ocugen

Our Mission is to

Develop **Gene Therapies** to Cure Blindness Diseases

and

Develop a **Vaccine** to Save Lives from COVID-19

NASDAQ: OCGN

Corporate Deck: May 2021

Forward Looking Statement

This presentation contains forward-looking statements that involve substantial risks and uncertainties. All statements, other than statements of historical facts, contained in this presentation, including statements regarding our business strategy, future results of operations and financial position, prospective products, product approvals, research and development costs, timing and likelihood of success, estimated market size or growth, and plans and objectives of management for future operations, are forward-looking statements. When used in this presentation, the words “anticipate,” “believe,” “contemplate,” “continue,” “could,” “estimate,” “expect,” “intend,” “may,” “plan,” “potential,” “predict,” “project,” “should,” “target,” “would,” and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words.

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Ocugen Overview

COVID-19 VACCINE

- **COVAXIN™:** Whole-virion inactivated COVID-19 vaccine candidate (with adjuvant). Licensed rights from Bharat Biotech for the US market (currently received EUA in India). Standard vaccine storage condition (2-8°C)
- 78% overall efficacy and 100% in severe COVID-19 disease (including hospitalization)
- Phase 3 clinical trial enrolled 25,800 participants between 18-98 years of age, including 2,433 over the age of 60 and 4,500 with comorbidities. Phase 1/2 enrolled 755 participants 12+ years of age
- Potential coverage against multiple protein antigens of the virus and potentially applicable to broader population
- Effectively neutralizes UK, BZ, and IN variant of SARS-Cov-2 reducing the possibility of mutant virus escape

OCUGEN'S BREAKTHROUGH MODIFIER GENE THERAPY PLATFORM

- Potential for one product to treat many diseases & multi-factor approach (POC study results published in Nature)
- **OCU400 (AAV-NR2E3):** Orphan medicinal product designation for the treatment of both retinitis pigmentosa (RP) and Leber Congenital amaurosis (LCA) covering diseases caused by mutations in over 175 genes. Initiation of Phase 1/2a this year
- **OCU410 (AAV-*RORA*):** Potential to treat dry age-related macular degeneration (Dry AMD) through multi-factor treatment approach – initiation of Phase 1/2 in 2022
- Strategic manufacturing partnership with CanSinoBio (~$13B market cap) – sets clear path for critical manufacturing

NOVEL BIOLOGIC

- **OCU200:** Targeting major retinal diseases: Diabetic Macular Edema (DME), Diabetic Retinopathy (DR), and Wet Age-Related Macular Degeneration (Wet AMD) (estimated global market size over $10B) – initiation of Phase 1/2 in 2022
- Novel MoA: Potential to initially treat non-responders to anti-VEGF/ therapies (~50% of patients)

Leadership Team

Leadership Team

Shankar Musunuri, PhD, MBA
Chairman, CEO and Co-Founder

Bruce D. Forrest, MB, BS, MD, MBA
Acting CMO

Sanjay Subramanian, MBA
CFO and Head of Corporate Development

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VP, Head of Research & Development

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Corporate Controller

Zara Gaudioso, SHRM-CP
Head of Human Resources

J.P. Gabriel
SVP, Manufacturing & Supply Chain

Scientific Advisory Boards

Retina Scientific Advisory Board

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Carl D. Regillo, MD, FACS

Mark Pennesi, MD, PhD

Geeta Lalwani, MD

Vaccine Scientific Advisory Board

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Bruce D. Forrest, MB, BS, MD, MBA

Catherine Pachuk, PhD

Harvey Rubin, MD, PhD

Susan Weiss, PhD

Pipeline Overview

Pre EUA

Vaccine

COVAXIN™
Whole-Virion Inactivated Vaccine

Active Immunization to Prevent COVID-19 caused by SARS-CoV-2

- **Phase 3 interim analysis - 78% efficacy; 100% against severe cases**
- **EUA in India for development partner**
- **US EUA pathway in development (Master File Submitted)**

R&D Pipeline

	Program	Indication		Prevalence (US)	Discovery	Preclinical	IND-Enabling	Phase 1/2
Modifier Gene Therapy Platform	**OCU400** AAV-hNR2E3	***NR2E3*** **Mutation - Associated Retinal Degeneration** **	Orphan US & EU*	500 - 600				
		RHO **Mutation - Associated Retinal Degeneration** **	Orphan US & EU*	10,400 - 12,700				
		CEP290 **Mutation - Associated Retinal Degeneration** **	Orphan US & EU*	2,500 - 3,000				
		PDE6B **Mutation - Associated Retinal Degeneration** **	Orphan US & EU*	1,800 - 2,800				
	OCU410 AAV-hRORA	**Dry Age Related Macular Degeneration** ** **(Dry AMD)**		9M - 10M				
Novel Biologic	**OCU200** Transferrin-Tumstatin	**Diabetic Macular Edema**		0.75M				
		Diabetic Retinopathy		7.7M				
		Wet Age Related Macular Degeneration (Wet AMD)		1.1M				

** **No approved therapies exist**
https://www.aao.org/eye-health/diseases/retinitis-pigmentosa-treatment
https://www.aao.org/eye-health/diseases/amd-treatment

*Orphan medicinal product designation for the treatment of both retinitis pigmentosa (RP) and Leber Congenital amaurosis (LCA)

COVAXIN™

Whole-Virion Inactivated COVID-19 Vaccine Licensed from Bharat Biotech (BBIL) for the US Market

COVAXIN™ - Product Profile

Whole virion inactivated SARS-CoV-2 (NIV-2020-770)
Antigen concentration & Adjuvant: 6µg + Algel–IMDG(TLR7/8)

PROPOSED INDICATION	Active Immunization to Prevent COVID-19 caused by SARS-CoV-2
TARGET POPULATION	12 Years of age and older
DOSE LEVEL and REGIMEN	0.5mL per dose suspension 2 Doses: Day 0 & Day 28
PRESENTATION	10 doses per vial
STORAGE	2°- 8°C (Expected shelf-life ~2 Yrs.) Room temp (25ºC): 3 Months

Why COVAXIN™

Designed to fill a significant unmet need in our national arsenal of vaccines against COVID-19

B

Broad Spectrum Immune Response

Both humoral & cellular responses generated against multiple viral proteins
Induces a Th1 response (cell-mediated immunity)

E

Effective → 78% Efficacy in Ph3 interim data (100% against severe)

Highly effective in neutralizing UK, BZ P2, and India “double mutant” variants
Potentially serve as a universal booster to minimize/eliminate viral escape and control the Pandemic

S

Safe in 12+ (Pediatric population covered in Ph 2 clinical studies)

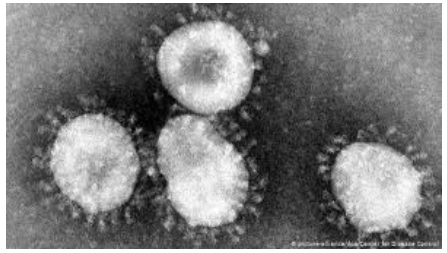
Proven technology platform and supply chain currently used for several licensed vaccines (Influenza, Polio, Rabies, JEV etc.).
Historically demonstrated acceptable safety, tolerability and efficacy in children and adults

T

Transportation and Storage Ease

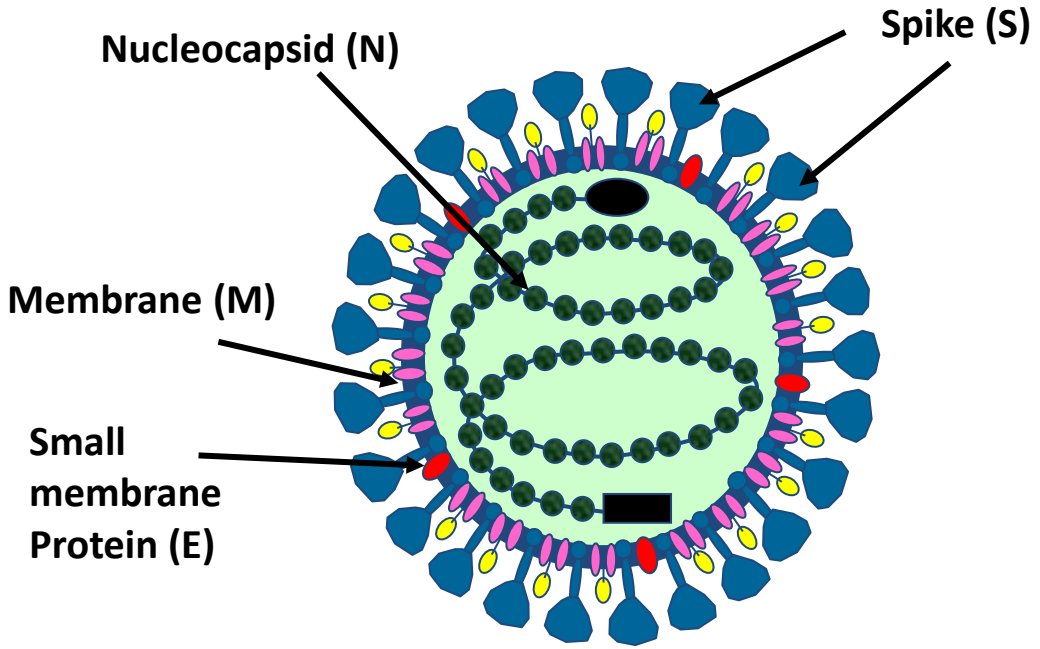
Stable for 3 months at room temperature
Can be stored in standard conditions (2°- 8°C) for several years. Can be stockpiled.

COVAXIN™ Presents Multiple Protein Targets to the Immune System Resulting in Broad Spectrum Response

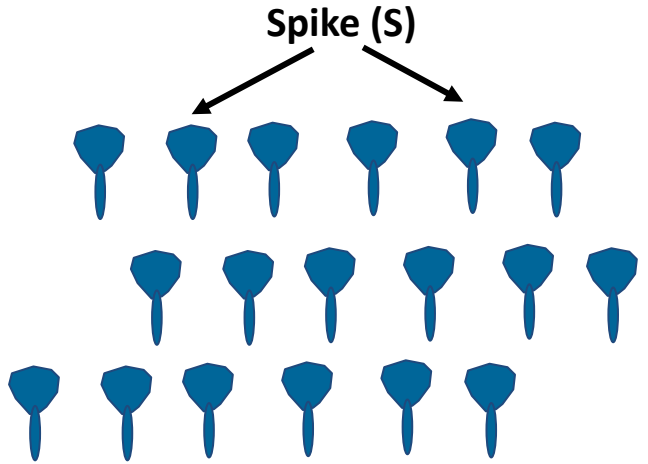


COVAXIN™, an adjuvanted inactivated virus vaccine candidate, elicited strong IgG responses against spike (S1) protein, receptor-binding domain (RBD), and the nucleocapsid (N) protein of SARS-CoV-2 along with strong cellular responses

COVAXIN™



mRNA and Adenovirus-Based Vaccines



COVAXIN™ Developed and Manufactured by Bharat Biotech

Established Robust Manufacturing Process for COVAXIN

Ocugen licensed COVAXIN™ on the back of Bharat's strong track record of developing & commercializing vaccines globally

Inactivated Vero cell derived vaccines are proven, time-tested and long-lasting. A few include:

ROTAVAC®
ORAL ROTAVIRUS VACCINE 116E, LIVE ATTENUATED

JENVAC®
PURIFIED, INACTIVATED JAPANESE ENCEPHALITIS VACCINE

INDIRAB®
PURIFIED, INACTIVATED RABIES VACCINE

ONGOING VACCINE CANDIDATE USING VERO CELL PLATFORM

- CHIKUNGUNYA
- ZIKA
- sIPV
- BBV152*

*COVAXIN

COVAXIN™ is Distinct Amongst Leading COVID-19 Vaccines and Select Vaccine Candidates in the United States

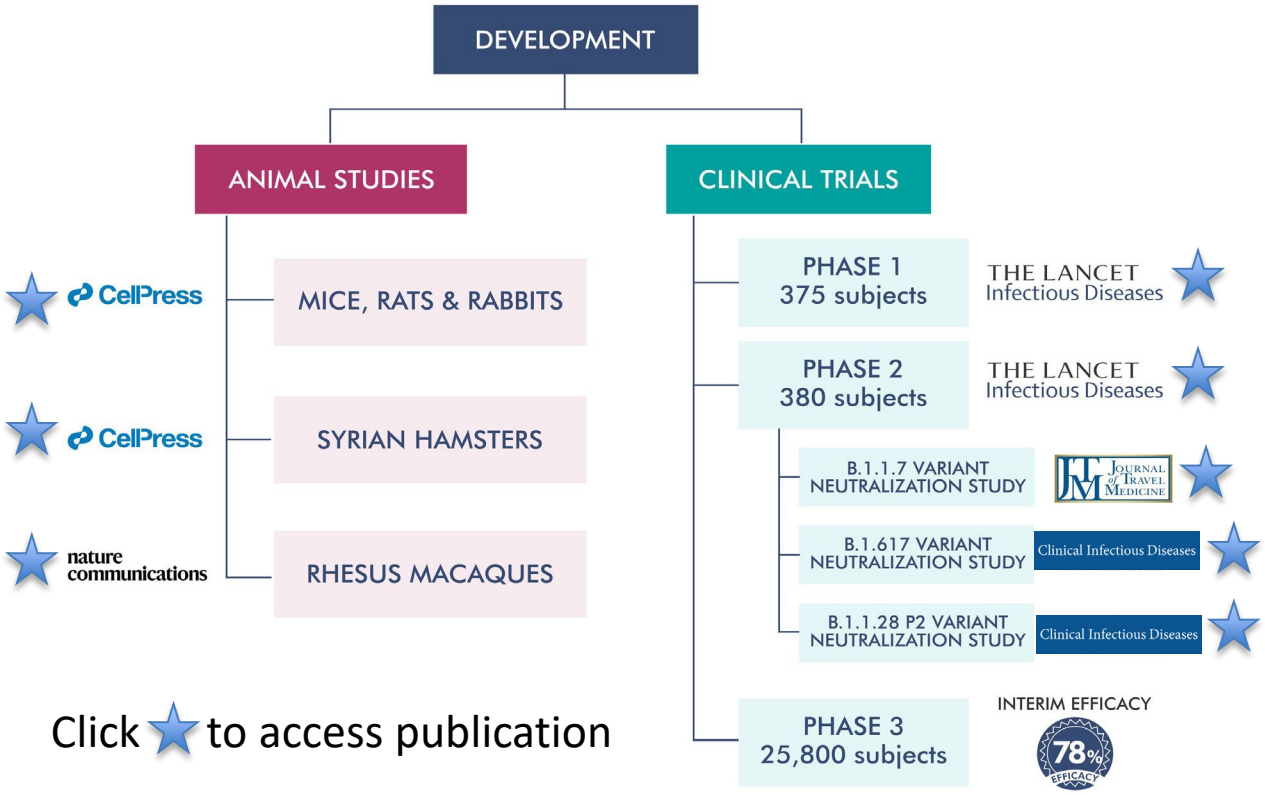
Company	Technology	Antigen	Stage
COVAXIN™	Inactivated SARS CoV-2 Virus, Aluminum hydroxide, TLR agonist	Whole virus (Including S & N Proteins)	EUA in India; pre-EUA discussions with FDA
Pfizer/ BioNTech	Lipoplex of SARS CoV-2 S protein mRNA	S protein	EUA
Moderna	Lipoplex of SARS CoV-2 S protein mRNA	S protein	EUA
AstraZeneca	Non-replicating infectious Adenovirus	S protein	EUA in India & UK
Johnson & Johnson	Non-replicating infectious Adenovirus	S protein	EUA

Technology Comparisons: Target Product Profile

Characteristic	mRNA	Adeno- Based	COVAXIN™
Acceptable Safety	✓	✓	✓
Neutralizing antibody response	✓	✓	✓+
Cellular responses against multiple viral antigens	✓	✓	✓+
Efficacy	✓	✓	✓+
Stability at 2-8°C	X	✓	✓
Multiple Viral Antigens	X	X	✓

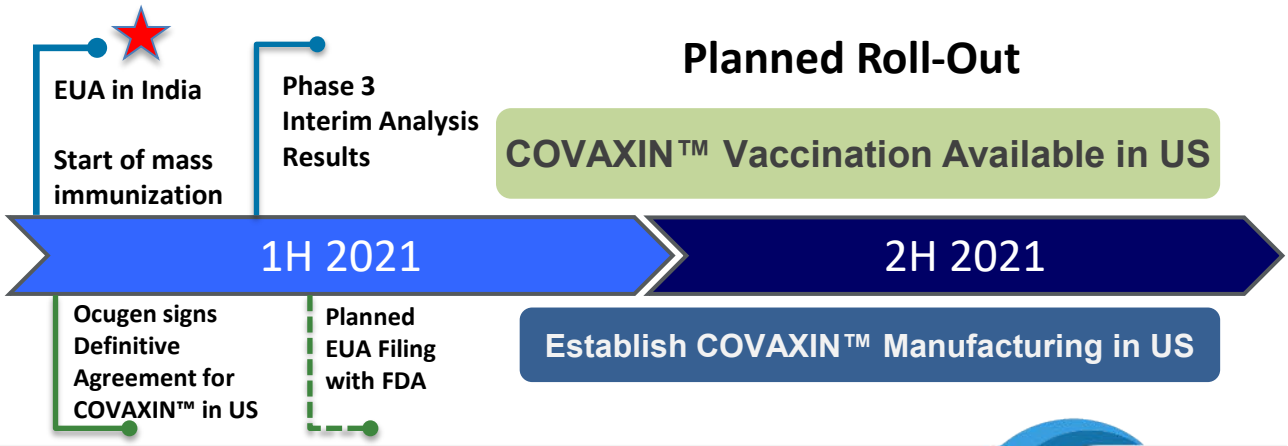
"+" : B and T cell immune responses to multiple proteins, Safety and Efficacy in Phase 1 and Phase 2 studies

COVAXIN™ Progress and Planned Milestones for U.S. Dev.



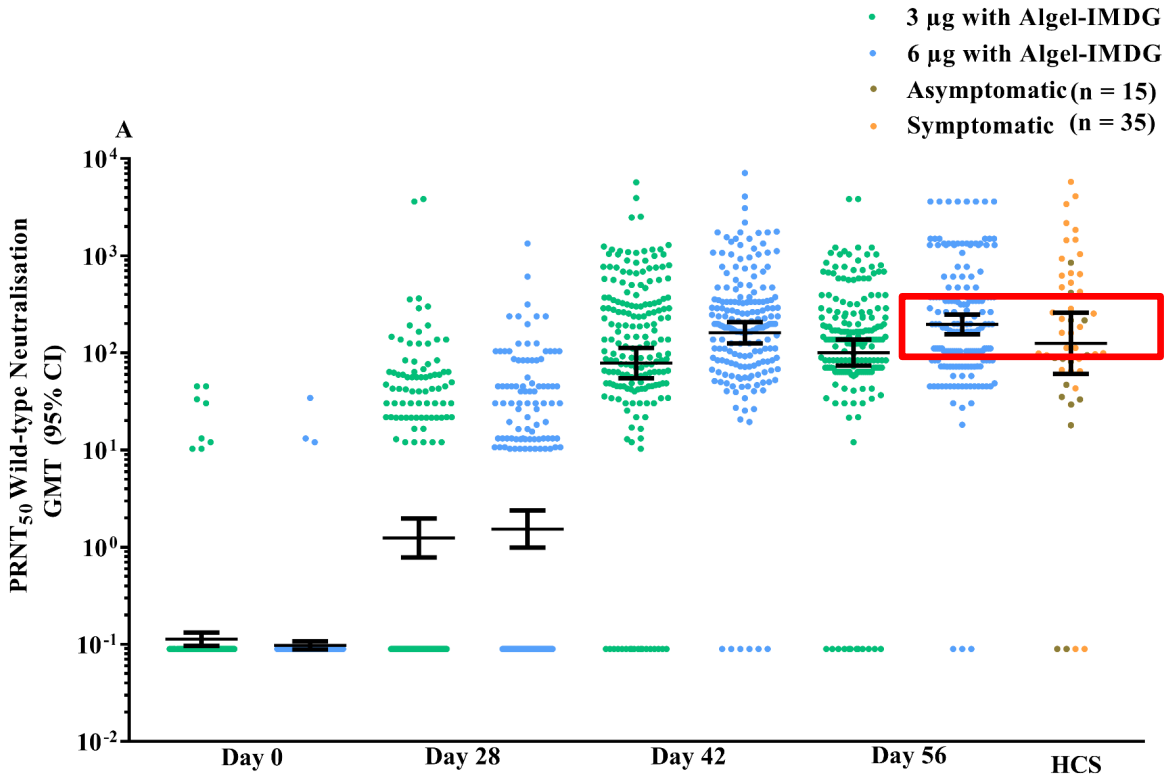
Click ★ to access publication

- **78% Overall Efficacy in Phase-3 Interim Analysis in India**
  - 100% in severe COVID-19 disease
- **US EUA Pathway in Development (Master File Submitted)**
- **Initial US Supply from Partner, BBIL, upon receiving EUA**
- **Execute Tech Transfer to US Sites**
- **Target 100M Doses/Year Starting 2021**

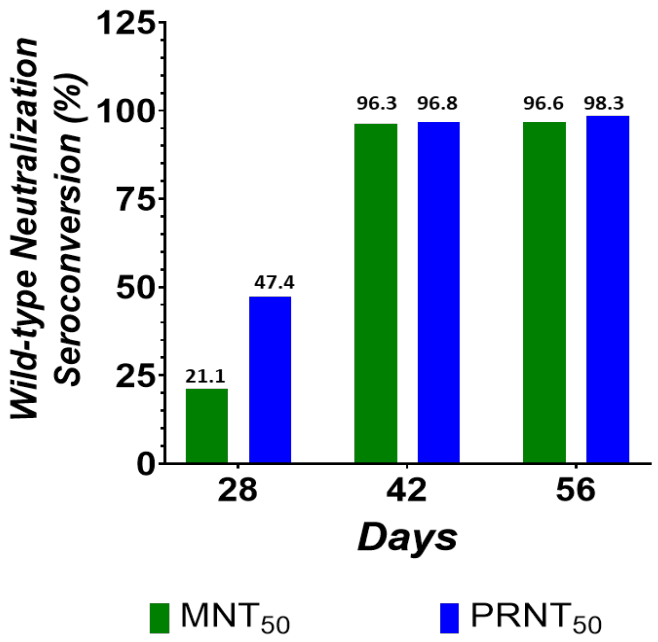


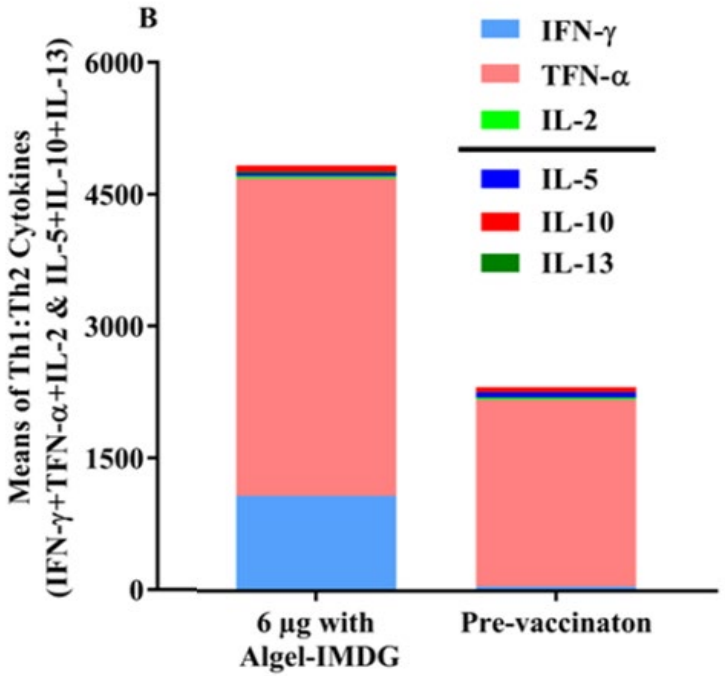
Phase 2: Study Results

- **6µg +Algel-IMDG** demonstrated high neutralizing Abs responses **compared to 3µg + Algel-IMDG group**
- Mean GMT (95% CI) **higher than human convalescent serum (HCS)**
- 6µg +Algel-IMDG (**Covaxin™**) selected for Phase 3 study



Phase 2: Study Results





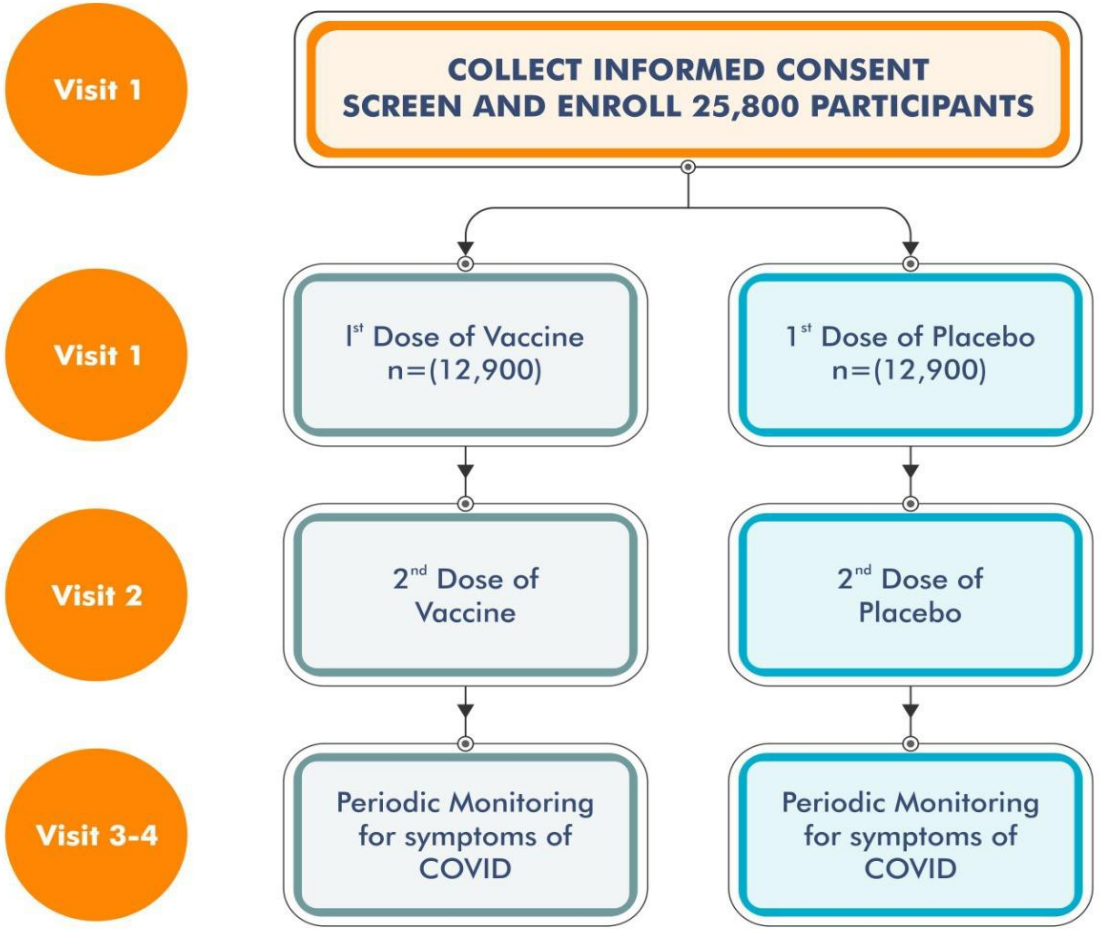
Safety

Events	Rate (%)	CI
Local	4.2% (1.8, 8.1)	95%
Systemic	7.4% (4.1, 12.1)	95%
Serious	0%	
Combined	**10.3% (7.4, 13.8)**	**95%**

- **High Seroconversion rates (>96%) in both MNT50 and PRNT50 measured up to day 56**
- **Induction of Th1 cell mediated immunity as measured by IFN-γ, IL-2, TNF-α**

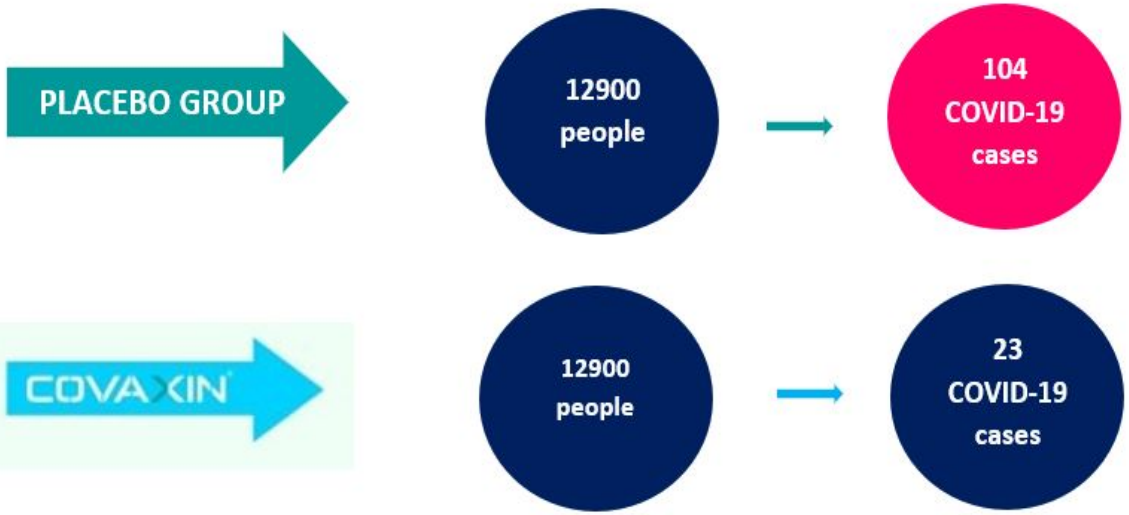
- **No vaccine-related severe or life-threatening adverse events reported to date**

Phase 3: Study Outline



Phase 3: Efficacy - Second Interim Analysis

- Phase 3 clinical trial enrolled 25,800 participants including
  - 2,433 in the age group 60 to 98
  - 4,500 with comorbidities
  - First interim analysis at 43 cases
- Phase 1/2 enrolled 755 participants 12+ years of age



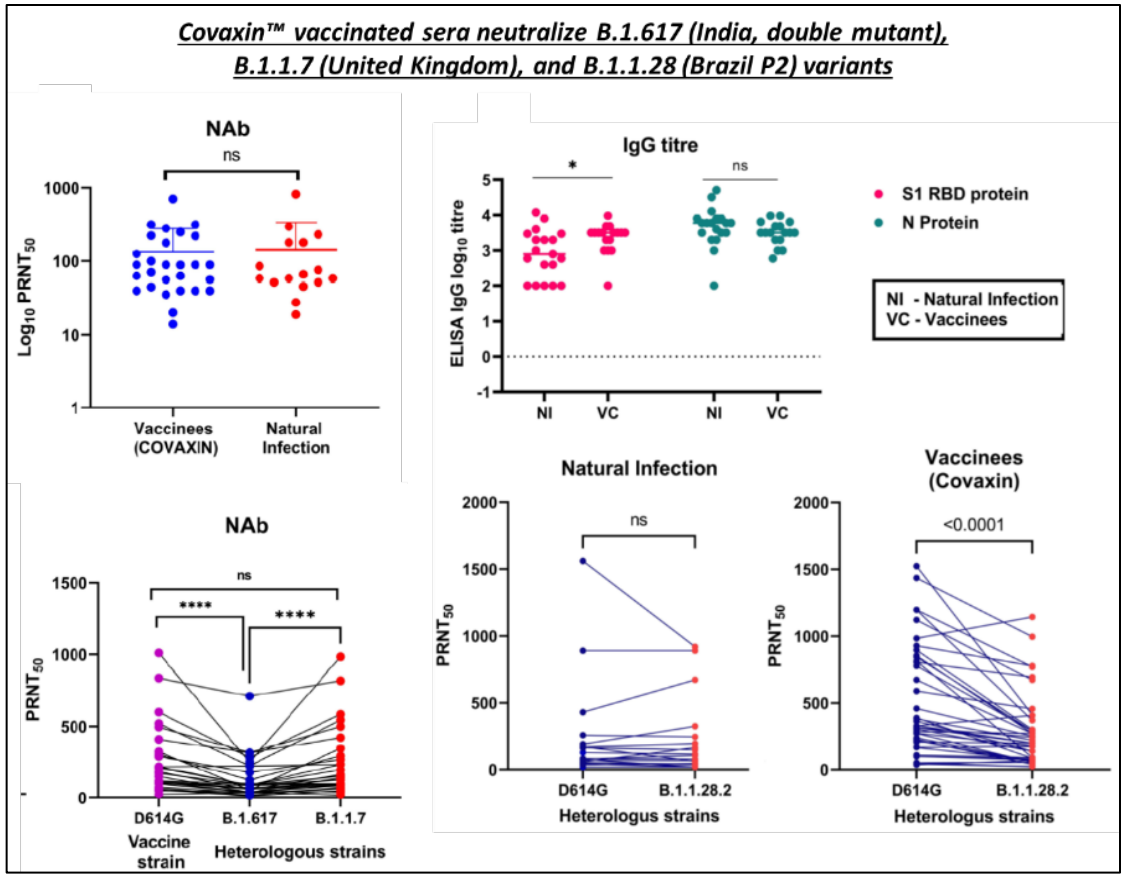
78% Overall Efficacy

95% CI [61, 88]

100% against severe disease

Effective Against at least 3 Key Variants

- **COVAXIN-vaccinated sera effectively neutralized several SARS-CoV-2 variants in an in-vitro plaque reduction neutralization assay**



- ✓ B.1.617 (India - double mutant)
- ✓ B.1.1.7 (United Kingdom)
- ✓ B.1.1.28 (Brazil P2)

- **The study was conducted by Indian Council of Medical Research (ICMR)-National Institute of Virology**
- **These studies suggest that COVAXIN vaccination may be effective against multiple SARS-CoV-2 variants.**

Ocugen's Modifier Gene Therapy Platform

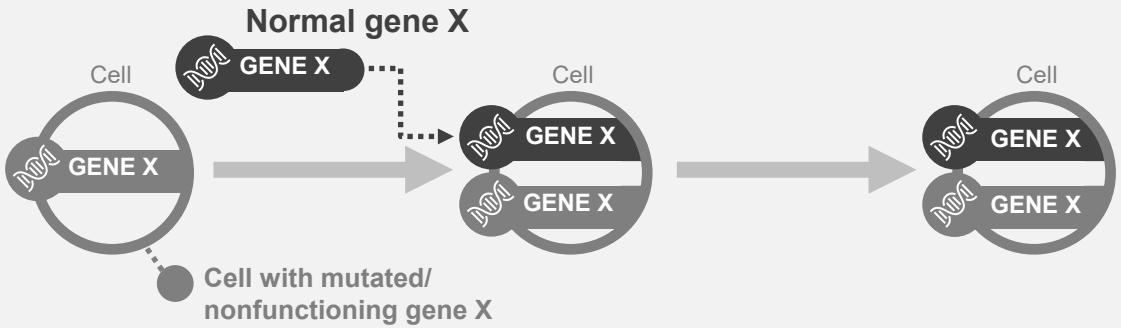
Breakthrough Technology Designed to

Address Multiple Diseases with One Product

Approach Complex Diseases Through Multiple Factors

Traditional Approach vs. Ocugen's Novel Platform

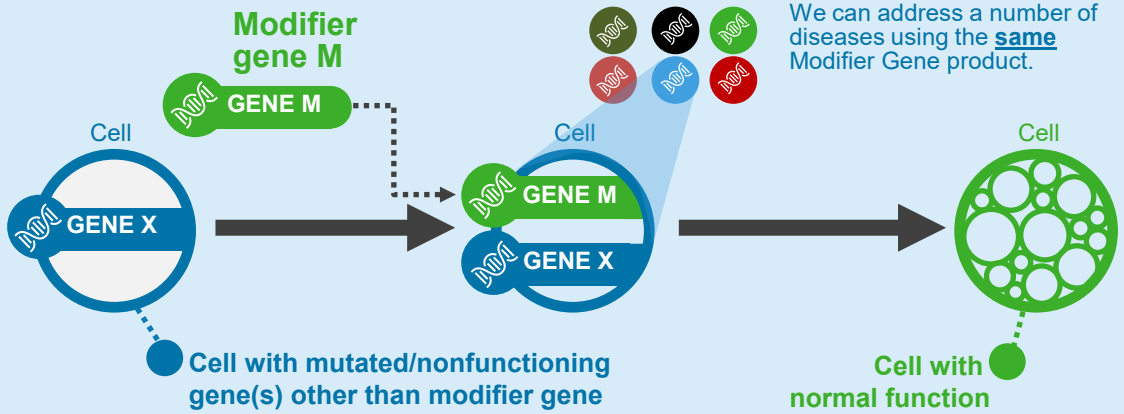
Gene Augmentation: Transfer functional version of a non-functional gene into the target cells.



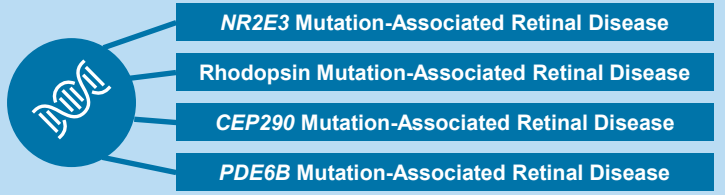
Traditional Gene Therapy

- Traditional approach that targets one individual gene mutation at a time
- Regulatory pathway focused on specific product for one disease
- Longer time to recoup development costs

Modifier Gene Therapy: Introduce a functional gene to modify the expression of many genes, gene-networks and regulate basic biological processes in retina



OCU400

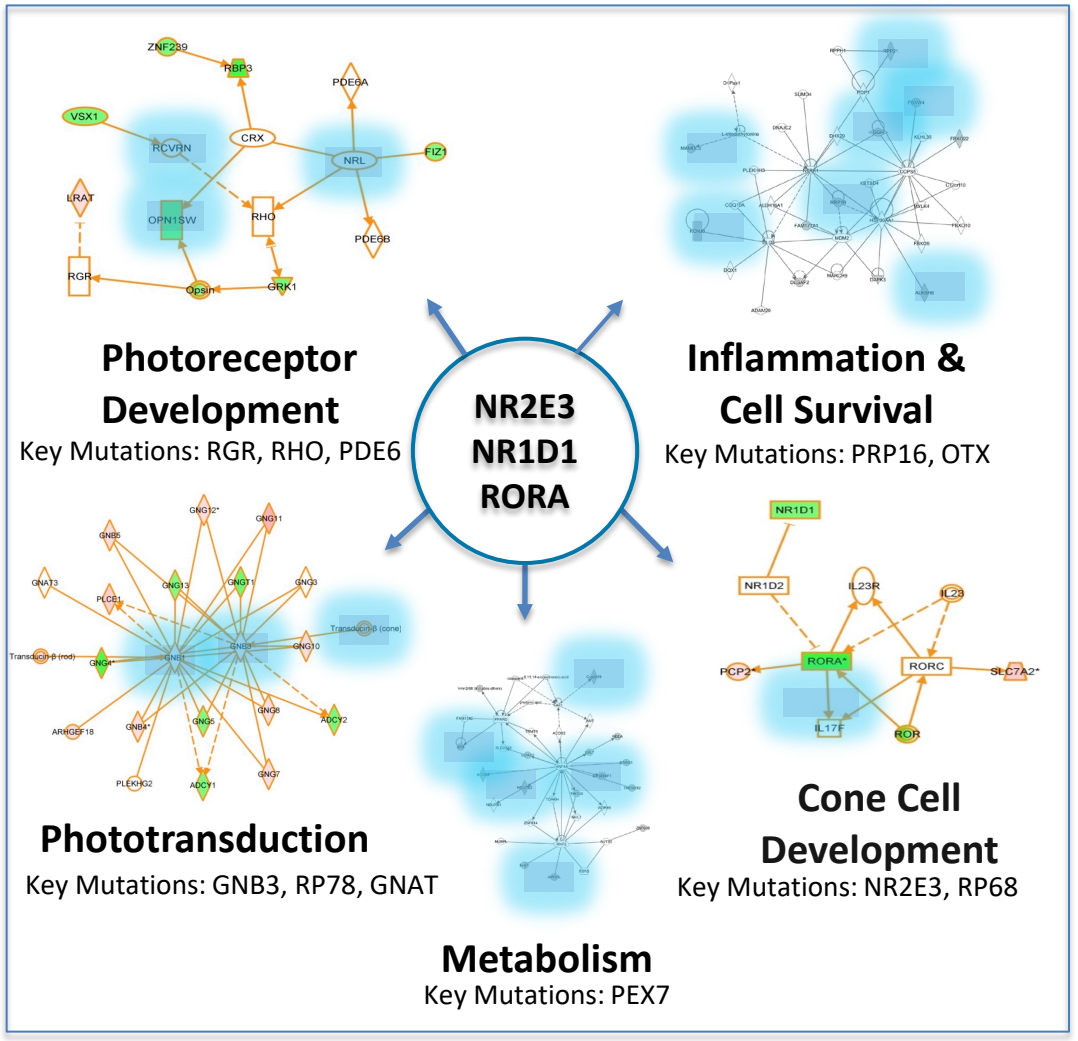


Broad Spectrum Therapy for RP

- Novel approach that targets nuclear hormone genes (NHRs), which regulate multiple functions within the retina
- Smoother regulatory pathway due to ability to target multiple diseases with one product
- Ability to recoup development costs over multiple therapeutic indications

Why Target Nuclear Hormone Receptor Genes (NHRs)?

- Modulators of retinal development & function
- Act as “master genes” in the retina
- Molecular reset of key transcription factors and associated gene networks – retinal homeostasis
- Gene modifier concept including impact on clinical phenotypes is well known in other disease areas, CF and SMA *



* **References:** https://pubmed.ncbi.nlm.nih.gov/28556246/
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5409218/
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https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0183526

Nature Gene Therapy Publication

Preclinical POC Data for *Nr2e3* Published in *Nature Gene Therapy*

- **Efficacy results shown in 5 unique mouse models of RP**
- **Technology developed at Harvard Medical School, Dr. Neena Haider's Lab**

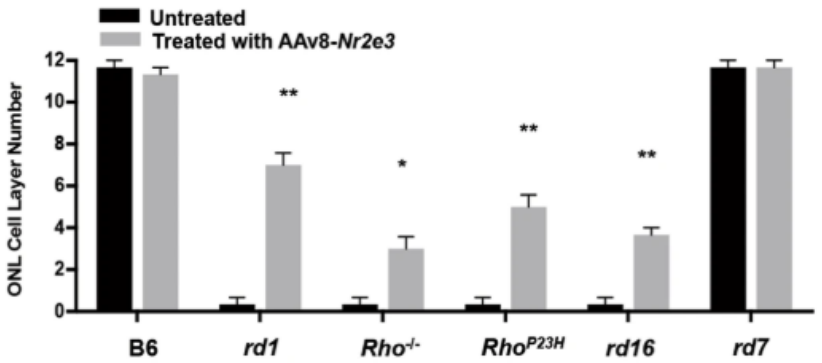
- **Study demonstrates potency of modifier gene therapy to elicit broad-spectrum therapeutic benefits in early and advanced stages of RP**
- **Results show evidence of vision rescue in Early & Advanced Stages of disease**

- Important milestone for development of therapy; demonstrated proof of principle
- Protection elicited in multiple animal models of degeneration caused by different mutations
- Potential to represent first broad-spectrum therapy and to provide rescue even after disease onset

https://www.nature.com/articles/s41434-020-0134-z

OCU400 – Rescue in Early & Advanced Stage of Disease

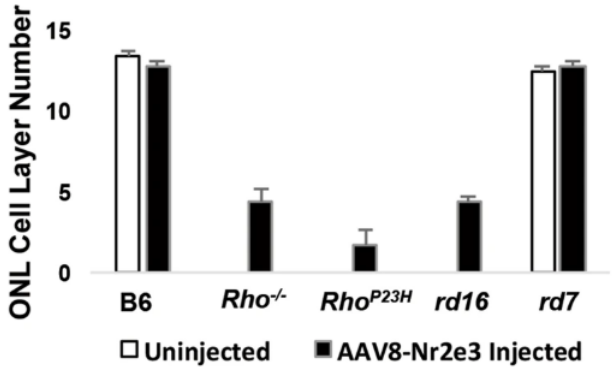
Early Stage Rescue



- P0 single subretinal injection, evaluation 3-4 months post injection
- *rd1* evaluated one-month post injection

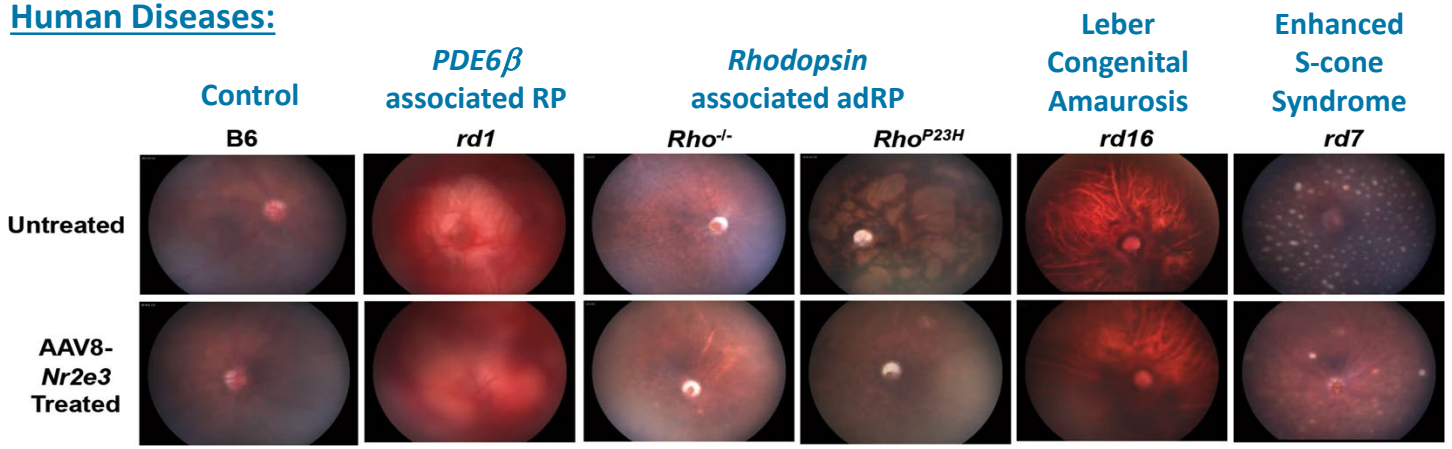
ONL: Outer Nuclear Layer

Advanced Stage Rescue



- P21 subretinal injection, evaluation 2–3 months post injection
- Restored ONL photoreceptors morphology in rd7
- ONL cell layer change in *rd7* model doesn't progress until 4-5 mos. of age

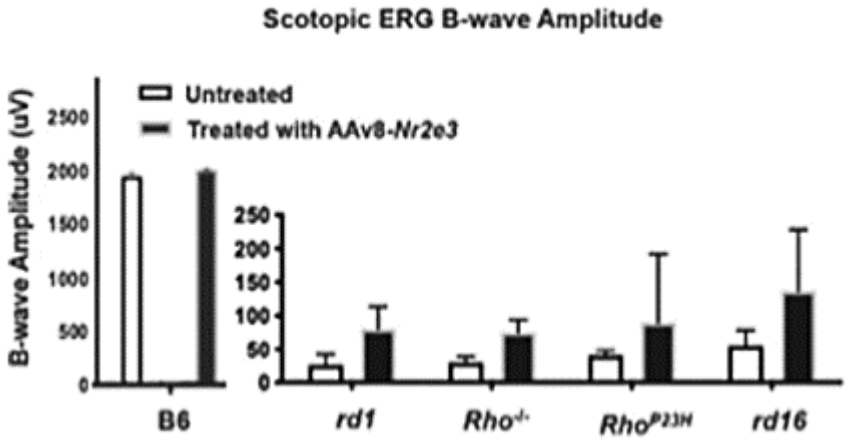
Human Diseases:

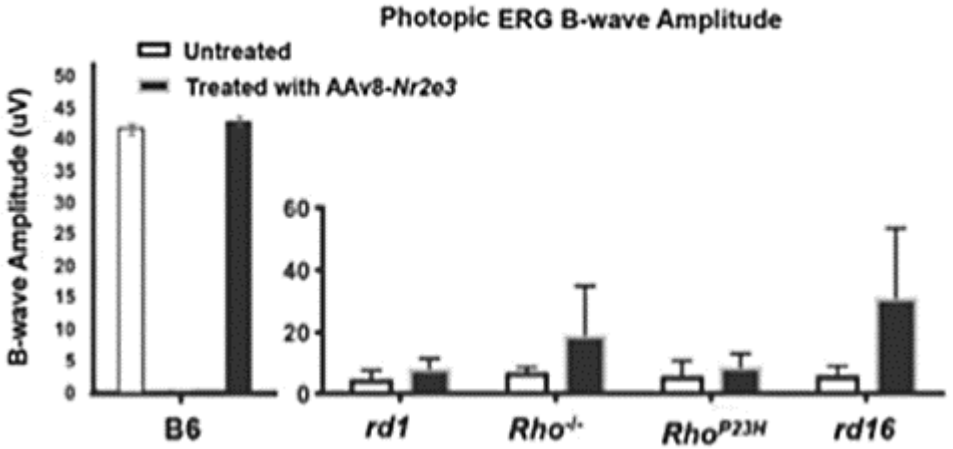


➢ **Fundus images and ONL count show how single product recuses vision in multiple mutations**

OCU400 – Demonstrates Improved Vision Signals in Retina

Electroretinogram (ERG) Response Reveals Rescue under Both Scotopic (dim-lit) as well as Photopic (well-lit) Conditions





ERG response: P0 single subretinal injection, evaluation 3-4 months post injection

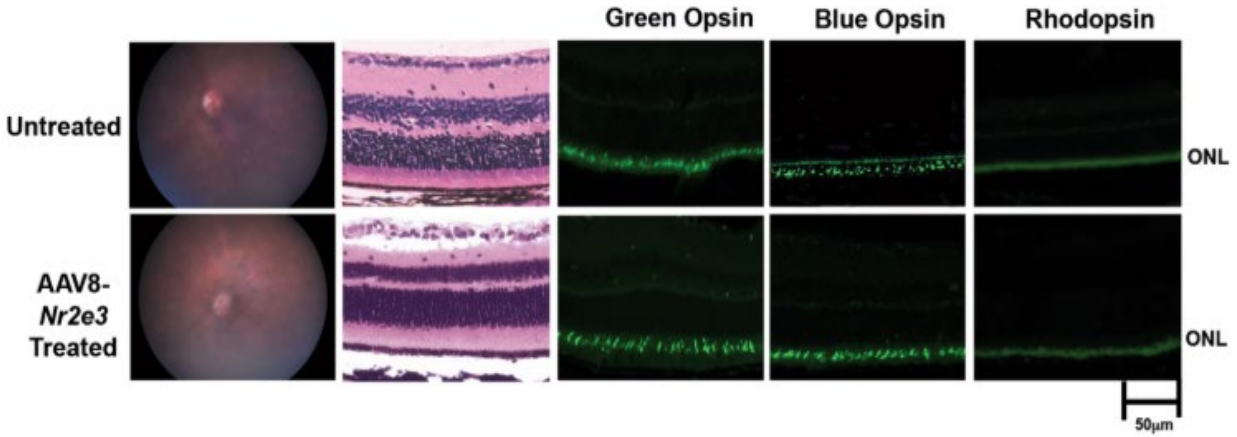
Human vision is enabled by three primary modes:

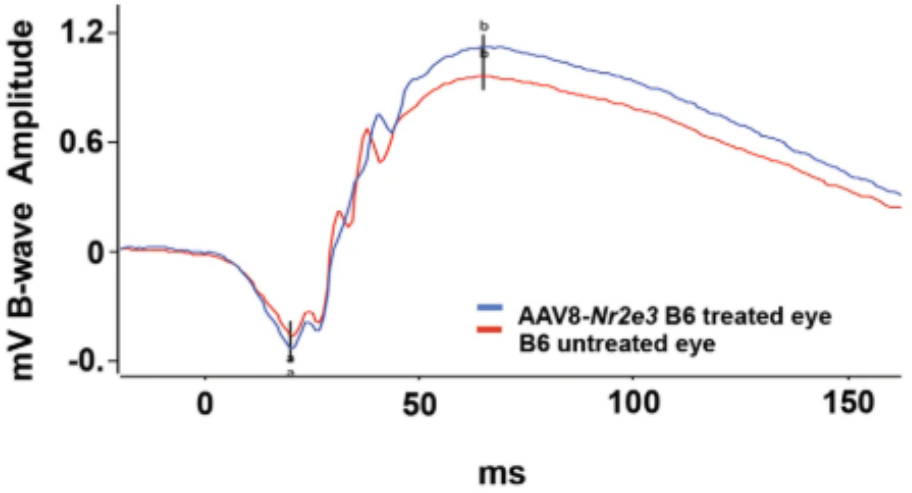
- **Photopic vision:** Vision under well-lit conditions, which provides for color perception and functions primarily due to cone cells in the eye
- **Mesopic vision:** A combination of photopic vision and scotopic vision in low lighting, which functions due to a combination of rod and cone cells in the eye
- **Scotopic vision:** Monochromatic vision in very low light, which functions primarily due to rod cells in the eye

https://www.nature.com/articles/s41434-020-0134-z

OCU400 – Demonstrated Safety in Mouse Model

Study Results Confirm Overexpression of *Nr2e3* by subretinal AAV8-*Nr2e3* Injection Is Not Detrimental to Retina – No Off-Target Effects





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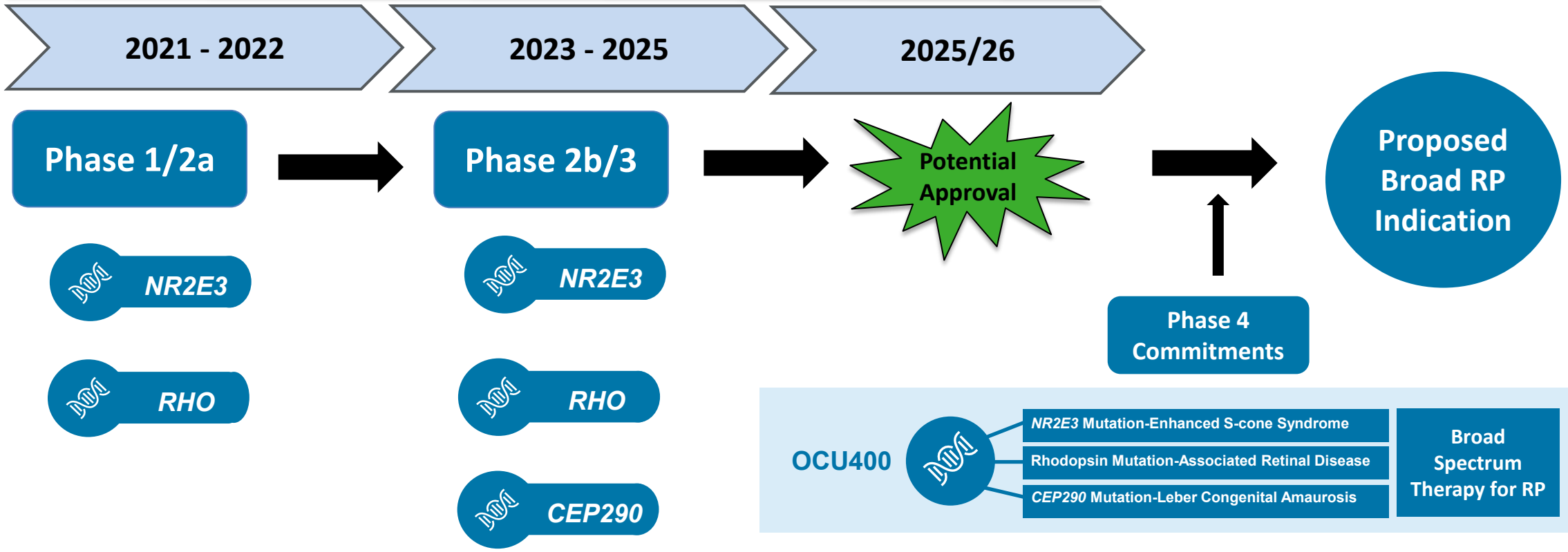
OCU400 – Clinical and Regulatory Strategy

Planned Timeline



- Successfully completed manufacturing at commercial scale (200L) at CanSinoBio to support clinical studies
- Preclinical tox studies in-progress
- On target to file IND in 2H21

OCU400 – Competitive Overview

Features	OCU400	Traditional Gene Therapy	Cell Therapy
	ocugen	Roche, HORAMA, Biogen, MEIRAGTx, agtc, NOVARTIS, Allergan, SANOFI	astellas, jCyte, ReNeuron
One product for many IRDs (including broad RP indication)	✓	✗	Limited ✓
Technology established in the ocular disease space	✓	✓	✗
POC data in RP models with different genetic mutations	✓	✗	✗
Expected long-term outcome	Potentially longer benefit due to promotion of homeostasis	Potentially limited due to loss of retinal cells over time	Not established
Target Patient Population	Large	Small (specific to mutation)	Variable
Developmental cost	Low (economies of scale)	High (No economies of scale)	High

Potential Competitors pursuing treatment of RP with Traditional Gene Therapy

Potential Competitors pursuing treatment of RP with Cell Therapy

OCU410 (AAV-*RORA*) – Dry Age-Related Macular Degeneration

We Believe OCU410 Has the Potential to Address this Disease through its Multi-Factor Approach

Normal Retina

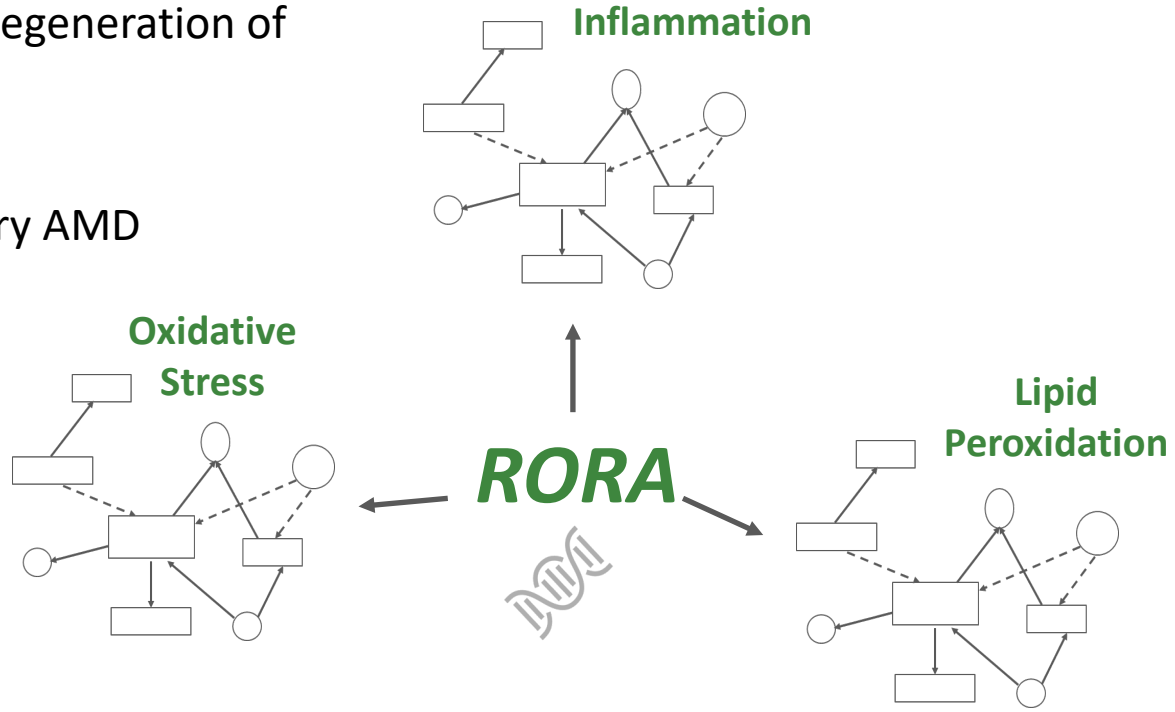
Dry AMD

- Leads to irreversible blindness due to degeneration of the retina
- ~9-10M patients in the U.S.
- Currently no approved treatment for Dry AMD

Dry AMD

Contributing Factors

- Aging
- Genetics
- Environmental Factors



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https://pubmed.ncbi.nlm.nih.gov/21998696/
https://pubmed.ncbi.nlm.nih.gov/19786043/

OCU200:

Diabetic Macular Edema (DME)
Diabetic Retinopathy (DR)
Wet Age-Related Macular Degeneration (Wet AMD)

Novel Biologic Offering Benefits Beyond Anti-VEGF

OCU200 – Potential to Treat DME, DR & Wet AMD

OCU200 Provides Hope to All patients with DME, DR or Wet AMD

DME → ~0.7M patients in the US*

DR → ~7.7M patients in the US*

Wet AMD → ~1.1M patients in the US*

~50% of Patients DO NOT Respond to Anti-VEGF/Corticosteroids Therapies

- **OCU200 is a Transferrin-Tumstatin Fusion Protein**
  - Tumstatin: Multiple MOAs for treatment and prevention of macular degeneration and neovascularization
  - Transferrin: Targets the site of action and improves uptake (better target engagement)
- Integrin Targeting provides hope to these patients who are non-responders to current therapies
- Distinct MOA through targeting Integrin pathways can potentially also help reduce number of injections for patients who do respond to Anti-VEGF & corticosteroids therapies
- Significant global market potential

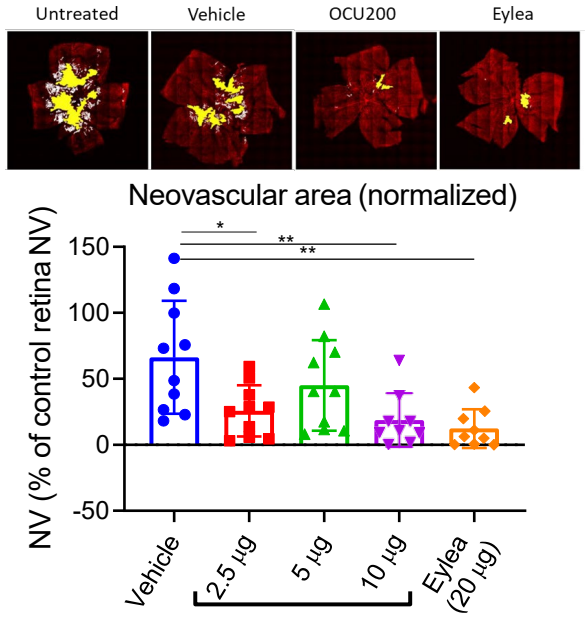
(*) https://www.gene.com/stories/retinal-diseases-fact-sheet
https://www.brightfocus.org/macular/article/age-related-macular-facts-figures

OCU200 –Transferrin-Tumstatin Fusion Protein

OCU200 Demonstrated Superior Efficacy Compared to Existing Anti-VEGF Therapies

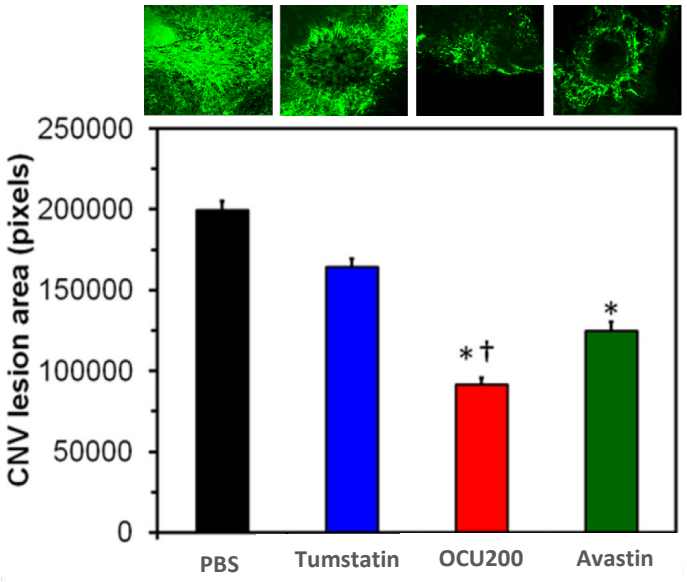
- Inhibits new blood vessel formation
- Anti-inflammatory
- Anti-oxidative

DME/DR
Oxygen-Induced Retinopathy (OIR) Mouse Model



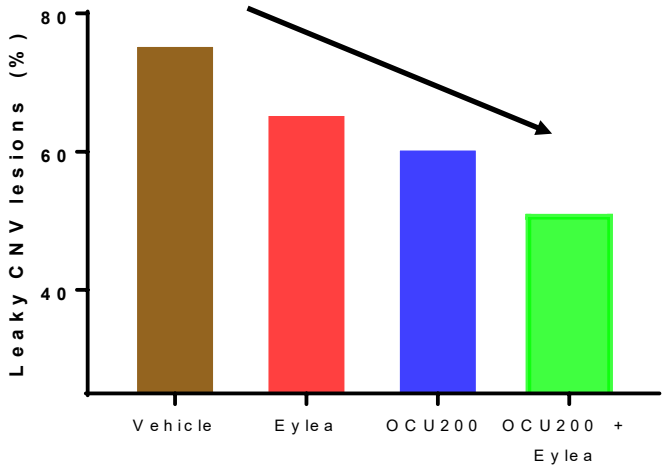
Effect of OCU200 intravitreal treatments on Neovascularization (NV). Data are presented as mean± SD. Filled circles represent data points from individual eyes
* P < 0.05, ** P < 0.01 (n = 9-10 eyes per group)

Wet AMD
In-Vivo Laser-Induced Rat CNV Model



* indicates p<0.05 when compared to PBS and/or tumstatin treatment
† indicates p<0.05 when compared to Avastin; CNV lesions measured on day 14 after treatment

Wet AMD
In-Vivo Laser-Induced Mouse CNV Model



Data expressed as percentage of CNV lesions on Day 10 after treatment. Laser induction & treatment start on Day 0

OCU200 – Distinct Mechanism of Action

We believe OCU200 has the potential to become a disease modifying therapeutic for broader patient population

Features	OCU200	Anti-VEGF	Anti-Integrin
	ocugen	Genentech[1] NOVARTIS[1] REGENERON[1] KODIAK	ASCLEPIX THERAPEUTICS Allegro OPHTHALMICS, LLC
Reduces VEGF level/Fluid	✓	✓	✓
Selectively works on active endothelial cells (Neovascular)	✓	✗	✓
Activates native anti-angiogenic response	✓	✗	✓
Enhanced effective delivery through Transferrin	✓	✗	✗
Pro-apoptotic and anti-oxidative	✓	✗	✓
Dosing Frequency	Expected once in 3 months	1-3 months	1-3 months

Potential Competitors pursuing treatment using Anti-VEGF approach

Potential Competitors pursuing treatment using Anti-Integrin approach

(1) Approved

Key Inflection Points

- COVAXIN™ - Vaccine candidate for the US market with potential for significant revenues this year
- Ophthalmology
  - Modifier Gene Therapy Platform has the potential for one product to treat many diseases
  - Novel biologic has the potential to treat anti-VEGF /corticosteroids non-responders (~50% of the patients)
  - Multiple near and mid-term milestones with plan to initiate four Phase 1/2 trials over next 18 months

A Bold Vision to Cure Blindness Diseases and Offer a Differentiated Vaccine to Save Lives from COVID-19

For more information, contact:

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