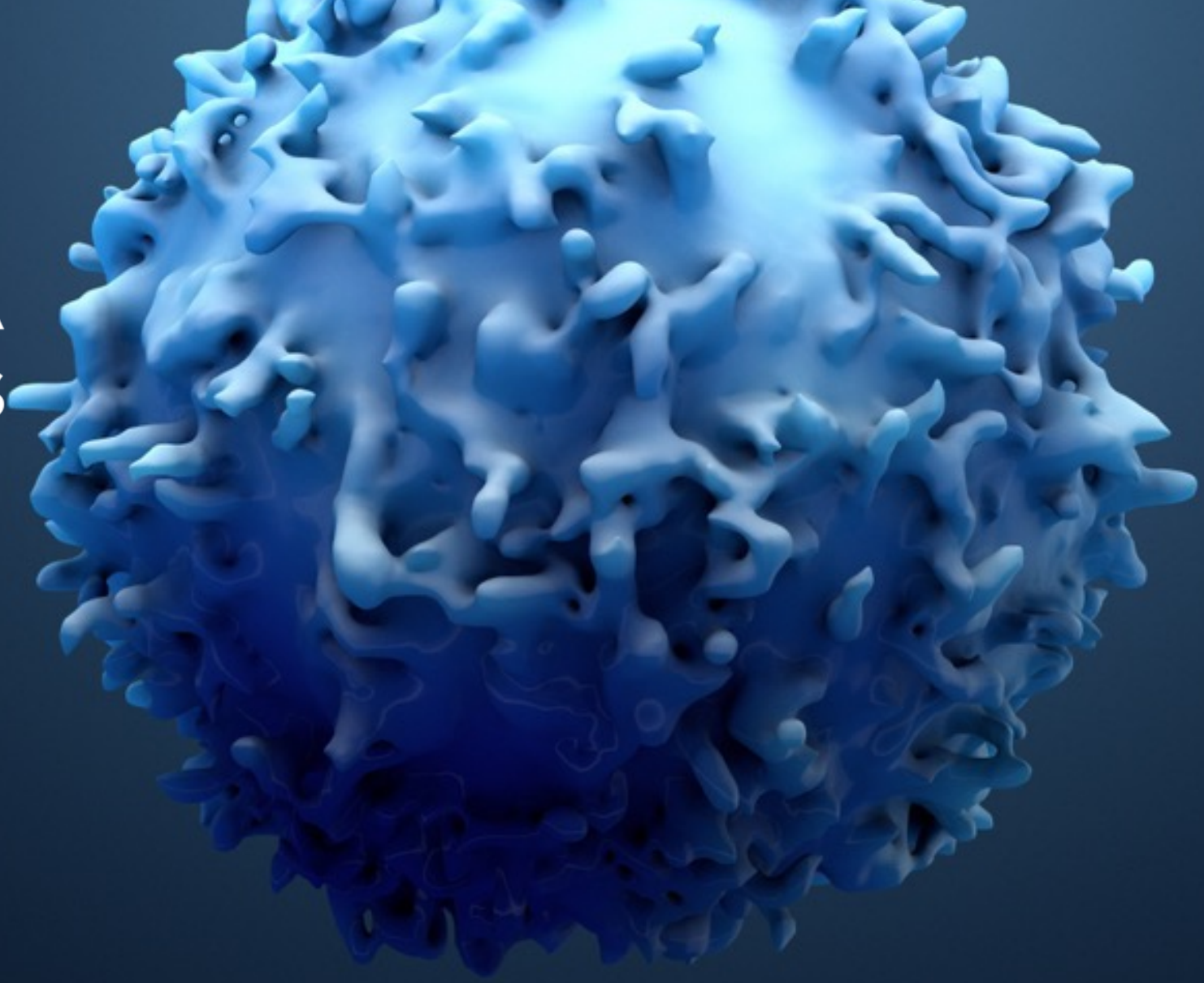
COYA THERAPEUTICS



Unleashing the Power of Regulatory T cells (Tregs)

Investor Presentation

January 2024

NASDAQ: COYA

www.coyatherapeutics.com

Cautionary Note of Forward-Looking Statements and Disclaimers

This presentation and the accompanying oral presentation contain “forward-looking” statements that are based on our management’s beliefs and assumptions and on information currently available to management. Forward-looking statements include all statements other than statements of historical fact contained in this presentation, including information concerning our current and future financial performance, business plans and objectives, current and future clinical and preclinical development activities, timing and success of our ongoing and planned clinical trials and related data, the timing of announcements, updates and results of our clinical trials and related data, our ability to obtain and maintain regulatory approval, the potential therapeutic benefits and economic value of our product candidates, competitive position, industry environment and potential market opportunities. The words “believe,” “may,” “will,” “estimate,” “continue,” “anticipate,” “intend,” “expect,” and similar expressions are intended to identify forward-looking statements.

Forward-looking statements are subject to known and unknown risks, uncertainties, assumptions and other factors including, but not limited to, those related to risks associated with the impact of COVID-19; the success, cost and timing of our product candidate development activities and ongoing and planned clinical trials; our plans to develop and commercialize targeted therapeutics; the progress of patient enrollment and dosing in our preclinical or clinical trials; the ability of our product candidates to achieve applicable endpoints in the clinical trials; the safety profile of our product candidates; the potential for data from our clinical trials to support a marketing application, as well as the timing of these events; our ability to obtain funding for our operations; development and commercialization of our product candidates; the timing of and our ability to obtain and maintain regulatory approvals; the rate and degree of market acceptance and clinical utility of our product candidates; the size and growth potential of the markets for our product candidates, and our ability to serve those markets; our commercialization, marketing and manufacturing capabilities and strategy; future agreements with third parties in connection with the commercialization of our product candidates; our expectations regarding our ability to obtain and maintain intellectual property protection; our dependence on third party manufacturers; the success of competing therapies or products that are or may become available; our ability to attract and retain key scientific or management personnel; our ability to identify additional product candidates with significant commercial potential consistent with our commercial objectives; and our estimates regarding expenses, future revenue, capital requirements and needs for additional financing.

We have based these forward-looking statements largely on our current expectations and projections about future events and trends that we believe may affect our financial condition, results of operations, business strategy, short-term and long-term business operations and objectives, and financial needs. Moreover, we operate in a very competitive and rapidly changing environment, and new risks may emerge from time to time. It is not possible for our management to predict all risks, nor can we assess the impact of all factors on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statements we may make. In light of these risks, uncertainties and assumptions, the forward-looking events and circumstances discussed herein may not occur and actual results could differ materially and adversely from those anticipated or implied in the forward-looking statements. Although our management believes that the expectations reflected in our forward-looking statements are reasonable, we cannot guarantee that the future results, levels of activity, performance or events and circumstances described in the forward-looking statements will be achieved or will occur. We undertake no obligation to publicly update any forward-looking statements, whether written or oral, that may be made from time to time, whether as a result of new information, future developments or otherwise.

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Highlights



Focused on Regulatory T Cells (Tregs)

- **Most clinically-advanced company focused on Treg-modulating therapies**
- Multi-modality approach:
  - Biologics (COYA 300 series)
  - Exosomes (COYA 200 series)
- Combination Immunotherapy targets multiple immune pathways that may limit clinical efficacy of monotherapy approaches
- **COYA 302** is lead asset that targets Tregs and pro-inflammatory pathways to address pathophysiology
- **COYA 302** being investigated in multiple neurodegenerative conditions



Strong Early Clinical Data

- **COYA 301 completed PoC** IIT study* in Alzheimer's Disease (AD)
- **COYA 302 completed PoC** IIT study* in Amyotrophic Lateral Sclerosis (ALS)
- **COYA 200** series for neurodegenerative diseases, autoimmune / inflammatory conditions, and metabolic diseases



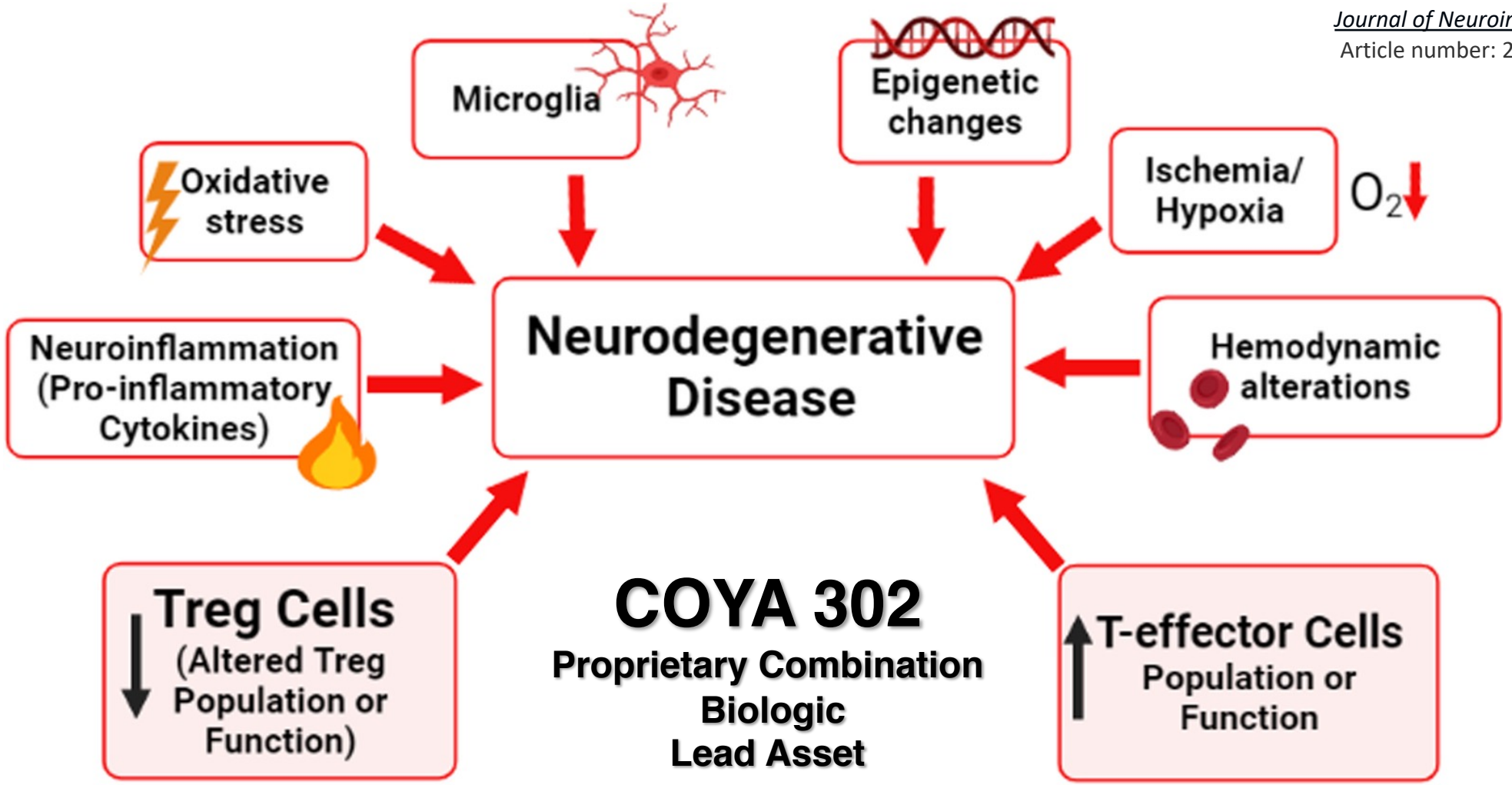
Multiple Near-Term Catalysts (12 months)

- **COYA 301** Academic double-blind Phase 2 PoC top-line data in AD Patients (Summer 2024), AD/PD Conference Data Presentation (1H 2024), Combination animal study in AD (2H 2024)
- **COYA 302** Biomarker data release/publication in ALS Patients (1H 2024), IND filing/Phase 2 initiation in ALS Patients (1H 2024), Peer-Reviewed PoC trial in ALS Patients Publication (1H 2024), IND Filing/Phase 2 initiation in FTD Patients (2H 2024)
- **COYA 200** Platform Series animal model validation data (2024)/ out-license discussions
- **COYA 206** target validation & custom cargo validation (2024)/ out-license discussions

IIT: Investigator Initiated Trial
AAIC: Alzheimer's Association International Conference
PoC: Proof of Concept
***Open label academic studies with commercially available product**

Neurodegenerative Diseases Involve Complex Pathophysiology
Multi-modal Combination Therapies May be Transformative

Journal of Neuroinflammation **volume 19,** Article number: 251 (2022



Like Oncology and Viral Disease, Combination Therapies May Be Transformative in the Treatment of Neurodegeneration

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Strong Proof-of-Concept Clinical Data

COYA 302 for the Treatment of Amyotrophic Lateral Sclerosis*

Open-label academic study in 4 ALS patients, conducted at Houston Methodist

Results were presented at MDA Conference in March 2023

No disease progression at week 24 and minimal progression at week 48 (by mean ALSFRS-R) in patients who were progressing prior to therapy

Consistent and significant Treg function enhancement and increased Treg numbers

Expression of blood biomarkers of inflammation were downregulated, correlating with disease severity and treatment response

Well tolerated

COYA 301 for the Treatment of Alzheimer's Disease*

Open-label academic study in 8 mild-to-moderate AD patients, conducted at Houston Methodist

Results were presented at Keystone Conference in May 2023 and at Alzheimer's Association International Conference in July 2023

Statistically significant improvement in cognitive function, as measured by the Mini-Mental State Examination test (MMSE)

Restored peripheral Treg function and numbers, and lowered the levels of systemic pro-inflammatory chemokines and biomarkers

Well tolerated

COYA THERAPEUTICS

* Studies were conducted with commercially available product.

Coya's Leadership Has Demonstrated Deep Expertise in Biotech

Management Team



Howard Berman, Ph.D.
Chief Executive Officer & Chairman of the Board

Prior Experience*
abbvie · Lilly · NOVARTIS · The University of Texas MD Anderson Cancer Center · imaware



Fred Grossman, D.O., FAPA
President & Chief Medical Officer

Prior Experience*
Johnson & Johnson · sunovion · Bristol Myers Squibb · glenmark · mesoblast · Lilly



David Snyder
Chief Financial Officer & Chief Operating Officer

Prior Experience*
DisperSol Technologies · exicure · Cellular Dynamics International · NimbleGen



Arun Swaminathan, Ph.D.
Chief Business Development Officer

Prior Experience*
Bristol Myers Squibb · Actinium Pharmaceuticals, Inc. · ALTEOGEN Inc.



Michelle Frazier
Senior Vice President of Regulatory Affairs

Prior Experience*
RVNC · CytomX · FDA · Coherus BIOSCIENCES

Board of Directors



Wilbur Ross
Former U.S. Secretary of Commerce

Prior Experience*
ROSS Acquisition Corp. I · ISG · U.S. Department of Commerce



Ann Lee, Ph.D.
Chief Technical Officer of Prime Medicine

Prior Experience*
Bristol Myers Squibb · Genentech · MERCK · Juno Therapeutics



Anabella Villalobos, Ph.D.
Head of Biotherapeutics and Medicinal Sciences of Biogen

Prior Experience*
Pfizer



Dieter Weinand
Former Chairman of Board and CEO, Bayer Pharma, AG

Prior Experience*
Bristol Myers Squibb · Bayer · Pfizer · Otsuka



Dov Goldstein, M.D., MBA
Chief Financial Officer of BioAge Labs

Prior Experience*
Vicuron Pharmaceuticals · INDAPTA THERAPEUTICS · SCHRÖDINGER · AISLING CAPITAL



Hideki Garren, M.D., Ph.D.
Chief Medical Officer of Prothena Biosciences

Prior Experience*
BAYHILL THERAPEUTICS · Roche · NOVARTIS · Genentech

COYA THERAPEUTICS

*Logos illustrated represent past experience

SAB Comprised of Seminal Leadership in Tregs

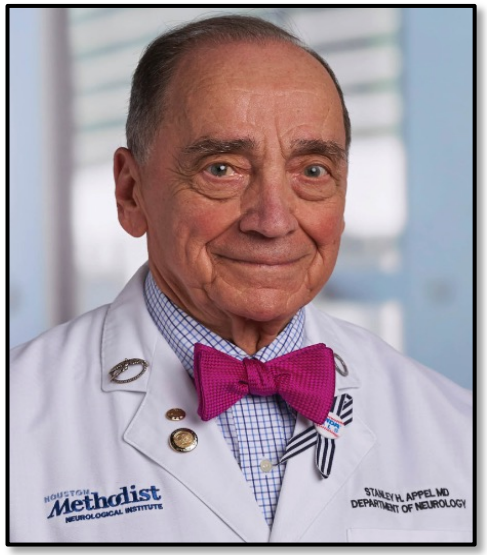
Following the discoveries of Dr. Sakaguchi and Dr. Appel, Coya is developing multiple product modalities to enhance the therapeutic potential of Tregs for the treatment of disorders of high unmet need



Shimon Sakaguchi, MD, PhD

Distinguished Professor at the World Premier International Research Initiative (WPI)-Immunology Frontier Research Center (IFReC) at Osaka University

Discovered Tregs in 1995



Stanley Appel, MD

Former Chair of the Stanley H. Appel Department of Neurology
Director of the Ann Kimball & John W. Johnson Center for Cellular Therapeutics
Houston Methodist Hospital

Pioneered Role of Tregs in Neurodegeneration

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SAB: Scientific Advisory Board

COYA 302 Program

Product Type	Discovery	Preclinical	IND-Enabling	Phase 1	Phase 2	Phase 3	Partnerships / Collaborations	2024 Milestones
COYA 302 **Treg-Enhancing / T Effector & Macrophage Depleting Biologics**	**COYA 302 (Low Dose IL-2 + CTLA4 Ig)** ***Amyotrophic Lateral Sclerosis (ALS)*** **Completed POC IIT open label study in patients with ALS***						**Licensing Transaction on 12/6/23:** **Dr. Reddy's Laboratories**	**1H 2024:** IND filing and Ph2 initiation **1H 2024:** PoC Peer-Reviewed publication **1H 2024:** Biomarker data publication
COYA 302 **Treg-Enhancing / T Effector & Macrophage Depleting Biologics**	**COYA 302 (Low Dose IL-2 + CTLA4 Ig)** ***Frontotemporal Dementia (FTD)***						**Retained Worldwide Rights**	**Q4 2024:** IND filing and Ph2 initiation
COYA 302 **Treg-Enhancing / T Effector & Macrophage Depleting Biologics**	**COYA 302 (Low Dose IL-2 + CTLA4 Ig)** ***Parkinson's Disease (PD)***						**Retained Worldwide Rights**	**1H/2H 2024:** Animal data **2025:** IND filing and Ph1/2 initiation

POC- Proof of Concept; IIT- Investigator Initiated Trial
* Conducted using commercially available products

Other Treg Enhancing Therapeutics

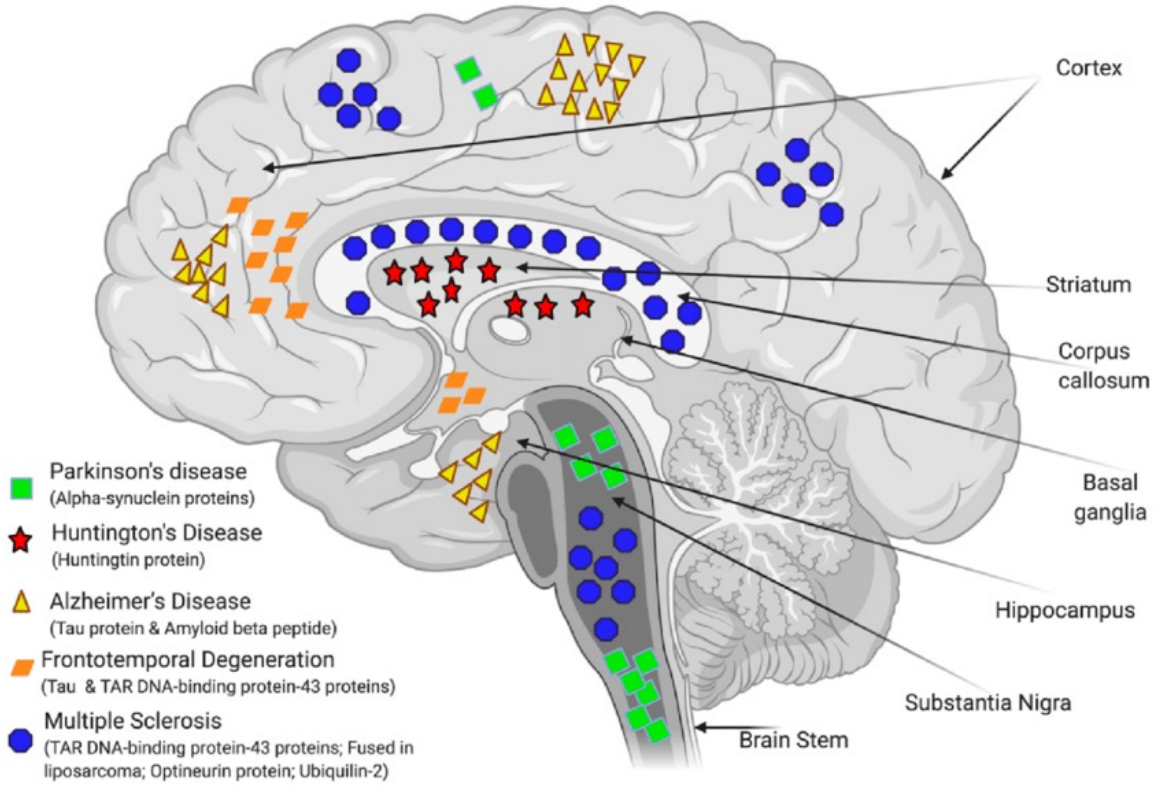
Product Type	Discovery	Preclinical	IND-Enabling	Phase 1	Phase 2	Phase 3	Partnerships / Collaborations	Milestones
COYA 301 **Treg-Enhancing Biologic**	COYA 301 (Low Dose IL-2) ***Alzheimer's Disease (AD)*** **Completed POC IIT open label study in patients with AD***						**Retained Worldwide Rights**	**Summer 2024:** Academic IIT double blind Ph2 data
COYA 201 **Allogeneic Treg Derived Exosomes**	COYA 201 ***Undisclosed***						**Retained Worldwide Rights**	**2024:** Additional animal model data
COYA 206 **Antigen-Directed Allogeneic Treg-Derived Exosomes**	COYA 206 ***Undisclosed***						**Retained Worldwide Rights**	**2024:** Target validation and cargo validation data

COYA THERAPEUTICS

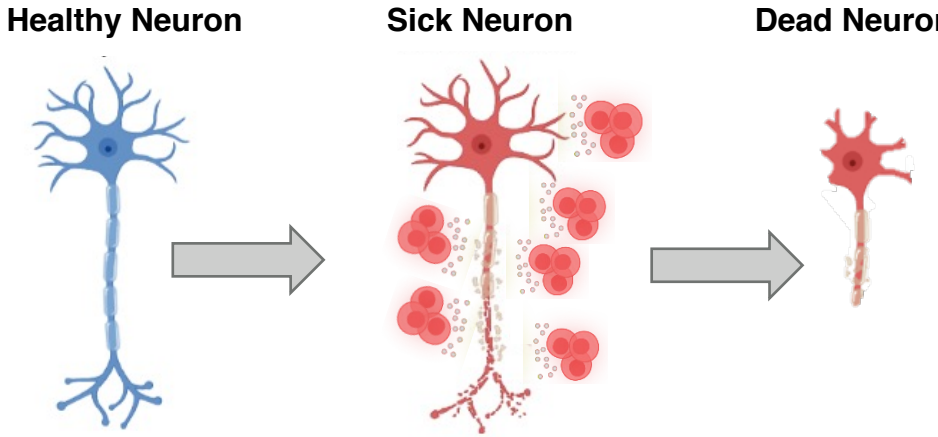
POC- Proof of Concept; IIT- Investigator Initiated Trial
* Conducted using commercially available products

Inflammation Plays a Critical Role in Neurodegeneration:
Regulatory T cells (Tregs) Dysfunction

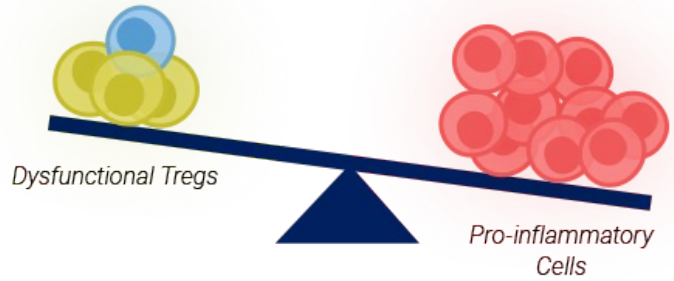
Neurodegeneration: Loss of Selective Population of Neurons



Inflammation in the Nervous System



Tregs play central role in inflammation and progression of neurodegeneration



Bioengineering 8(2):30
DOI:10.3390/bioengineering8020030

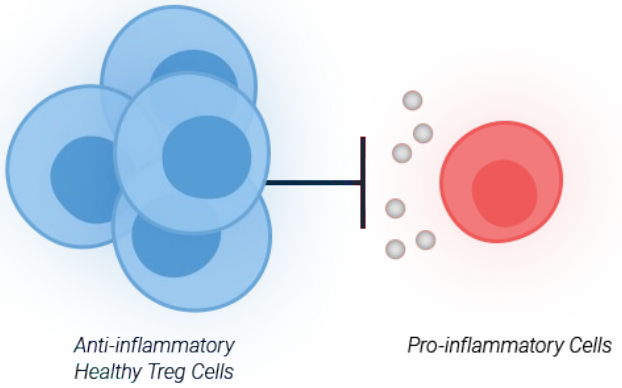
COYA THERAPEUTICS

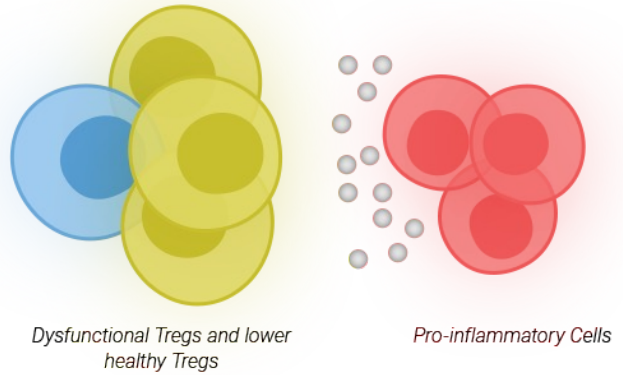
What Are Tregs and How They Are Dysfunctional

Tregs are a type of lymphocyte that modulate the body's immune response

The main functions of Tregs are:

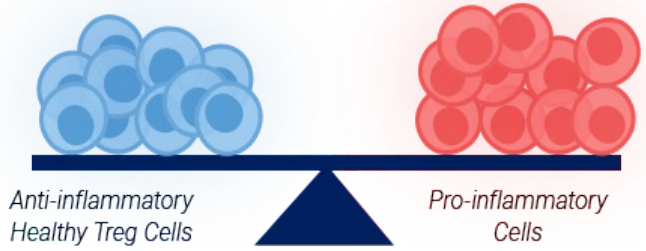
- *Ameliorate inflammatory mechanisms and reactions*
- *Inhibit the release of pro-inflammatory cytokines*
- *Maintain self-tolerance*





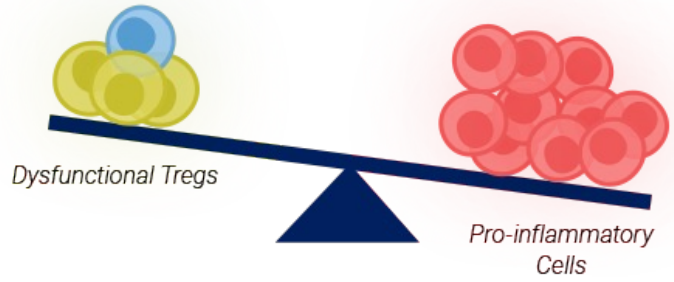
Healthy Tregs

Tregs are important anti-inflammatory immune cells involved in homeostasis. Tregs act on multiple immune cells to down-regulate the release of pro-inflammatory cytokines.



Dysfunctional Tregs

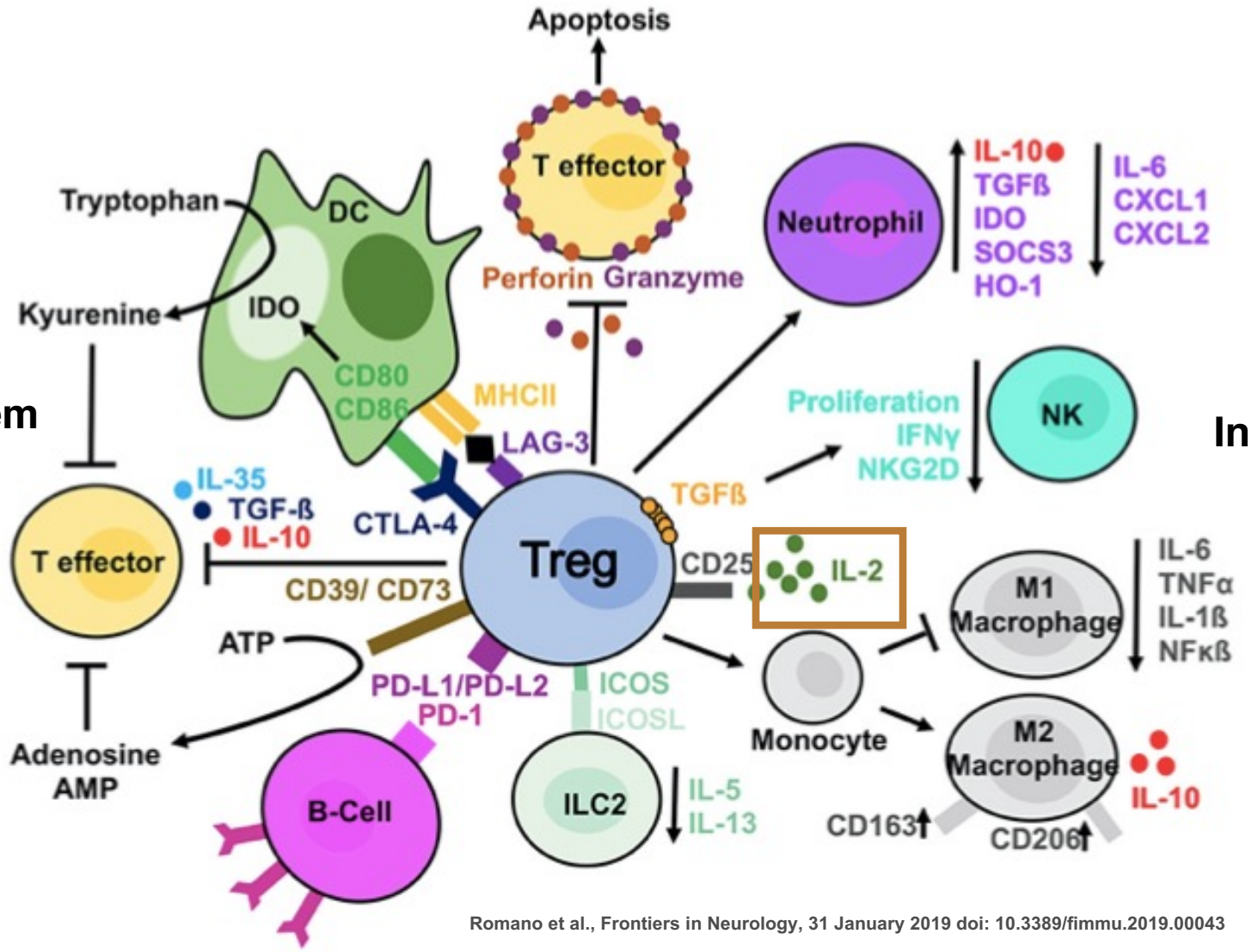
When Tregs become dysfunctional, a cytokine-mediated inflammatory state can arise leading to neurodegenerative, autoimmune, and metabolic diseases.



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Tregs Regulate Multiple Downstream Pathways to Reduce Inflammation

Adaptive Immune System



Innate Immune System

Romano et al., Frontiers in Neurology, 31 January 2019 doi: 10.3389/fimmu.2019.00043

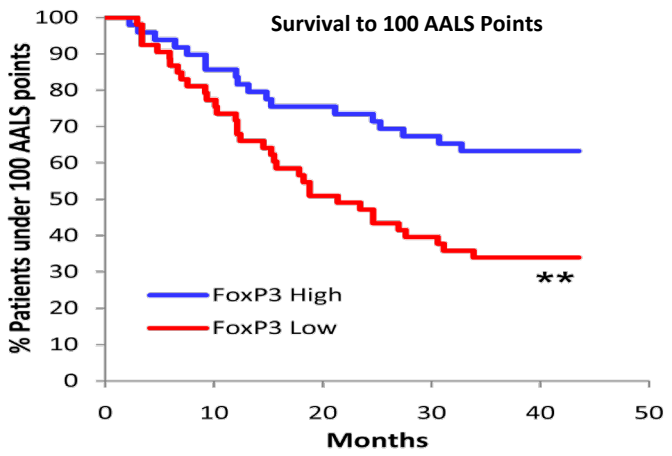
COYA THERAPEUTICS

Adaptive Immune System Involvement in ALS: Treg Dysfunction Is a Core Driver of Neurodegeneration

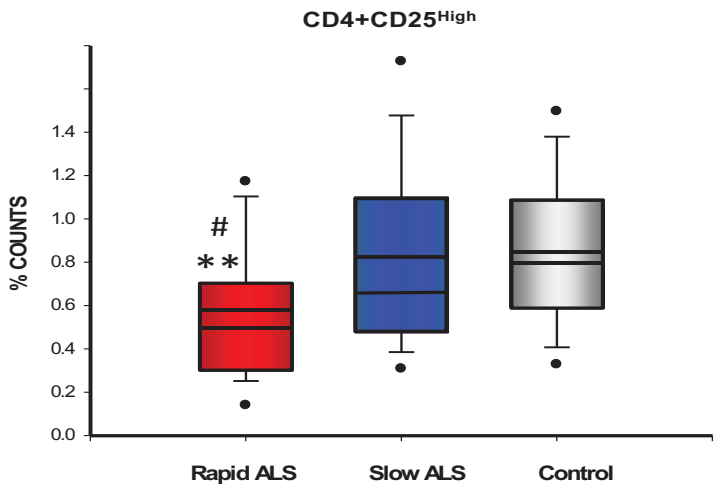
Treg dysfunction is associated with ALS disease progression and burden of disease…

…and is similarly associated in other neurodegenerative diseases

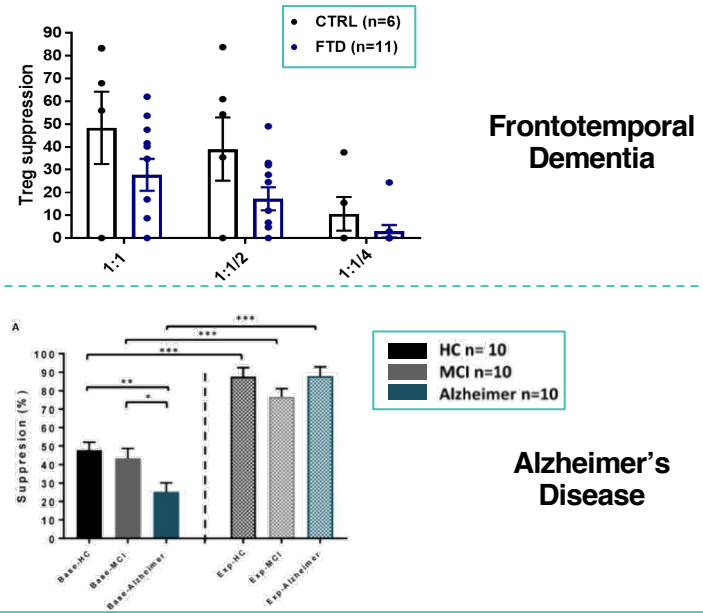
Treg Dysfunction is Associated with Reduced Survival in ALS



Treg Dysfunction Plays a Role in the Rate of Decline in ALS



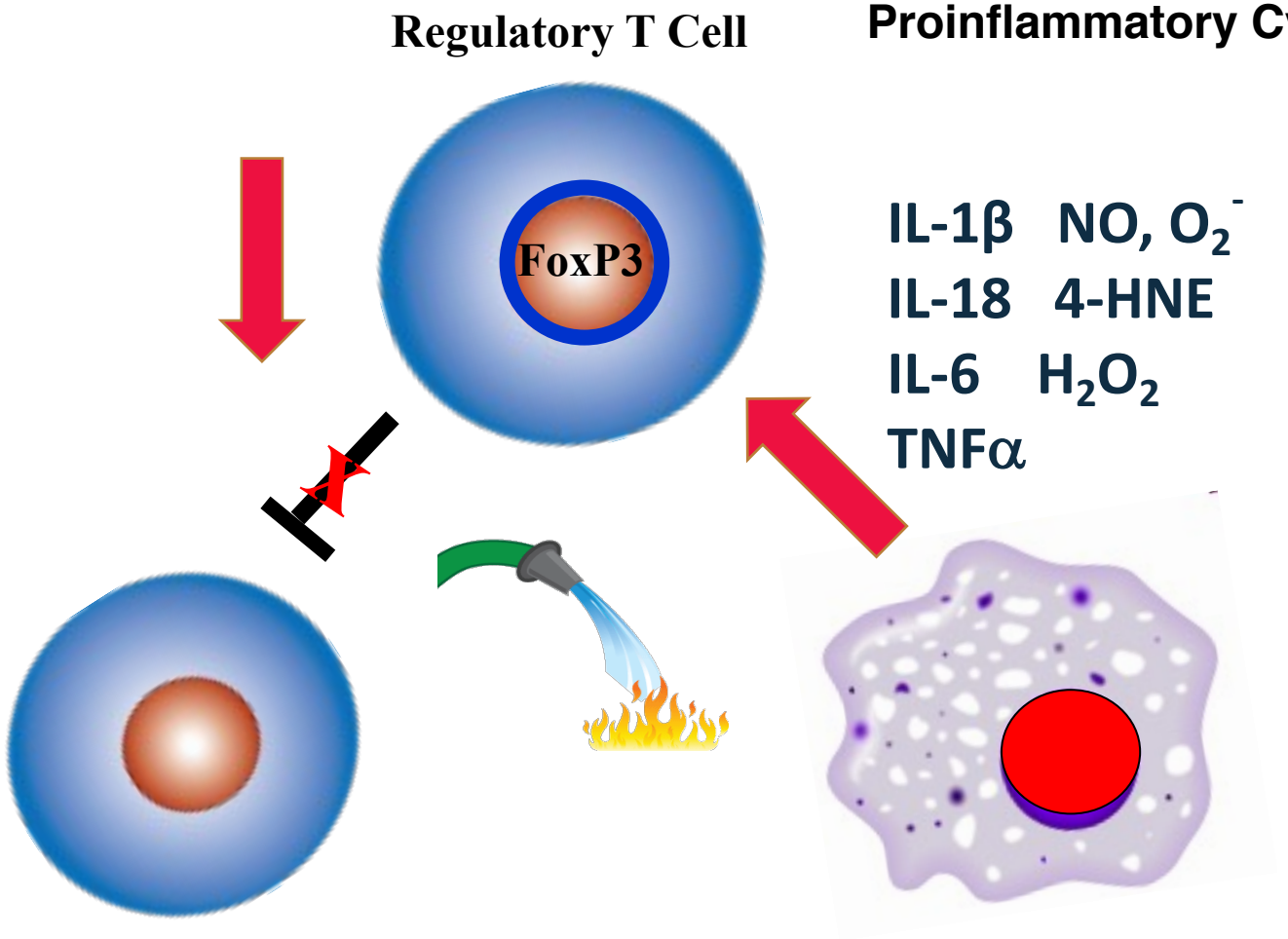
Treg Dysfunction Is Implicated in FTD & AD



Henkel et al, EMBO Mol Med. 2012 Nov 9
Faridar et al, Brain Communications, Volume 2, Issue 2, 2020, fcaa112

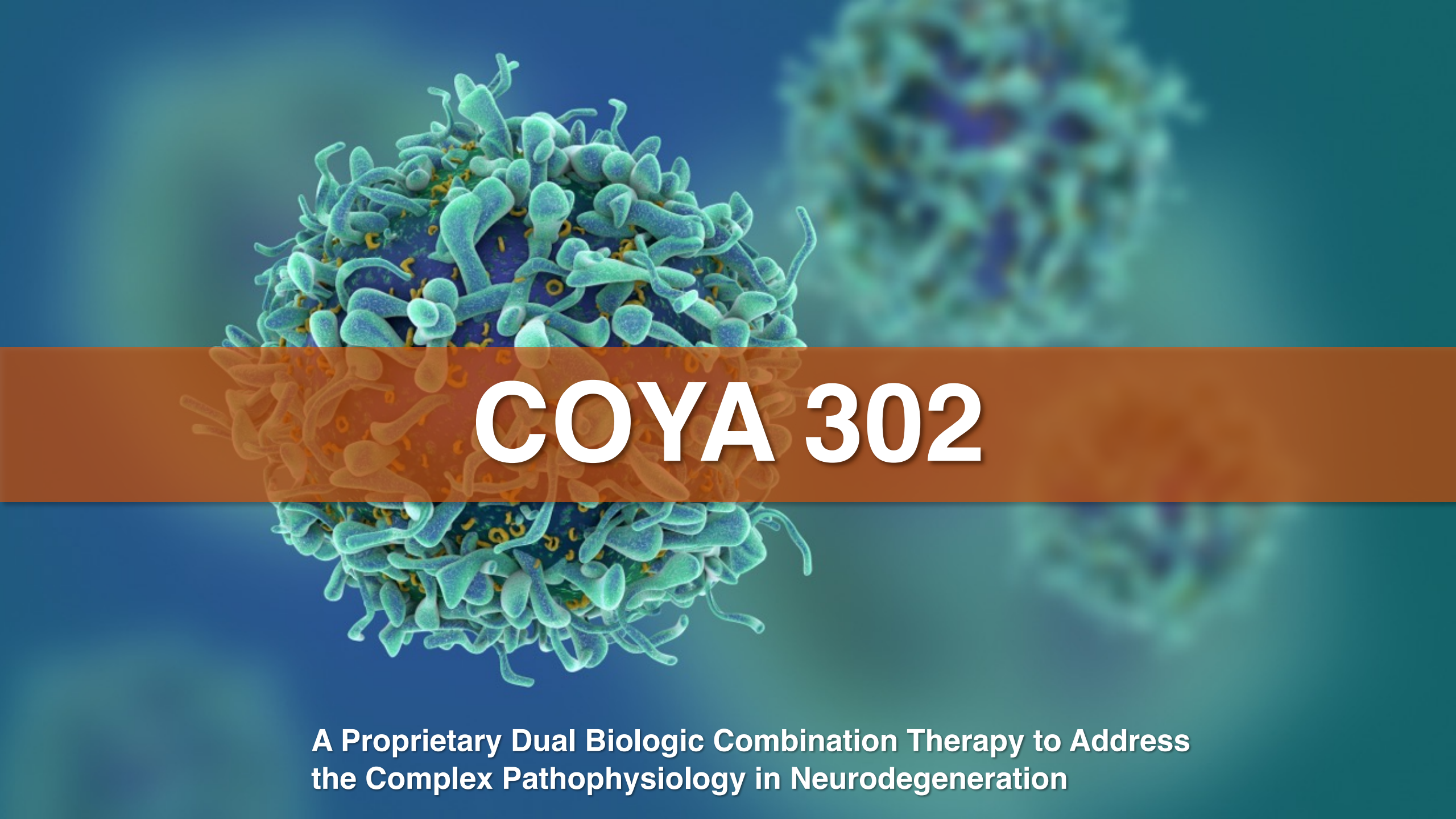
Multiple Immune Pathways Involved in Complex Neurodegenerative Diseases

Macrophages Promote Dysfunction of Tregs Releasing Proinflammatory Cytokines and Oxidative Stress



Oxidative Stress/Cytokines contribute to pathophysiology of neuronal injury and cell death in ALS

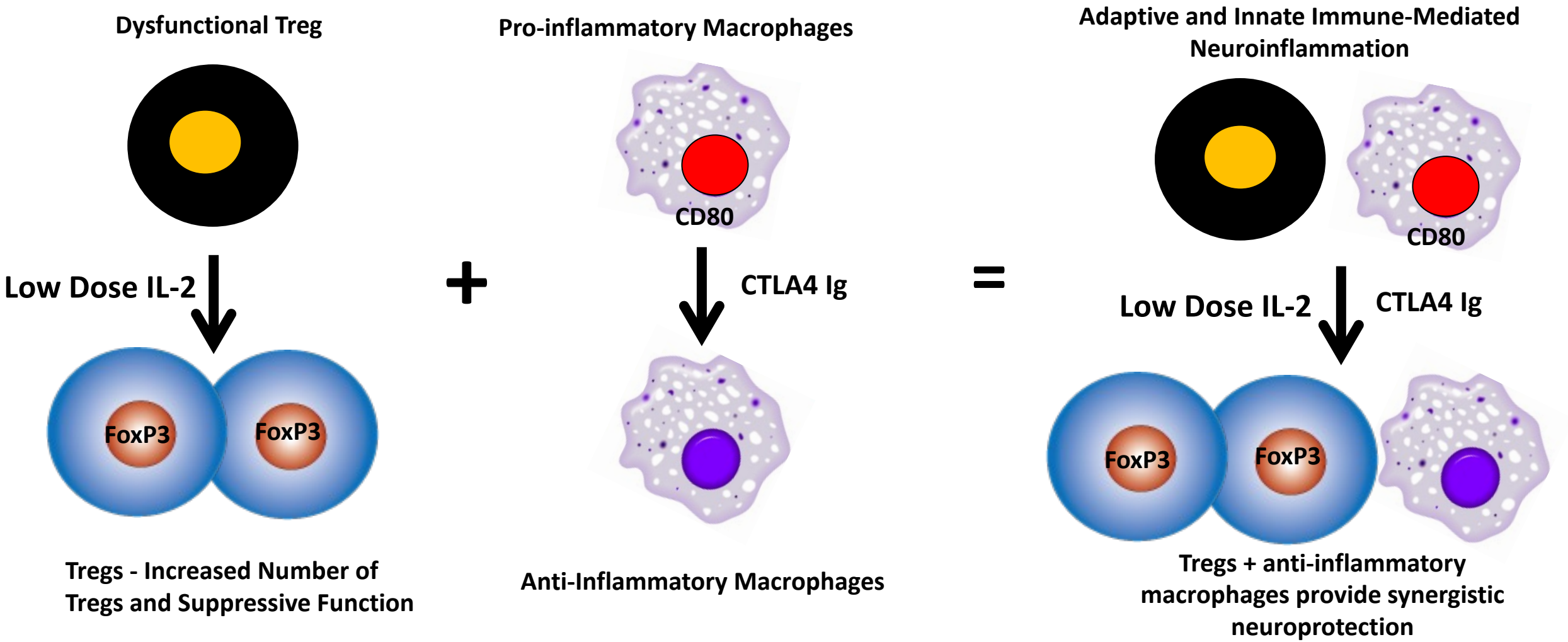
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COYA 302

A Proprietary Dual Biologic Combination Therapy to Address the Complex Pathophysiology in Neurodegeneration

COYA 302: Combination Immunotherapy Targeting the Adaptive and Innate Immune System that Drives ALS Pathophysiology



COYA 302:
A Novel Approach to the Treatment of Neurodegenerative Diseases

Unique combination compared to commercial IL-2 (High Dose Lyophilized Format) or CTLA4-Ig (Orencia)

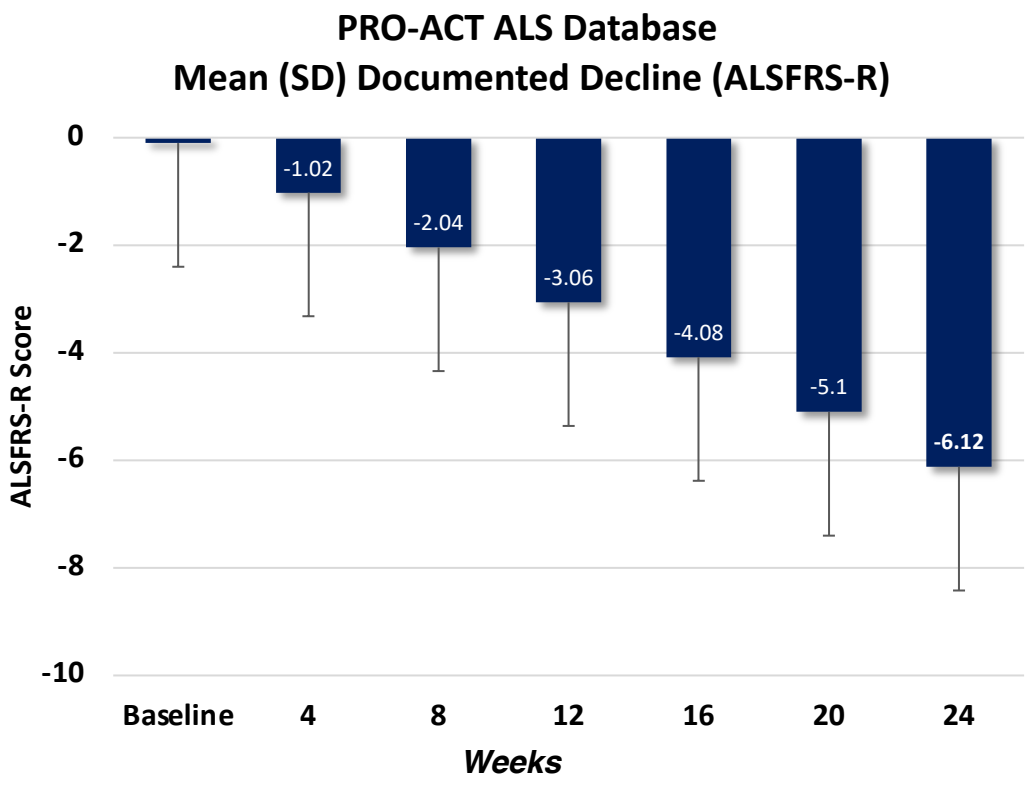
- New Indications including ALS, Alzheimer's, other ND diseases
- Unique low dose strength and dosing regimen
- Ready-to-administer stable subcutaneous formulation
- Well-established GMP manufacturing
- Strong IP

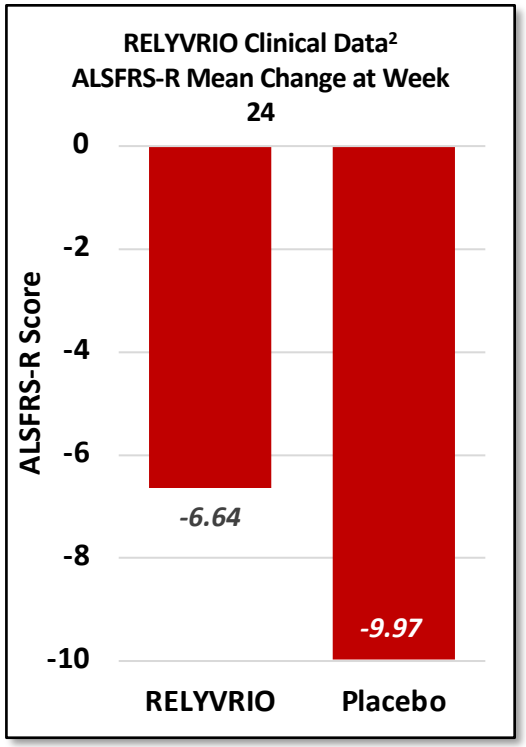
COYA 302 is an investigational product, not yet approved by the US Food and Drug Administration

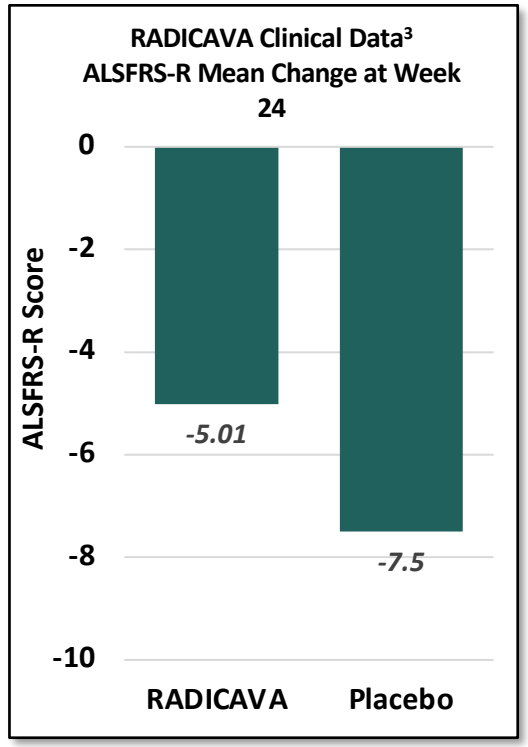
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Current Therapies for ALS Aim to Slow Disease Progression

Many companies have garnered significant value by demonstrating a *limited* benefit of slowing the rate of ALS progression







Average rate of patient decline is 1.02 points/month in ALSFRS-R score[1]

1. The PRO-ACT database is the largest ALS data repository (Atassi et al, 2014)
2. Relyvrio US Prescribing Information (9/2022)
3. Radicava US Prescribing Information (5/2022)

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COYA 302:
Open-Label, Single-Arm PoC Clinical Study in ALS Patients (N=4)

Screening

20 weeks

Screening Assessments

- ✓ Clinical Labs
- ✓ ALSFRS-R Score
- ✓ Electrocardiogram (ECG)
- ✓ Physical & Neurological Exam

Study patients had well-documented disease progression prior to treatment (-1.1 points/month prior to treatment with COYA 302)

Treatment Period

***COYA 302** was administered via subcutaneous injection over 48 weeks*

Treatment Period Assessments

- ✓ Safety and Tolerability
- ✓ Treg Function and Numbers
- ✓ Serum Biomarkers
- ✓ ALSFRS-R Score

Follow-Up

8 weeks

Post-Treatment Assessments

- ✓ Safety and Tolerability
- ✓ Treg Function & Numbers
- ✓ Serum Biomarkers
- ✓ ALSFRS-R Score

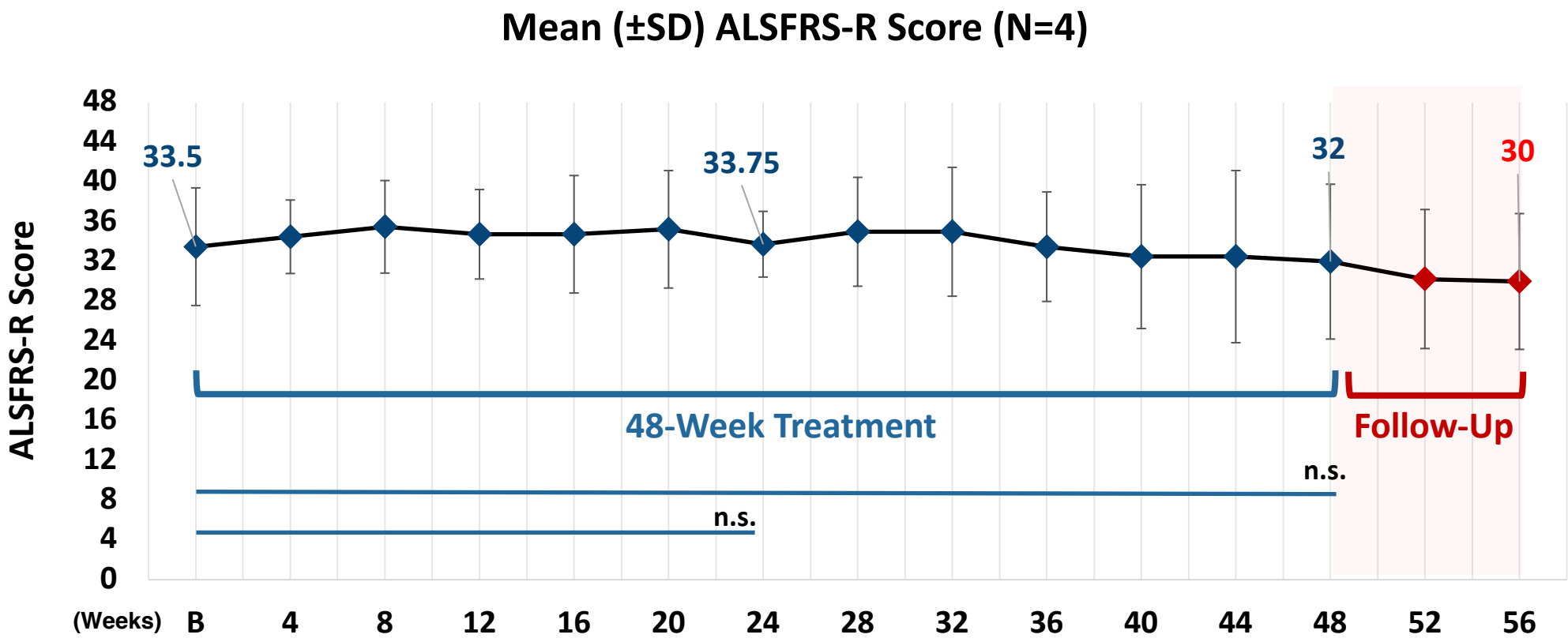
Safety and tolerability assessments included reported adverse events, periodic physical and neurological exams, clinical labs, and ECGs

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COYA 302:
PoC Trial Patient Demographics and Baseline Characteristics

	Age (years)	Sex	Type	Onset	ALS Progression Prior to Baseline (ALSFRS-R score)	Respiratory Status	Respiratory Support
Patient 1	47	Female	Familial	Limb	-1.6 points / month	No Respiratory Insufficiency	None
Patient 2	54	Male	Sporadic	Limb	-1 points / month	Respiratory Insufficiency	Non-invasive Ventilation
Patient 3	57	Female	Sporadic	Bulbar	-1 point / month	Respiratory Insufficiency	Non-invasive Ventilation
Patient 4	84	Female	Sporadic	Bulbar	-0.7 points / month	Respiratory Insufficiency	None

COYA 302:
Appears to Ameliorate ALS Progression Over 48 Weeks



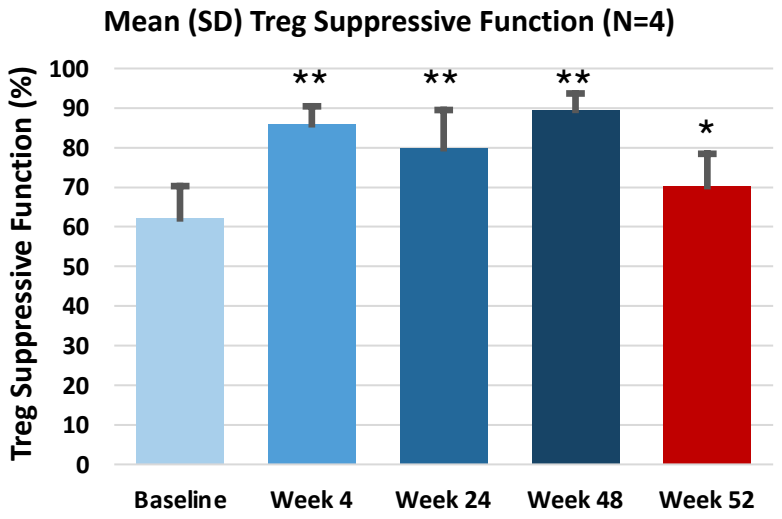
COYA 302 was well tolerated over 48 weeks; the most common AE was mild injection site reaction. All patients completed the study; no deaths or serious AEs (SAEs) occurred over the course of the study.

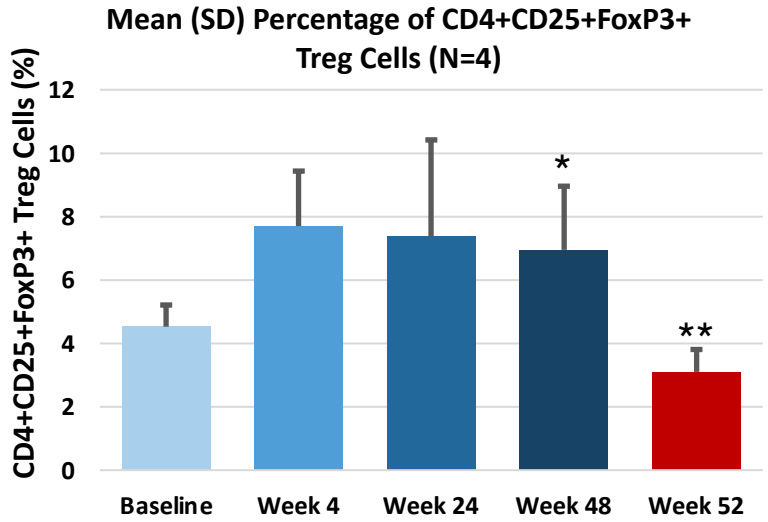
B: Baseline
n.s.: not significant (paired t test)

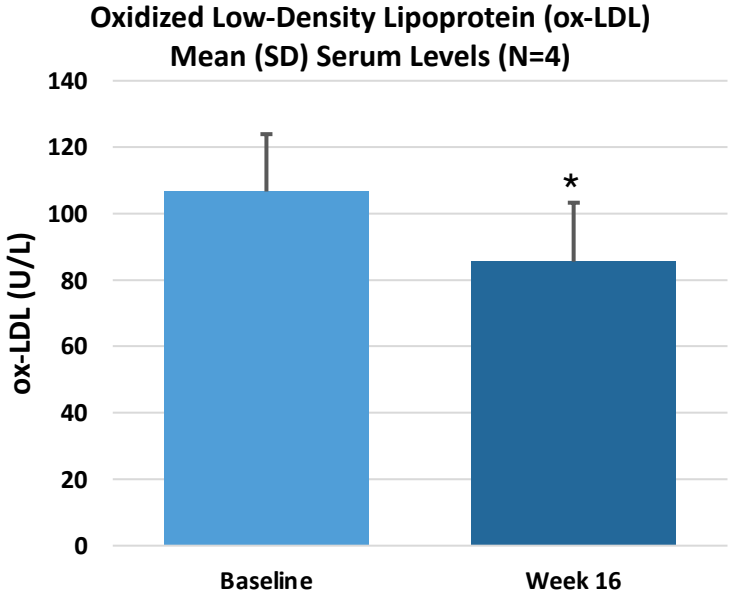
COYA 302:
Enhanced Biologic Activity

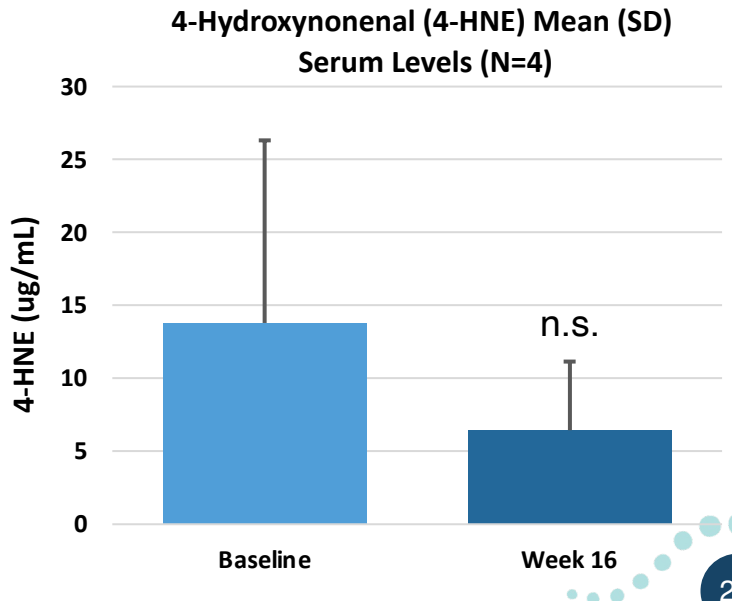
Key Takeaways

- ✓ **COYA 302 significantly expands Treg suppressive function** as early as 4 weeks after initiation of treatment and maintained a significantly increased Treg function.
- ✓ **COYA 302 increased Treg numbers as early as 4 weeks** after initiation of treatment and maintained a higher number over the course of treatment.
- ✓ **COYA 302 enhanced suppression** of macrophage-mediated **oxidative stress and proinflammatory cytokine biomarkers** over 48 weeks









n.s.: not significant (paired t test)
*p <0.05
** p <0.01 (paired t test)

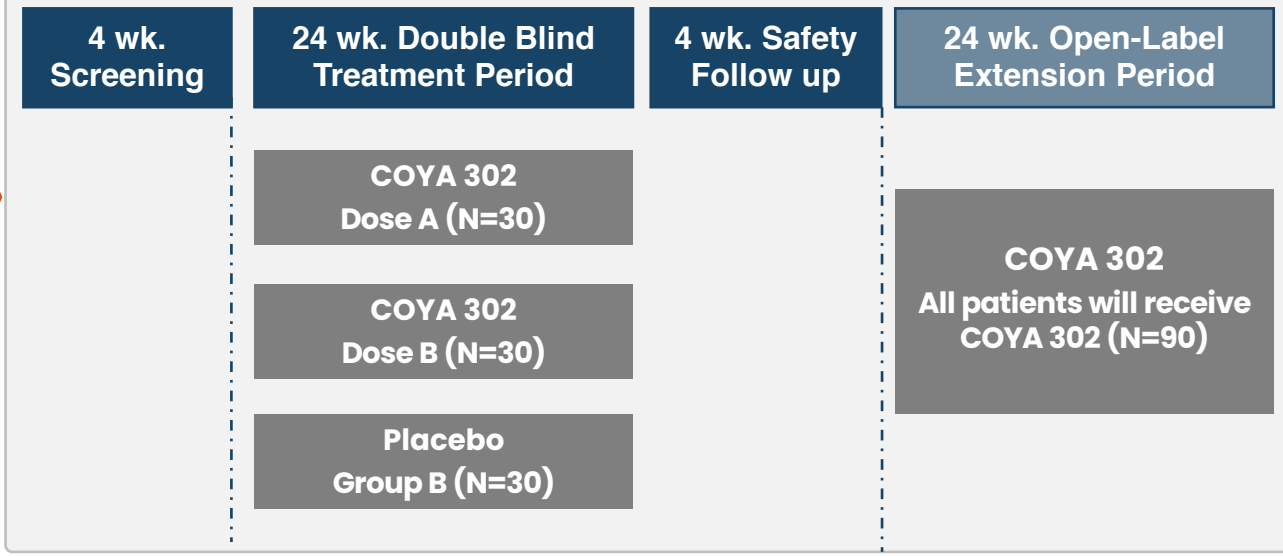
COYA THERAPEUTICS

COYA 302:
Overview of Phase 2 Study Design in ALS

Key Inclusion Criteria

- Diagnosis of sporadic or familial ALS
- Time since onset of ALS symptoms ≤ 24 months from Screening
- ALSFR-R score ≥ 35 at Screening
- A score of at least 2 points in each ALSFRS-R item
- Forced vital capacity (FVC) ≥ 70% of predicted capacity for age, height, and gender at Screening
- Documented disease progression (by ALSFR-R score) for at least 16 weeks prior to Screening

Randomized, Double-Blind, Placebo-Controlled Phase 2 with Open-Label Extension



Primary Endpoint

Combined Assessment of Function (ALSFRS-R) and Survival (CAFS)

Study Objectives

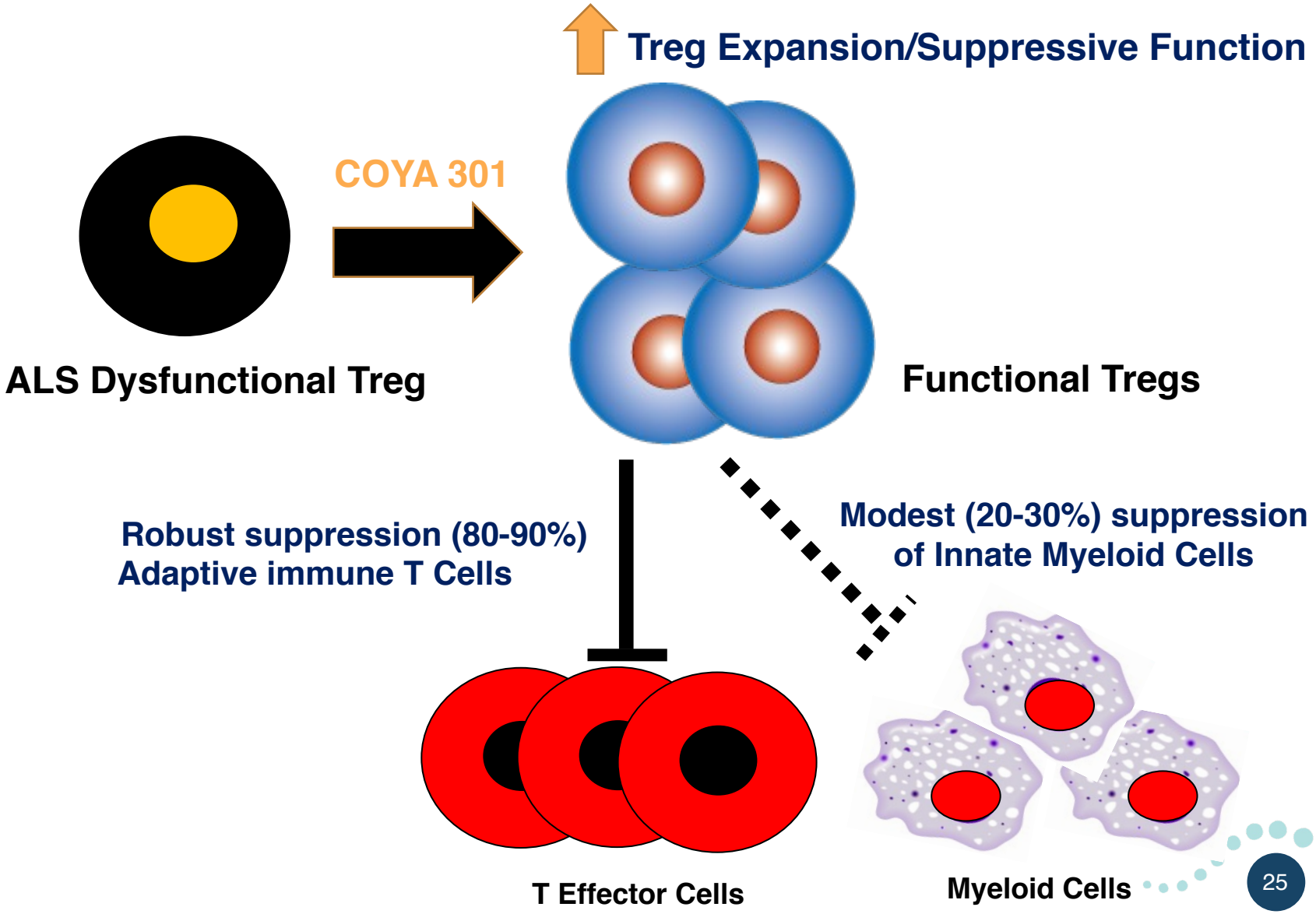
1. Efficacy
2. Safety and Tolerability
3. Biological Activity
4. Biomarker levels

COYA THERAPEUTICS


COYA 301

COYA 301: Proprietary Treg Enhancing Low-Dose IL-2 Suppresses Adaptive Immunity Robustly and Innate Immunity Modestly

Dysfunctional Tregs are associated with neuroinflammation promoted by activated T effector cells and activated innate myeloid cells

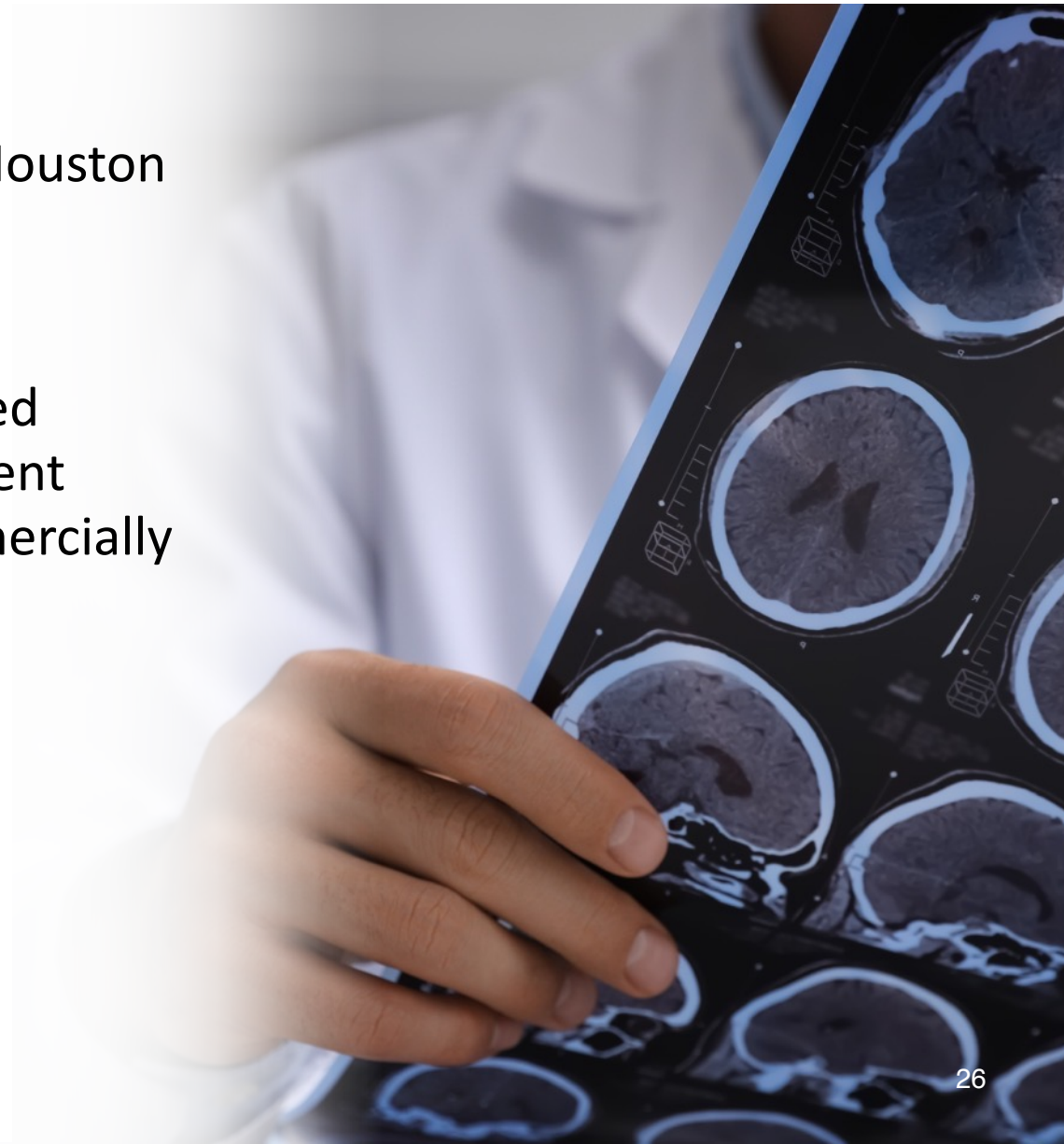


COYA THERAPEUTICS

COYA 301:
Investigator-Initiated Study in Alzheimer's Disease (AD)

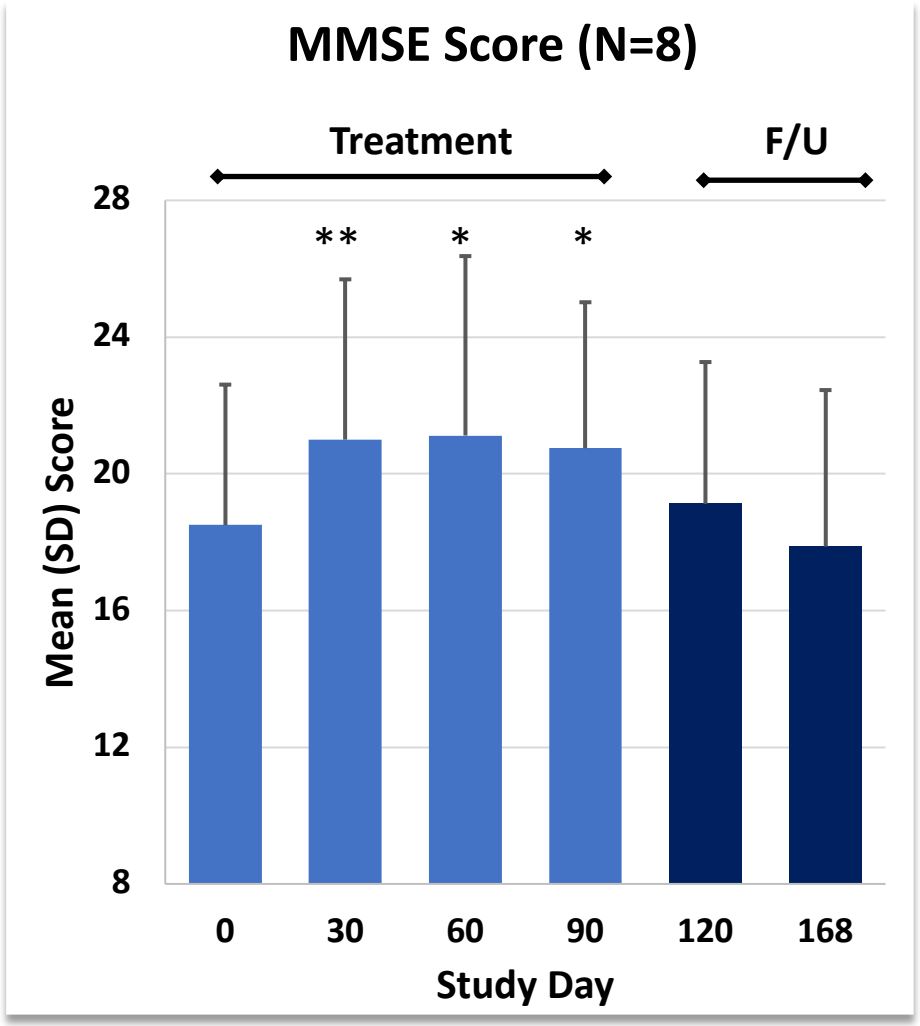
Overall Study Design

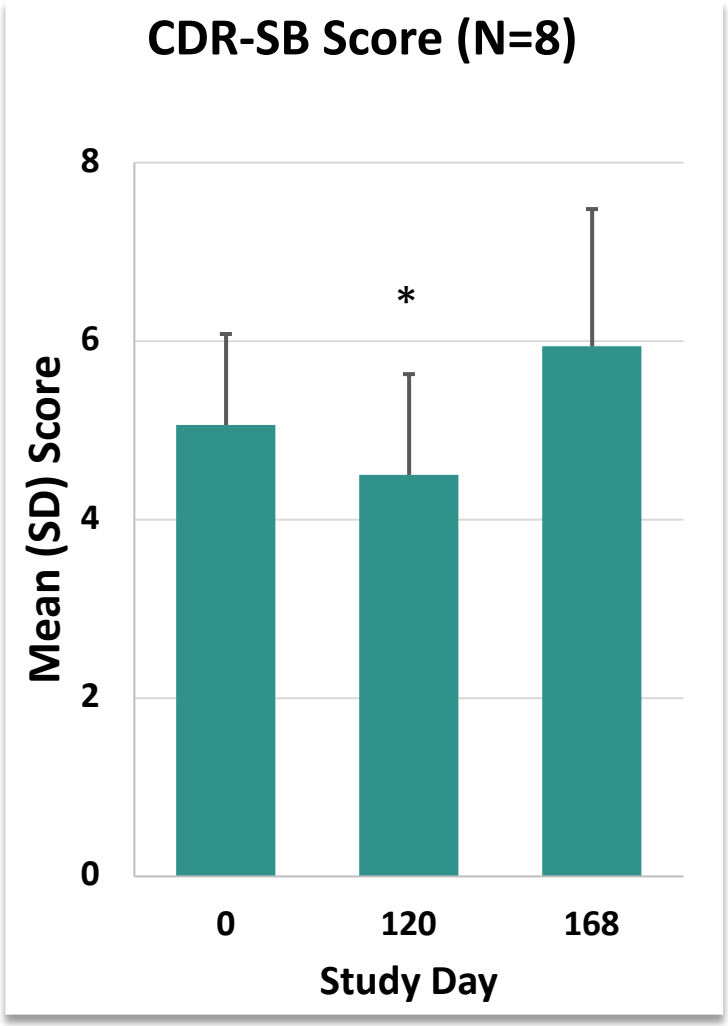
- Proof-of-Concept open-label study, conducted at Houston Methodist Hospital
- Population: 8 patients with mild-to-moderate AD
- Treatment: 4 monthly COYA 301 cycles administered subcutaneously, followed by 2-month post-treatment observation. The study was conducted with commercially available product
- Assessments:
  - Treg suppressive function and Treg numbers
  - Peripheral proinflammatory biomarkers
  - Cognitive status
  - Safety and tolerability

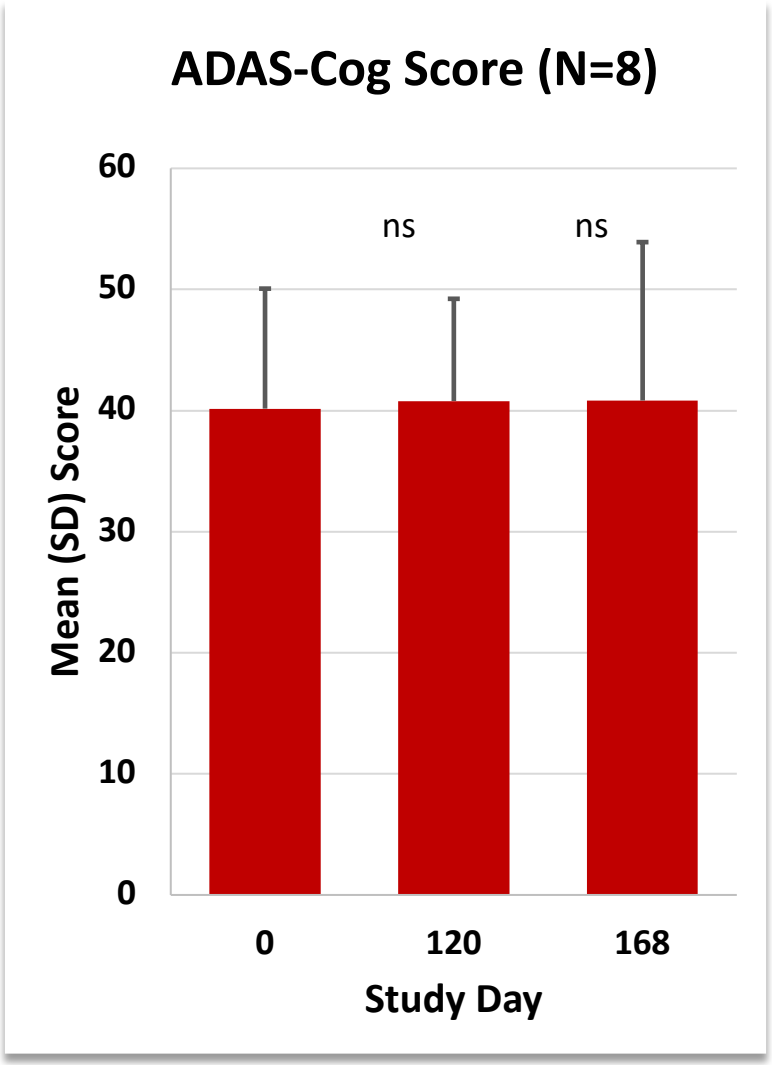


COYA THERAPEUTICS

COYA 301:
Improved or Halted Cognitive Decline in AD Patients





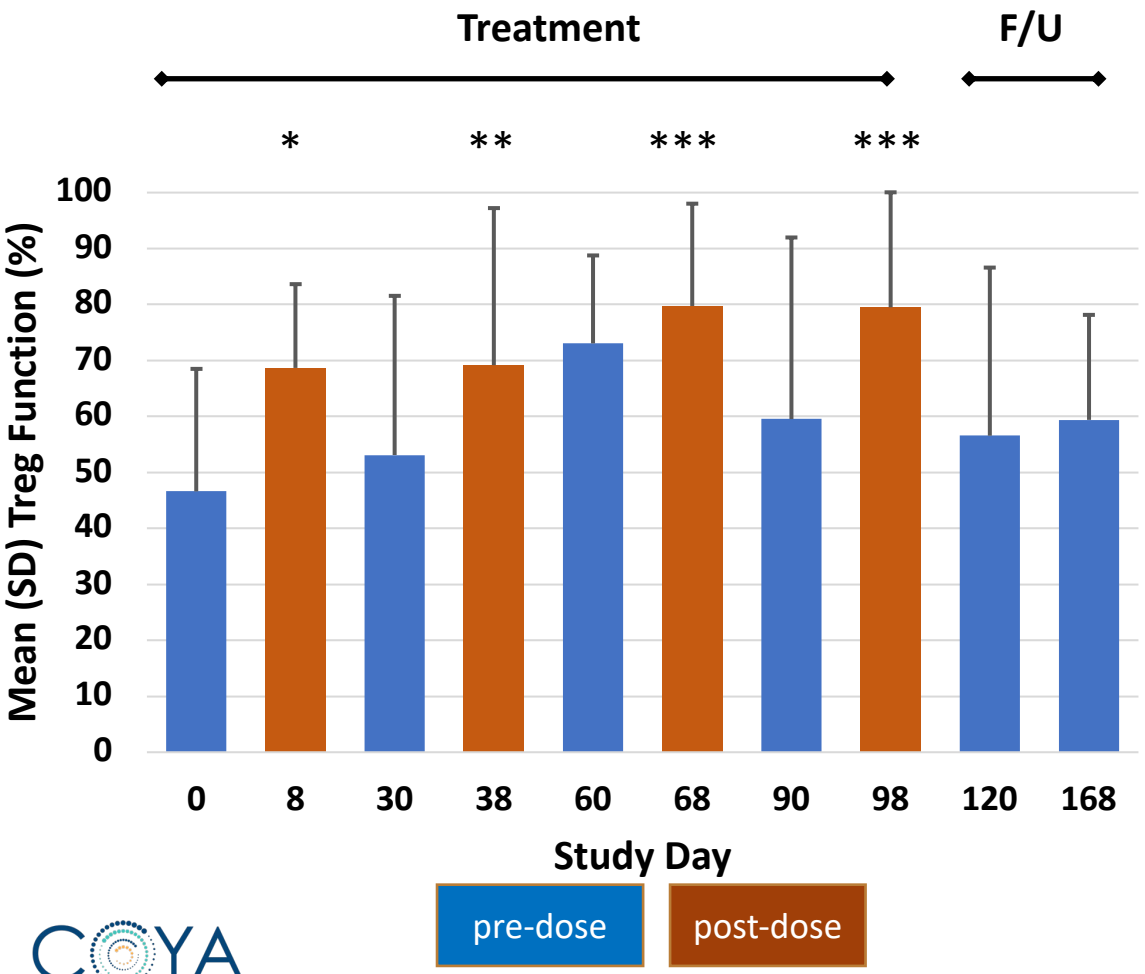


*p<0.05, **p<0.01 ns: not significant

MMSE: Mini-Mental State Examination, ADAS-Cog: Alzheimer's Disease Assessment Scale-Cognitive Subscale
CDR-SB: Clinical Dementia Rating scale – Sum of Boxes

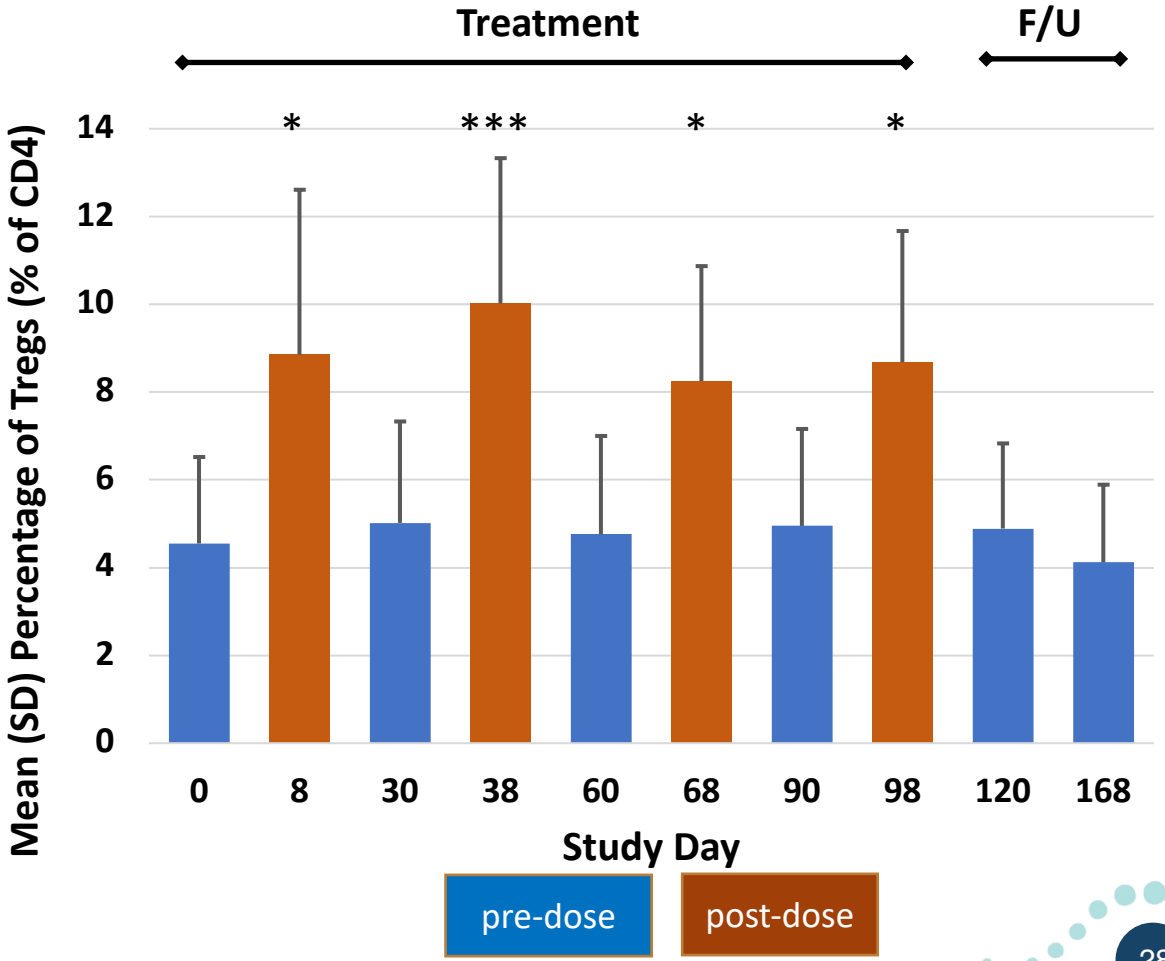
COYA 301:
Enhanced Treg Function and Numbers *in vivo* in AD Patients (N=8)

Statistically Significant Enhancement of Treg Suppressive Function



*p<0.05, **p<0.01, ***p<0.001

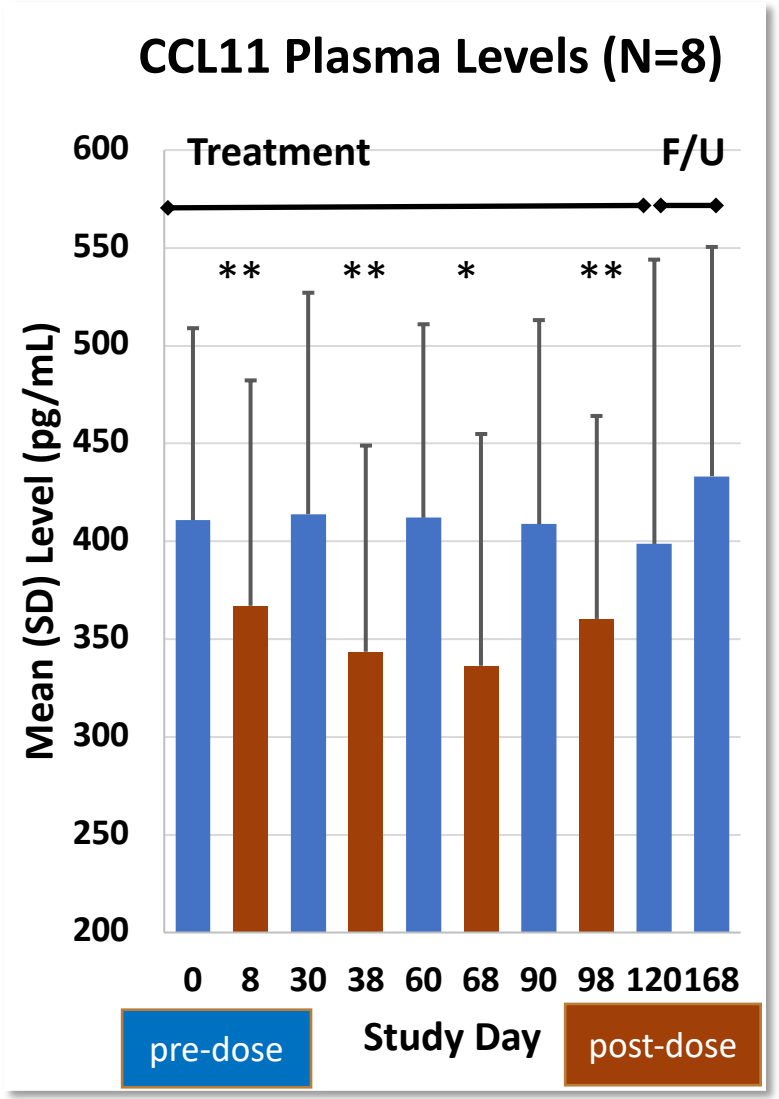
Statistically Significant Enhancement of Treg Numbers

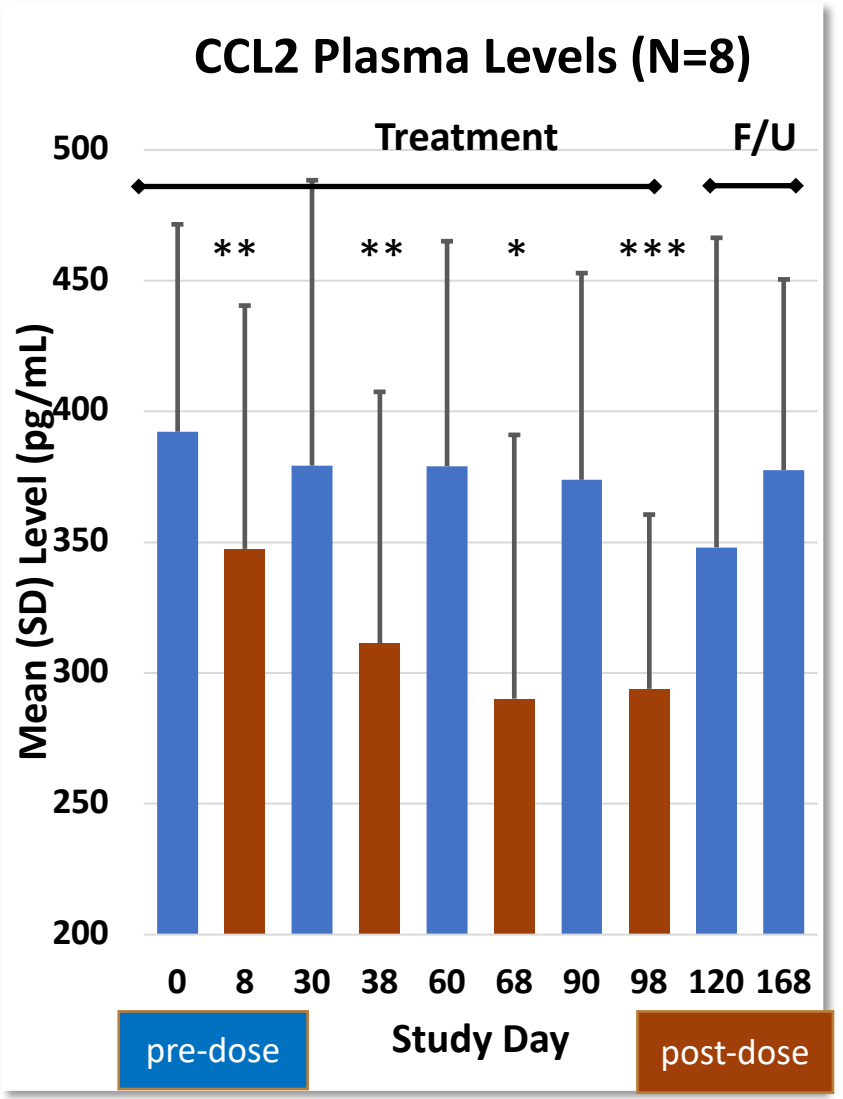


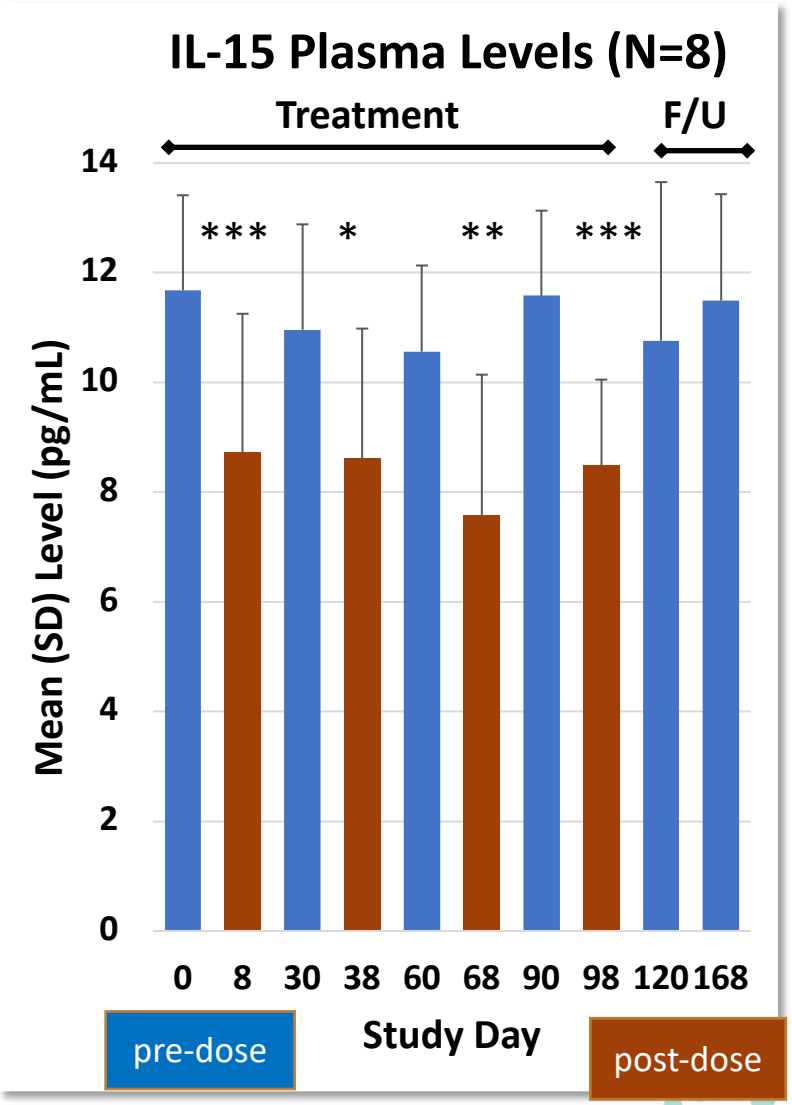
*p<0.05, ***p<0.001

COYA THERAPEUTICS

COYA 301: Significantly Lowered Plasma Proinflammatory Chemokines and Cytokines in AD Patients



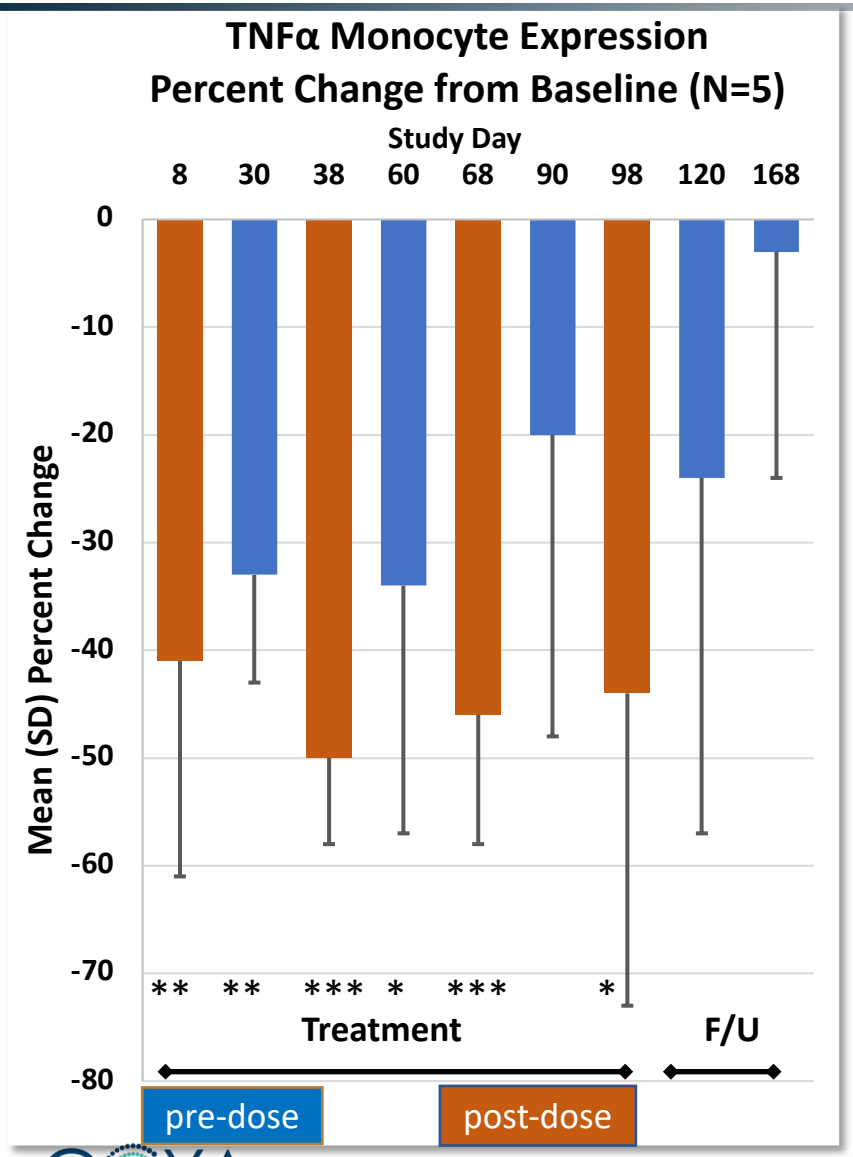


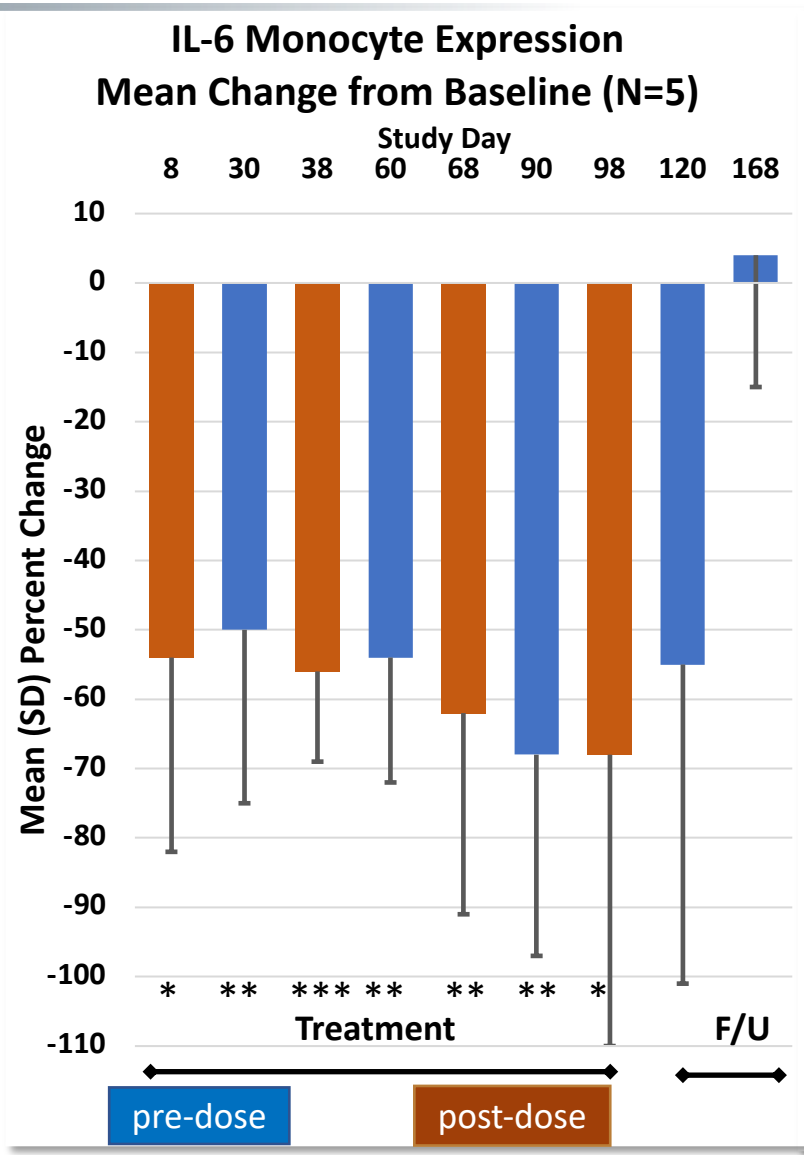


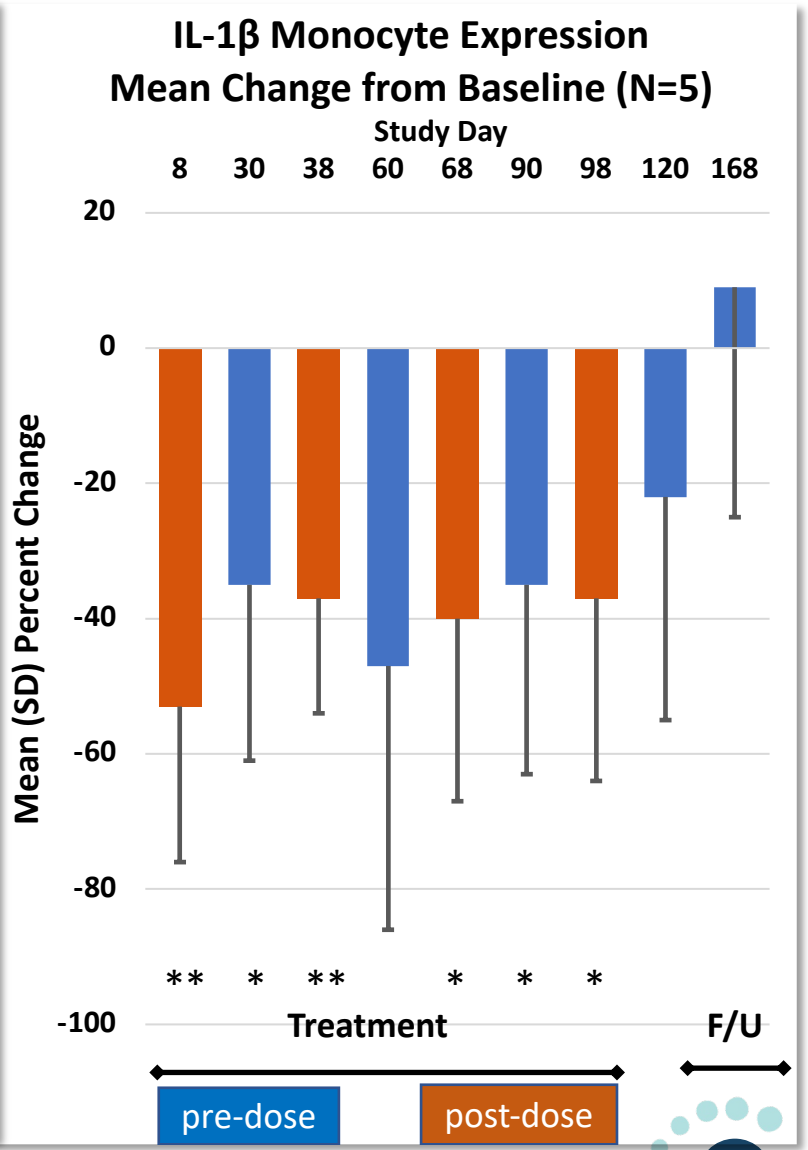
CCL11: chemokine C-C motif ligand 11 (eotaxin-1); CCL2: chemokine monocyte chemoattractant protein 1
IL-15: interleukin 15

*p<0.05, **p<0.01, ***p<0.001

COYA 301: Significantly Lowers Expression of Proinflammatory Cytokines in AD Patients





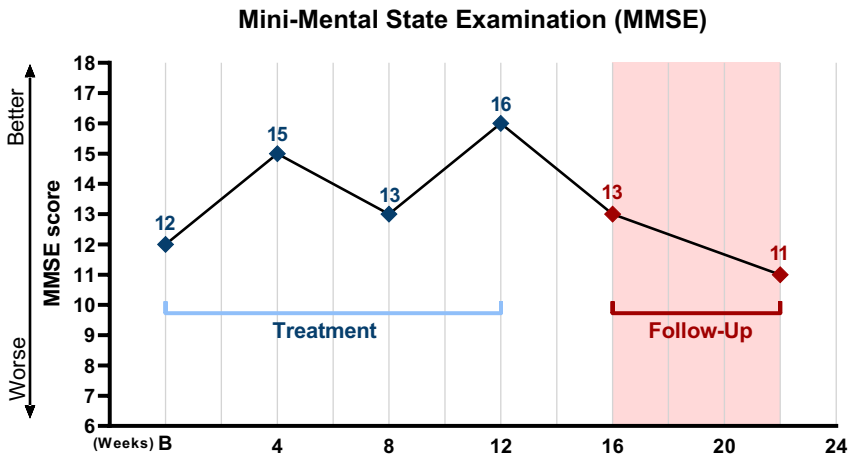


TNFα: tumor necrosis factor alpha; IL-6: interleukin 6; IL-1β: interleukin 1 beta

*p<0.05, **p<0.01, ***p<0.001

Case Study of Brain Imaging of AD Patient before and after COYA 301 treatment

70-Year-Old Male
Baseline MMSE: 12
Positive PIB PET Scan
Positive Neurodegeneration MRI
Other Rx: Donepezil 10mg

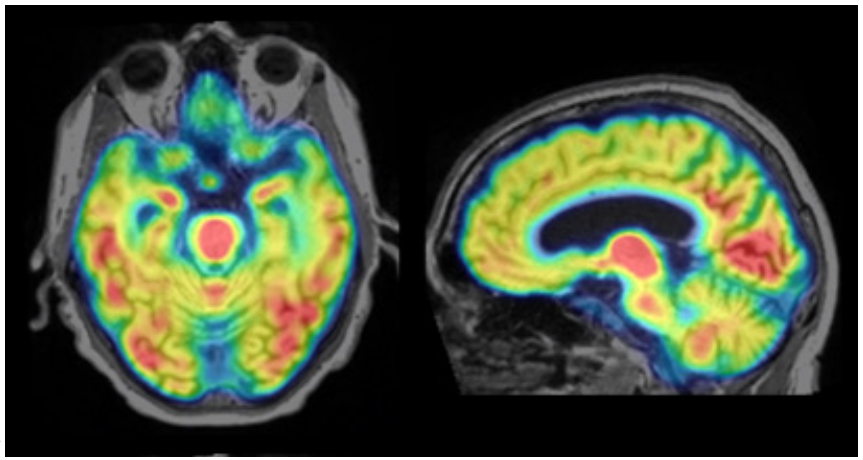


Neuroinflammation (TSPO) (^{11}C) ER-176 PET Scan at baseline and after 4-monthly cycles of low dose IL-2.

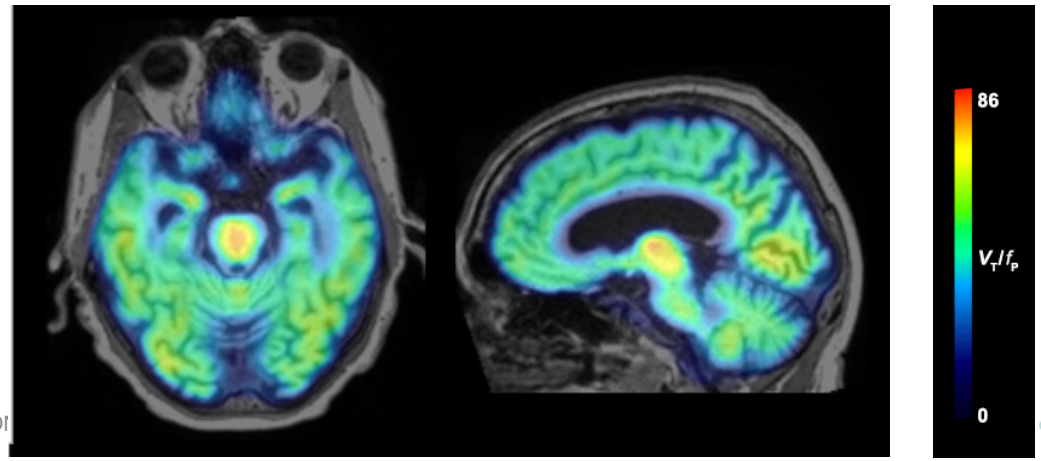
The second PET scan was done 2 weeks after last dose.

PET: Positron Emission Tomography
TSPO: translocator protein

PET Scan (Baseline)



PET Scan (2 weeks after last dose)



COI

COYA THERAPEUTICS

COYA 301:
Safety & Tolerability

- Overall, COYA 301 was well tolerated in patients with AD
- Most common adverse events (AEs) were mild injection site reactions and mild leukopenia
- All patients completed the study
- No deaths or other serious AE occurred over the course of the study



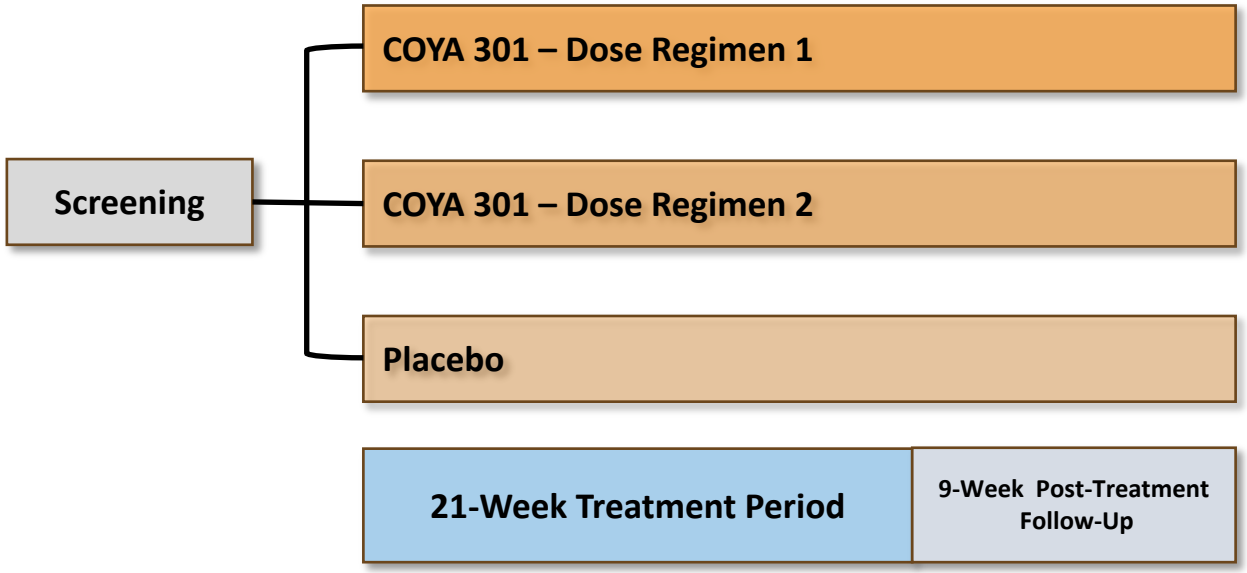
COYA THERAPEUTICS

COYA 301:
Double-Blind, Placebo-Controlled Study in AD Patients is Ongoing

The encouraging results of the open-label, proof-of-concept study in AD (N=8) supported conducting the ongoing randomized, double-blind, well-controlled phase 2 study in 38 patients with mild-to-moderate AD.

Study Objectives

- Safety & tolerability
- Biological activity (Treg function)
- Blood and CSF biomarkers
- Cognitive function



Dose Regimen 1: 1 million IU administered SC daily for 5 days, **every 4 weeks**
Dose Regimen 2: 1 million IU administered SC daily for 5 days, **every 2 weeks**

Enrollment completed in October 2023

Topline results are anticipated in Summer 2024

Study funded by the Gates Foundation and Alzheimer's Association

COYA THERAPEUTICS

COYA 301: A Backbone for Combination Immunotherapy

Activated T effector Cells

Activated Macrophages/Microglia

Treg Function and numbers

COYA 301

Subcutaneous Low-Dose Interleukin-2

Backbone Therapy

\+

CTLA4 Ig → COYA 302

Shown therapeutic benefit in ALS patients

Beta Amyloid Inhibitors → COYA 303*

Alzheimer's Disease

Ferroptosis Inhibitor → COYA 304*

Neurodegenerative
Autoimmune
Metabolic

Multifactorial inflammatory pathways may require synergistic combination therapies

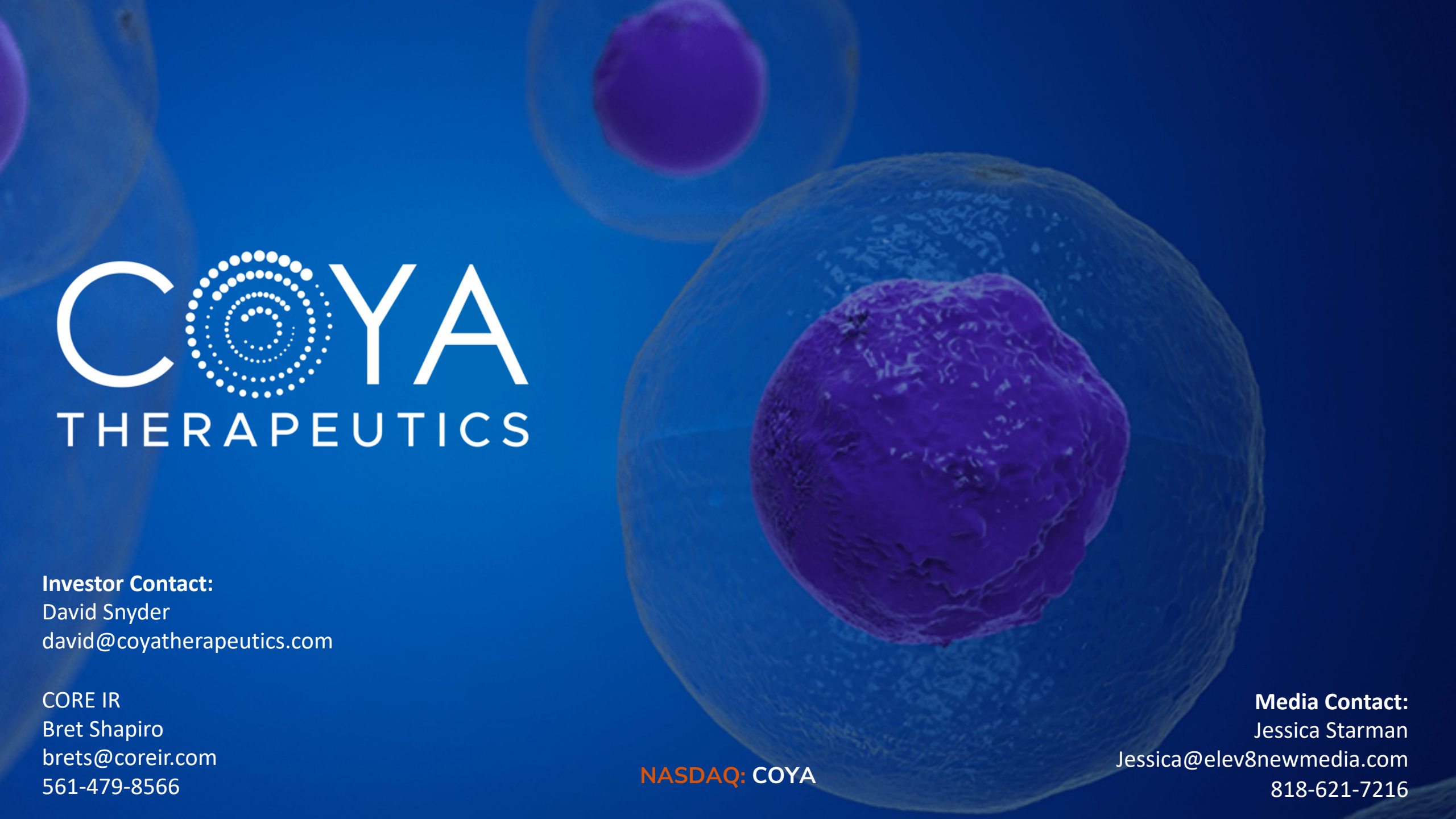
* Opportunities for additional indications and partnerships

COYA THERAPEUTICS

Coya – Critical Catalysts Over the Next 2 Years

1H 2024	2H 2024	2025
• COYA 302 File IND and Initiate Phase 2 Trial in ALS Patients • COYA 301 Presentation of Investigator Initiated Trial data in AD Patients at 18th annual AD + PD Conference • COYA 302 Publication of Investigator Initiated Trial clinical data in ALS Patients • COYA 302 Publication of Biomarker data correlation to survival in ALS Patients (registry) • Neurologic Conference to Present Biomarker data in ALS Patients	• COYA 301 Proof of Concept combination data with Drug X in AD mice model • COYA 301 **Phase 2 Investigator Initiated Trial Topline AD Patients data** (Summer) • COYA 302 first patient dosed in ALS Patient trial • COYA 302 File IND and Initiate Phase 2 Trial in FTD Patients • COYA 302 Animal data released in PD Model	• COYA 302 **Phase 2 Topline Data in ALS Patients** • COYA 302 **Phase 2 Topline Data in FTD Patients** • COYA 302 File IND and Initiate Trial in PD Patients

COYA THERAPEUTICS



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