Corporate Presentation

CUE BIOPHARMA™

Immune Responses, On Cue™

Nasdaq: CUE

May 2019

Forward-Looking Statements

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CUE™
BIOPHARMA

Cue Biopharma

- Publicly listed company, founded in 2015 out of the Albert Einstein College of Medicine around breakthrough technology enabling selective modulation of disease relevant T cells directly in a patient's body

- Recently received first IND approval, allowing initiation of a translation-led clinical development strategy for our lead asset CUE-101 in oncology, with initial safety and biologic activity data sets expected in late 2019

- Modular Immuno-STAT platform presents applications in oncology (IO), autoimmune (AI), chronic infectious disease (CID) and we have established strategic partnerships with LG Chem to accelerate our IO pipeline and Merck to demonstrate proof of mechanism in AI

CUE™
BIOPHARMA

Vision and Approach

Vision

Harness the specificity and diversity of the immune system to cure complex human diseases and fundamentally transform patient lives

Approach

Deploy rational protein engineering with our Immuno-STAT™ platform to develop biologics that selectively and specifically modulate disease-relevant T cells in a patient's body

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Immune Balance: A Key Component of Human Health

Autoimmune Disease

Over Stimulation

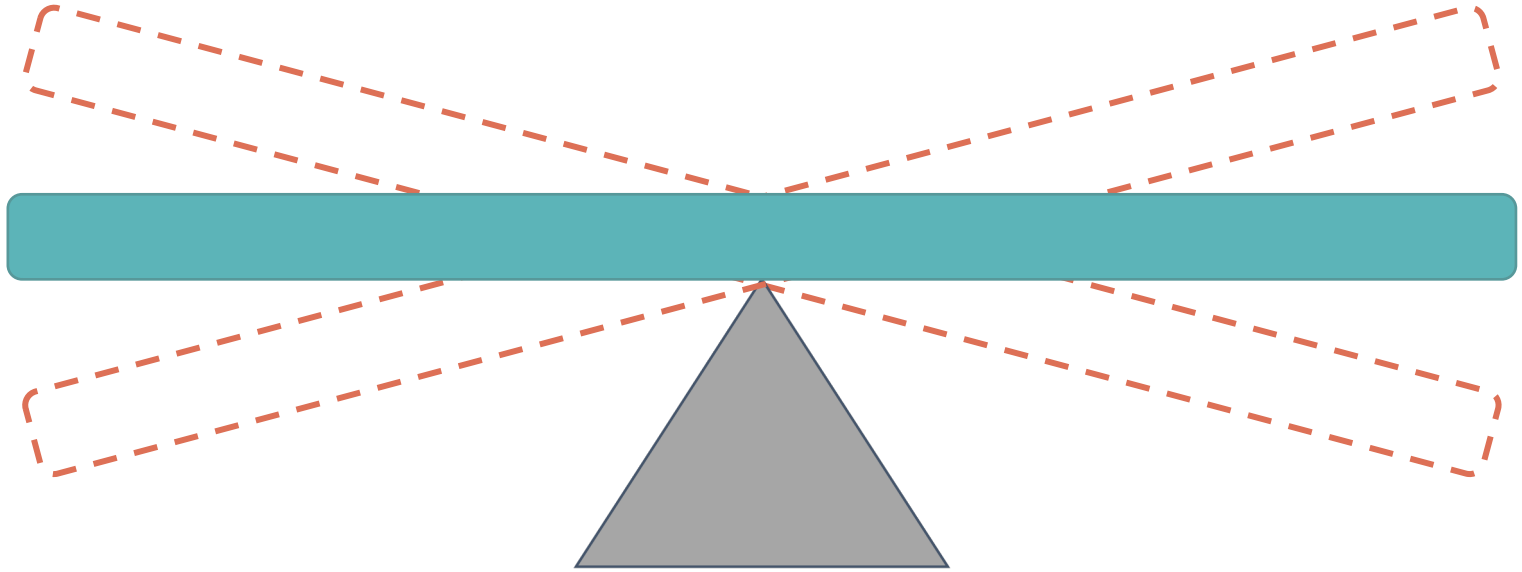
Requires inhibition of pathogenic effector T cells and/or selective activation of Tregs

Balance

Suppression

Requires expansion of tumor-specific effector T cells or reversal of exhausted T cells

Cancer & Infection



Cue Biopharma is focused on restoring the body's natural immune balance to cure complex human diseases

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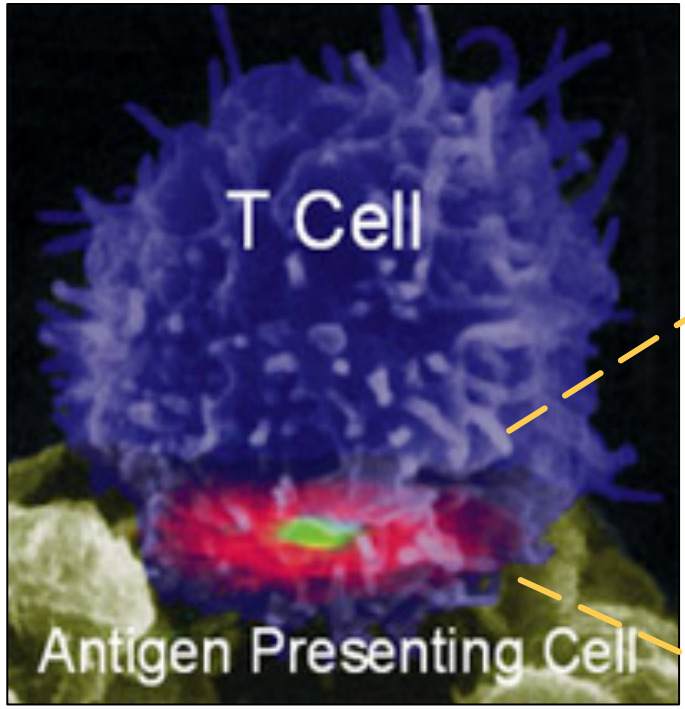
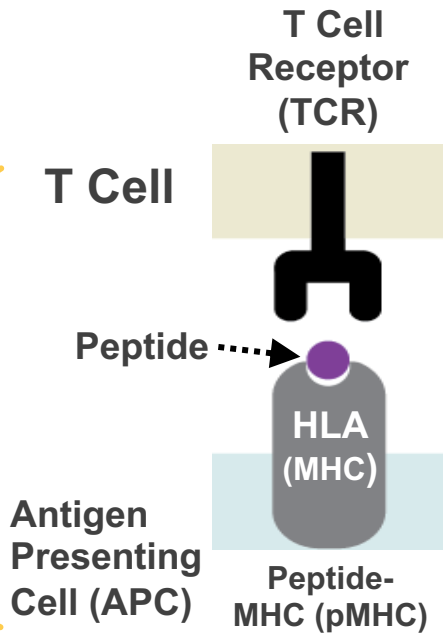
Immune Synapse: Determines T Cell Modulation and Fate

Nature's Cues

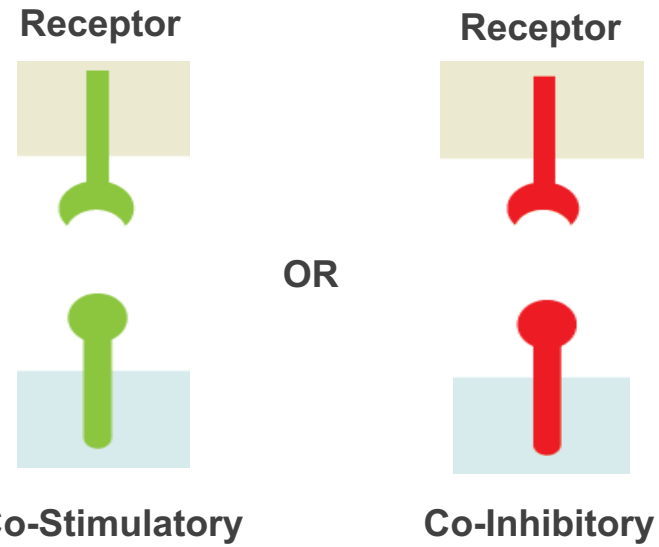


Source: Dustin ML. "The Immunological Synapse"

Signal 1
Selectivity / Specificity

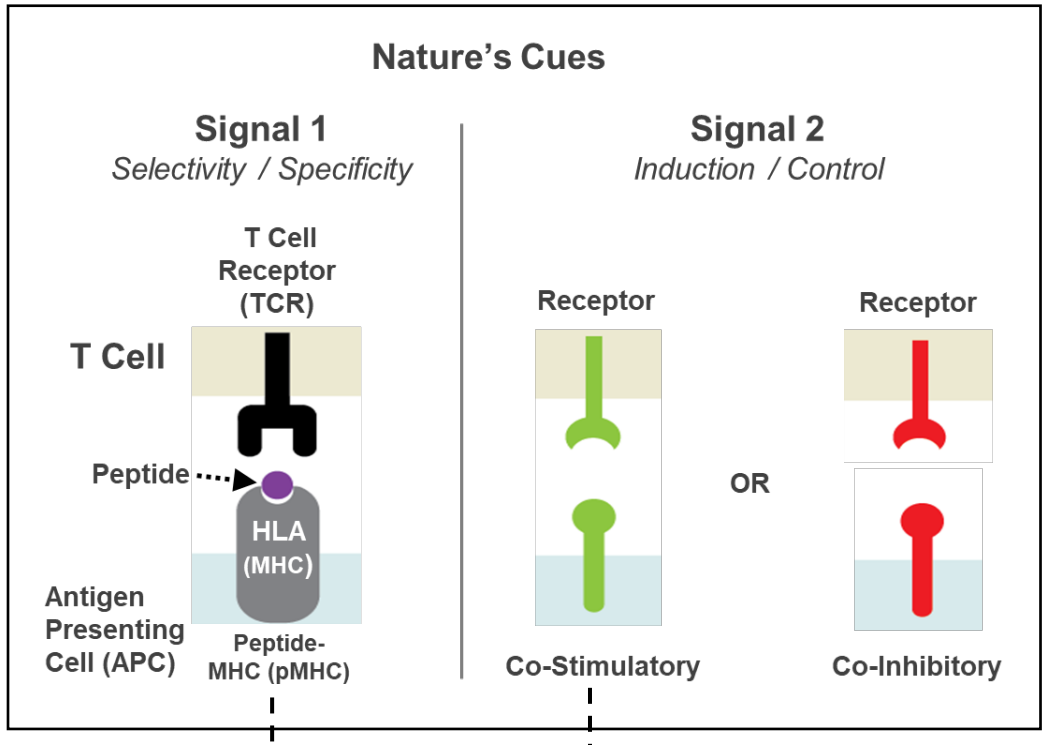


Signal 2
Induction / Control

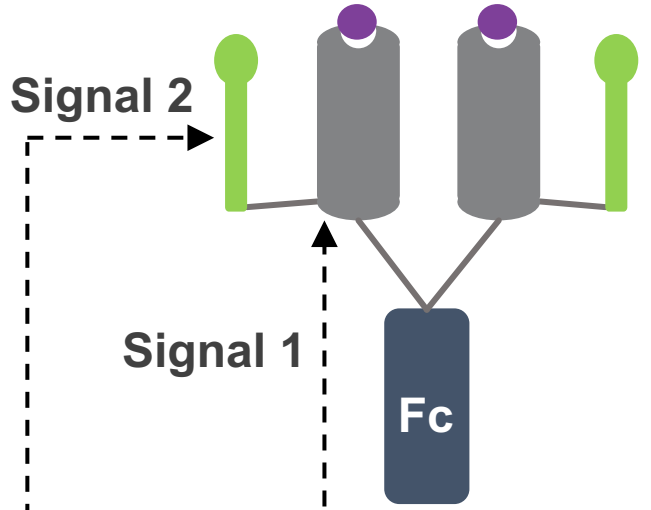


Selective T cell activation requires two distinct signals

The Immuno-STAT: Emulating Nature's Cues



Immuno-STAT
(**S**elective **T**argeting and **A**lteration of **T** cells)



We have rationally engineered the Immuno-STAT to selectively activate disease-relevant T cells

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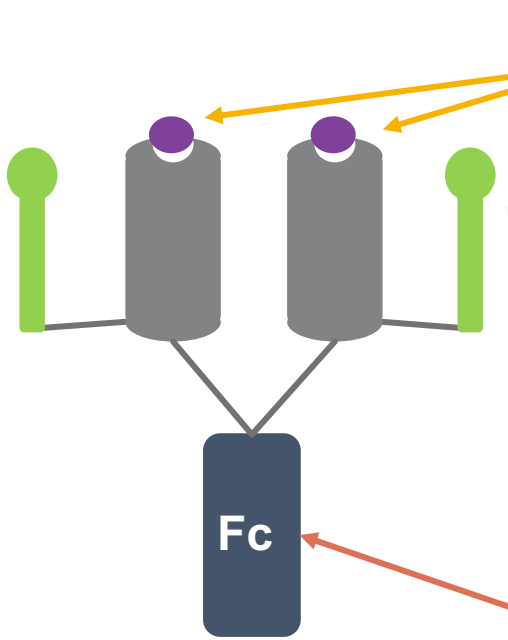
Immuno-STAT Framework



Signal 1
A stabilized peptide-MHC complex (pMHC) to engage disease relevant T cells

Signal 2
A co-stimulatory or inhibitory signal to control the activity of target T cells

Fc Backbone
A well-characterized construct that provides stability and ease of manufacture

Key Points of Differentiation

- **"Ready-to-engage"** biologic that **specifically targets and selectively modulates disease relevant T cells**
- **Not dependent on barriers of natural antigen presentation via antigen presenting cells** (e.g., vaccines)
- Ability to control **specificity, quantity and quality** of the modulating signal rather than systemic, non-selective signaling (e.g., rIL-2, bi-specifics, etc.)
- **Administered directly to the patient and does not involve ex-vivo manipulation of T cells** (e.g., cell therapy)

A single biologic that incorporates antigen specificity, along with secondary activating or inhibitory signals, to achieve T cell modulation

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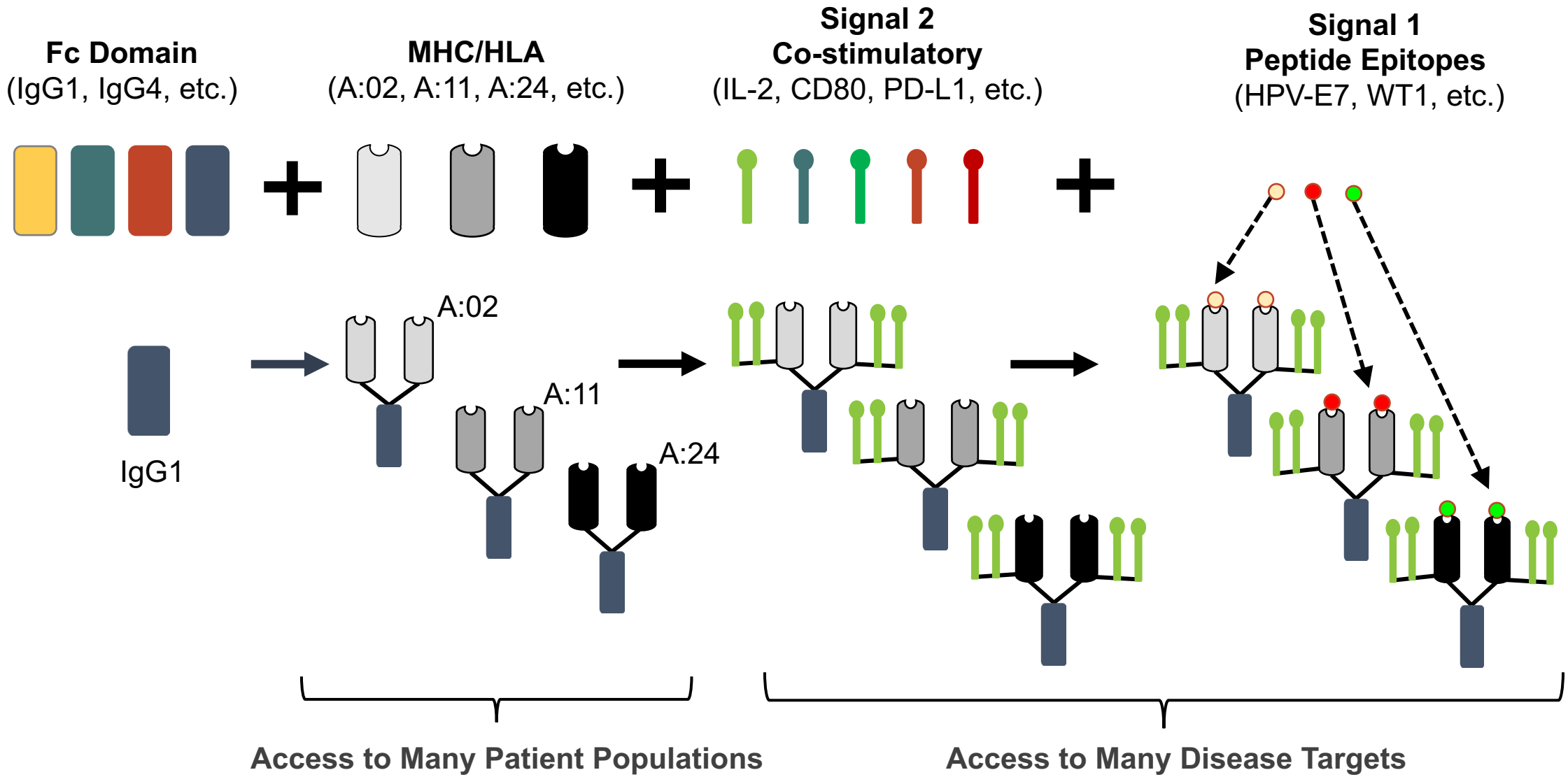
Immuno-STAT Modularity



Value Creation Strategy

Immuno-Oncology

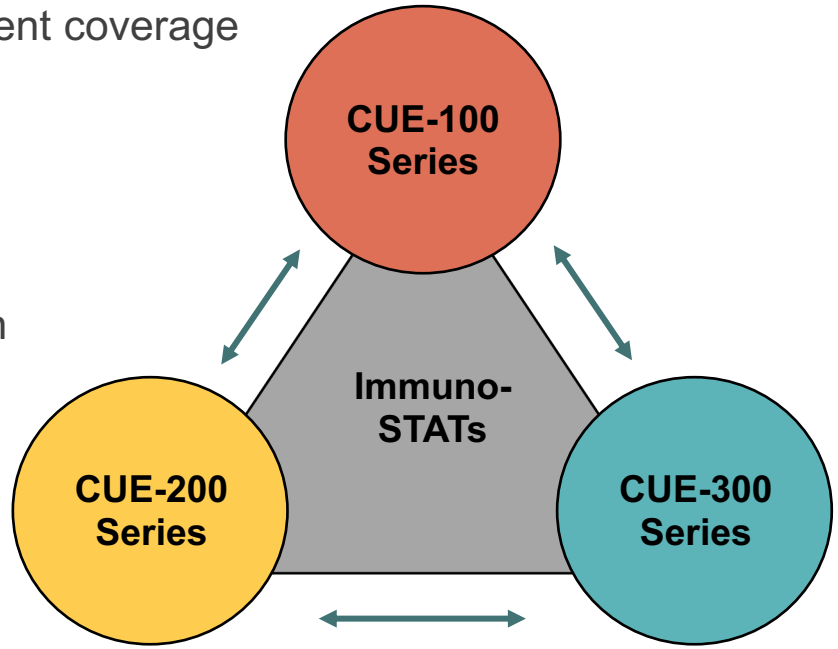
Expansion of tumor-specific effector T cells

- Demonstrate Immuno-STAT proof of concept in the clinic with CUE-101
- Asia partnership with LG Chem expands pipeline and patient coverage

Chronic Infectious Disease

Reversal/expansion of exhausted T cells

- Generate PoC data with Albert Einstein
- Partner with infectious disease leader



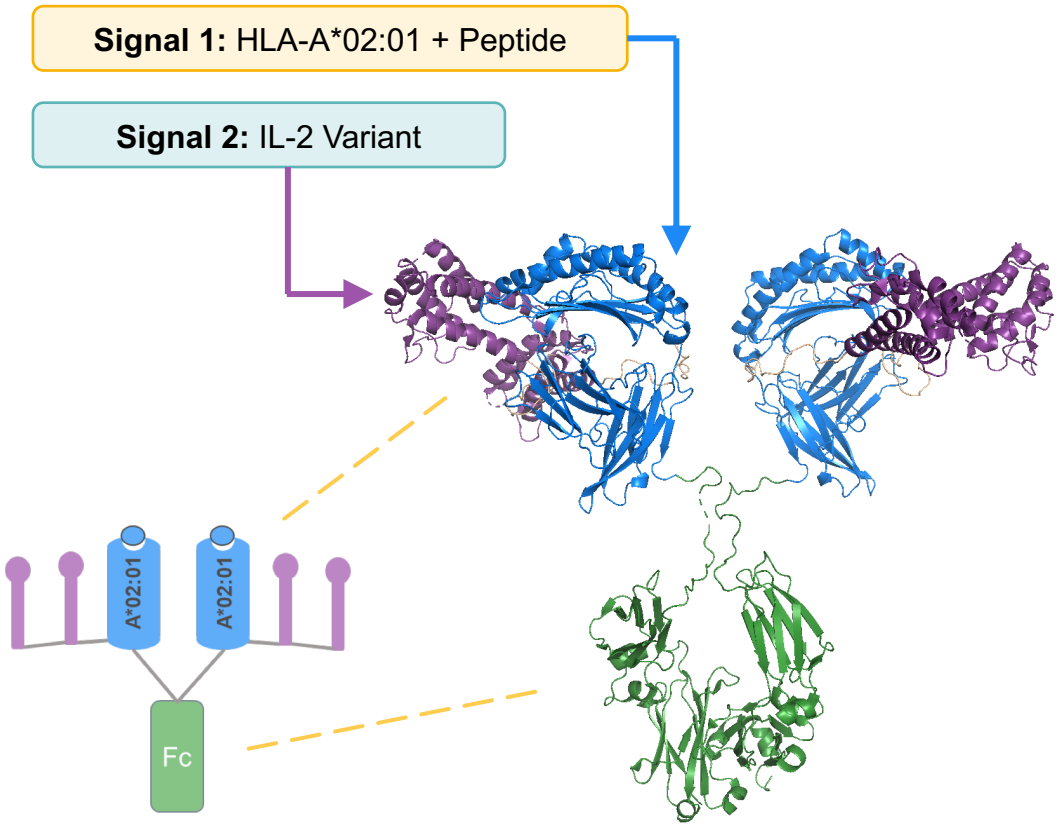
Autoimmune Disease

Selective activation of Tregs and/or inhibition of pathogenic effector T cells

- Establish proof of mechanism through R&D collaboration with Merck
- Partner for large, primary care indications

Cue Biopharma is developing MHC Class I and Class II Immuno-STATs to strategically address opportunities in cancer, chronic infectious disease and autoimmune disease

Immuno-STAT CUE-100 Series



CUE-100 Series Incorporates

- **HLA class I (A*02:01; A*11:01; A*24:02)**
- **IL-2 variant (affinity attenuated against IL-2R alpha and beta subunits)**

Manufacturability of CUE-100 molecules follows standard upstream and downstream processes for commercial mAb production

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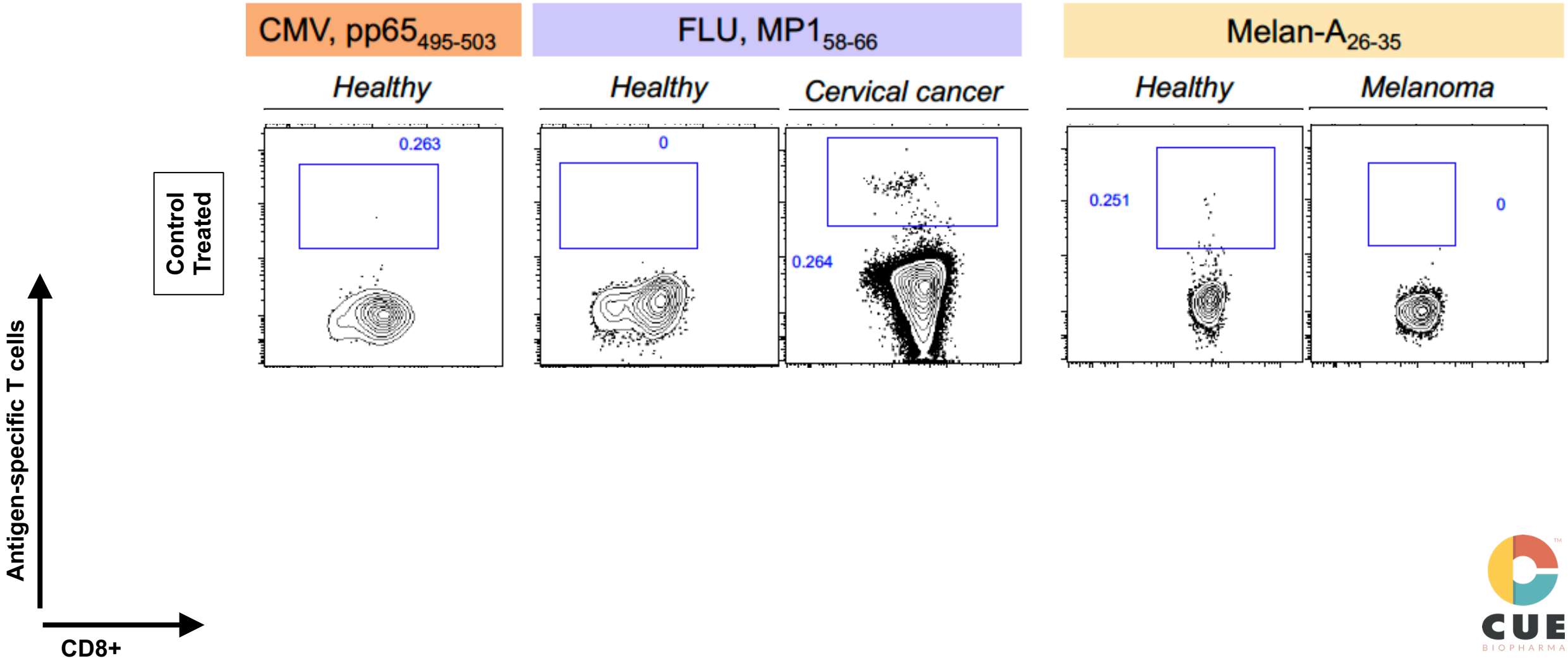
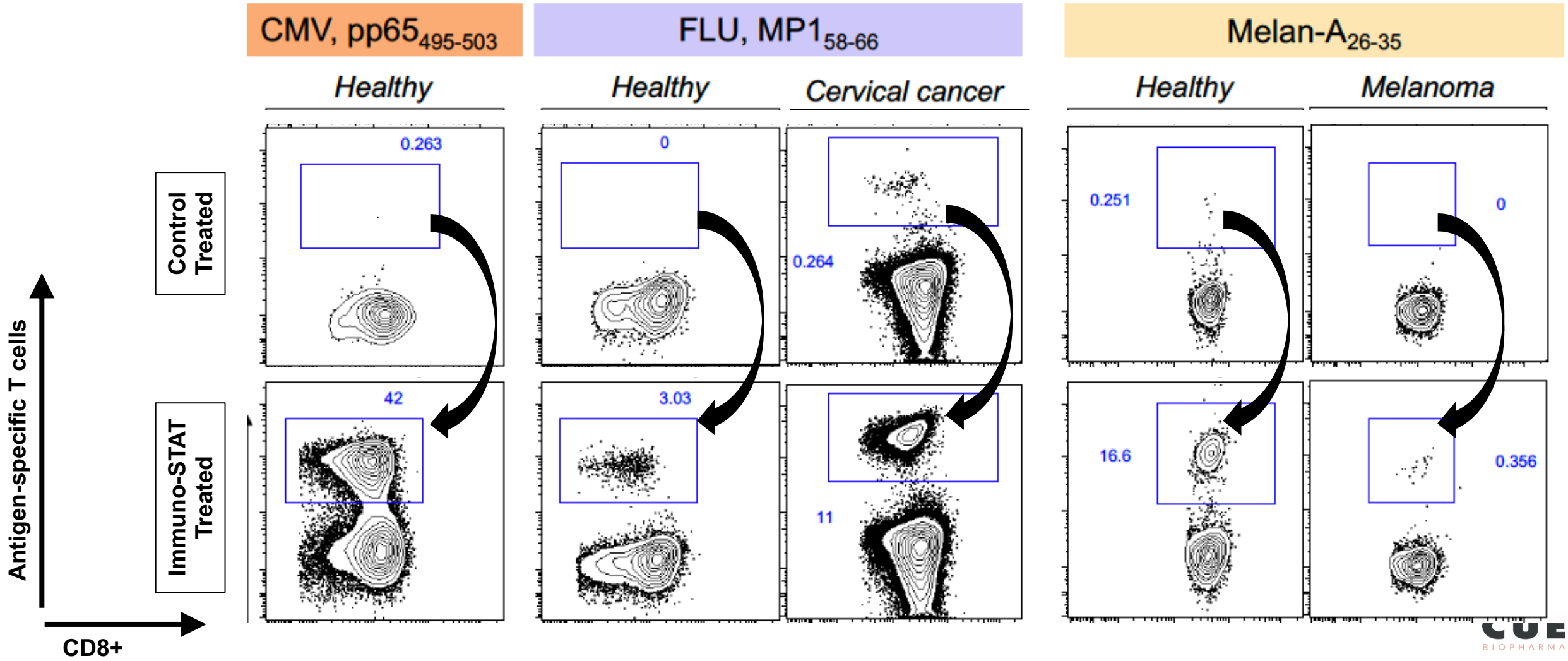
Immuno-STATs Drive Selective Expansion of Human T Cells

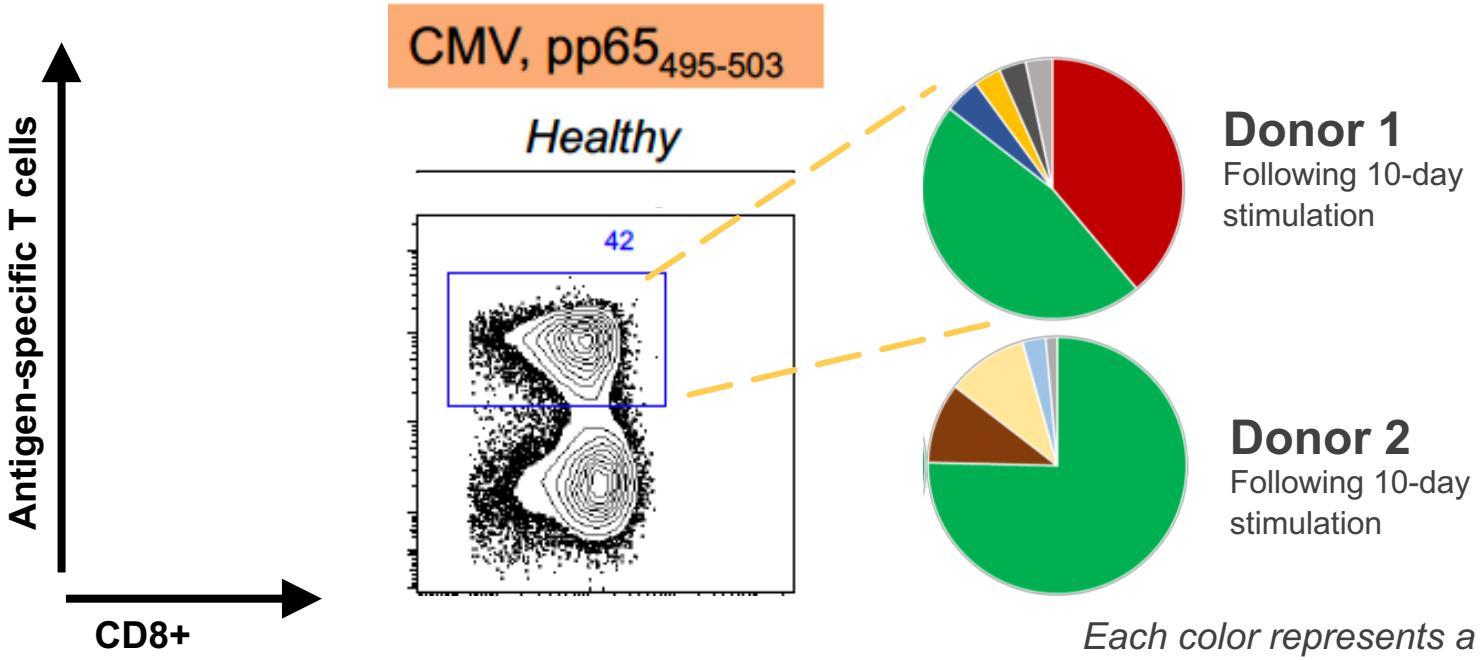


Immuno-STATs Drive Selective Expansion of Human T Cells

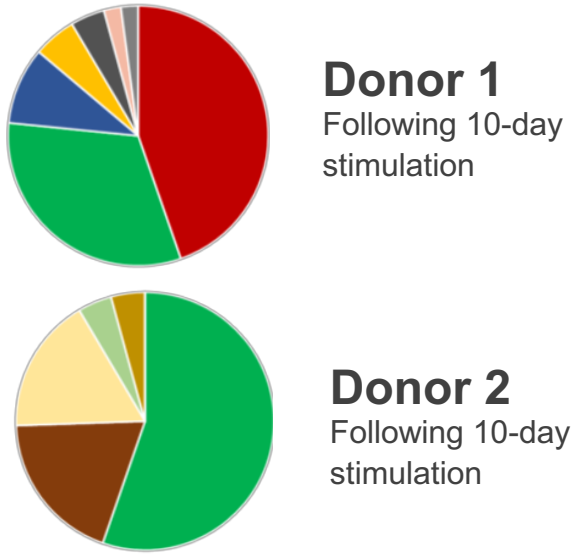


Immuno-STATs Expand a Diverse T Cell Repertoire

T Cell Expansion with CMV Immuno-STAT



T Cell Expansion with Peptide Stim (*Ex vivo* CMV Peptide + IL2)



Each color represents a distinct CDR3 TCRβ sequence
All unique CDR3 TCRβ (non-clonal) are grouped in gray

Diverse oligoclonal T cell repertoire is associated with enhanced tumor immunity

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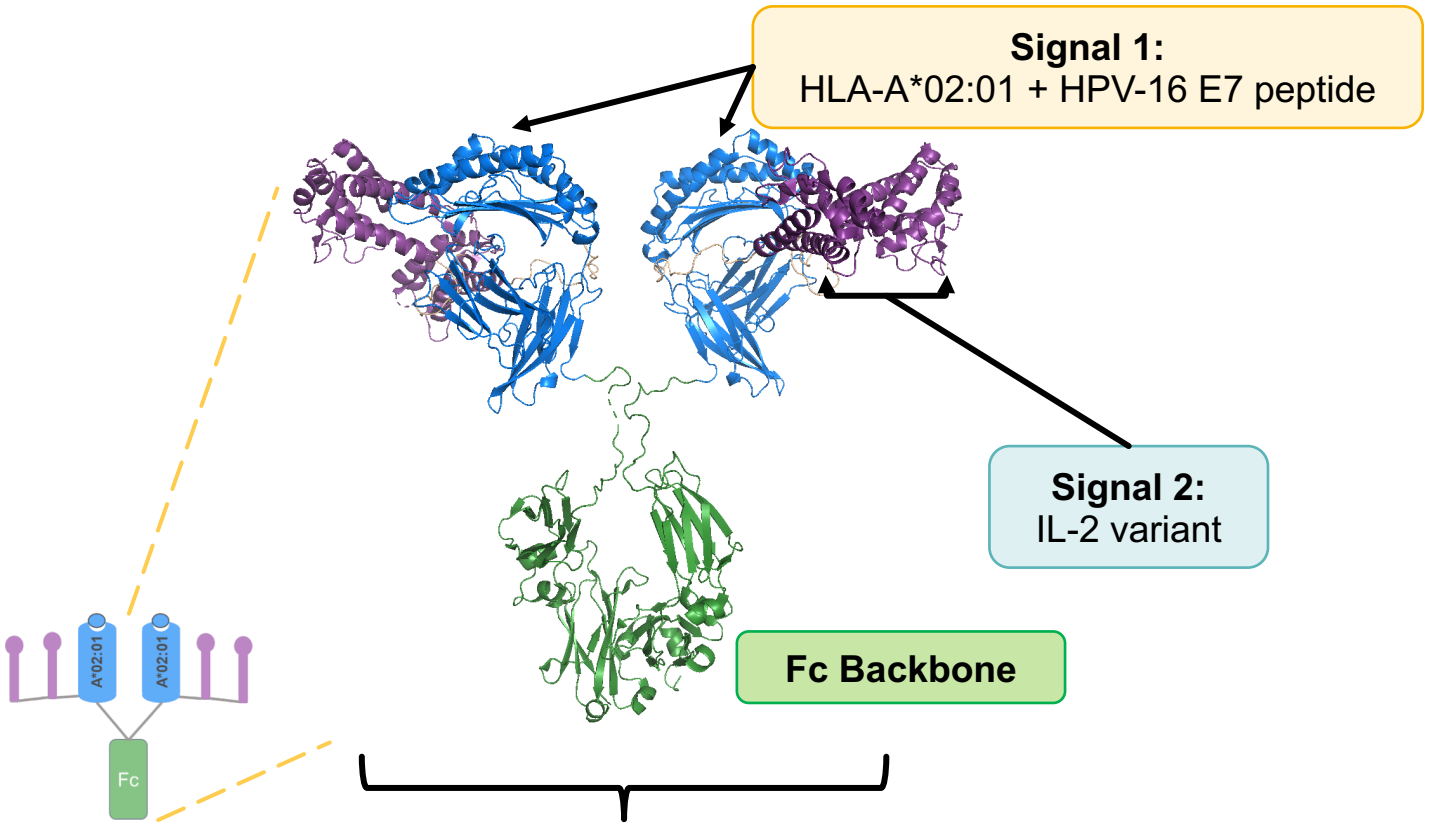
CUE-101 for HPV-Driven Malignancies

CUE-101
Immuno-STAT™ Design



Approximately 200 kDa
Successfully manufactured at 2000L scale

Clinical Rationale and Proposed Mechanism of Action

- HPV-16 E7 protein is a **primary driver of tumorigenesis**
- The E7 peptide presented by CUE-101 is a **highly conserved T cell epitope and is immunogenic**
- **Selective targeting** of IL-2 to tumor specific T cells
- **Enables precise patient stratification**: pre-selection based on HLA-A*02:01+ and HPV-16+ tumor status

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CUE-101 Clinical Development Strategy

- **Initial Protocol: CUE-101 monotherapy dose escalation and expansion in high need recurrent/metastatic (R/M) setting for head and neck squamous cell carcinoma (HNSCC)**
  - Patients screened for HPV16^{+} and HLA A*02:01^{+}
  - Phase I monotherapy in advanced setting (after chemo ± Erbitux and / or Pembro / Nivo)
  - Opportunity to carry forward monotherapy and/or combo-therapy (anti-PD-1) to inform registration path
- **Concurrent Protocol: CUE-101 monotherapy in the neoadjuvant setting for locally advanced HNSCC with resectable disease**
  - Opportunity to assess impact on blood and tumor biomarkers in therapeutically naive patients, including infiltrating T cells
- **Potential Indication Expansion: CUE-101 in the R/M setting for cervical cancer**

Objective of Initial Protocol: Evaluate safety of CUE-100 framework (IL-2) and assess mechanistic activity (expansion of target T cells) in patients

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Phase I Synopsis

A PHASE 1, FIRST-IN-HUMAN, OPEN-LABEL, DOSE ESCALATION AND EXPANSION STUDY OF CUE-101 MONOTHERAPY IN PATIENTS WITH HPV+ RECURRENT/ METASTATIC HEAD AND NECK SQUAMOUS CELL CARCINOMA (HNSCC)

CUE-101 administered by intravenous (IV) infusion once every 3 weeks as monotherapy

Part A: Dose Escalation & Expansion

- 3+3 design with incremental dosing
- Characterize biologic activity; selected cohorts may be expanded to 9 subjects (Bayesian Approach)
- Establish safety and tolerability profile
- Define BED or MTD

Part B: Dose Confirmation

- Up to 20 patients
- Confirm safety and antitumor activity at RP2D

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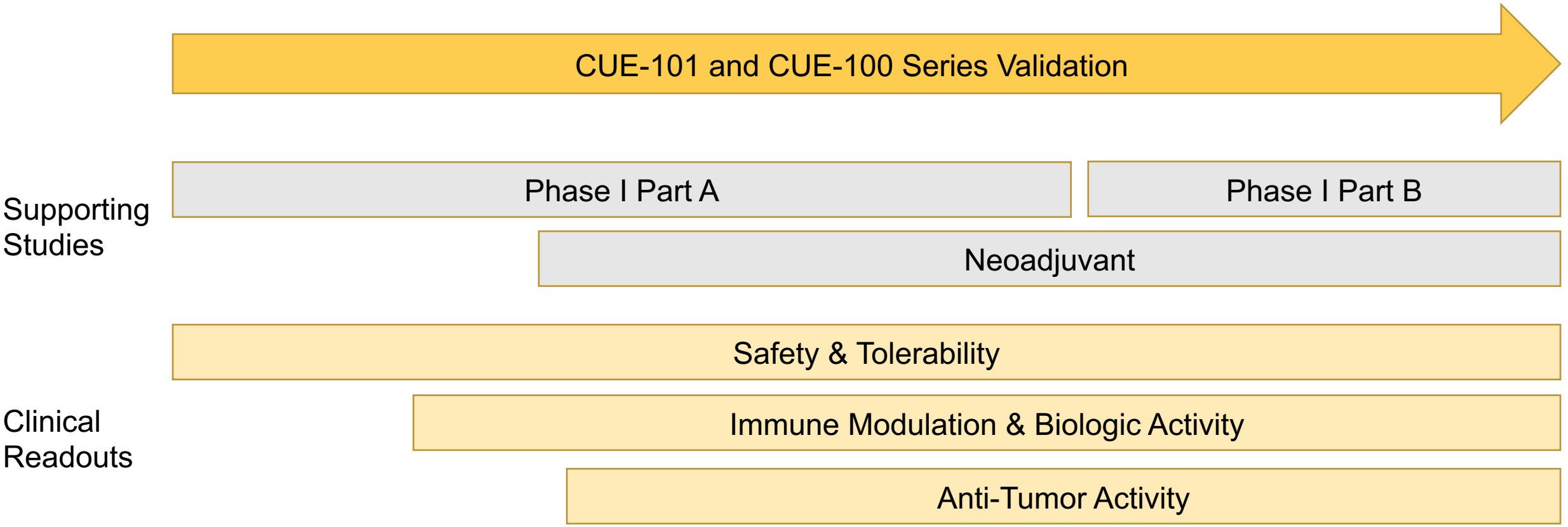
Key CUE-101 Readouts Toward Clinical Proof of Concept



Translation-led strategy to show therapy-induced objective tumor responses driven by expansion of tumor-infiltrating HPV-E7 T cells

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CUE-101 Studies Supporting Translational Clinical Strategy

In Vitro

- ✓ Selective binding to HPV-specific $CD8^+$ T cells
- ✓ Dose-dependent induction of effector function
- ✓ Expansion of HPV16 $E7_{11-20}$ $CD8^+$ T cells from human PBMCs
- ✓ Polyfunctionality of expanded HPV16 $E7_{11-20}$ $CD8^+$ T cells
- ✓ Mitigation of risk associated with systemic IL-2 activation

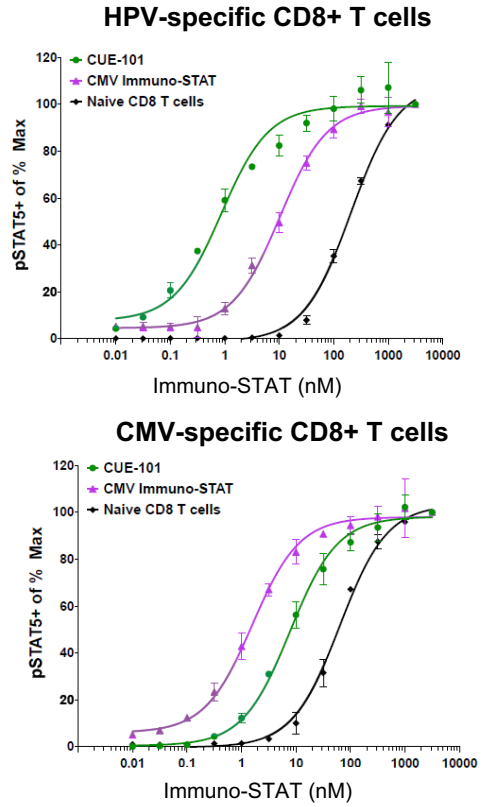
In Vivo

- ✓ Selective expansion of HPV-specific $CD8^+$ T cells in the tumor and in the periphery
- ✓ Inhibition of tumor growth and prolonged survival in TC-1 syngeneic murine model, both as a monotherapy and in combination with anti-PD-1
- ✓ Generation of immunologic memory against TC-1 tumor cells (i.e., re-challenge study)
- ✓ Expansion of HPV16 $E7_{11-20}$ $CD8^+$ T cells from a naïve T cell repertoire in HLA-A2 tg mice

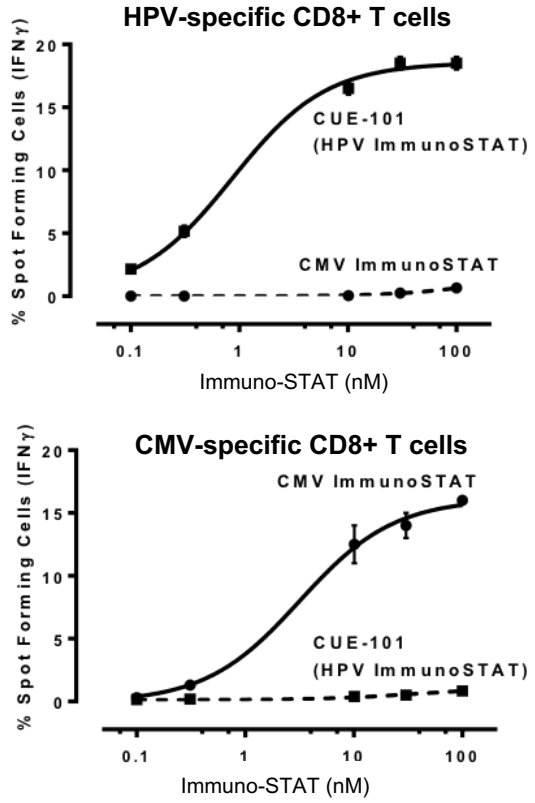
Note: Data are available on the Investor Relations section of the Cue Biopharma website

CUE-101 *In Vitro* Activity

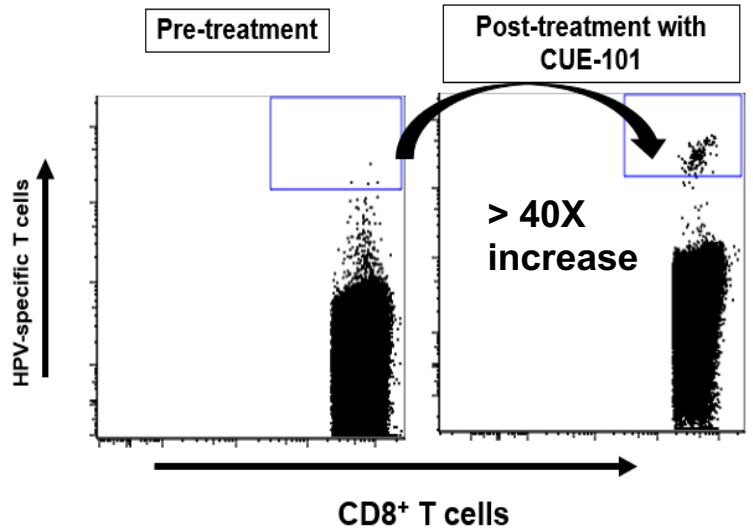
Selective Binding



Intact Effector Function

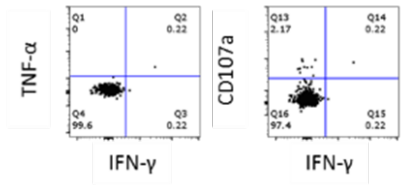
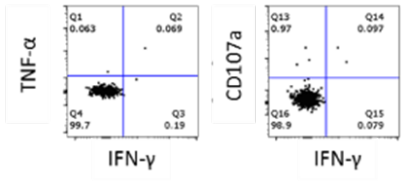
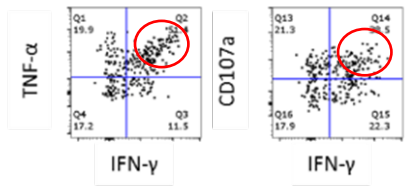
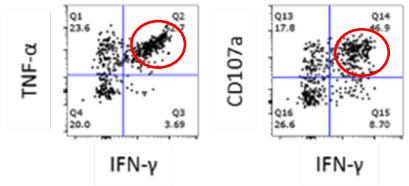
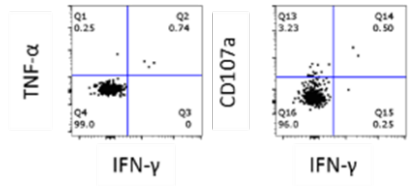
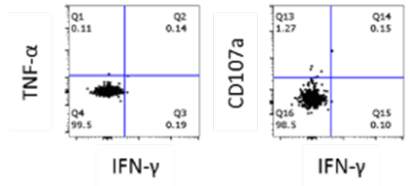
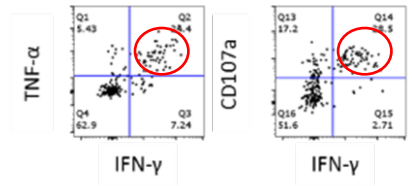
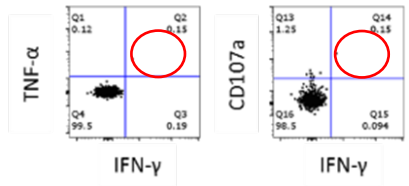


Expansion of HPV Specific T Cells From PBMCs



CUE-101 specifically targets, activates, and expands HPV-E7 T cells

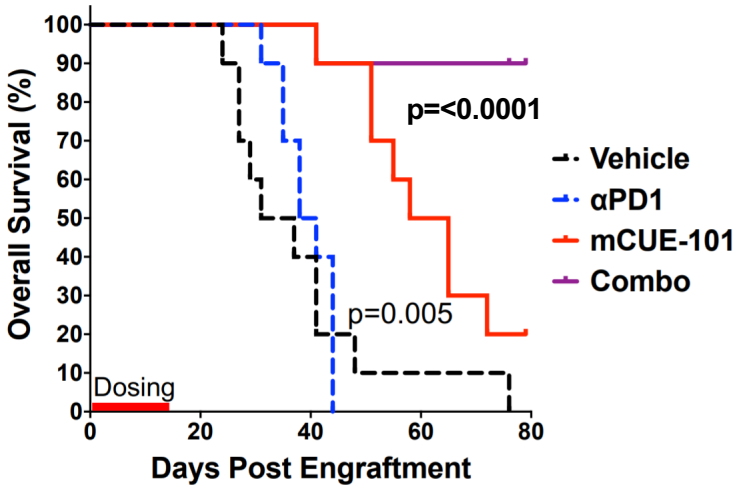
CUE-101 Expanded CD8+ T Cells Exhibit Polyfunctionality

	Antigen-specific CD8+ T Cells	Non-antigen-specific CD8+ T Cells	
Media			*Control*
PMA/ionomycin			*Positive Control*
T2+SL9 peptide (SLYNTVATL)			*Negative Control*
T2+E7 peptide (YMLDLQPETT)			*Demonstrates Selectivity*

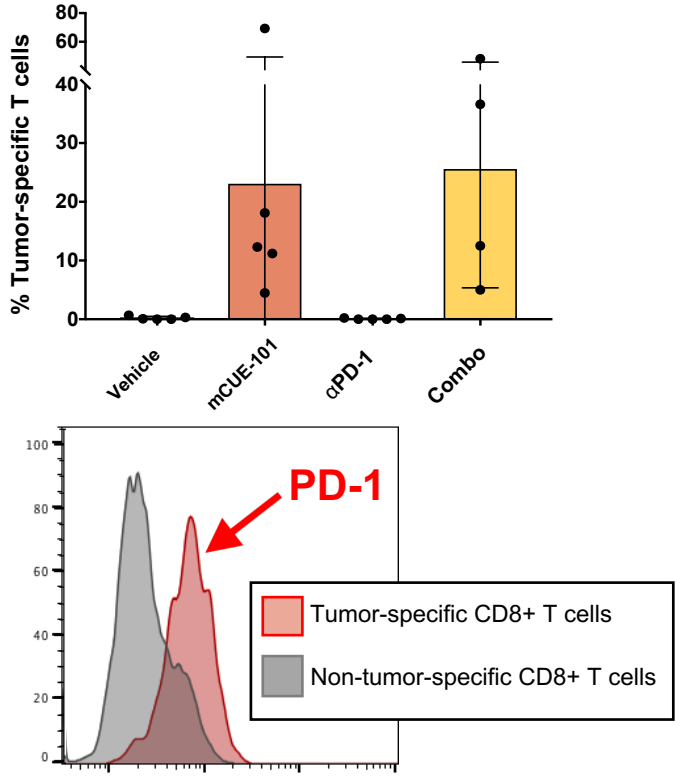
Polyfunctional CD8+ T cells are associated with robust tumor target cell killing

CUE-101 Surrogate Activity in Preclinical Model

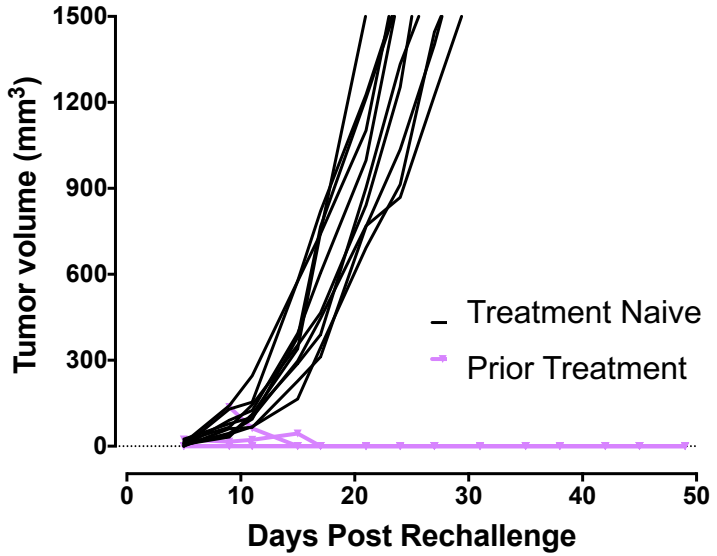
TC1 Tumor Model: Improved Survival (mono vs combo w/ anti-PD-1)



Specific T Cell Expansion in Tumors



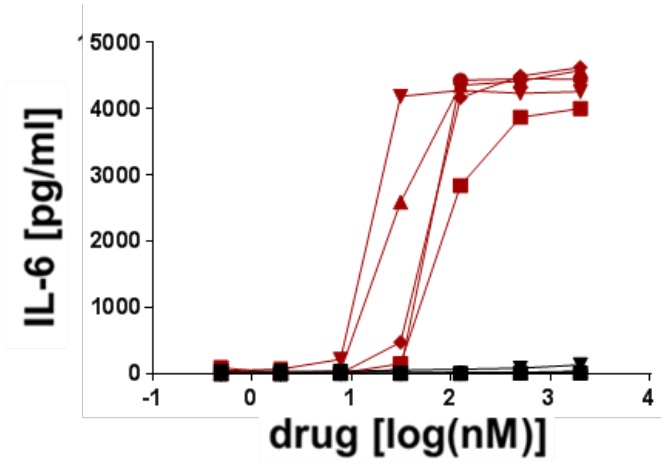
Induction of Long Term Memory

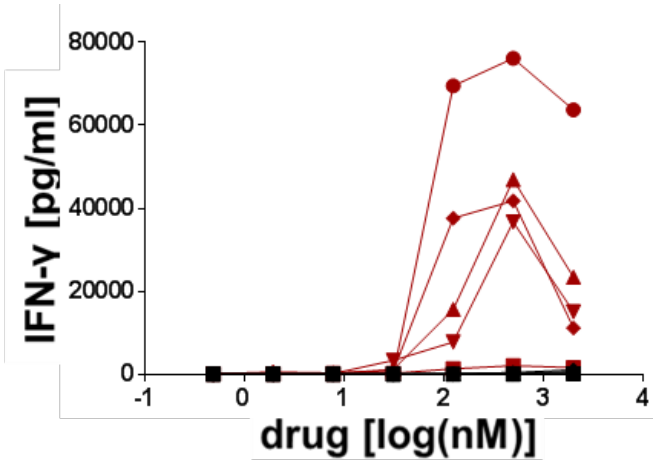


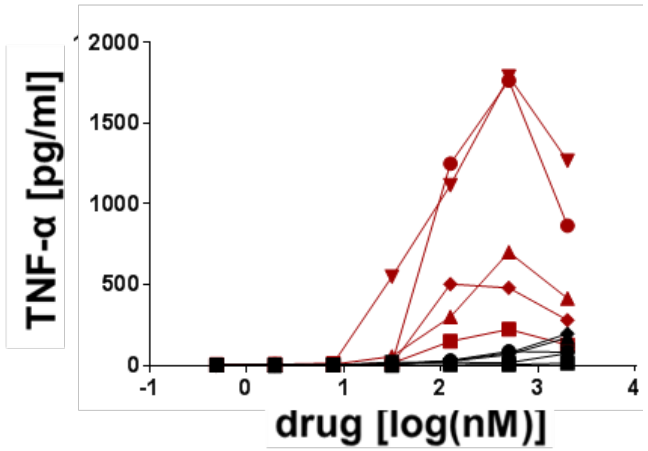
Re-challenge of long-term protected mice at post d80 in absence of any additional treatment

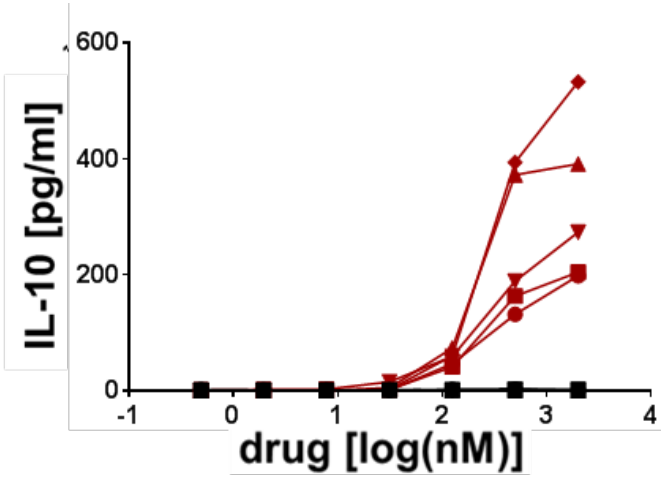
CUE-101 surrogate shows improved survival, both as a monotherapy and in combination with PD-1, through expansion of tumor-specific T cells with the potential to induce long term memory

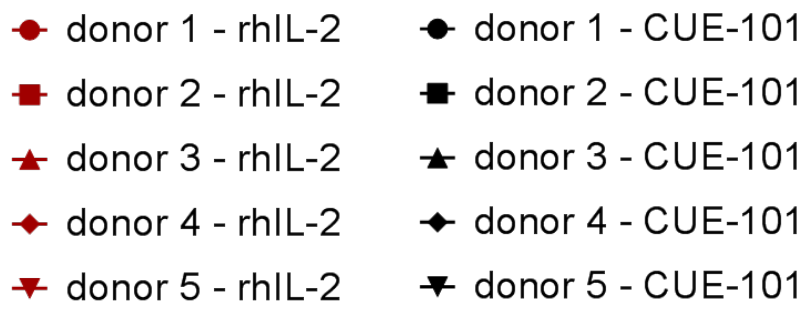
CUE-101 vs Wild-Type IL-2: Mitigating the Risk Associated with Systemic IL-2 Activation











- **PBMC from healthy human donors were stimulated for 18 hours with increasing amounts of CUE-101 or recombinant human IL-2**
- **Cytokine production was assessed in culture supernatant by MSD**

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Pipeline

Program	Discovery	Optimization	IND-Enabling	Phase I	Development Partner
CUE-100 Series – MHC Class I / IL-2					
CUE-101 (HPV E7 / IL-2)					LG Chem *Asia Rights*
CUE-102 (WT1 / IL-2)					LG Chem *Asia Rights*
CUE-103 (Undisclosed / IL-2)					LG Chem *Asia Rights*
CUE-200 Series – MHC Class I / CD80 and 4-1BBL					
CUE-201					MERCK
CUE-300 Series – MHC Class I & II / Undisclosed					
CUE-301					

Immuno-Oncology (IO) Chronic Infectious Disease (CID) Autoimmune (AI)

CUE BIOPHARMA™

Broad Opportunity in WT-1 Expressing Cancers

	Indication	US + EU5 Annual Incidence[1]	US + EU5 5-year OS[2]	US + EU5 Annual Deaths[1]	WT1 Expression IHC[3]	WT1 Expression PCR[4]	Under Active Clinical Investigation[5]
Major Hem Malignancies	AML	40,000	30%	20,000	>75%	90%	Juno (TCR-T), Atara Bio (CTL), Medigene (Vaccine), Sellas (Vaccine)
	ALL	12,000	65%	3,000	50-75%	80%	
	MM	65,000	50%	25,000	25-50%	50%	Atara Bio (CTL), Sellas (Vaccine)
	MDS	30,000	70%	8,000	25-50%	50%	
Major Solid Tumors	Breast	520,000	85%	100,000	<25%	80%	
	Colorectal	365,000	65%	140,000	<25%	80%	
	NSCLC	430,000	20%	320,000	<25%	60%	Juno (TCR-T)
	Ovarian	50,000	45%	32,000	50-75%	80%	Sellas (Vaccine)
	Pancreatic	105,000	<10%	95,000	25-50%	90%	Tella (Vaccine)
Rare / Pediatric Tumors	Glioblastoma	30,000	<10%	26,000	>75%	90%	Inovio (DNA Vaccine)
	Mesothelioma	6,000	15%	5,000	>75%	90%	Juno (TCR-T), Sellas (Vaccine)
	Neuroblastoma	1,500	65%	800	50-75%	80%	
	Sarcoma (ST)	25,000	80%	10,000	50-75%	90%	
	Wilms Tumor	1,500	90%	300	>75%	90%	

1: NCI SEER Program, IACR GLOBOCAN
2: NCI SEER Program
3: Qi XW et al. Sci Rep 2015
4: Sugiyama et al., Jap J Clin Oncol, 2010
5: Cortellis Clarivate Analytics, Cue Analysis

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Investment Highlights

Differentiated Platform

- Rationally designed Immuno-STAT biologics for selective and specific engagement of disease-relevant T cells in a patient's body without the need for ex vivo expansion

Multiple 2019 Catalysts

- CUE-100
  - With IND now approved, generate safety data and demonstrate initial biologic activity for CUE-101 in the clinic through Phase I protocol in HPV+ head and neck cancer
  - Continue to advance pipeline through activities in support of future IND filing for CUE-102 and nomination of antigen target for CUE-103
- CUE-200
  - Develop data package for the CUE-200 series that demonstrates the ability to reverse T cell exhaustion and applicability in chronic infectious disease
- CUE-300
  - Establish proof of mechanism for CUE-300 series in autoimmune disease through our research collaboration with Merck

Well Positioned

- Near-term readouts to demonstrate safety and selective immune modulation of Immuno-STAT platform in a clinical setting
- Potential breakthrough approach for immunotherapy across multiple major disease areas

CUE™ BIOPHARMA

Management Team

Dan Passeri, M.Sc., J.D.

President and CEO

- More than 20 years of experience managing drug discovery and business development with focus on oncology and strategic partner generation
- Previously served as CEO at Curis and SVP at GeneLogic

Anish Suri, Ph.D.

SVP and CSO

- More than 20 years of experience in immuno-oncology, autoimmune disorders, and inflammation research
- Previously served as Senior Director at Janssen Immunosciences and held senior roles at BMS

Kenneth Pienta, M.D.

Acting CMO

- Professor of Oncology at Johns Hopkins University
- Co-Director of the Hopkins inHealth initiative to better define the practice of precision medicine
- Author of more than 350 peer-reviewed articles

Colin Sandercock, J.D.

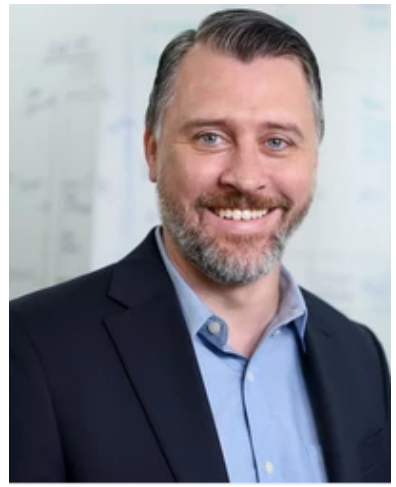
SVP and General Counsel

- More than 30 years of experience in patent litigation, counseling, and licensing within the life sciences
- Previously a partner at Perkins Coie LLP

Kerri-Ann Millar

VP Finance

- More than 10 years of experience in audit and finance functions
- Former Corporate Controller for Flexion Therapeutics
- Served as Finance Executive at Curis



Brandan Hillerich. Ph.D.

VP Corporate Development

- Contributing member of team that developed technology leading to Immuno-STAT™ platform at Albert Einstein College of Medicine
- Previously served on R&D advisory team at PWC

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Thank You

Immune Responses, On Cue™