## Mobilizing the Patient's Immune System to Treat Serious Diseases

May 15, 2025



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## **Cautionary Note Regarding Forward Looking Statements**

This presentation contains "forward-looking statements" within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended, that are intended to be covered by the "safe harbor" created by those sections. Forward-looking statements, which are based on certain assumptions and describe our future plans, strategies and expectations, can generally be identified by the use of forward-looking terms such as "believe," "expect," "may," "will," "should," "would," "could," "seek," "intend," "plan," "goal," "project," "estimate," "anticipate," "strategy," "future, "vision", "likely" or other comparable terms, although not all forward-looking statements contain these identifying words. All statements other than statements of historical facts included in this presentation regarding our strategies, prospects, financial condition, operations, costs, plans and objectives are forward-looking statements. Examples of forward-looking statements include, among others, statements we make regarding our belief that CUE-401 has the potential to transform treatment across a broad spectrum of autoimmune and inflammatory diseases, our belief regarding the potential benefits, applications, novelty and market potential of our drug candidates and programs, our development plans with respect to our CUE-100, CUE-400, and CUE-500 series, our business strategies, plans and prospects, including our pans to advance CUE-401 toward the clinic and explore additional portfolio optimization and partnering opportunities, our cash runway and the sufficiency of our cash and cash equivalents to fund our operations and our expectations regarding the timing of milestone events, regulatory developments and expected future operating results. Forward-looking statements are neither historical facts nor assurances of future performance. Instead, they are based only on our current beliefs, expectations and assumptions regarding the future of our business, future plans and strategies, projections, anticipated events and trends, the economy and other future conditions. Because forward-looking statements relate to the future, they are subject to inherent uncertainties, risks and changes in circumstances that are difficult to predict and many of which are outside of our control. Our actual results and financial condition may differ materially from those indicated in the forward-looking statements. Therefore, you should not rely on any of these forward-looking statements. Important factors that could cause our actual results and financial condition to differ materially from those indicated in the forward-looking statements include, among others, our limited operating history, limited cash and a history of losses; our ability to achieve profitability; potential setbacks in our research and development efforts including negative or inconclusive results from our preclinical studies, or clinical trials or our ability to replicate in later clinical trials

positive results found in preclinical studies and early-stage clinical trials of our product candidates; serious and unexpected drug-related side effects or other safety issues experienced by participants in clinical trials; our ability to secure required U.S. Food and Drug Administration ("FDA") or other governmental approvals for our product candidates and the breadth of any approved indication; adverse effects caused by public health pandemics including possible effects on our operations and clinical trials; delays and changes in regulatory requirements, policy and guidelines including potential delays in submitting required regulatory applications to the FDA; our reliance on licensors, collaborators, contract research organizations, suppliers and other business partners; our ability to obtain adequate financing to fund our business operations in the near-term; our ability to successfully remediate our current "going concern" determination that we do not have sufficient capital on hand to continue operations beyond the next twelve months; our ability to maintain and enforce necessary patent and other intellectual property protection; competitive factors; general economic and market conditions; and the other risks and uncertainties described in the Risk Factors and in Management's Discussion and Analysis of Financial Condition and Results of Operations sections of our most recently filed Annual Report on Form 10-K, subsequently filed Quarterly Report(s) on Form 10-Q and other filings we make with the SEC. Any forward-looking statement made by us in this presentation is based only on information currently available to us and speaks only as of the date on which it is made. We undertake no obligation to publicly update any forward-looking statement, whether written or oral, that may be made from time to time, whether as a result of new information, future developments or otherwise.

## Our Mission: To Develop Therapies that Mobilize the Immune System

## **Agenda and Speakers**

Mobilizing the Immune System: Cue Biopharma's Novel Biologics Portfolio

| Welcome – Cue's Progress<br>and Promise | Dan Passeri, Chief<br>Executive Officer (CEO)  |
|-----------------------------------------|------------------------------------------------|
| CUE-401                                 | Matteo Levisetti, MD,<br>Chief Medical Officer |
| KOL Perspective -<br>Tregs in Context   | Dr. Richard DiPaolo<br>Dr. Andrew Cope         |
| Discussion & Q&A                        | Cue Management & KOLs                          |
| Closing Remarks                         | Dan Passeri, CEO                               |



Dan Passeri, MSc, JD Chief Executive Officer



**Richard DiPaolo, PhD** *Professor and Chair, Department of Molecular Microbiology* & *Immunology, Saint Louis University,* 



Matteo Levisetti, MD Chief Medical Officer



Andrew Cope, MD, PhD Head, Centre for Rheumatic Diseases, King's College, London

## Key Takeaways

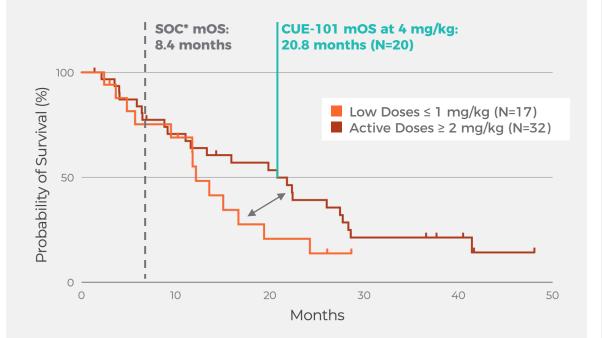
## Mobilizing the Immune System to Treat Serious Disease

- Specific T cell populations play a critical role in serious diseases
- **CUE's biologics platform** is designed to enable selective modulation of T cell populations to treat immune mediated diseases
- Maturing clinical data show notable increases in survival for CUE-100 Series and confirm the safety and efficacy of our IL-2 mutein in this setting
- **CUE-401 is a unique Treg inducer** with potential to become a new standard of care for autoimmune and inflammatory diseases
- Recent Boehringer Ingelheim collaboration provides validation of our approach to redirect anti-viral T cells to treat autoimmune disease with CUE-501

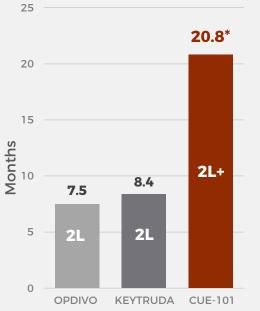
## **CUE-100 Series**

## Maturing Data Shows Notable Increase in Survival

#### **Overall Survival of CUE-101 Monotherapy**

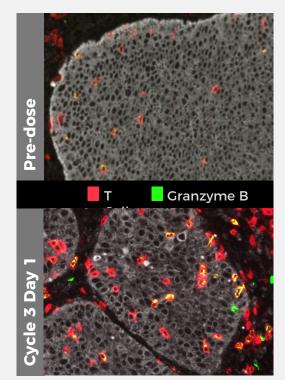


CUE-101 Median Overall Survival vs. Benchmarks<sup>1,2</sup>



1. Ferris et al Checkmate 141 *NEJM* 375;19, 2016 2. Cohen et al KEYNOTE-040 *Lancet*, 2018 Note:: Comparison to historic data is a cross-trial comparison and does not involve a head-to-head trial

#### Marked Increase in T Cell Infiltration Post-CUE-101



Data Extract: 04-Aug-24 from live database with active patients.

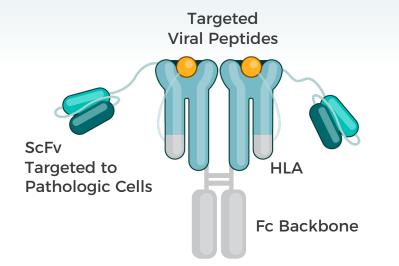
\* Historic - Keytruda - Reported Median Overall Survival (mOS) for second line HNSCC patients Cohen et al KEYNOTE-040 Lancet, 2018

Note:: Comparison to historic data is a cross-trial comparison and does not involve a head-to-head trial



## **CUE-500 Series**

# Partnering with Boehringer Ingelheim to Validate and Accelerate Development of CUE-501



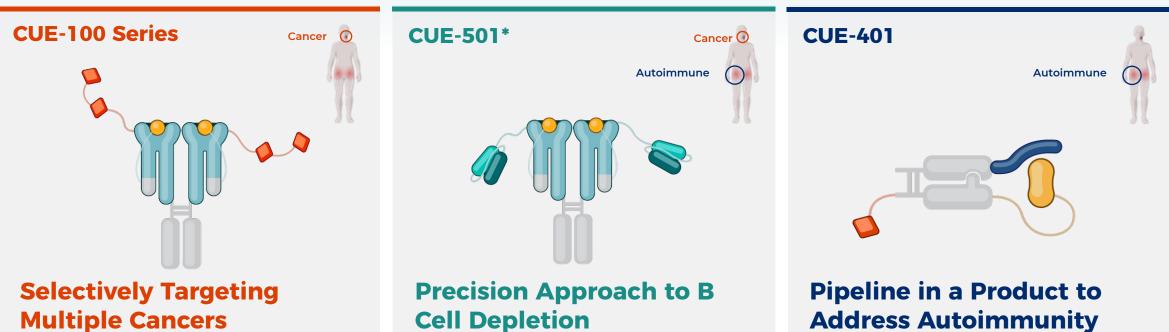
- Paints target cell with a virusspecific epitope
- Redirects anti-viral killer T cells to eradicate pathogenic B cells, cancer cells, mast cells, and others

### CUE-501 Pre-IND Enabling Studies Underway

|                                | CUE-501 Deal Terms                                                                                                                                   |  |  |  |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|
| Upfront                        | \$12 million                                                                                                                                         |  |  |  |
| R&D<br>Funding                 | Providing research support payments                                                                                                                  |  |  |  |
| Milestones<br>and<br>Royalties | Up to \$345 million in success-based milestone<br>payments, beginning with two preclinical<br>development milestones, plus royalties on net<br>sales |  |  |  |
| Focus                          | Autoimmune and inflammatory diseases with potential to expand into other applications where B cells play a key role                                  |  |  |  |

## **Innovative Growth Through our Platform**

Redirecting Immune Repertoires as a Therapeutic Strategy



- Clinically de-risked
- Demonstrated Clinical Benefit: **ORR** and Survival
- Efficient Production

- Recruitment and activation of virus specific killer T cells
- Platform opportunity for future expansion

## **Address Autoimmunity**

- Re-establish immune balance/tolerance
- Potential to address multiple high-value indications
- Platform opportunity for future expansion



## Matteo Levisetti, MD CUE-401: A Disruptive Approach in Autoimmune Disease

First-in-class mechanism using cutting-edge technology Possibility for new standard of care No HLA restriction

## **CUE-401**

## Transforming Effector T Cells into Regulatory T Cells

#### **T Lymphocyte populations**

- Effector T cells: Responsible for inflammatory activity in health and disease
- Regulatory T cells: Responsible for controlling unwanted/destructive inflammatory activity

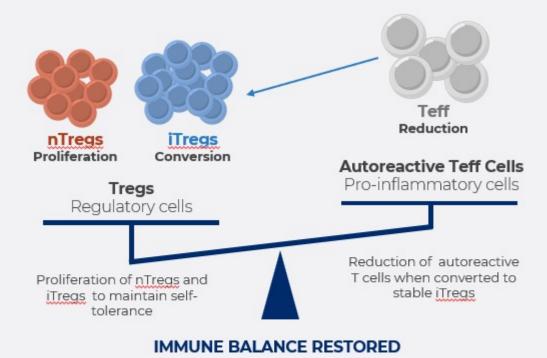
#### Regulatory T cells are powerful anti-inflammatory mediators that are critical for maintenance of immune balance

## CUE-401 has the potential to restore immune balance and tolerance by

- $_{\odot}$  Transforming effector T cells into new Tregs, and
- Expanding existing Treg populations

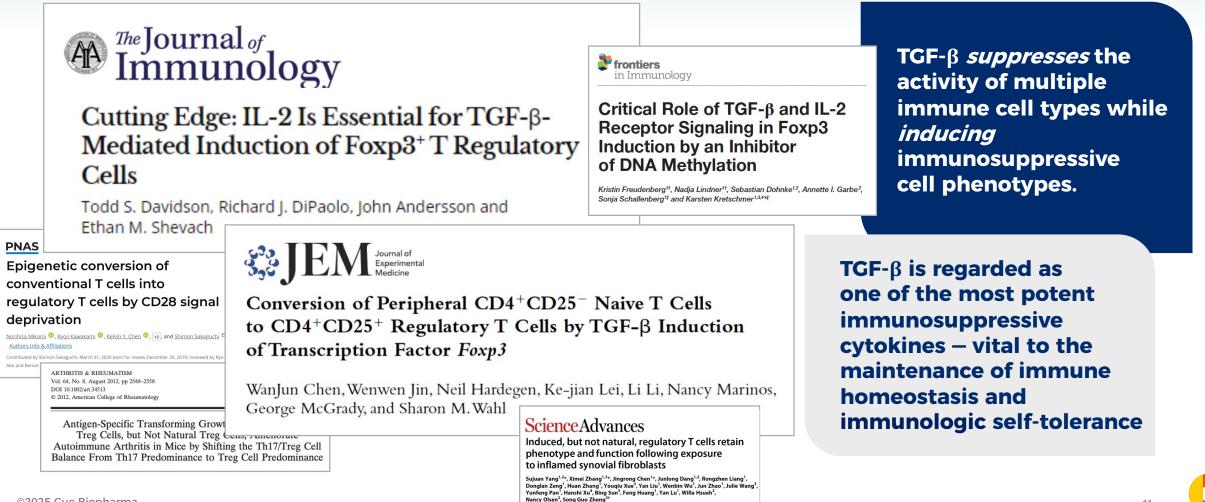
#### CUE-401

By restoring cellular immune homeostasis, acute responses and long-term maintenance are possible



## CUE-401: Harnessing the Power of TGF- $\beta$

Potent Immunosuppressive Cytokine Vital to the Maintenance of Immune Tolerance and Homeostasis



## **CUE-401: High-Value Opportunity** Potential for Disruptive Efficacy in Broad Range of Autoimmune Indications

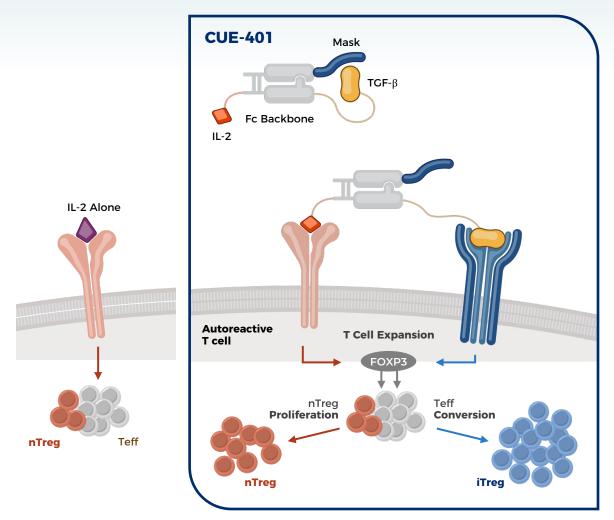
| Pipeline in a<br>Product              | <ul> <li>Transformative First-in-class mechanism</li> <li>Cutting-edge biology compared with validated IL-2 approaches</li> <li>Efficacy shown in multiple disease models suggests broad application in the autoimmune space</li> </ul> | FC Backbone<br>Allows for simultaneous delivery of<br>both IL-2 and TFG-β, along with<br>ease of manufacturability<br>Mask |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Components*<br>Clinically<br>Derisked | <ul> <li>No HLA restriction</li> <li>Incorporates IL-2 and parts of Fc from CUE-100 series*</li> <li>Favorable tolerability in multiple species, including non-<br/>human primates</li> </ul>                                           | Fc Backbone<br>IL-2                                                                                                        |
| Clear Path<br>to Clinic               | <ul> <li>Manufacturing and IND enabling studies underway</li> </ul>                                                                                                                                                                     | IL-2TGF-β VariantIL-2 VariantAffinity attenuated;<br>improved safety and<br>manufacturability                              |
| Near-term Value<br>Inflection         | <ul> <li>Phase 1 clinical data anticipated within 3-year time<br/>frame</li> </ul>                                                                                                                                                      | CUE-401 Masked Bispecific                                                                                                  |



Ec Dackhana

## **CUE-401: Differentiated Mechanism**

Simultaneous IL-2 and TGF- $\beta$  Signaling as the Essential Inducer for Treg Cells



"Breathing Mask" design enables active but attenuated TGF- $\beta$  function and differentiated mechanism of action vs IL-2 muteins

#### **Increased Quantity of Regulatory T Cells**

results from the proliferation of existing nTregs as well as induction of new iTregs from T effector pool



## Dr. Richard DiPaolo Recognized Expert in Regulatory T Cells

Professor and Chair, Department of Molecular Microbiology & Immunology, Saint Louis University





## Background on Working with Tregs Induced by TGF $\beta$ and IL-2

#### Volume 178, Issue 7 1 April 2007

MUNOLOG

BRIEF REPORT | APRIL 01 2007

#### Cutting Edge: IL-2 Is Essential for TGF-β-Mediated Induction of Foxp3<sup>-</sup> T Regulatory Cells **FREE**

Todd S. Davidson: Richard J. DiPaolo: John Andersson: Ethan M. Shevach

Volume 179, Issue 7 1 October 2007



RESEARCH ARTICLE | OCTOBER 01 2007

Autoantigen-Specific TGFβ-Induced Foxp3<sup>-</sup> Regulatory T Cells Prevent Autoimmunity by Inhibiting Dendritic Cells from Activating Autoreactive T Cells<sup>1</sup> FREE

RESEARCH ARTICLE | AUGUST 15 2011

Richard J. DiPaolo; Carine Brinster; Todd S. Davidson; John Andersson; Deborah Glass; Ethan M. Shevach

+ Author & Article Information

Volume 187, Issue 4 RES

15 August 2011



Antigen-Specific TGF- $\beta$ -Induced Regulatory T Cells Secrete Chemokines, Regulate T Cell Trafficking, and Suppress Ongoing Autoimmunity  $\bigcirc$ 

Thanh-Long M. Nguyen; Nicole L. Sullivan; Mark Ebel; Ryan M. Teague; Richard J. DiPaolo 😒

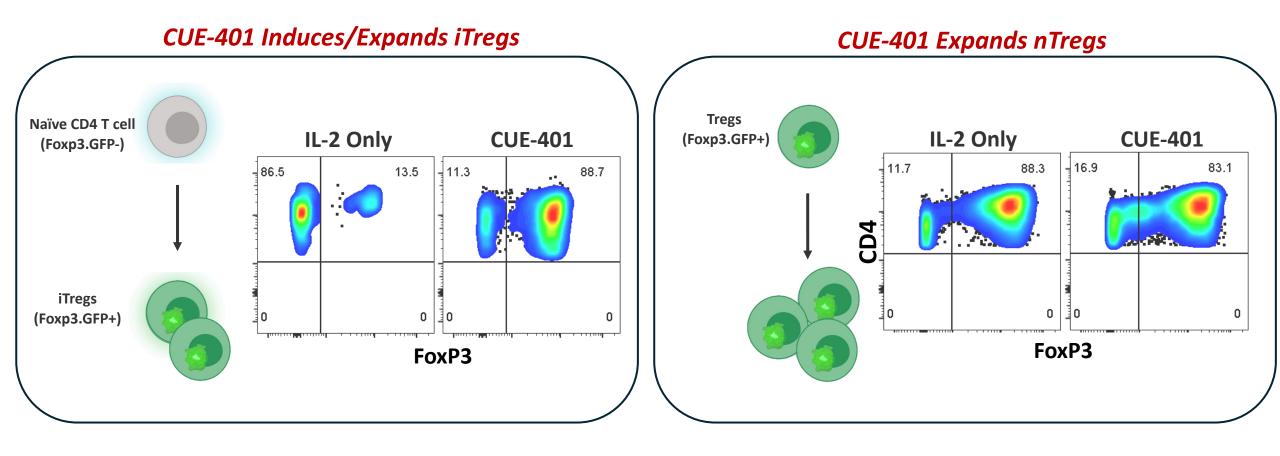
+ Author & Article Information

J Immunol (2011) 187 (4): 1745–1753.

https://doi.org/10.4049/jimmunol.1004112 Article history

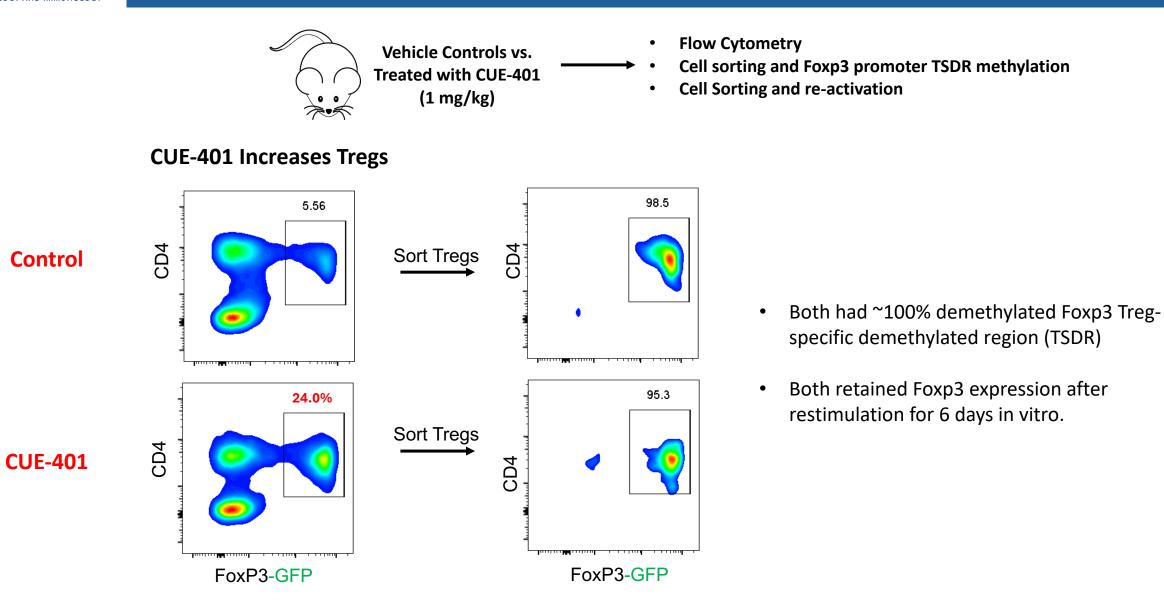


### Testing Effects of CUE-401 on CD4<sup>+</sup> T cell Activation *in vitro*





### Testing the Effects of CUE-401 in vivo





- CUE-401 treatment is effective at increasing the frequency of CD4<sup>+</sup>Foxp3<sup>+</sup> Tregs.
- Tregs induced/expanded by CUE-401 are stable.
- Tregs induced/expanded by CUE-401 have an activated phenotype (CD25<sup>hi</sup>CTLA4<sup>hi</sup>GITR<sup>hi</sup>).
- CUE-401 did not induce the expansion/activation of effector T cells (unlike IL-2 complexes).
- A subset of the CUE-401 induced/expanded Tregs were transcriptionally distinct from Tregs expanded with IL-2 complexes
  - These Tregs shared transcripts previously associated with TGFβ + IL-2 induced Tregs *in vitro*.



### **Testing CUE-401's Ability to Suppress Autoimmunity**

Isolate spleen cells.

Deplete CD25 expressing cells (Tregs).

Transfer 25x10<sup>6</sup> into T cell deficient mice.

Transfer a small number of autoreactive T cells (gastritis-causing) to track effects on autoreactive T cells

### BALB/c Nude Mice



After 2 months mice develop autoimmunity **due to lack of Tregs.** 

100% of mice develop autoimmune gastritis.

#### JOURNAL ARTICLE

Pillars Article: Immunologic Self-Tolerance Maintained by Activated T Cells Expressing IL-2 Receptor α-Chains (CD25). Breakdown of a Single Mechanism of Self-Tolerance Causes Various Autoimmune Diseases. J. Immunol. 1995. 155: 1151– 1164 Get access >

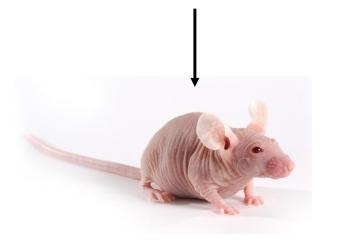
Shimon Sakaguchi, Noriko Sakaguchi, Masanao Asano, Misako Itoh, Masaaki Toda

The Journal of Immunology, Volume 186, Issue 7, April 2011, Pages 3808–3821, https://doi.org/10.1093/jimmunol/186.7.3808 Published: 01 April 2011



### **Can CUE-401 Suppress Autoimmunity?**

25x10<sup>6</sup> CD25-(Treg) depleted splenocytes (Thy1.2) +50,000 TxA23-Thy1.1 autoreactive tracer cells (0.2%)



#### <u>Day +1, +14</u>

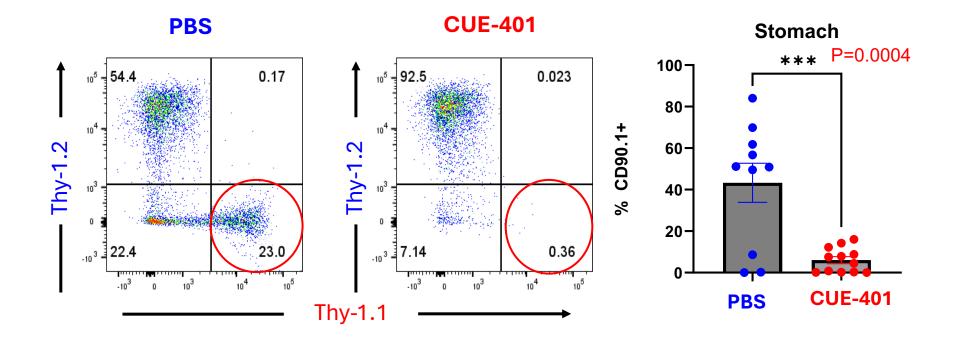
- PBS (control)
- CUE-401 (1 mg/kg)

#### Take Down Day 62

- Analyze cells in: stomachs, spleens, LNs
- Analyze gastric pathology



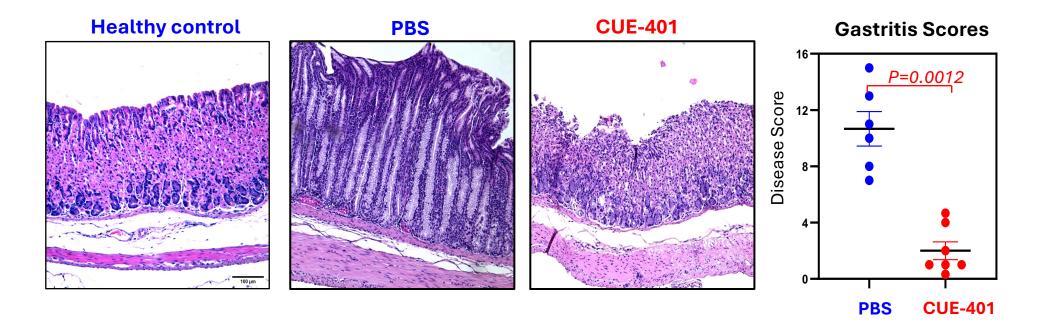
### Significant Reduction of Autoreactive T cells in Stomach



CUE-401 treatment resulted in significant and durable reduction of autoreactive T cells in the target tissue (stomach) that was maintained long after treatment.



### Significant Reduction of Gastric Pathology in Stomach



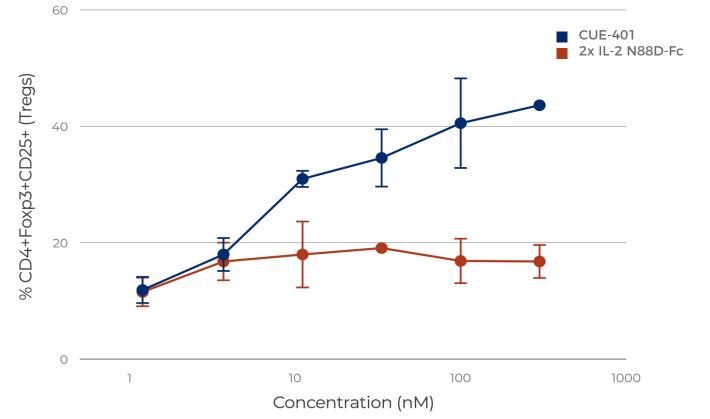
- CUE-401 treatment results in significant protection from autoimmune gastritis caused by a deficiency in Tregs.
- > Initial short-term treatment with CUE-401 resulted in long-term protection.



- CUE-401 functions to induce new Tregs, expand existing Tregs, and suppress some effector T cell functions.
- In vivo administration of CUE-401 is effective at inducing/expanding and activating Tregs.
- Short term CUE-401 administration resulted in durable suppression of autoimmunity in a wellestablished model where autoimmunity develops as a result of a deficiency in Tregs.

## **CUE-401 Harnesses Multiple Signals to Induce Tregs** Data Shows Evidence of Inducible Treg Expansion from Effector T Cells (Teff), Differentiating from IL-2 Muteins

Treg Generation from Effector T Cells (Teff) with CUE-401 vs IL-2 Mutein: Human MLR\* (In Vitro GVHD)

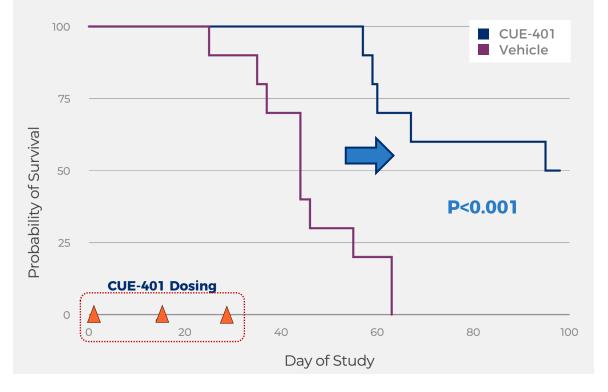


## **CUE-401: Differentiated Benefit in Pre-clinical Models of GVHD vs. IL-2 Mutein**

CUE-401 Increased Survival 9+ Weeks Post-Treatment while IL-2 Mutein Alone Accelerated Disease

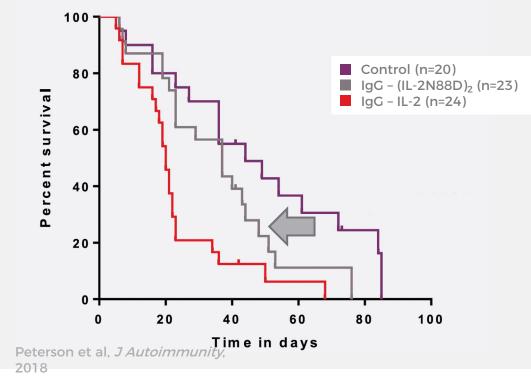
#### **CUE-401**

Significantly delayed development of GVHD & increased overall survival



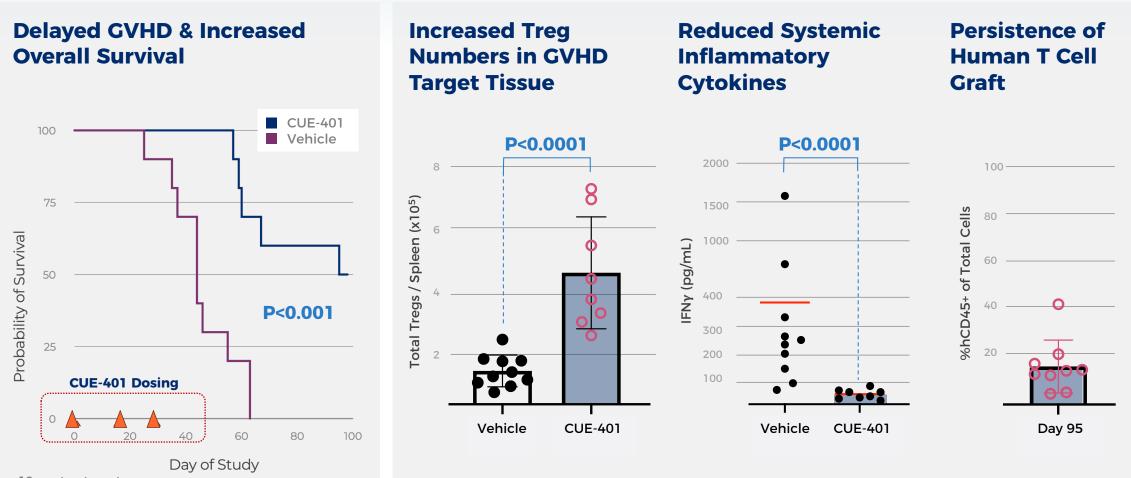
#### IL-2 (wild type or a mutein)

Accelerated progression of GVHD & reduced overall survival



## CUE-401: Durable Benefit & Pharmacodynamics in Model of Acute GVHD Increased Tissue Tregs, Reduced Proinflammatory Cytokines,

and Increases Survival 9+ Weeks Post-Treatment



n=10 per treatment group

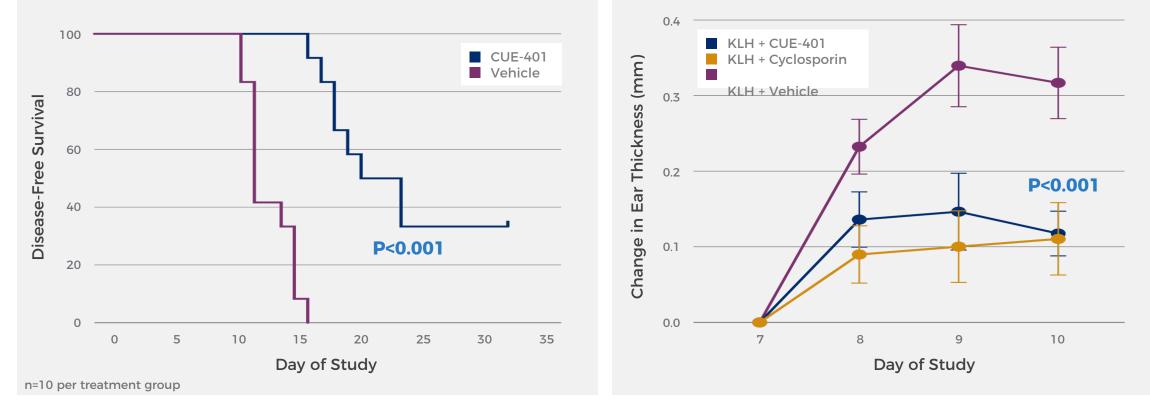
## **CUE-401: Efficacy Across Diverse Disease Mechanisms** Functional Suppression of Inflammation in Multiple Disease Models Supports Broad Applicability in the Clinic

#### **EAE Model of Multiple Sclerosis**

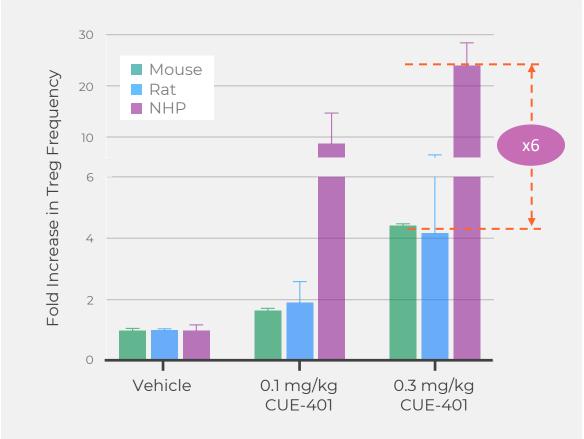
Significant inhibition and delay of disease onset

#### **Delayed Type Hypersensitivity - T Cell Mediated**

Significant inhibition of cutaneous inflammation



### **CUE-401: Significant Treg Expansion Across Species** Greatest Magnitude of Treg Expansion in Non-Human Primates (NHP) – Supports Strong Potential Activity in Humans



- CUE-401 is well tolerated across all species at dose levels that result in maximum Treg expansion
- $\rightarrow$  Enables & derisks efficient IND-enabling GLP toxicology program
- Even low doses in NHP drive significant Treg increases well beyond that observed in rodents
- → CUE-401 has the potential to promote meaningful increases in Tregs in humans at low dose levels

## **CUE-401: Novel, First-in-Class T Cell Immunomodulator** Broad Potential Across Multiple Autoimmune Indications

|         | Bispecific<br>Mechanism of<br>Action | <b>"Breathing Mask"</b> design enables active but attenuated TGF-β function and differentiated mechanism of action vs IL-2 muteins with potential to induce immune tolerance |
|---------|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CUE-401 | Preclinical Data                     | <b>CUE has generated efficacy and tolerability data sets</b> in 3 species and 3 disease models in addition to data generated by Dr. DiPaolo                                  |
|         | Pharmacokinetics                     | <b>Comparable exposure across species</b> sufficient to promote significant Treg expansion                                                                                   |
|         | Manufacturing                        | Productive cell line established, <b>stability demonstrated, and</b><br>scale-up manufacturing ongoing                                                                       |

## Dr. Andrew Cope The Clinical Perspective

Head, Centre for Rheumatic Diseases, King's College, London

## A Commitment to T Cell Biology and "Immune Reset"

Chronic Exposure to Tumc Activation of T Cells through the T Cell Receptor/CD3 Complex; Reversal In Vivo by Anti-TNF Antibodics in Detionts with Decumstoid Arthritic

Andrew P. Cope, Marco Londei, N. Rand Ravinder N. Maini, and Marc Feldmann

The Mathilda and Terence Kennedy Institute of Kneumaiology, survey Division, Hummersman, London, 110 OL17, Onaca Kingdom

Complement regulator CD46 temporally regulates cytokine production by conventional and unconventional T cells

John Cardone<sup>1,8</sup>, Gaelle Le Friec<sup>1,8</sup>, Pierre Vantourout<sup>2,3</sup>, Andrew Roberts<sup>2,3</sup>, Anja Fuchs<sup>4</sup>, Ian Jackson<sup>1,5</sup>, Tesha Suddason<sup>1,5</sup>, Graham Lord<sup>1,5</sup>, John P Atkinson<sup>6</sup>, Andrew Cope<sup>5,7</sup>, Adrian Hayday<sup>1-3,5</sup> & Claudia Kemper<sup>1</sup>

ARTICLE

https://doi.org/10.1038/s41467-019-08332-9 OPEN

## The cholesterol biosynthesis pathway regulates IL-10 expression in human Th1 cells

nature

nature

immunology

. . 1 . .

Esperanza Perucha <sup>1,2</sup>, Rossella Melchiotti<sup>3</sup>, Jack A Bibby<sup>1,2</sup>, Wing Wu<sup>1,2</sup>, Klaus Stensgaard Frederiksen <sup>4</sup>, Ceri A. Roberts<sup>2,14</sup>, Zoe Hall<sup>5</sup>, Gaelle LeFriec<sup>6</sup>, Kevin A. Robertson<sup>7</sup>, Paul Lavender<sup>8</sup>, Jens Gammeltoft Gerwien<sup>4,15</sup>, Leonie S. Taams <sup>2</sup>, Julian L. Griffin<sup>5</sup>, Emanuele de Rinaldis<sup>3</sup>, Lisa G.M. van Baarsen<sup>9,10</sup>, Claudia Kemper<sup>6,11,12</sup>, Peter Ghazal<sup>7,13</sup> & Andrew P. Cope <sup>1,2</sup>



## Lessons from the Clinic:

Co-stimulation modulation delays but does not prevent RA



## Abatacept in individuals at high risk of rheumatoid arthritis (APIPPRA): a randomised, double-blind, multicentre, parallel, placebo-controlled, phase 2b clinical trial

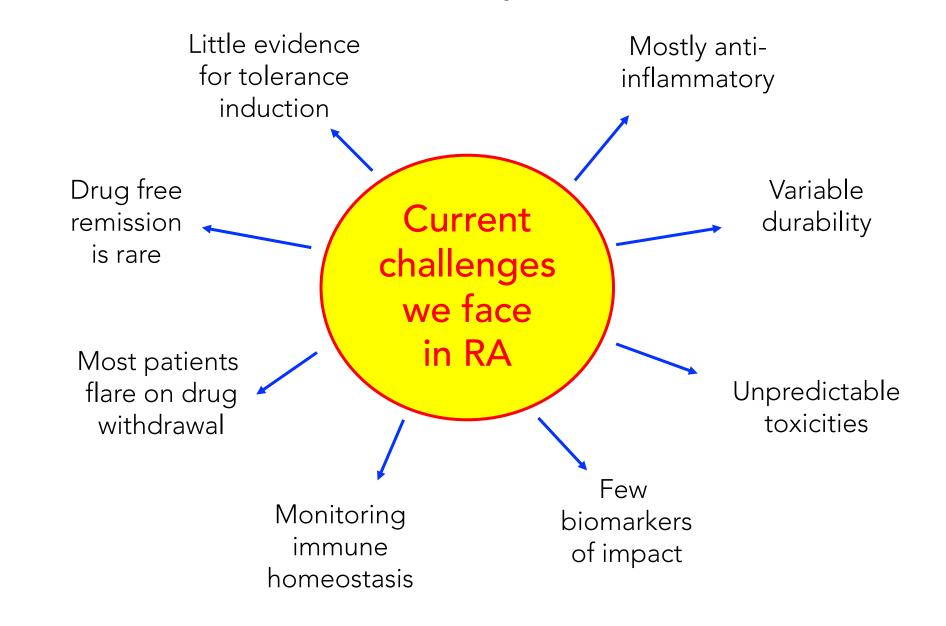


Andrew P Cope, Marianna Jasenecova, Joana C Vasconcelos, Andrew Filer, Karim Raza, Sumera Qureshi, Maria Antonietta D'Agostino, Iain B McInnes, John D Isaacs, Arthur G Pratt, Benjamin A Fisher, Christopher D Buckley, Paul Emery, Pauline Ho, Maya H Buch, Coziana Ciurtin, Dirkjan van Schaardenburg, Thomas Huizinga, René Toes, Evangelos Georgiou, Joanna Kelly, Caroline Murphy, A Toby Prevost, on behalf of the APIPPRA study investigators\*



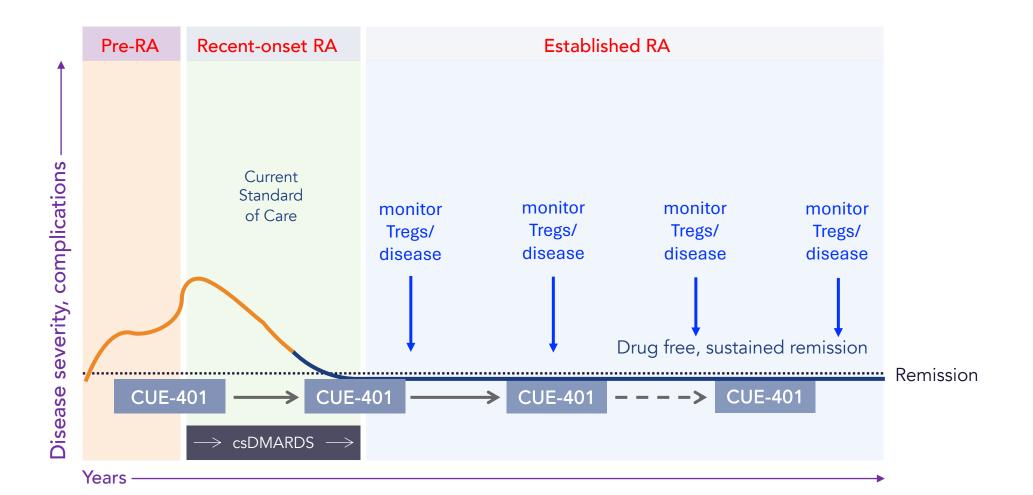
Cope et al, *Lancet* 2024;403:838-849

## The Problem with Current Therapies for Rheumatoid Arthritis





## Future Vision for Immune Reset in RA with CUE-401





## **CUE-401: Clinical Perspectives**

- CUE-401 may be a transformative treatment for RA at several stages of disease, including pre-RA, recent-onset RA and established RA.
- Expansion and induction of Tregs by CUE-401 is an innovative approach to achieving an immune "reset" in patients with autoimmune and inflammatory disease.
- Mechanism of action of inducing and expanding Tregs is likely to be efficacious in many autoimmune diseases.
- Immune rebalance established by durable expansion of Tregs may lead to long-lasting tolerance.



## **KOLs & Cue Management Discussion and Q&A Session**

# Dan Passeri, CEO Key Take Aways

## **Key Takeaways**

## Mobilizing the Immune System to Treat Serious Disease

- Specific T cell populations play a critical role in the immune response to serious diseases
- **CUE's unique biologics platform** enables selective modulation of select T cell populations for the treatment of autoimmune disease and cancer
- New data suggest that CUE-401 could transform the standard of care for autoimmune diseases and inflammation
- Recent Boehringer Ingelheim collaboration showcases CUE-501: potential ability to use anti-viral T cells to treat autoimmune disease
- Maturing clinical data show notable increase in survival data for CUE-100 Series
- Current cash resources expected to support key developments of our corporate strategy





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