Delivering the Potential of Immunotherapy

Corporate Overview

May 2021

Legal Disclaimer

This presentation and the accompanying oral commentary contain 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 presentation and the accompanying oral commentary, 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," "continue," "estimate," "expect," "may," "plan," "potential," "predict," "should," or "will" 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 Investigational New Drug and other regulatory submissions, including our pre-clinical EphA2 program, our Phase 1b trial of ATRC-101, and our planned checkpoint inhibitor and chemotherapy combination trials; the initiation, timing, progress and results of our collaborations and partnerships; our expectations regarding the activity and therapeutic potential of our product candidate ATRC-101 or potential future product candidates; the differentiation of our antibody in our EphA2 program; 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; our expectations regarding the achievement and timing of research, development, clinical, regulatory and other corporate milestones; the adequacy of our cash balance to support our anticipated future operations; our anticipated milestones and the implementation of our business model and strategic plans for our business, technologies, and current or potential future product candidates. You should not rely on forward-looking statements as predictions of future events. We have based the forward-looking statements contained in this presentation and the accompanying oral commentary 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 greater detail in our most recent Quarterly Report on Form 10-Q filed with the U.S. Securities and Exchange Commission, and may cause our actual results, performance or achievement to differ materially and adversely from those anticipated or implied by our forward-looking statements. 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 presentation. 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. 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 presentation and the accompanying oral commentary. 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.

This presentation discusses our current and potential future product candidates that are under clinical investigation and which have not yet been approved for marketing by the U.S. Food and Drug Administration. No representation is made as to the safety or effectiveness of these current or potential future product candidates for the use for which such product candidates are being studied.

The forward-looking statements made in this presentation and the accompanying oral commentary relate only to events as of the date on which the statements are made, and while we believe such information forms a reasonable basis for such statements, such information may be limited or incomplete, and our statements should not be read to indicate that we have conducted an exhaustive inquiry into, or review of, all potentially available relevant information. We undertake no obligation to update any forward-looking statements made in this presentation and the accompanying oral commentary to reflect events or circumstances after the date of this presentation and the accompanying oral commentary 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.

Company Highlights

Discovering and Developing Novel Antibody-based Cancer Immunotherapeutics

Differentiated Discovery Approach	• First-mover advantages in accessing a potentially large and underexploited target space via interrogation of the human active anti-tumor immune response • Delivers novel antibodies binding to targets otherwise unlikely discoverable by traditional approaches • Scalable and industrialized platform
Large Opportunities	• Approach leads to antibodies that bind to “public” tumor targets • Potential treatments for large patient populations across multiple tumor types
Lead Candidate: ATRC-101	• Monoclonal antibody with a novel mechanism of action and target • Demonstrated potent single-agent anti-tumor activity in multiple preclinical solid tumor models • Dosed First Patient in Phase 1b trial in early 2020, initial summary data expected in July 2021 • Combo studies with PD-1 inhibitor and chemotherapy planned for 2Q21 and 2H21, respectively
Pipeline Expansion	• Early-stage internal program targeting EphA2 in development • Collaborating with Xencor to develop T cell-engaging antibodies • Growing hit library of >2,000 human antibodies that bind to non-autologous tumor tissue preferentially • Potential for additional product candidates in oncology with distinct mechanisms of action

Pipeline

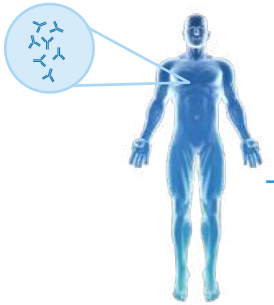
Asset	Target	Format/MOA	Discovery	Lead / Preclinical	Phase 1	Phase 2	Collaborators
ONCOLOGY							
ATRC-101	Novel RNP Complex	Activating Fc; Driver Antigen Engagement		→	→		ATRECA
APN-122597	EphA2	Multiple Formats Being Evaluated		→			ATRECA
Multiple	Multiple	T Cell Engagement		→			ATRECA, Xencor
		ADC (Cytotoxic)		→			ATRECA + undisclosed
		Immunostimulation		→			ATRECA + undisclosed
		Others		→			ATRECA
COVID-19							
Alliance to discover, develop, and manufacture therapeutic antibodies	Multiple	Targeting SARS-CoV-2		→			ATRECA, IGM Biosciences, BeiGene

ADC, antibody–drug conjugate; EphA2, ephrin type-A receptor 2; MOA, mechanism of action; RNP, ribonucleoprotein.

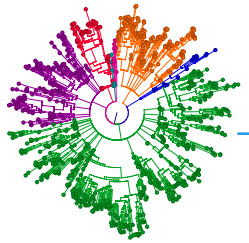
The Atreca Discovery Platform

Our Novel Approach Inverts the Discovery Paradigm

The **HUMAN IMMUNE SYSTEM** tells us what is important



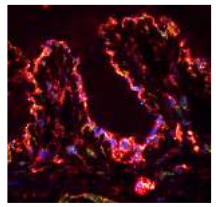
"Responder" with anti-tumor immune response



Interrogation of the active B cell response at the **single-cell** level

Identification of novel antibody–target pairs

Selection & Screening

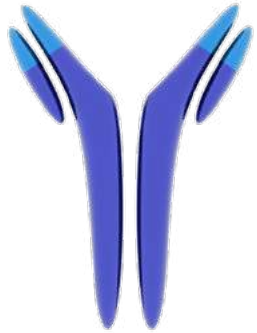


Currently **>2,000 "hit"** antibodies against non-autologous "public" **targets**

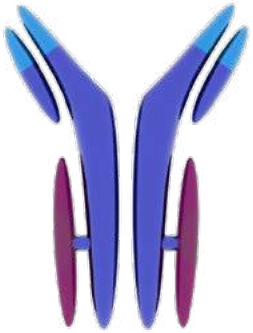
Hit Antibodies

Weaponization

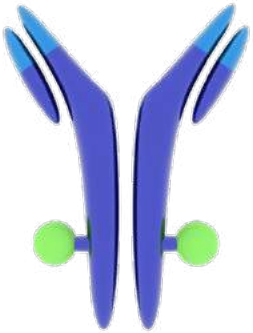
Leads



Activating Fc



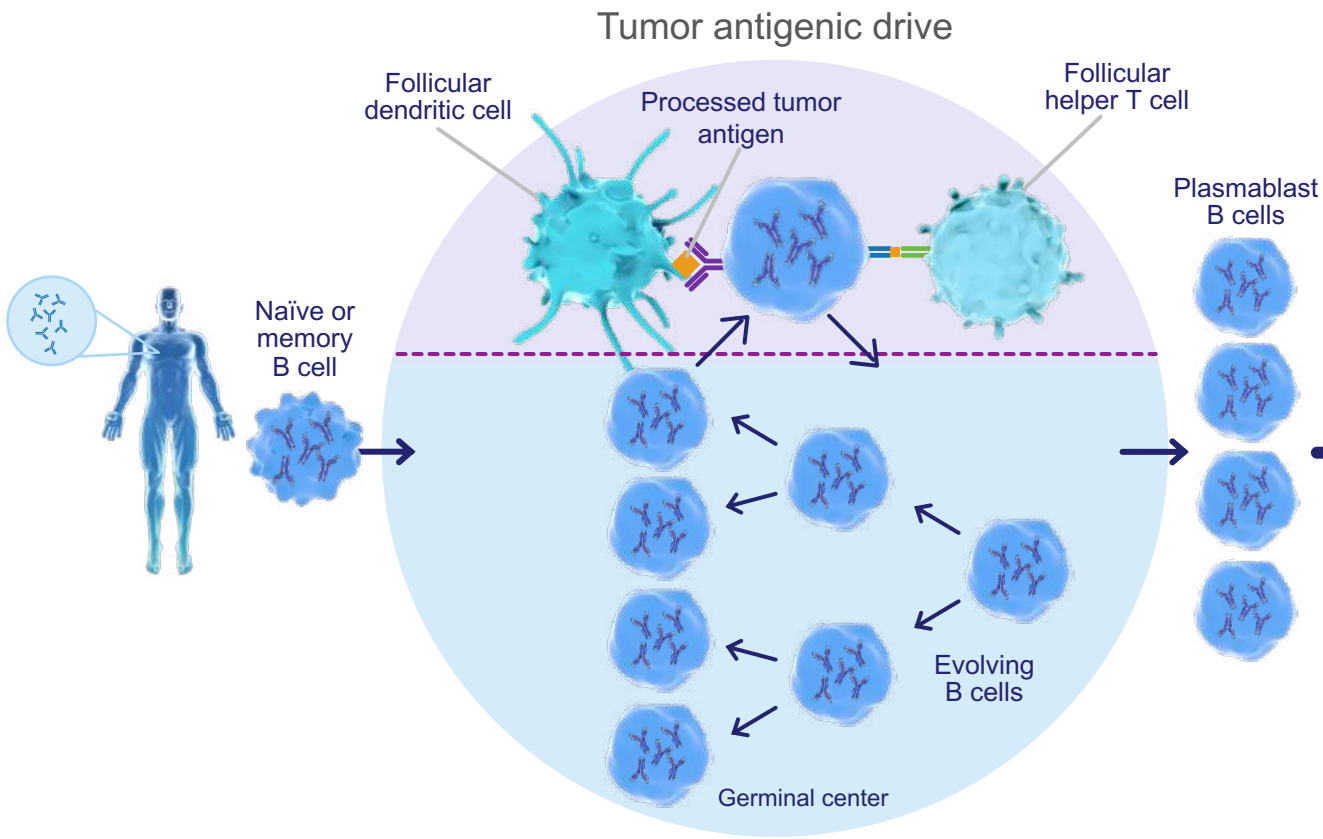
Fc + binding domain (*e.g.*, T cell engager)



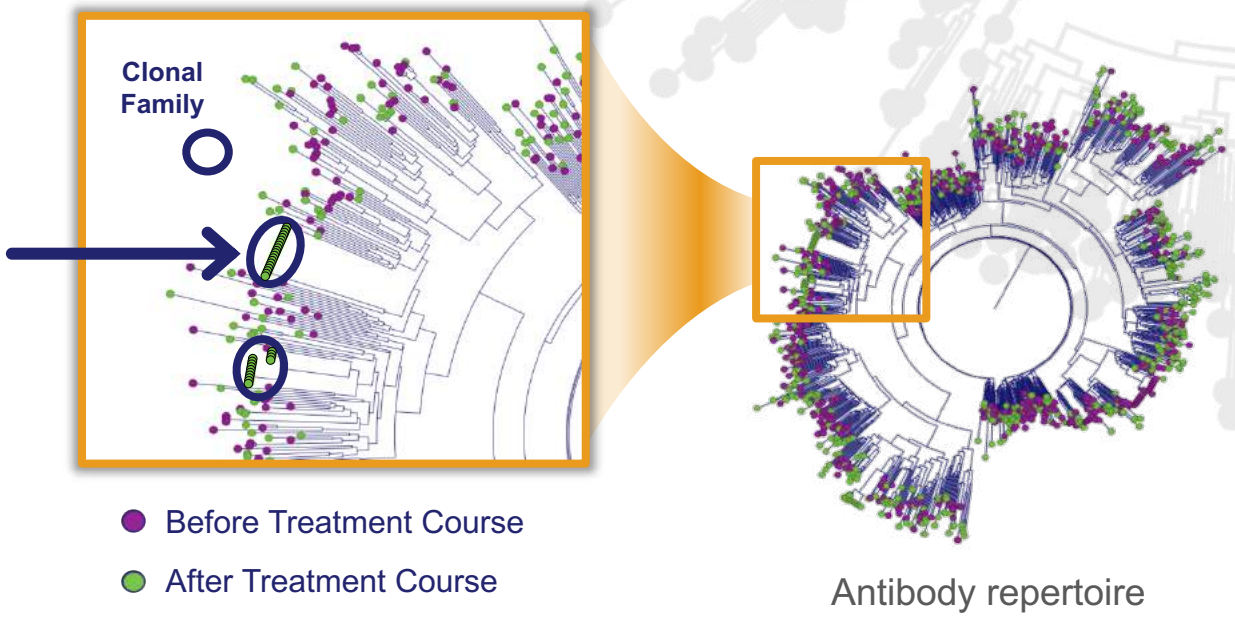
Fc + small molecule (*e.g.*, ADC)

ADC, antibody-drug conjugate.

B cells and Generation of Plasmablasts in Anti-Tumor Immune Responses



Number of B cells and tertiary lymphoid structures (composed of dendritic, B, and T cells) in tumors correlates with better survival[1]

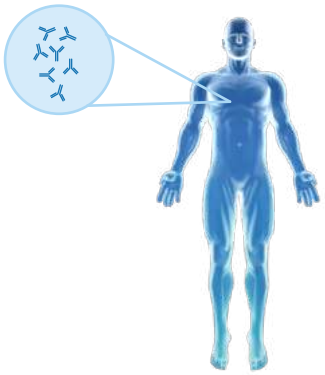


Analyses of plasmablasts generated in cancer patients indicate that these patients have an antigen-driven B cell response similar to those driven by antigens in infectious disease or autoimmunity[2]

1. Petitprez F, et al. *Nature*. 2020;577:556-560. 2. DeFalco J, et al. *Clin Immunol*. 2018;187:37-45.

Platform Provides Robust Industrialization Capabilities

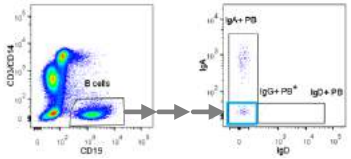
Sample acquisition & repository



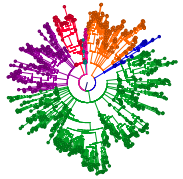
1,500+ samples

30+ cancer types

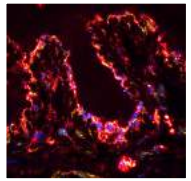
Active immune response analysis



Plasmablast isolation



Native H+L sequence generation



Antibody synthesis, selection & screening

Lead & candidate generation

Target identification

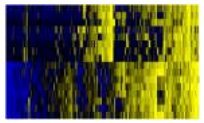
Protein engineering

In vitro & *in vivo* analysis

Expanded Target ID Platform Delivering

Internal & External Technologies

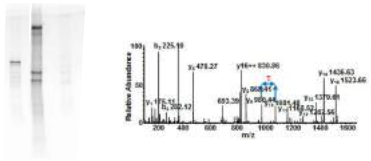
Protein & Carbohydrate Arrays



NIH NATIONAL CANCER INSTITUTE

ATRECA *et al.*

IP / XL and MS



ATRECA

Other Modalities

MERCK

Serimmune

Oncimmune®

ATRECA *et al.*

Evolving Platform

Hit Antibodies

- ***Arrays***
- ***MS-based approaches***
- ***Proximity labeling***
- ***Functional genomics***

Accelerating Output

Array screening

- Initial step
- 100's of antibodies per year
- > 25% of input antibodies positive

Targets confirmed in 2020

- 13 confirmed from 75 array positives

Targets ID'ed in multiple classes

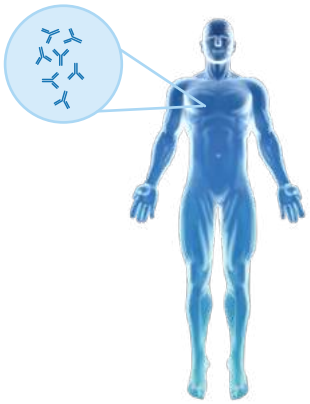
- Transmembrane proteins
- Glycans
- RNA-binding proteins
- *Et al.*

MS, mass spectrometry.

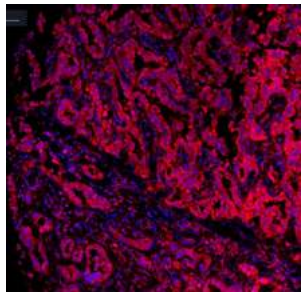
ATRC-101

ATRC-101: A New Way to Target Cancer

Engineered version of a patient antibody discovered via the Atreca platform



Lung adenocarcinoma patient with active anti-tumor immune response



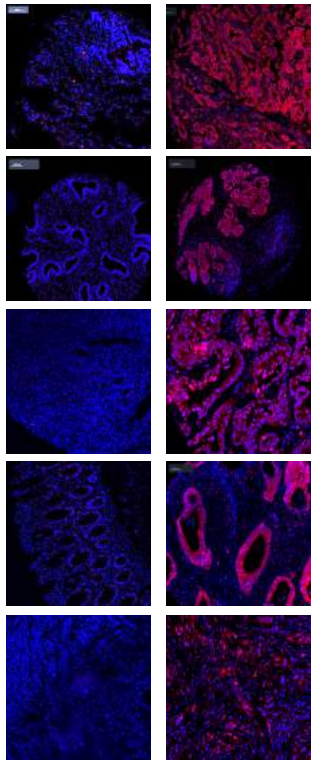
ATRC-101 binds its target in multiple tumor types from different patients

- First-in-class program
  - Novel target
  - Novel MOA
- Phase 1b trial in dose escalation stage enrolling patients with solid tumors
  - NSCLC
  - Breast
  - Ovarian
  - Colorectal
  - Acral melanoma
- Plans for combination trials with checkpoint inhibitors and with chemotherapy

MOA, mechanism of action; NSCLC, non-small cell lung cancer.

ATRC-101 Has Potential to Treat Large Groups of Patients

ATRC-101 reactivity is tumor-specific across multiple cancer types



		% reactive** samples
NORMAL Adjacent Lung	ADENOCARCINOMA Lung	NSCLC N = 563 65%
BENIGN Breast Fibroadenoma	CARCINOMA Breast Invasive Ductal	Breast N = 208 65%
NORMAL Adjacent Ovary	ADENOCARCINOMA Ovary	Ovarian N = 878 58%
NORMAL Adjacent Colon	ADENOCARCINOMA Colon	Colorectal N = 307 57%
BENIGN Nevus	MELANOMA Cutaneous	Melanoma N = 70 46%

Reactivity has also been observed in several other tumor types

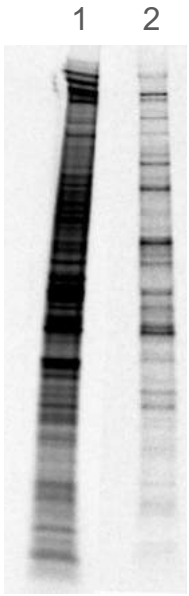
** "Reactive" samples had moderate to high signal overall with ≥40% malignant cells positive (N = total samples). Samples were largely from treatment-naïve patients. Percentages based on samples from all subtypes within solid tumor type

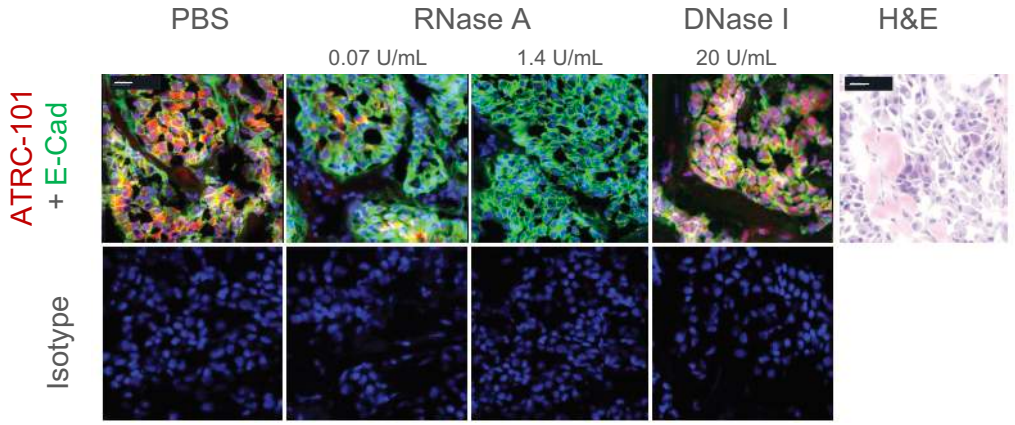
ATRC-101 Targets a Ribonucleoprotein Complex

Isolated target of ATRC-101 is composed of multiple RNA-binding proteins and RNA

1 – Whole cell lysate
2 – ATRC-101P immuno-isolate

Immuno-isolation from a human cell line under stringent conditions yields a reproducible set of proteins, including many that bind RNA



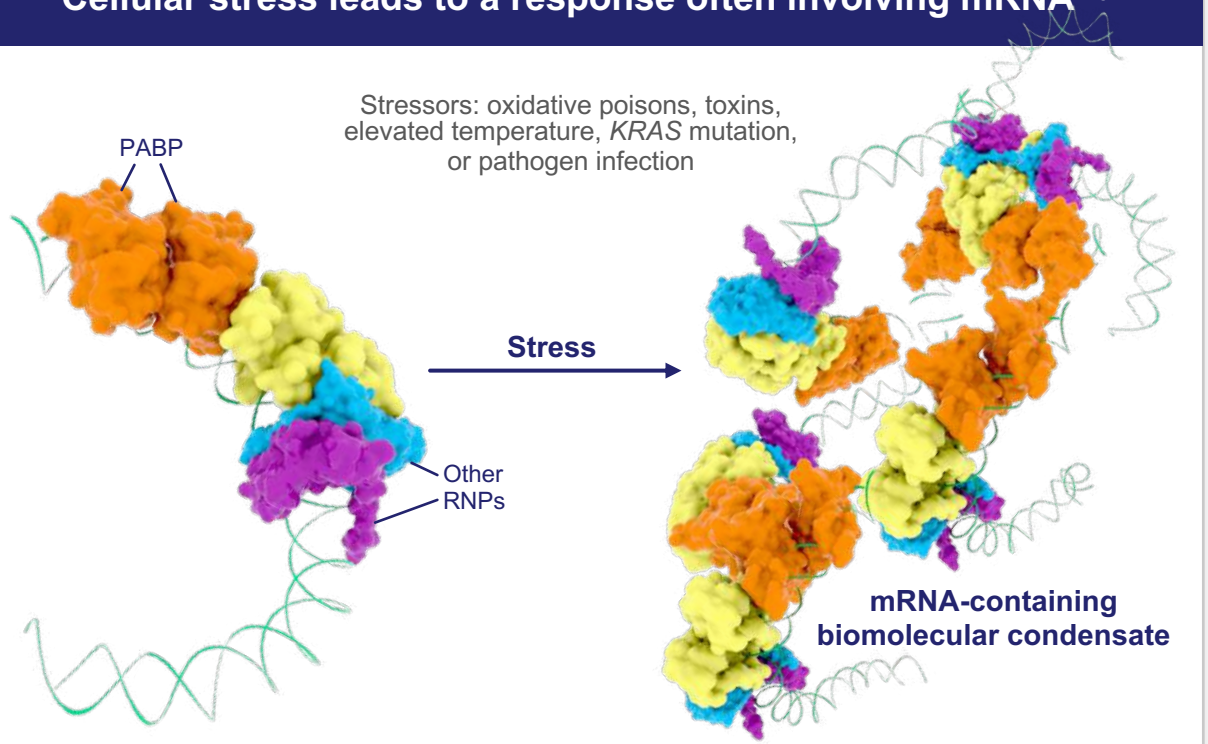


Treatment with RNase prevents recognition of target by ATRC-101 in human tumor tissue

E-Cad, E-cadherin; H&E, hematoxylin and eosin; PBS, phosphate-buffered saline.

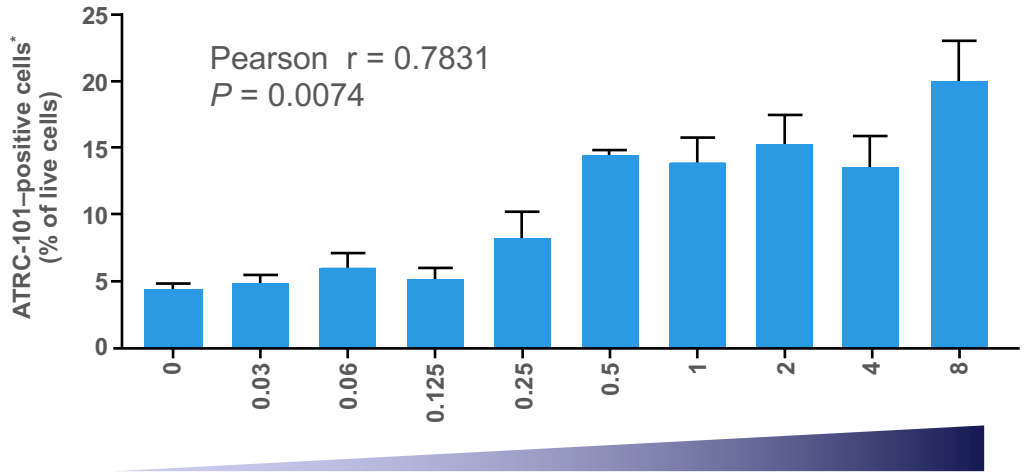
Stress Induces the Target of ATRC-101 in Tumor Cells

Cellular stress leads to a response often involving mRNA[1-3]



Stress responses involving mRNA and the generation of biomolecular condensates help cells adapt by allowing them to modulate translation

Stress induces the target of ATRC-101



Stress induction of the target of ATRC-101 together with the biochemical properties and composition of the immuno-isolated target indicate that the target RNP complex has the hallmarks of a biomolecular condensate

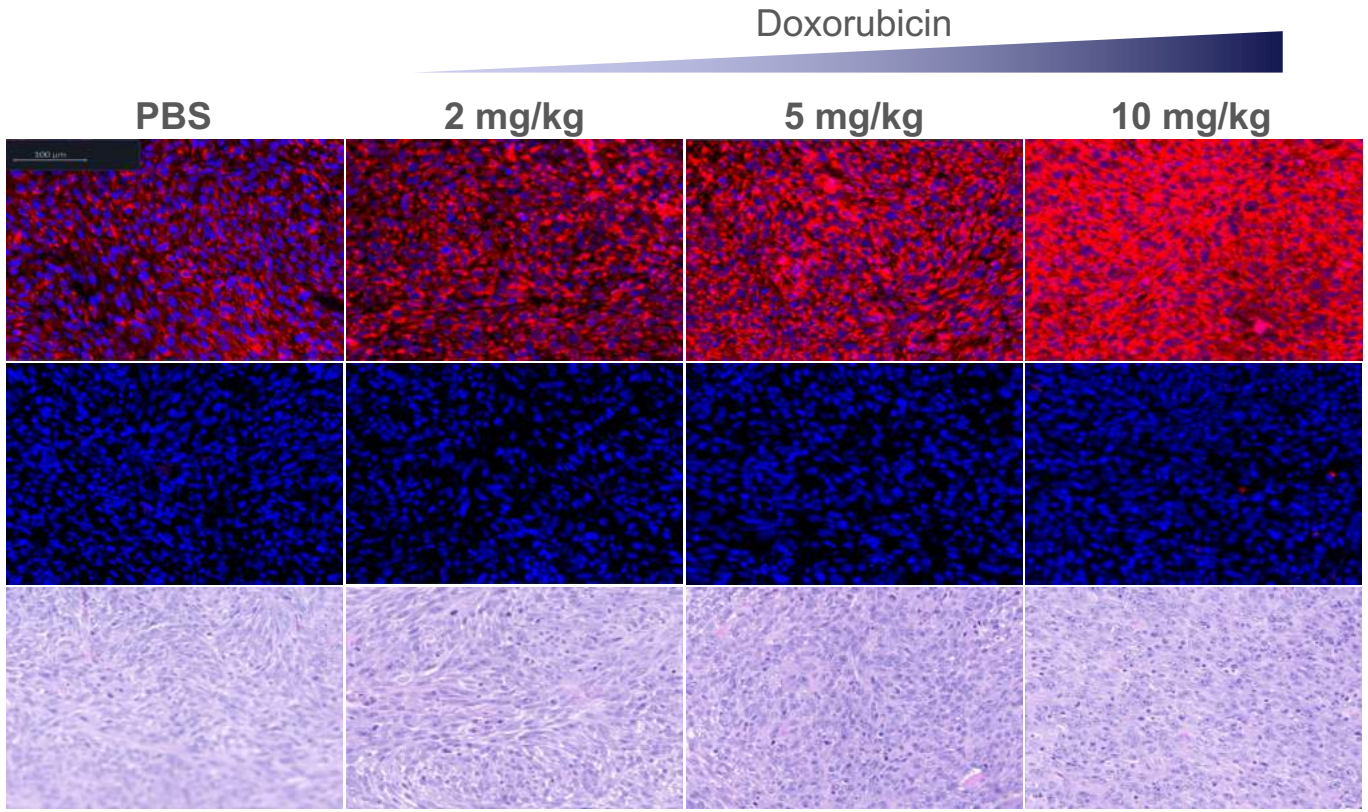
* Error bars based on the standard error of technical replicates

G3BP, Ras-GAP SH3 domain binding protein; mRNA, messenger RNA; $NaAsO_2$, sodium arsenite; PABP, polyadenylate-binding protein; RNP, ribonucleoprotein.

1. Tourriere H, et al. *J Cell Biol*. 2003;160:823-831. 2. Protter DSW, et al. *Trends Cell Biol*. 2016;26:668-679. 3. Guillen-Boixet, J, et al. *Cell*. 2020;181:346-361.

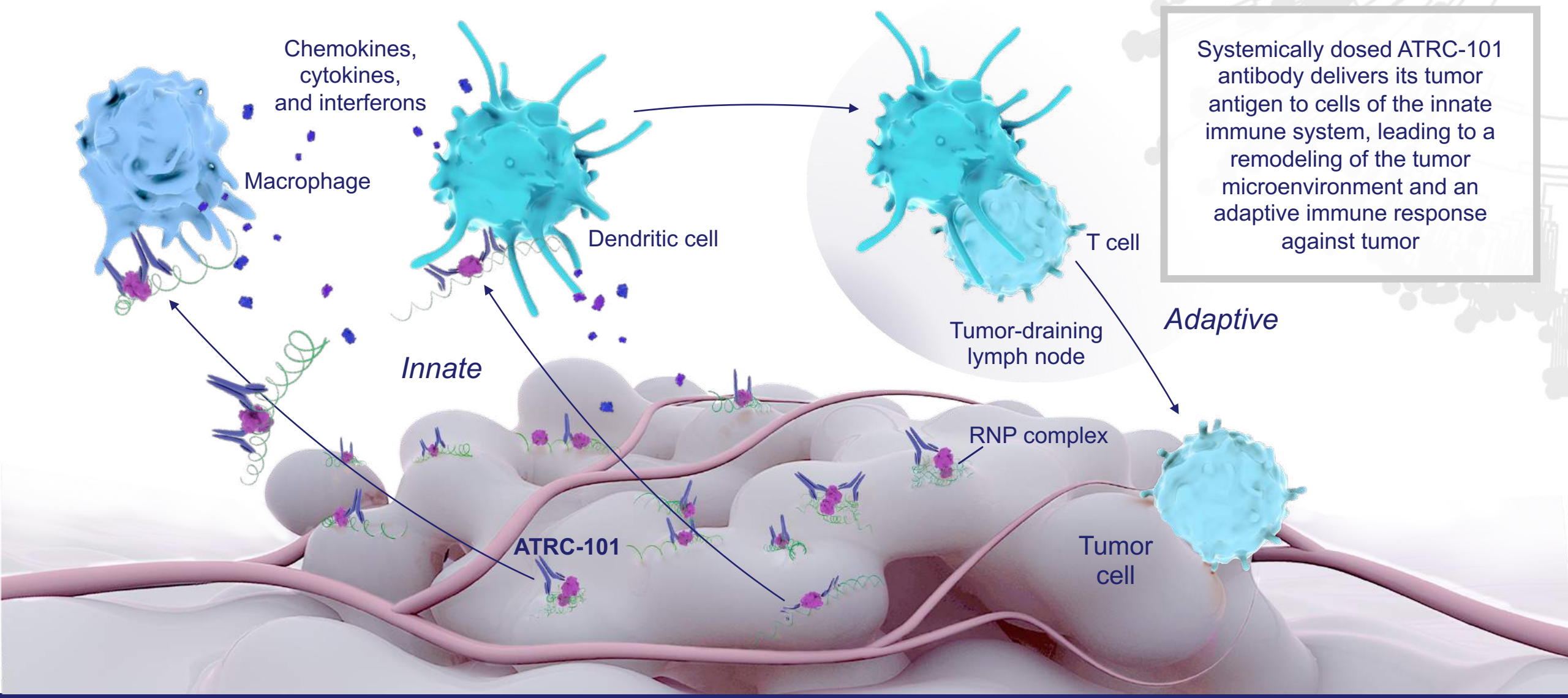
Chemotherapy Induces the Target of ATRC-101 *in vivo*

Doxorubicin induces the target of ATRC-101 at dose levels that have limited effect on tumor growth



Number EMT6 tumors with increased reactivity	n = 0/10	n = 5/10	n = 7/10	n = 7/7	$P < 0.0001$

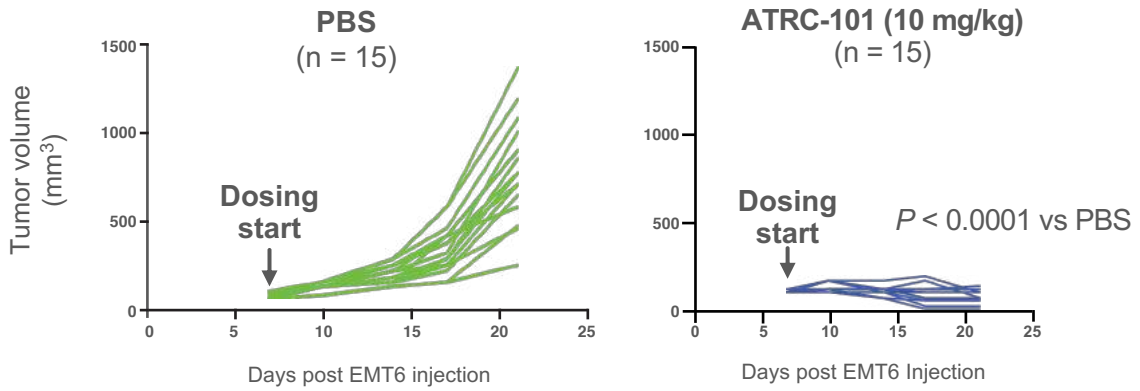
ATRC-101: A Novel Way to Target Cancer

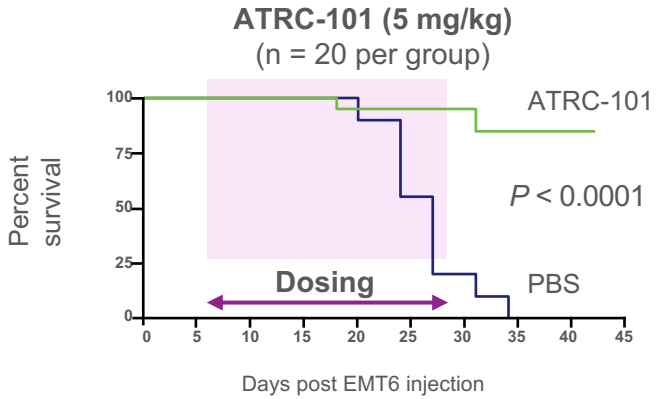


Systemically dosed ATRC-101 antibody delivers its tumor antigen to cells of the innate immune system, leading to a remodeling of the tumor microenvironment and an adaptive immune response against tumor

ATRC-101 Exhibits Potent Single-Agent Activity in Mouse Models of Cancer

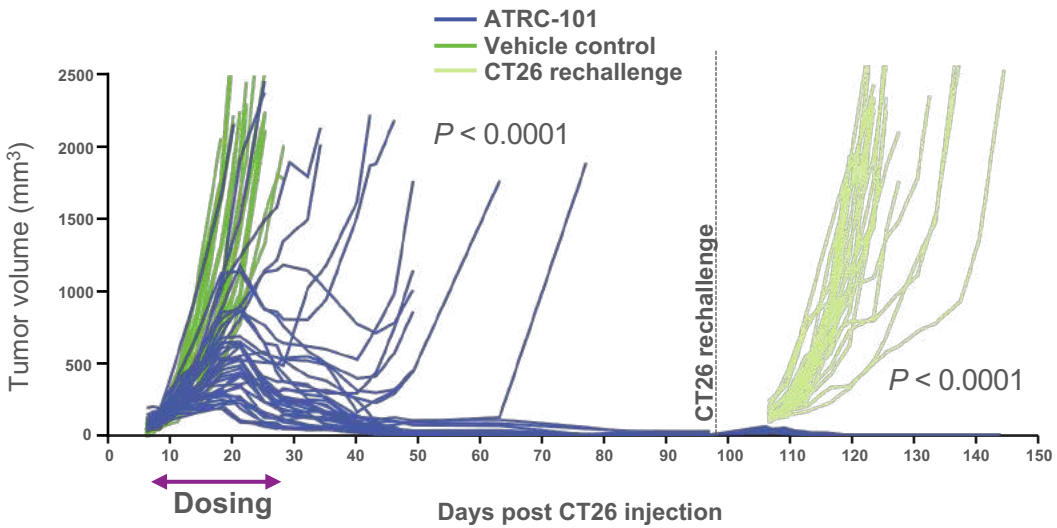
ATRC-101 inhibits tumor growth and prolongs survival in EMT6 syngeneic tumor model





- EMT6 model considered a model of the T cell-excluded phenotype in human cancer
- In these mice, ATRC-101 inhibited tumor growth and extended survival compared with control treatment

ATRC-101 inhibits tumor growth and leads to immune memory in CT26 syngeneic model

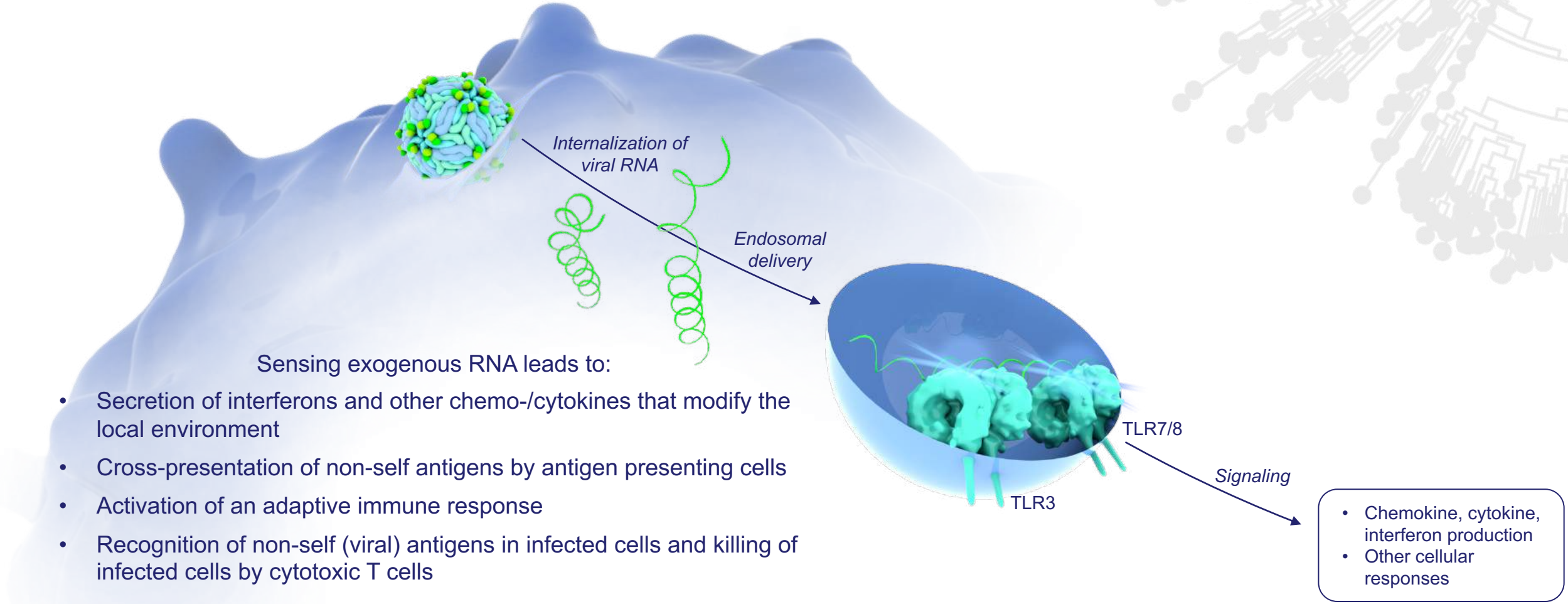


Large tumors can be eradicated in this model by continued dosing with ATRC-101

Immune memory prevents re-establishment of tumors after tumor clearance by a second CT26 injection (also observed in EMT6 model)

PBS, phosphate buffered saline.

Detection of Exogenous RNA by Myeloid Cells is Important in Immune Responses Against Viral Infection



Sensing exogenous RNA leads to:

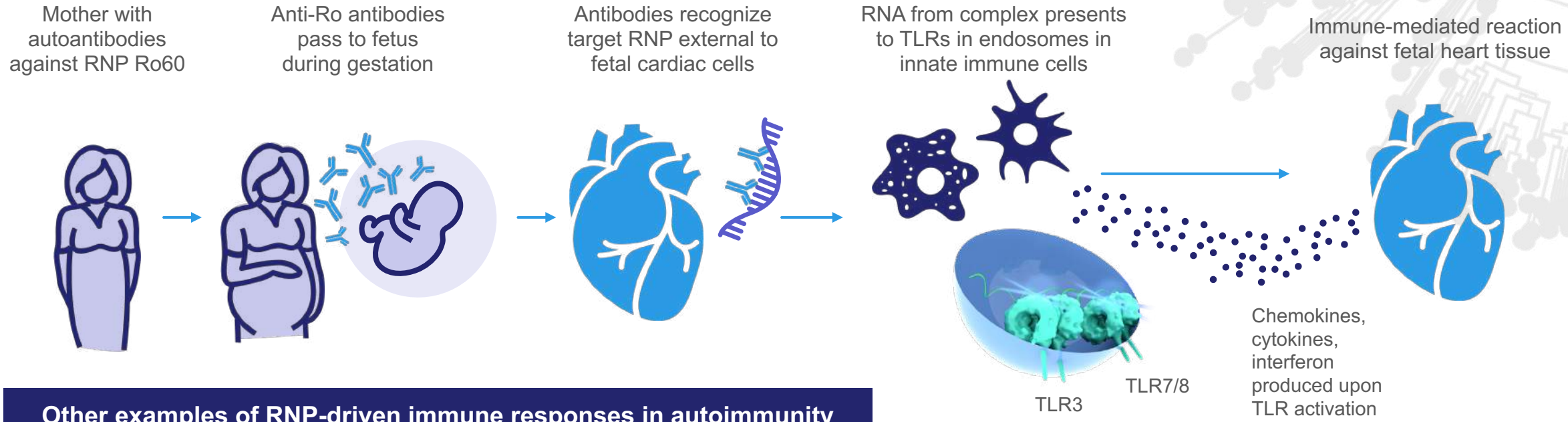
- Secretion of interferons and other chemo-/cytokines that modify the local environment
- Cross-presentation of non-self antigens by antigen presenting cells
- Activation of an adaptive immune response
- Recognition of non-self (viral) antigens in infected cells and killing of infected cells by cytotoxic T cells

TLR, Toll-like receptor.

Boehme KW, et al. *J Virol*. 2004;78:7867-7873.

RNP Complexes are Antigens that Drive Tissue-Destructive Immune Responses in Autoimmune Disease

Neonatal lupus as an example of immune response initiated by an antibody–RNP complex in humans[1]

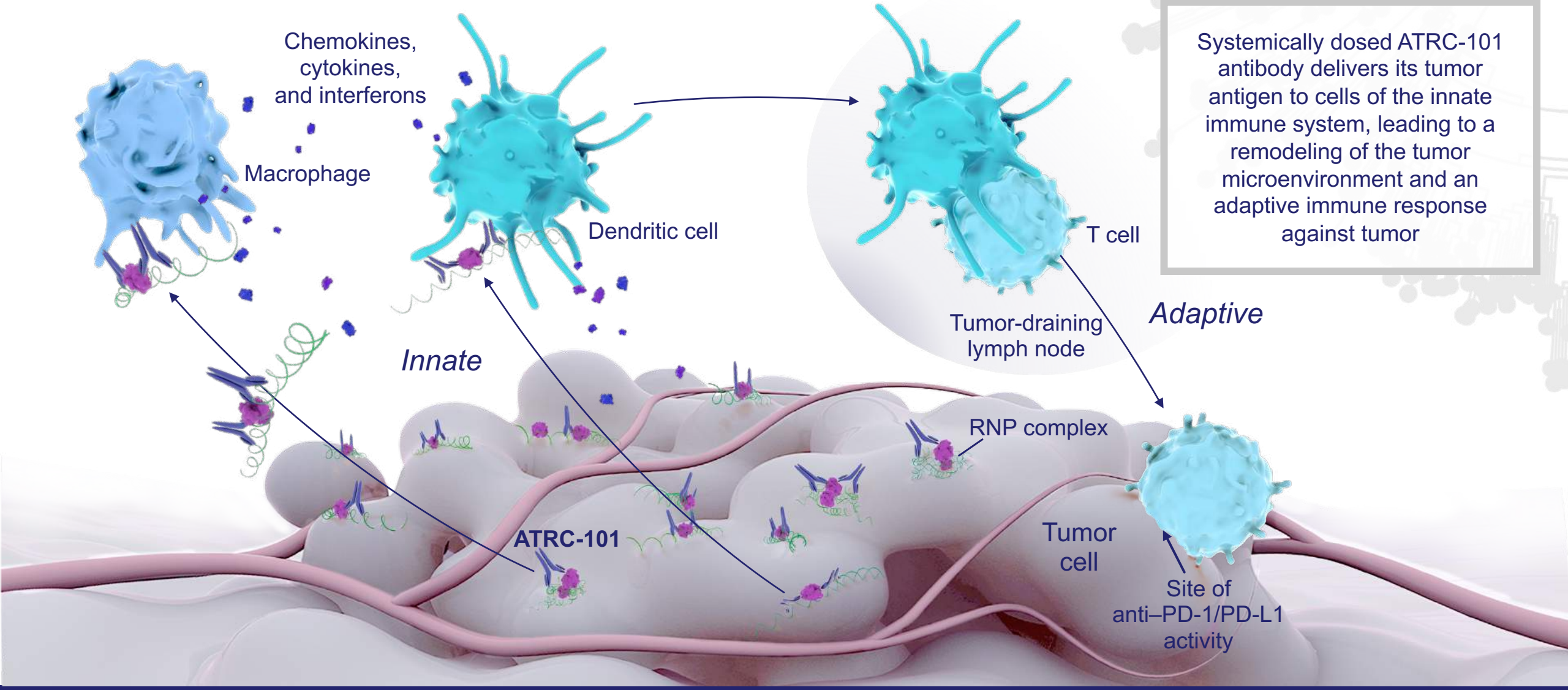


Other examples of RNP-driven immune responses in autoimmunity

- Sjögren's syndrome[2]
- Mixed connective tissue disease[3]
- Paraneoplastic syndromes[4]

1. Ambrosi A, et al. *Arthritis Res Ther*. 2012;14:208. 2. Routsias JG, et al. *Eur J Clin Invest*. 2010;40:1026-1036.
3. Agris PF, et al. *Immunol Commun*. 1984;13:137-149. 4. Darnell RB, et al. *N Engl J Med*. 2003;349:1543-1554.

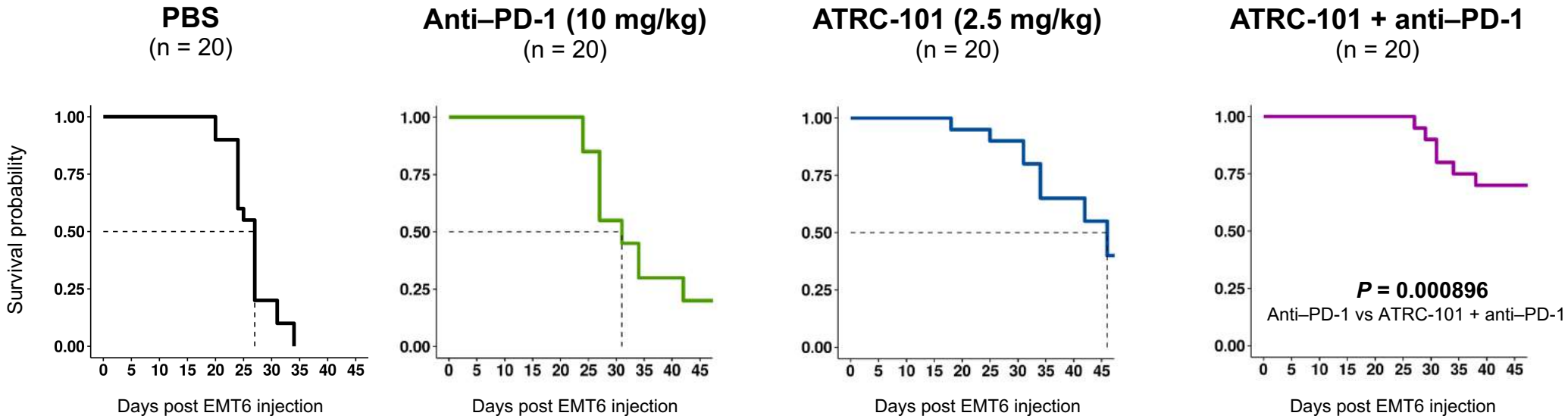
Mechanistic Rationale for Combination with Anti–PD-1



Systemically dosed ATRC-101 antibody delivers its tumor antigen to cells of the innate immune system, leading to a remodeling of the tumor microenvironment and an adaptive immune response against tumor

ATRC-101 Facilitated Activity of Checkpoint Inhibitors and other T Cell Focused Therapeutics in an Animal Model

ATRC-101 facilitates anti–PD-1 activity in a model of the T cell-excluded phenotype



Anti–PD-1: Dosing 2x per week x 2 weeks (last dose Day 21).
ATRC-101 antibody: Dosing 2x per week x 3.5 weeks (last dose Day 28).

By engaging the innate immune system to modify the tumor microenvironment and drive an adaptive immune response involving T cells, ATRC-101 may lead to greater activity for agents that target T cells

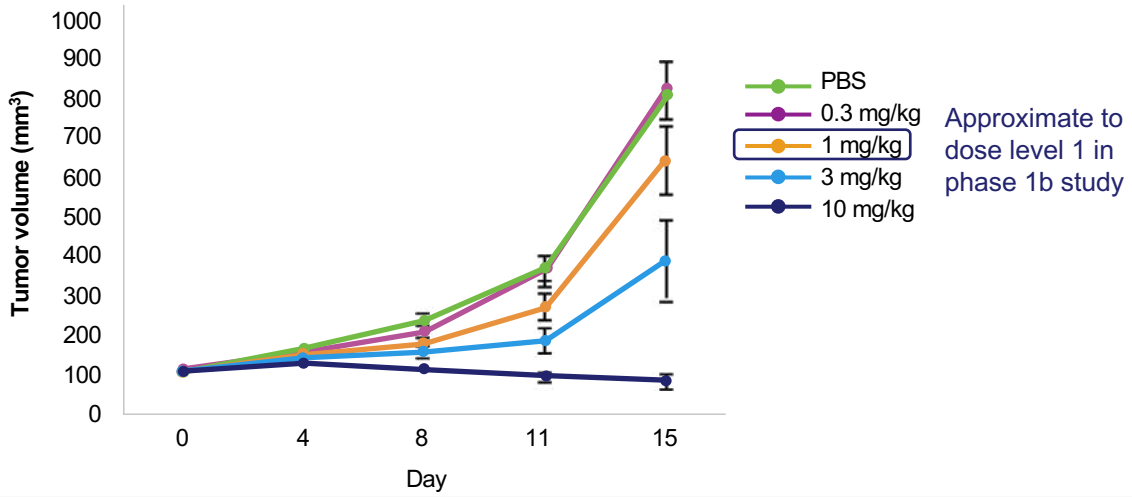
PD-1, programmed death-1.

ATRC-101 Possesses Dose-Dependent Activity in Preclinical Models with No Substantial Safety Concerns

Dose-dependent tumor growth inhibition and activity

Phase 1b dosing

- Correlation between dose and anti-tumor activity demonstrated in preclinical studies
- Starting dose in the phase 1b trial (0.3 mg/kg) approximates the 1 mg/kg dose evaluated in the EMT6 mouse model



Safety studies summary

Normal tissue binding

- No signal of toxicological significance observed across a wide range of normal human tissues in a GLP tissue cross-reactivity study

In vivo safety assessments

- Four repeat doses over 4 weeks of up to 100 mg/kg in NHPs were well tolerated and no definitive safety signals were observed
- No definitive safety signals observed in repeat dose safety studies in normal and tumor-bearing mice (EMT6)

GLP, good laboratory practice; NHP, nonhuman primate.

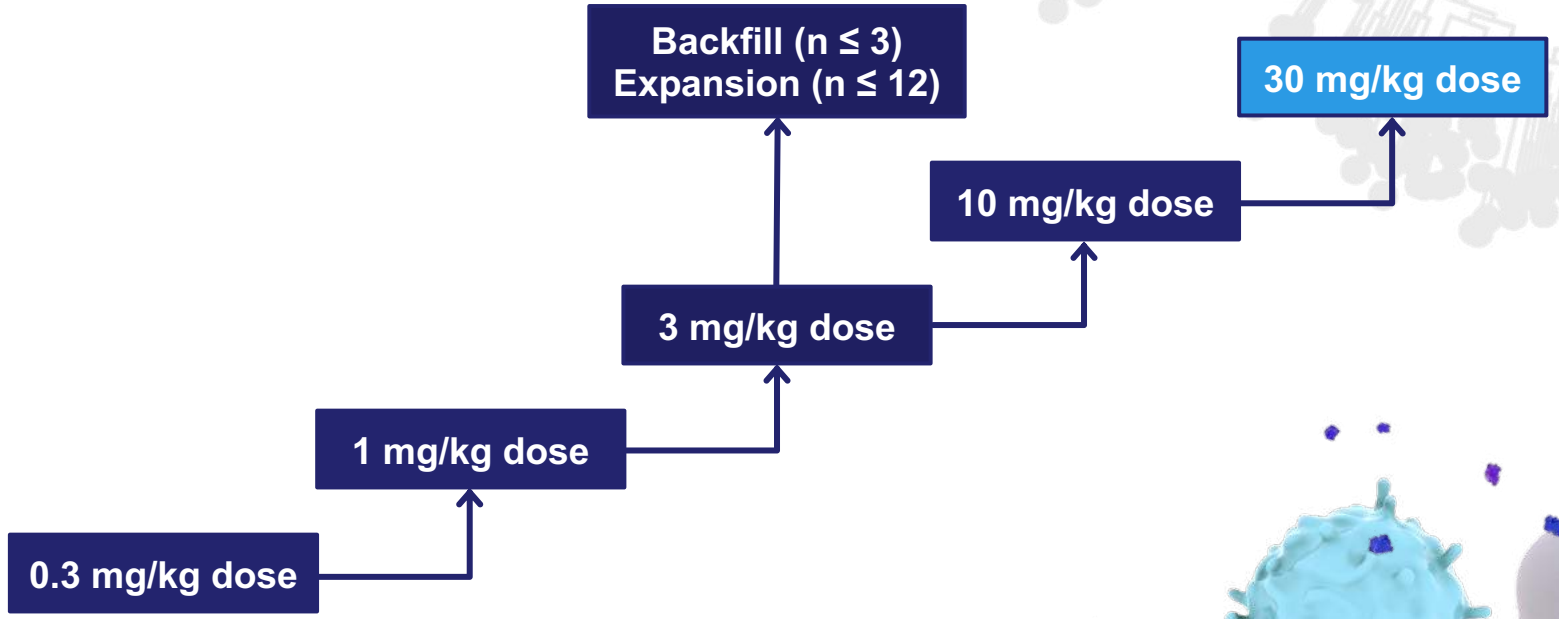
A Phase 1b Trial was Initiated in Early 2020

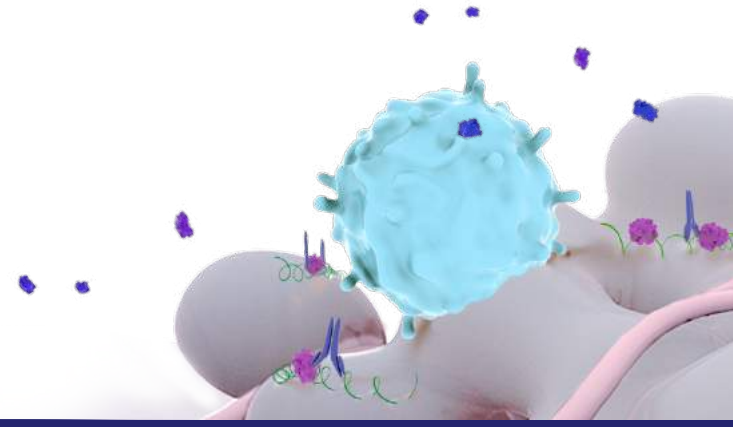
OBJECTIVES

- Characterize safety
- Determine MTD or RP2D
- Analyze target expression retrospectively
- Measure initial clinical activity
- Characterize tumor lymphocyte infiltration and other potential biomarkers of activity in tumors, plasma, and PBMCs

MONOTHERAPY ARM

- Open-label, dose-escalation, adaptive 3+3 design
- Dosing cycle: IV infusion q21d
- Enrolling patients with advanced solid tumors that demonstrated >50% reactivity to ATRC-101 in preclinical studies, including:
  - Ovarian
  - NSCLC
  - Colorectal
  - Breast
  - Acral melanoma





Enrollment in 30mg/kg dose cohort planned following Dose Review Committee clearance, as of 5/13/21 (1Q21 Update)

IV, intravenous; MTD, maximum tolerated dose; NSCLC, non-small cell lung cancer; PBMC, peripheral blood mononuclear cell; q21d, every 21 days; RP2D, recommended phase 2 dose; DLT, dose-limiting toxicity.

Considerations for Clinical Development

Monotherapy (enrolling)

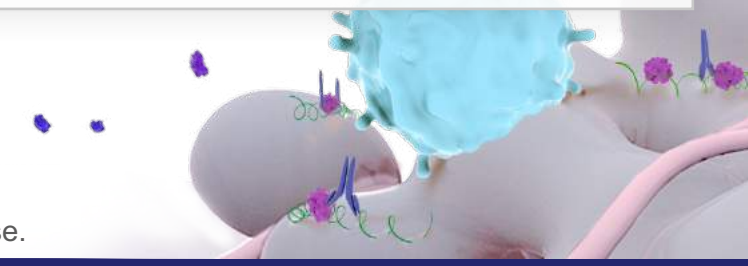
- **Rationale** – monotherapy activity in preclinical models
- **Trial stages***
  - Dose-escalation/expansion to characterize safety and identify RP2D
    - Eligibility – multiple tumor types defined by target expression
  - Efficacy expansion cohorts (single indication or biomarker defined)

Checkpoint inhibitor combination

- **Rationale**
  - Supported by MOA
  - Preclinical data suggestive of synergy
- **Trial stages***
  - Dose escalation with fixed dose of checkpoint inhibitor
  - Efficacy expansion/phase 2

Chemotherapy combination

- **Rationale**
  - Chemo may increase target expression
  - Chemo may promote antigen release
  - Independent pathways to cell killing
  - Precedence of combining chemotherapy with tumor-targeting antibodies (*e.g.*, trastuzumab plus paclitaxel)
  - Opportunity to introduce earlier in treatment course
- **Trial stages*** – phase 2 with safety run-in at dose level RP2D-1



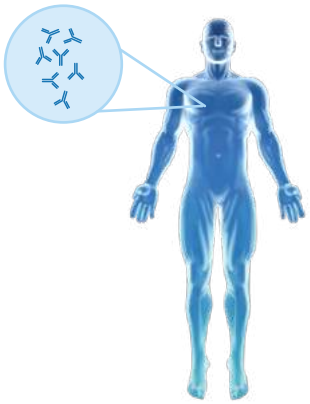
* Trial stages and study designs are subject to FDA agreement and emerging data.

Chemo, chemotherapy; FDA, United States Food and Drug Administration; MOA, mechanism of action; RP2D, recommended phase 2 dose.

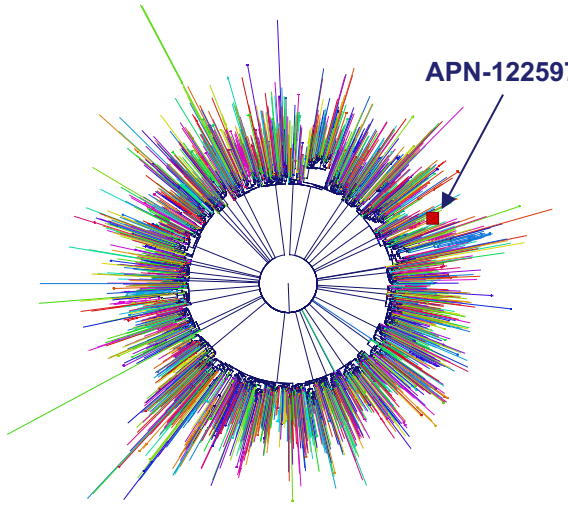
EphA2 Program

EphA2: A Validated and Potentially High Value Target

Lead antibody APN-122597 discovered via the Atreca platform



Lung adenocarcinoma patient with tumor shrinkage and active anti-tumor immune response after treatment with nivolumab



Analysis of IRC®-generated antibody repertoire identified a small clonal family with APN-122597 as the most divergent member*

EphA2 extracellular domain[1]

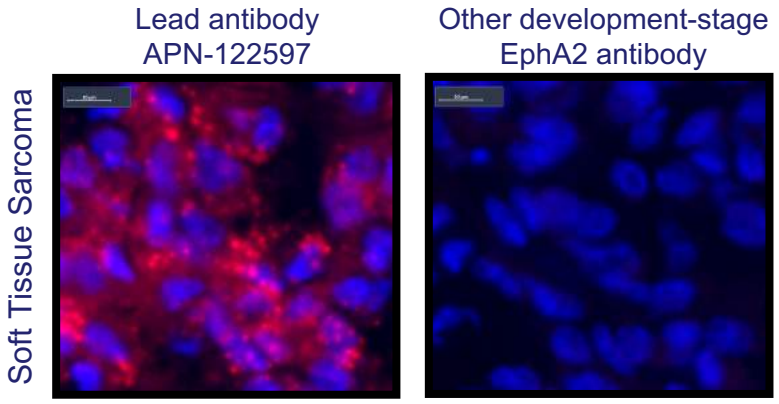
- Receptor tyrosine kinase (RTK) validated as tumor target with no approved therapies
- Limited number of development-stage programs currently targeting
- Overexpressed in **many** cancers
  - Melanoma
  - Colon
  - Glioma
  - Esophageal
  - Prostate
  - Gastric
  - Breast
  - Cervical
  - Ovarian
  - Bladder
  - Lung

* Branches differentially colored by lineage.

1. Seiradake E, et al. Crystal structure of the complete EphA2 ectodomain. doi: 10.2210/pdb2X10/pdb.

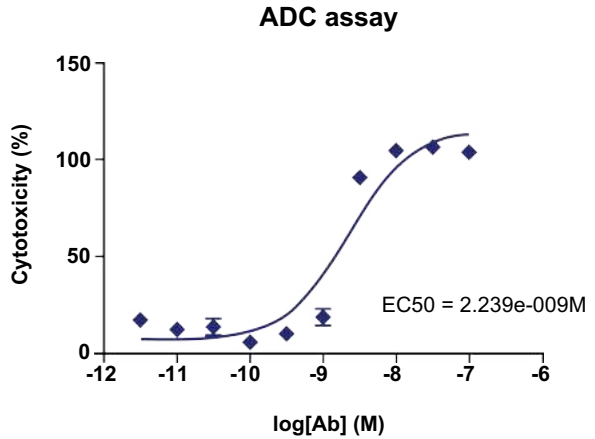
Program Lead Differentiated Across Multiple Parameters

Reactivity with tumor tissue and cells



- No reactivity with other Eph family members
- No reactivity of toxicological significance observed in a human tissue cross-reactivity study

Activity profile



- Active *in vitro* in multiple formats
- No apparent induction of EphA2 activation or interference with ligand-induced activation

Binding and structure

Membrane proximal extracellular epitope

Crystallized Fab shows **differentiating structural features** often found via IRC®

Optimization underway with low risk of sequence-based manufacturing liabilities

Discovery Programs and Weaponization

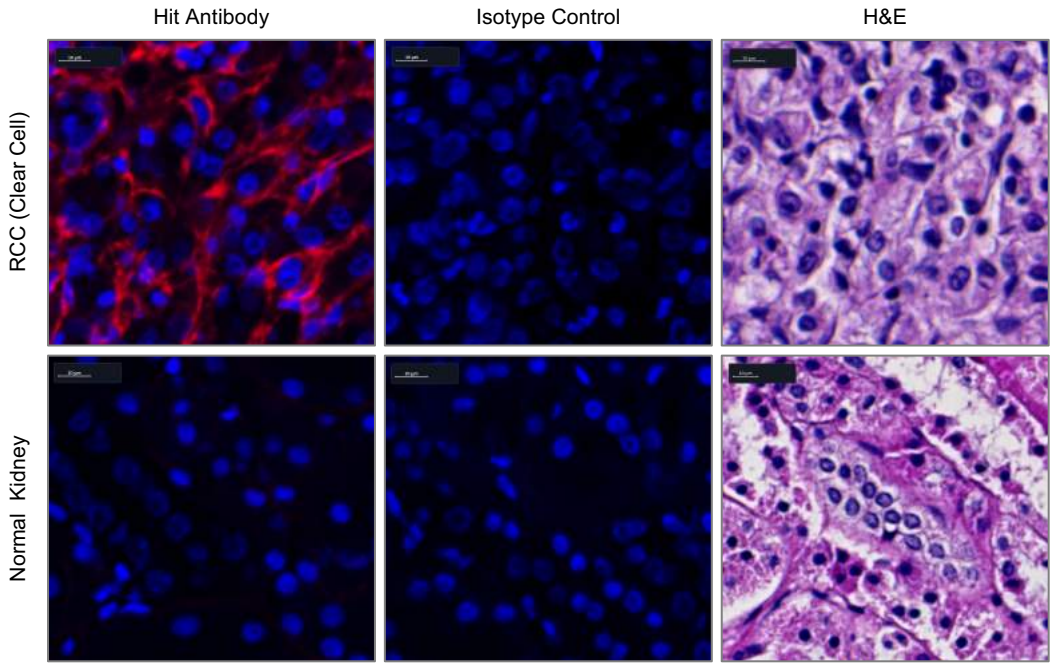
Pipeline

Asset	Target	Format/MOA	Discovery	Lead / Preclinical	Phase 1	Phase 2	Collaborators
ONCOLOGY							
ATRC-101	Novel RNP Complex	Activating Fc; Driver Antigen Engagement		→	→		ATRECA
APN-122597	EphA2	Multiple Formats Being Evaluated		→			ATRECA
Multiple	Multiple	T Cell Engagement		→			ATRECA, Xencor
		ADC (Cytotoxic)		→			ATRECA + undisclosed
		Immunostimulation		→			ATRECA + undisclosed
		Others		→			ATRECA
COVID-19							
Alliance to discover, develop, and manufacture therapeutic antibodies	Multiple	Targeting SARS-CoV-2		→			ATRECA, IGM Biosciences, BeiGene

ADC, antibody–drug conjugate; EphA2, ephrin type-A receptor 2; MOA, mechanism of action; RNP, ribonucleoprotein.

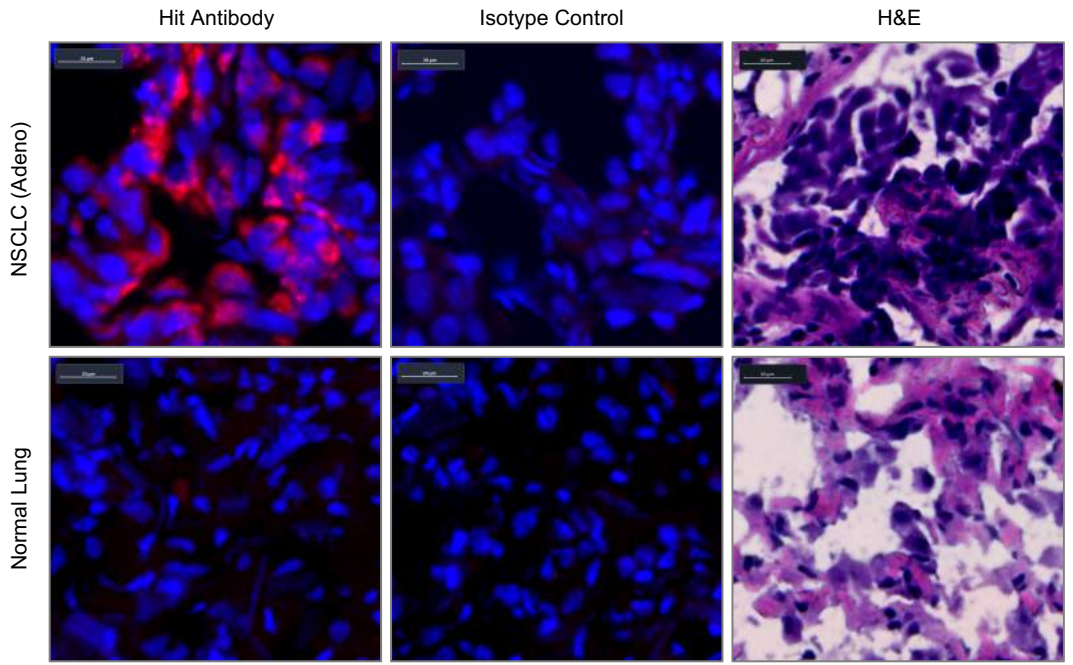
Examples of Antibody-Target Pairs

Glycan Target



- Novel oncology target
- Present in multiple tumor types
- Active in ADCC, ADCP assays
- Being evaluated in multiple potential formats

EphA2

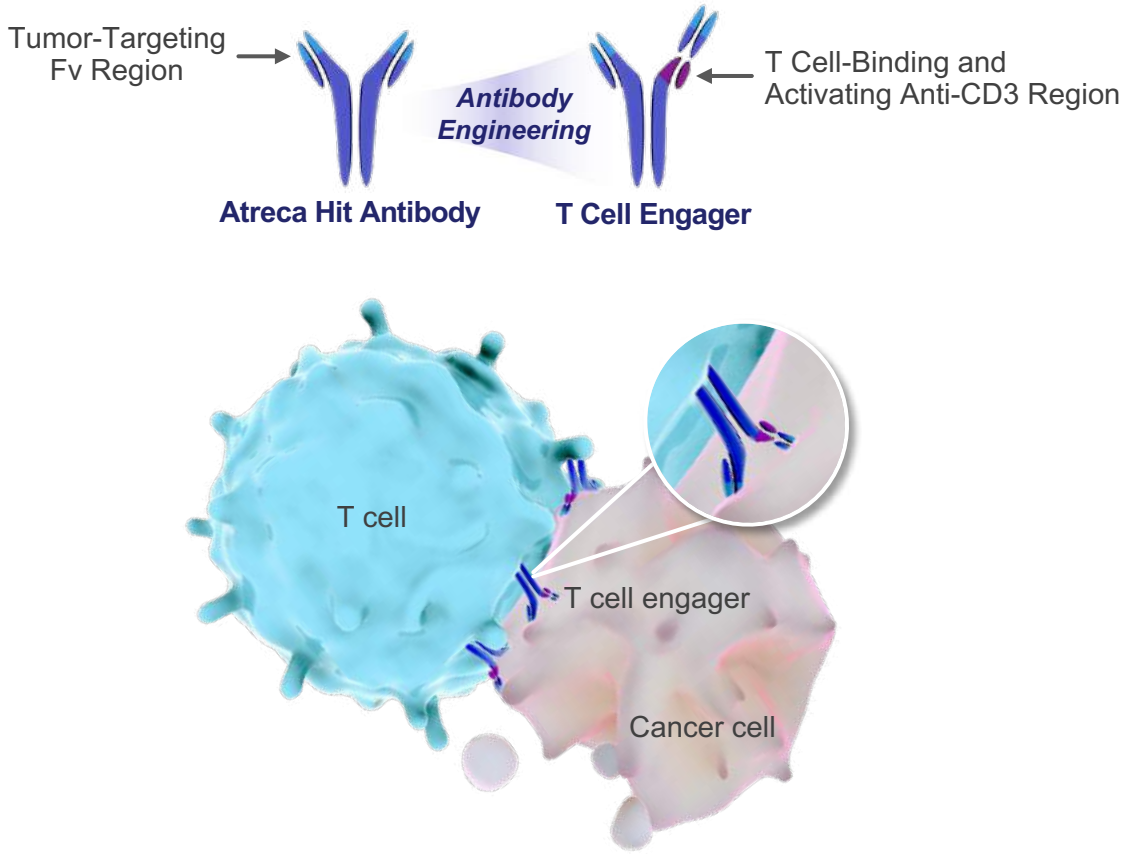


- Known oncology target (no approved therapy)
- Present in multiple tumor types
- Active in ADCC, ADCP, ADC assays
- Being evaluated in multiple potential formats

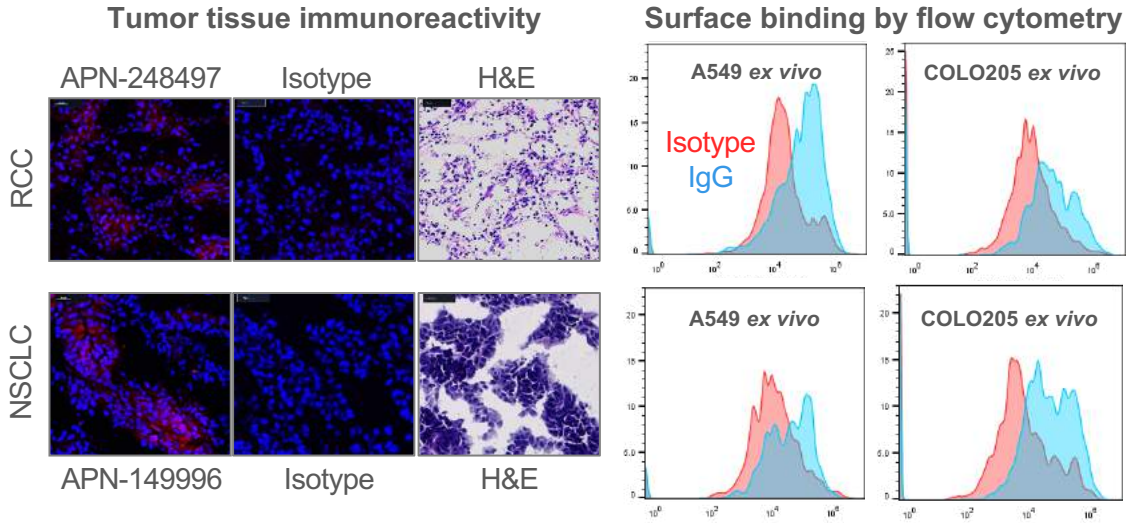
ADCC, antibody–dependent cellular cytotoxicity; ADCP, Antibody-Dependent Cellular Phagocytosis; ADC, antibody–drug conjugate.

T Cell Engagers
Xencor Partnership

CD3-binding bispecifics bring T cells into contact with cancer cells and activate the T cells



Atreca antibodies being advanced as T cell engagers have been characterized *in vitro*



- Atreca antibodies have also been characterized for:
  - Reactivity to other tumor types and normal tissues
  - Expression, thermal stability, and polyspecificity in multiple Xencor bispecific formats
  - T cell-dependent cellular cytotoxicity in bispecific format

CD3, cluster of differentiation 3; H&E, hematoxylin and eosin; IgG, immunoglobulin; NSCLC, non-small cell lung cancer; RCC, renal cell carcinoma.

Collaborating with Xencor to Discover and Develop Novel T Cell-Engaging Bispecific Antibodies

- **Atreca** will provide antibodies against novel targets from which **Xencor** will engineer XmAb bispecific antibodies that bind to the CD3 receptor on T cells
- Up to two joint programs will be mutually selected for further development and commercialization with 50/50 cost and profit sharing
  - Each company will lead development, regulatory, and commercialization activities for one of the joint programs
  - Atreca to lead the first joint program
- Each partner may pursue up to two programs independently with royalties payable on net sales; **Xencor** to select and lead the first independent program
- Work began in 2019 under a material transfer agreement to accelerate the collaboration
- **Xencor** is a leader in generating **CD3-binding bispecific T cell engagers** from initial antibody engineering and manufacturing through clinical development; advantages of the platform relevant to **Atreca** include:
  - Bispecific Fc domain technology that retains full-length antibody properties in a bispecific antibody format
  - Ability to tune the potency of T cell killing in a plug-and-play manner

Key Milestones and Financial Overview

Anticipated Milestones and Financial/IP Overview

Milestones

2020	2021	2022
✓ Initiate Phase 1b trial of ATRC-101	Ongoing phase 1b data collection and reporting	Target IND filing for second product candidate
✓ Potential strategic drug discovery partnership	Initiate study of ATRC-101 plus anti-PD-1	
	Initiate study of ATRC-101 plus chemotherapy	

Financial Overview

- **$125M** equity financing completed in **July 2020**
- Current capital expected to be adequate to fund operations into **1H23**
- Cash, cash equivalents & investments of **$211.7M** as of **March 31, 2021**

Intellectual Property

- Patents issued in multiple jurisdictions covering key aspects of Atreca technologies and platform, including recently allowed US patent application, exclusively licensed to Atreca, covering fundamental aspects of Atreca's Immune Repertoire Capture® technology (IRC®)
- Patent applications covering compositions of matter and methods of use for ATRC-101 and related antibodies filed internationally