a manner and to the extent it will deem necessary or expedient to make the Plan or Stock Award fully effective.

(iii) To settle all controversies regarding the Plan and Stock Awards granted under it.

(iv) To accelerate, in whole or in part, the time at which a Stock Award may be exercised or vest (or the time at which cash or shares of Common Stock may be issued in settlement thereof).

(v) To suspend or terminate the Plan at any time. Except as otherwise provided in the Plan or a Stock Award Agreement, suspension or termination of the Plan will not impair a Participant's rights under the Participant's then-outstanding Stock Award without the Participant's written consent, except as provided in subsection (viii) below.

(vi) To amend the Plan in any respect the Board deems necessary or advisable, including, without limitation, by adopting amendments relating to Incentive Stock Options and certain nonqualified deferred compensation under Section 409A of the Code and/or to make the Plan or Stock Awards granted under the Plan compliant with the requirements for Incentive Stock Options or exempt from, or compliant with, the requirements for nonqualified deferred compensation under Section 409A of the Code, subject to the limitations, if any, of applicable law. If required by applicable law or listing requirements, and except as provided in Section 9(a) relating to Capitalization Adjustments, the Company will seek stockholder approval of any amendment of the Plan that (A) materially increases the number of shares of Common Stock available for issuance under the Plan, (B) materially expands the class of individuals eligible to receive Stock Awards under the Plan, (C) materially increases the benefits accruing to Participants under the Plan, (D) materially extends the term of the Plan, or (E) materially expands the types of Stock Awards available for issuance under the Plan. Except as provided in the Plan (including subsection (viii) below) or a Stock Award Agreement, no amendment of the Plan will impair a Participant's rights under an outstanding Stock Award unless (1) the Company requests the consent of the affected Participant, and (2) such Participant consents in writing.

(vii) To submit any amendment to the Plan for stockholder approval, including, but not limited to, amendments to the Plan intended to satisfy the requirements of (A) Section 422 of the Code regarding "incentive stock options" or (B) Rule 16b-3.

(viii) To approve forms of Stock Award Agreements for use under the Plan and to amend the terms of any one or more Stock Awards, including, but not limited to, amendments to provide terms more favorable to the Participant than previously provided in the Stock Award Agreement, subject to any specified limits in the Plan that are not subject to Board discretion; *provided*, *however*, that a Participant's rights under any Stock Award will not be impaired by any such amendment unless (A) the Company requests the consent of the affected Participant, and (B) such Participant consents in writing. Notwithstanding the foregoing, (1) a Participant's rights will not be deemed to have been impaired by any such amendment if the Board, in its sole discretion, determines that the amendment, taken as a whole, does not materially impair the Participant's rights, and (2) subject to the limitations of applicable law, if any, the Board may amend the terms of any one or more Stock Awards without the affected Participant's consent (A) to maintain the qualified status of the Stock Award as an Incentive Stock Option under Section 422 of the Code; (B) to clarify the manner of exemption from, or to bring the Stock Award into compliance with, Section 409A of the Code; or (C) to comply with other applicable laws or listing requirements.

(ix) Generally, to exercise such powers and to perform such acts as the Board deems necessary or expedient to promote the best interests of the Company and that are not in conflict with the provisions of the Plan or Stock Awards.

(x) To adopt such rules, procedures and sub-plans related to the operation and administration of the Plan as are necessary or appropriate under local laws and regulations to permit participation in the Plan by Employees, Directors or Consultants who are foreign nationals or employed outside the United States (provided that Board approval will not be necessary for immaterial modifications to the Plan or any Stock Award Agreement made to ensure or facilitate compliance with the laws or regulations of the relevant foreign jurisdiction).

(xi) To effect, with the consent of any adversely affected Participant, (A) the reduction of the exercise, purchase or strike price of any outstanding Stock Award; (B) the cancellation of any outstanding Stock Award and the grant in substitution therefor of a new (1) Option or SAR, (2) Restricted Stock Award, (3) Restricted Stock Unit Award, (4) Other Stock Award, (5) cash and/or (6) other valuable consideration determined by the Board, in its sole discretion, with any such substituted award (x) covering the same or a different number of shares of Common Stock as the cancelled Stock Award and (y) granted under the Plan or another equity or compensatory plan of the Company; or (C) any other action that is treated as a repricing under generally accepted accounting principles (collectively (A) through (C), an "***Exchange Program***").

(c) Delegation to Committee.

(i) General. The Board may delegate some or all of the administration of the Plan to a Committee or Committees. If administration of the Plan is delegated to a Committee, the Committee will have, in connection with the administration of the Plan, the powers theretofore possessed by the Board that have been delegated to the Committee, including the power to delegate to a subcommittee of the Committee any of the administrative powers the Committee is authorized to exercise (and references in this Plan to the Board will thereafter be to the Committee or subcommittee, as applicable). Any delegation of administrative powers will be reflected in resolutions, not inconsistent with the provisions of the Plan, adopted from time to time by the Board or Committee (as applicable). The Board may retain the authority to concurrently administer the Plan with the Committee and may, at any time, revest in the

Board some or all of the powers previously delegated. Whether or not the Board has delegated administration of the Plan to a Committee, the Board will have the final power to determine all questions of policy and expediency that may arise in the administration of the Plan.

(ii) Rule 16b-3 Compliance. The Committee may consist solely of two or more Non-Employee Directors, in accordance with Rule 16b-3.

(d) Delegation to an Officer. The Board may delegate to one (1) or more Officers the authority to do one or both of the following (i) designate Employees who are not Officers to be recipients of Options and SARs (and, to the extent permitted by applicable law, other Stock Awards) and, to the extent permitted by applicable law, the terms of such Stock Awards, and (ii) determine the number of shares of Common Stock to be subject to such Stock Awards granted to such Employees; *provided*, *however*, that the Board resolutions regarding such delegation will specify the total number of shares of Common Stock that may be subject to the Stock Awards granted by such Officer and that such Officer may not grant a Stock Award to himself or herself. Any such Stock Awards will be granted on the form of Stock Award Agreement most recently approved for use by the Committee or the Board, unless otherwise provided in the resolutions approving the delegation authority. The Board may not delegate authority to an Officer who is acting solely in the capacity of an Officer (and not also as a Director) to determine the Fair Market Value pursuant to Section 13(v)(iii) below.

(e) Effect of Board's Decision. All determinations, interpretations and constructions made by the Board in good faith will not be subject to review by any person and will be final, binding and conclusive on all persons.

3. SHARES SUBJECT TO THE PLAN.

(a) Share Reserve.

(i) Subject to Section 9(a) relating to Capitalization Adjustments, and the following sentence regarding the annual increase, the aggregate number of shares of Common Stock that may be issued pursuant to Stock Awards will not exceed 36,851,056[1] shares, which number is the sum of (A) 14,500,000[2], plus (B) the number of shares that remain available for issuance under the Prior Plan's Available Reserve as of the Effective Date, plus (C) the Returning Shares, if any, which become available for grant under this Plan from time to time (such aggregate number of shares described in (A), (B) and (C) above, the "***Share Reserve***"). In addition, the Share Reserve will automatically increase on January 1st of each calendar year, beginning on January 1 in the calendar year following the calendar year in which the IPO Date occurs and ending on (and including) January 1, 2029 (each, an "***Evergreen Date***") in an amount equal to four percent (4%) of the total number of shares of Capital Stock outstanding on the last day of the immediately preceding calendar year. Notwithstanding the foregoing, the Board may act prior to the Evergreen Date of a given year to provide that there will be no increase in the Share Reserve for such year or that the increase in the Share Reserve for such year will be a lesser number of shares of Common Stock than would otherwise occur pursuant to the preceding sentence.

(i) For clarity, the Share Reserve in this Section 3(a) is a limitation on the number of shares of Common Stock that may be issued pursuant to the Plan. As a single share may be subject to grant more than once (e.g., if a share subject to a Stock Award is forfeited, it may be made subject to

[1] The initial 36,851,056 aggregate number of shares of Common Stock that may be issued pursuant to Stock Awards were adjusted to 6,141,842 pursuant to the 1-for-6 reverse split of the Company's Common Stock, effective June 7, 2019.
[2] The initial 14,500,000 shares reserved for issuance were adjusted to 2,416,666 pursuant to the 1-for-6 reverse split of the Company's Common Stock, effective June 7, 2019.

grant again as provided in Section 3(b) below), the Share Reserve is not a limit on the number of Stock Awards that can be granted.

(ii) Shares may be issued in connection with a merger or acquisition as permitted by NASDAQ Listing Rule 5635(c) or, if applicable, NYSE Listed Company Manual Section 303A.08, NYSE American Company Guide Section 711 or other applicable rule, and such issuance will not reduce the number of shares available for issuance under the Plan.

(b) Reversion of Shares to the Share Reserve. If a Stock Award or any portion thereof (i) expires or otherwise terminates without all of the shares covered by such Stock Award having been issued or (ii) is settled in cash (*i.e.*, the Participant receives cash rather than stock), such expiration, termination or settlement will not reduce (or otherwise offset) the number of shares of Common Stock that may be available for issuance under the Plan. If any shares of Common Stock issued pursuant to a Stock Award are forfeited back to or repurchased by the Company because of the failure to meet a contingency or condition required to vest such shares in the Participant or shares of Common Stock that are surrendered to the Company pursuant to an Exchange Program, then the shares that are forfeited, repurchased or so surrendered will again become available for issuance under the Plan. Any shares reacquired by the Company in satisfaction of tax withholding obligations on a Stock Award or as consideration for the exercise or purchase price of a Stock Award will again become available for issuance under the Plan.

(c) Incentive Stock Option Limit. Subject to the provisions of Section 9(a) relating to Capitalization Adjustments, the aggregate maximum number of shares of Common Stock that may be issued pursuant to the exercise of Incentive Stock Options will be will be 110,553,168[3] shares of Common Stock.

(d) Limitation on Compensation of Non-Employee Directors. During any one calendar year, no Non-Employee Director may receive Stock Awards under the Plan that, when combined with cash compensation received for service as a Non-Employee Director, exceeds $750,000 in a calendar year, increased to $1,000,000 in the calendar year of his or her initial services as a Non-Employee Director (calculating the value of any such Stock Awards based on the grant date fair value of such Stock Awards for financial reporting purposes). Stock Awards granted to an individual while he or she was serving in the capacity as an Employee or Consultant but not a Non-Employee Director will not count for purposes of the limitations set forth in this Section 3(d).

(e) Source of Shares. The stock issuable under the Plan will be shares of authorized but unissued or reacquired Common Stock, including shares repurchased by the Company on the open market or otherwise.

4. ELIGIBILITY.

(a) Eligibility for Specific Stock Awards. Incentive Stock Options may be granted only to employees of the Company or a "parent corporation" or "subsidiary corporation" thereof (as such terms are defined in Sections 424(e) and 424(f) of the Code). Stock Awards other than Incentive Stock Options may be granted to Employees, Directors and Consultants; *provided, however*, that Stock Awards may not be granted to Employees, Directors and Consultants who are providing Continuous Service only to any "parent" of the Company, as such term is defined in Rule 405 of the Securities Act, unless (i) the stock underlying such Stock Awards is treated as "service recipient stock" under Section 409A of the Code (for example, because the Stock Awards are granted pursuant to a corporate transaction such as a spin off

[3] The initial 110,553,168 aggregate maximum number of shares of Common Stock that may be issued pursuant to the exercise of Incentive Stock Options were adjusted to 18,425,528 pursuant to the 1-for-6 reverse split of the Company's Common Stock, effective June 7, 2019.

transaction), (ii) the Company, in consultation with its legal counsel, has determined that such Stock Awards are otherwise exempt from Section 409A of the Code, or (iii) the Company, in consultation with its legal counsel, has determined that such Stock Awards comply with the requirements of Section 409A of the Code.

(b) Ten Percent Stockholders. A Ten Percent Stockholder will not be granted an Incentive Stock Option unless the exercise price of such Option is at least 110% of the Fair Market Value on the date of grant and the Option is not exercisable after the expiration of five years from the date of grant.

5. PROVISIONS RELATING TO OPTIONS AND STOCK APPRECIATION RIGHTS.

Each Option or SAR will be in such form and will contain such terms and conditions as the Board deems appropriate. All Options will be separately designated Incentive Stock Options or Nonstatutory Stock Options at the time of grant, and, if certificates are issued, a separate certificate or certificates will be issued for shares of Common Stock purchased on exercise of each type of Option. If an Option is not specifically designated as an Incentive Stock Option, or if an Option is designated as an Incentive Stock Option but some portion or all of the Option fails to qualify as an Incentive Stock Option under the applicable rules, then the Option (or portion thereof) will be a Nonstatutory Stock Option. The provisions of separate Options or SARs need not be identical; *provided, however*, that each Stock Award Agreement will conform to (through incorporation of provisions hereof by reference in the applicable Stock Award Agreement or otherwise) the substance of each of the following provisions:

(a) Term. Subject to the provisions of Section 4(b) regarding Ten Percent Stockholders, no Option or SAR will be exercisable after the expiration of ten years from the date of its grant or such shorter period specified in the Stock Award Agreement.

(b) Exercise Price. Subject to the provisions of Section 4(b) regarding Ten Percent Stockholders, the exercise or strike price of each Option or SAR will be not less than 100% of the Fair Market Value of the Common Stock subject to the Option or SAR on the date the Stock Award is granted. Notwithstanding the foregoing, an Option or SAR may be granted with an exercise or strike price lower than 100% of the Fair Market Value of the Common Stock subject to the Stock Award if such Stock Award is granted pursuant to an assumption of or substitution for another option or stock appreciation right pursuant to a Corporate Transaction and in a manner consistent with the provisions of Section 409A of the Code and, if applicable, Section 424(a) of the Code. Each SAR will be denominated in shares of Common Stock equivalents.

(c) Purchase Price for Options. The purchase price of Common Stock acquired pursuant to the exercise of an Option may be paid, to the extent permitted by applicable law and as determined by the Board in its sole discretion, by any combination of the methods of payment set forth below. The Board will have the authority to grant Options that do not permit all of the following methods of payment (or otherwise restrict the ability to use certain methods) and to grant Options that require the consent of the Company to use a particular method of payment. The permitted methods of payment are as follows:

(i) by cash, check, bank draft or money order payable to the Company;

(ii) pursuant to a program developed under Regulation T as promulgated by the Federal Reserve Board that, prior to the issuance of the stock subject to the Option, results in either the receipt of cash (or check) by the Company or the receipt of irrevocable instructions to pay the aggregate exercise price to the Company from the sales proceeds;

(iii) if an Option is a Nonstatutory Stock Option, by a "net exercise" arrangement pursuant to which the Company will reduce the number of shares of Common Stock issuable upon exercise by the largest whole number of shares with a Fair Market Value that does not exceed the aggregate exercise price; *provided, however*, that the Company will accept a cash or other payment from the Participant to the extent of any remaining balance of the aggregate exercise price not satisfied by such reduction in the number of whole shares to be issued. Shares of Common Stock will no longer be subject to an Option and will not be exercisable thereafter to the extent that (A) shares issuable upon exercise are used to pay the exercise price pursuant to the "net exercise," (B) shares are delivered to the Participant as a result of such exercise, and/or (C) shares are withheld to satisfy tax withholding obligations; or

(iv) in any other form of legal consideration that may be acceptable to the Board and specified in the applicable Stock Award Agreement.

(d) Exercise and Payment of a SAR. To exercise any outstanding SAR, the Participant must provide written notice of exercise to the Company in compliance with the provisions of the Stock Appreciation Right Agreement evidencing such SAR. The appreciation distribution payable on the exercise of a SAR will be not greater than an amount equal to the excess of (A) the aggregate Fair Market Value (on the date of the exercise of the SAR) of a number of shares of Common Stock equal to the number of Common Stock equivalents in which the Participant is vested under such SAR, and with respect to which the Participant is exercising the SAR on such date, over (B) the aggregate strike price of the number of Common Stock equivalents with respect to which the Participant is exercising the SAR on such date. The appreciation distribution may be paid in Common Stock, in cash, in any combination of the two or in any other form of consideration, as determined by the Board and contained in the Stock Award Agreement evidencing such SAR.

(e) Transferability of Options and SARs. The Board may, in its sole discretion, impose such limitations on the transferability of Options and SARs as the Board will determine. In the absence of such a determination by the Board to the contrary, the following restrictions on the transferability of Options and SARs will apply:

(i) Restrictions on Transfer. An Option or SAR will not be transferable except by will or by the laws of descent and distribution (or pursuant to subsections (ii) and (iii) below), and will be exercisable during the lifetime of the Participant only by the Participant. The Board may permit transfer of the Option or SAR in a manner that is not prohibited by applicable laws or regulations. Except as explicitly provided in the Plan, neither an Option nor a SAR may be transferred for consideration.

(ii) Domestic Relations Orders. Subject to the approval of the Board or a duly authorized Officer, an Option or SAR may be transferred pursuant to the terms of a domestic relations order, official marital settlement agreement or other divorce or separation instrument as permitted by Treasury Regulations Section 1.421-1(b)(2) or comparable non-U.S. law. If an Option is an Incentive Stock Option, such Option may be deemed to be a Nonstatutory Stock Option as a result of such transfer.

(iii) Beneficiary Designation. Subject to the approval of the Board or a duly authorized Officer, a Participant may, by delivering written notice to the Company or to any third party designated by the Company, in a form approved by the Company (or the designated broker), designate a third party who, upon the death of the Participant, will thereafter be entitled to exercise the Option or SAR and receive the Common Stock or other consideration resulting from such exercise. In the absence of such a designation, upon the death of the Participant, the executor or administrator of the Participant's estate or the Participant's legal heirs will be entitled to exercise the Option or SAR and receive the Common Stock or other consideration resulting from such exercise. However, the Company may prohibit

designation of a beneficiary at any time, including due to any conclusion by the Company that such designation would be inconsistent with the provisions of applicable laws.

(f) Vesting Generally. The total number of shares of Common Stock subject to an Option or SAR may vest and become exercisable in periodic installments that may or may not be equal. The Option or SAR may be subject to such other terms and conditions on the time or times when it may or may not be exercised (which may be based on the satisfaction of Performance Goals or other criteria) as the Board may deem appropriate. The vesting provisions of individual Options or SARs may vary. The provisions of this Section 5(f) are subject to any Option or SAR provisions governing the minimum number of shares of Common Stock as to which an Option or SAR may be exercised.

(g) Termination of Continuous Service. Except as otherwise provided in the applicable Stock Award Agreement or other agreement between the Participant and the Company, if a Participant's Continuous Service terminates (other than for Cause and other than upon the Participant's death or Disability), the Participant may exercise his or her Option or SAR (to the extent that the Participant was entitled to exercise such Stock Award as of the date of termination of Continuous Service) within the period of time ending on the earlier of (i) the date which occurs three (3) months following the termination of the Participant's Continuous Service (or such longer or shorter period specified in the applicable Stock Award Agreement), and (ii) the expiration of the term of the Option or SAR as set forth in the Stock Award Agreement. If, after termination of Continuous Service, the Participant does not exercise his or her Option or SAR (as applicable) within the applicable time frame, the Option or SAR will terminate.

(h) Extension of Termination Date. Except as otherwise provided in the applicable Stock Award Agreement or other agreement between the Participant and the Company, if the exercise of an Option or SAR following the termination of the Participant's Continuous Service would be prohibited at any time solely because the issuance of shares of Common Stock would violate the registration requirements under the Securities Act, then the Option or SAR will terminate on the earlier of (i) the expiration of a total period of time (that need not be consecutive) equal to the applicable post termination exercise period after the termination of the Participant's Continuous Service during which the exercise of the Option or SAR would not be in violation of such registration requirements, and (ii) the expiration of the term of the Option or SAR as set forth in the applicable Stock Award Agreement. In addition, unless otherwise provided in a Participant's Stock Award Agreement, if the sale of any Common Stock received upon exercise of an Option or SAR following the termination of the Participant's Continuous Service would violate the Company's insider trading policy, then the Option or SAR will terminate on the earlier of (i) the expiration of the period of months (that need not be consecutive) equal to the applicable post-termination exercise period after the termination of the Participant's Continuous Service during which the sale of the Common Stock received upon exercise of the Option or SAR would not be in violation of the Company's insider trading policy, or (ii) the expiration of the term of the Option or SAR as set forth in the applicable Stock Award Agreement.

(i) Disability of Participant. Except as otherwise provided in the applicable Stock Award Agreement or other agreement between the Participant and the Company, if a Participant's Continuous Service terminates as a result of the Participant's Disability, the Participant may exercise his or her Option or SAR (to the extent that the Participant was entitled to exercise such Option or SAR as of the date of termination of Continuous Service), but only within such period of time ending on the earlier of (i) the date which occurs 12 months following such termination of Continuous Service (or such longer or shorter period specified in the Stock Award Agreement), and (ii) the expiration of the term of the Option or SAR as set forth in the Stock Award Agreement. If, after termination of Continuous Service, the Participant does not exercise his or her Option or SAR within the applicable time frame, the Option or SAR (as applicable) will terminate.

(j) Death of Participant. Except as otherwise provided in the applicable Stock Award Agreement or other agreement between the Participant and the Company, if (i) a Participant's Continuous Service terminates as a result of the Participant's death, or (ii) the Participant dies within the period (if any) specified in the Stock Award Agreement for exercisability after the termination of the Participant's Continuous Service for a reason other than death, then the Option or SAR may be exercised (to the extent the Participant was entitled to exercise such Option or SAR as of the date of death) by the Participant's estate, by a person who acquired the right to exercise the Option or SAR by bequest or inheritance or by a person designated to exercise the Option or SAR upon the Participant's death, but only within the period ending on the earlier of (i) the date 18 months following the date of death (or such longer or shorter period specified in the Stock Award Agreement), and (ii) the expiration of the term of such Option or SAR as set forth in the Stock Award Agreement. If, after the Participant's death, the Option or SAR is not exercised within the applicable time frame, the Option or SAR (as applicable) will terminate.

(k) Termination for Cause. Except as explicitly provided otherwise in the applicable Stock Award Agreement or other written agreement between the Participant and the Company, if a Participant's Continuous Service is terminated for Cause, the Option or SAR will terminate immediately upon such Participant's termination of Continuous Service, and the Participant will be prohibited from exercising his or her Option or SAR from and after the date of such termination of Continuous Service. If a Participant's Continuous Service is suspended pending an investigation of the existence of Cause, all of the Participant's rights under the Option or SAR will also be suspended during the investigation period.

(l) Non-Exempt Employees. If an Option or SAR is granted to an Employee who is a non-exempt employee for purposes of the U.S. Fair Labor Standards Act of 1938, as amended, the Option or SAR will not be first exercisable for any shares of Common Stock until at least six months following the date of grant of the Option or SAR (although the Stock Award may vest prior to such date). Consistent with the provisions of the U.S. Worker Economic Opportunity Act, (i) if such non-exempt Employee dies or suffers a Disability, (ii) upon a Corporate Transaction in which such Option or SAR is not assumed, continued, or substituted, (iii) upon a Change in Control, or (iv) upon the Participant's retirement (as such term may be defined in the Participant's Stock Award Agreement in another agreement between the Participant and the Company, or, if no such definition, in accordance with the Company's then current employment policies and guidelines), the vested portion of any Options and SARs may be exercised earlier than six months following the date of grant. The foregoing provision is intended to operate so that any income derived by a non-exempt employee in connection with the exercise or vesting of an Option or SAR will be exempt from his or her regular rate of pay. To the extent permitted and/or required for compliance with the U.S. Worker Economic Opportunity Act to ensure that any income derived by a non-exempt employee in connection with the exercise, vesting or issuance of any shares under any other Stock Award will be exempt from the employee's regular rate of pay, the provisions of this Section 5(l) will apply to all Stock Awards and are hereby incorporated by reference into such Stock Award Agreements.

6. PROVISIONS OF STOCK AWARDS OTHER THAN OPTIONS AND SARS.

(a) Restricted Stock Awards. Each Restricted Stock Award Agreement will be in such form and will contain such terms and conditions as the Board will deem appropriate. To the extent consistent with the Company's bylaws, at the Board's election, shares of Common Stock may be (x) held in book entry form subject to the Company's instructions until any restrictions relating to the Restricted Stock Award lapse; or (y) evidenced by a certificate, which certificate will be held in such form and manner as determined by the Board. The terms and conditions of Restricted Stock Award Agreements may change from time to time, and the terms and conditions of separate Restricted Stock Award Agreements need not be identical. Each Restricted Stock Award Agreement will conform to (through incorporation of the provisions hereof by reference in the agreement or otherwise) the substance of each of the following provisions:

(i) Consideration. A Restricted Stock Award may be awarded in consideration for (A) cash, check, bank draft or money order payable to the Company, (B) past services to the Company or an Affiliate, or (C) any other form of legal consideration (including future services) that may be acceptable to the Board, in its sole discretion, and permissible under applicable law.

(ii) Vesting. Shares of Common Stock awarded under the Restricted Stock Award Agreement may be subject to forfeiture to the Company in accordance with a vesting schedule to be determined by the Board.

(iii) Termination of Participant's Continuous Service. If a Participant's Continuous Service terminates, the Company may receive through a forfeiture condition or a repurchase right any or all of the shares of Common Stock held by the Participant that have not vested as of the date of termination of Continuous Service under the terms of the Restricted Stock Award Agreement.

(iv) Transferability. Rights to acquire shares of Common Stock under the Restricted Stock Award Agreement will be transferable by the Participant only upon such terms and conditions as are set forth in the Restricted Stock Award Agreement, as the Board will determine in its sole discretion, so long as Common Stock awarded under the Restricted Stock Award Agreement remains subject to the terms of the Restricted Stock Award Agreement.

(v) Dividends. A Restricted Stock Award Agreement may provide that any dividends paid on Restricted Stock will be subject to the same vesting and forfeiture restrictions as apply to the shares of Common Stock subject to the Restricted Stock Award to which they relate.

(b) Restricted Stock Unit Awards. Each Restricted Stock Unit Award Agreement will be in such form and will contain such terms and conditions as the Board will deem appropriate. The terms and conditions of Restricted Stock Unit Award Agreements may change from time to time, and the terms and conditions of separate Restricted Stock Unit Award Agreements need not be identical. Each Restricted Stock Unit Award Agreement will conform to (through incorporation of the provisions hereof by reference in the Agreement or otherwise) the substance of each of the following provisions:

(i) Consideration. At the time of grant of a Restricted Stock Unit Award, the Board will determine the consideration, if any, to be paid by the Participant upon delivery of each share of Common Stock subject to the Restricted Stock Unit Award. The consideration to be paid (if any) by the Participant for each share of Common Stock subject to a Restricted Stock Unit Award may be paid in any form of legal consideration that may be acceptable to the Board, in its sole discretion, and permissible under applicable law.

(ii) Vesting. At the time of the grant of a Restricted Stock Unit Award, the Board may impose such restrictions on or conditions to the vesting of the Restricted Stock Unit Award as it, in its sole discretion, deems appropriate.

(iii) Payment. A Restricted Stock Unit Award may be settled by the delivery of shares of Common Stock, their cash equivalent, any combination thereof or in any other form of consideration, as determined by the Board and contained in the Restricted Stock Unit Award Agreement.

(iv) Additional Restrictions. At the time of the grant of a Restricted Stock Unit Award, the Board, as it deems appropriate, may impose such restrictions or conditions that delay the delivery of the shares of Common Stock (or their cash equivalent) subject to a Restricted Stock Unit Award to a time after the vesting of such Restricted Stock Unit Award.

(v) Dividend Equivalents. Dividend equivalents may be credited in respect of shares of Common Stock covered by a Restricted Stock Unit Award, as determined by the Board and contained in the Restricted Stock Unit Award Agreement. At the sole discretion of the Board, such dividend equivalents may be converted into additional shares of Common Stock covered by the Restricted Stock Unit Award in such manner as determined by the Board. Any additional shares covered by the Restricted Stock Unit Award credited by reason of such dividend equivalents will be subject to all of the same terms and conditions of the underlying Restricted Stock Unit Award Agreement to which they relate.

(vi) Termination of Participant's Continuous Service. Except as otherwise provided in the applicable Restricted Stock Unit Award Agreement, such portion of the Restricted Stock Unit Award that has not vested will be forfeited upon the Participant's termination of Continuous Service.

(c) Performance Stock Awards.

(i) Performance Stock Awards. A Performance Stock Award is a Stock Award that is payable (including that may be granted, may vest or may be exercised) contingent upon the attainment during a Performance Period of certain Performance Goals. A Performance Stock Award may but need not require the Participant's completion of a specified period of Continuous Service. The length of any Performance Period, the Performance Goals to be achieved during the Performance Period, and the measure of whether and to what degree such Performance Goals have been attained will be conclusively determined by the Board or Committee, in its sole discretion. In addition, to the extent permitted by applicable law and the applicable Stock Award Agreement, the Board may determine that cash may be used in payment of Performance Stock Awards.

(ii) Board Discretion. The Board retains the discretion to adjust or eliminate the compensation or economic benefit due upon attainment of Performance Goals and to define the manner of calculating the Performance Criteria it selects to use for a Performance Period.

(d) Other Stock Awards. Other forms of Stock Awards valued in whole or in part by reference to, or otherwise based on, Common Stock, including the appreciation in value thereof (e.g., options or stock rights with an exercise price or strike price less than 100% of the Fair Market Value of the Common Stock at the time of grant) may be granted either alone or in addition to Stock Awards provided for under Section 5 and the preceding provisions of this Section 6. Subject to the provisions of the Plan, the Board will have sole and complete authority to determine the persons to whom and the time or times at which such Other Stock Awards will be granted, the number of shares of Common Stock (or the cash equivalent thereof) to be granted pursuant to such Other Stock Awards and all other terms and conditions of such Other Stock Awards.

7. COVENANTS OF THE COMPANY.

(a) Availability of Shares. The Company will keep available at all times the number of shares of Common Stock reasonably required to satisfy then-outstanding Stock Awards.

(b) Compliance with Law. The Company will seek to obtain from each regulatory commission or agency, as necessary, such authority as may be required to grant Stock Awards and to issue and sell shares of Common Stock upon exercise or vesting of the Stock Awards; *provided*, *however*, that this undertaking will not require the Company to register under the Securities Act the Plan or other securities or applicable laws, any Stock Award or any Common Stock issued or issuable pursuant to any such Stock Award. If, after reasonable efforts and at a reasonable cost, the Company is unable to obtain

from any such regulatory commission or agency the authority that counsel for the Company deems necessary or advisable for the lawful issuance and sale of Common Stock under the Plan, the Company will be relieved from any liability for failure to issue and sell Common Stock upon exercise or vesting of such Stock Awards unless and until such authority is obtained. A Participant will not be eligible for the grant of a Stock Award or the subsequent issuance of cash or Common Stock pursuant to the Stock Award if such grant or issuance would be in violation of any applicable law.

(c) No Obligation to Notify or Minimize Taxes. The Company will have no duty or obligation to any Participant to advise such holder as to the time or manner or tax treatment of exercising such Stock Award. Furthermore, the Company will have no duty or obligation to warn or otherwise advise such holder of a pending termination or expiration of a Stock Award or a possible period in which the Stock Award may not be exercised. The Company has no duty or obligation to minimize the tax consequences of a Stock Award to the holder of such Stock Award.

8. MISCELLANEOUS.

(a) Use of Proceeds from Sales of Common Stock. Proceeds from the sale of shares of Common Stock pursuant to Stock Awards will constitute general funds of the Company.

(b) Corporate Action Constituting Grant of Stock Awards. Corporate action constituting a grant by the Company of a Stock Award to any Participant will be deemed completed as of the date of such corporate action, unless otherwise determined by the Board, regardless of when the instrument, certificate, or letter evidencing the Stock Award is communicated to, or actually received or accepted by, the Participant. In the event that the corporate records (e.g., Board consents, resolutions or minutes) documenting the corporate action constituting the grant contain terms (e.g., exercise price, vesting schedule or number of shares) that are inconsistent with those in the Stock Award Agreement or related grant documents as a result of a clerical error in the papering of the Stock Award Agreement or related grant documents, the corporate records will control and the Participant will have no legally binding right to the incorrect term in the Stock Award Agreement or related grant documents.

(c) Stockholder Rights. No Participant will be deemed to be the holder of, or to have any of the rights of a holder with respect to, any shares of Common Stock subject to a Stock Award unless and until (i) such Participant has satisfied all requirements for exercise of, or the issuance of shares of Common Stock under, the Stock Award pursuant to its terms, and (ii) the issuance of the Common Stock subject to such Stock Award has been entered into the books and records of the Company.

(d) No Employment or Other Service Rights. Nothing in the Plan, any Stock Award Agreement or any other instrument executed thereunder or in connection with any Stock Award granted pursuant thereto will confer upon any Participant any right to continue to serve the Company or an Affiliate in the capacity in effect at the time the Stock Award was granted or will affect the right of the Company or an Affiliate to terminate (i) the employment of an Employee with or without notice and with or without cause, (ii) the service of a Consultant pursuant to the terms of such Consultant's agreement with the Company or an Affiliate, or (iii) the service of a Director pursuant to the bylaws of the Company or an Affiliate, and any applicable provisions of the corporate law of the state or foreign jurisdiction in which the Company or the Affiliate is domiciled or incorporated, as the case may be. Furthermore, to the extent the Company is not the employer of a Participant, the grant of a Stock Award will be not establish an employment or other service relationship between the Company and the Participant.

(e) Change in Time Commitment. In the event a Participant's regular level of time commitment in the performance of his or her services for the Company and any Affiliates is reduced (for example, and without limitation, if the Participant is an Employee of the Company and the Employee has

a change in status from a full-time Employee to a part-time Employee or takes an extended leave of absence) after the date of grant of any Stock Award to the Participant, the Board has the right in its sole discretion to (x) make a corresponding reduction in the number of shares or cash amount subject to any portion of such Stock Award that is scheduled to vest or become payable after the date of such change in time commitment, and (y) in lieu of or in combination with such a reduction, extend the vesting or payment schedule applicable to such Stock Award. In the event of any such reduction, the Participant will have no right with respect to any portion of the Stock Award that is so reduced.

(f) Incentive Stock Option Limitations. To the extent that the aggregate Fair Market Value (determined at the time of grant) of Common Stock with respect to which Incentive Stock Options are exercisable for the first time by any Optionholder during any calendar year (under all plans of the Company and any Affiliates) exceeds U.S. $100,000 (or such other limit established in the Code) or otherwise does not comply with the rules governing Incentive Stock Options, the Options or portions thereof that exceed such limit (according to the order in which they were granted) or otherwise do not comply with such rules will be treated as Nonstatutory Stock Options, notwithstanding any contrary provision of the applicable Option Agreement(s).

(g) Investment Assurances. The Company may require a Participant, as a condition of exercising or acquiring Common Stock under any Stock Award, (i) to give written assurances satisfactory to the Company as to the Participant's knowledge and experience in financial and business matters and/or to employ a purchaser representative reasonably satisfactory to the Company who is knowledgeable and experienced in financial and business matters and that such Participant is capable of evaluating, alone or together with the purchaser representative, the merits and risks of exercising the Stock Award; and (ii) to give written assurances satisfactory to the Company stating that the Participant is acquiring Common Stock subject to the Stock Award for the Participant's own account and not with any present intention of selling or otherwise distributing the Common Stock. The foregoing requirements, and any assurances given pursuant to such requirements, will be inoperative if (A) the issuance of the shares upon the exercise or acquisition of Common Stock under the Stock Award has been registered under a then currently effective registration statement under the Securities Act, or (B) as to any particular requirement, a determination is made by counsel for the Company that such requirement need not be met in the circumstances under the then applicable securities laws. The Company may, upon advice of counsel to the Company, place legends on stock certificates issued under the Plan as such counsel deems necessary or appropriate in order to comply with applicable securities laws, including, but not limited to, legends restricting the transfer of the Common Stock.

(h) Withholding Obligations. Unless prohibited by the terms of a Stock Award Agreement, the Company may, in its sole discretion, satisfy any U.S. and non-U.S. federal, state or local tax withholding obligation relating to a Stock Award by any of the following means or by a combination of such means: (i) causing the Participant to tender a cash payment; (ii) withholding shares of Common Stock from the shares of Common Stock issued or otherwise issuable to the Participant in connection with the Stock Award; *provided, however,* that (A) no shares of Common Stock are withheld with a value exceeding the maximum amount of tax that may be required to be withheld by law (or such other amount as may be permitted while still avoiding classification of the Stock Award as a liability for financial accounting purposes)), and (B) with respect to a Stock Award held by any Participant who is subject to the filing requirements of Section 16 of the Exchange Act, any such share withholding must be specifically approved by the Compensation Committee as the applicable method that must be used to satisfy the tax withholding obligation or such share withholding procedure must otherwise satisfy the requirements for an exempt transaction under Section 16(b) of the Exchange Act; (iii) withholding cash from a Stock Award settled in cash; (iv) withholding payment from any amounts otherwise payable to the Participant; (v) by means of a "cashless exercise" pursuant to a program developed under Regulation T as

promulgated by the Federal Reserve Board, or (vi) by such other method as may be set forth in the Stock Award Agreement.

(i) Electronic Delivery. Any reference herein to a "written" agreement or document will include any agreement or document delivered electronically, filed publicly at www.sec.gov (or any successor website thereto) or posted on the Company's intranet (or other shared electronic medium controlled by the Company to which the Participant has access).

(j) Deferrals. To the extent permitted by applicable law, the Board, in its sole discretion, may determine that the delivery of Common Stock or the payment of cash, upon the exercise, vesting or settlement of all or a portion of any Stock Award may be deferred and may establish programs and procedures for deferral elections to be made by Participants. Deferrals by Participants will be made in accordance with Section 409A of the Code. Consistent with Section 409A of the Code, the Board may provide for distributions while a Participant is still an employee or otherwise providing services to the Company. The Board is authorized to make deferrals of Stock Awards and determine when, and in what annual percentages, Participants may receive payments, including lump sum payments, following the Participant's termination of Continuous Service, and implement such other terms and conditions consistent with the provisions of the Plan and in accordance with applicable law.

(k) Compliance with Section 409A of the Code. Unless otherwise expressly provided for in a Stock Award Agreement, the Plan and Stock Award Agreements will be interpreted to the greatest extent possible in a manner that makes the Plan and the Stock Awards granted hereunder exempt from Section 409A of the Code, and, to the extent not so exempt, in compliance with Section 409A of the Code. If the Board determines that any Stock Award granted hereunder is not exempt from and is therefore subject to Section 409A of the Code, the Stock Award Agreement evidencing such Stock Award will incorporate the terms and conditions necessary to avoid the consequences specified in Section 409A(a)(1) of the Code, and to the extent a Stock Award Agreement is silent on terms necessary for compliance, such terms are hereby incorporated by reference into the Stock Award Agreement. Notwithstanding anything to the contrary in this Plan (and unless the Stock Award Agreement specifically provides otherwise), if the shares of Common Stock are publicly traded, and if a Participant holding a Stock Award that constitutes "deferred compensation" under Section 409A of the Code is a "specified employee" for purposes of Section 409A of the Code, no distribution or payment of any amount that is due because of a "separation from service" (as defined in Section 409A of the Code without regard to alternative definitions thereunder) will be issued or paid before the date that is six months following the date of such Participant's "separation from service" or, if earlier, the date of the Participant's death, unless such distribution or payment can be made in a manner that complies with Section 409A of the Code, and any amounts so deferred will be paid in a lump sum on the day after such six month period elapses, with the balance paid thereafter on the original schedule.

(l) Exchange Program. Without prior stockholder approval, the Board may engage in an Exchange Program.

(m) Clawback/Recovery. All Stock Awards granted under the Plan will be subject to recoupment in accordance with any clawback policy that the Company is required to adopt pursuant to the listing standards of any national securities exchange or association on which the Company's securities are listed or as is otherwise required by the U.S. Dodd-Frank Wall Street Reform and Consumer Protection Act or other applicable law. In addition, the Board may impose such other clawback, recovery or recoupment provisions in a Stock Award Agreement as the Board determines necessary or appropriate, including but not limited to a reacquisition right in respect of previously acquired shares of Common Stock or other cash or property upon the occurrence of an event constituting Cause. No recovery of compensation under such a clawback policy will be an event giving rise to a right to resign for "good

reason" or "constructive termination" (or similar term) under any agreement with the Company or an Affiliate.

9. ADJUSTMENTS UPON CHANGES IN COMMON STOCK; OTHER CORPORATE EVENTS.

(a) Capitalization Adjustments. In the event of a Capitalization Adjustment, the Board will appropriately and proportionately adjust: (i) the class(es) and maximum number of securities subject to the Plan pursuant to Section 3(a), (ii) the class(es) and maximum number of securities that may be issued pursuant to the exercise of Incentive Stock Options pursuant to Section 3(c), and (iii) the class(es) and number of securities and price per share of stock subject to outstanding Stock Awards. The Board will make such adjustments, and its determination will be final, binding and conclusive.

(b) Dissolution or Liquidation. Except as otherwise provided in the Stock Award Agreement, in the event of a dissolution or liquidation of the Company, all outstanding Stock Awards (other than Stock Awards consisting of vested and outstanding shares of Common Stock not subject to a forfeiture condition or the Company's right of repurchase) will terminate immediately prior to the completion of such dissolution or liquidation, and the shares of Common Stock subject to the Company's repurchase rights or subject to a forfeiture condition may be repurchased or reacquired by the Company notwithstanding the fact that the holder of such Stock Award is providing Continuous Service; *provided*, *however*, that the Board may, in its sole discretion, cause some or all Stock Awards to become fully vested, exercisable and/or no longer subject to repurchase or forfeiture (to the extent such Stock Awards have not previously expired or terminated) before the dissolution or liquidation is completed but contingent on its completion.

(c) Corporate Transaction. The following provisions will apply to Stock Awards in the event of a Corporate Transaction unless otherwise provided in the Stock Award Agreement or any other written agreement between the Company or any Affiliate and the Participant or unless otherwise expressly provided by the Board at the time of grant of a Stock Award. In the event of a Corporate Transaction, then, notwithstanding any other provision of the Plan, the Board may take one or more of the following actions with respect to Stock Awards, contingent upon the closing or completion of the Corporate Transaction:

(i) arrange for the surviving corporation or acquiring corporation (or the surviving or acquiring corporation's parent company) to assume or continue the Stock Award or to substitute a similar stock award for the Stock Award (including, but not limited to, an award to acquire the same consideration paid to the stockholders of the Company pursuant to the Corporate Transaction);

(ii) arrange for the assignment of any reacquisition or repurchase rights held by the Company in respect of Common Stock issued pursuant to the Stock Award to the surviving corporation or acquiring corporation (or the surviving or acquiring corporation's parent company);

(iii) accelerate the vesting, in whole or in part, of the Stock Award (and, if applicable, the time at which the Stock Award may be exercised) to a date prior to the effective time of such Corporate Transaction as the Board determines (or, if the Board does not determine such a date, to the date that is five days prior to the effective date of the Corporate Transaction), which exercise is contingent upon the effectiveness of such Corporate Transaction with such Stock Award terminating if not exercised (if applicable) at or prior to the effective time of the Corporate Transaction; *provided*, *however*, that the Board may require Participants to complete and deliver to the Company a notice of exercise before the effective date of a Corporate Transaction;

(iv) arrange for the lapse, in whole or in part, of any reacquisition or repurchase rights held by the Company with respect to the Stock Award;

(v) cancel or arrange for the cancellation of the Stock Award, to the extent not vested or not exercised prior to the effective time of the Corporate Transaction, in exchange for such cash consideration, if any, as the Board, in its sole discretion, may consider appropriate; and

(vi) make a payment, in such form as may be determined by the Board equal to the excess, if any, of (A) the per share amount (or value of property per share) payable to holders of Common Stock in connection with the Corporate Transaction, over (B) the per share exercise price under the applicable Stock Award, multiplied by the number of shares subject to the Stock Award. For clarity, this payment may be zero (U.S. $0) if the amount per share (or value of property per share) payable to the holders of the Common Stock is equal to or less than the exercise price of the Stock Award. In addition, any escrow, holdback, earnout or similar provisions in the definitive agreement for the Corporate Transaction may apply to such payment to the holder of the Stock Award to the same extent and in the same manner as such provisions apply to the holders of Common Stock.

The Board need not take the same action or actions with respect to all Stock Awards or portions thereof or with respect to all Participants. The Board may take different actions with respect to the vested and unvested portions of a Stock Award.

(d) Change in Control. A Stock Award may be subject to additional acceleration of vesting and exercisability upon or after a Change in Control as may be provided in the Stock Award Agreement for such Stock Award or as may be provided in any other written agreement between the Company or any Affiliate and the Participant, but in the absence of such provision, no such acceleration will occur.

10. TERMINATION OR SUSPENSION OF THE PLAN.

The Board may suspend or terminate the Plan at any time. No Incentive Stock Options may be granted after the tenth anniversary of the earlier of (i) the Adoption Date, or (ii) the date the Plan is approved by the stockholders of the Company. No Stock Awards may be granted under the Plan while the Plan is suspended or after it is terminated.

11. EXISTENCE OF THE PLAN; TIMING OF FIRST GRANT OR EXERCISE.

The Plan will come into existence on the Adoption Date; *provided*, *however*, no Stock Award may be granted prior to the IPO Date (that is, the Effective Date). In addition, no Stock Award will be exercised (or, in the case of a Restricted Stock Award, Restricted Stock Unit Award, Performance Stock Award, or Other Stock Award, will be granted) unless and until the Plan has been approved by the stockholders of the Company, which approval will be within 12 months before or after the Adoption Date.

12. CHOICE OF LAW.

The law of the State of Delaware will govern all questions concerning the construction, validity and interpretation of this Plan, without regard to that state's conflict of laws rules.

13. DEFINITIONS.

As used in the Plan, the following definitions will apply to the capitalized terms indicated below:

(a) "***Adoption Date***" means the date the Plan is adopted by the Board.

(b) "***Affiliate***" means, at the time of determination, any "parent" or "subsidiary" of the Company as such terms are defined in Rule 405 of the Securities Act. The Board will have the authority to determine the time or times at which "parent" or "subsidiary" status is determined within the foregoing definition.

(c) "***Board***" means the Board of Directors of the Company.

(d) "***Capital Stock***" means each and every class of common stock of the Company, regardless of the number of votes per share.

(e) "***Capitalization Adjustment***" means any change that is made in, or other events that occur with respect to, the Common Stock subject to the Plan or subject to any Stock Award after the Adoption Date without the receipt of consideration by the Company through merger, consolidation, reorganization, recapitalization, reincorporation, stock dividend, dividend in property other than cash, large nonrecurring cash dividend, stock split, reverse stock split, liquidating dividend, combination of shares, exchange of shares, change in corporate structure or any similar equity restructuring transaction, as that term is used in Statement of Financial Accounting Standards Board Accounting Standards Codification Topic 718 (or any successor thereto). Notwithstanding the foregoing, the conversion of any convertible securities of the Company will not be treated as a Capitalization Adjustment.

(f) "***Cause***" will have the meaning ascribed to such term in any written agreement between the Participant and the Company defining such term and, in the absence of such agreement, such term means, with respect to a Participant, the occurrence of any of the following events: (i) such Participant's commission of any felony or any crime involving fraud, dishonesty or moral turpitude under the laws of the United States, any state thereof, or any applicable foreign jurisdiction; (ii) such Participant's attempted commission of, or participation in, a fraud or act of dishonesty against the Company or any Affiliate; (iii) such Participant's intentional, material violation of any contract or agreement between the Participant and the Company or any Affiliate, of any policy of the Company or any Affiliate applicable to Participant or of any statutory or fiduciary duty owed to the Company or any Affiliate; (iv) such Participant's unauthorized use or disclosure of the Company's or any Affiliate's confidential information or trade secrets; or (v) such Participant's gross misconduct. The determination that a termination of the Participant's Continuous Service is either for Cause or without Cause shall be made by the Company in its sole discretion. Any determination by the Company that the Continuous Service of a Participant was terminated by reason of dismissal without Cause for the purposes of outstanding Stock Awards held by such Participant shall have no effect upon any determination of the rights or obligations of the Company or such Participant for any other purpose.

(g) "***Change in Control***" means the occurrence, in a single transaction or in a series of related transactions, of any one or more of the following events:

(i) any Exchange Act Person becomes the Owner, directly or indirectly, of securities of the Company representing more than 50% of the combined voting power of the Company's then outstanding securities other than by virtue of a merger, consolidation or similar transaction. Notwithstanding the foregoing, a Change in Control will not be deemed to occur (A) on account of the acquisition of securities of the Company directly from the Company, (B) on account of the acquisition of securities of the Company by an investor, any affiliate thereof or any other Exchange Act Person that acquires the Company's securities in a transaction or series of related transactions the primary purpose of which is to obtain financing for the Company through the issuance of equity securities, (C) on account of the acquisition of securities of the Company by any individual who is, on the IPO Date, either an executive officer or a Director (either, an "***IPO Investor***") and/or any Entity in which an IPO Investor has a direct or indirect interest (whether in the form of voting rights or participation in profits or capital

contributions) of more than 50% (collectively, the "***IPO Entities***") or on account of the IPO Entities continuing to hold shares that come to represent more than 50% of the combined voting power of the Company's then outstanding securities as a result of the conversion of any class of the Company's securities into another class of the Company's securities having a different number of votes per share pursuant to the conversion provisions set forth in the Company's Amended and Restated Certificate of Incorporation; or (D) solely because the level of Ownership held by any Exchange Act Person (the "***Subject Person***") exceeds the designated percentage threshold of the outstanding voting securities as a result of a repurchase or other acquisition of voting securities by the Company reducing the number of shares outstanding, provided that if a Change in Control would occur (but for the operation of this sentence) as a result of the acquisition of voting securities by the Company, and after such share acquisition, the Subject Person becomes the Owner of any additional voting securities that, assuming the repurchase or other acquisition had not occurred, increases the percentage of the then outstanding voting securities Owned by the Subject Person over the designated percentage threshold, then a Change in Control will be deemed to occur;

(ii) there is consummated a merger, consolidation or similar transaction involving (directly or indirectly) the Company and, immediately after the consummation of such merger, consolidation or similar transaction, the stockholders of the Company immediately prior thereto do not Own, directly or indirectly, either (A) outstanding voting securities representing more than 50% of the combined outstanding voting power of the surviving Entity in such merger, consolidation or similar transaction or (B) more than 50% of the combined outstanding voting power of the parent of the surviving Entity in such merger, consolidation or similar transaction, in each case in substantially the same proportions as their Ownership of the outstanding voting securities of the Company immediately prior to such transaction; *provided*, *however*, that a merger, consolidation or similar transaction will not constitute a Change in Control under this prong of the definition if the outstanding voting securities representing more than 50% of the combined voting power of the surviving Entity or its parent are owned by the IPO Entities;

(iii) there is consummated a sale, lease, exclusive license or other disposition of all or substantially all of the consolidated assets of the Company and its Subsidiaries, other than a sale, lease, license or other disposition of all or substantially all of the consolidated assets of the Company and its Subsidiaries to an Entity, more than 50% of the combined voting power of the voting securities of which are Owned by stockholders of the Company in substantially the same proportions as their Ownership of the outstanding voting securities of the Company immediately prior to such sale, lease, license or other disposition; *provided*, *however*, that a sale, lease, exclusive license or other disposition of all or substantially all of the consolidated assets of the Company and its Subsidiaries will not constitute a Change in Control under this prong of the definition if the outstanding voting securities representing more than 50% of the combined voting power of the acquiring Entity or its parent are owned by the IPO Entities; or

(iv) individuals who, on the date the Plan is adopted by the Board, are members of the Board (the "***Incumbent Board***") cease for any reason to constitute at least a majority of the members of the Board; *provided*, *however*, that if the appointment or election (or nomination for election) of any new Board member was approved or recommended by a majority vote of the members of the Incumbent Board then still in office, such new member will, for purposes of this Plan, be considered as a member of the Incumbent Board.

Notwithstanding the foregoing or any other provision of the Plan, the term Change in Control will not include a sale of assets, merger or other transaction effected exclusively for the purpose of changing the domicile of the Company and the definition of Change in Control (or any analogous term) in an individual written agreement between the Company or any Affiliate and the Participant will supersede the

foregoing definition with respect to Stock Awards subject to such agreement; *provided, however*, that if no definition of Change in Control or any analogous term is set forth in such an individual written agreement, the foregoing definition will apply. To the extent required for compliance with Section 409A of the Code, in no event will a Change in Control be deemed to have occurred if such transaction is not also a "change in the ownership or effective control of" the Company or "a change in the ownership of a substantial portion of the assets of" the Company as determined under Treasury Regulations Section 1.409A-3(i)(5) (without regard to any alternative definition thereunder). The Board may, in its sole discretion and without a Participant's consent, amend the definition of "Change in Control" to conform to the definition of "Change in Control" under Section 409A of the Code, and the regulations thereunder.

(h) "***Code***" means the Internal Revenue Code of 1986, as amended, including any applicable regulations and guidance thereunder.

(i) "***Committee***" means a committee of one or more Directors to whom authority has been delegated by the Board in accordance with Section 2(c).

(j) "***Common Stock***" means, as of the IPO Date, Class A shares of Company common stock.

(k) "***Company***" means Atreca, Inc., a Delaware corporation.

(l) "***Consultant***" means any person, including an advisor, who is (i) engaged by the Company or an Affiliate to render consulting or advisory services and is compensated for such services, or (ii) serving as a member of the board of directors of an Affiliate and is compensated for such services. However, service solely as a Director, or payment of a fee for such service, will not cause a Director to be considered a "Consultant" for purposes of the Plan. Notwithstanding the foregoing, a person is treated as a Consultant under this Plan only if a Form S-8 Registration Statement under the Securities Act is available to register either the offer or the sale of the Company's securities to such person.

(m) "***Continuous Service***" means that the Participant's service with the Company or an Affiliate, whether as an Employee, Director or Consultant, is not interrupted or terminated. A change in the capacity in which the Participant renders service to the Company or an Affiliate as an Employee, Consultant or Director or a change in the Entity for which the Participant renders such service, provided that there is no interruption or termination of the Participant's service with the Company or an Affiliate, will not terminate a Participant's Continuous Service; *provided, however*, that if the Entity for which a Participant is rendering services ceases to qualify as an Affiliate, as determined by the Board, in its sole discretion, such Participant's Continuous Service will be considered to have terminated on the date such Entity ceases to qualify as an Affiliate. For example, a change in status from an Employee of the Company to a Consultant of an Affiliate or to a Director will not constitute an interruption of Continuous Service. To the extent permitted by law, the Board or the chief executive officer of the Company, in that party's sole discretion, may determine whether Continuous Service will be considered interrupted in the case of (i) any leave of absence approved by the Board or chief executive officer, including sick leave, military leave or any other personal leave, or (ii) transfers between the Company, an Affiliate, or their successors. Notwithstanding the foregoing, a leave of absence will be treated as Continuous Service for purposes of vesting in a Stock Award only to such extent as may be provided in the Company's leave of absence policy, in the written terms of any leave of absence agreement or policy applicable to the Participant, or as otherwise required by law. In addition, to the extent required for exemption from or compliance with Section 409A of the Code, the determination of whether there has been a termination of Continuous Service will be made, and such term will be construed, in a manner that is consistent with the definition of "separation from service" as defined under Treasury Regulation Section 1.409A-1(h) (without regard to any alternative definition thereunder).

(n) "***Corporate Transaction***" means the consummation, in a single transaction or in a series of related transactions, of any one or more of the following events:

(i) a sale or other disposition of all or substantially all, as determined by the Board, in its sole discretion, of the consolidated assets of the Company and its Subsidiaries;

(ii) a sale or other disposition of more than 50% of the outstanding securities of the Company;

(iii) a merger, consolidation or similar transaction following which the Company is not the surviving corporation; or

(iv) a merger, consolidation or similar transaction following which the Company is the surviving corporation but the shares of Common Stock outstanding immediately preceding the merger, consolidation or similar transaction are converted or exchanged by virtue of the merger, consolidation or similar transaction into other property, whether in the form of securities, cash or otherwise.

If required for compliance with Section 409A of the Code, in no event will a Corporate Transaction be deemed to have occurred if such transaction is not also a "change in the ownership or effective control of" the Company or "a change in the ownership of a substantial portion of the assets of" the Company as determined under Treasury Regulation Section 1.409A-3(i)(5) (without regard to any alternative definition thereunder).

(o) "***Director***" means a member of the Board.

(p) "***Disability***" means, with respect to a Participant, the inability of such Participant to engage in any substantial gainful activity by reason of any medically determinable physical or mental impairment that can be expected to result in death or that has lasted or can be expected to last for a continuous period of not less than 12 months, as provided in Sections 22(e)(3) and 409A(a)(2)(c)(i) of the Code, and will be determined by the Board on the basis of such medical evidence as the Board deems warranted under the circumstances.

(q) "***Effective Date***" means the IPO Date.

(r) "***Employee***" means any person employed by the Company or an Affiliate. However, service solely as a Director, or payment of a fee for such services, will not cause a Director to be considered an "Employee" for purposes of the Plan.

(s) "***Entity***" means a corporation, partnership, limited liability company or other entity.

(t) "***Exchange Act***" means the U.S. Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder.

(u) "***Exchange Act Person***" means any natural person, Entity or "group" (within the meaning of Section 13(d) or 14(d) of the Exchange Act), except that "Exchange Act Person" will not include (i) the Company or any Subsidiary of the Company, (ii) any employee benefit plan of the Company or any Subsidiary of the Company or any trustee or other fiduciary holding securities under an employee benefit plan of the Company or any Subsidiary of the Company, (iii) an underwriter temporarily holding securities pursuant to a registered public offering of such securities, (iv) an Entity

Owned, directly or indirectly, by the stockholders of the Company in substantially the same proportions as their Ownership of stock of the Company; or (v) any natural person, Entity or "group" (within the meaning of Section 13(d) or 14(d) of the Exchange Act) that, as of the Effective Date, is the Owner, directly or indirectly, of securities of the Company representing more than 50% of the combined voting power of the Company's then outstanding securities.

(v) "***Fair Market Value***" means, as of any date, the value of the Common Stock determined as follows:

(i) If the Common Stock is listed on any established stock exchange or traded on any established market, the Fair Market Value of a share of Common Stock will be, unless otherwise determined by the Board, the closing sales price for such stock as quoted on such exchange or market (or the exchange or market with the greatest volume of trading in the Common Stock) on the date of determination, as reported in a source the Board deems reliable.

(ii) Unless otherwise provided by the Board, if there is no closing sales price for the Common Stock on the date of determination, then the Fair Market Value will be the closing selling price on the last preceding date for which such quotation exists.

(iii) In the absence of such markets for the Common Stock, the Fair Market Value will be determined by the Board in good faith and in a manner that complies with Sections 409A and 422 of the Code.

(w) "***Incentive Stock Option***" means an option granted pursuant to Section 5 of the Plan that is intended to be, and qualifies as, an "incentive stock option" within the meaning of Section 422 of the Code.

(x) "***IPO Date***" means the date of the underwriting agreement between the Company and the underwriter(s) managing the initial public offering of the Common Stock, pursuant to which the Common Stock is priced for the initial public offering.

(y) "***Non-Employee Director***" means a Director who either (i) is not a current employee or officer of the Company or an Affiliate, does not receive compensation, either directly or indirectly, from the Company or an Affiliate for services rendered as a consultant or in any capacity other than as a Director (except for an amount as to which disclosure would not be required under Item 404(a) of Regulation S-K promulgated pursuant to the Securities Act ("***Regulation S-K***")), does not possess an interest in any other transaction for which disclosure would be required under Item 404(a) of Regulation S-K, and is not engaged in a business relationship for which disclosure would be required pursuant to Item 404(b) of Regulation S-K; or (ii) is otherwise considered a "non-employee director" for purposes of Rule 16b-3.

(z) "***Nonstatutory Stock Option***" means any Option granted pursuant to Section 5 of the Plan that does not qualify as an Incentive Stock Option.

(aa) "***Officer***" means a person who is an officer of the Company within the meaning of Section 16 of the Exchange Act.

(bb) "***Option***" means an Incentive Stock Option or a Nonstatutory Stock Option to purchase shares of Common Stock granted pursuant to the Plan.

(cc) "***Option Agreement***" means a written agreement between the Company and an Optionholder evidencing the terms and conditions of an Option grant. Each Option Agreement will be subject to the terms and conditions of the Plan.

(dd) "***Optionholder***" means a person to whom an Option is granted pursuant to the Plan or, if applicable, such other person who holds an outstanding Option.

(ee) "***Other Stock Award***" means an award based in whole or in part by reference to the Common Stock which is granted pursuant to the terms and conditions of Section 6(d).

(ff) "***Other Stock Award Agreement***" means a written agreement between the Company and a holder of an Other Stock Award evidencing the terms and conditions of an Other Stock Award grant. Each Other Stock Award Agreement will be subject to the terms and conditions of the Plan.

(gg) "***Own,***" "***Owned,***" "***Owner,***" "***Ownership***" means a person or Entity will be deemed to "Own," to have "Owned," to be the "Owner" of, or to have acquired "Ownership" of securities if such person or Entity, directly or indirectly, through any contract, arrangement, understanding, relationship or otherwise, has or shares voting power, which includes the power to vote or to direct the voting, with respect to such securities.

(hh) "***Parent***" means any corporation (other than the Company) in an unbroken chain of corporations ending with the Company, if each of the corporations other than the Company owns stock possessing 50% or more of the total combined voting power of all classes of stock in one of the other corporations in such chain. A corporation that attains the status of a Parent on a date after the adoption of the Plan shall be considered a Parent commencing as of such date.

(ii) "***Participant***" means a person to whom a Stock Award is granted pursuant to the Plan or, if applicable, such other person who holds an outstanding Stock Award.

(jj) "***Performance Criteria***" means the one or more criteria that the Board or Committee (as applicable) will select for purposes of establishing the Performance Goals for a Performance Period. The Performance Criteria that will be used to establish such Performance Goals may be based on any one of, or combination of, the following as determined by the Board or Committee (as applicable): (1) earnings (including earnings per share and net earnings); (2) earnings before interest, taxes, depreciation and amortization; (3) total stockholder return; (4) return on equity or average stockholder's equity; (5) return on assets, investment, or capital employed; (6) stock price; (7) margin (including gross margin); (8) income (before or after taxes); (9) operating income; (10) operating income after taxes; (11) pre-tax profit; (12) operating cash flow; (13) sales or revenue targets; (14) increases in revenue or product revenue; (15) expenses and cost reduction goals; (16) improvement in or attainment of working capital levels; (17) economic value added (or an equivalent metric); (18) market share; (19) cash flow; (20) cash flow per share; (21) share price performance; (22) debt reduction; (23) customer satisfaction; (24) stockholders' equity; (25) capital expenditures; (26) debt levels; (27) operating profit or net operating profit; (28) workforce diversity; (29) growth of net income or operating income; (30) billings; (31) implementation or completion of projects or processes; (32) financing; (33) regulatory milestones; (34) stockholder liquidity; (35) corporate governance and compliance; (36) product commercialization; (37) intellectual property; (38) personnel matters; (39) progress of internal research or clinical programs; (40) progress of partnered programs; (41) partner satisfaction; (42) budget management; (43) clinical achievements; (44) completing phases of a clinical study (including the treatment phase); (45) announcing or presenting preliminary or final data from clinical studies; in each case, whether on particular timelines or generally; (46) timely completion of clinical trials; (47) submission of Device Master File(s) and other

regulatory achievements; (48) partner or collaborator achievements; (49) internal controls, including those related to the Sarbanes-Oxley Act of 2002; (50) research progress, including the development of programs; (51) investor relations, analysts and communication; (52) manufacturing achievements (including obtaining particular yields from manufacturing runs and other measurable objectives related to process development activities); (53) strategic partnerships or transactions (including in-licensing and out-licensing of intellectual property; (54) establishing relationships with commercial entities with respect to the marketing, distribution and sale of the Company's products and services (including with group purchasing organizations, distributors and other vendors); (55) supply chain achievements (including establishing relationships with manufacturers, suppliers and other services providers of the Company's products and services); (56) co-development, co-marketing, profit sharing, joint venture or other similar arrangements; (57) individual performance goals; (58) corporate development and planning goals; and (59) other measures of performance selected by the Board or Committee.

(kk) "***Performance Goals***" means, for a Performance Period, the one or more goals established by the Board or Committee (as applicable) for the Performance Period based upon the Performance Criteria. Performance Goals may be based on a Company-wide basis, with respect to one or more business units, divisions, Affiliates, or business segments, and in either absolute terms or relative to the performance of one or more comparable companies or the performance of one or more relevant indices. Unless specified otherwise by the Board or Committee (as applicable) (i) in the Stock Award Agreement at the time the Stock Award is granted or (ii) in such other document setting forth the Performance Goals at the time the Performance Goals are established, the Board or Committee (as applicable) will appropriately make adjustments in the method of calculating the attainment of Performance Goals for a Performance Period as follows: (1) to exclude restructuring and/or other nonrecurring charges; (2) to exclude exchange rate effects; (3) to exclude the effects of changes to generally accepted accounting principles; (4) to exclude the effects of any statutory adjustments to corporate tax rates; (5) to exclude the effects of items that are "unusual" in nature or occur "infrequently" as determined under generally accepted accounting principles; (6) to exclude the dilutive effects of acquisitions or joint ventures; (7) to assume that any business divested by the Company achieved performance objectives at targeted levels during the balance of a Performance Period following such divestiture; (8) to exclude the effect of any change in the outstanding shares of common stock of the Company by reason of any stock dividend or split, stock repurchase, reorganization, recapitalization, merger, consolidation, spin-off, combination or exchange of shares or other similar corporate change, or any distributions to common stockholders other than regular cash dividends; (9) to exclude the effects of stock based compensation and the award of bonuses under the Company's bonus plans; (10) to exclude costs incurred in connection with potential acquisitions or divestitures that are required to be expensed under generally accepted accounting principles; (11) to exclude the goodwill and intangible asset impairment charges that are required to be recorded under generally accepted accounting principles and (12) to exclude the effect of any other unusual, nonrecurring gain or loss or other extraordinary item. In addition, the Board or Committee (as applicable) retains the discretion to reduce or eliminate the compensation or economic benefit due upon attainment of Performance Goals and to define the manner of calculating the Performance Criteria it selects to use for such Performance Period. Partial achievement of the specified criteria may result in the payment or vesting corresponding to the degree of achievement as specified in the Stock Award Agreement.

(ll) "***Performance Period***" means the period of time selected by the Board or Committee (as applicable) over which the attainment of one or more Performance Goals will be measured for the purpose of determining a Participant's right to and the payment of a Stock Award. Performance Periods

may be of varying and overlapping duration, at the sole discretion of the Board or Committee (as applicable).

(mm) "***Performance Stock Award***" means a Stock Award granted under the terms and conditions of Section 6(c)(i).

(nn) "***Plan***" means this Atreca, Inc. 2019 Equity Incentive Plan, as it may be amended from time to time.

(oo) "***Restricted Stock Award***" means an award of shares of Common Stock which is granted pursuant to the terms and conditions of Section 6(a).

(pp) "***Restricted Stock Award Agreement***" means a written agreement between the Company and a holder of a Restricted Stock Award evidencing the terms and conditions of a Restricted Stock Award grant. Each Restricted Stock Award Agreement will be subject to the terms and conditions of the Plan.

(qq) "***Restricted Stock Unit Award***" means a right to receive shares of Common Stock which is granted pursuant to the terms and conditions of Section 6(b).

(rr) "***Restricted Stock Unit Award Agreement***" means a written agreement between the Company and a holder of a Restricted Stock Unit Award evidencing the terms and conditions of a Restricted Stock Unit Award grant. Each Restricted Stock Unit Award Agreement will be subject to the terms and conditions of the Plan.

(ss) "***Rule 16b-3***" means Rule 16b-3 promulgated under the Exchange Act or any successor to Rule 16b-3, as in effect from time to time.

(tt) "***Securities Act***" means the Securities Act of 1933, as amended.

(uu) "***Stock Appreciation Right***" or "***SAR***" means a right to receive the appreciation on Common Stock that is granted pursuant to the terms and conditions of Section 5.

(vv) "***Stock Appreciation Right Agreement***" means a written agreement between the Company and a holder of a Stock Appreciation Right evidencing the terms and conditions of a Stock Appreciation Right grant. Each Stock Appreciation Right Agreement will be subject to the terms and conditions of the Plan.

(ww) "***Stock Award***" means any right to receive Common Stock granted under the Plan, including an Incentive Stock Option, a Nonstatutory Stock Option, a Restricted Stock Award, a Restricted Stock Unit Award, a Stock Appreciation Right, a Performance Stock Award or any Other Stock Award.

(xx) "***Stock Award Agreement***" means a written agreement between the Company and a Participant evidencing the terms and conditions of a Stock Award grant. Each Stock Award Agreement will be subject to the terms and conditions of the Plan.

(yy) "***Subsidiary***" means, with respect to the Company, (i) any corporation of which more than 50% of the outstanding capital stock having ordinary voting power to elect a majority of the board of directors of such corporation (irrespective of whether, at the time, stock of any other class or classes of such corporation will have or might have voting power by reason of the happening of any contingency) is

at the time, directly or indirectly, Owned by the Company, and (ii) any partnership, limited liability company or other entity in which the Company has a direct or indirect interest (whether in the form of voting or participation in profits or capital contribution) of more than 50%.

(zz) "***Ten Percent Stockholder***" means a person who Owns (or is deemed to Own pursuant to Section 424(d) of the Code) stock possessing more than 10% of the total combined voting power of all classes of stock of the Company or any Affiliate.

For U.S. Participants

ATRECA, INC.

2019 EQUITY INCENTIVE PLAN
STOCK OPTION GRANT NOTICE

Atreca, Inc. (the "***Company***"), pursuant to its 2019 Equity Incentive Plan (the "***Plan***"), hereby grants to Optionholder an option to purchase the number of shares of the Company's Common Stock set forth below. This option is subject to all of the terms and conditions as set forth in this stock option grant notice (this "***Stock Option Grant Notice***"), in the Stock Option Agreement, the Plan and the Notice of Exercise, all of which are attached hereto and incorporated herein in their entirety. Capitalized terms not explicitly defined herein but defined in the Plan or the Stock Option Agreement will have the same definitions as in the Plan or the Stock Option Agreement. If there is any conflict between the terms herein and the Plan, the terms of the Plan will control.

Optionholder:	«Optionee»
Date of Grant:	«GrantDate»
Vesting Commencement Date:	«VestingCommenceDate»
Number of Shares Subject to Option:	«NoofShares»
Exercise Price (Per Share):	«ExercisePrice»
Total Exercise Price:	«TotalExercisePrice»
Expiration Date:	«ExpirDate»

Type of Grant: o Incentive Stock Option o Nonstatutory Stock Option

Exercise Schedule: Same as Vesting Schedule

Vesting Schedule: [VESTING SCHEDULE]

Payment: By one or a combination of the following items (described in the Stock Option Agreement):

- o By cash, check, bank draft, wire transfer or money order payable to the Company
- o Pursuant to a Regulation T Program if the shares are publicly traded
- o If and only to the extent this option is a Nonstatutory Stock Option, and subject to the Company's consent at the time of exercise, by a "net exercise" arrangement

Additional Terms/Acknowledgements: Optionholder acknowledges receipt of, and understands and agrees to, this Stock Option Grant Notice, the Stock Option Agreement and the Plan. Optionholder acknowledges and agrees that this Stock Option Grant Notice and the Stock Option Agreement may not be modified, amended or revised except as provided in the Plan. Optionholder further acknowledges that as of the Date of Grant, this Stock Option Grant Notice, the Stock Option Agreement, and the Plan set forth the entire understanding between Optionholder and the Company regarding this option award and supersede all prior oral and written agreements, promises and/or representations on that subject with the exception of (i) options and other equity awards previously granted and delivered to Optionholder, (ii) any compensation recovery policy that is adopted by the Company or is otherwise required by applicable

law and (iii) any written employment or severance arrangement that would provide for vesting acceleration of this option upon the terms and conditions set forth therein.

By accepting this option, Optionholder consents to receive such documents by electronic delivery and to participate in the Plan through an on-line or electronic system established and maintained by the Company or another third party designated by the Company.

ATRECA, INC.	**OPTIONHOLDER:**
By: _____ Signature	_____ Signature
Title: _____	Date: _____
Date: _____	

ATTACHMENTS: Stock Option Agreement, 2019 Equity Incentive Plan, Notice of Exercise

ATTACHMENT I

ATRECA, INC.

2019 EQUITY INCENTIVE PLAN
STOCK OPTION AGREEMENT

Pursuant to your Stock Option Grant Notice ("***Stock Option Grant Notice***") and this Stock Option Agreement (this "***Stock Option Agreement***"), Atreca, Inc. (the "***Company***") has granted you an option under its 2019 Equity Incentive Plan (the "***Plan***") to purchase the number of shares of the Company's Common Stock indicated in your Stock Option Grant Notice at the exercise price indicated in your Stock Option Grant Notice. The option is granted to you effective as of the date of grant set forth in the Stock Option Grant Notice (the "***Date of Grant***"). If there is any conflict between the terms in this Stock Option Agreement and the Plan, the terms of the Plan will control. Capitalized terms not explicitly defined in this Stock Option Agreement or in the Stock Option Grant Notice but defined in the Plan will have the same definitions as in the Plan.

The details of your option, in addition to those set forth in the Stock Option Grant Notice and the Plan, are as follows:

1. VESTING. Your option will vest as provided in your Stock Option Grant Notice. Vesting will cease upon the termination of your Continuous Service.

2. NUMBER OF SHARES AND EXERCISE PRICE. The number of shares of Common Stock subject to your option and your exercise price per share in your Stock Option Grant Notice will be adjusted for Capitalization Adjustments.

3. EXERCISE RESTRICTION FOR NON-EXEMPT EMPLOYEES. If you are an Employee eligible for overtime compensation under the Fair Labor Standards Act of 1938, as amended (that is, a "***Non-Exempt Employee***"), and except as otherwise provided in the Plan, you may not exercise your option until you have completed at least six (6) months of Continuous Service measured from the Date of Grant, even if you have already been an employee for more than six (6) months. Consistent with the provisions of the Worker Economic Opportunity Act, you may exercise your option as to any vested portion prior to such six (6) month anniversary in the case of (i) your death or disability, (ii) a Corporate Transaction in which your option is not assumed, continued or substituted, (iii) a Change in Control or (iv) your termination of Continuous Service on your "retirement" (as defined in the Company's benefit plans).

4. INCENTIVE STOCK OPTION LIMITATION. If your option is an Incentive Stock Option, then, to the extent that the aggregate Fair Market Value (determined at the Date of Grant) of the shares of Common Stock with respect to which your option plus all other Incentive Stock Options you hold are exercisable for the first time by you during any calendar year (under all plans of the Company and its Affiliates) exceeds one hundred thousand dollars ($100,000), your option(s) or portions thereof that exceed such limit (according to the order in which they were granted) will be treated as Nonstatutory Stock Options.

5. METHOD OF PAYMENT. You must pay the full amount of the exercise price for the shares you wish to exercise. You may pay the exercise price in cash or by check, bank draft, wire transfer or money order payable to the Company or in any other manner permitted by your Stock Option Grant Notice, which may include, provided that at the time of exercise the Common Stock is publicly traded,

pursuant to a program developed under Regulation T as promulgated by the Federal Reserve Board that, prior to the issuance of Common Stock, results in either the receipt of cash (or check) by the Company or the receipt of irrevocable instructions to pay the aggregate exercise price to the Company from the sales proceeds (this manner of payment is also known as a "broker-assisted exercise", "same day sale", or "sell to cover").

6. WHOLE SHARES. You may exercise your option only for whole shares of Common Stock.

7. SECURITIES LAW COMPLIANCE. In no event may you exercise your option unless the shares of Common Stock issuable upon exercise are then registered under the Securities Act or, if not registered, the Company has determined that your exercise and the issuance of the shares would be exempt from the registration requirements of the Securities Act. The exercise of your option also must comply with all other applicable laws and regulations governing your option, and you may not exercise your option if the Company determines that such exercise would not be in material compliance with such laws and regulations (including any restrictions on exercise required for compliance with Treas. Reg. 1.401(k)-1(d)(3), if applicable).

8. TERM. You may not exercise your option before the Date of Grant or after the expiration of the option's term. The term of your option expires, subject to the provisions of Section 5(h) of the Plan, upon the earliest of the following:

(a) immediately upon the termination of your Continuous Service for Cause;

(b) three (3) months after the termination of your Continuous Service for any reason other than Cause, your Disability, or your death (except as otherwise provided in Section 8(d) below); *provided*, *however*, that if during any part of such three-month period your option is not exercisable solely because of the condition set forth in Section 7 above relating to "Securities Law Compliance," your option will not expire until the earlier of the Expiration Date or until it has been exercisable for an aggregate period of three (3) months after the termination of your Continuous Service; *provided further*, that if (i) you are a Non-Exempt Employee, (ii) your Continuous Service terminates within six (6) months after the Date of Grant, and (iii) you have vested in a portion of your option at the time of your termination of Continuous Service, your option will not expire until the earlier of (x) the later of (A) the date that is seven (7) months after the Date of Grant, and (B) the date that is three (3) months after the termination of your Continuous Service, and (y) the Expiration Date;

(c) twelve (12) months after the termination of your Continuous Service due to your Disability (except as otherwise provided in Section 8(d)) below;

(d) eighteen (18) months after your death if you die either during your Continuous Service or within three (3) months after your Continuous Service terminates for any reason other than Cause;

(e) the Expiration Date indicated in your Stock Option Grant Notice; and

(f) the day before the tenth (10th) anniversary of the Date of Grant.

If your option is an Incentive Stock Option, note that to obtain the federal income tax advantages associated with an Incentive Stock Option, the Code requires that at all times beginning on the Date of Grant and ending on the day three (3) months before the date of your option's exercise, you must be an employee of the Company or an Affiliate, except in the event of your death or Disability. The Company

has provided for extended exercisability of your option under certain circumstances for your benefit but cannot guarantee that your option will necessarily be treated as an Incentive Stock Option if you continue to provide services to the Company or an Affiliate as a Consultant or Director after your employment terminates or if you otherwise exercise your option more than three (3) months after the date your employment with the Company or an Affiliate terminates.

9. EXERCISE.

(a) You may exercise the vested portion of your option during its term by (i) delivering a Notice of Exercise (in a form designated by the Company) or completing such other documents and/or procedures designated by the Company for exercise and (ii) paying the exercise price and any applicable withholding taxes to the Company's Secretary, stock plan administrator, or such other person as the Company may designate, together with such additional documents as the Company may then require.

(b) By exercising your option you agree that, as a condition to any exercise of your option, the Company may require you to enter into an arrangement providing for the payment by you to the Company of any tax withholding obligation of the Company arising by reason of (i) the exercise of your option, or (ii) the disposition of shares of Common Stock acquired upon such exercise.

(c) If your option is an Incentive Stock Option, by exercising your option you agree that you will notify the Company in writing within fifteen (15) days after the date of any disposition of any of the shares of the Common Stock issued upon exercise of your option that occurs within two (2) years after the Date of Grant or within one (1) year after such shares of Common Stock are transferred upon exercise of your option.

(d) By exercising your option you agree that you will not sell, dispose of, transfer, make any short sale of, grant any option for the purchase of, or enter into any hedging or similar transaction with the same economic effect as a sale with respect to any shares of Common Stock or other securities of the Company held by you, for a period of one hundred eighty (180) days following the effective date of a registration statement of the Company filed under the Securities Act or such longer period as the underwriters or the Company will request to facilitate compliance with FINRA Rule 2241 or any successor or similar rule or regulation (the "***Lock-Up Period***"); *provided*, *however*, that nothing contained in this Section 9(d) will prevent the exercise of a repurchase option, if any, in favor of the Company during the Lock-Up Period. You further agree to execute and deliver such other agreements as may be reasonably requested by the Company or the underwriters that are consistent with the foregoing or that are necessary to give further effect thereto. In order to enforce the foregoing covenant, the Company may impose stop-transfer instructions with respect to your shares of Common Stock until the end of such period. You also agree that any transferee of any shares of Common Stock (or other securities) of the Company held by you will be bound by this Section 9(d). The underwriters of the Company's stock are intended third party beneficiaries of this Section 9(d) and will have the right, power and authority to enforce the provisions hereof as though they were a party hereto.

10. TRANSFERABILITY. Except as otherwise provided in this Section 10, your option is not transferable, except by will or by the laws of descent and distribution, and is exercisable during your life only by you.

(a) Certain Trusts. Upon receiving written permission from the Board or its duly authorized designee, you may transfer your option to a trust if you are considered to be the sole beneficial owner (determined under Section 671 of the Code and applicable state law) while the option is held in the trust. You and the trustee must enter into transfer and other agreements required by the Company.

(b) Domestic Relations Orders. Upon receiving written permission from the Board or its duly authorized designee, and provided that you and the designated transferee enter into transfer and other agreements required by the Company, you may transfer your option pursuant to the terms of a domestic relations order, official marital settlement agreement or other divorce or separation instrument as permitted by Treasury Regulation 1.421-1(b)(2) that contains the information required by the Company to effectuate the transfer. You are encouraged to discuss the proposed terms of any division of this option with the Company prior to finalizing the domestic relations order or marital settlement agreement to help ensure the required information is contained within the domestic relations order or marital settlement agreement. If this option is an Incentive Stock Option, this option may be deemed to be a Nonstatutory Stock Option as a result of such transfer.

(c) Beneficiary Designation. Upon receiving written permission from the Board or its duly authorized designee, you may, by delivering written notice to the Company, in a form approved by the Company and any broker designated by the Company to handle option exercises, designate a third party who, on your death, will thereafter be entitled to exercise this option and receive the Common Stock or other consideration resulting from such exercise. In the absence of such a designation, your executor or administrator of your estate will be entitled to exercise this option and receive, on behalf of your estate, the Common Stock or other consideration resulting from such exercise.

11. RIGHT OF REPURCHASE. The Company will have the right to repurchase all of the shares of Common Stock you acquire pursuant to the exercise of your option upon termination of your Continuous Service for Cause. Such repurchase will be at the exercise price you paid to acquire the shares and will be effected pursuant to such other terms and conditions, and at such time, as the Company will determine.

12. OPTION NOT A SERVICE CONTRACT. Your option is not an employment or service contract, and nothing in your option will be deemed to create in any way whatsoever any obligation on your part to continue in the employ of the Company or an Affiliate, or of the Company or an Affiliate to continue your employment. In addition, nothing in your option will obligate the Company or an Affiliate, their respective stockholders, boards of directors, officers or employees to continue any relationship that you might have as a Director or Consultant for the Company or an Affiliate.

13. WITHHOLDING OBLIGATIONS.

(a) At the time you exercise your option, in whole or in part, and at any time thereafter as requested by the Company, you hereby authorize withholding from payroll and any other amounts payable to you, and otherwise agree to make adequate provision for (including by means of a "same day sale" pursuant to a program developed under Regulation T as promulgated by the Federal Reserve Board to the extent permitted by the Company), any sums required to satisfy the federal, state, local and foreign income tax, social insurance, payroll tax, fringe benefit tax, payment on account or other tax-related withholding obligations of the Company or an Affiliate, if any, which arise in connection with the exercise of your option or the disposition of shares of Common Stock acquired upon such exercise.

(b) If this option is a Nonstatutory Stock Option, then upon your request and subject to approval by the Company, and compliance with any applicable legal conditions or restrictions, the Company may withhold from fully vested shares of Common Stock otherwise issuable to you upon the exercise of your option a number of whole shares of Common Stock having a Fair Market Value, determined by the Company as of the date of exercise, not in excess of the maximum amount of tax required to be withheld by law (or such other greater or lesser amount that avoids classification of your option as a liability for financial accounting purposes). Any adverse consequences to you arising in connection with such share withholding procedure will be your sole responsibility.

(c) You may not exercise your option unless the tax withholding obligations of the Company and/or any Affiliate are satisfied. Accordingly, you may not be able to exercise your option when desired even though your option is vested, and the Company will have no obligation to issue a certificate for such shares of Common Stock or release such shares of Common Stock from any escrow provided for herein, if applicable, unless such obligations are satisfied.

14. TAX CONSEQUENCES. You hereby agree that the Company does not have a duty to design or administer the Plan or its other compensation programs in a manner that minimizes your tax liabilities. You will not make any claim against the Company, or any of its Officers, Directors, Employees or Affiliates related to tax liabilities arising from your option or your other compensation. In particular, you acknowledge that this option is exempt from Section 409A of the Code only if the exercise price per share specified in the Stock Option Grant Notice is at least equal to the "fair market value" per share of the Common Stock on the Date of Grant and there is no other impermissible deferral of compensation associated with the option.

15. NOTICES. Any notices provided for in your option or the Plan will be given in writing (including electronically) and will be deemed effectively given upon receipt or, in the case of notices delivered by mail by the Company to you, five (5) days after deposit in the United States mail, postage prepaid, addressed to you at the last address you provided to the Company. The Company may, in its sole discretion, decide to deliver any documents related to participation in the Plan and this option by electronic means or to request your consent to participate in the Plan by electronic means. By accepting this option, you consent to receive such documents by electronic delivery and to participate in the Plan through an on-line or electronic system established and maintained by the Company or another third party designated by the Company.

16. GOVERNING PLAN DOCUMENT. Your option is subject to all the provisions of the Plan, the provisions of which are hereby made a part of your option, and is further subject to all interpretations, amendments, rules and regulations, which may from time to time be promulgated and adopted pursuant to the Plan. If there is any conflict between the provisions of your option and those of the Plan, the provisions of the Plan will control. In addition, your option (and any compensation paid or shares issued under your option) is subject to recoupment in accordance with The Dodd–Frank Wall Street Reform and Consumer Protection Act and any implementing regulations thereunder, any clawback policy adopted by the Company and any compensation recovery policy otherwise required by applicable law. No recovery of compensation under such a clawback policy will be an event giving rise to a right to voluntarily terminate employment upon a resignation for "good reason," or for a "constructive termination" or any similar term under any plan of or agreement with the Company.

17. OTHER DOCUMENTS. You hereby acknowledge receipt of and the right to receive a document providing the information required by Rule 428(b)(1) promulgated under the Securities Act, which includes the Plan prospectus. In addition, you acknowledge receipt of the Company's policy permitting certain individuals to sell shares only during certain "window" periods and the Company's insider trading policy, in effect from time to time.

18. EFFECT ON OTHER EMPLOYEE BENEFIT PLANS. The value of this option will not be included as compensation, earnings, salaries, or other similar terms used when calculating your benefits under any employee benefit plan sponsored by the Company or any Affiliate, except as such plan otherwise expressly provides. The Company expressly reserves its rights to amend, modify, or terminate any of the Company's or any Affiliate's employee benefit plans.

19. VOTING RIGHTS. You will not have voting or any other rights as a shareholder of the Company with respect to the shares to be issued pursuant to this option until such shares are issued to

you. Upon such issuance, you will obtain full voting and other rights as a shareholder of the Company. Nothing contained in this option, and no action taken pursuant to its provisions, will create or be construed to create a trust of any kind or a fiduciary relationship between you and the Company or any other person.

20. SEVERABILITY. If all or any part of this Stock Option Agreement or the Plan is declared by any court or governmental authority to be unlawful or invalid, such unlawfulness or invalidity will not invalidate any portion of this Stock Option Agreement or the Plan not declared to be unlawful or invalid. Any section of this Stock Option Agreement (or part of such a section) so declared to be unlawful or invalid shall, if possible, be construed in a manner which will give effect to the terms of such section or part of a section to the fullest extent possible while remaining lawful and valid.

21. NO ADVICE REGARDING GRANT. The Company is not providing any tax, legal or financial advice, nor is the Company making any recommendations regarding your participation in the Plan, or your acquisition or sale of the underlying shares of stock. You are hereby advised to consult with your own personal tax, legal and financial advisors regarding your participation in the Plan before taking any action related to the Plan.

22. ELECTRONIC DELIVERY AND ACCEPTANCE. The Company may, in its sole discretion, decide to deliver any documents related to current or future participation in the Plan by electronic means. You hereby consent to receive such documents by electronic delivery and agree to participate in the Plan through an on-line or electronic system established and maintained by the Company or a third party designated by the Company and that such online or electronic participation shall have the same force and effect as documentation executed in written form.

23. MISCELLANEOUS.

(a) The rights and obligations of the Company under your option will be transferable to any one or more persons or entities, and all covenants and agreements hereunder will inure to the benefit of, and be enforceable by the Company's successors and assigns.

(b) You agree upon request to execute any further documents or instruments necessary or desirable in the sole determination of the Company to carry out the purposes or intent of your option.

(c) You acknowledge and agree that you have reviewed your option in its entirety, have had an opportunity to obtain the advice of counsel prior to executing and accepting your option, and fully understand all provisions of your option.

(d) This Stock Option Agreement will be subject to all applicable laws, rules, and regulations, and to such approvals by any governmental agencies or national securities exchanges as may be required.

(e) All obligations of the Company under the Plan and this Stock Option Agreement will be binding on any successor to the Company, whether the existence of such successor is the result of a direct or indirect purchase, merger, consolidation, or otherwise, of all or substantially all of the business and/or assets of the Company.

ATTACHMENT II

2019 EQUITY INCENTIVE PLAN

ATTACHMENT III

NOTICE OF EXERCISE

ATRECA, INC.
500 SAGINAW DRIVE
REDWOOD CITY, CA 94063

Date of Exercise:

This constitutes notice to Atreca, Inc. (the "***Company***") under my stock option that I elect to purchase the below number of shares of Common Stock of the Company (the "***Shares***") for the exercise price set forth below.

Type of option (check one):	Incentive o	Nonstatutory o
Stock option dated:		
Number of Shares as to which option is exercised:		
Certificates to be issued in name of:		
Total exercise price:	$	$
Cash payment delivered herewith:	$	$
Regulation T Program (cashless exercise[1]):	$	$

By this exercise, I agree (i) to provide such additional documents as you may require pursuant to the terms of the Atreca, Inc. 2019 Equity Incentive Plan, (ii) to provide for the payment by me to you (in the manner designated by you) of your withholding obligation, if any, relating to the exercise of this option, and (iii) if this exercise relates to an Incentive Stock Option, to notify you in writing within fifteen (15) days after the date of any disposition of any of the Shares issued upon exercise of this option that occurs within two (2) years after the date of grant of this option or within one (1) year after such Shares are issued upon exercise of this option.

I agree that, if required by the Company (or a representative of the underwriters) in connection with the first underwritten registration of the offering of any securities of the Company under the Securities Act, I will not sell, dispose of, transfer, make any short sale of, grant any option for the purchase of, or enter into any hedging or similar transaction with the same economic effect as a sale with respect to any shares of Common Stock or other securities of the Company for a period of one hundred eighty (180) days following the effective date of a registration statement of the Company filed under the Securities Act (or such longer period as the underwriters or the Company will request to facilitate

[1] Shares must meet the public trading requirements set forth in the Stock Option Agreement.

compliance with FINRA Rule 2241 or any successor or similar rule or regulation). I further agree to execute and deliver such other agreements as may be reasonably requested by the Company or the underwriters that are consistent with the foregoing or that are necessary to give further effect thereto. In order to enforce the foregoing covenant, the Company may impose stop-transfer instructions with respect to securities subject to the foregoing restrictions until the end of such period.

Very truly yours,

_____
Signature

_____
Print Name

Address of Record:

For U.S. Participants

ATRECA, INC.

2019 EQUITY INCENTIVE PLAN
RESTRICTED STOCK UNIT GRANT NOTICE

Atreca, Inc. (the "***Company***"), pursuant to its 2019 Equity Incentive Plan (the "***Plan***"), hereby awards to Participant a Restricted Stock Unit Award for the number of shares of the Company's Common Stock ("***Restricted Stock Units***") set forth below (the "***Award***"). The Award is subject to all of the terms and conditions as set forth in this notice of grant (this "***Restricted Stock Unit Grant Notice***"), and in the Plan and the Restricted Stock Unit Award Agreement, both of which are attached hereto and incorporated herein in their entirety. Capitalized terms not explicitly defined herein will have the meanings set forth in the Plan or the Restricted Stock Unit Award Agreement. In the event of any conflict between the terms in this Restricted Stock Unit Grant Notice or the Restricted Stock Unit Award Agreement and the Plan, the terms of the Plan will control.

Participant:	_____
Date of Grant:	_____
Vesting Commencement Date:	_____
Number of Restricted Stock Units:	_____

Vesting Schedule: [_____], subject to Participant's Continuous Service through each such vesting date.

Issuance Schedule: Subject to any Capitalization Adjustment, one share of Common Stock will be issued for each Restricted Stock Unit that vests at the time set forth in Section 6 of the Restricted Stock Unit Award Agreement.

Additional Terms/Acknowledgements: Participant acknowledges receipt of, and understands and agrees to, this Restricted Stock Unit Grant Notice, the Restricted Stock Unit Award Agreement and the Plan. Participant further acknowledges that as of the Date of Grant, this Restricted Stock Unit Grant Notice, the Restricted Stock Unit Award Agreement and the Plan set forth the entire understanding between Participant and the Company regarding the acquisition of the Common Stock pursuant to the Award specified above and supersede all prior oral and written agreements on the terms of this Award, with the exception, if applicable, of (i) equity awards previously granted and delivered to Participant, (ii) any compensation recovery policy that is adopted by the Company or is otherwise required by applicable law; and (iii) any written employment agreement or severance arrangement that would provide for vesting acceleration of this Award upon the terms and conditions set forth therein.

By accepting this Award, Participant acknowledges having received and read the Restricted Stock Unit Grant Notice, the Restricted Stock Unit Award Agreement and the Plan and agrees to all of the terms and conditions set forth in these documents. Participant consents to receive such documents by electronic delivery and to participate in the Plan through an on-line or electronic system established and maintained by the Company or a third party designated by the Company.

ATRECA, INC.	**PARTICIPANT**
By: _____	_____
Signature	Signature
Title: _____	Date: _____
Date: _____	

ATTACHMENTS: Restricted Stock Unit Award Agreement and 2019 Equity Incentive Plan

ATTACHMENT I

ATRECA, INC.

2019 EQUITY INCENTIVE PLAN
RESTRICTED STOCK UNIT AWARD AGREEMENT

Pursuant to the Restricted Stock Unit Grant Notice (the "***Grant Notice***") and this Restricted Stock Unit Award Agreement, Atreca, Inc. (the "***Company***") has awarded you ("***Participant***") a Restricted Stock Unit Award (the "***Award***") pursuant to the Company's 2019 Equity Incentive Plan (the "***Plan***") for the number of Restricted Stock Units/shares of Common Stock indicated in the Grant Notice. Capitalized terms not explicitly defined in this Restricted Stock Unit Award Agreement or the Grant Notice will have the same meanings given to them in the Plan. The terms of your Award, in addition to those set forth in the Grant Notice, are as follows.

1. GRANT OF THE AWARD. This Award represents the right to be issued on a future date one (1) share of Common Stock for each Restricted Stock Unit that vests on the applicable vesting date(s) (subject to any adjustment under Section 3 below) as indicated in the Grant Notice. As of the Date of Grant, the Company will credit to a bookkeeping account maintained by the Company for your benefit (the "***Account***") the number of Restricted Stock Units/shares of Common Stock subject to the Award. This Award was granted in consideration of your services to the Company. Except as otherwise provided herein, you will not be required to make any payment to the Company or an Affiliate (other than services to the Company or an Affiliate) with respect to your receipt of the Award, the vesting of the Restricted Stock Units or the delivery of the Company's Common Stock to be issued in respect of the Award.

2. VESTING. Subject to the limitations contained herein, your Award will vest, if at all, in accordance with the vesting schedule provided in the Grant Notice, provided that vesting will cease upon the termination of your Continuous Service. Upon such termination of your Continuous Service, the Restricted Stock Units/shares of Common Stock credited to the Account that were not vested on the date of such termination will be forfeited at no cost to the Company and you will have no further right, title or interest in or to such underlying shares of Common Stock.

3. NUMBER OF SHARES. The number of Restricted Stock Units subject to your Award may be adjusted from time to time for Capitalization Adjustments, as provided in the Plan. Any additional Restricted Stock Units, shares, cash or other property that becomes subject to the Award pursuant to this Section 3, if any, will be subject, in a manner determined by the Board to the same forfeiture restrictions, restrictions on transferability, and time and manner of delivery as applicable to the other Restricted Stock Units and shares covered by your Award. Notwithstanding the provisions of this Section 3, no fractional shares or rights for fractional shares of Common Stock will be created pursuant to this Section 3. Any fraction of a share will be rounded down to the nearest whole share.

4. SECURITIES LAW COMPLIANCE. You may not be issued any Common Stock under your Award unless the shares of Common Stock underlying the Restricted Stock Units are either (i) then registered under the Securities Act, or (ii) the Company has determined that such issuance would be exempt from the registration requirements of the Securities Act. Your Award must also comply with other applicable laws and regulations governing the Award, and you will not receive such Common Stock if the Company determines that such receipt would not be in material compliance with such laws and regulations.

5. TRANSFER RESTRICTIONS. Prior to the time that shares of Common Stock have been delivered to you, you may not transfer, pledge, sell or otherwise dispose of this Award or the shares issuable in respect of your Award, except as expressly provided in this Section 5. For example, you may not use shares that may be issued in respect of your Restricted Stock Units as security for a loan. The restrictions on transfer set forth herein will lapse upon delivery to you of shares in respect of your vested Restricted Stock Units. Notwithstanding the foregoing, by delivering written notice to the Company, in a

form satisfactory to the Company, you may designate a third party who, in the event of your death, will thereafter be entitled to receive any distribution of Common Stock to which you were entitled at the time of your death pursuant to this Restricted Stock Unit Award Agreement (a "***Beneficiary Designation***"). In the absence of such a designation, your legal representative will be entitled to receive, on behalf of your estate, such Common Stock or other consideration.

(a) Death. Your Award is transferable by will and by the laws of descent and distribution. At your death, vesting of your Award will cease and, except as otherwise set forth in a Beneficiary Designation provided the Company in accordance with the terms of this Restricted Stock Unit Award Agreement, your executor or administrator of your estate will be entitled to receive, on behalf of your estate, any Common Stock or other consideration that vested but was not issued before your death.

(b) Domestic Relations Orders. Upon receiving written permission from the Board or its duly authorized designee, and provided that you and the designated transferee enter into transfer and other agreements required by the Company, you may transfer your right to receive the distribution of Common Stock or other consideration hereunder, pursuant to a domestic relations order, official marital settlement agreement or other divorce or separation instrument as permitted by applicable law that contains the information required by the Company to effectuate the transfer. You are encouraged to discuss the proposed terms of any division of this Award with the Company's General Counsel prior to finalizing the domestic relations order or marital settlement agreement to verify that you may make such transfer, and if so, to help ensure the required information is contained within the domestic relations order or marital settlement agreement.

6. DATE OF ISSUANCE.

(a) The issuance of shares in respect of the Restricted Stock Units is intended to comply with Treasury Regulations Section 1.409A-1(b)(4) and will be construed and administered in such a manner. Subject to the satisfaction of the Tax-Related Items (as defined in Section 9 below), in the event one or more Restricted Stock Units vests, the Company will issue to you one (1) share of Common Stock for each Restricted Stock Unit that vests on the applicable vesting date(s) (subject to any adjustment under Section 3 above, and subject to any different provisions in the Grant Notice). Each issuance date determined by this paragraph is referred to as an "***Original Issuance Date***".

(b) If the Original Issuance Date falls on a date that is not a business day, delivery will instead occur on the next following business day. In addition, if:

(i) the Original Issuance Date does not occur (1) during an "open window period" applicable to you, as determined by the Company in accordance with the Company's then-effective policy on trading in Company securities ("***Insider Trading Policy***"), or (2) on a date when you are otherwise permitted to sell shares of Common Stock on an established stock exchange or stock market (including but not limited to under a previously established written trading plan that meets the requirements of Rule 10b5-1 under the Exchange Act and was entered into in compliance with the Company's policies (a "***10b5-1 Arrangement***")), *and*

(ii) (1) the Company's then-effective Insider Trading Policy does not permit sell to cover transactions in satisfaction of applicable Tax-Related Items, (2) Tax-Related Items do not apply, or (3) Tax-Related Items do apply but the Company decides, prior to the Original Issuance Date, (A) not to satisfy the Tax-Related Items by withholding shares of Common Stock from the shares otherwise due, on the Original Issuance Date, to you under this Award, and (B) not to permit you to enter into a "same day sale" commitment with a broker-dealer pursuant to Section 9 of this Restricted Stock Unit Award Agreement (including but not limited to a commitment under a 10b5-1 Arrangement) and (C) not to permit you to pay your Tax-Related Items in cash,

then the shares that would otherwise be issued to you on the Original Issuance Date will not be delivered on such Original Issuance Date and will instead be delivered on the first business day when you

are not prohibited from selling shares of the Company's Common Stock in the open public market, but in no event later than December 31 of the calendar year in which the Original Issuance Date occurs (that is, the last day of your taxable year in which the Original Issuance Date occurs), or, if and only if permitted in a manner that complies with Treasury Regulations Section 1.409A-1(b)(4), no later than the date that is the 15th day of the third calendar month of the applicable year following the year in which the shares of Common Stock under this Award are no longer subject to a "substantial risk of forfeiture" within the meaning of Treasury Regulations Section 1.409A-1(d).

(c) The form of delivery of the shares of Common Stock in respect of your Award (e.g., a stock certificate or electronic entry evidencing such shares) will be determined by the Company.

7. DIVIDENDS. You will receive no benefit or adjustment to your Award with respect to any cash dividend, stock dividend or other distribution that does not result from a Capitalization Adjustment; provided, however, that this sentence will not apply with respect to any shares of Common Stock that are delivered to you in connection with your Award after such shares have been delivered to you.

8. AWARD NOT A SERVICE CONTRACT.

(a) Your Continuous Service with the Company or an Affiliate is not for any specified term and may be terminated by you or by the Company or an Affiliate at any time, for any reason, with or without cause and with or without notice. Nothing in this Restricted Stock Unit Award Agreement (including, but not limited to, the vesting of your Award or the issuance of the shares subject to your Award), the Plan or any covenant of good faith and fair dealing that may be found implicit in this Restricted Stock Unit Award Agreement or the Plan will: (i) confer upon you any right to continue in the employ or service of, or affiliation with, the Company or an Affiliate; (ii) constitute any promise or commitment by the Company or an Affiliate regarding the fact or nature of future positions, future work assignments, future compensation or any other term or condition of employment or affiliation; (iii) confer any right or benefit under this Restricted Stock Unit Award Agreement or the Plan unless such right or benefit has specifically accrued under the terms of this Restricted Stock Unit Award Agreement or Plan; or (iv) deprive the Company of the right to terminate you at will and without regard to any future vesting opportunity that you may have.

(b) By accepting this Award, you acknowledge and agree that the right to continue vesting in the Award is earned only by continuing as an Employee, Director or Consultant at the will of the Company or an Affiliate and that the Company has the right to reorganize, sell, spin-out or otherwise restructure one or more of its businesses or Affiliates at any time or from time to time, as it deems appropriate (a "***reorganization***"). You acknowledge and agree that such a reorganization could result in the termination of your Continuous Service, or the termination of Affiliate status of your employer and the loss of benefits available to you under this Restricted Stock Unit Award Agreement, including but not limited to, the termination of the right to continue vesting in the Award. You further acknowledge and agree that this Restricted Stock Unit Award Agreement, the Plan, the transactions contemplated hereunder and the vesting schedule set forth herein or any covenant of good faith and fair dealing that may be found implicit in any of them do not constitute an express or implied promise of continued engagement as an Employee, Director or Consultant for the term of this Restricted Stock Unit Award Agreement, for any period, or at all, and will not interfere in any way with the Company's right to terminate your Continuous Service at any time, with or without your cause or notice, or to conduct a reorganization.

9. RESPONSIBILITY FOR TAXES.

(a) You acknowledge that, regardless of any action the Company or, if different, the Affiliate which employs you (the "***Employer***") takes with respect to any or all federal, state, local and foreign income tax, social insurance, payroll tax, fringe benefit tax, payment on account or other tax-items related to the Award and your participation in the Plan and legally applicable to you, including, as applicable, obligations of the Company or the Employer ("***Tax-Related Items***"), the ultimate liability for

all Tax-Related Items is and remains your responsibility and may exceed the amount actually withheld by the Company or the Employer. You further acknowledge that the Company and the Employer (i) make no representations or undertakings regarding the treatment of any Tax-Related Items in connection with any aspect of your Restricted Stock Units, including the grant of the Restricted Stock Units, the vesting and settlement of the Restricted Stock Units, the delivery or sale of any shares of Common Stock and the issuance of any dividends, and (ii) do not commit to and are under no obligation to structure the terms of the grant or any aspect of your Award to reduce or eliminate your liability for Tax-Related Items or achieve any particular tax result. You acknowledge and agree that you will not make any claim against the Company, or any of its Officers, Directors, Employees or Affiliates for Tax-Related Items arising from your Award or your other compensation. Further, if you are subject to Tax-Related Items in more than one jurisdiction, you acknowledge that the Company and/or the Employer may be required to withhold or account for Tax-Related Items in more than one jurisdiction.

(b) Prior to the relevant taxable or tax withholding event, as applicable, you agree to make adequate arrangements satisfactory to the Company and/or the Employer to satisfy all Tax-Related Items. By accepting this Award, you acknowledge and agree that the Company and/or the Employer may, in its sole discretion, satisfy all or any portion of the Tax-Related Items relating to your Award by any of the following means or by a combination of such means: (i) causing you to pay any portion of the Tax-Related Items in cash (which may be in the form of a check, electronic wire transfer or other method permitted by the Company); (ii) withholding from any wages or other cash compensation otherwise payable to you by the Company or the Employer; (iii) withholding a number of shares of Common Stock having a Fair Market Value determined by the Company as of the date of the relevant taxable or tax withholding event, as applicable, up to the amount of the Tax-Related Items that are otherwise deliverable to you upon settlement; *provided*, *however,* that to the extent necessary to qualify for an exemption from application of Section 16(b) of the Exchange Act, if applicable, such share withholding procedure will be subject to the express prior approval of the Board or the Company's Compensation Committee; and/or (iv) permitting or requiring you to enter into a "same day sale" commitment, if applicable, with a broker-dealer that is a member of the Financial Industry Regulatory Authority (a "***FINRA Dealer***"), pursuant to this authorization and without further consent, whereby you irrevocably elect to sell a portion of the shares to be delivered in connection with your Restricted Stock Units to satisfy the Tax-Related Items and whereby the FINRA Dealer irrevocably commits to forward the proceeds necessary to satisfy the Tax-Related Items directly to the Company and/or the Employer.

(c) Depending on the withholding method, the Company or the Employer may withhold or account for Tax-Related Items by considering applicable minimum statutory withholding amounts or other applicable withholding rates, including maximum applicable rates, in which case you may receive a refund of any over-withheld amount in cash and will have no entitlement to the Common Stock equivalent. If the obligation for Tax-Related Items is satisfied by withholding in shares of Common Stock, for tax purposes, you are deemed to have been issued the full number of shares of Common Stock subject to the vested Restricted Stock Units notwithstanding that a number of the shares of Common Stock are held back solely for the purpose of paying the Tax-Related Items.

(d) You acknowledge and agree that, unless the Tax-Related Items are satisfied, the Company will have no obligation to deliver to you any Common Stock or other consideration pursuant to this Award.

(e) You agree to pay to the Company or the Employer any amount of Tax-Related Items that the Company or the Employer may be required to withhold or account for as a result of your participation in the Plan that cannot be satisfied by the means previously described. In the event any Tax-Related Items arise prior to the delivery to you of Common Stock or it is determined after the delivery of Common Stock to you that the amount of the Tax-Related Items was greater than the amount withheld by the Company and/or the Employer, you agree to indemnify and hold the Company and the Employer harmless from any failure by the Company and/or the Employer to withhold the proper amount.

10. TAX CONSEQUENCES. The Company has no duty or obligation to minimize the tax consequences to you of this Award and will not be liable to you for any adverse tax consequences to you arising in connection with this Award. You are hereby advised to consult with your own personal tax, financial and/or legal advisors regarding the tax consequences of this Award and by signing the Grant Notice, you have agreed that you have done so or knowingly and voluntarily declined to do so. You understand that you (and not the Company or the Employer) will be responsible for your own tax liability that may arise as a result of this investment or the transactions contemplated by this Restricted Stock Unit Award Agreement.

11. UNSECURED OBLIGATION. Your Award is unfunded, and as a holder of a vested Award, you will be considered an unsecured creditor of the Company with respect to the Company's obligation, if any, to issue shares or other property pursuant to this Restricted Stock Unit Award Agreement. You will not have voting or any other rights as a stockholder of the Company with respect to the shares to be issued pursuant to this Restricted Stock Unit Award Agreement until such shares are issued to you pursuant to Section 6 of this Restricted Stock Unit Award Agreement. Upon such issuance, you will obtain full voting and other rights as a stockholder of the Company. Nothing contained in this Restricted Stock Unit Award Agreement, and no action taken pursuant to its provisions, will create or be construed to create a trust of any kind or a fiduciary relationship between you and the Company or any other person.

12. NOTICES. Any notice or request required or permitted hereunder will be given in writing (including electronically) and will be deemed effectively given upon receipt or, in the case of notices delivered by mail by the Company to you, five (5) days after deposit in the United States mail, postage prepaid, addressed to you at the last address you provided to the Company. The Company may, in its sole discretion, decide to deliver any documents related to participation in the Plan and this Award by electronic means or to request your consent to participate in the Plan by electronic means. By accepting this Award, you consent to receive such documents by electronic delivery and to participate in the Plan through an on-line or electronic system established and maintained by the Company or another third party designated by the Company.

13. ADDITIONAL ACKNOWLEDGEMENTS. You hereby consent and acknowledge that:

(a) Receipt of the Award is voluntary and therefore you must accept the terms and conditions of this Restricted Stock Unit Award Agreement and Grant Notice as a condition to receipt of this Award. This Award is voluntary and occasional and does not create any contractual or other right to receive future awards or other benefits in lieu of future awards, even if similar awards have been granted repeatedly in the past. All determinations with respect to any such future awards, including, but not limited to, the time or times when such awards are made, the size of such awards and performance and other conditions applied to the awards, will be at the sole discretion of the Company.

(b) The future value of your Award is unknown and cannot be predicted with certainty. You do not have, and will not assert, any claim or entitlement to compensation, indemnity or damages arising from the termination of this Award or diminution in value of this Award and you irrevocably release the Company, its Affiliates and, if applicable, your employer, if different from the Company, from any such claim that may arise.

(c) The rights and obligations of the Company under your Award will be transferable by the Company to any one or more persons or entities, and all covenants and agreements hereunder will inure to the benefit of, and be enforceable by, the Company's successors and assigns.

(d) You agree upon request to execute any further documents or instruments necessary or desirable in the sole determination of the Company to carry out the purposes or intent of your Award.

(e) You acknowledge and agree that you have reviewed your Award in its entirety, have had an opportunity to obtain the advice of counsel prior to executing and accepting your Award and

fully understand all provisions of your Award.

(f) This Restricted Stock Unit Award Agreement will be subject to all applicable laws, rules, and regulations, and to such approvals by any governmental agencies or national securities exchanges as may be required.

(g) All obligations of the Company under the Plan and this Restricted Stock Unit Award Agreement will be binding on any successor to the Company, whether the existence of such successor is the result of a direct or indirect purchase, merger, consolidation, or otherwise, of all or substantially all of the business and assets of the Company.

14. CLAWBACK. Your Award (and any compensation paid or shares issued under your Award) is subject to recoupment in accordance with The Dodd–Frank Wall Street Reform and Consumer Protection Act and any implementing regulations thereunder, any clawback policy adopted by the Company and any compensation recovery policy otherwise required by applicable law. No recovery of compensation under such a clawback policy will be an event giving rise to a right to voluntarily terminate employment upon a resignation for "good reason," or for a "constructive termination" or any similar term under any plan of or agreement with the Company.

15. GOVERNING PLAN DOCUMENT. Your Award is subject to all the provisions of the Plan, the provisions of which are hereby made a part of your Award, and is further subject to all interpretations, amendments, rules and regulations which may from time to time be promulgated and adopted pursuant to the Plan.

16. EFFECT ON OTHER EMPLOYEE BENEFIT PLANS. The value of the Award subject to this Restricted Stock Unit Award Agreement will not be included as compensation, earnings, salaries, or other similar terms used when calculating benefits under any employee benefit plan (other than the Plan) sponsored by the Company or any Affiliate except as such plan otherwise expressly provides. The Company expressly reserves its rights to amend, modify, or terminate any or all of the employee benefit plans of the Company or any Affiliate.

17. SEVERABILITY. If all or any part of this Restricted Stock Unit Award Agreement or the Plan is declared by any court or governmental authority to be unlawful or invalid, such unlawfulness or invalidity will not invalidate any portion of this Restricted Stock Unit Award Agreement or the Plan not declared to be unlawful or invalid. Any Section of this Restricted Stock Unit Award Agreement (or part of such a Section) so declared to be unlawful or invalid will, if possible, be construed in a manner which will give effect to the terms of such Section or part of a Section to the fullest extent possible while remaining lawful and valid.

18. OTHER DOCUMENTS. You hereby acknowledge receipt or the right to receive a document providing the information required by Rule 428(b)(1) promulgated under the Securities Act, which includes the Plan prospectus. In addition, you acknowledge receipt of the Company's policy permitting certain individuals to sell shares only during certain "window" periods and the Company's Insider Trading Policy, in effect from time to time.

19. AMENDMENT. This Restricted Stock Unit Award Agreement may not be modified, amended or terminated except by an instrument in writing, signed by you and by a duly authorized representative of the Company. Notwithstanding the foregoing, this Restricted Stock Unit Award Agreement may be amended solely by the Board by a writing which specifically states that it is amending this Restricted Stock Unit Award Agreement, so long as a copy of such amendment is delivered to you, and provided that, except as otherwise expressly provided in the Plan, no such amendment materially adversely affecting your rights hereunder may be made without your written consent. Without limiting the foregoing, the Board reserves the right to change, by written notice to you, the provisions of this Restricted Stock Unit Award Agreement in any way it may deem necessary or advisable to carry out the purpose of the Award as a result of any change in applicable laws or regulations or any future law,

regulation, ruling, or judicial decision, provided that any such change will be applicable only to rights relating to that portion of the Award which is then subject to restrictions as provided herein.

20. COMPLIANCE WITH SECTION 409A OF THE CODE. This Award is intended to be exempt from the application of Section 409A of the Code, including but not limited to by reason of complying with the "short-term deferral" rule set forth in Treasury Regulation Section 1.409A-1(b)(4) and any ambiguities herein will be interpreted accordingly. Notwithstanding the foregoing, if it is determined that the Award fails to satisfy the requirements of the short-term deferral rule and is otherwise not exempt from, and determined to be deferred compensation subject to Section 409A of the Code, this Award will comply with Section 409A to the extent necessary to avoid adverse personal tax consequences and any ambiguities herein will be interpreted accordingly. If it is determined that the Award is deferred compensation subject to Section 409A and you are a "specified employee" (within the meaning set forth in Section 409A(a)(2)(B)(i) of the Code) as of the date of your "separation from service" (as defined in Section 409A), then the issuance of any shares that would otherwise be made upon the date of your separation from service or within the first six (6) months thereafter will not be made on the originally scheduled date(s) and will instead be issued in a lump sum on the date that is six (6) months and one day after the date of the Separation from Service or, if earlier, the date of your death, with the balance of the shares issued thereafter in accordance with the original issuance schedule set forth above, but if and only if such delay in the issuance of the shares is necessary to avoid the imposition of adverse taxation on you in respect of the shares under Section 409A of the Code. Each installment of shares that vests is intended to constitute a "separate payment" for purposes of Treasury Regulation Section 1.409A-2(b)(2). Notwithstanding any contrary provision of the Notice of Grant or of this Restricted Stock Unit Award Agreement, under no circumstances will the Company reimburse you for any taxes or other costs under Section 409A or any other tax law or rule. All such taxes and costs are solely your responsibility.

* * * * *

This Restricted Stock Unit Award Agreement will be deemed to be signed by the Company and the Participant upon the signing by the Participant of the Restricted Stock Unit Grant Notice to which it is attached.

ATTACHMENT II

2019 EQUITY INCENTIVE PLAN

For U.S. Participants

ATRECA, INC.

2019 EQUITY INCENTIVE PLAN
RESTRICTED STOCK UNIT GRANT NOTICE

Atreca, Inc. (the "***Company***"), pursuant to its 2019 Equity Incentive Plan (the "***Plan***"), hereby awards to Participant a Restricted Stock Unit Award for the number of shares of the Company's Common Stock ("***Restricted Stock Units***") set forth below (the "***Award***"). The Award is subject to all of the terms and conditions as set forth in this notice of grant (this "***Restricted Stock Unit Grant Notice***"), and in the Plan and the Restricted Stock Unit Award Agreement, both of which are attached hereto and incorporated herein in their entirety. Capitalized terms not explicitly defined herein will have the meanings set forth in the Plan or the Restricted Stock Unit Award Agreement. In the event of any conflict between the terms in this Restricted Stock Unit Grant Notice or the Restricted Stock Unit Award Agreement and the Plan, the terms of the Plan will control.

Participant:
Date of Grant:
Vesting Commencement Date:
Number of Restricted Stock Units:

Vesting Schedule: [ ], subject to Participant's Continuous Service through each such vesting date.

Issuance Schedule: Subject to any Capitalization Adjustment, one share of Common Stock will be issued for each Restricted Stock Unit that vests at the time set forth in Section 6 of the Restricted Stock Unit Award Agreement.

Mandatory Sale to Cover Withholding Tax:

As a condition to acceptance of this Award, to the greatest extent permitted under the Plan and applicable law, any withholding obligations for applicable Tax-Related Items (as defined in Section 9 of the Restricted Stock Unit Award Agreement) will be satisfied through the sale of a number of the shares of Common Stock subject to the Award as determined in accordance with Section 9 of the Restricted Stock Unit Award Agreement and the remittance of the cash proceeds of such sale to the Company. Under the Award Agreement, the Company is authorized and directed by Participant to make payment from the cash proceeds of this sale directly to the appropriate taxing authorities in an amount equal to the withholding obligation for Tax-Related Items. It is the Company's intent that the mandatory sale to cover withholding obligations for Tax-Related Items imposed by the Company on Participant in connection with the receipt of this Award comply with the requirements of Rule 10b5-1(c)(1)(i)(B) under the Exchange Act and be interpreted to comply with the requirements of Rule 10b5-1(c).

Additional Terms/Acknowledgements: Participant acknowledges receipt of, and understands and agrees to, this Restricted Stock Unit Grant Notice, the Restricted Stock Unit Award Agreement and the Plan. Participant further acknowledges that as of the Date of Grant, this Restricted Stock Unit Grant Notice, the Restricted Stock Unit Award Agreement and the Plan set forth the entire understanding between Participant and the Company regarding the acquisition of the Common Stock pursuant to the

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Award specified above and supersede all prior oral and written agreements on the terms of this Award, with the exception, if applicable, of (i) equity awards previously granted and delivered to Participant, (ii) any compensation recovery policy that is adopted by the Company or is otherwise required by applicable law; and (iii) any written employment agreement or severance arrangement that would provide for vesting acceleration of this Award upon the terms and conditions set forth therein.

By accepting this Award, Participant acknowledges having received and read the Restricted Stock Unit Grant Notice, the Restricted Stock Unit Award Agreement and the Plan and agrees to all of the terms and conditions set forth in these documents. Participant consents to receive such documents by electronic delivery and to participate in the Plan through an on-line or electronic system established and maintained by the Company or a third party designated by the Company.

ATRECA, INC.	**PARTICIPANT**
By: _____	_____
Signature	Signature
Title: _____	Date: _____
Date: _____	

ATTACHMENTS: Restricted Stock Unit Award Agreement and 2019 Equity Incentive Plan

ATTACHMENT I

ATRECA, INC.

2019 EQUITY INCENTIVE PLAN
RESTRICTED STOCK UNIT AWARD AGREEMENT

Pursuant to the Restricted Stock Unit Grant Notice (the "***Grant Notice***") and this Restricted Stock Unit Award Agreement, Atreca, Inc. (the "***Company***") has awarded you ("***Participant***") a Restricted Stock Unit Award (the "***Award***") pursuant to the Company's 2019 Equity Incentive Plan (the "***Plan***") for the number of Restricted Stock Units/shares of Common Stock indicated in the Grant Notice. Capitalized terms not explicitly defined in this Restricted Stock Unit Award Agreement or the Grant Notice will have the same meanings given to them in the Plan. The terms of your Award, in addition to those set forth in the Grant Notice, are as follows.

1. GRANT OF THE AWARD. This Award represents the right to be issued on a future date one (1) share of Common Stock for each Restricted Stock Unit that vests on the applicable vesting date(s) (subject to any adjustment under Section 3 below) as indicated in the Grant Notice. As of the Date of Grant, the Company will credit to a bookkeeping account maintained by the Company for your benefit (the "***Account***") the number of Restricted Stock Units/shares of Common Stock subject to the Award. This Award was granted in consideration of your services to the Company. Except as otherwise provided herein, you will not be required to make any payment to the Company or an Affiliate (other than services to the Company or an Affiliate) with respect to your receipt of the Award, the vesting of the Restricted Stock Units or the delivery of the Company's Common Stock to be issued in respect of the Award.

2. VESTING. Subject to the limitations contained herein, your Award will vest, if at all, in accordance with the vesting schedule provided in the Grant Notice, provided that vesting will cease upon the termination of your Continuous Service. Upon such termination of your Continuous Service, the Restricted Stock Units/shares of Common Stock credited to the Account that were not vested on the date of such termination will be forfeited at no cost to the Company and you will have no further right, title or interest in or to such underlying shares of Common Stock.

3. NUMBER OF SHARES. The number of Restricted Stock Units subject to your Award may be adjusted from time to time for Capitalization Adjustments, as provided in the Plan. Any additional Restricted Stock Units, shares, cash or other property that becomes subject to the Award pursuant to this Section 3, if any, will be subject, in a manner determined by the Board to the same forfeiture restrictions, restrictions on transferability, and time and manner of delivery as applicable to the other Restricted Stock Units and shares covered by your Award. Notwithstanding the provisions of this Section 3, no fractional shares or rights for fractional shares of Common Stock will be created pursuant to this Section 3. Any fraction of a share will be rounded down to the nearest whole share.

4. SECURITIES LAW COMPLIANCE. You may not be issued any Common Stock under your Award unless the shares of Common Stock underlying the Restricted Stock Units are either (i) then registered under the Securities Act, or (ii) the Company has determined that such issuance would be exempt from the registration requirements of the Securities Act. Your Award must also comply with other applicable laws and regulations governing the Award, and you will not receive such Common Stock if the Company determines that such receipt would not be in material compliance with such laws and regulations.

5. TRANSFER RESTRICTIONS. Prior to the time that shares of Common Stock have been delivered to you, you may not transfer, pledge, sell or otherwise dispose of this Award or the shares issuable in respect of your Award, except as expressly provided in this Section 5. For example, you may not use shares that may be issued in respect of your Restricted Stock Units as security for a loan. The restrictions on transfer set forth herein will lapse upon delivery to you of shares in respect of your vested

Restricted Stock Units. Notwithstanding the foregoing, by delivering written notice to the Company, in a form satisfactory to the Company, you may designate a third party who, in the event of your death, will thereafter be entitled to receive any distribution of Common Stock to which you were entitled at the time of your death pursuant to this Restricted Stock Unit Award Agreement (a "***Beneficiary Designation***"). In the absence of such a designation, your legal representative will be entitled to receive, on behalf of your estate, such Common Stock or other consideration.

(a) Death. Your Award is transferable by will and by the laws of descent and distribution. At your death, vesting of your Award will cease and, except as otherwise set forth in a Beneficiary Designation provided the Company in accordance with the terms of this Restricted Stock Unit Award Agreement, your executor or administrator of your estate will be entitled to receive, on behalf of your estate, any Common Stock or other consideration that vested but was not issued before your death.

(b) Domestic Relations Orders. Upon receiving written permission from the Board or its duly authorized designee, and provided that you and the designated transferee enter into transfer and other agreements required by the Company, you may transfer your right to receive the distribution of Common Stock or other consideration hereunder, pursuant to a domestic relations order, official marital settlement agreement or other divorce or separation instrument as permitted by applicable law that contains the information required by the Company to effectuate the transfer. You are encouraged to discuss the proposed terms of any division of this Award with the Company's General Counsel prior to finalizing the domestic relations order or marital settlement agreement to verify that you may make such transfer, and if so, to help ensure the required information is contained within the domestic relations order or marital settlement agreement.

6. DATE OF ISSUANCE.

(a) The issuance of shares in respect of the Restricted Stock Units is intended to comply with Treasury Regulations Section 1.409A-1(b)(4) and will be construed and administered in such a manner. Subject to the satisfaction of the Tax-Related Items (as defined in Section 9 below), in the event one or more Restricted Stock Units vests, the Company will issue to you one (1) share of Common Stock for each Restricted Stock Unit that vests on the applicable vesting date(s) (subject to any adjustment under Section 3 above, and subject to any different provisions in the Grant Notice). Each issuance date determined by this paragraph is referred to as an "***Original Issuance Date***".

(b) If the Original Issuance Date falls on a date that is not a business day, delivery will instead occur on the next following business day. In addition, if:

(i) the Original Issuance Date does not occur (1) during an "open window period" applicable to you, as determined by the Company in accordance with the Company's then-effective policy on trading in Company securities ("***Insider Trading Policy***"), or (2) on a date when you are otherwise permitted to sell shares of Common Stock on an established stock exchange or stock market (including but not limited to under a previously established written trading plan that meets the requirements of Rule 10b5-1 under the Exchange Act and was entered into in compliance with the Company's policies (a "***10b5-1 Arrangement***")), *and*

(ii) (1) the Company's then-effective Insider Trading Policy does not permit sell to cover transactions in satisfaction of applicable Tax-Related Items, (2) Tax-Related Items do not apply, or (3) Tax-Related Items do apply but the Company decides, prior to the Original Issuance Date, (A) not to satisfy the Tax-Related Items by withholding shares of Common Stock from the shares otherwise due, on the Original Issuance Date, to you under this Award, and (B) not to permit you to enter into a "same day sale" commitment with a broker-dealer pursuant to Section 9 of this Restricted Stock Unit Award Agreement (including but not limited to a commitment under a 10b5-1 Arrangement) and (C) not to permit you to pay your Tax-Related Items in cash,

then the shares that would otherwise be issued to you on the Original Issuance Date will not be delivered on such Original Issuance Date and will instead be delivered on the first business day when you are not prohibited from selling shares of the Company's Common Stock in the open public market, but in no event later than December 31 of the calendar year in which the Original Issuance Date occurs (that is, the last day of your taxable year in which the Original Issuance Date occurs), or, if and only if permitted in a manner that complies with Treasury Regulations Section 1.409A-1(b)(4), no later than the date that is the 15th day of the third calendar month of the applicable year following the year in which the shares of Common Stock under this Award are no longer subject to a "substantial risk of forfeiture" within the meaning of Treasury Regulations Section 1.409A-1(d).

(c) The form of delivery of the shares of Common Stock in respect of your Award (e.g., a stock certificate or electronic entry evidencing such shares) will be determined by the Company.

7. DIVIDENDS. You will receive no benefit or adjustment to your Award with respect to any cash dividend, stock dividend or other distribution that does not result from a Capitalization Adjustment; provided, however, that this sentence will not apply with respect to any shares of Common Stock that are delivered to you in connection with your Award after such shares have been delivered to you.

8. AWARD NOT A SERVICE CONTRACT.

(a) Your Continuous Service with the Company or an Affiliate is not for any specified term and may be terminated by you or by the Company or an Affiliate at any time, for any reason, with or without cause and with or without notice. Nothing in this Restricted Stock Unit Award Agreement (including, but not limited to, the vesting of your Award or the issuance of the shares subject to your Award), the Plan or any covenant of good faith and fair dealing that may be found implicit in this Restricted Stock Unit Award Agreement or the Plan will: (i) confer upon you any right to continue in the employ or service of, or affiliation with, the Company or an Affiliate; (ii) constitute any promise or commitment by the Company or an Affiliate regarding the fact or nature of future positions, future work assignments, future compensation or any other term or condition of employment or affiliation; (iii) confer any right or benefit under this Restricted Stock Unit Award Agreement or the Plan unless such right or benefit has specifically accrued under the terms of this Restricted Stock Unit Award Agreement or Plan; or (iv) deprive the Company of the right to terminate you at will and without regard to any future vesting opportunity that you may have.

(b) By accepting this Award, you acknowledge and agree that the right to continue vesting in the Award is earned only by continuing as an Employee, Director or Consultant at the will of the Company or an Affiliate and that the Company has the right to reorganize, sell, spin-out or otherwise restructure one or more of its businesses or Affiliates at any time or from time to time, as it deems appropriate (a "***reorganization***"). You acknowledge and agree that such a reorganization could result in the termination of your Continuous Service, or the termination of Affiliate status of your employer and the loss of benefits available to you under this Restricted Stock Unit Award Agreement, including but not limited to, the termination of the right to continue vesting in the Award. You further acknowledge and agree that this Restricted Stock Unit Award Agreement, the Plan, the transactions contemplated hereunder and the vesting schedule set forth herein or any covenant of good faith and fair dealing that may be found implicit in any of them do not constitute an express or implied promise of continued engagement as an Employee, Director or Consultant for the term of this Restricted Stock Unit Award Agreement, for any period, or at all, and will not interfere in any way with the Company's right to terminate your Continuous Service at any time, with or without your cause or notice, or to conduct a reorganization.

9. RESPONSIBILITY FOR TAXES.

(a) You acknowledge that, regardless of any action the Company or, if different, the Affiliate which employs you (the "***Employer***") takes with respect to any or all federal, state, local and

foreign income tax, social insurance, payroll tax, fringe benefit tax, payment on account or other tax- items related to the Award and your participation in the Plan and legally applicable to you, including, as applicable, obligations of the Company or the Employer ("***Tax-Related Items***"), the ultimate liability for all Tax-Related Items is and remains your responsibility and may exceed the amount actually withheld by the Company or the Employer. You further acknowledge that the Company and the Employer (i) make no representations or undertakings regarding the treatment of any Tax-Related Items in connection with any aspect of your Restricted Stock Units, including the grant of the Restricted Stock Units, the vesting and settlement of the Restricted Stock Units, the delivery or sale of any shares of Common Stock and the issuance of any dividends, and (ii) do not commit to and are under no obligation to structure the terms of the grant or any aspect of your Award to reduce or eliminate your liability for Tax-Related Items or achieve any particular tax result. You acknowledge and agree that you will not make any claim against the Company, or any of its Officers, Directors, Employees or Affiliates for Tax-Related Items arising from your Award or your other compensation. Further, if you are subject to Tax-Related Items in more than one jurisdiction, you acknowledge that the Company and/or the Employer may be required to withhold or account for Tax-Related Items in more than one jurisdiction.

(b) Prior to the relevant taxable or tax withholding event, as applicable, you agree to make adequate arrangements satisfactory to the Company and/or the Employer to satisfy all Tax-Related Items. Specifically, pursuant to Section 9(d) below, you have agreed to a "same day sale" commitment with a broker-dealer that is a member of the Financial Industry Regulatory Authority (a "***FINRA Dealer***") whereby you have (except in the case of Officers, as set forth below) irrevocably agreed to sell a portion of the shares of Common Stock to be delivered in connection with your Restricted Stock Units to satisfy any withholding obligations for Tax-Related Items and whereby the FINRA Dealer has committed to forward the proceeds necessary to satisfy any withholding obligations for Tax-Related Items directly to the Company and/or the Employer. If, for any reason, such "same day sale" commitment pursuant to Section 9(d) does not result in sufficient proceeds to satisfy any withholding obligations for Tax-Related Items, or you are an Officer and have provided notice to the Company at least five business days prior to a vesting date of your election to opt out of the "same day sale" commitment under Section 9(d) with respect to such vesting date, you authorize the Company and/or the Employer, or their respective agents, at their discretion, to satisfy their withholding obligations with regard to all Tax-Related Items by one or a combination of the following: (i) withholding from your wages or other cash compensation otherwise payable to you by the Company or the Employer; (ii) withholding a number of shares of Common Stock having a Fair Market Value determined by the Company as of the date of the relevant taxable or tax withholding event, as applicable, up to the amount of the Tax-Related Items that are otherwise deliverable to you upon settlement; *provided, however,* that to the extent necessary to qualify for an exemption from application of Section 16(b) of the Exchange Act, if applicable, such share withholding procedure will be subject to the express prior approval of the Board or the Company's Compensation Committee; or (iv) causing you to tender a cash payment (which may be in the form of a check, electronic wire transfer or other method permitted by the Company).

(c) Depending on the withholding method, the Company or the Employer may withhold or account for Tax-Related Items by considering applicable minimum statutory withholding amounts or other applicable withholding rates, including maximum applicable rates, in which case you may receive a refund of any over-withheld amount in cash and will have no entitlement to the Common Stock equivalent. If the obligation for Tax-Related Items is satisfied by withholding in shares of Common Stock, for tax purposes, you are deemed to have been issued the full number of shares of Common Stock subject to the vested Restricted Stock Units notwithstanding that a number of the shares of Common Stock are held back solely for the purpose of paying the Tax-Related Items.

(d) You hereby acknowledge and agree to the following:

(i) I hereby appoint Morgan Stanley (or any successor agent determined by the Company) as my agent (the "***Agent***"), and authorize the Agent to:

(1) Sell on the open market at the then prevailing market price(s), on my behalf, as soon as practicable on or after each date on which shares of Common Stock underlying my Restricted Stock Units vest and are issued, the number (rounded up to the next whole number) of the shares of Common Stock to be delivered to me in connection with the vesting of those shares sufficient to generate proceeds to cover (1) any withholding obligations for Tax-Related Items arising in connection with the Award, and (2) all applicable fees and commissions due to, or required to be collected by, the Agent with respect thereto; and

(2) Remit any remaining funds to me.

(ii) I hereby authorize the Company and the Agent to cooperate and communicate with one another to determine the number of shares of Common Stock underlying my Restricted Stock Units that must be sold pursuant to this Section 9(d).

(iii) I understand that the Agent may effect sales as provided in this Section 9(d) in one or more sales and that the average price for executions resulting from bunched orders will be assigned to my account. In addition, I acknowledge that it may not be possible to sell shares of Common Stock as provided by in this Section 9(d) due to (i) a legal or contractual restriction applicable to me or the Agent, (ii) a market disruption, (iii) rules governing order execution priority on the national exchange where the Common Stock may be traded or (iv) applicable law restricting such sale. In the event of the Agent's inability to sell shares of Common Stock, I will continue to be responsible for the timely payment to the Company of all Tax-Related Items that are required by applicable laws and regulations to be withheld.

(iv) I acknowledge that regardless of any other term or condition of this Section 9(d), the Agent will not be liable to me for (a) special, indirect, punitive, exemplary, or consequential damages, or incidental losses or damages of any kind, or (b) any failure to perform or for any delay in performance that results from a cause or circumstance that is beyond its reasonable control.

(v) I hereby agree to execute and deliver to the Agent any other agreements or documents as the Agent reasonably deems necessary or appropriate to carry out the purposes and intent of this Section 9(d). The Agent is a third-party beneficiary of this Section 9(d).

(vi) This Section 9(d) shall terminate not later than the date on which all Tax-Related Items arising in connection with the Award have been satisfied.

(vii) Officers may, on notice delivered five or more business days prior to a vesting date, opt out of the "same day sale" commitment under this Section 9(d) with respect to such vesting date provided alternate arrangements acceptable to the Company to satisfy any withholding obligation for Tax-Related Items have been made, as described in Section 9(a).

(viii) I hereby authorize the Company to appoint a successor Agent should the above named entity in (i) above (or its successor) resign as Agent or be replaced by the Company.

(e) You acknowledge and agree that, unless the Tax-Related Items are satisfied, the Company will have no obligation to deliver to you any Common Stock or other consideration pursuant to this Award.

(f) You agree to pay to the Company or the Employer any amount of Tax-Related Items that the Company or the Employer may be required to withhold or account for as a result of your participation in the Plan that cannot be satisfied by the means previously described. In the event any Tax-Related Items arise prior to the delivery to you of Common Stock or it is determined after the delivery of Common Stock to you that the amount of the Tax-Related Items was greater than the amount withheld by

the Company and/or the Employer, you agree to indemnify and hold the Company and the Employer harmless from any failure by the Company and/or the Employer to withhold the proper amount.

10. TAX CONSEQUENCES. The Company has no duty or obligation to minimize the tax consequences to you of this Award and will not be liable to you for any adverse tax consequences to you arising in connection with this Award. You are hereby advised to consult with your own personal tax, financial and/or legal advisors regarding the tax consequences of this Award and by signing the Grant Notice, you have agreed that you have done so or knowingly and voluntarily declined to do so. You understand that you (and not the Company or the Employer) will be responsible for your own tax liability that may arise as a result of this investment or the transactions contemplated by this Restricted Stock Unit Award Agreement.

11. UNSECURED OBLIGATION. Your Award is unfunded, and as a holder of a vested Award, you will be considered an unsecured creditor of the Company with respect to the Company's obligation, if any, to issue shares or other property pursuant to this Restricted Stock Unit Award Agreement. You will not have voting or any other rights as a stockholder of the Company with respect to the shares to be issued pursuant to this Restricted Stock Unit Award Agreement until such shares are issued to you pursuant to Section 6 of this Restricted Stock Unit Award Agreement. Upon such issuance, you will obtain full voting and other rights as a stockholder of the Company. Nothing contained in this Restricted Stock Unit Award Agreement, and no action taken pursuant to its provisions, will create or be construed to create a trust of any kind or a fiduciary relationship between you and the Company or any other person.

12. NOTICES. Any notice or request required or permitted hereunder will be given in writing (including electronically) and will be deemed effectively given upon receipt or, in the case of notices delivered by mail by the Company to you, five (5) days after deposit in the United States mail, postage prepaid, addressed to you at the last address you provided to the Company. The Company may, in its sole discretion, decide to deliver any documents related to participation in the Plan and this Award by electronic means or to request your consent to participate in the Plan by electronic means. By accepting this Award, you consent to receive such documents by electronic delivery and to participate in the Plan through an on-line or electronic system established and maintained by the Company or another third party designated by the Company.

13. ADDITIONAL ACKNOWLEDGEMENTS. You hereby consent and acknowledge that:

(a) Receipt of the Award is voluntary and therefore you must accept the terms and conditions of this Restricted Stock Unit Award Agreement and Grant Notice as a condition to receipt of this Award. This Award is voluntary and occasional and does not create any contractual or other right to receive future awards or other benefits in lieu of future awards, even if similar awards have been granted repeatedly in the past. All determinations with respect to any such future awards, including, but not limited to, the time or times when such awards are made, the size of such awards and performance and other conditions applied to the awards, will be at the sole discretion of the Company.

(b) The future value of your Award is unknown and cannot be predicted with certainty. You do not have, and will not assert, any claim or entitlement to compensation, indemnity or damages arising from the termination of this Award or diminution in value of this Award and you irrevocably release the Company, its Affiliates and, if applicable, your employer, if different from the Company, from any such claim that may arise.

(c) The rights and obligations of the Company under your Award will be transferable by the Company to any one or more persons or entities, and all covenants and agreements hereunder will inure to the benefit of, and be enforceable by, the Company's successors and assigns.

(d) You agree upon request to execute any further documents or instruments necessary or desirable in the sole determination of the Company to carry out the purposes or intent of

your Award.

(e) You acknowledge and agree that you have reviewed your Award in its entirety, have had an opportunity to obtain the advice of counsel prior to executing and accepting your Award and fully understand all provisions of your Award.

(f) This Restricted Stock Unit Award Agreement will be subject to all applicable laws, rules, and regulations, and to such approvals by any governmental agencies or national securities exchanges as may be required.

(g) All obligations of the Company under the Plan and this Restricted Stock Unit Award Agreement will be binding on any successor to the Company, whether the existence of such successor is the result of a direct or indirect purchase, merger, consolidation, or otherwise, of all or substantially all of the business and assets of the Company.

14. CLAWBACK. Your Award (and any compensation paid or shares issued under your Award) is subject to recoupment in accordance with The Dodd–Frank Wall Street Reform and Consumer Protection Act and any implementing regulations thereunder, any clawback policy adopted by the Company and any compensation recovery policy otherwise required by applicable law. No recovery of compensation under such a clawback policy will be an event giving rise to a right to voluntarily terminate employment upon a resignation for "good reason," or for a "constructive termination" or any similar term under any plan of or agreement with the Company.

15. GOVERNING PLAN DOCUMENT. Your Award is subject to all the provisions of the Plan, the provisions of which are hereby made a part of your Award, and is further subject to all interpretations, amendments, rules and regulations which may from time to time be promulgated and adopted pursuant to the Plan.

16. EFFECT ON OTHER EMPLOYEE BENEFIT PLANS. The value of the Award subject to this Restricted Stock Unit Award Agreement will not be included as compensation, earnings, salaries, or other similar terms used when calculating benefits under any employee benefit plan (other than the Plan) sponsored by the Company or any Affiliate except as such plan otherwise expressly provides. The Company expressly reserves its rights to amend, modify, or terminate any or all of the employee benefit plans of the Company or any Affiliate.

17. SEVERABILITY. If all or any part of this Restricted Stock Unit Award Agreement or the Plan is declared by any court or governmental authority to be unlawful or invalid, such unlawfulness or invalidity will not invalidate any portion of this Restricted Stock Unit Award Agreement or the Plan not declared to be unlawful or invalid. Any Section of this Restricted Stock Unit Award Agreement (or part of such a Section) so declared to be unlawful or invalid will, if possible, be construed in a manner which will give effect to the terms of such Section or part of a Section to the fullest extent possible while remaining lawful and valid.

18. OTHER DOCUMENTS. You hereby acknowledge receipt or the right to receive a document providing the information required by Rule 428(b)(1) promulgated under the Securities Act, which includes the Plan prospectus. In addition, you acknowledge receipt of the Company's policy permitting certain individuals to sell shares only during certain "window" periods and the Company's Insider Trading Policy, in effect from time to time.

19. AMENDMENT. This Restricted Stock Unit Award Agreement may not be modified, amended or terminated except by an instrument in writing, signed by you and by a duly authorized representative of the Company. Notwithstanding the foregoing, this Restricted Stock Unit Award Agreement may be amended solely by the Board by a writing which specifically states that it is amending this Restricted Stock Unit Award Agreement, so long as a copy of such amendment is delivered to you,

and provided that, except as otherwise expressly provided in the Plan, no such amendment materially adversely affecting your rights hereunder may be made without your written consent. Without limiting the foregoing, the Board reserves the right to change, by written notice to you, the provisions of this Restricted Stock Unit Award Agreement in any way it may deem necessary or advisable to carry out the purpose of the Award as a result of any change in applicable laws or regulations or any future law, regulation, ruling, or judicial decision, provided that any such change will be applicable only to rights relating to that portion of the Award which is then subject to restrictions as provided herein.

20. COMPLIANCE WITH SECTION 409A OF THE CODE. This Award is intended to be exempt from the application of Section 409A of the Code, including but not limited to by reason of complying with the "short-term deferral" rule set forth in Treasury Regulation Section 1.409A-1(b)(4) and any ambiguities herein will be interpreted accordingly. Notwithstanding the foregoing, if it is determined that the Award fails to satisfy the requirements of the short-term deferral rule and is otherwise not exempt from, and determined to be deferred compensation subject to Section 409A of the Code, this Award will comply with Section 409A to the extent necessary to avoid adverse personal tax consequences and any ambiguities herein will be interpreted accordingly. If it is determined that the Award is deferred compensation subject to Section 409A and you are a "specified employee" (within the meaning set forth in Section 409A(a)(2)(B)(i) of the Code) as of the date of your "separation from service" (as defined in Section 409A), then the issuance of any shares that would otherwise be made upon the date of your separation from service or within the first six (6) months thereafter will not be made on the originally scheduled date(s) and will instead be issued in a lump sum on the date that is six (6) months and one day after the date of the Separation from Service or, if earlier, the date of your death, with the balance of the shares issued thereafter in accordance with the original issuance schedule set forth above, but if and only if such delay in the issuance of the shares is necessary to avoid the imposition of adverse taxation on you in respect of the shares under Section 409A of the Code. Each installment of shares that vests is intended to constitute a "separate payment" for purposes of Treasury Regulation Section 1.409A-2(b)(2). Notwithstanding any contrary provision of the Notice of Grant or of this Restricted Stock Unit Award Agreement, under no circumstances will the Company reimburse you for any taxes or other costs under Section 409A or any other tax law or rule. All such taxes and costs are solely your responsibility.

* * * * *

This Restricted Stock Unit Award Agreement will be deemed to be signed by the Company and the Participant upon the signing by the Participant of the Restricted Stock Unit Grant Notice to which it is attached.

ATTACHMENT II

2019 EQUITY INCENTIVE PLAN

Exhibit 10.3

ATRECA, INC.

2019 EMPLOYEE STOCK PURCHASE PLAN

1. GENERAL; PURPOSE.

(a) The Plan provides a means by which Eligible Employees of the Company and certain Designated Companies may be given an opportunity to purchase shares of Common Stock. The Plan permits the Company to grant a series of Purchase Rights to Eligible Employees under an Employee Stock Purchase Plan.

(b) The Company, by means of the Plan, seeks to retain the services of such Employees, to secure and retain the services of new Employees and to provide incentives for such persons to exert maximum efforts for the success of the Company and its Related Corporations and Affiliates.

(c) The Plan includes two components: a 423 Component and a Non-423 Component. The Company intends (but makes no undertaking or representation to maintain) the 423 Component to qualify as an Employee Stock Purchase Plan. The provisions of the 423 Component, accordingly, will be construed in a manner that is consistent with the requirements of Section 423 of the Code. In addition, this Plan authorizes grants of Purchase Rights under the Non-423 Component that do not meet the requirements of an Employee Stock Purchase Plan. Except as otherwise provided in the Plan or determined by the Board, the Non-423 Component will operate and be administered in the same manner as the 423 Component. In addition, the Company may make separate Offerings which vary in terms (provided that such terms are not inconsistent with the provisions of the Plan or the requirements of an Employee Stock Purchase Plan), and the Company will designate which Designated Company is participating in each separate Offering.

2. ADMINISTRATION.

(a) The Board will administer the Plan unless and until the Board delegates administration of the Plan to a Committee or Committees, as provided in Section 2(c).

(b) The Board will have the power, subject to, and within the limitations of, the express provisions of the Plan:

(i) To determine how and when Purchase Rights will be granted and the provisions of each Offering (which need not be identical).

(ii) To designate from time to time which Related Corporations will be eligible to participate in the Plan as Designated 423 Corporations or as Designated Non-423 Corporations, which Affiliates may be excluded from participation in the Plan, and which Designated Companies will participate in each separate Offering (to the extent that the Company makes separate Offerings).

(iii) To construe and interpret the Plan and Purchase Rights, and to establish, amend and revoke rules and regulations for its administration. The Board, in the exercise of this power, may correct any defect, omission or inconsistency in the Plan, in a manner and to the extent it deems necessary or expedient to make the Plan fully effective.

(iv) To settle all controversies regarding the Plan and Purchase Rights granted under the Plan.

(v) To suspend or terminate the Plan at any time as provided in Section 12.

(vi) To amend the Plan at any time as provided in Section 12.

(vii) Generally, to exercise such powers and to perform such acts as it deems necessary or expedient to promote the best interests of the Company, its Related Corporations, and Affiliates and to carry out the intent that the 423 Component be treated as an Employee Stock Purchase Plan.

(viii) To adopt such rules, procedures and sub-plans relating to the operation and administration of the Plan as are necessary or appropriate under applicable local laws, regulations and procedures to permit or facilitate participation in the Plan by Employees who are foreign nationals or employed or located outside the United States. Without limiting the generality of, but consistent with, the foregoing, the Board specifically is authorized to adopt rules, procedures, and sub-plans, which, if applicable to a Designated Non-423 Corporation, do not have to comply with the requirements of Section 423 of the Code, regarding, without limitation, eligibility to participate in the Plan, the definition of eligible "earnings," handling and making of Contributions, establishment of bank or trust accounts to hold Contributions, payment of interest, conversion of local currency, obligations to pay payroll tax, determination of beneficiary designation requirements, withholding procedures and handling of share issuances, any of which may vary according to applicable requirements.

(c) The Board may delegate some or all of the administration of the Plan to a Committee or Committees. If administration is delegated to a Committee, the Committee will have, in connection with the administration of the Plan, the powers theretofore possessed by the Board that have been delegated to the Committee, including the power to delegate to a subcommittee any of the administrative powers the Committee is authorized to exercise (and references in this Plan to the Board will thereafter be to the Committee or subcommittee, as applicable), subject, however, to such resolutions, not inconsistent with the provisions of the Plan, as may be adopted from time to time by the Board. Further, to the extent not prohibited by applicable law, the Board or Committee may, from time to time, delegate some or all of its authority under the Plan to other persons or groups of persons as it deems necessary, appropriate, or advisable under conditions or limitations that it may set at or after the time of the delegation. The Board may retain the authority to concurrently administer the Plan with the Committee and may, at any time, revest in the Board some or all of the powers previously delegated. Whether or not the Board has delegated administration of the Plan to a Committee, the Board will have the final power to determine all questions of policy and expediency that may arise in the administration of the Plan.

(d) All determinations, interpretations and constructions made by the Board in good faith will not be subject to review by any person and will be final, binding and conclusive on all persons.

3. SHARES OF COMMON STOCK SUBJECT TO THE PLAN.

(a) Subject to the provisions of Section 11(a) relating to Capitalization Adjustments and the following sentence regarding the Evergreen Increase, the initial number of shares of Common Stock that may be issued under the Plan shall equal 1,700,000[1] shares of Common Stock (the "***Share Reserve***"). In addition, the Share Reserve will automatically increase on January 1st of each year for a period of up to ten (10) years, commencing on January 1, 2020 and ending on (and including) January 1, 2029 (each, an "***Evergreen Date***"), in an amount equal to the lesser of (i) one percent (1% of the total number of shares of Capital Stock outstanding on December 31st immediately preceding the applicable Evergreen Date,

[1] The initial 1,700,000 shares of Common Stock that may be issued under the Plan were adjusted to 283,333 pursuant to the 1-for-6 reverse split of the Company's Common Stock, effective June 7, 2019.

and (ii) 2,500,000[2] shares (the "***Evergreen Increase***"). Notwithstanding the foregoing, the Board may act prior to the Evergreen Date of a given year to provide that there will be no Evergreen Increase for such year or that the Evergreen Increase for such year will be a lesser number of shares of Common Stock than would otherwise occur pursuant to the preceding sentence. For the avoidance of doubt, up to the maximum number of shares of Common Stock reserved under this Section 3(a) may be used to satisfy purchases of Common Stock under the 423 Component and any remaining portion of such maximum number of shares may be used to satisfy purchases of Common Stock under the Non-423 Component.

(b) If any Purchase Right granted under the Plan terminates without having been exercised in full, the shares of Common Stock not purchased under such Purchase Right will again become available for issuance under the Plan.

(c) The stock purchasable under the Plan will be shares of authorized but unissued or reacquired Common Stock, including shares repurchased by the Company on the open market.

4. GRANT OF PURCHASE RIGHTS; OFFERING.

(a) The Board may from time to time grant or provide for the grant of Purchase Rights to Eligible Employees under an Offering (consisting of one or more Purchase Periods) on an Offering Date or Offering Dates selected by the Board. Each Offering will be in such form and will contain such terms and conditions as the Board will deem appropriate, and, with respect to the 423 Component, will comply with the requirement of Section 423(b)(5) of the Code that all Employees granted Purchase Rights will have the same rights and privileges. The terms and conditions of an Offering shall be incorporated by reference into the Plan and treated as part of the Plan. The provisions of separate Offerings need not be identical, but each Offering will include (through incorporation of the provisions of this Plan by reference in the Offering Document or otherwise) the period during which the Offering will be effective, which period will not exceed 27 months beginning with the Offering Date, and the substance of the provisions contained in Sections 5 through 8, inclusive.

(b) If a Participant has more than one Purchase Right outstanding under the Plan, unless he or she otherwise indicates in forms delivered to the Company or a third party designated by the Company (each, a "***Company Designee***"): (i) each form will apply to all of his or her Purchase Rights under the Plan, and (ii) a Purchase Right with a lower exercise price (or an earlier-granted Purchase Right, if different Purchase Rights have identical exercise prices) will be exercised to the fullest possible extent before a Purchase Right with a higher exercise price (or a later-granted Purchase Right if different Purchase Rights have identical exercise prices) will be exercised.

(c) The Board will have the discretion to structure an Offering so that if the Fair Market Value of a share of Common Stock on the first Trading Day of a new Purchase Period within that Offering is less than or equal to the Fair Market Value of a share of Common Stock on the Offering Date for that Offering, then (i) that Offering will terminate immediately as of that first Trading Day, and (ii) the Participants in such terminated Offering will be automatically enrolled in a new Offering beginning on the first Trading Day of such new Purchase Period.

5. ELIGIBILITY.

(a) Purchase Rights may be granted only to Employees of the Company or, as the Board may designate in accordance with Section 2(b), to Employees of a Related Corporation or an Affiliate. Except as provided in Section 5(b) or as required by applicable law, an Employee will not be eligible to be

[2] The initial 2,500,000 shares were adjusted to 416,666 pursuant to the 1-for-6 reverse split of the Company's Common Stock, effective June 7, 2019.

granted Purchase Rights unless, on the Offering Date, the Employee has been in the employ of the Company, a Related Corporation or an Affiliate, as the case may be, for such continuous period preceding such Offering Date as the Board may require, but in no event will the required period of continuous employment be equal to or greater than two years. In addition, the Board may provide that no Employee will be eligible to be granted Purchase Rights under the Plan unless, on the Offering Date, such Employee's customary employment with the Company, the Related Corporation, or the Affiliate, as applicable, is more than 20 hours per week and more than five months per calendar year or such other criteria as the Board may determine consistent with Section 423 of the Code with respect to the 423 Component and applicable laws.

(b) The Board may provide that each person who, during the course of an Offering, first becomes an Eligible Employee will, on a date or dates specified in the Offering which coincides with the day on which such person becomes an Eligible Employee or which occurs thereafter, receive a Purchase Right under that Offering, which Purchase Right will thereafter be deemed to be a part of that Offering. Such Purchase Right will have the same characteristics as any Purchase Rights originally granted under that Offering, as described herein, except that:

(i) the date on which such Purchase Right is granted will be the "Offering Date" of such Purchase Right for all purposes, including determination of the exercise price of such Purchase Right;

(ii) the period of the Offering with respect to such Purchase Right will begin on its Offering Date and end coincident with the end of such Offering; and

(iii) the Board may provide that if such person first becomes an Eligible Employee within a specified period of time before the end of the Offering, he or she will not receive any Purchase Right under that Offering.

(c) No Employee will be eligible for the grant of any Purchase Rights if, immediately after any such Purchase Rights are granted, such Employee owns stock possessing five percent or more of the total combined voting power or value of all classes of stock of the Company or of any Related Corporation. For purposes of this Section 5(c), the rules of Section 424(d) of the Code will apply in determining the stock ownership of any Employee, and stock which such Employee may purchase under all outstanding Purchase Rights and options will be treated as stock owned by such Employee.

(d) As specified by Section 423(b)(8) of the Code, an Eligible Employee may be granted Purchase Rights only if such Purchase Rights, together with any other rights granted under all Employee Stock Purchase Plans of the Company and any Related Corporations or Affiliates, do not permit such Eligible Employee's rights to purchase stock of the Company or any Related Corporation or Affiliates to accrue at a rate which, when aggregated, exceeds US$25,000 of Fair Market Value of such stock (determined at the time such rights are granted, and which, with respect to the Plan, will be determined as of their respective Offering Dates) for each calendar year in which such rights are outstanding at any time, subject to compliance with applicable laws.

(e) Officers of the Company and any Designated Company, if they are otherwise Eligible Employees, will be eligible to participate in Offerings under the Plan. Notwithstanding the foregoing, the Board may provide in an Offering that Employees who are highly compensated Employees within the meaning of Section 423(b)(4)(D) of the Code will not be eligible to participate.

(f) Notwithstanding anything in this Section 5 to the contrary, in the case of an Offering under the Non-423 Component, an Eligible Employee (or group of Eligible Employees) may be excluded

from participation in the Plan or an Offering if the Board has determined, in its sole discretion, that participation of such Eligible Employee(s) is not advisable or practical for any reason.

6. PURCHASE RIGHTS; PURCHASE PRICE.

(a) On each Offering Date, each Eligible Employee, pursuant to an Offering made under the Plan, will be granted a Purchase Right to purchase up to that number of shares of Common Stock (rounded down to the nearest whole share) purchasable either with a percentage or with a maximum dollar amount, as designated by the Board, but in either case not exceeding 15% of such Employee's earnings (as defined by the Board in each Offering) during the period that begins on the Offering Date (or such later date as the Board determines for a particular Offering) and ends on the date stated in the Offering, which date will be no later than the end of the Offering.

(b) The Board will establish one or more Purchase Dates during an Offering on which Purchase Rights granted for that Offering will be exercised and shares of Common Stock will be purchased in accordance with such Offering.

(c) In connection with each Offering made under the Plan, the Board may specify (i) a maximum number of shares of Common Stock that may be purchased by any Participant on any Purchase Date during such Offering, (ii) a maximum aggregate number of shares of Common Stock that may be purchased by all Participants pursuant to such Offering and/or (iii) a maximum aggregate number of shares of Common Stock that may be purchased by all Participants on any Purchase Date under the Offering. If the aggregate purchase of shares of Common Stock issuable upon exercise of Purchase Rights granted under the Offering would exceed any such maximum aggregate number, then, in the absence of any Board action otherwise, a pro rata (based on each Participant's accumulated Contributions) allocation of the shares of Common Stock (rounded down to the nearest whole share) available will be made in as nearly a uniform manner as will be practicable and equitable.

(d) The purchase price of shares of Common Stock acquired pursuant to Purchase Rights will be not less than the lesser of:

(i) an amount equal to 85% of the Fair Market Value of the shares of Common Stock on the Offering Date; or

(ii) an amount equal to 85% of the Fair Market Value of the shares of Common Stock on the applicable Purchase Date.

7. PARTICIPATION; WITHDRAWAL; TERMINATION.

(a) An Eligible Employee may elect to authorize payroll deductions as the means of making Contributions by completing and delivering to the Company or Company Designee, within the time specified in the Offering, an enrollment form provided by the Company or Company Designee. The enrollment form will specify the amount of Contributions not to exceed the maximum amount specified by the Board. Each Participant's Contributions will be credited to a bookkeeping account for such Participant under the Plan and will be deposited with the general funds of the Company except where applicable laws or regulations require that Contributions be deposited with a Company Designee or otherwise segregated. If permitted in the Offering, a Participant may begin such Contributions with the first payroll occurring on or after the Offering Date (or, in the case of a payroll date that occurs after the end of the prior Offering but before the Offering Date of the next new Offering, Contributions from such payroll will be included in the new Offering). If permitted in the Offering, a Participant may thereafter reduce (including to zero) or increase his or her Contributions. If required under applicable laws or

regulations or if specifically provided in the Offering, in addition to or instead of making Contributions by payroll deductions, a Participant may make Contributions through a payment by cash, check, or wire transfer prior to a Purchase Date, in a manner directed by the Company or a Company Designee.

(b) During an Offering, a Participant may cease making Contributions and withdraw from the Offering by delivering to the Company or a Company Designee a withdrawal form provided by the Company. The Company may impose a deadline before a Purchase Date for withdrawing. Upon such withdrawal, such Participant's Purchase Right in that Offering will immediately terminate and the Company will distribute as soon as practicable to such Participant all of his or her accumulated but unused Contributions and such Participant's Purchase Right in that Offering shall thereupon terminate. A Participant's withdrawal from that Offering will have no effect upon his or her eligibility to participate in any other Offerings under the Plan, but such Participant will be required to deliver a new enrollment form to participate in subsequent Offerings.

(c) Unless otherwise required by applicable law, Purchase Rights granted pursuant to any Offering under the Plan will terminate immediately if the Participant either (i) is no longer an Employee for any reason or for no reason or (ii) is otherwise no longer eligible to participate. In this regard, unless otherwise determined by the Board, a Participant whose employment transfers or whose employment terminates with an immediate rehire (with no break in service) by or between the Company and a Designated Company will not be treated as having terminated employment for purposes of participating in the Plan or an Offering; however, if a Participant transfers from an Offering under the 423 Component to an Offering under the Non-423 Component, the exercise of the Participant's Purchase Right will be qualified under the 423 Component only to the extent such exercise complies with Section 423 of the Code. If a Participant transfers from an Offering under the Non-423 Component to an Offering under the 423 Component, the exercise of the Purchase Right will remain non-qualified under the Non-423 Component. In the event that a Participant's Purchase Right is terminated under the Plan, the Company will distribute as soon as practicable to such individual all of his or her accumulated but unused Contributions.

(d) During a Participant's lifetime, Purchase Rights will be exercisable only by such Participant. Purchase Rights are not transferable by a Participant, except by will, by the laws of descent and distribution, or, if permitted by the Company, by a beneficiary designation as described in Section 10.

(e) Unless otherwise specified in the Offering or required by applicable law, the Company will have no obligation to pay interest on Contributions.

8. EXERCISE OF PURCHASE RIGHTS.

(a) On each Purchase Date, each Participant's accumulated Contributions will be applied to the purchase of shares of Common Stock (rounded down to the nearest whole share), up to the maximum number of shares of Common Stock permitted by the Plan and the applicable Offering, at the purchase price specified in the Offering. No fractional shares will be issued unless specifically provided for in the Offering.

(b) Unless otherwise provided in the Offering, if any amount of accumulated Contributions remains in a Participant's account after the purchase of shares of Common Stock on a Purchase Date in an Offering, then such remaining amount will be distributed to such Participant as soon as practicable after the applicable Purchase Date, without interest, unless the payment of interest is required by applicable laws.

(c) No Purchase Rights may be exercised to any extent unless the shares of Common Stock to be issued upon such exercise under the Plan are covered by an effective registration statement pursuant to the Securities Act and the Plan is in material compliance with all applicable U.S. federal and state, foreign and other securities, exchange control and other laws applicable to the Plan. If on a Purchase Date the shares of Common Stock are not so registered or the Plan is not in such compliance, no Purchase Rights will be exercised on such Purchase Date, and the Purchase Date will be delayed until the shares of Common Stock are subject to such an effective registration statement and the Plan is in material compliance, except that the Purchase Date will in no event be more than 6 months from the Offering Date. If, on the Purchase Date, as delayed to the maximum extent permissible, the shares of Common Stock are not registered and the Plan is not in material compliance with all applicable laws or regulations, as determined by the Company in its sole discretion, no Purchase Rights will be exercised and all accumulated but unused Contributions will be distributed as soon as practicable to the Participants without interest, unless the payment of interest is required by applicable laws.

9. COVENANTS OF THE COMPANY.

The Company will seek to obtain from each U.S. federal or state, foreign or other regulatory commission or agency having jurisdiction over the Plan such authority as may be required to grant Purchase Rights and issue and sell shares of Common Stock thereunder unless the Company determines, in its sole discretion, that doing so would cause the Company to incur costs that are unreasonable. If, after commercially reasonable efforts, the Company is unable to obtain the authority that counsel for the Company deems necessary for the grant of Purchase Rights or the lawful issuance and sale of Common Stock under the Plan, and at a commercially reasonable cost, the Company will be relieved from any liability for failure to grant Purchase Rights and/or to issue and sell Common Stock upon exercise of such Purchase Rights.

10. DESIGNATION OF BENEFICIARY.

(a) The Company may, but is not obligated to, permit a Participant to submit a form designating a beneficiary who will receive any shares of Common Stock and/or Contributions from the Participant's account under the Plan if the Participant dies before such shares and/or Contributions are delivered to the Participant. The Company may, but is not obligated to, permit the Participant to change such designation of beneficiary. Any such designation and/or change must be on a form approved by the Company or as approved by the Company for use by a Company Designee.

(b) If a Participant dies, in the absence of a valid beneficiary designation, the Company will deliver any shares of Common Stock and/or Contributions to the executor or administrator of the estate of the Participant. If no executor or administrator has been appointed (to the knowledge of the Company), the Company, in its sole discretion, may deliver such shares of Common Stock and/or Contributions, without interest, unless the payment of interest is required by applicable laws, to the Participant's spouse, dependents or relatives, or if no spouse, dependent or relative is known to the Company, then to such other person as the Company may designate.

11. ADJUSTMENTS UPON CHANGES IN COMMON STOCK; CORPORATE TRANSACTIONS.

(a) In the event of a Capitalization Adjustment, the Board will appropriately and proportionately adjust: (i) the class(es) and maximum number of securities subject to the Plan pursuant to Section 3(a), (ii) the class(es) and maximum number of securities by which the share reserve is to increase automatically each year pursuant to Section 3(a), (iii) the class(es) and number of securities subject to, and the purchase price applicable to outstanding Offerings and Purchase Rights, and (iv) the class(es) and

number of securities that are the subject of the purchase limits under each ongoing Offering. The Board will make these adjustments, and its determination will be final, binding and conclusive.

(b) In the event of a Corporate Transaction, then: (i) any surviving corporation or acquiring corporation (or the surviving or acquiring corporation's parent company) may assume or continue outstanding Purchase Rights or may substitute similar rights (including a right to acquire the same consideration paid to the stockholders in the Corporate Transaction) for outstanding Purchase Rights, or (ii) if any surviving or acquiring corporation (or its parent company) does not assume or continue such Purchase Rights or does not substitute similar rights for such Purchase Rights, then the Participants' accumulated Contributions will be used to purchase shares of Common Stock (rounded down to the nearest whole share) within ten business days prior to the Corporate Transaction under the outstanding Purchase Rights, and the Purchase Rights will terminate immediately after such purchase.

(c) In the event of a spin-off or similar transaction, the Board may take actions including shortening an Offering.

12. AMENDMENT, TERMINATION OR SUSPENSION OF THE PLAN.

(a) The Board may amend the Plan at any time in any respect the Board deems necessary or advisable. However, except as provided in Section 11(a) relating to Capitalization Adjustments, stockholder approval will be required for any amendment of the Plan for which stockholder approval is required by applicable laws, regulations or listing requirements, including any amendment that either (i) materially increases the number of shares of Common Stock available for issuance under the Plan, (ii) materially expands the class of individuals eligible to become Participants and receive Purchase Rights, (iii) materially increases the benefits accruing to Participants under the Plan or materially reduces the price at which shares of Common Stock may be purchased under the Plan, (iv) materially extends the term of the Plan, or (v) expands the types of awards available for issuance under the Plan, but in each of (i) through (v) above only to the extent stockholder approval is required by applicable laws, regulations, or listing requirements.

(b) The Board may suspend or terminate the Plan at any time. No Purchase Rights may be granted under the Plan while the Plan is suspended or after it is terminated.

(c) Any benefits, privileges, entitlements and obligations under any outstanding Purchase Rights granted before an amendment, suspension or termination of the Plan will not be materially impaired by any such amendment, suspension or termination except (i) with the consent of the person to whom such Purchase Rights were granted, (ii) as necessary to comply with any laws, listing requirements, or governmental regulations (including, without limitation, the provisions of Section 423 of the Code and the regulations and other interpretive guidance issued thereunder relating to Employee Stock Purchase Plans) including without limitation any such regulations or other guidance that may be issued or amended after the Effective Date, or (iii) as necessary to obtain or maintain any special tax, listing, or regulatory treatment. To be clear, the Board may amend outstanding Purchase Rights without a Participant's consent if such amendment is necessary to ensure that the Purchase Right and/or the 423 Component complies with the requirements of Section 423 of the Code, or other applicable laws, listing requirements, or governmental regulations.

Notwithstanding anything in the Plan to the contrary, the Board will be entitled to: (i) permit Contributions in excess of the amount designated by a Participant in order to adjust for mistakes in the Company's processing of properly completed Contribution elections; (ii) establish reasonable waiting and adjustment periods and/or accounting and crediting procedures to ensure that amounts applied toward the purchase of Common Stock for each Participant properly correspond with amounts withheld from the

Participant's Contributions; (iii) amend any outstanding Purchase Rights or clarify any ambiguities regarding the terms of any Offering to enable the Purchase Rights to qualify under and/or comply with Section 423 of the Code; and (iv) establish other limitations or procedures as the Board determines in its sole discretion advisable that are consistent with the Plan. The actions of the Board pursuant to this paragraph will not be considered to alter or impair any Purchase Rights granted under an Offering as they are part of the initial terms of each Offering and the Purchase Rights granted under each Offering.

13. TAX MATTERS.

(a) Purchase Rights granted under the 423 Component are intended to be exempt from the application of Section 409A of the Code under U.S. Treasury Regulation Section 1.409A-1(b)(5)(ii). Purchase Rights granted under the Non-423 Component to U.S. taxpayers are intended to be exempt from the application of Section 409A of the Code under the short-term deferral exception or compliant with Section 409A of the Code and any ambiguities will be construed and interpreted in accordance with such intent.

(b) Although the Company may endeavor to qualify a Purchase Right for special tax treatment under the laws of the United States or jurisdictions outside of the United States, or avoid adverse tax treatment (*e.g.*, under Section 409A of the Code), the Company makes no representation to that effect and expressly disavows any covenant to maintain special or to avoid unfavorable tax treatment, notwithstanding anything to the contrary in this Plan.

14. TAX WITHHOLDING.

The Participant will make adequate provision to satisfy the Tax-Related Items withholding obligations, if any, of the Company and/or the applicable Designated Company which arise with respect to Participant's participation in the Plan or upon the disposition of the shares of the Common Stock. The Company and/or the Designated Company may, but will not be obligated to, withhold from the Participant's compensation or any other payments due the Participant the amount necessary to meet such withholding obligations or withhold from the proceeds of the sale of shares of Common Stock or any other method of withholding that the Company and/or the Designated Company deems appropriate. The Company and/or the Designated Company will have the right to take such other action as may be necessary in the opinion of the Company or a Designated Company to satisfy withholding and/or reporting obligations for such Tax-Related Items.

15. EFFECTIVE DATE OF PLAN.

The Plan will become effective immediately prior to and contingent upon the IPO Date. No Purchase Rights will be exercised unless and until the Plan has been approved by the stockholders of the Company, which approval must be within 12 months before or after the date the Plan is adopted (or if required under Section 12(a) above, materially amended) by the Board.

16. MISCELLANEOUS PROVISIONS.

(a) Proceeds from the sale of shares of Common Stock pursuant to Purchase Rights will constitute general funds of the Company.

(b) A Participant will not be deemed to be the holder of, or to have any of the rights of a holder with respect to, shares of Common Stock subject to Purchase Rights unless and until the Participant's shares of Common Stock acquired upon exercise of Purchase Rights are recorded in the books of the Company (or its transfer agent).

(c) The Plan and Offering do not constitute an employment contract. Nothing in the Plan or in the Offering will in any way alter the at-will nature of a Participant's employment, if applicable, or be deemed to create in any way whatsoever any obligation on the part of any Participant to continue in the employ of the Company, a Related Corporation, or an Affiliate, or on the part of the Company, a Related Corporation or an Affiliate to continue the employment of a Participant.

(d) The provisions of the Plan will be governed by the laws of the State of Delaware without resort to that state's conflicts of laws rules.

(e) If any particular provision of the Plan is found to be invalid or otherwise unenforceable, such provision will not affect the other provisions of the Plan, but the Plan will be construed in all respects as if such invalid provision were omitted.

(f) If any provision of the Plan does not comply with applicable law or regulations, such provision shall be construed in such a manner as to comply with applicable law or regulations.

17. DEFINITIONS.

As used in the Plan, the following definitions will apply to the capitalized terms indicated below:

(a) "***423 Component***" means the part of the Plan, which excludes the Non-423 Component, pursuant to which Purchase Rights that satisfy the requirements for an Employee Stock Purchase Plan may be granted to Eligible Employees.

(b) "***Affiliate***" means any entity, other than a Related Corporation, in which the Company has an equity or other ownership interest or that is directly or indirectly controlled by, controls, or is under common control with the Company, in all cases, as determined by the Board, whether now or hereafter existing.

(c) "***Board***" means the board of directors of the Company.

(d) "***Capital Stock***" means each and every class of common stock of the Company, regardless of the number of votes per share.

(e) "***Capitalization Adjustment***" means any change that is made in, or other events that occur with respect to, the Common Stock subject to the Plan or subject to any Purchase Right after the Effective Date without the receipt of consideration by the Company through merger, consolidation, reorganization, recapitalization, reincorporation, stock dividend, dividend in property other than cash, large nonrecurring cash dividend, stock split, liquidating dividend, combination of shares, exchange of shares, change in corporate structure or other similar equity restructuring transaction, as that term is used in Financial Accounting Standards Board Accounting Standards Codification Topic 718 (or any successor thereto). Notwithstanding the foregoing, the conversion of any convertible securities of the Company will not be treated as a Capitalization Adjustment.

(f) "***Code***" means the U.S. Internal Revenue Code of 1986, as amended, including any applicable regulations and guidance thereunder.

(g) "***Committee***" means a committee of one or more members of the Board to whom authority has been delegated by the Board in accordance with Section 2(c).

(h) "***Common Stock***" means, as of the IPO Date, the Class A common stock of the Company.

(i) "***Company***" means Atreca, Inc., a Delaware corporation, and any successor corporation thereto.

(j) ***"Contributions***" means the payroll deductions and/or other payments specifically provided for in the Offering that a Participant contributes to fund the exercise of a Purchase Right. A Participant may make additional payments into his or her account if specifically provided for in the Offering, and then only if the Participant has not already contributed the maximum permitted amount of payroll deductions and/or other payments during the Offering.

(k) "***Corporate Transaction***" means the consummation, in a single transaction or in a series of related transactions, of any one or more of the following events:

(i) a sale or other disposition of all or substantially all, as determined by the Board in its sole discretion, of the consolidated assets of the Company and its Subsidiaries;

(ii) a sale or other disposition of more than 50% of the outstanding securities of the Company;

(iii) a merger, consolidation or similar transaction following which the Company is not the surviving corporation; or

(iv) a merger, consolidation or similar transaction following which the Company is the surviving corporation but the shares of Common Stock outstanding immediately preceding the merger, consolidation or similar transaction are converted or exchanged by virtue of the merger, consolidation or similar transaction into other property, whether in the form of securities, cash or otherwise.

(l) "***Designated 423 Corporation***" means any Related Corporation selected by the Board as participating in the 423 Component.

(m) "***Designated Company***" means any Designated Non-423 Corporation or Designated 423 Corporation, provided, however, that at any given time, a Related Corporation participating in the 423 Component shall not be a Related Corporation participating in the Non-423 Component.

(n) "***Designated Non-423 Corporation***" means any Related Corporation or Affiliate selected by the Board as participating in the Non-423 Component.

(o) "***Director***" means a member of the Board.

(p) "***Effective Date***" means the effective date of the Plan, as set forth in Section 15.

(q) "***Eligible Employee***" means an Employee who meets the requirements set forth in the document(s) governing the Offering for eligibility to participate in the Offering, provided that such Employee also meets the requirements for eligibility to participate set forth in the Plan.

(r) "***Employee***" means any person, including an Officer or Director, who is "employed" for purposes of Section 423(b)(4) of the Code by the Company or a Related Corporation (including an

Affiliate). However, service solely as a Director, or payment of a fee for such services, will not cause a Director to be considered an "Employee" for purposes of the Plan.

(s) "***Employee Stock Purchase Plan***" means a plan that grants Purchase Rights intended to be options issued under an "employee stock purchase plan," as that term is defined in Section 423(b) of the Code.

(t) "***Exchange Act***" means the U.S. Securities Exchange Act of 1934, as amended and the rules and regulations promulgated thereunder.

(u) "***Fair Market Value***" means, as of any date, the value of the Common Stock determined as follows:

(i) If the Common Stock is listed on any established stock exchange or traded on any established market, the Fair Market Value of a share of Common Stock will be, unless otherwise determined by the Board, the closing sales price for such stock as quoted on such exchange or market (or the exchange or market with the greatest volume of trading in the Common Stock) on the date of determination, as reported in such source as the Board deems reliable. Unless otherwise provided by the Board, if there is no closing sales price for the Common Stock on the date of determination, then the Fair Market Value will be the closing sales price on the last preceding date for which such quotation exists.

(ii) In the absence of such markets for the Common Stock, the Fair Market Value will be determined by the Board in good faith in compliance with applicable laws and regulations and in a manner that complies with Sections 409A of the Code.

(iii) Notwithstanding the foregoing, for any Offering that commences on the IPO Date, the Fair Market Value of the shares of Common Stock on the Offering Date will be the price per share at which shares are first sold to the public in the Company's initial public offering as specified in the final prospectus for that initial public offering.

(v) "***IPO Date***" means the date of the underwriting agreement between the Company and the underwriter(s) managing the initial public offering of the Common Stock, pursuant to which the Common Stock is priced for the initial public offering.

(w) "***Non-423 Component***" means the part of the Plan, which excludes the 423 Component, pursuant to which Purchase Rights that are not intended to satisfy the requirements for an Employee Stock Purchase Plan may be granted to Eligible Employees.

(x) "***Offering***" means the grant to Eligible Employees of Purchase Rights, with the exercise of those Purchase Rights automatically occurring at the end of one or more Purchase Periods. The terms and conditions of an Offering will generally be set forth in the "***Offering Document***" approved by the Board for that Offering.

(y) "***Offering Date***" means a date selected by the Board for an Offering to commence.

(z) "***Officer***" means a person who is an officer of the Company or a Related Corporation or Affiliate within the meaning of Section 16 of the Exchange Act.

(aa) "***Participant***" means an Eligible Employee who holds an outstanding Purchase Right.

(bb) "***Plan***" means this Atreca, Inc. 2019 Employee Stock Purchase Plan, as amended from time to time.

(cc) "***Purchase Date***" means one or more dates during an Offering selected by the Board on which Purchase Rights will be exercised and on which purchases of shares of Common Stock will be carried out in accordance with such Offering.

(dd) "***Purchase Period***" means a period of time specified within an Offering, generally beginning on the Offering Date or on the first Trading Day following a Purchase Date, and ending on a Purchase Date. An Offering may consist of one or more Purchase Periods.

(ee) "***Purchase Right***" means an option to purchase shares of Common Stock granted pursuant to the Plan.

(ff) "***Related Corporation***" means any "parent corporation" or "subsidiary corporation" of the Company whether now or subsequently established, as those terms are defined in Sections 424(e) and (f), respectively, of the Code.

(gg) "***Securities Act***" means the U.S. Securities Act of 1933, as amended.

(hh) "***Tax-Related Items***" means any income tax, social insurance, payroll tax, fringe benefit tax, payment on account or other tax-related items arising in relation to a Participant's participation in the Plan.

(ii) "***Trading Day***" means any day on which the exchange(s) or market(s) on which shares of Common Stock are listed, including but not limited to the NYSE, Nasdaq Global Select Market, the Nasdaq Global Market, the Nasdaq Capital Market or any successors thereto, is open for trading.

Exhibit 10.14

CERTAIN CONFIDENTIAL INFORMATION CONTAINED IN THIS DOCUMENT , MARKED BY [*], HAS BEEN OMITTED BECAUSE IT IS NOT MATERIAL AND WOULD LIKELY CAUSE COMPETITIVE HARM TO ATRECA, INC. IF PUBLICLY DISCLOSED.

August 21, 2015

Atreca, Inc.
75 Shoreway Rd, Suite C
San Carlos, CA 94047-2727

Re: Program Related Investment by the Bill & Melinda Gates Foundation in Atreca, Inc.

Ladies and Gentleman:

This letter agreement ("***Letter Agreement***") is entered into in connection with the investment by the Bill & Melinda Gates Foundation (the "***Foundation***"), a Washington charitable trust that is a tax-exempt private foundation, of an amount equal to approximately $[*] U.S. Dollars in cash (the "***New Cash Investment***") in the Series A Preferred Stock ("***Preferred Stock***") of Atreca, Inc. (the "***Company***"), and the conversion of $[*] U.S. Dollars in outstanding convertible debt previously issued to the Foundation by the Company pursuant to Convertible Promissory Notes (the "***Notes***"), plus accrued and unpaid interest on such Notes (together with the cash investment, the "***BMGF Investment***"). This Letter Agreement amends and restates in its entirety that certain letter agreement, dated June 9, 2014, entered into by the Foundation and the Company, as amended from time to time. The Foundation is making the BMGF Investment in accordance with the provisions of that certain Series A Preferred Stock Purchase Agreement, dated as of August 21, 2015 (the "***Purchase Agreement***"), and related documents, in each case as amended from time to time (collectively, the "***Investment Documents***"). Capitalized terms not defined herein shall have the same meaning as in the Investment Documents.

In consideration of the Foundation making the BMGF Investment on the terms and conditions stated herein and in the Investment Documents, and for other good and valuable consideration, the undersigned hereby irrevocably agree as follows:

1. Charitable Purposes and Use of Funds

The Foundation is making the BMGF Investment as a "program-related investment" within the meaning of Section 4944(c) of the U.S. Internal Revenue Code (the "***Code***"), and the Foundation's primary purpose in making the BMGF Investment is to further significantly the accomplishment of its charitable purposes, including the relief of the poor and distressed, by seeking to (a) address global health challenges that disproportionately impact developing countries and (b) increase the access of poor and distressed individuals and families in the developing world to life-saving and other important vaccines and drugs, that can improve their health care ("***Charitability Requirement***"). The Company shall use proceeds from the BMGF Investment for the charitable purposes described herein by supporting development of the Company's technology to perform single-cell analyses of immune responses, including (a) rapidly identifying the repertoire of functional antibodies generated in an immune response by using DNA barcoding to enable high-throughput sequencing of paired immunoglobulin heavy and light chain genes from individual

[*] = Certain confidential information contained in this document, marked by brackets, has been omitted pursuant to Rule 406 of the Securities Act of 1933, as amended.

activated B cells generated in an immune response; (b) rapidly identifying T cell repertoires generated in an immune response by using DNA barcoding to enable high-throughput sequencing of paired T cell receptor genes (such as alpha/beta and gamma/delta TCRs) from individual T cells generated in an immune response; and (c) rapidly profiling gene expression by using molecular barcoding to enable high-throughput sequencing and quantification of nucleic acids from individual lymphocytes (the "***Platform Technology***") necessary for the Company to make the Global Access Commitments (as defined in Section 3). The Foundation believes that because of the broad applicability of the Platform Technology to the development of vaccines, drugs and diagnostics necessary to address global health concerns, the further development and improvements of the Platform Technology, in conjunction with the Global Access Commitments (defined in Section 3), will achieve the Charitability Requirement.

The Company understands and acknowledges that a primary organizational objective of the Foundation is to provide funding to support the development of drugs and vaccines to address diseases that have a disproportionate impact on people within developing countries, and to ensure that such products can be made available and accessible at reasonable cost to people within developing countries (the "***Global Access Objectives***"). The Foundation is forming a strategic partnership with the Company in order to ensure (i) nonexclusive access to the Platform Technology for application to Developing World (defined below) vaccines, therapeutics and diagnostics and (ii) that resulting products (vaccines, therapeutics and diagnostics) are available and accessible at reasonable cost to people within the Developing World. "***Developing World***" means those countries listed on the attached Appendix 1. "***Developed World***" means all countries not included in "Developing World."

2. Developing World Diseases and Conditions

The Foundation and the Company agree that it is appropriate to separately consider sub categories of different diseases found in the Developing World, in particular as it relates to the right to use the information that arises from the Services (defined below).

The three sub-categories and the diseases they comprise are:

- **Group 1 Diseases:** [*]
- **Group 2 Diseases:** [*]
- **Group 3 Diseases:** [*]

3. Permitted Use of Platform Technology by Foundation and Foundation-Supported Entities

To ensure satisfaction of the Global Access Objectives, the Company will commit to the following as a condition to the Foundation making the BMGF Investment (the "***Global Access Commitments***"):

a. At the request of the Foundation, the Company will receive and process samples from the Foundation or Foundation-Supported Entities (as defined below) and use the Platform Technology to rapidly identify the repertoire of functional antibodies generated in an immune response related to Group 1, Group 2 and Group 3 Diseases

and Conditions (the "***Services***"). The specific terms under which the Company will receive and process samples will be determined in connection with each project, which terms must be acceptable to the Company, the Foundation, and (as applicable) the Foundation-Supported entities providing such samples. For the avoidance of doubt, neither the Foundation nor the Company shall delay or hinder the implementation of this Letter Agreement by unreasonably objecting to such terms. The Services will further include research facilitation translation of the identified repertoire of functional antibodies into one or more clinical candidate for prophylaxis and/or therapy. For clarity, a "Foundation-Supported Entity" is a third party receiving funding from the Foundation, is collaborating with the Foundation, or both, for the purpose of accomplishing the Global Access Objectives. The Services will be subject to the following conditions:

i. The Services will be funded by a grant or contract from the Foundation or Foundation-Supported Entities.

ii. The results of the Services provided by the Company to the Foundation or Foundation-Supported Entities per each project plan may be used worldwide by the Foundation (or Foundation-Supported Entities) in research, development, manufacture and regulatory approval processes without any milestone payments, royalties or other monetary or non-monetary restrictions imposed on the Foundation (or any such Foundation-Supported Entities) by the Company so long as the Global Access Objectives are pursued by the Foundation (or any such Foundation Supported Entities), subject to Section 3.a.iii.

iii. Any product in the categories below that arises from such research, development, manufacture and is subject to such regulatory approvals may only be sold or distributed by the Foundation (or Foundation-Supported Entities) in accordance with the following (see Appendix II):

(a) For Group 1 Diseases, therapeutic or prophylactic products (both monoclonal/protein and vector/nucleic acid based), vaccines, and diagnostics may be sold or distributed in either the Developing World or the Developed World by the Foundation (or Foundation-Supported Entities) without any milestone payments, royalties or other monetary or non-monetary restrictions imposed on the Foundation (or any such Foundation-Supported Entities) by the Company so long as the Global Access Objectives are pursued by the Foundation (or any such Foundation Supported Entities).

(b) For Group 2 Diseases, therapeutic or prophylactic products (both monoclonal/protein and vector/nucleic acid based), vaccines, and diagnostics may only be sold or distributed in the Developing World by the Foundation (or Foundation-Supported Entities) without any milestone payments, royalties or other monetary or non-monetary restrictions imposed on the Foundation (or any such Foundation-

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Supported Entities) by the Company so long as the Global Access Objectives are pursued by the Foundation. For Group 2 Diseases, therapeutic or prophylactic products (both monoclonal/protein and vector/nucleic acid based), vaccines, and diagnostics may be sold or distributed in the Developed World by the Foundation (or Foundation-Supported Entities) only if written approval is provided by the Company and in accordance with such terms and conditions as the Company and the Foundation (or Foundation-Supported Entities) may agree.

(c) For Group 3 Diseases, therapeutic or prophylactic products (vector/nucleic acid based, but not including monoclonal/protein), vaccines, and diagnostics may only be sold or distributed in the Developing World by the Foundation (or Foundation-Supported Entities) without any milestone payments, royalties or other monetary or non-monetary restrictions imposed on the Foundation (or any such Foundation-Supported Entities) by the Company so long as the Global Access Objectives are pursued by the Foundation. For Group 3 Diseases, therapeutic or prophylactic products (vector/nucleic acid based, but not including monoclonal/protein), vaccines, and diagnostics may be sold or distributed in the Developed World by the Foundation (or Foundation-Supported Entities) only if written approval is provided by the Company and in accordance with such terms and conditions as the Company and the Foundation (or Foundation-Supported Entities) may agree.

iv. Immediately following the execution of this Agreement, the Company will reserve for the Foundation and Foundation-Supported Entities a capacity of sample processing and sequence generation for single-cell analysis of at least 3,000 lymphocytes per week, and a capacity of 10,000 lymphocytes per week for discrete periods of time with a three-month advance notice and commitment by the Foundation to the Company to utilize such increased capacity.

v. The Company agrees to set a price for the Services that is commercially reasonable and that reflects the needs, including price sensitivity, of people most in need within the Developing World.

b. Within the Developing World, the Foundation has rights to manufacture or have manufactured and the rights to develop and commercialize the vaccines, therapeutics and diagnostics for diseases and conditions that are not Group 1, Group 2 or Group 3 Diseases that arise from information gained through Services provided by Company to the Foundation or Foundation-Supported Entities, so long as the Global Access Objectives are pursued by the Foundation, and in accordance with such terms and conditions as the Company and the Foundation (or Foundation-Supported Entities) may agree. Within the Developed World, the Foundation's

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rights to manufacture or have manufactured and the rights to develop and commercialize the vaccines, therapeutics and diagnostics for diseases and conditions that are not Group 1, Group 2 or Group 3 Diseases that arise from information gained through Services provided by Company to the Foundation or Foundation-Supported Entities are subject to written approval by the Company and may be open to negotiations on a case-by-case basis.

c. The Company agrees to use commercially reasonable efforts to enable the Foundation or Foundation-Supported Entities to exercise their rights to use the results of the Services provided by the Company in research, development, manufacture and regulatory approval processes and in connection with the permitted sale or distribution of products in accordance with this Section 3.

4. Development Other than with BMGF

To the extent the Company utilizes the Platform Technology and successfully develops a vaccine, therapeutic or diagnostic for any of the diseases listed in the definition of Group 1, Group 2 or Group 3 Diseases (i.e., without support from the Foundation or Foundation-Supported Entities), the Company will use reasonably diligent efforts, that take into account both the Global Access Objectives and the Company's profitability, enterprise value and other commercial interests, to make such product accessible to people most in need within the Developing World. For clarity, nothing in this Letter Agreement shall limit the right or ability of the Company to work, for itself or with a third party, to use the Platform Technology on any products, whether for human use or otherwise. The Company will report to the Foundation if it reasonably believes that a conflict in available capacity may arise as a result of work for itself or a third party. The Company will further report to the Foundation before entering into negotiations for any license or other transfer of rights in the Platform Technology to a third party.

5. Obligations in the Event of Acquisition of Platform Technology or Company by Another

In the event the Platform Technology is acquired directly, or through a merger or an acquisition of the Company by a third party, the Company will ensure the Global Access Commitments applicable to the Company's Platform Technology described above will survive and be assumed by the acquirer. The Company will not grant to a third-party any rights to, or enter into any arrangements with respect to, the Platform Technology that would prohibit, prevent or otherwise significantly restrict the Company (or any acquirer of the Platform Technology) from fulfilling the above stated commitments. The Global Access Commitments shall apply solely to the Company's Platform Technology and intellectual property rights and proprietary information owned or controlled by the Company, and shall expressly not be applicable to other services, products or intellectual property rights, including rights of any licensee of the Company or any company that merges with or acquires the Company.

6. Withdrawal Right

The withdrawal right described in this section will be triggered only as a result of actions taken by the Company that are inconsistent with restrictions herein on the use of funds or with the Global Access Commitments or related U.S. tax obligations, including without limitation the requirements

set forth in paragraphs 9 and 12 below. For the avoidance of doubt, the withdrawal right will not be triggered by the inability, for scientific and technical reasons beyond the control of the Company, to provide Services and successfully develop a product for the Group 1, Group 2 or Group 3 Diseases, so long as the Company has not breached any of the Global Access Commitments.

In the event that the Company fails to comply with the restrictions on the use of funds, the Global Access Commitments or the other related U.S. tax obligations set forth herein, (a "***Charitability Default***"), the Foundation will have the rights set forth below (the "***Withdrawal Right***"). Each party shall promptly notify the other party in writing of the occurrence of such event, and the Company shall thereafter promptly provide to the Foundation a proposed strategy to remedy the Charitability Default.

If the Company fails to cure the Charitability Default within ninety (90) days of the above-described notice, the Company shall have the option to either (i) redeem all Atreca Preferred Stock held by the Foundation and any Common Stock held by the Foundation issued upon conversion of the Atreca Preferred Stock, as applicable (collectively, the "***Foundation's Holdings***"), provided that such redemption shall be made only to the extent permitted by applicable law, or (ii) locate a third party that will purchase the Foundation's Holdings. In the event of a Charitability Default, the Foundation and Foundation-Supported Entities will also be provided with nonexclusive access (including any necessary licenses to relevant intellectual property) to the Platform Technology sufficient to enable the Foundation and Foundation-Supported Entities to practice the Platform Technology for the pursuit of the Global Access Objectives. Such access shall include, but not be limited to, access contemplated in this Letter Agreement sufficient for the Foundation or Foundation-Supported Entities to complete the Services that the Company agreed to perform under a grant or contract previously entered into between the Company and the Foundation or Foundation Supported Entity. Such access to and permissions to practice the Platform Technology shall be accomplished without any delay or hindrance by the Company (regardless of whether or not the provision of the Services had been started). The Foundation will continue to have the other rights set forth in this Letter Agreement (e.g., use of the results of the Services in accordance with Section 3.a.ii.). If the Company is unable to redeem all of the Foundation's Holdings, and no third party purchases the Foundation's Holdings, then the Company shall use its best efforts to effect the Withdrawal Right, consistent with the Code and applicable law (e.g., solvency requirements). Upon the transfer of any of the Foundation's Holdings to any one or more transferees that are tax-exempt organizations as described in Section 501(c)(3) of the Code, the Foundation may assign to any such transferee all of its rights attached to such Foundation's Holdings.

For redemption or purchase by a third party, the Foundation's Holdings shall be valued at the greater of [*] or, if an appraisal is elected by the Foundation, the then current fair market value of the Foundation Holdings as determined by a mutually agreed upon (such agreement not unreasonably withheld) independent third-party appraiser. [*].

If the Foundation's Holdings are sold or redeemed due to a Charitability Default, commencing upon the date of such sale or redemption, the Foundation will have two-year lookback rights by which, in the event of a sale of all or substantially all of the shares of the Company, or a sale of all or substantially all of its assets or a public offering of the Company that results in cash proceeds representing a valuation for the Company in excess of [*]% of the valuation used for the sale or

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redemption of the Foundation's Holdings, the Foundation will receive compensation commensurate with its converted equity interest in the Company had the Charitability Default not occurred.

7. Exclusive License by Stanford to the Company and Provision for Benefit of Foundation

The Company has provided language acceptable to the Foundation in the exclusive license from Stanford in the event that license is terminated for any reason. Such language provides the Foundation continued nonexclusive access to the patent or patents licensed to the Company by Stanford relating to the Platform Technology on terms consistent with the global access requirements of the Foundation. Moreover, the Company further agrees, in the event of a termination of the Stanford license, to enter into a license to provide the Foundation, consistent with the Foundation's rights in the territories as set forth in this letter, non-exclusive access to the Company proprietary information (including software in source code and executable formats) sufficient to allow the Foundation (or any entity it would identify for this purpose) to most directly and efficiently utilize the patent or patents previously licensed to the Company by Stanford relating to the Platform Technology as of the date of the termination of the Stanford license.

8. Term.

This Letter Agreement shall become effective as of the Effective Date (as defined below) and shall expire as of the Patent Expiration Date of the Atreca Platform Technology, unless sooner terminated by mutual written agreement between the Company and the Foundation.

9. Required Reporting and Inspection Rights.

In addition to any and all reports required to be delivered to the Foundation under the Investment Documents, the Company shall furnish, or cause to be furnished, to the Foundation the following reports and certifications:

a. within ninety days after the end of the Company's fiscal year during which the Foundation owns any portion of the Foundation's Holdings, a certificate from the Company signed by an officer or director of the Company and substantially in the form attached to this Letter Agreement, certifying that the requirements of the BMGF Investment were met during the immediately preceding fiscal year, describing the use of the proceeds of the BMGF Investment, and evaluating the Company's progress toward achieving the purposes of the BMGF Investment including, specifically, information regarding progress against the Global Access Commitments;

b. within ninety days after the end of the Company's fiscal year during which the Foundation ceases to own any portion of the Foundation's Holdings, a certificate from the Company signed by an officer or director of the Company and substantially in the form attached to this Letter Agreement, certifying that the requirements of the BMGF Investment were met during the term of the BMGF Investment, describing the use of the proceeds of the BMGF Investment, and evaluating the Company's progress toward achieving the purposes of the BMGF Investment including, specifically, information regarding progress against the Global Access Commitments;

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c. any other information respecting the operations, activities and financial condition of the Company as the Foundation may from time to time request to discharge any expenditure responsibility, within the meaning of Sections 4945(d)(4) and 4945(h) of the Code, of the Foundation with respect to the BMGF Investment, and to otherwise monitor the charitable benefits intended to be served by the BMGF Investment (which shall be at the Foundation's expense);

d. (i) within one hundred eighty days after the end of each fiscal year of the Company, the Company shall provide to the Foundation a balance sheet, income statement and statement of cash flows for such preceding fiscal year, all in reasonable detail and audited by independent certified public accountants selected by the Company ("***Company's Accountants***"), and such financial statements shall be accompanied by a report and opinion thereon by the Company's Accountants; (ii) within ninety days after the end of each fiscal year of the Company, the Company shall provide to the Foundation an unaudited balance sheet, income statement and statement of cash flows for such preceding fiscal year as prepared in accordance with generally accepted accounting principles; and (iii) within forty-five days after the end of each fiscal quarter of the Company, the Company shall provide to the Foundation an unaudited balance sheet, income statement and statement of cash flows for such quarter as prepared in accordance with generally accepted accounting principles; *provided, however*, that if the Company merges with, is acquired by or becomes, a reporting company under the Securities Exchange Act of 1934, as amended, the filing of quarterly and annual reports with the S.E.C. shall be deemed to satisfy the financial reporting obligations pursuant to this Section 3.d; *and provided further that* if, for any period, the Company has any subsidiary whose accounts are consolidated with those of the Company, then in respect of such period the financial statements delivered pursuant to the foregoing sections shall be the consolidated and consolidating financial statements of the Company and all such consolidated subsidiaries;

e. at least thirty days prior to the end of each fiscal year, a budget and business plan for the next fiscal year, approved by the Board of Directors of the Company, and prepared on a monthly basis, including balance sheets, income statements, and statements of cash flow for such months and, promptly after prepared, any other budgets or revised budgets prepared by the Company;

f. such other information relating to the financial condition, business, prospects, or corporate affairs of the Company as the Foundation may from time to time reasonably request; *provided, however*, that the Company shall not be obligated under this Section 3.f to provide information (i) that the Company reasonably determines in good faith to be a trade secret; or (ii) the disclosure of which would adversely affect the attorney-client privilege between the Company and its counsel; and

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g. all information, including the terms and conditions, in this Letter Agreement and provided in the future with respect to the commitments and performance of the Company hereunder shall be treated as confidential information and subject to the Mutual Nondisclosure Agreement dated March 18, 2012; *provided that* at all times the Foundation shall be permitted to disclose such information as may be required to satisfy its reporting requirements under the Code.

10. Access to Records and Facilities.

The Company shall maintain books and records adequate to provide the information ordinarily required by commercial investors under similar circumstances, and provide the Foundation access to such books and records. Such reports shall be maintained for four years after the BMGF Investment has terminated. The Company shall permit the Foundation, at the Foundation's expense and in connection with its rights under this Letter Agreement, to visit and inspect the Company's properties; examine its books of account and records; and discuss the Company's affairs, finances, and accounts with its officers, during normal business hours of the Company as may be reasonably requested by the Foundation.

11. Public Reports.

The Foundation may include information about the Company in its periodic public reports to the extent such information is not confidential. The Company may include information about the Foundation in its periodic reports to the extent such information is not confidential, provided that if such disclosure is required by law, rule, regulation or administrative process, such confidentiality shall not prevent the Company from disclosing such information (solely to the extent required by such law, rule, regulation or administrative process).

12. Prohibited Uses.

The Company shall not expend any proceeds of the BMGF Investment to carry on propaganda or otherwise to attempt to influence legislation, to influence the outcome of any specific public election or to carry on, directly or indirectly, any voter registration drive, or to participate or intervene in any political campaign on behalf of or in opposition to any candidate for public office within the meaning of Section 4945(d) of the Code. The proceeds of the BMGF Investment shall not (i) be earmarked to be used for any activity, appearance or communication associated with the activities described in the foregoing sentence nor (ii) be intended for benefit, and will not benefit, any person having a personal or private interest in the Foundation, including without limitation, descendants of the founders of the Foundation, or persons related to or controlled by, directly or indirectly, such private interests.

13. Disqualified Person.

Neither the Company nor (to the best knowledge of the Company) any shareholder of the Company is a "disqualified person" with respect to the Foundation (as the term "disqualified person" is defined in Section 4946(a) of the Code). The Foundation does not, and one or more disqualified persons with respect to the Foundation do not, directly or indirectly, control the Company.

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14. Promotion of Terrorist Activities.

In compliance with the provisions of the Patriot Act and Executive Order 13224, the Company represents that it will not promote or support terrorist activities and that it will not provide any proceeds of the BMGF Investment to any entity or individual that promotes or engages in such activities.

15. Use of Name.

Except as permitted in Section 9 of this Letter Agreement (including, without limitation, Section 9.g.), any announcement of the Foundation's investment by any of the Foundation, the Company or any of their respective representatives, directors, trustees, officers, stockholders, agents, investors, employees, partners or members of either the Foundation or the Company, as applicable, will require the prior written approval of both the Foundation and the Company. Prior written approval of the Foundation shall be required for any use of the Foundation's name or logo in any respect; provided, however, that the Company may use the Foundation's name for any uses that have been pre-approved in writing by the Foundation. Notwithstanding the foregoing, the Foundation's name and logo will not be used by any party in any manner to market, sell or otherwise promote the Company, its products, services and/or business.

Prior written approval of the Company shall be required for any use of the Company's name or logo in any respect; provided, however, that the Foundation may use the Company's name for any uses that have been pre-approved in writing by the Company; provided further that disclosures permitted under Section 9 of this Letter Agreement (including without limitation Section 9.g.) shall be deemed to be pre-approved. Notwithstanding the foregoing, the Company's name and logo will not be used by any party in any manner to market, sell or otherwise promote the Foundation, its products, services and/or business. Notwithstanding the terms of this Section 15 or any other provisions of this Letter Agreement, either party may disclose any information to the extent required to comply with any applicable law, rule, regulation, court order, or demand or order of a governmental body with competent jurisdiction.

16. Entire Agreement; Modification.

The terms and conditions set forth in this Letter Agreement are in addition to the provisions stated in the Investment Documents. No change, modification or waiver of any term or condition of this Letter Agreement shall be valid unless it is in writing, it is signed by the party to be bound, and it expressly refers to this Letter Agreement. The Company will not take any action or enter into any agreement or arrangement that is reasonably likely to prohibit, restrict or limit the Company from honoring the rights of the Foundation, or the obligations or commitments of the Company, under this Letter Agreement or any other Investment Document.

17. Authority.

Each of the signatories below covenants, represents and warrants that he, she or it had all authority necessary to execute this Letter Agreement and that, on execution, this Letter Agreement will be fully binding and enforceable in accordance with its terms, and that no other consents or approvals of any other person or third parties are required or necessary for this Letter Agreement to be so binding.

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18. Charitability Opinion.

As a condition to making the New Cash Investment, the Foundation must obtain a written legal opinion from its outside special tax counsel (to be provided at the Foundation's expense), that the Investment will qualify as a program-related investment under the Code.

19. Additional Company Representations and Warranties.

The Company hereby represents and warrants to the Foundation that, as of the date of this Letter Agreement, the representations and warranties set forth in Section 3 of the Purchase Agreement are true and correct in all material respects as of the date hereof, except to extent of any disclosures by the Company as set forth in the Schedule of Exceptions delivered by the Company in connection with the Closing (as defined in the Purchase Agreement) or in the Schedules attached hereto. In addition, except as set forth in the Schedules attached hereto, the Company hereby represents and warrants to the Foundation, as of the date hereof, as follows:

a. Changes. Since the Statement Date (as defined in the Purchase Agreement), there has not been:

i. any material change to a material contract or agreement by which the Company or any of its assets is bound or subject;

ii. any (x) material change in any compensation arrangement or agreement with any employee, officer, director or stockholder or (y) resignation or termination of employment of any officer or key employee of the Company; or (z) loans or guarantees made by the Company to or for the benefit of its employees, officers or directors, or any members of their immediate families, other than travel advances and other advances made in the ordinary course of its business;

iii. any mortgage, pledge, transfer of a security interest in, or lien, created by the Company, with respect to any of its material properties or assets, except liens for taxes not yet due or payable and liens that arise in the ordinary course of business and do not materially impair the Company's ownership or use of such property or assets;

iv. other than repurchases of Common Stock that are unvested or exercises by the Company of its right of first refusal (each, a "***Permitted Distribution***"), any declaration, setting aside or payment or other distribution in respect of any of the Company's capital stock, or any direct or indirect redemption, purchase, or other acquisition of any of such stock by the Company;

v. receipt of notice that there has been a loss of, or material order cancellation by, any major customer of the Company; or

vi. any arrangement or commitment by the Company to do any of the things described in this Section 19.a.

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b. Agreements; Actions.

i. Except for the Related Agreements (as defined in the Purchase Agreement) or as described in the Memorandum (as defined in the Purchase Agreement), there are no agreements, understandings, instruments, contracts or proposed transactions to which the Company is a party or by which it is bound that involve (A) obligations (contingent or otherwise) of, or payments to, the Company in excess of $500,000, or (B) the grant of rights to manufacture, produce, assemble, license, market, or sell its products to any other person that limit the Company's exclusive right to develop, manufacture, assemble, distribute, market or sell its products.

ii. Since the Statement Date, the Company has not (A) declared or paid any dividends, or authorized or made any distribution upon or with respect to any class or series of its capital stock in each case other than any Permitted Distribution, (B) made any loans or advances to any person, other than ordinary advances for travel expenses, or (C) other than in the ordinary course of business sold, exchanged or otherwise disposed of any of its assets or rights the sale, exchange or other disposition of which would have or would reasonably be likely to have a Material Adverse Effect.

iii. The Company is not a guarantor or indemnitor of any indebtedness of any other person.

c. Employees.

To its knowledge, the Company has complied in all material respects with all applicable state and federal equal employment opportunity laws and with other laws related to employment, including those related to wages, hours, worker classification and collective bargaining. Except as required by law, upon termination of the employment of any such employees, no severance or other payments will become due.

d. Foreign Corrupt Practices Act. Neither the Company nor, to its knowledge, any of the Company's directors, officers, employees or agents have, directly or, to the Company's knowledge, indirectly, made, offered, promised or authorized any payment or gift of any money or anything of value to or for the benefit of any "foreign official" (as such term is defined in the U.S. Foreign Corrupt Practices Act of 1977, as amended (the "***FCPA***")), foreign political party or official thereof or candidate for foreign political office for the purpose of (i) influencing any official act or decision of such official, party or candidate, (ii) inducing such official, party or candidate to use his, her or its influence to affect any act or decision of a foreign governmental authority, or (iii) securing any improper advantage, in the case of (i), (ii) and (iii) above in order to assist the Company or any of its affiliates in obtaining or retaining business for or with, or directing business to, any person. Neither the Company nor, to the Company's knowledge, any of its directors, officers, employees or agents have made or, to the Company's knowledge, authorized any

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bribe, rebate, payoff, influence payment, kickback or other unlawful payment of funds or received or retained any funds in violation of any law, rule or regulation. To the Company's knowledge, neither the Company nor any of its officers, directors or employees is the subject of any allegation, voluntary disclosure, investigation, prosecution or other enforcement action related to the FCPA or any other anti-corruption law.

For purposes of this Section 19, "Company" shall include the Company's wholly-owned subsidiary, Atreca Pte. Ltd, a limited company organized under the laws of Singapore.

20. Counterparts.

This Letter Agreement may be executed in one or more counterparts, each of which shall be deemed an original, but all of which shall be deemed to be and constitute one and the same instrument.

[Signature Page to Follow]

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IN WITNESS WHEREOF, the parties have caused to be executed this Letter Agreement effective as of the date first set forth above (the "***Effective Date***").

Atreca, Inc.	Bill & Melinda Gates Foundation
By: /s/ Tito A. Serafini	By:
Name: Tito A. Serafini	Name:
Title: President and Chief Executive Officer	Title:

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IN WITNESS WHEREOF, the parties have caused to be executed this Letter Agreement effective as of the date first set forth above (the "***Effective Date***").

Atreca, Inc.	Bill & Melinda Gates Foundation
By: _____	By: /s/ Jim Bromley
Name: _____	Name: Jim Bromley
Title: _____	Title: Chief Financial Officer

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Appendix I

Developing World

The following 74 countries shall be included in the definition of Developing World, all of which (except for South Africa and Thailand) are eligible for support from GAVI as of the date of this Letter Agreement.

- Afghanistan
- Angola
- Armenia
- Azerbaijan
- Bangladesh
- Benin
- Bhutan
- Bolivia
- Burkina Faso
- Burundi
- Cambodia
- Cameroon
- Central African Republic
- Chad
- Comoros
- Congo
- Congo, Dem Republic of
- Cote d'Ivoire
- Djibouti
- Eritrea
- Ethiopia
- Gambia
- Georgia
- Ghana
- Guinea
- Guinea-Bissau
- Guyana
- Haiti
- Honduras
- India
- Indonesia
- Kenya
- Kiribati
- Korea, DPR
- Kyrgyz Republic
- Lao PDR
- Lesotho
- Liberia
- Madagascar
- Malawi
- Mali
- Mauritania
- Moldova
- Mongolia
- Mozambique
- Myanmar
- Nepal
- Nicaragua
- Niger
- Nigeria
- Pakistan
- Papua New Guinea
- Rwanda
- Sao Tome e Principe
- Senegal
- Sierra Leone
- Solomon Islands
- Somalia
- South Africa
- Sri Lanka
- Sudan
- Thailand
- Tajikistan
- Tanzania
- Timor Leste
- Togo
- Uganda
- Ukraine
- Uzbekistan
- VietNam
- Yemen
- Zambia
- Zimbabwe

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Appendix II

Disease Access Rights

Disease(s)	Therapeutic/Prophylactic		Vaccine (Antigen)	Diagnostics
	Monoclonal/ Protein	Vector/ Nucleic Acid Based		
Group 1	Y	Y	Y	Y
Group 2	Y	Y	Y	Y
Group 3		Y	Y	Y

Exhibit 10.15

CERTAIN CONFIDENTIAL INFORMATION CONTAINED IN THIS DOCUMENT , MARKED BY [*], HAS BEEN OMITTED BECAUSE IT IS NOT MATERIAL AND WOULD LIKELY CAUSE COMPETITIVE HARM TO ATRECA, INC. IF PUBLICLY DISCLOSED.

Execution Version

NOMINATING AGREEMENT

THIS NOMINATING AGREEMENT (this "**Agreement**"), dated as of September 5, 2018, by and among Atreca, Inc., a Delaware corporation (the "**Company**"), Baker Brothers Life Sciences, L.P. ("**BBLS**") and 667, L.P. (together with BBLS, the "**Investor**").

WHEREAS, the Company and the Investor are parties to that certain Series C Preferred Stock Purchase Agreement of even date herewith (the "**Purchase Agreement**");

WHEREAS, in order to induce the Investor to invest funds in the Company pursuant to the Purchase Agreement, the Investor and the Company hereby agree that this Agreement shall set forth certain rights and obligations with respect to the shares of the Company's capital stock beneficially owned by the Investor.

NOW, THEREFORE, for good and valuable consideration, the receipt and adequacy of which are hereby acknowledged, the parties hereto, intending to be legally bound, hereby agree as follows:

1. Definitions. As used in this Agreement, the following terms shall have the following respective meanings:

(a) "**Affiliate**" has the meaning given to that term in Rule 12b-2 under the Securities Exchange Act of 1934, as amended.

(b) "**Board of Directors**" means the Board of Directors of the Company.

(c) "**Bylaws**" means the Bylaws of the Company, as may be amended, restated or otherwise modified from time to time.

(d) "**Common Stock**" means shares of the Company's Common Stock, par value $0.0001 per share.

(e) "**IPO**" means the Company's first underwritten public offering of its Common Stock under the Securities Act of 1933, as amended.

2. Board Representation.

(a) Subject at all times to Sections 2(b) and 3(n) below, during the period beginning at the closing of the IPO until such time as the Investor and its Affiliates no longer beneficially own at least [*] shares of Common Stock (as adjusted for any stock dividends, combinations, splits, recapitalizations and the like with respect to such shares), the Company shall support the nomination of, and cause the Board of Directors to include in the slate of nominees recommended to the Company's stockholders for election as directors of the Company, two (2) persons designated at any time and from time to time by the Investor (each, an "**Investor Designee**"). In the event that an Investor Designee resigns his or her seat on the Board of Directors or is removed or otherwise fails to become or ceases to be a director for any reason, the vacancy will be filled by the election or appointment of another director nominated by the Investor as soon as reasonably practicable in compliance with applicable laws, rules and regulations. Investor will provide the Company, in writing, the information about each Investor Designee that is reasonably required by

applicable law for inclusion in the Company's proxy materials for meetings of stockholders promptly after the Company requests such information from the Investor, and will cause each Investor Designee to submit on a timely basis to the Company a completed and executed questionnaire in the form that the Company provides to its outside directors generally.

(b) Notwithstanding the provisions of Section 2(a), the Investor shall not be entitled to designate any person as a nominee to the Board of Directors if a majority of the disinterested members of the Board of Directors reasonably and in good faith determines, after consultation with the Company's outside legal counsel, that such person would not be qualified to serve as a director of the Company under any applicable law, rule or regulation, rule of the stock exchange on which the Company's shares are listed, the Bylaws or any policy or guidelines previously approved by the Board of Directors. The Company shall notify the Investor of any objection to an Investor Designee pursuant to this Section 2(b) sufficiently in advance of the date on which the proxy materials related to any such designee are to be mailed by the Company in connection with such election of directors so as to enable the Investor to propose a replacement Investor Designee in accordance with the terms of this Agreement.

(c) Subject at all times to Section 3(n) below and the other limitations set forth in this Section 2(c), during the period beginning at the closing of the IPO until such time as the Investor and its Affiliates no longer beneficially own at least [*] shares of Common Stock (as adjusted for any stock dividends, combinations, splits, recapitalizations and the like with respect to such shares), the Company shall invite two (2) designees of the Investor (each, an "**Observer**") to attend all meetings of the Board of Directors and each committee thereof in a nonvoting observer capacity. In this respect, the Company shall give each Observer copies of all notices, minutes, consents, and other materials that it provides to its directors at substantially the same time and in the same manner as provided to such directors; provided, however, that such Observer shall agree to hold in confidence and trust and to act in a fiduciary manner with respect to all information so provided; and provided, further, that the Company reserves the right to withhold any information and to exclude such Observer from any meeting or portion thereof if (i) the Board of Directors determines based upon the advice of outside counsel that access to such information or attendance at such meeting is reasonably likely to adversely affect the attorney-client privilege between the Company and its counsel, (ii) the Board of Directors determines that access to such information or attendance at such meeting is reasonably likely to result in a conflict of interest, (iii) the Board of Directors reasonably determines in good faith that such Observer or an Affiliate of such Observer is a competitor of the Company, (iv) to protect highly confidential information, or (v) for other similar reasons. With respect to any particular Observer, the Company's obligations under this Section 2(c) are contingent upon such Observer's (x) entering into a confidentiality agreement with the Company in a form that is reasonably acceptable to the Company and the Investor and (y) agreeing to be bound by the Company's insider trading and window policies then in effect and applicable to members of the Board of Directors. Additionally, the rights set forth in this Section 2(c) may only be exercised by the Investor at such time or times when no Investor Designee is on the Board of Directors.

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3. Miscellaneous.

(a) Governing Law. This Agreement shall be governed by and construed in accordance with the internal laws of the State of Delaware, without giving effect to its principles of conflicts of laws.

(b) Certain Adjustments. Subject to Section 3(n) below, the provisions of this Agreement shall apply to the full extent set forth herein with respect to any and all shares of capital stock of the Company or any successor or assign of the Company (whether by merger, consolidation, sale of assets or otherwise) that may be issued in respect of, in exchange for, or in substitution for the shares of Common Stock, by combination, recapitalization, reclassification, merger, consolidation or otherwise and the term "Common Stock" shall include all such other securities. In the event of any change in the capitalization of the Company, as a result of any stock split, stock dividend or stock combination or otherwise, the provisions of this Agreement shall be appropriately adjusted.

(c) Enforcement. The parties expressly agree that the provisions of this Agreement may be specifically enforced against each of the parties hereto in any court of competent jurisdiction.

(d) Successors and Assigns. Except as otherwise provided herein, the provisions hereof shall inure to the benefit of, and be binding upon, the successors, assigns, heirs, executors, and administrators of the parties hereto.

(e) Entire Agreement. This Agreement, the Bylaws and for so long as they remain in force, the Voting Agreement and the Letter Agreement (each as defined in the Purchase Agreement) constitutes the full and entire understanding and agreement between the parties with regard to the subject matter hereof and supersedes all prior oral or written (and all contemporaneous oral) agreements or understandings with respect to the subject matter hereof.

(f) All notices required or permitted under this Agreement must be in writing and sent to the address or facsimile number identified below. Notices must be given: (a) by personal delivery, with receipt acknowledged; (b) by facsimile followed by hard copy delivered by the methods under clause (c) or (d); (c) by prepaid certified or registered mail, return receipt requested; or (d) by prepaid reputable overnight delivery service. Notices shall be effective upon receipt. Either party may change its notice address by providing the other party written notice of such change. Notices shall be delivered as follows:

If to the Investor:	Baker Brothers Investments [PRIVATE ADDRESS]
If to the Company:	500 Saginaw Drive, First Floor Redwood City, CA 94063 Attention: John Orwin, Chief Executive Officer Email: jorwin@atreca.com
with a copy (which copy shall not constitute notice) to:	Cooley LLP 3175 Hanover Street

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Palo Alto, CA 94304
Attention: Danielle Naftulin, Esq.
Email: dnaftulin@cooley.com
Fax: (650) 849-7400

(g) Delays or Omissions. No delay or omission to exercise any right, power or remedy accruing to the Investor hereto upon any breach or default of the Company under this Agreement, shall impair any such right, power or remedy of the Investor nor shall it be construed to be a waiver of any such breach or default, or an acquiescence therein, or of or in any similar breach or default thereunder occurring; nor shall any waiver of any single breach or default be deemed a waiver of any other breach or default therefore or thereafter occurring. Any waiver, permit, consent or approval of any kind or character on the part of the Investor of any breach or default of the Company under this Agreement, or any waiver on the part of any party of any provisions or conditions of this Agreement, in each case, must be in writing and shall be effective only to the extent specifically set forth in such writing. All remedies, either under this Agreement, or by law or otherwise afforded to any party, shall be cumulative and not alternative.

(h) Counterparts. This Agreement may be executed in any number of counterparts (including by facsimile or other electronic means), each of which may be executed by less than all of the parties hereto, each of which shall be enforceable against the parties actually executing such counterparts, and all of which together shall constitute one instrument.

(i) Severability. If any provision of this Agreement shall be invalid, illegal or unenforceable, the validity, legality and enforceability of the remaining provisions shall not in any way be affected or impaired thereby.

(j) Amendments and Waivers. The provisions of this Agreement may be amended at any time and from time to time, and particular provisions of this Agreement may be waived or modified, with and only with an agreement or consent in writing signed by the Company and the Investor.

(k) Jurisdiction. The parties hereto irrevocably submit, in any legal action or proceeding relating to this Agreement, to the jurisdiction of the courts of the United States located in the State of Delaware or in any Delaware state court and consent that any such action or proceeding may be brought in such courts and waive any objection that they may now or hereafter have to the venue of such action or proceeding in any such court or that such action or proceeding was brought in an inconvenient forum.

(l) Further Assurances. The parties agree to use their best efforts and act in good faith in carrying out their obligations under this Agreement. The parties also agree, without further consideration, to execute such further instruments and to take such further actions as may be necessary or desirable to carry out the purposes and intent of this Agreement.

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(m) Enforcement. The parties expressly agree that the provisions of this Agreement may be specifically enforced against each of the parties hereto in any court of competent jurisdiction.

(n) Termination. This Agreement shall automatically terminate upon the earlier of (i) such time as the Investor and its Affiliates no longer beneficially own at least [*] shares of Common Stock (as adjusted for any stock dividends, combinations, splits, recapitalizations and the like with respect to such shares), or (ii) consummation of an Acquisition as defined in the Company's Amended and Restated Certificate of Incorporation as in effect on the date hereof.

[Remainder of page intentionally left blank]

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IN WITNESS WHEREOF, each of the parties hereto has executed this Nominating Agreement as of the date first above written.

ATRECA, INC.

By: /s/John Orwin
Name: John Orwin
Title: Chief Executive Officer

667, L.P.

BY: BAKER BROS. ADVISORS LP, management company and investment adviser to **667, L.P.**, pursuant to authority granted to it by Baker Biotech Capital, L.P., general partner to 667, L.P., and not as the general partner.

By:
Name: Scott Lessing
Title: President

BAKER BROTHERS LIFE SCIENCES, L.P.

By: BAKER BROS. ADVISORS LP, management company and investment adviser to **Baker Brothers Life Sciences, L.P**., pursuant to authority granted to it by Baker Brothers Life Sciences Capital, L.P., general partner to Baker Brothers Life Sciences, L.P., and not as the general partner.

By:
Name: Scott Lessing
Title: President

[*] = Certain confidential information contained in this document, marked by brackets, has been omitted pursuant to Rule 406 of the Securities Act of 1933, as amended.

IN WITNESS WHEREOF, each of the parties hereto has executed this Nominating Agreement as of the date first above written.

ATRECA, INC.

By: _____
Name: John Orwin
Title: Chief Executive Officer

667, L.P.

BY: BAKER BROS. ADVISORS LP, management company and investment adviser to **667, L.P.**, pursuant to authority granted to it by Baker Biotech Capital, L.P., general partner to 667, L.P., and not as the general partner.

By: /s/Scott Lessing
Name: Scott Lessing
Title: President

BAKER BROTHERS LIFE SCIENCES, L.P.

By: BAKER BROS. ADVISORS LP, management company and investment adviser to **Baker Brothers Life Sciences, L.P**., pursuant to authority granted to it by Baker Brothers Life Sciences Capital, L.P., general partner to Baker Brothers Life Sciences, L.P., and not as the general partner.

By: /s/Scott Lessing
Name: Scott Lessing
Title: President

CERTAIN CONFIDENTIAL INFORMATION CONTAINED IN THIS DOCUMENT , MARKED BY [*], HAS BEEN OMITTED BECAUSE IT IS NOT MATERIAL AND WOULD LIKELY CAUSE COMPETITIVE HARM TO ATRECA, INC. IF PUBLICLY DISCLOSED.

EXCLUSIVE (EQUITY) AGREEMENT

This Agreement between THE BOARD OF TRUSTEES OF THE LELAND STANFORD JUNIOR UNIVERSITY ("Stanford"), an institution of higher education having powers under the laws of the State of California, and Atreca ("Atreca"), a corporation having a principal place of business at 2703 Witheridge Road, Belmont, CA 94002-3340, is effective on the 28 day of June, 2012 ("Effective Date").

1 BACKGROUND

Stanford has an assignment of an invention entitled "Efficient isolation of human immunoglobulin genes," was invented in the laboratory of Dr. William Robinson, an employee of Stanford and the United States Department of Veterans Affairs ("VA"), and is described in Stanford Docket S10-409. The invention was made in the course of research supported by the National Institutes of Health. Stanford wants to have the invention perfected and marketed as soon as possible so that resulting products may be available for public use and benefit.

The invention is subject to a Cooperative Technology Administration Agreement between Stanford and the VA, effective September 1, 2000, that authorizes Stanford to exclusively manage certain inventions on behalf of both Stanford and the VA.

2 DEFINITIONS

2.1 "Developing Nations" means nonindustrialized poor countries that are seeking to develop their resources by industrialization. Such countries are outlined in the International Monetary Fund's World Economic Outlook Report, April 2011, which may be periodically updated.

2.2 "Exclusive" means that, subject to Articles 3 and 5, Stanford will not grant further licenses under the Licensed Patents in the Licensed Field of Use in the Licensed Territory.

2.3 "Licensed Field of Use" means all fields.

2.4 "Fully Diluted Basis" means the total number of shares of Atreca's issued and outstanding common stock, assuming:

(A) the conversion of all issued and outstanding securities convertible into common stock;

(B) the exercise of all issued and outstanding warrants or options, regardless of whether then exercisable; and

(C) the issuance, grant, and exercise of all securities reserved for issuance pursuant to any Atreca stock or stock option plan then in effect.

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2.5 "Indemnitees" means the VA, Stanford and Stanford Hospitals and Clinics, and their respective trustees, officers, employees, students, and agents.

2.6 "Licensed Patent" means Stanford and the VA's U.S. Patent Application, Serial Number 61/517,976 filed April 28, 2011 (the "Original Application"), Serial Number 61/575,652 filed August 24, 2011, Serial Number 61/599,870 filed February 16, 2012, Serial Number 61/608,571 filed March 8, 2012, Serial Number PCT/US2012/000221 filed April 27, 2012, and Serial Number 61/687,610 filed April 27, 2012, any foreign patent application corresponding thereto, and any divisional, continuation, or reexamination application, and each patent that issues or reissues from any of these patent applications. "Licensed Patent" includes Continuation-in-Part (CIP) patent applications but only to the extent they are filed within two years of the date of the first non-provisional application filed and only to the extent that they cover technology disclosed, claimed in and dominated by the Original Application. The Continuations-in-Part expressly do not include continuations-in-part that have different named inventors than the original application or that are the result of sponsored research or any other collaboration between Stanford and a third party pursuant to which such third party has rights to such invention.

2.7 "Licensed Product" means a product or part of a product in the Licensed Field of Use:

(A) the making, using, importing or selling of which, absent this license, infringes, induces infringement, or contributes to infringement of a Valid Claim of a Licensed Patent;

(B) which is made with, uses or incorporates any method covered under a Valid Claim of a Licensed Patent; or

(C) which is made with, uses or incorporates any Technology.

For purposes of clarity, Licensed Products include antibodies developed with or antigens identified using (i) methods and compositions claimed in the Licensed Patents or (ii) any Technology.

2.8 "Licensed Territory" means worldwide.

2.9 "Net Sales" means all gross revenue derived by Atreca or sublicensees from Licensed Product. Net Sales excludes the following items (but only as they pertain to the making, using, importing or selling of Licensed Products, are included in gross revenue, and are separately billed):

(A) import, export, excise and sales taxes, and custom duties;

(B) costs of insurance, packing, and transportation from the place of manufacture to the customer's premises or point of installation;

(C) costs of installation at the place of use;

(D) credit for returns, allowances, or trades; and

(E) quantity and cash discounts.

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2.10 "Nonroyalty Sublicensing Consideration" means any consideration received by Atreca from a sublicensee hereunder but excluding any consideration for:

(A) royalties on products sales (royalties on product sales by sublicensees will be treated as if Atreca made the sale of such product);

(B) investments in Atreca stock;

(C) the portion of payments (e.g. "access fees") utilized in an auditable fashion for research and development expenses calculated on a fully burdened basis incurred under the sublicense;

(D) research and development expenses calculated on a fully burdened basis and which are auditable as direct payments from sublicensee for such research and development expenses;

(E) fully reimbursed work on specific projects for not-for-profit foundations;

(F) debt; and

(G) reimbursement of out-of pocket patent prosecution and maintenance expenses for Licensed Patents.

Section 2.10 (C) does not apply until January 1, 2014.

2.11 "Sublicense" means any agreement between Atreca and a third party that contains a grant to Stanford's Licensed Patents regardless of the name given to the agreement by the parties; however, an agreement to make, have made, use or sell Licensed Products on behalf of Atreca is not considered a Sublicense.

2.12 "Technology" means that additional information or materials listed in Appendix D that will be provided by Stanford to Atreca. Technology may or may not be confidential in nature.

2.13 "Valid Claim" means (a) any claim of an issued and unexpired Licensed Patent which has not been held unenforceable or invalid by a court or other governmental agency of competent jurisdiction in an unappealed or unappealable decision, and which has not been disclaimed or admitted to be invalid or unenforceable through reissue or otherwise, or (b) a pending claim in a pending Licensed Patent application, provided that if such pending claim does not issue as a valid and enforceable claim within seven (7) years from its earliest priority date, such pending claim will cease to be a Valid Claim unless and until actually issued.

3 GRANT

3.1 **Grant.** Subject to the terms and conditions of this Agreement, Stanford grants Atreca a license under the Licensed Patent in the Licensed Field of Use to make, have made, use, import, offer to sell and sell Licensed Product in the Licensed Territory.

3.2 **Exclusivity.** The license is Exclusive, including the right to Sublicense under Article 4, in the Licensed Field of Use beginning on the Effective Date and ending on:

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(A) June 28, 2018 for research kits and reagents; and

(B) the last to expire of Licensed Patents for the rest of the Licensed Field of Use.

For 3.2 (A), Atreca will have the opportunity to extend such exclusivity on research kits and reagents upon written request by Atreca and acceptance by Stanford. If the exclusivity is not extended, then the license on research kits and reagents will become non-exclusive six years from the Effective Date.

3.3 **Retained Rights.** Stanford retains the right, on behalf of itself and all other non-profit research institutions, to practice the Licensed Patent and use Technology for any non-profit purpose, including sponsored research and collaborations. Atreca agrees that, notwithstanding any other provision of this Agreement, it has no right to enforce the Licensed Patent against any such institution. Stanford and any such other institution have the right to publish any information included in the Technology or a Licensed Patent.

3.4 **Specific Exclusion.** Stanford does not:

(A) grant to Atreca any other licenses, implied or otherwise, to any patents or other rights of Stanford or the VA other than those rights granted under Licensed Patent, regardless of whether the patents or other rights are dominant or subordinate to any Licensed Patent, or are required to exploit any Licensed Patent or Technology;

(B) commit to Atreca to bring suit against third parties for infringement, except as described in Article 14; and

(C) agree to furnish to Atreca any technology or technological information other than the Technology or to provide Atreca with any assistance.

4 SUBLICENSING

4.1 **Permitted Sublicensing.** Atreca may grant Sublicenses in the Exclusive Licensed Field of Use only during the Exclusive term and only if Atreca is developing or selling Licensed Products. Sublicenses with any exclusivity must include diligence requirements commensurate with the diligence requirements of Appendix A.

4.2 **Required Sublicensing.** If Atreca is unable or unwilling to serve or develop a potential market or market territory for which there is a company willing to be a sublicensee, Atreca will, at Stanford's request, negotiate in good faith a Sublicense with any such company. Stanford would like licensees to address unmet needs, such as those of neglected patient populations or geographic areas, giving particular attention to improved therapeutics, diagnostics and technologies for the developing world.

4.3 **Sublicense Requirements.** Any Sublicense:

(A) is subject to this Agreement;

(B) will reflect that any sublicensee will not further Sublicense;

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(C) will prohibit sublicensee from paying royalties to an escrow or other similar account;

(D) will expressly include the provisions of Articles 8, 9, and 10 for the benefit of Stanford;

(E) will include the provisions of Section 4.4 and require the transfer of all the sublicensee's obligations to Atreca, including the payment of royalties specified in the Sublicense, to Stanford or its designee, if this Agreement is terminated. If the sublicensee is a spin-out from Atreca, Atreca must guarantee the sublicensee's performance with respect to the payment of Stanford's share of Sublicense royalties.

4.4 **Litigation by Sublicensee.** Any Sublicense must include the following clauses:

(A) In the event sublicensee brings an action seeking to invalidate any Licensed Patent:

(1) sublicensee will double the payment paid to Atreca during the pendency of such action. Moreover, should the outcome of such action determine that any claim of a patent challenged by the sublicensee is both valid and infringed by a Licensed Product, sublicensee will pay triple times the payment paid under the original Sublicense;

(2) sublicensee will have no right to recoup any royalties paid before or during the period challenge;

(3) any dispute regarding the validity of any Licensed Patent shall be litigated in the courts located in Santa Clara County, and the parties agree not to challenge personal jurisdiction in that forum;

(4) sublicensee shall not pay royalties into any escrow or other similar account.

(B) Sublicensee will provide written notice to Stanford at least three months prior to bringing an action seeking to invalidate a Licensed Patent. Sublicensee will include with such written notice an identification of all prior art it believes invalidates any claim of the Licensed Patent.

4.5 **Copy of Sublicenses.** Atreca will submit to Stanford a copy of each Sublicense. Stanford has the right to receive all copies of sublicensees' royalty reports upon written request to Atreca.

4.6 **Sharing of Sublicensing Income.** Atreca will pay to Stanford a portion of all Nonroyalty Sublicensing Consideration for the sublicense of Licensed Patents and Technology, as provided below:

(A) [*]% of Nonroyalty Sublicensing Consideration for the first $[*] total Atreca receives from sublicensees in 2012 and 2013. Thereafter, Atreca will pay to Stanford [*]% of Nonroyalty Sublicensing Consideration for any sublicense signed in 2012, 2013, 2014 or 2015;

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(B) [*]% of Nonroyalty Sublicensing Consideration if sublicensed anytime thereafter.

4.7 **Royalty-Free Sublicenses.** If Atreca pays all royalties due Stanford from a sublicensee's Net Sales, Atreca may grant that sublicensee a royalty-free or non-cash:

(A) Sublicense or

(B) cross-license.

5 GOVERNMENT RIGHTS

5.1 This Agreement is subject to Title 35 Sections 200-204 of the United States Code. Among other, things, these provisions provide the United States Government with nonexclusive rights in the Licensed Patent. They also impose the obligation that Licensed Product sold or produced in the United States be "manufactured substantially in the United States." Atreca will ensure all obligations of these provisions are met.

5.2 The United States Government shall have the nonexclusive, nontransferable, irrevocable, royalty-free, paid-up right to practice or have practiced the Licensed Patent throughout the world by or on behalf of the United States Government and on behalf of any foreign government or international organization pursuant to any existing or future treaty or agreement to which the United States Government is a signatory.

5.3 Atreca certifies that Atreca is in good standing to do business with the federal government regarding debarment, suspension, proposed debarment or other matters rendering them ineligible.

6 DILIGENCE

6.1 **Milestones.** Because the invention is not yet commercially viable as of the Effective Date. Atreca will diligently develop, manufacture, and sell Licensed Product and will diligently develop markets for Licensed Product. In addition, Atreca will meet the milestones shown in Appendix A, and notify Stanford in writing as each milestone is met.

6.2 **Progress Report.** By March 1 of each year, Atreca will submit a written annual report to Stanford covering the preceding calendar year. The report will include information sufficient to enable Stanford to satisfy reporting requirements of the U.S. Government and for Stanford to ascertain progress by Atreca toward meeting this Agreement's diligence requirements. Each report will describe, where relevant: Atreca's progress toward commercialization of Licensed Product, including work completed, key scientific discoveries, summary of work-in-progress, current schedule of anticipated events or milestones, market plans for introduction of Licensed Product, and significant corporate transactions involving Licensed Product.

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6.3 **Clinical Trial Notice.** Atreca will notify Stanford prior to commencing any clinical trials at Stanford.

7 ROYALTIES

7.1 **Issue Royalty.** Atreca will pay to Stanford a noncreditable, nonrefundable license issue royalty of $[*], $[*] of which is due upon signing this Agreement and $[*] of which is due by December 31, 2012.

7.2 **Equity Interest.** As further consideration, Atreca will grant to Stanford [*] shares of common stock in Atreca. When issued, those shares will represent [*]% of the capital stock of Atreca on a Fully Diluted Basis, calculated immediately after such issuance. Concurrently with the execution of this Agreement, Atreca agrees to provide Stanford with a capitalization table setting forth the fully-diluted capitalization of Atreca as of immediately after such issuance. Atreca will issue [*]% of all shares granted to Stanford pursuant to this Section 7.2 and Section 7.3 directly to and in the name of the inventors listed below allocated as stated below:

William Robinson — [*]

Jeremy Sokolove — [*]

Yann Chong Tan — [*]

7.3 **Anti-Dilution Protection.** Upon the consummation of the First Round (as defined below), Atreca will issue Stanford, without further consideration, an additional number of shares of common stock as is necessary to ensure that, immediately following the consummation of the First Round, the number of shares issued Stanford (including the shares issued to the individuals set forth above) pursuant to Section 7.2 and this Section 7.3 (excluding any shares of capital stock purchased by Stanford in the First Round pursuant to Section 7.4 or otherwise) represents 2.0% of the shares issued and outstanding on an immediately post-First Round, Fully-Diluted Basis. The “First Round” means a bona fide round of equity, warrant, option or convertible equity financing of Atreca in which such securities (in any combination) are issued (in any number of closings) by Atreca in exchange for cash and/or the conversion of outstanding indebtedness in the aggregate amount of at least $5,000,000 or, if sooner, the execution of a Note Purchase Agreement with the Bill and Melinda Gates Foundation for the sale of convertible promissory notes. This right will expire upon the issuance of all shares to be issued in connection with such First Round, but will apply to all shares to be issued in or in connection with such First Round.

7.4 **10% Purchase Right.** In any private offering of Atreca’s equity securities (or securities convertible into or exercisable for Atreca’s equity securities, but excluding the issuance of up to six million U.S. dollars ($6,000,000.00) in convertible notes to the Bill and Melinda Gates Foundation pursuant to a Note Purchase Agreement entered into on or about the date of this Agreement) for cash (or in satisfaction of debt issued for cash) having its final closing held on or after the date of this Agreement, Stanford may purchase for cash up to 10% of the

securities issued in such offering. This right will expire following the first round of bona fide equity investment in Atreca from a single investor or group of investors that includes at least one venture capital, professional angel, not-for-profit foundation, corporate or other similar institutional investor (other than Stanford) and that either (i) is at least $2,500,000 in size or (ii) involves the sale to outside investors of at least 25% of the shares outstanding after such round on a Fully-Diluted Basis, but will apply to all shares to be issued in such round. For the avoidance of doubt, any securities Stanford may acquire or have the right to acquire under Section 7.3 shall not reduce the number of securities Stanford may purchase under this Section 7.4.

7.5 **Future Offerings; Limitation on Right to Purchase.** In any private offering of Atreca's equity securities (or securities convertible into or exercisable for Atreca's equity securities) in exchange for cash (or in satisfaction of debt issued for cash), Stanford may purchase for cash that number of the securities issued in such offering as is necessary for Stanford to maintain its pro rata ownership interest in Atreca on a Fully-Diluted Basis. For the avoidance of doubt: (i) any securities Stanford may acquire or have the right to acquire under Section 7.3 shall not reduce the number of securities Stanford may purchase under this Section 7.5; (ii) if both Section 7.4 and this Section 7.5 apply to an offering, the provision granting Stanford the superior rights will govern; and (iii) Stanford shall not be obligated to purchase under Section 7.4 or 7.5 any Atreca securities it has the right to acquire under Section 7.3.

7.6 **Purchase Terms and Procedures; Financial Information; Notices.**

(A) In any offering subject to Section 7.4 or 7.5:

(1) Atreca will give Stanford notice of the terms of the offering, including: (i) the names of the investors, the allocation of shares among them and the total amounts to be invested by each of them in such offering; (ii) pre- and post- (projected) financing capitalization table; (iii) investor presentation (if available); (iv) an introduction to the lead investor in such offering for the purpose of discussing the lead investor's due diligence process; and (v) such other documents and information as Stanford may reasonably request for the purpose of making an investment decision or verifying the number of shares it is entitled to purchase in such offering;

(2) Stanford's purchase right shall be on the same terms as the other investors in such offering, except that Stanford shall not be required to enter into any investor rights or similar agreement unless such agreement: (i) provides Stanford with rights no less favorable than those granted to any other investor that is a party to any such agreement with Atreca, regardless of the number of Atreca shares held by Stanford; (ii) provides that any registration rights granted to investors apply to both common and preferred stock held by Stanford; (iii) provides Stanford with rights no less favorable than those set forth in Sections 7.3 through and including Section 7.7; and (iv)

provides that no amendment to the rights specified in the preceding clauses (i), (ii) and (iii) will be effective without Stanford's written consent;

(3) Stanford may elect to exercise its right of purchase, in whole or in part, by notice given to Atreca within 15 Stanford business days (i.e., days other than Saturdays, Sundays, and holidays or other days on which Stanford is officially closed) after receipt of Atreca's notice; and

(4) If Stanford elects not to purchase, or fails to give an election notice within such period, Stanford's purchase right will not apply to the offering if (and only if and to the extent) it is consummated within 90 days on the same or less favorable (to the investor) terms as stated in Atreca's notice to Stanford.

(B) If there is a conflict between the terms of this Agreement and those of any Atreca investor rights or similar agreement to which Stanford is a party, this Agreement will prevail.

(C) Stanford's rights under Sections 7.4 and 7.5 will not apply to the issuance of stock: (i) to employees, advisors and other service providers pursuant to a plan approved by Company's Board of Directors; (ii) in connection with merger, consolidation, acquisition or other similar business combination, (iii) as additional consideration in lending or leasing transactions; (iv) in an offering made to one or more corporate strategic partners (excluding offerings to the venture capital or seed financing arms of such companies), which offering is for the principal purpose of forming a strategic relationship with the Company for product research, development, or distribution; or (v) pursuant to a registration statement filed under the Securities Act or 1933, as amended.

(D) In the event of the closing of a firm commitment underwritten public offering of Atreca's common stock, the rights granted in Sections 7.4 and 7.5 will terminate (in addition to any earlier termination pursuant to their terms) immediately before such closing.

(E) Atreca shall furnish to Stanford, as promptly as reasonably practicable, Atreca's annual financial statements and annual operating plan, including an annual report of the holders of Atreca's capital stock and other securities, and such other information as Stanford may reasonably request from time to time for the purpose of valuing its interest in Atreca.

(F) Notwithstanding any notice provision in this Agreement to the contrary, any notice given under this Agreement that refers or relates to any of Section 7.3 through and including Section 7.7 shall be copied concurrently to pvfnotices@stanford.edu; provided, however, that delivery of the copy will not by itself constitute notice for any purpose under this Agreement.

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7.7 **Repurchase Obligation.**

If Stanford is to conduct any clinical trial on behalf of Atreca or any agent of Atreca, Atreca will repurchase all Stanford's equity interest in Atreca (whether or not acquired pursuant to this Agreement) and Stanford's right to acquire Atreca securities under this Agreement will terminate upon the commencement of such trial. Atreca cannot begin any such trial until Stanford no longer holds any equity interest in Atreca. The repurchase price for any such equity interest will be the fair market value for that equity at the time Atreca and Stanford enter into a definitive agreement under which any such clinical research will be performed. Fair market value of publicly traded equity instruments will be determined by taking the average of the closing price for such equity over the five days preceding such date. Fair market value of non-public equity instruments will be at least as high as the greater of:

(A) the last value placed on any such equity in Atreca through an arms-length transaction regarding the issuance or sale of any equity in Atreca; or

(B) the last value placed on such equity by Atreca's Board of Directors in good faith in connection with any transaction purporting to value such equity at fair market value, other than this repurchase of shares from Stanford.

7.8 **License Maintenance Fee.** Beginning June 28, 2014 and each June 28 thereafter, Atreca will pay Stanford a yearly license maintenance fees as follows:

(A) $[*] on June 28, 2014 and June 28, 2015;

(B) $[*] each June 28 thereafter until the first commercial sale of a treatment Licensed Product;

(C) $[*] each June 28 thereafter.

Yearly maintenance payments are nonrefundable, but they are creditable each year as described in Section 7.12.

7.9 **Milestone Payments.** Atreca will pay Stanford the following milestone payments:

(A) $[*] upon [*] as a [*];

(B) $[*] upon [*] for a [*];

(C) $[*] upon [*];

(D) Thereafter, $[*] upon [*].

Milestones will not be due for Licensed Products in Developing Nations.

7.10 **Earned Royalty.** Atreca will pay Stanford earned royalties ([*]%) on Net Sales as follows:

(A) [*]% of Net Sales for [*];

[*] = Certain confidential information contained in this document, marked by brackets, has been omitted pursuant to Rule 406 of the Securities Act of 1933, as amended.

(B) [*]% of Net Sales for [*];

(C) [*]% of Net Sales for [*];

(D) [*]% of Net Sales for [*];

(E) [*]% of Net Sales for [*];

(F) [*]% of Net Sales for [*].

If the Licensed Product becomes non-exclusive for 7.10 (E), the amount due will be reduced by [*] ([*]%). Atreca will not receive any earned royalties from its work with the Bill and Melinda Gates Foundation, and therefore Stanford will also not receive any earned royalties from any Licensed Products that would otherwise fall under this Agreement.

7.11 **Earned Royalty if Atreca Challenges the Patent.** Notwithstanding the above, should Atreca bring an action seeking to invalidate any Licensed Patent, Atreca will pay royalties to Stanford at the rate of [*] percent ([*]%) of the Net Sales of all Licensed Products sold during the pendency of such action. Moreover, should the outcome of such action determine that any claim of a patent challenged by Atreca is both valid and infringed by a Licensed Product, Atreca will pay royalties at the rate of [*] percent ([*]%) of the Net Sales of all Licensed Products sold.

7.12 **Creditable Payments.** The license maintenance fee for a year may be offset against earned royalty payments due on Net Sales occurring in that year.

For example:

(A) if Atreca pays Stanford a $[*] maintenance payment for year Y, and
according to Section 7.10 $[*] in earned royalties are due Stanford for Net Sales in year Y, Atreca will only need to pay Stanford an additional

$[*] for that year's earned royalties.

(B) if Atreca pays Stanford a $[*] maintenance payment for year Y, and according to Section 7.10 $[*] in earned royalties are due Stanford for Net Sales in year Y, Atreca will not need to pay Stanford any earned royalty payment for that year. Atreca will not be able to offset the remaining $[*] against a future year's earned royalties.

7.13 **Obligation to Pay Royalties.** A royalty is due Stanford under this Agreement for any activity conducted under the licenses granted. For convenience's sake, the amount of that royalty is calculated using Net Sales. Nonetheless, if certain Licensed Products are made, used, imported, or offered for sale before the date this

Agreement terminates, and those Licensed Products are sold after the termination date, Atreca will pay Stanford an earned royalty for its exercise of rights based on the Net Sales of those Licensed Products.

7.14 **No Escrow.** Atreca shall not pay royalties into any escrow or other similar account.

7.15 **Currency.** Atreca will calculate the royalty on sales in currencies other than U.S. Dollars using the appropriate foreign exchange rate for the currency quoted by the Wall Street Journal on the close of business on the last banking day of each calendar quarter. Atreca will make royalty payments to Stanford in U.S. Dollars.

7.16 **Non-U.S. Taxes.** Atreca will pay all non-U.S. taxes related to royalty payments. These payments are not deductible from any payments due to Stanford.

7.17 **Interest.** Any payments not made when due will bear interest at the lower of (a) the Prime Rate published in the Wall Street Journal plus 200 basis points or (b) the maximum rate permitted by law.

8 ROYALTY REPORTS, PAYMENTS, AND ACCOUNTING

8.1 **Quarterly Earned Royalty Payment and Report.** Beginning with the first sale of a Licensed Product by Atreca or a sublicensee, Atreca will submit to Stanford a written report (even if there are no sales) and an earned royalty payment within 30 days after the end of each calendar quarter. This report will be in the form of Appendix B and will state the number, description, and aggregate Net Sales of Licensed Product during the completed calendar quarter. The report will include an overview of the process and documents relied upon to permit Stanford to understand how the earned royalties are calculated. With each report Atreca will include any earned royalty payment due Stanford for the completed calendar quarter (as calculated under Section 7.10).

8.2 **No Refund.** In the event that a validity or non-infringement challenge of a Licensed Patent brought by Atreca is successful, Atreca will have no right to recoup any royalties paid before or during the period challenge.

8.3 **Termination Report.** Atreca will pay to Stanford all applicable royalties and submit to Stanford a written report within 90 days after the license terminates. Atreca will continue to submit earned royalty payments and reports to Stanford after the license terminates, until all Licensed Products made or imported under the license have been sold.

8.4 **Accounting.** Atreca will maintain records showing manufacture, importation, sale, and use of a Licensed Product for 7 years from the date of sale of that Licensed Product. Records will include general-ledger records showing cash receipts and expenses, and records that include: production records, customers, invoices, serial numbers, and related information in sufficient detail to enable Stanford to determine the royalties payable under this Agreement.

8.5 **Audit by Stanford.** Atreca will allow Stanford or its designee to examine Atreca's records to verify payments made by Atreca under this Agreement.

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8.6 **Paying for Audit.** Stanford will pay for any audit done under Section 8.5. But if the audit reveals an underreporting of earned royalties due Stanford of 5% or more for the period being audited, Atreca will pay the audit costs.

8.7 **Self-audit.** Atreca will conduct an independent audit of sales and royalties at least every 2 years if annual sales of Licensed Product are over $5,000,000. The audit will address, at a minimum, the amount of gross sales by or on behalf of Atreca during the audit period, the amount of funds owed to Stanford under this Agreement, and whether the amount owed has been paid to Stanford and is reflected in the records of the Atreca. Atreca will submit the auditor's report promptly to Stanford upon completion. Atreca will pay for the entire cost of the audit.

9 EXCLUSIONS AND NEGATION OF WARRANTIES

9.1 **Negation of Warranties.** Stanford provides Atreca the rights granted in this Agreement AS IS and WITH ALL FAULTS. Stanford makes no representations and extends no warranties of any kind, either express or implied. Among other things, Stanford disclaims any express or implied warranty:

(A) of merchantability, of fitness for a particular purpose,

(B) of non-infringement or

(C) arising out of any course of dealing.

9.2 **No Representation of Licensed Patent.** Atreca also acknowledges that Stanford does not represent or warrant:

(A) the validity or scope of any Licensed Patent, or

(B) that the exploitation of Licensed Patent or Technology will be successful.

10 INDEMNITY

10.1 **Indemnification.** Atreca will indemnify, hold harmless, and defend all Stanford Indemnitees against any claim of any kind arising out of or related to the exercise of any rights granted Atreca under this Agreement or the breach of this Agreement by Atreca.

10.2 **No Indirect Liability.** Stanford is not liable for any special, consequential, lost profit, expectation, punitive or other indirect damages in connection with any claim arising out of or related to this Agreement, whether grounded in tort (including negligence), strict liability, contract, or otherwise.

10.3 **Workers' Compensation.** Atreca will comply with all statutory workers' compensation and employers liability requirements for activities performed under this Agreement.

10.4 **Insurance.** During the term of this Agreement, Atreca will maintain Comprehensive General Liability Insurance with a reputable and financially secure insurance carrier to cover the activities of Atreca and its sublicensees. The insurance will provide minimum limits of liability of $2,000,000.00 and will

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include all Stanford Indemnitees as additional insureds. Atreca will add Product Liability Insurance prior to the start of human clinical trials and will maintain Comprehensive General Liability Insurance, including Product Liability Insurance with minimum limits of liability of $5,000,000.00. Insurance must cover claims incurred, discovered, manifested, or made during or after the expiration of this Agreement and must be placed with carriers with ratings of at least A- as rated by A.M. Best. Within 15 days of the Effective Date of this Agreement, Atreca will furnish a Certificate of Insurance evidencing primary coverage and additional insured requirements. Atreca will provide to Stanford 30 days prior written notice of cancellation or material change to this insurance coverage. Atreca will advise Stanford in writing that it maintains excess liability coverage (following form) over primary insurance for at least the minimum limits set forth above. All insurance of Atreca will be primary coverage; insurance of Stanford and Stanford Hospitals and Clinics will be excess and noncontributory.

11 EXPORT

Atreca and its affiliates and sublicensees shall comply with all United States laws and regulations controlling the export of licensed commodities and technical data. (For the purpose of this paragraph, “licensed commodities” means any article, material or supply but does not include information; and “technical data” means tangible or intangible technical information that is subject to US export regulations, including blueprints, plans, diagrams, models, formulae, tables, engineering designs and specifications, manuals and instructions.) These laws and regulations may include, but are not limited to, the Export Administration Regulations (15 CFR 730-774), the International Traffic in Arms Regulations (22 CFR 120-130) and the various economic sanctions regulations administered by the US Department of the Treasury (31 CFR 500-600).

Among other things, these laws and regulations prohibit or require a license for the export or retransfer of certain commodities and technical data to specified countries, entities and persons. Atreca hereby gives written assurance that it will comply with, and will cause its affiliates and sublicensees to comply with all United States export control laws and regulations, that it bears sole responsibility for any violation of such laws and regulations by itself or its affiliates or sublicensees, and that it will indemnify, defend and hold Stanford harmless for the consequences of any such violation.

12 MARKING

Before any Licensed Patent issues, Atreca will mark Licensed Product with the words “Patent Pending.” Otherwise, Atreca will mark Licensed Product with the number of any issued Licensed Patent.

13 STANFORD NAMES AND MARKS

Atreca will not identify Stanford or the VA in any promotional statement, or otherwise use the name of any Stanford faculty member, employee, or student, any VA employee, or any trademark, service mark, trade name, or symbol of Stanford, Stanford Hospitals and Clinics, or the VA including the Stanford or VA name, unless Atreca has received

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Stanford's or the VA's prior written consent, as the case may be. Permission may be withheld at Stanford's or the VA's sole discretion.

14 PROSECUTION AND PROTECTION OF PATENTS

14.1 **Patent Prosecution.** Following the Effective Date and subject to Stanford's approval, Atreca will be responsible for preparing, filing, and prosecuting broad patent claims (including any interference or reexamination actions) for Stanford and the VA's benefit in the Licensed Territory and for maintaining all Licensed Patents. Atreca will notify Stanford before taking any substantive actions in prosecuting the claims, and Stanford will have final approval on how to proceed with any such actions. To aid Atreca in this process, Stanford will provide information, execute and deliver documents and do other acts as Atreca shall reasonably request from time to time. Atreca will reimburse Stanford for Stanford's reasonable costs incurred in complying with such requests. Stanford and Atreca agree that Stanford is the client of record for the attorney prosecuting the Licensed Patents and agree to have Appendix C fully executed by the appropriate parties upon execution of this Agreement.

14.2 **Patent Costs.** Within 30 days after receiving a statement from Stanford, Atreca will reimburse Stanford for all Licensed Patent's patenting expenses, including any interference or reexamination matters, incurred by Stanford. In all instances, Stanford will pay the fees prescribed for large entities to the United States Patent and Trademark Office.

14.3 **Infringement Procedure.** Atreca will promptly notify Stanford if it believes a third party infringes a Licensed Patent or if a third party files a declaratory judgment action with respect to any Licensed Patent. During the Exclusive term of this Agreement and if the Atreca is developing Licensed Product, Atreca may have the right to institute a suit against or defend any declaratory judgment action initiated by this third party as provided in Sections 14.4 — 14.8.

14.4 **Stanford and VA Suit.** Stanford and the VA have the first right to institute suit, and may name Atreca as a party for standing purposes. If Stanford or the VA decides to institute suit, it will notify Atreca in writing. If Atreca does not notify Stanford in writing that it desires to jointly prosecute the suit within 15 days after the date of the notice, Atreca will assign. and hereby does assign to Stanford or the VA, as the case may be, all rights, causes of action, and damages resulting from the alleged infringement. Stanford or the VA will bear the entire cost of the litigation and will retain the entire amount of any recovery or settlement.

14.5 **Joint Suit.** If Stanford and Atreca so agree, they may institute suit or defend the declaratory judgment action jointly. If so, they will:

(A) prosecute the suit in both their names;

(B) bear the out-of-pocket costs equally;

(C) share any recovery or settlement equally; and

(D) agree how they will exercise control over the action.

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14.6 **Atreca Suit.** If neither Section 14.4 nor 14.5 apply, Atreca may institute and prosecute a suit or defend any declaratory judgment action so long as it conforms with the requirements of this Section and Atreca is diligently developing or selling Licensed Product. Atreca will diligently pursue the suit and Atreca will bear the entire cost of the litigation, including expenses and counsel fees incurred by Stanford and the VA. Atreca will keep Stanford reasonably apprised of all developments in the suit, and will seek Stanford's input and approval on any substantive submissions or positions taken in the litigation regarding the scope, validity and enforceability of the Licensed Patent. Atreca will not prosecute, settle or otherwise compromise any such suit in a manner that adversely affects Stanford's interests without Stanford's prior written consent. Stanford or the VA may be named as a party only if:

(A) Atreca's and Stanford's respective counsel recommend that such action is necessary in their reasonable opinion to achieve standing;

(B) Neither Stanford nor the VA are the first named party in the action; and

(C) The pleadings and any public statements about the action state that Atreca is pursuing the action and that Atreca has the right to join Stanford and the VA as a party.

14.7 **Recovery.** If Atreca sues under Section 14.6, then any recovery in excess of any unrecovered litigation costs and fees will be shared with Stanford as follows:

(A) any payment for past sales will be deemed Net Sales, and Atreca will pay Stanford royalties at the rates specified in Section 7.10;

(B) any payment for future sales will be deemed a payment under a Sublicense, and royalties will be shared as specified in Article 4.

(C) Atreca and Stanford will negotiate in good faith appropriate compensation to Stanford for any non-cash settlement or non-cash cross-license.

14.8 **Abandonment of Suit.** If either Stanford or Atreca commences a suit and then wants to abandon the suit, it will give timely notice to the other party. The other party may continue prosecution of the suit after Stanford and Atreca agree on the sharing of expenses and any recovery in the suit.

14.9 **VA Cooperation.** The VA's cooperation in litigation proceedings instituted under this Agreement is subject to U.S. Department of Justice approval on a case-by-case basis.

15 TERMINATION

15.1 **Termination by Atreca.** Atreca may terminate this Agreement by giving Stanford written notice at least 30 days in advance of the effective date of termination selected by Atreca.

15.2 **Termination by Stanford.**

(A) Stanford may also terminate this Agreement if Atreca:

(1) is delinquent on any report or payment;

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(2) is not diligently developing and commercializing Licensed Product;

(3) misses a milestone described in Appendix A;

(4) is in breach of any provision; or

(5) provides any false report.

(B) Termination under this Section 15.2 will take effect 30 days after written notice by Stanford unless Atreca remedies the problem in that 30-day period.

15.3 **Surviving Provisions.** Surviving any termination or expiration are:

(A) Atreca's obligation to pay royalties accrued or accruable;

(B) any claim of Atreca or Stanford, accrued or to accrue, because of any breach or default by the other party; and

(C) the provisions of Articles 8, 9, and 10 and any other provision that by its nature is intended to survive.

16 ASSIGNMENT

16.1 **Permitted Assignment by Atreca.** Subject to Section 16.3, Atreca may assign this Agreement as part of a sale or change of control, regardless of whether such a sale or change of control occurs through an asset sale, stock sale, merger or other combination, or any other transfer of:

(A) Atreca's entire business; or

(B) that part of Atreca's business that exercises all rights granted under this Agreement.

16.2 **Any Other Assignment by Atreca.** Any other attempt to assign this Agreement by Atreca is null and void.

16.3 **Conditions of Assignment.** Prior to any assignment, the following conditions must be met:

(A) Atreca must give Stanford 30 days prior written notice of the assignment, including the new assignee's contact information; and

(B) the new assignee must agree in writing to Stanford to be bound by this Agreement; and

(C) Stanford must have received a $[*] assignment fee.

16.4 **After the Assignment.** Upon a permitted assignment of this Agreement pursuant to Article 16, Atreca will be released of liability under this Agreement and the term "Atreca" in this Agreement will mean the assignee.

16.5 **Bankruptcy.** In the event of a bankruptcy, assignment is permitted only to a party that can provide adequate assurance of future performance, including diligent development and sales, of Licensed Product.

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16.6 **The Bill and Melinda Gates Foundation (BMGF).** In the case of a bankruptcy or for any reason the license is terminated (other than for a breach by the BMGF), if the BMGF is interested in continued nonexclusive access to the Licensed Patent representing the invention and to the Technology on terms consistent with the global access requirements of the foundation to (a) address global health challenges that disproportionately impact developing countries and to (b) increase the access of poor and distressed individuals and families in the developing world to life-saving and other important vaccines and drugs, that can improve their health care for the term stated in the Letter Agreement between Atreca and the BMGF dated June 28, 2012, Stanford agrees to enter into negotiations for such an agreement with the BMGF.

17 DISPUTE RESOLUTION

17.1 **Dispute Resolution by Arbitration.** Any dispute between the parties regarding any payments made or due under this Agreement will be settled by arbitration in accordance with the JAMS Arbitration Rules and Procedures. The parties are not obligated to settle any other dispute that may arise under this Agreement by arbitration.

17.2 **Request for Arbitration.** Either party may request such arbitration. Stanford and Atreca will mutually agree in writing on a third party arbitrator within 30 days of the arbitration request. The arbitrator's decision will be final and nonappealable and may be entered in any court having jurisdiction.

17.3 **Discovery.** The parties will be entitled to discovery as if the arbitration were a civil suit in the California Superior Court. The arbitrator may limit the scope, time, and issues involved in discovery.

17.4 **Place of Arbitration.** The arbitration will be held in Stanford, California unless the parties mutually agree in writing to another place.

17.5 **Patent Validity.** Any dispute regarding the validity of any Licensed Patent shall be litigated in the courts located in Santa Clara County, California, and the parties agree not to challenge personal jurisdiction in that forum.

18 NOTICES

18.1 **Legal Action.** Atreca will provide written notice to Stanford at least three months prior to bringing an action seeking to invalidate any Licensed Patent or a declaration of non-infringement. Atreca will include with such written notice an identification of all prior art it believes invalidates any claim of the Licensed Patent.

18.2 **All Notices.** All notices under this Agreement are deemed fully given when written, addressed, and sent as follows:

All general notices to Atreca are mailed or emailed to:

Name: Chief Executive Officer

Address: 75 Shoreway Road, Suite C San Carlos, CA 94070

[*] = Certain confidential information contained in this document, marked by brackets, has been omitted pursuant to Rule 406 of the Securities Act of 1933, as amended.

Email: ceo@atreca.com

All financial invoices to Atreca (i.e., accounting contact) are e-mailed to:

Name: Chief Executive Officer

Email: ceo@atreca.com

All progress report invoices to Atreca (i.e., technical contact) are e-mailed to:

Name: Chief Executive Officer

Email: ceo@atreca.com

All general notices to Stanford are e-mailed or mailed to:

Office of Technology Licensing

1705 El Camino Real

Palo Alto, CA 94306-1106

info@otlmail.stanford.edu

All payments to Stanford are mailed to:

Stanford University

Office of Technology Licensing

Department #44439

P.O. Box 44000

San Francisco, CA 94144-4439

All progress reports to Stanford are e-mailed or mailed to:

Office of Technology Licensing

1705 El Camino Real

Palo Alto, CA 94306-1106

info@otlmail.stanford.edu

Either party may change its address with written notice to the other party.

19 MISCELLANEOUS

19.1 **Waiver.** No term of this Agreement can be waived except by the written consent of the party waiving compliance.

19.2 **Choice of Law.** This Agreement and any dispute arising under it is governed by the laws of the State of California, United States of America, applicable to agreements negotiated, executed, and performed within California.

19.3 **Entire Agreement.** The parties have read this Agreement and agree to be bound by its terms, and further agree that it constitutes the complete and entire agreement of the parties and supersedes all previous communications, oral or written, and all other communications between them relating to the license and to the subject

hereof. This Agreement may not be amended except by writing executed by authorized representatives of both parties. No representations or statements of any kind made by either party, which are not expressly stated herein, will be binding on such party.

19.4 **Exclusive Forum.** The state and federal courts having jurisdiction over Stanford, California, United States of America, provide the exclusive forum for any court action between the parties relating to this Agreement. Atreca submits to the jurisdiction of such courts, and waives any claim that such a court lacks jurisdiction over Atreca or constitutes an inconvenient or improper forum.

19.5 **Headings.** No headings in this Agreement affect its interpretation.

19.6 **Electronic Copy**. The parties to this document agree that a copy of the original signature (including an electronic copy) may be used for any and all purposes for which the original signature may have been used. The parties further waive any right to challenge the admissibility or authenticity of this document in a court of law based solely on the absence of an original signature.

The parties execute this Agreement in duplicate originals by their duly authorized officers or representatives.

THE BOARD OF TRUSTEES OF THE LELAND

STANFORD JUNIOR UNIVERSITY

Signature	/s/ Katharine Ku
Name	Katharine Ku
Title	Director, Technology Licensing
Date	June 27, 2012

Atreca, Inc.

Signature	/s/ Tito Serafini
Name	Tito Serafini, Ph.D.
Title	CEO and President
Date	June 27, 2012

[*] = Certain confidential information contained in this document, marked by brackets, has been omitted pursuant to Rule 406 of the Securities Act of 1933, as amended.

Appendix A - Milestones

1. By August 31, 2012, Atreca will have $3,000,000 of available non-contingent, operating capital to proceed with the exploration and development of Licensed Product. Capital will be from a third party who may or may not be an investor in Atreca and unused capital will be on deposit in a financial institutional acceptable to both Stanford and Atreca.

2. Atreca has already provided Stanford a preliminary business plan. By October 31, 2012 Atreca will provide Stanford a detailed document covering Atreca's plans as to projected product development, markets and financial forecasts ("Business Plan"). Stanford will treat this Business Plan as confidential information and to protect it as Stanford would its own confidential information.

3. By October 31, 2012 Atreca will provide to Stanford a listing of the management team or a schedule for the recruitment of key management positions.

4, By March 31, 2013, Atreca will develop the technology to the point of having a capability of generating 1,000 heavy and light immunoglobulin chains from multiple samples within a two week period.

5. By December 31, 2015, Atreca will develop initial prototype research kit or reagent.

6. By December 31, 2016, Atreca will initiate a Phase, I clinical trial on its first therapeutic product.

7. By June 30, 2016, Atreca will release to market its first research kit or reagent.

8. By June 30, 2017, Atreca will initiate a proof of concept (Phase 1/2) clinical trial on its first therapeutic product.

9. By January 31, 2018, Atreca and Stanford will meet and agree upon new milestones to be included in this Appendix A.

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Appendix B — Sample Reporting Form

Stanford Docket No. S10-409

This report is provided pursuant to the license agreement between Stanford University and Atreca

License Agreement Effective Date:

Name(s) of Licensed Products being reported:

Report Covering Period	
Yearly Maintenance Fee	$
Number of Sublicenses Executed	
Gross Revenue	$
Net Sales	$
Royalty Calculation	
Royalty Subtotal	$
Credit	$
Royalty Due	$

Comments:

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Appendix C — Client and Billing Agreement

The Board of Trustees of the Leland Stanford Junior University ("STANFORD"); and _____ a Corporation of the State of _____, with a principal place of business at _____, ("ATRECA"); have agreed to use the law firm of _____ ("FIRM") to prepare, file and prosecute the pending patent applications listed in Exhibit A attached hereto and maintain the patents that issue thereon ("Patents").

WHEREAS, FIRM desires to perform the legal services related to obtaining and maintaining the Patents; and

WHEREAS, STANFORD remains the client of the FIRM; and

WHEREAS, ATRECA is the licensee of STANFORD's interest in the Patents;

NOW THEREFORE, in consideration of the premises and the faithful performance of the convenants herein contained, IT IS AGREED:

1. FIRM can interact directly with ATRECA on all patent prosecution matters related to the Patents and will copy STANFORD and the U.S. Department of Veterans Affairs ("VA") on all correspondence. STANFORD will be notified by FIRM prior to any substantive actions and will have final approval on proceeding with such actions. In addition, as prosecution proceeds, FIRM will notify STANFORD if there is any change in inventorship from the originally filed application:

2. ATRECA is responsible for the payment of all charges and fees by FIRM related to the prosecution and maintenance of the Patents. FIRM will invoice ATRECA and ATRECA must pay FIRM directly for all charges. If STANFORD requests, STANFORD will be copied on all invoices and payments. FIRM must inform STANFORD within 90 days if the licensee is delinquent on payment. Otherwise, STANFORD will not be responsible for those expenses.

3. Notices and copies of all correspondence should be sent to the following:

To ATRECA:

Name, Title

Address

To STANFORD:

Name

Office of Technology Licensing

Stanford University

1705 El Camino Real

Palo Alto, CA 94306-1106

[*] = Certain confidential information contained in this document, marked by brackets, has been omitted pursuant to Rule 406 of the Securities Act of 1933, as amended.

To FIRM:

Attorney Name

Law Firm Address

To VA:

Director (122)

Technology Transfer Program

Office of Research and Development

U.S. Department of Veterans Affairs

8 10 Vermont Avenue N.W.

Washington, D.C. 20420

4. The parties to this document agree that a copy of the original signature (including an electronic copy) may be used for any and all purposes for which the original signature may have been used. The parties further waive any right to challenge the admissibility or authenticity of this document in a court of law based solely on the absence of an original signature.

ACCEPTED AND AGREED TO:

STANFORD

By: _____

Name: Katharine Ku

Title: Director

Date: _____

Atreca, Inc.

By: _____

Name:

Title:

Date: _____

[*] = Certain confidential information contained in this document, marked by brackets, has been omitted pursuant to Rule 406 of the Securities Act of 1933, as amended.

Law Firm Name

By: _____

Name:

Title:

Date: _____

[*] = Certain confidential information contained in this document, marked by brackets, has been omitted pursuant to Rule 406 of the Securities Act of 1933, as amended.

Appendix D — Technology

Table 1. Immunoglobulin sequence datasets

Item	Sample	Condition	Date Generated
Immunoglobulin sequence datasets	F2	Flu vaccine	4/12/2012

Table 2. Processed cDNA or mRNA from single B cells

Item	Sample	Condition	Type	Date Generated
Processed eDNA or mRNA from single B cells	k3	Flu vaccine	cDNA	3/8/2012
	381	*S. aureus* infection	mRNA	4/8/2011
	393	*S. aureus* infection	cDNA	3/29/2012
	397	*S. aureus* infection	cDNA	3/29/2012
	411	*S. aureus* infection	cDNA	3/15/2012
	412	*S. aureus* infection	cDNA	3/15/2012
	398	*C. difficile* infection	cDNA	3/8/2012
	410	*C. difficile* infection	cDNA	3/8/2012
	403	Rheumatoid arthritis	cDNA	3/15/2012
	406	Rheumatoid arthritis	mRNA	3/22/2012
	410b	Rheumatoid arthritis	mRNA	4/12/2012
	30605	Rheumatoid arthritis	mRNA	4/12/2012
	411b	Rheumatoid arthritis	cDNA	5/15/2012
	412c	Rheumatoid arthritis	cDNA	5/8/2012
	414	Rheumatoid arthritis	cDNA	6/18/2012
	30612	Rheumatoid arthritis	mRNA	5/3/2012
	421	Rheumatoid arthritis	mRNA	5/3/2012
	PAH2	Pulmonary arterial hypertension	mRNA	4/25/2012
	PAH3	Pulmonary arterial hypertension	mRNA	4/25/2012
	PAH5	Pulmonary arterial hypertension	mRNA	4/19/2012
	PAH6	Pulmonary arterial hypertension	mRNA	4/26/2012
	PAH7	Pulmonary arterial hypertension	cDNA	5/8/2012
	PAH8	Pulmonary arterial hypertension	cDNA	6/18/2012
	CMV1	Cytomegalovirus infection	cDNA	6/18/2012
	M1	Melanoma	mRNA	3/4/2011

Exhibit 10.17

AMENDMENT TO EXCLUSIVE (EQUITY) AGREEMENT

This **AMENDMENT TO THE EXCLUSIVE (EQUITY) AGREEMENT** (the "***Amendment***") is effective as of May 24, 2018 (the "***Amendment Effective Date***") by and between **ATRECA, INC.**, a Delaware corporation, located at 500 Saginaw Drive, Redwood City, California 94063-4750 ("***Atreca***"), and **THE BOARD OF TRUSTEES OF THE LELAND STANFORD JUNIOR UNIVERSITY**, an institution of higher education having powers under the laws of the State of California ("***Stanford***").

RECITALS

A. Atreca and Stanford are parties to that certain Exclusive (Equity) Agreement, dated June 28, 2012 (the "***Agreement***"), pursuant to which Stanford granted Atreca a license to certain patents relating to an invention entitled "Efficient isolation of human immunoglobulin genes," and further described in Stanford Docket S10-409.

B. The parties now desire to extend the term of the exclusive license for the research kits and reagents and the term for completing certain diligence milestones under the Agreement.

C. Accordingly, the parties wish to amend the Agreement, in accordance with Section 19.3 thereof.

NOW, THEREFORE, the parties agree as follows:

1. AMENDMENT OF THE AGREEMENT

The parties hereby agree to amend the terms of the Agreement as provided below, effective as of the Amendment Effective Date. Where the Agreement is not explicitly amended, the terms of the Agreement will remain in force. Capitalized terms used in this Amendment that are not otherwise defined herein shall have the meanings such terms are given in the Agreement.

1.1 Section 3.2 of the Agreement is hereby deleted and replaced with the following:

3.2 Exclusivity. The license is Exclusive, including the right to Sublicense under Article 4, in the Licensed Field of Use beginning on the Effective Date and ending on:

(A) June 28, 2024 for research kits and reagents; and

(B) the last to expire of Licensed Patents for the rest of the Licensed Field of Use.

For 3.2 (A), Atreca will have the opportunity to extend such exclusivity on research kits and reagents upon written request by Atreca and acceptance by Stanford. If the exclusivity is not extended, then the license on research kits and reagents will become non-exclusive on June 28, 2024.

1.2 Appendix A (Milestones) to the Agreement is hereby deleted and replaced with the following:

Appendix A- Milestones

1. By December 31, 2019, Atreca will initiate a Phase I clinical trial on its first therapeutic product.

2. By December 31, 2021, Atreca will release to market its first research kit or reagent.

3. By December 31, 2022, Atreca will complete a first efficacy assessment clinical trial on its first therapeutic product.

4. By June 30, 2023, Atreca and Stanford will meet and agree upon new milestones to be included in this Appendix A.

1.3 Stanford hereby acknowledges and agrees that Atreca has met milestones 1-5 on Appendix A of the Agreement. Stanford hereby waives any failure of Atreca to meet milestones 5-9 on Appendix A by the applicable dates set forth on the Agreement.

2. AMENDMENT OF THE AGREEMENT

2.1 Full Force and Effect. This Amendment amends the terms of the Agreement and is deemed incorporated into the Agreement. The provisions of the Agreement, as amended by this Amendment, remain in full force and effect.

2.2 Entire Agreement. The Agreement and this Amendment constitute the entire agreement, both written and oral, between the parties with respect to the subject matter hereof, and any and all prior agreements with respect to the subject matter hereof, either written or oral, expressed or implied, are superseded hereby, merged and canceled, and are null and void and of no effect.

2.3 Counterparts. This Amendment may be executed in one or more counterparts, each of which will be an original and all of which together will constitute one instrument.

IN WITNESS WHEREOF, the parties have executed this Amendment as of the Amendment Effective Date.

ATRECA, INC.	**THE BOARD OF TRUSTEES OF THE LELAND STANFORD JUNIOR UNIVERSITY**
By: /s/ Paulette Dillon	By: /s/ Mona Wan
Name: Paulette Dillon	Name: Mona Wan
Title: SVP of Corporate Development	Title: Associate Director

Exhibit 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the use in this Amendment No. 1 to Registration Statement on Form S-1 of our report dated March 5, 2019 (except for Note 14 as to which the date is April 23, 2019 and except for Note 2, under the heading *Reverse Stock Split,* as to which the date is June 10, 2019) relating to the consolidated financial statements of Atreca, Inc. appearing in the Prospectus, which is part of this Amendment No. 1 to Registration Statement on Form S-1.

We also consent to the reference to us under the caption "Experts" in the Prospectus.

/s/ OUM & CO. LLP

San Francisco, California
June 10, 2019

QuickLinks