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*Thanks, Ben Shaberman*

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Foundation Fighting Blindness

# National Science Update

May 29, 2019

Ben Shaberman

Senior Director, Scientific Outreach & Community Engagement

Foundation Fighting Blindness

# Clinical Trials

## 36 Clinical Trials Underway

Foundation-funded research attracting  
commercial investments

Foundation's portfolio: 75 projects (global)

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# Gene Discovery

**1989:** 1<sup>st</sup> inherited retinal disease gene identified (*RHO*)

**Today:** ~ 270 IRD genes identified

**Today:** ~65-70% of patients will have gene defect identified

## Finding the remaining, elusive IRD genes and mutations

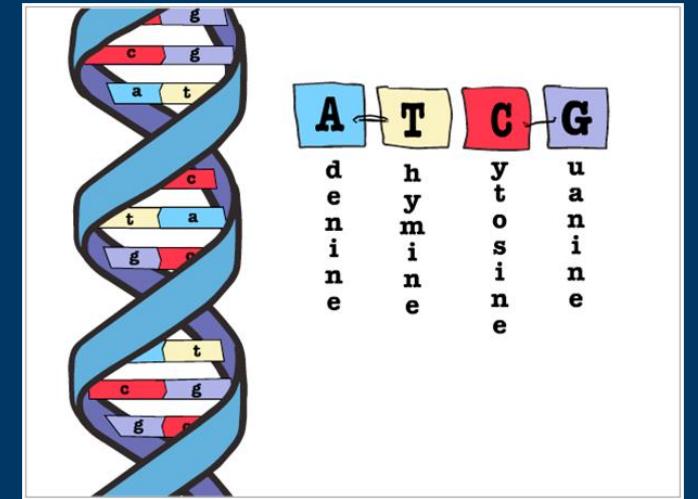
Foundation investing \$2.5 million to identify new genes/mutations

Stephen Daiger, PhD, University of Texas, Houston

Radha Ayyagari, PhD, UCSD

Eric Pierce, MD, PhD, Kinga Bujakowska, PhD, Mass Eye and Ear

Looking for deletions, duplications, intronic mutations



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# My Retina Tracker

## Patient Registry

- Global, Free, Secure, Easy-to-Use
- Patient-Controlled
- Researchers use for clinical trial recruitment
- 12,000+ active registrants
- 5,000+ requests for free genetic testing
- [www.MyRetinaTracker.org](http://www.MyRetinaTracker.org)



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## Genetic Testing Study – free genetic testing for IRD patients registered on My Retina Tracker

### To Participate:

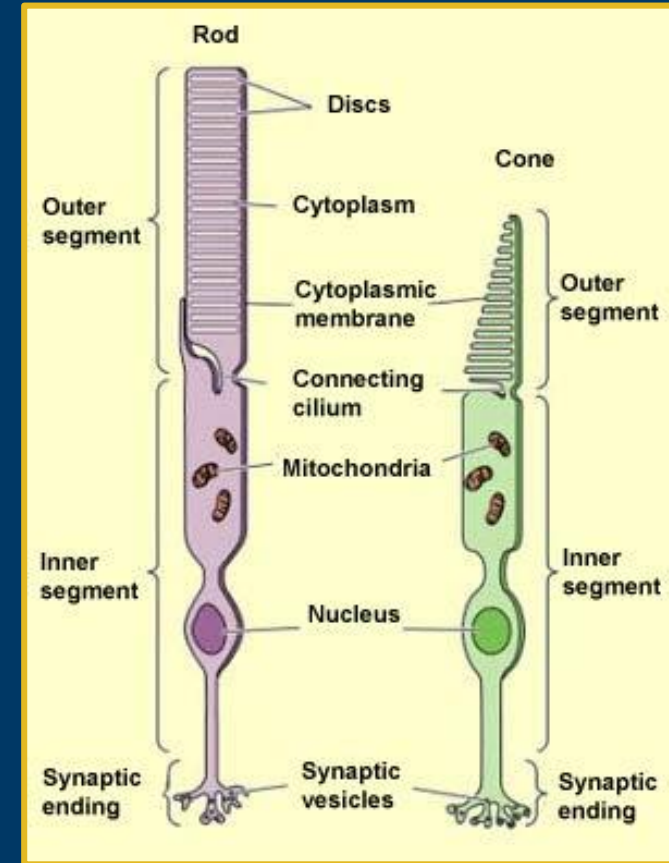
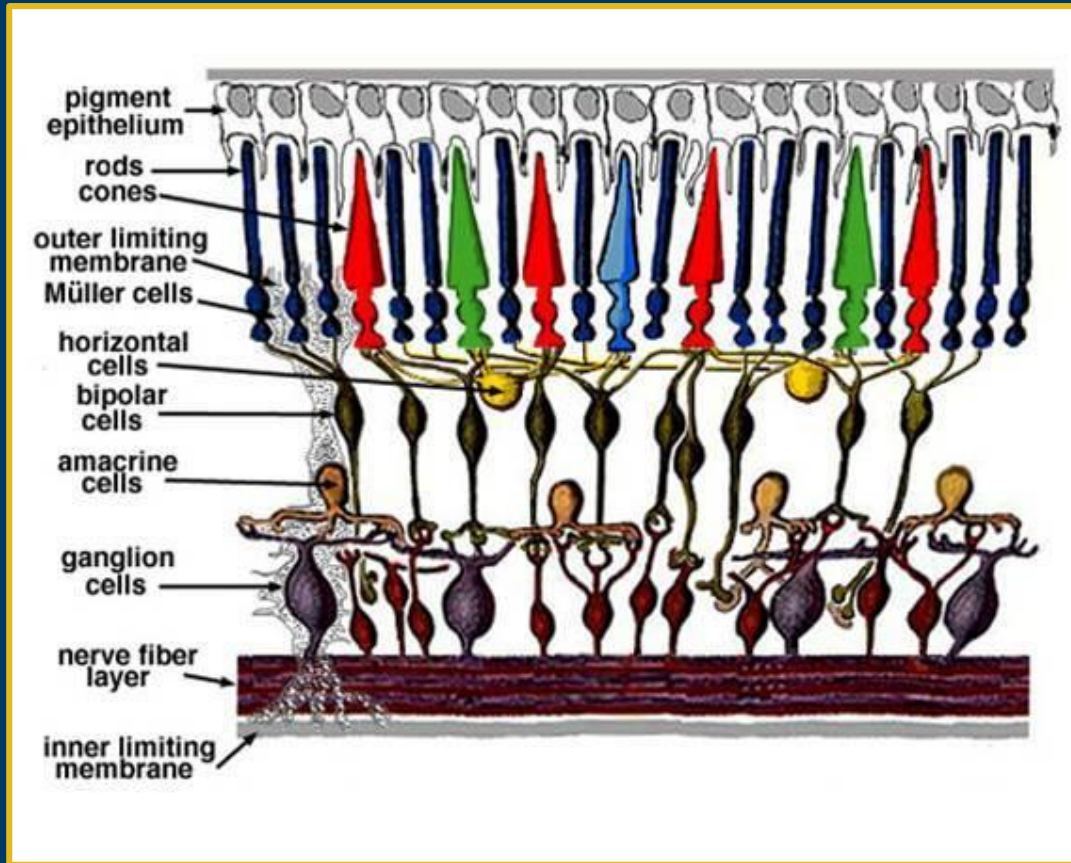
- Register in My Retina Tracker
- Go to FAQs at [www.MyRetinaTracker.org](http://www.MyRetinaTracker.org)
- Download information packet
- Read the information packet 😊
- Participating physicians are listed in packet
- Contact participating physician



# So you want to be in a clinical trial...

- Remember: Clinical trials are research studies in humans
- Register at [www.MyRetinaTracker.org](http://www.MyRetinaTracker.org)
- Get genetically tested
- Therapy trials: cross-cutting vs. gene/mutation specific

# The Retina



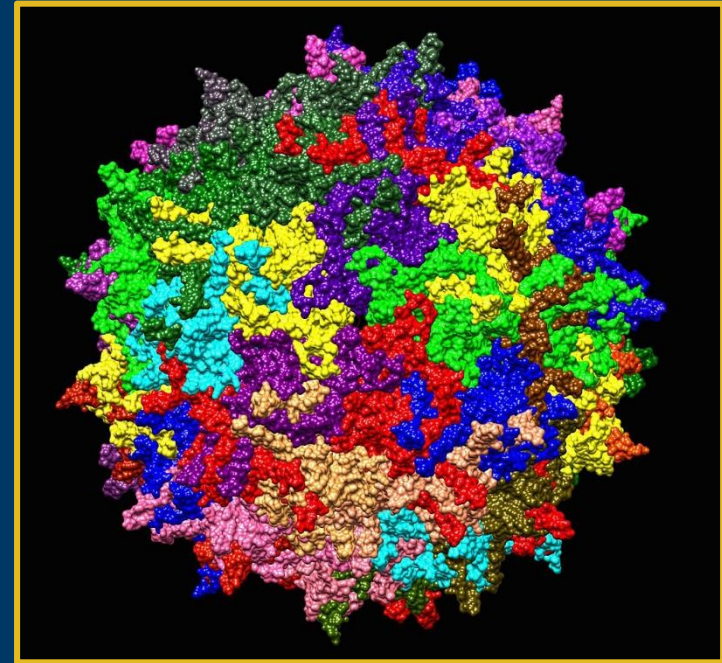


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# Gene Therapy – So Far, So Good



Therapeutic gene  
(i.e., cargo)



AAV, Viral Delivery System  
(i.e., truck)

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# LUXTURNA: Spark's RPE65 (LCA & RP) Gene Therapy

First FDA-approved gene therapy for the eye or an inherited disease. Patients receiving commercial therapy.



# Nightstar Therapeutics

## Choroideremia – Phase 3

- Europe and US, 140 participants, 18 sites
- Phase 1/2, VA maintained or improved for at least 1 year for 90% of participants

## XLRP (RPGR) – Phase 1/2

- UK and US, 24 participants, 18 sites
- Some macular function improvements



# AGTC

## **XLRP (RPGR) – Phase 1/2**

- 5 sites in U.S., 15 participants

## **Achromatopsia (CNGB3) – Phase 1/2**

- 5 sites in U.S., 24 participants

## **Achromatopsia (CNGA3) – Phase 1/2**

- 5 sites in U.S., 1 in Israel, 36 pts.

## **Retinoschisis (XLRS) – Phase 1/2**

- 8 sites in U.S., 27 participants



# More Gene Replacement Clinical Trials

This is a partial list:

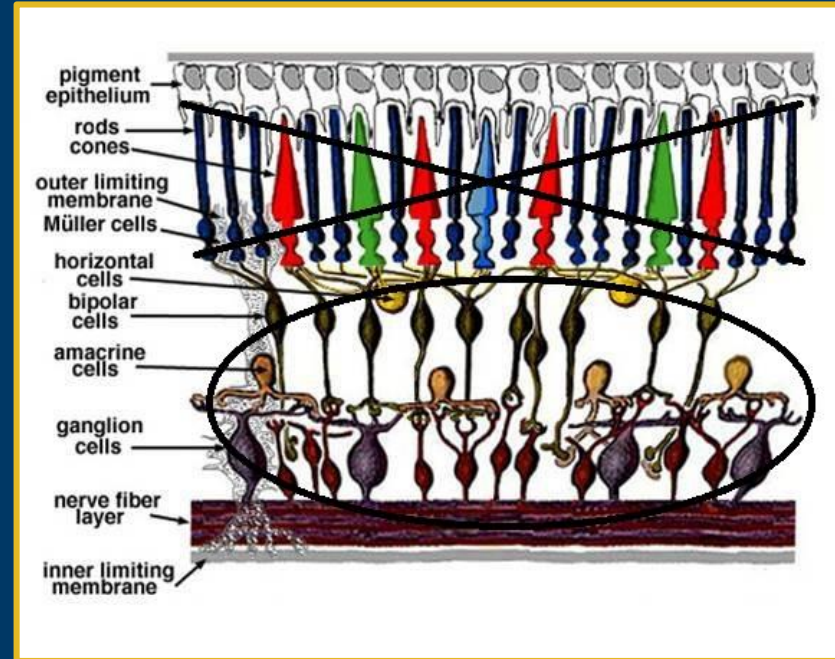
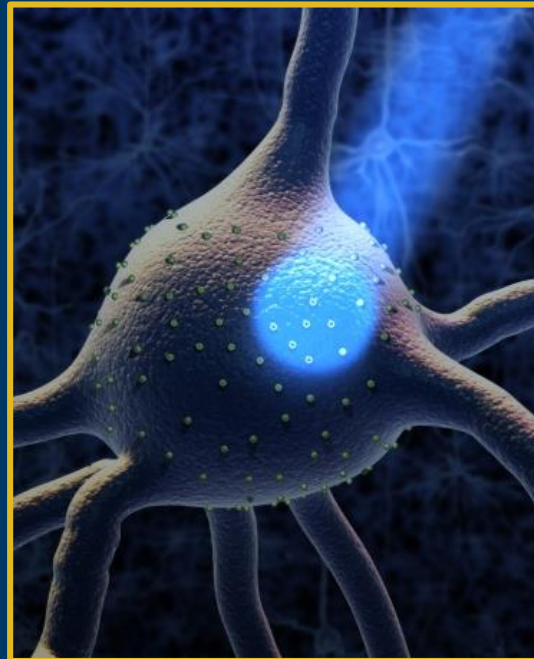
- **Choroideremia** – Spark has Phase 1/2 trial in US.
- **Usher syndrome type 1B** – Sanofi (US and Paris)
- **Stargardt disease** – Sanofi (US and Paris)
- **RP (PDE6B)** – Horama in France
- **RP (RLBP1)** – Novartis in Sweden
- **LCA (GUCY2D)** – Univ. of Florida, Genzyme, planned

# Optogenetic Therapies

Restores light sensitivity to retina affected by advanced disease.

## Two Clinical Trials:

- Allergan (US)
- GenSight (UK)

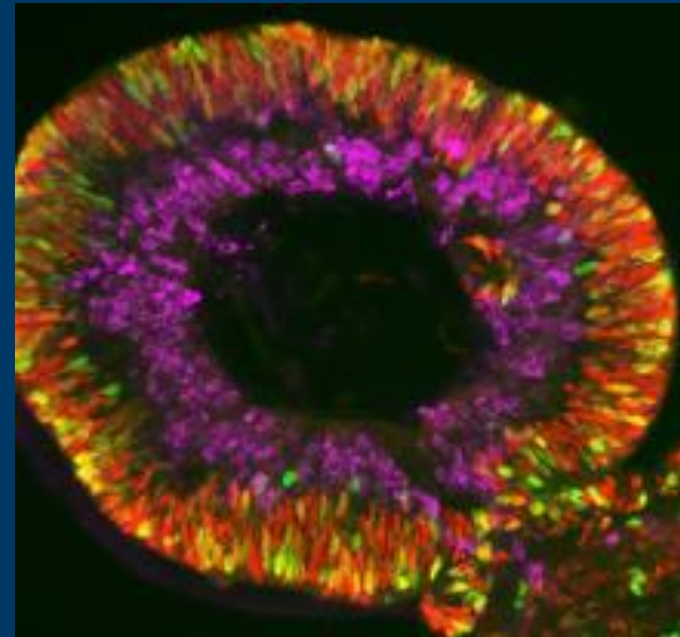
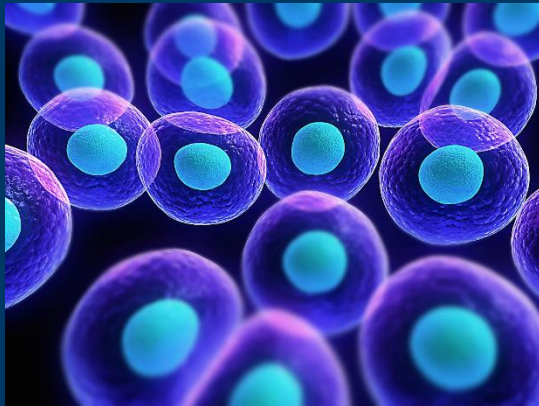




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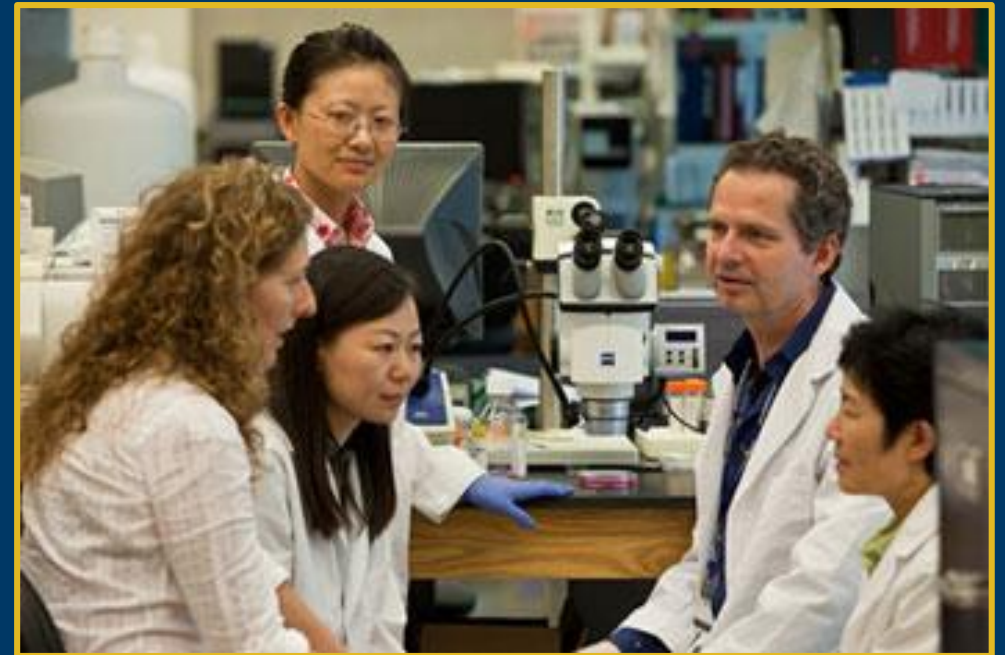
# Stem Cells – Grow New Retinal Cells

Replace or protect diseased retinal cells.



# Retinal Progenitors (Neuroprotective for RP)

- jCyte – stem cells that have partially developed into photoreceptors
- Henry Klassen, Ph.D., University of California, Irvine
- Injected into the vitreous – release several growth factors
- Rescues cones
- 28 patients treated – moved into Phase 2b (85 participants)





# Retinal Progenitors (Photoreceptor Replacement for RP)

## ReNeuron (Mass Eye and Ear Infirmary)

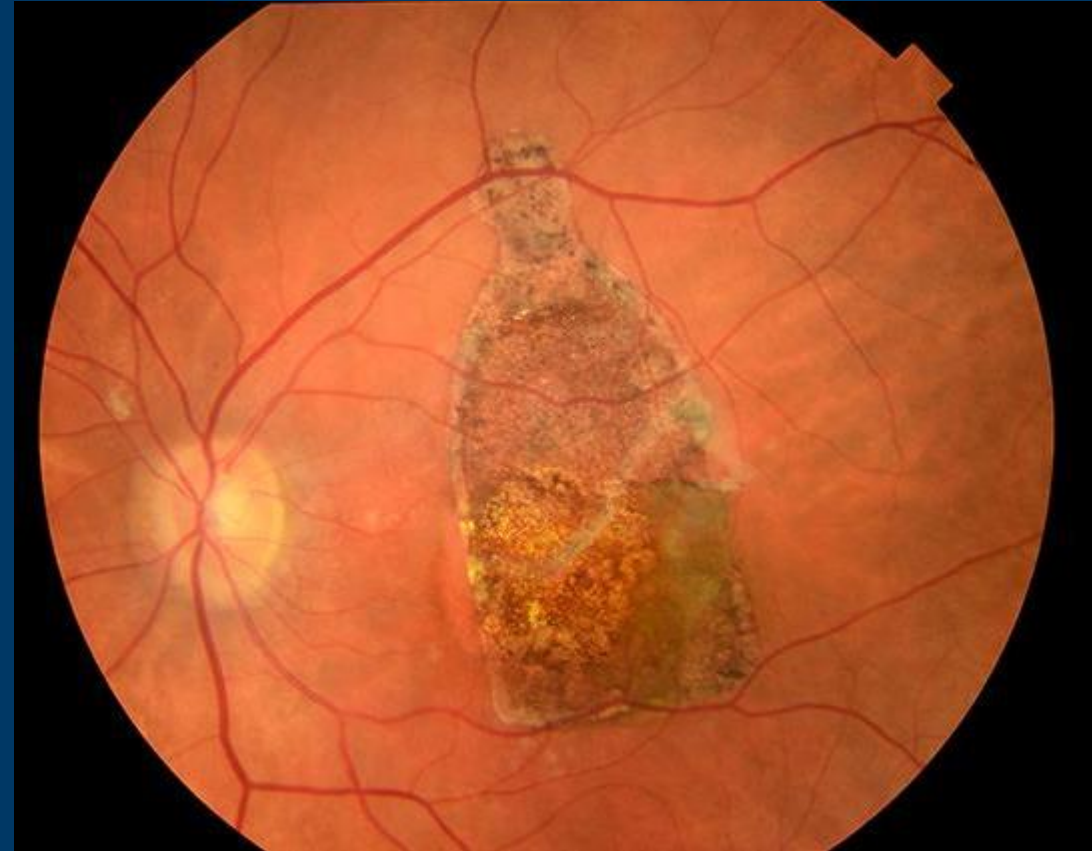
- Transplant partially developed photoreceptors
- Functionally replace lost photoreceptors
- Improved visual acuity for first three patients in Phase 2
- Jason Comander leading trial
- Significant funding from FFB



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# Regenerative Patch Technologies

- Dry AMD
- RPE cells derived from stem cells
- Scaffold mimics Bruch's membrane
- Well tolerated – suggestion of efficacy
- Dennis Clegg, PhD – UC Santa Barbara



# Three Major Foundation Investments

## **Nacuity (Dallas) – up to \$7.5 million**

- NACA – strong antioxidant to slow vision loss (RP, others)
- Developed at Johns Hopkins
- Similar to NAC, N-acetylcysteine (FDA-approved)

## **SparingVision (France) – up to €7 million**

- RdCVF – rod-derived cone viability factor (protein)
- Saves cones (RP, others)
- Developed at Institut de la Vision

## **ProQR (Netherlands) – up to \$7.5 million**

- Antisense oligonucleotides (like genetic tape/mask)
- USH2A exon 13 (FFB-funded) Phase 1/2
- LCA (CEP290) – Vision improvements, moving into Phase 2/3

# Select Stargardt disease therapy clinical trials

\*Alkeus – deuterated vitamin A, burns cleaner than standard vitamin A, Phase 2

Acucela – visual cycle modulator, slows uptake of vitamin A, Phase 3

\*Iveric – Zimura (Phase 2) targets complement system (also developing ABCA4, RHO, Best disease gene therapies – preclinical)

\* Also potentially for dry AMD

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# Resources

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[www.FightingBlindness.org](http://www.FightingBlindness.org)

[www.ClinicalTrials.gov](http://www.ClinicalTrials.gov)

[www.MyRetinaTracker.org](http://www.MyRetinaTracker.org)