

Educating Patients on the Advanced IOL Journey

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Crystilex: Consultant/Equity Owner

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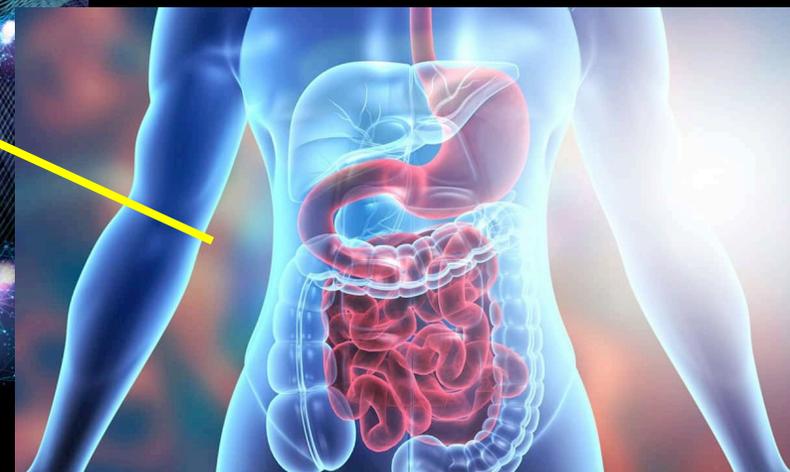
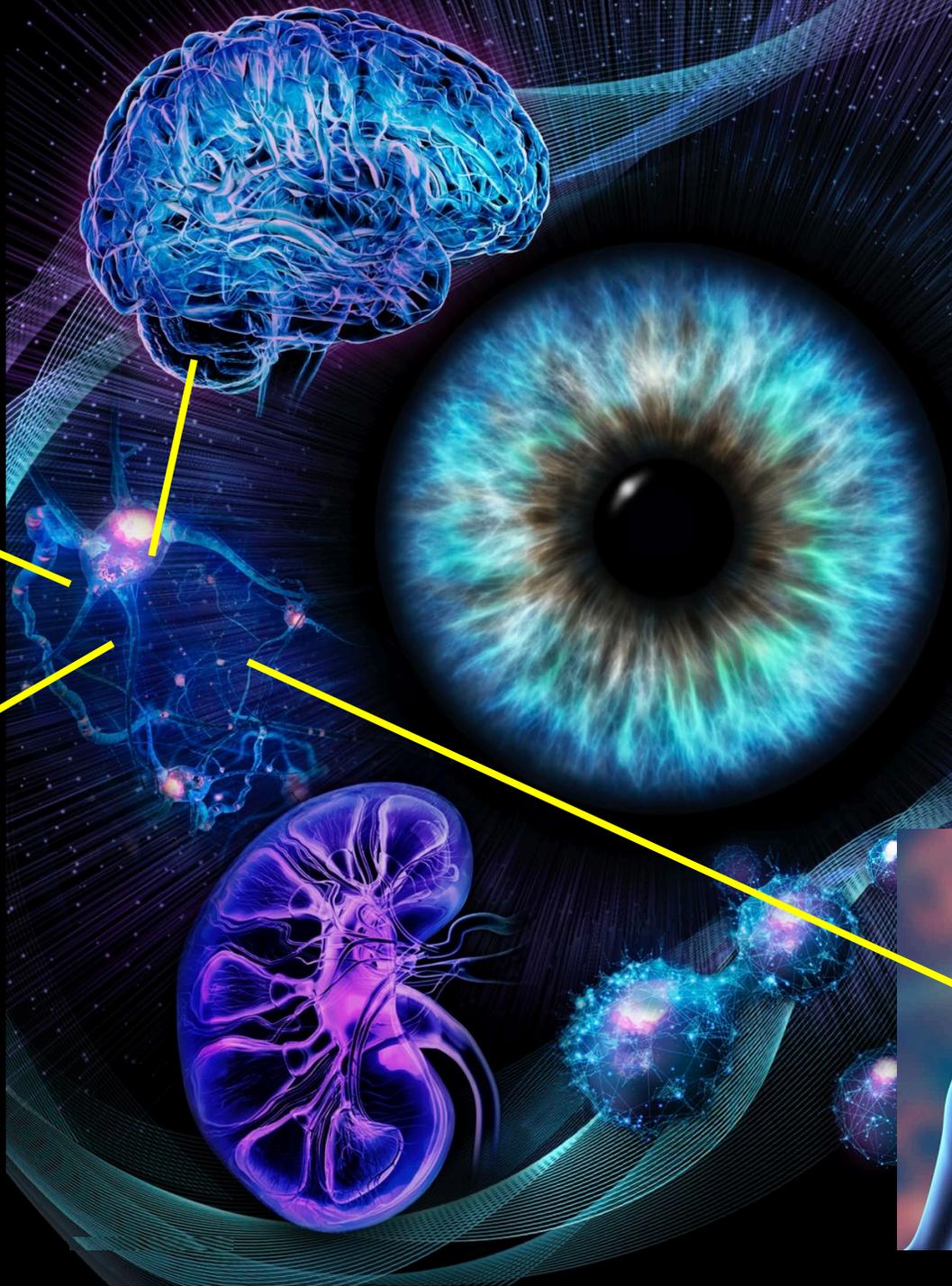
Visionary Ventures: Consultant

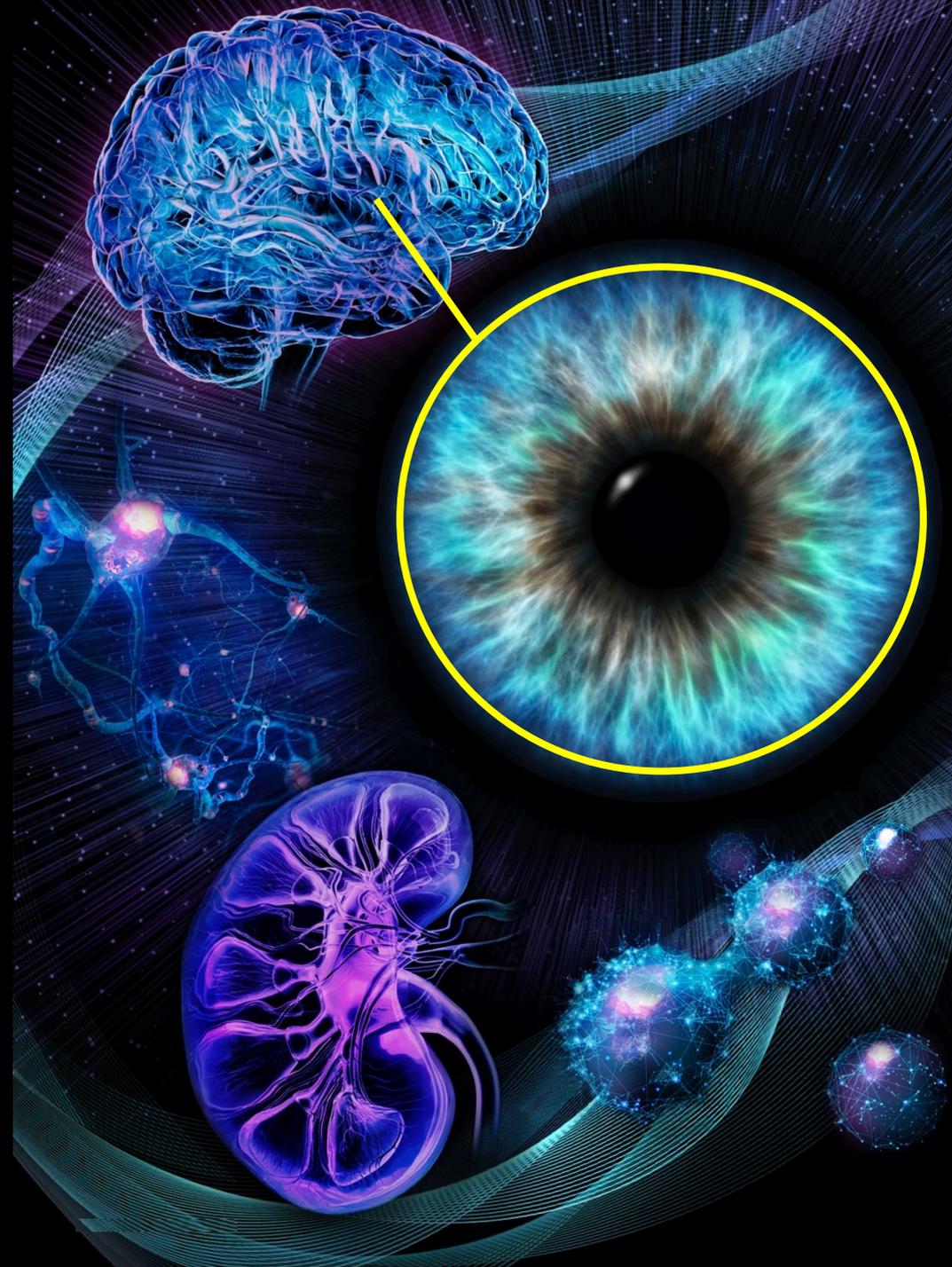
Visus: Consultant/Equity Owner

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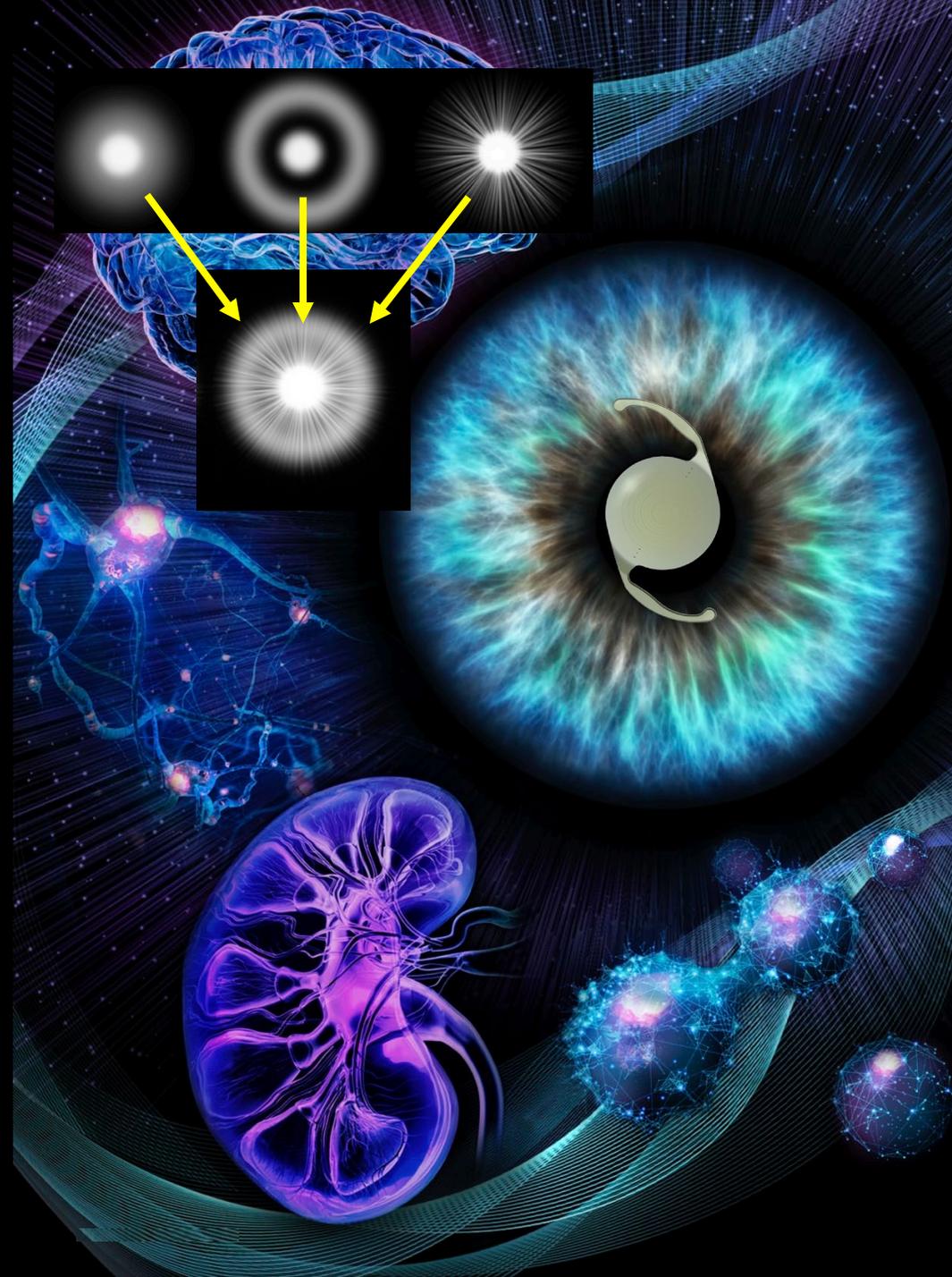
Educating Patients on the Advanced IOL Journey

- **Expectations**
- **Optimization**
- **The Power of Neural Adaptation**









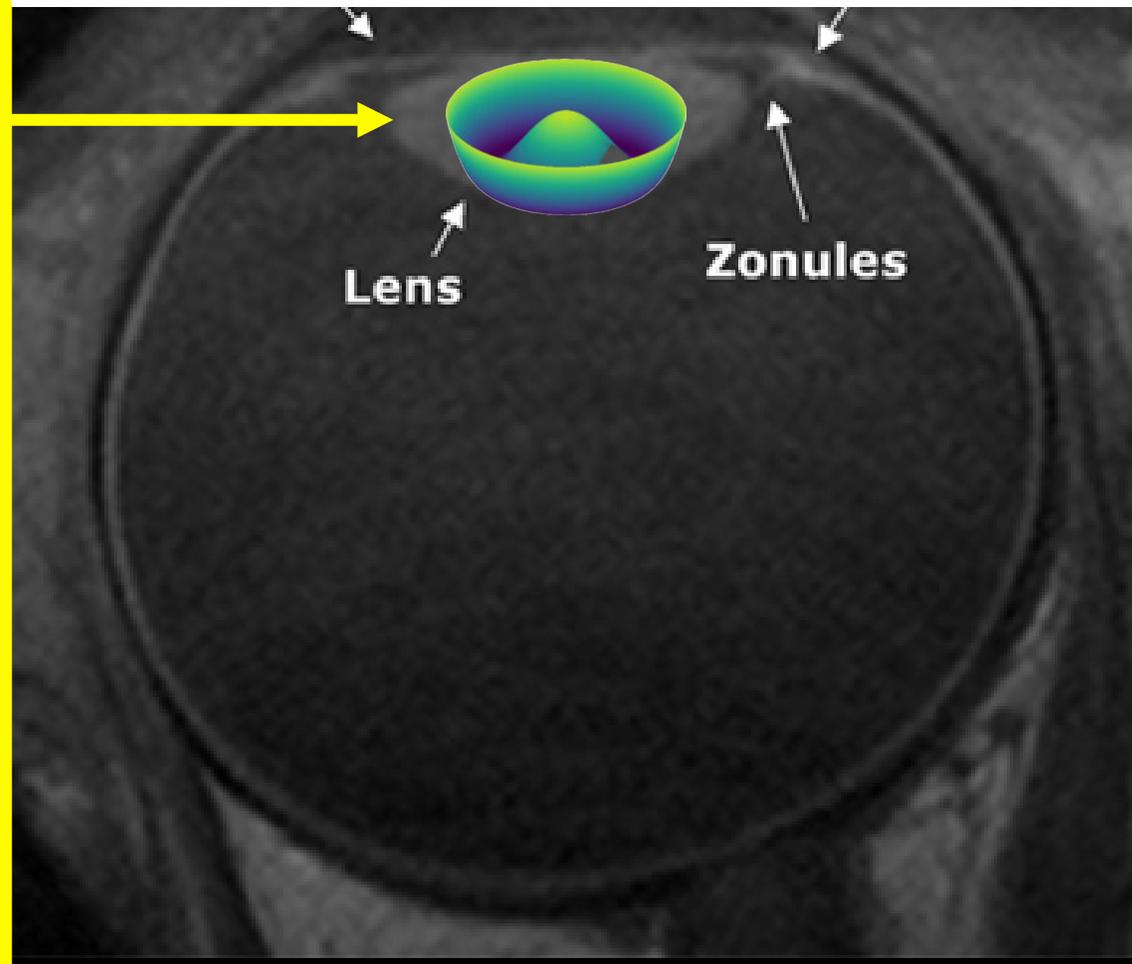
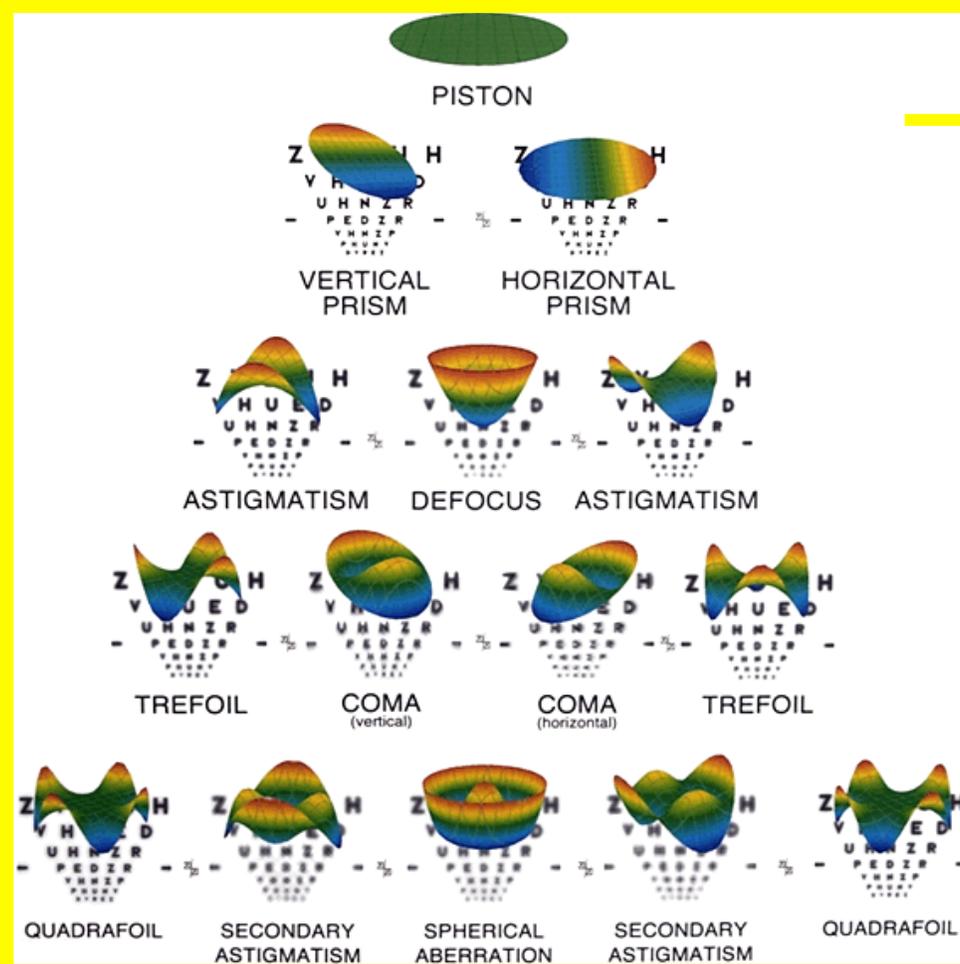




Contributions of the cornea and the lens to the aberrations of the human eye

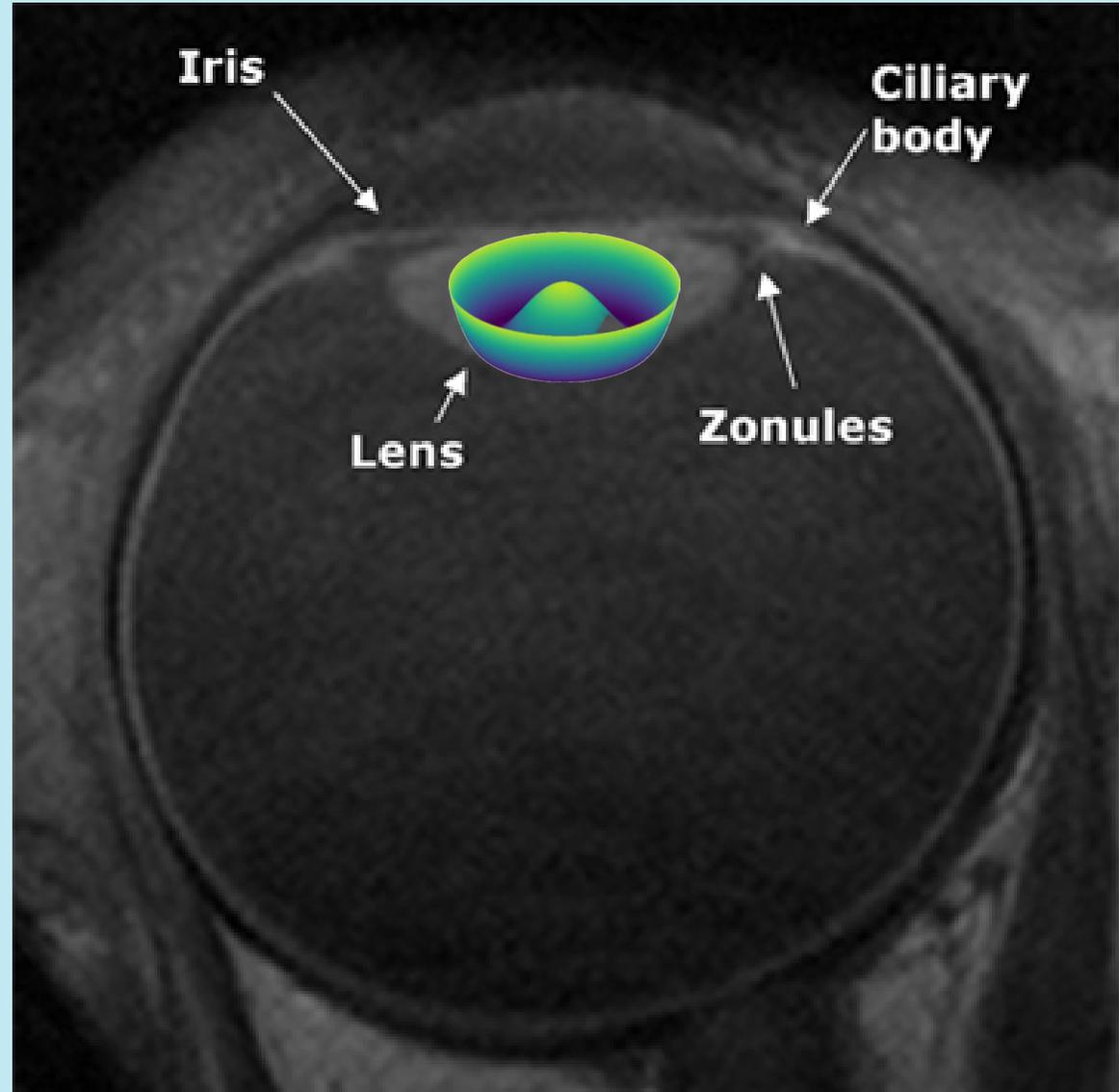
Pablo Artal and Antonio Guirao

Laboratorio de Optica, Departamento de Física, Universidad de Murcia, Campus de Espinardo (Edificio C), 30071 Murcia, Spain



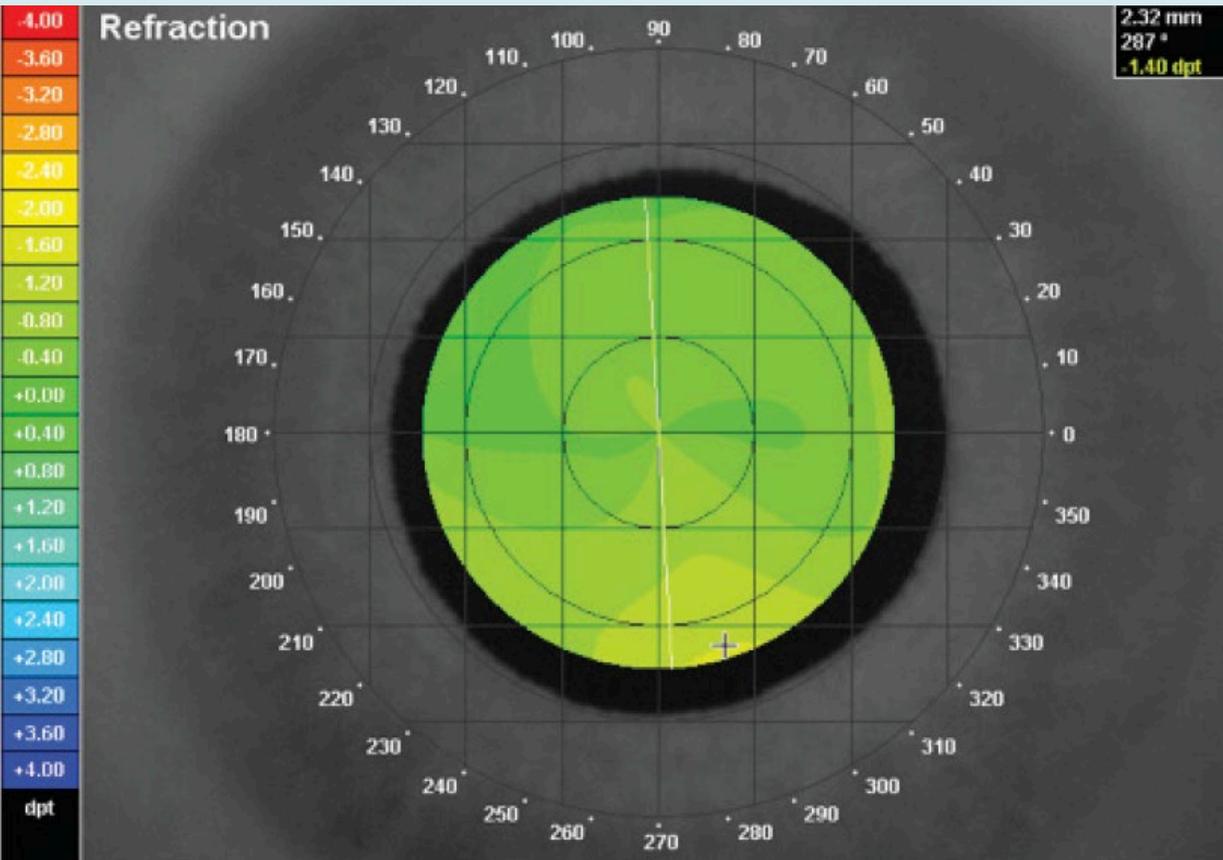
Multifocality in Humans

- Normal
- Less in distance
- More in reading

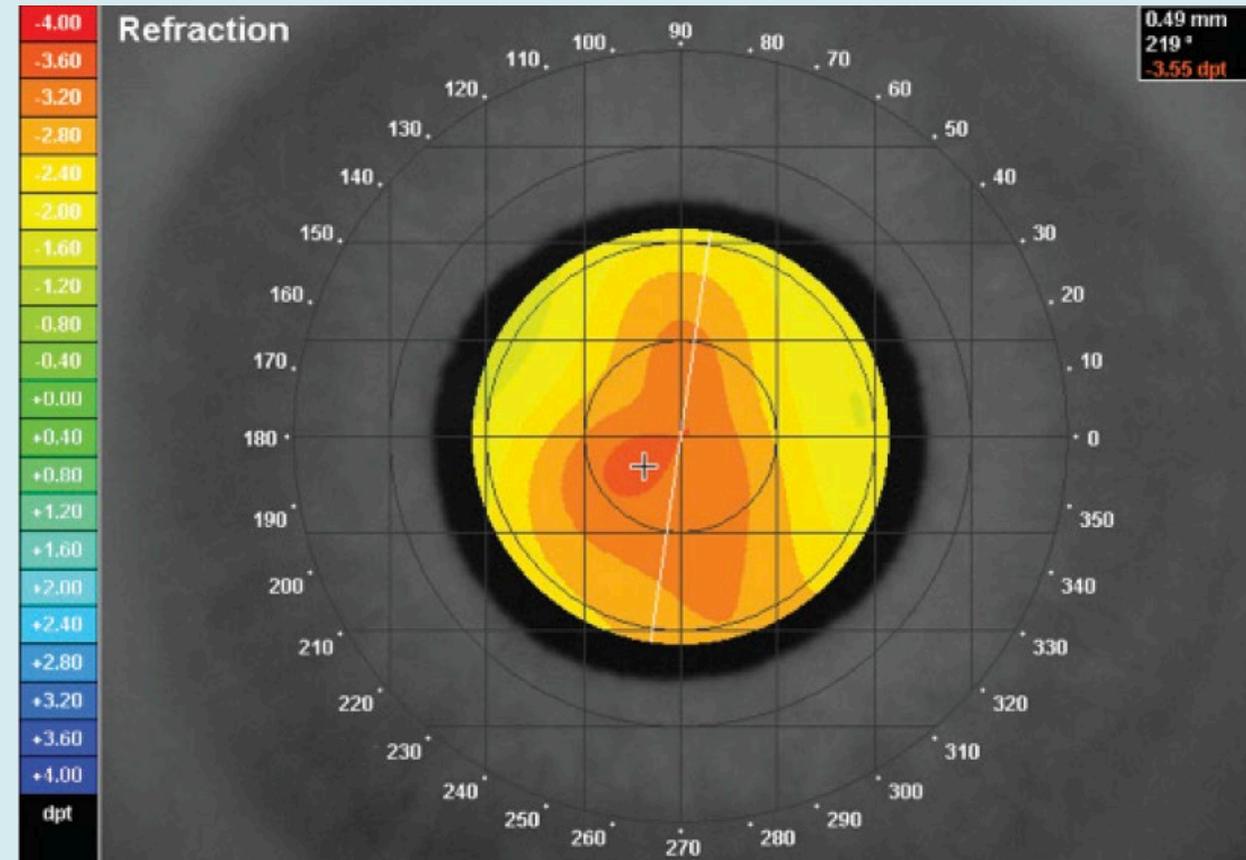


19 y.o. male medical student

Unaccommodated



Accommodated



The function of the lens capsule in the accommodation of the eye

E F Fincham¹

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[Transactions of the Optical Society, Volume 30, Number 3](#)

Citation E F Fincham 1929 *Trans. Opt. Soc.* **30** 101

Author affiliations

¹ Northampton Polytechnic Institute, London

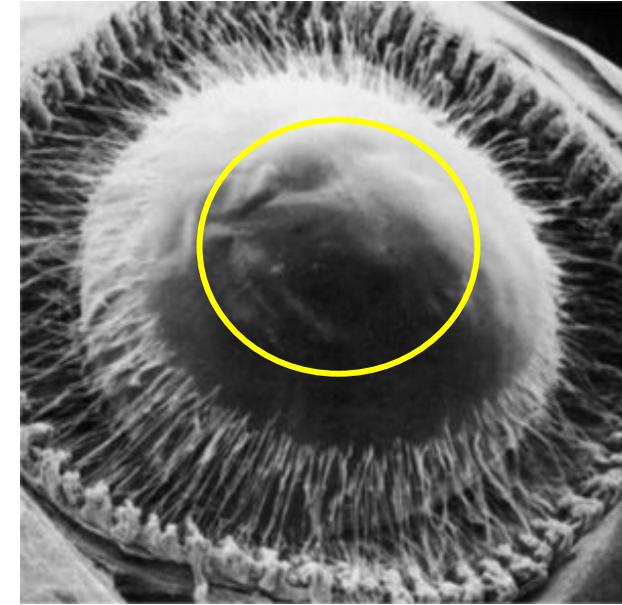
Dates

1. Received 13 December 1928

Abstract

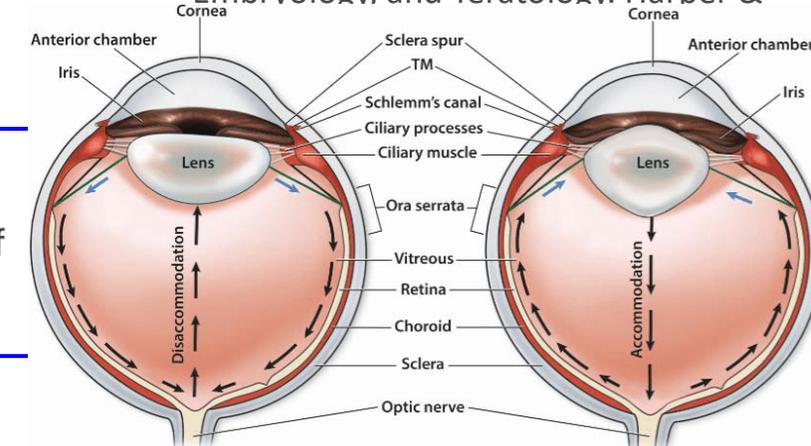
Although abundant evidence is now available in support of the general principle of Helmholtz's theory of accommodation, no definite explanation has been given of the formation of the "lenticonus" discovered by Tscherning, which led him to challenge that theory. In a paper which appeared in these *Transactions* in 1925 the present author suggested that the varying thickness of the capsule covering the anterior surface of the lens would account for the type of surface which Tscherning had described.

The results show that in primates the anterior surface of the lens assumes a somewhat conical form with an area of increased curvature in the centre, when the suspensions are severed. The capsule of the primate lens has a zone of increased thickness surrounding a central thin area.



Scanning electron micrograph of anterior zonular insertion after removal of cornea and iris.

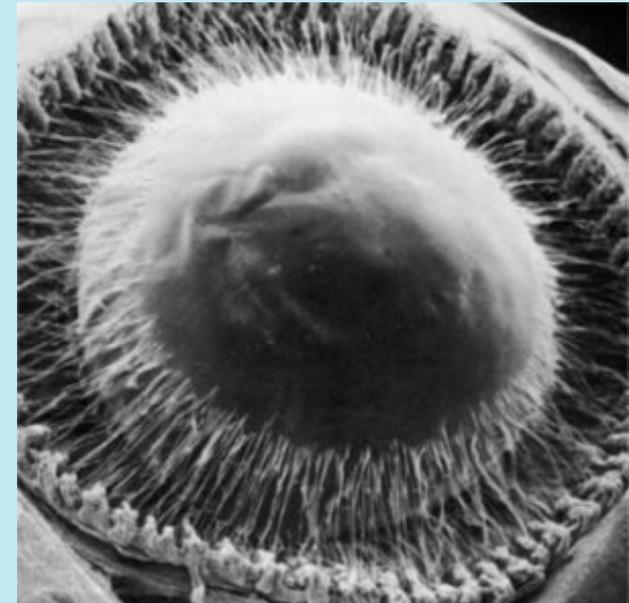
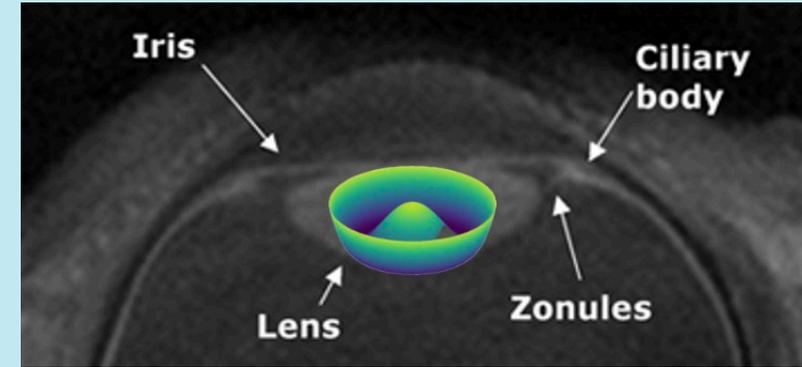
(From Streeton BW [1982], in Jakobiec FA [editor]: *Ocular Anatomy, Embryology, and Teratology*. Harper &



Multifocality in Humans

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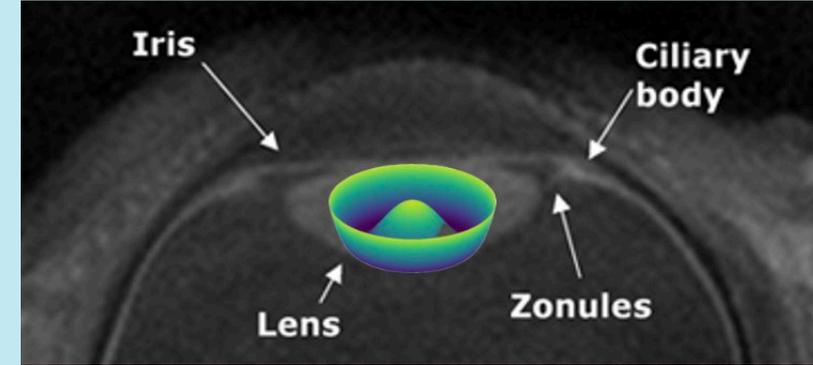
Static **-Slow**
Dynamic



Multifocality in Humans

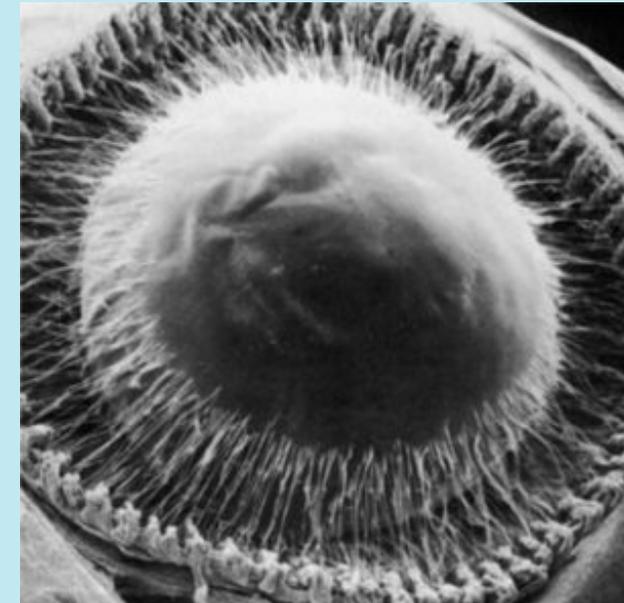
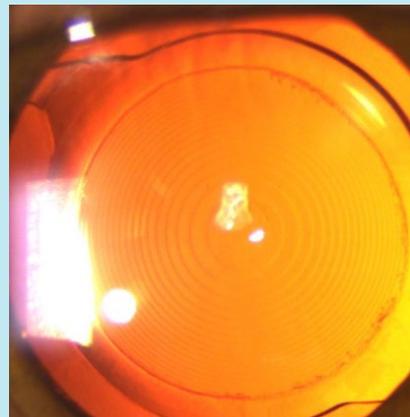
- Normal
- Less in distance
- More in reading

Static - **Slow**
Dynamic



-
- Multifocal IOL

Static - **Sudden**

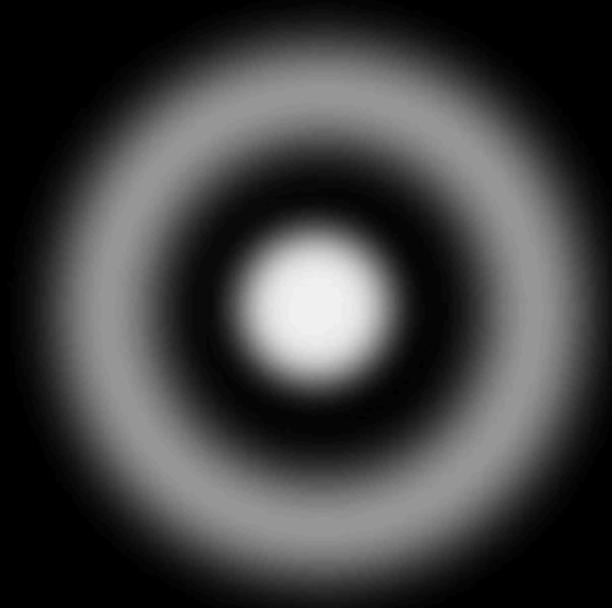




Light Source



Glare



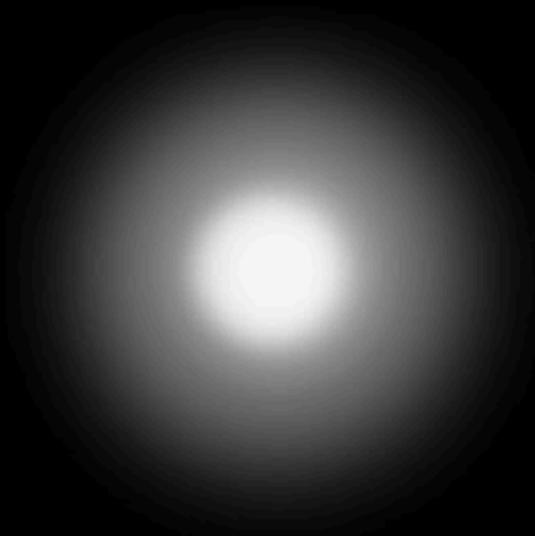
Halo



Starburst

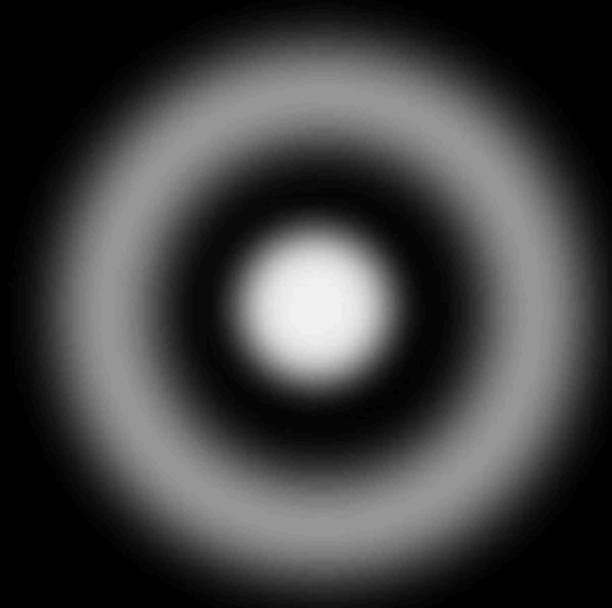


Light Source



Glare

“a blurring or smearing”



Halo



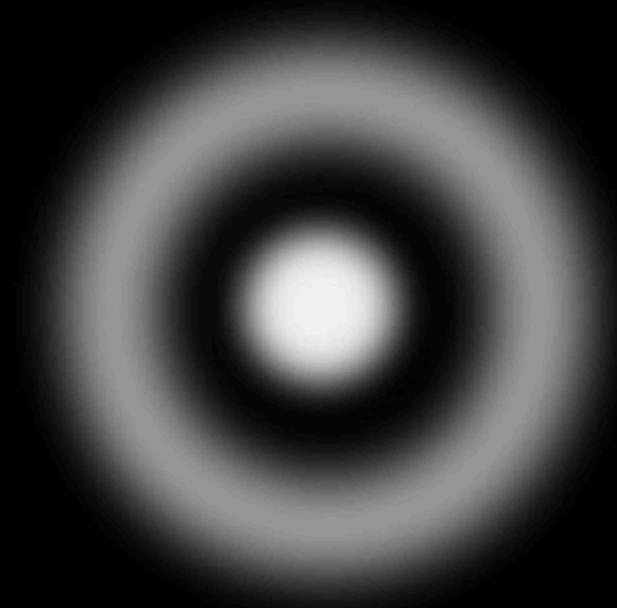
Starburst



Light Source



Glare



Halo

“distinct rings”



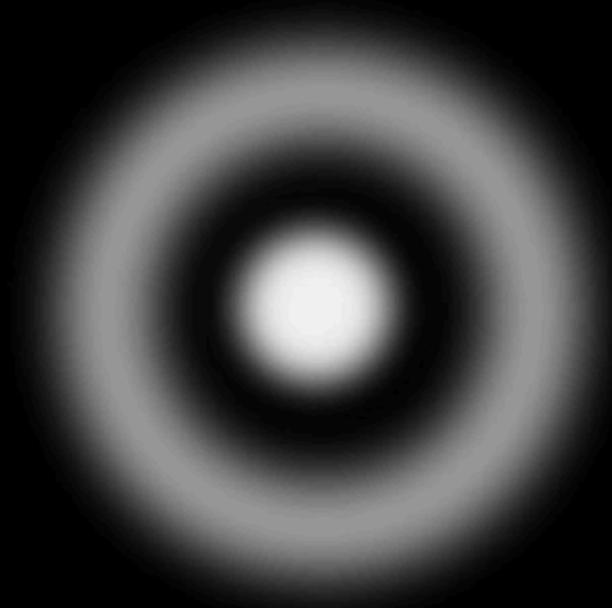
Starburst



Light Source



Glare



Halo



Starburst

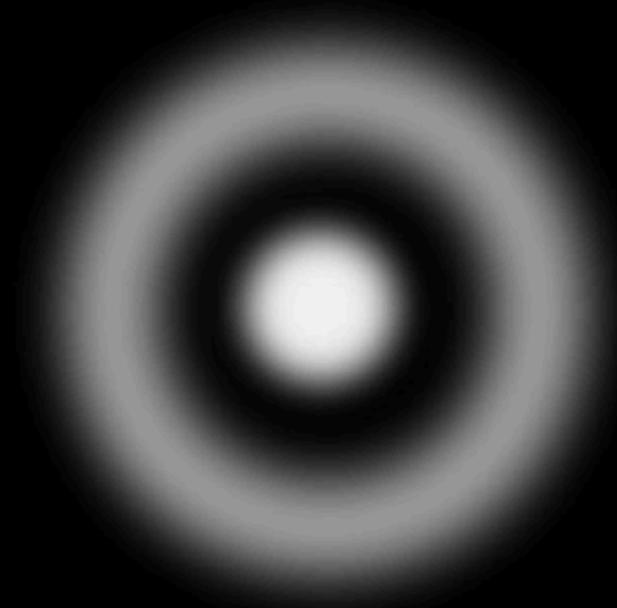
“rays or streaks”



Light Source



Glare



Halo



Starburst

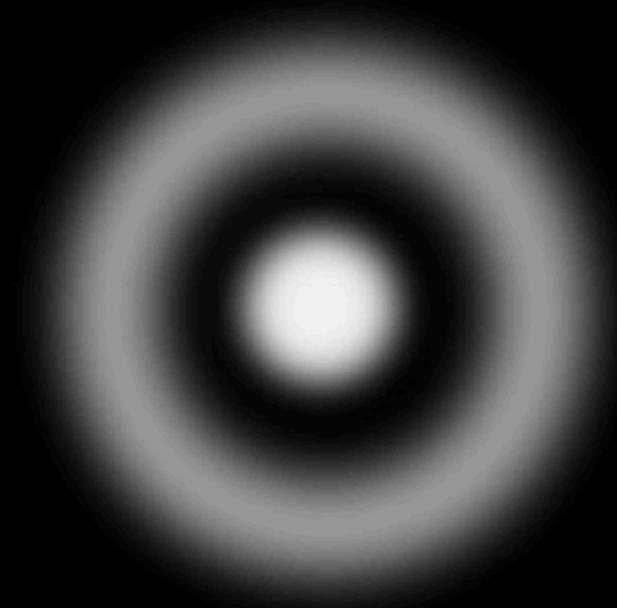
PCO, refractive error, OSD



Light Source



Glare



Halo

Multifocal IOLs

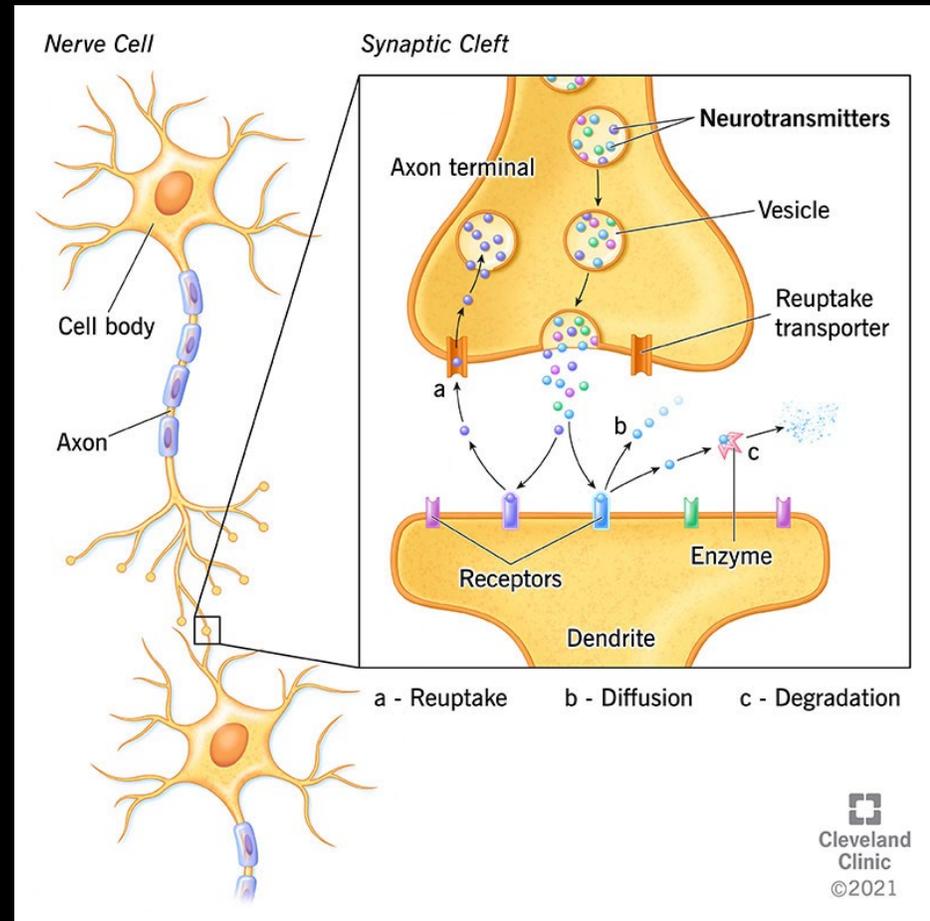


Starburst



Multifocal IOLs
PCO, refractive error, OSD

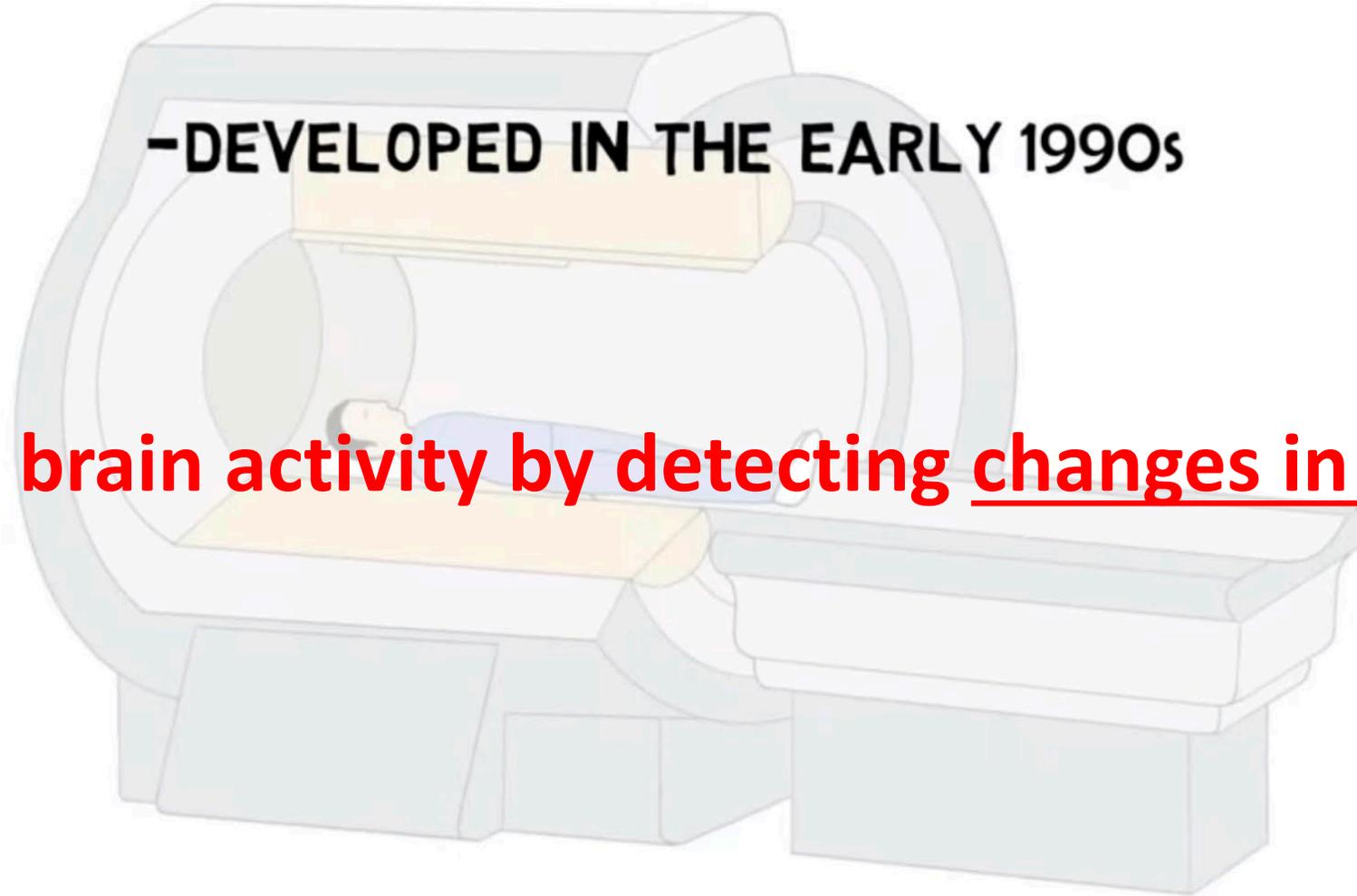




fMRI

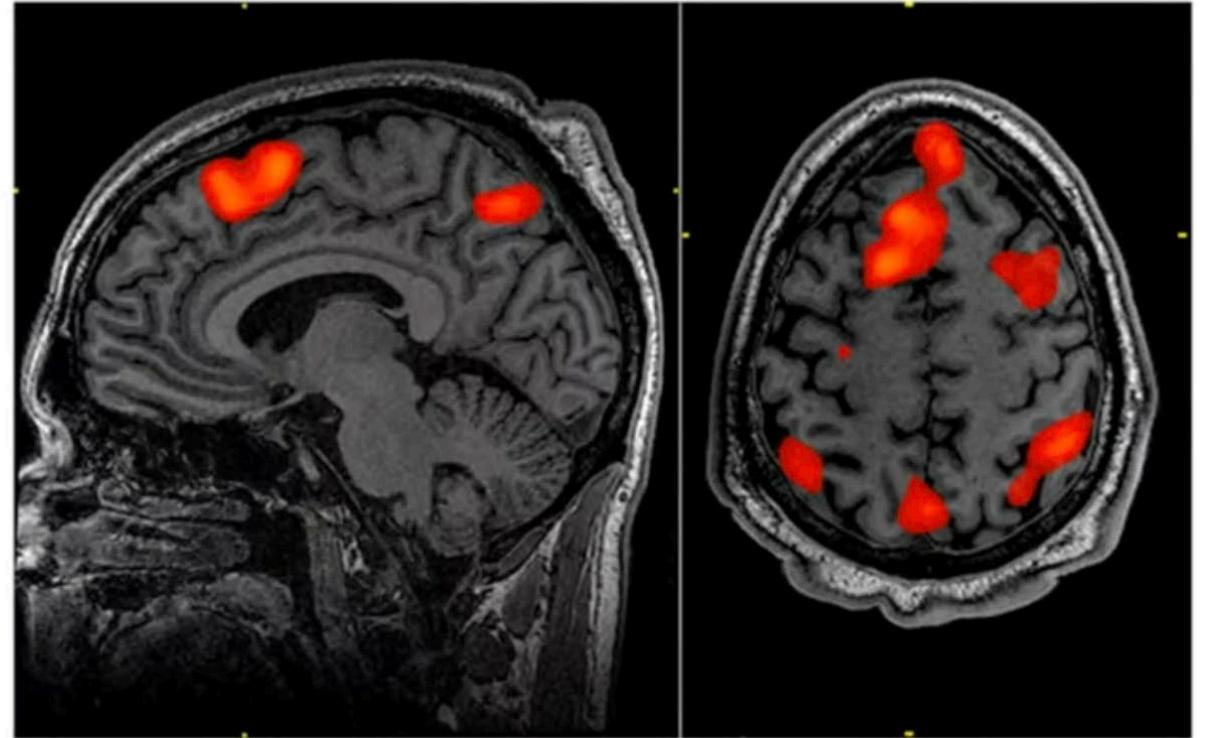
-DEVELOPED IN THE EARLY 1990s

measures brain activity by detecting changes in blood flow.



BLOOD-OXYGEN-LEVEL-DEPENDENT (BOLD) CONTRAST

identifies differences in the magnetic properties of oxygenated and deoxygenated blood.

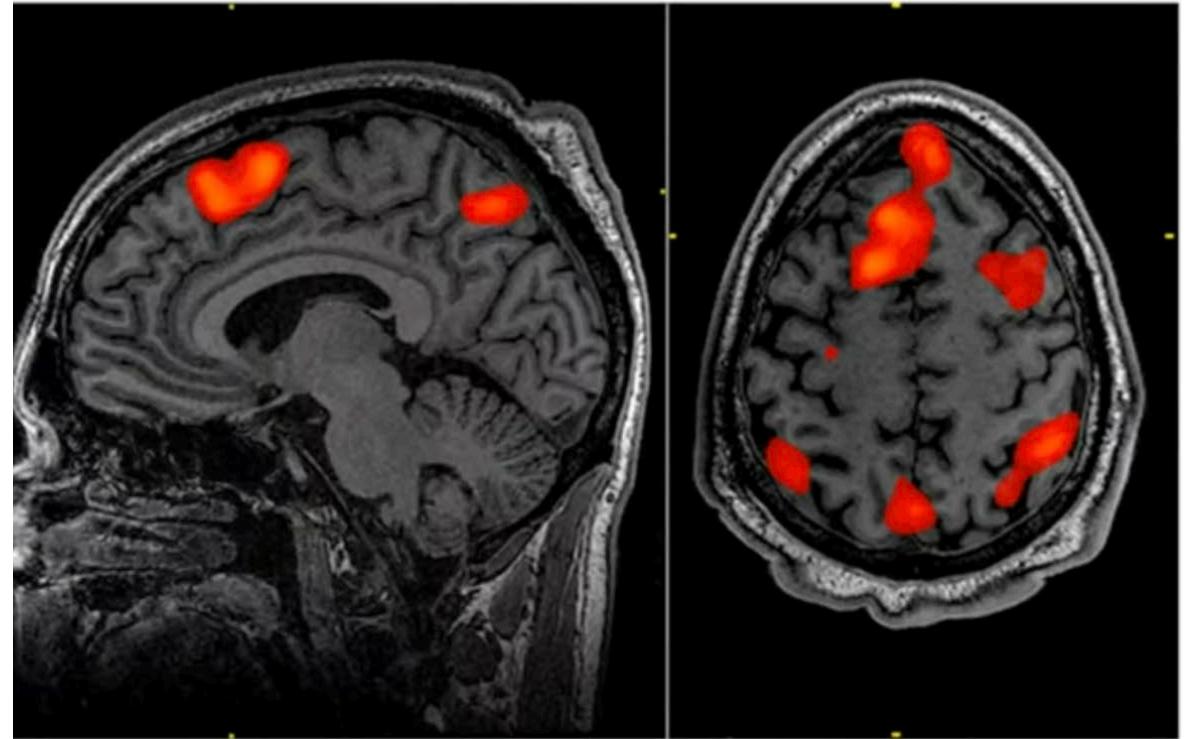


BLOOD-OXYGEN-LEVEL-DEPENDENT (BOLD) CONTRAST

When a brain region is more active

Consumes more oxygen

More blood flow

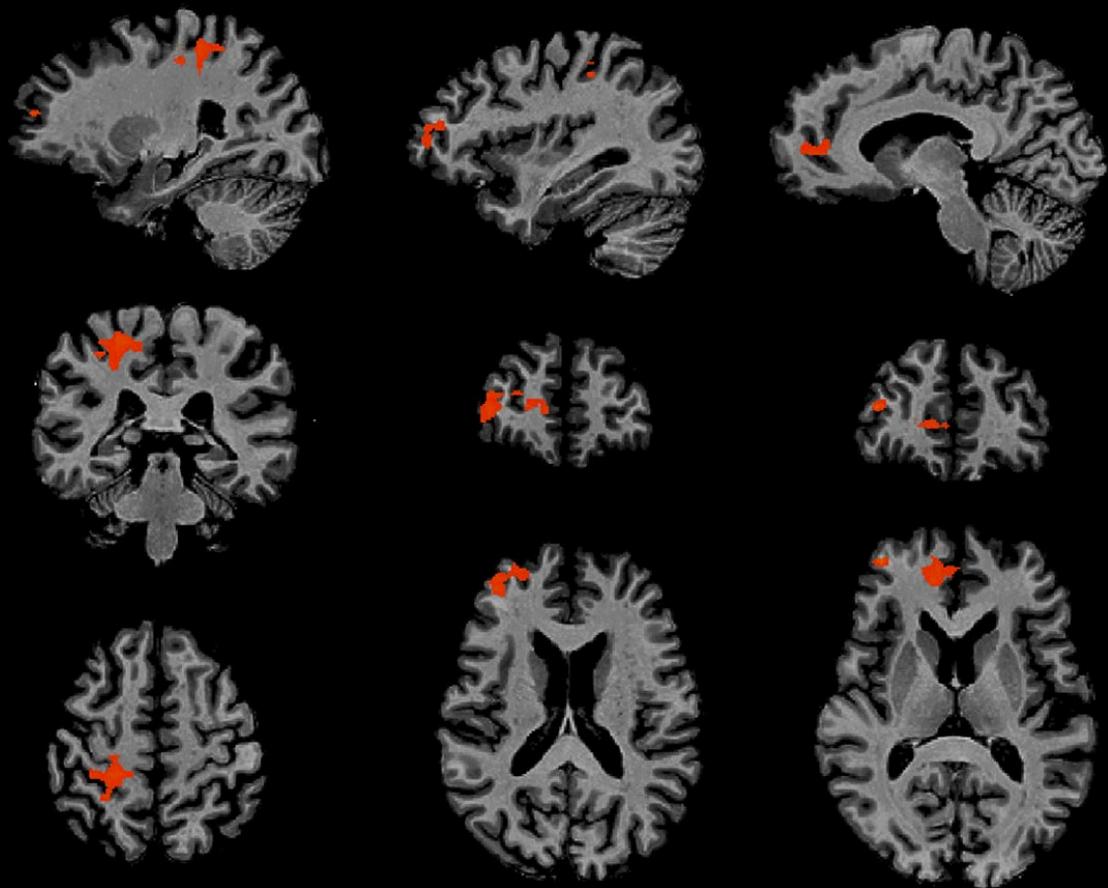


Rosa AM, Miranda ÂC, Patrício M, McAlinden C, Silva FL, Murta JN, Castelo-Branco M. **Functional Magnetic Resonance Imaging to Assess the Neurobehavioral Impact of Dysphotopsia with Multifocal Intraocular Lenses.** Ophthalmology. 2017 Sep;124(9):1280-1289.

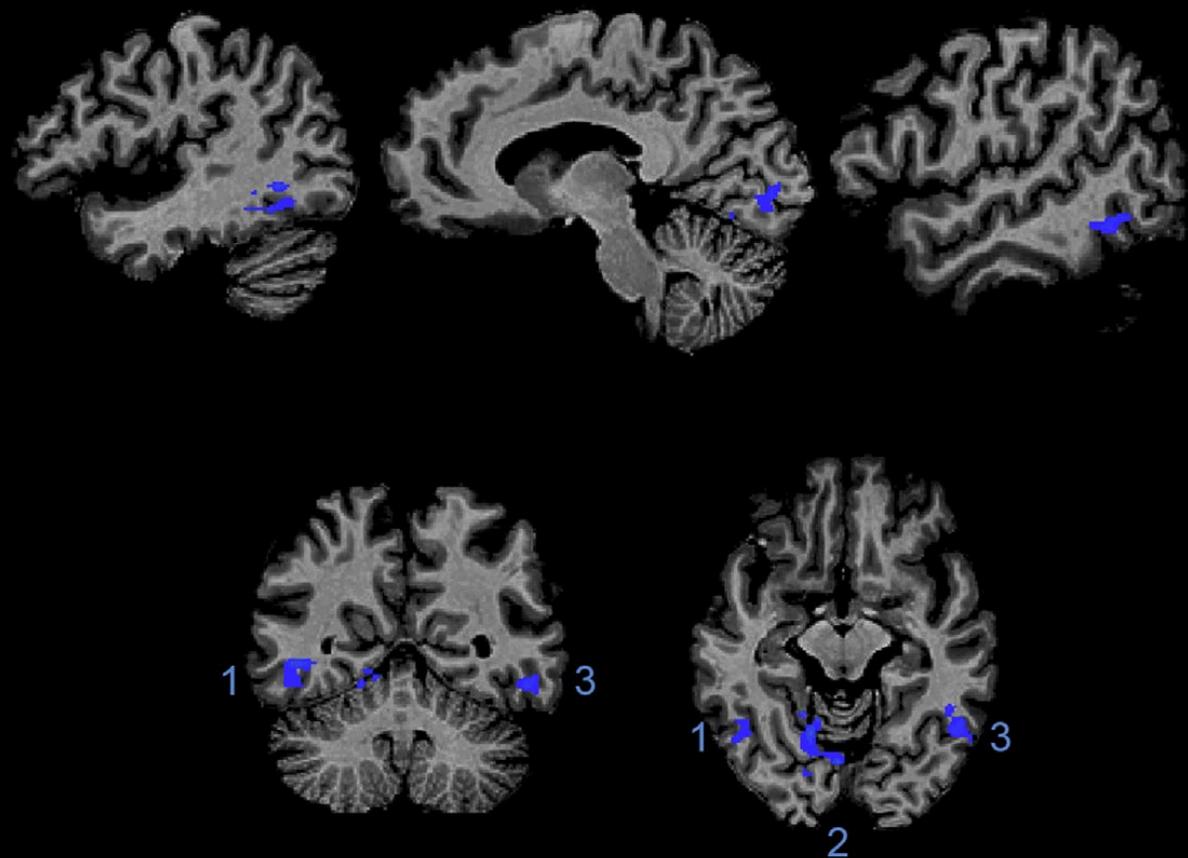
fMRIs 3-4 weeks Post-Op

- 30 Multifocals**
- 15 Monofocals**

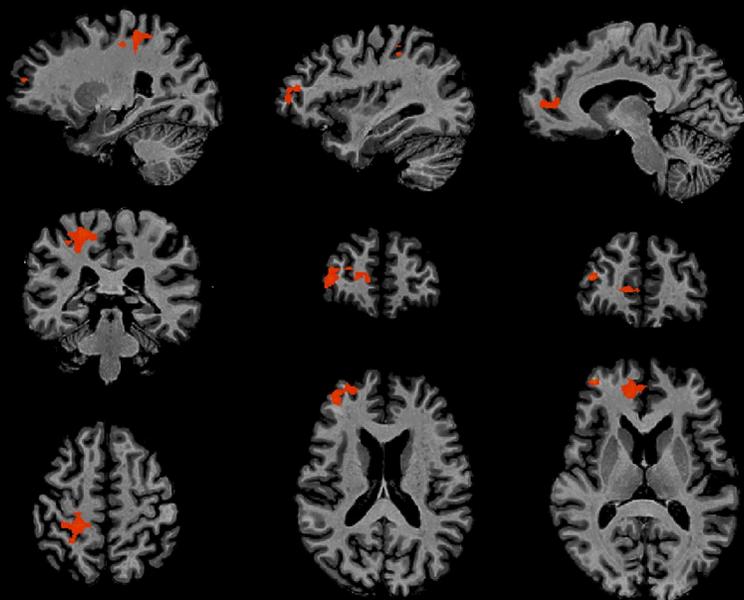
Multifocal



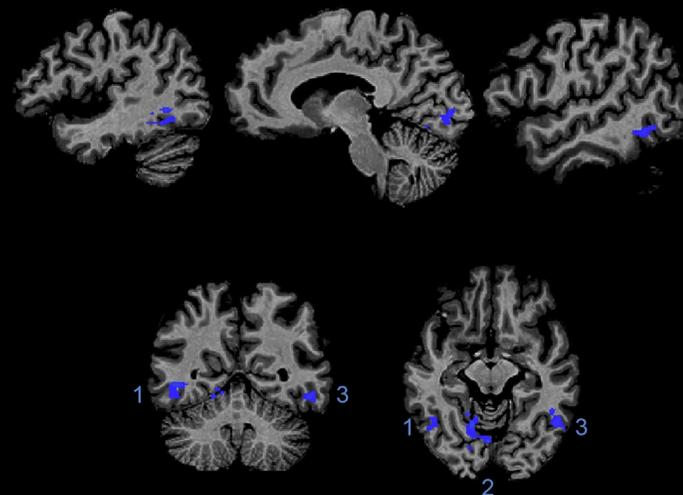
Monofocal



Multifocal

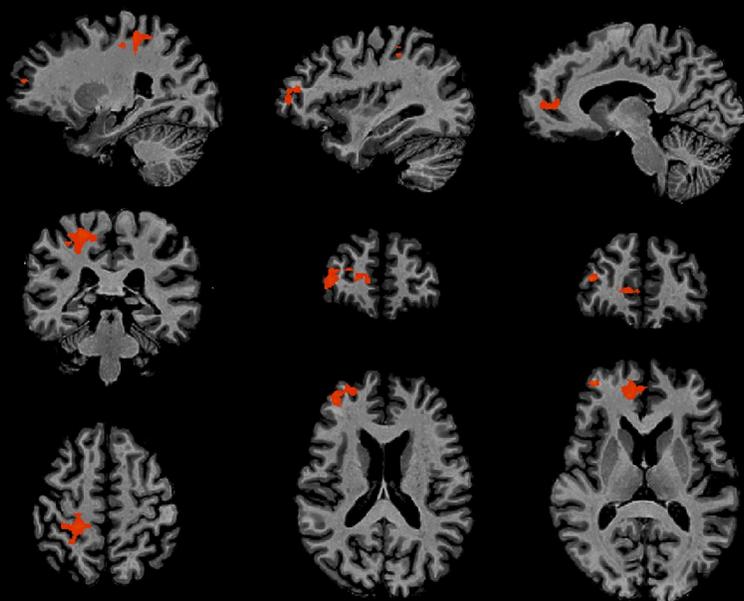


Monofocal

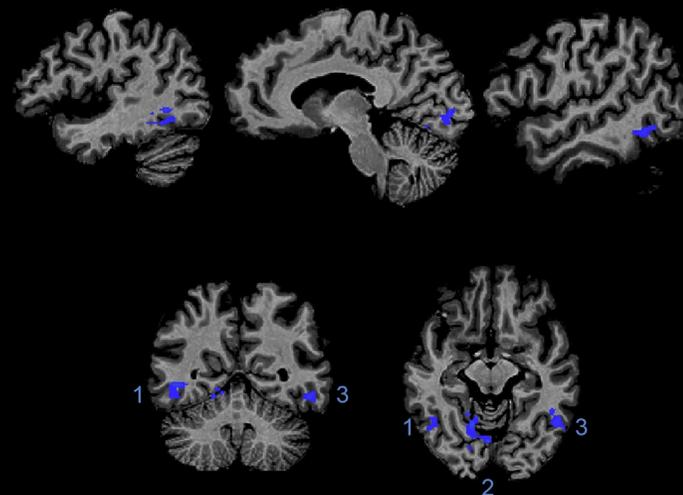


association between patient-reported subjective difficulties and fMRI outcomes

Multifocal



Monofocal



Likely represents the beginning of the neuroadaptation process to multifocal IOLs.

Refractive Status Tear Film+ Epithelium + Ant Stroma + IOL + Posterior Capsule + Vitreous = Vision

plano

pristine

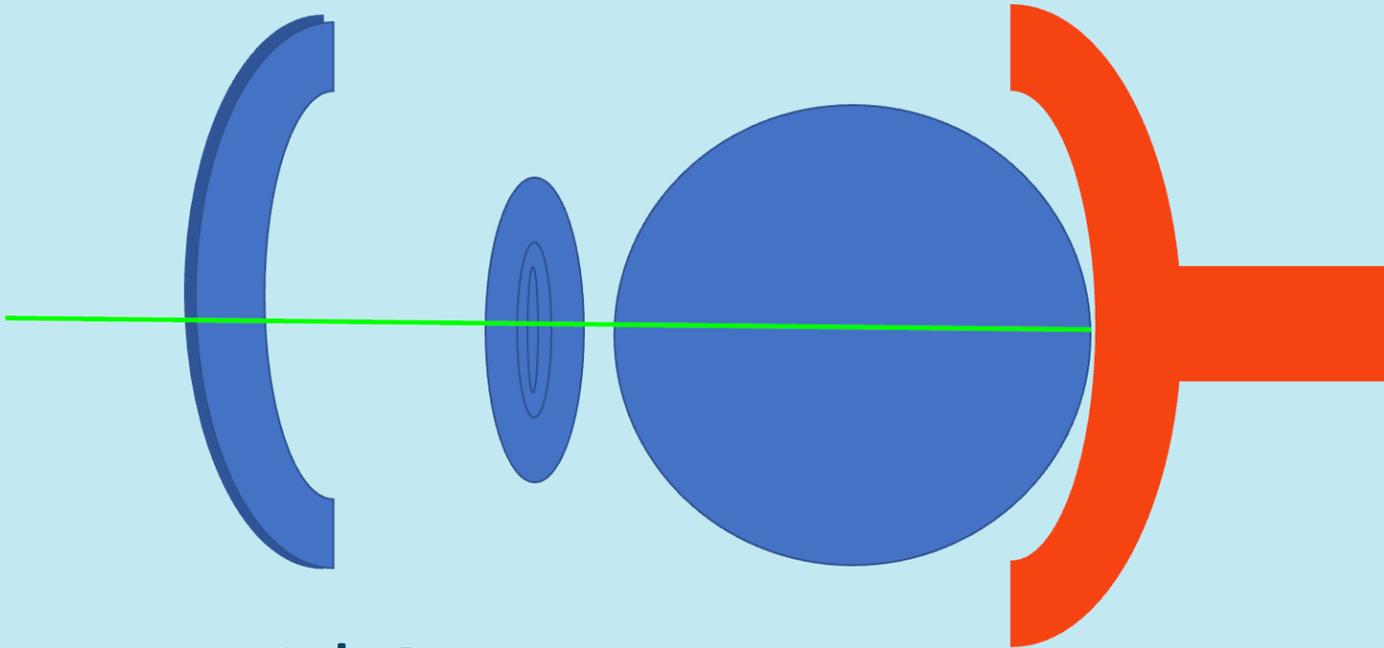
regular

smooth

centered
normal tilt

clear

No VS floaters



1st 6 mo

Optimizing The Eye

Refractive Status Tear Film+ Epithelium + Ant Stroma + IOL + Posterior Capsule + Vitreous = Vision

plano

pristine

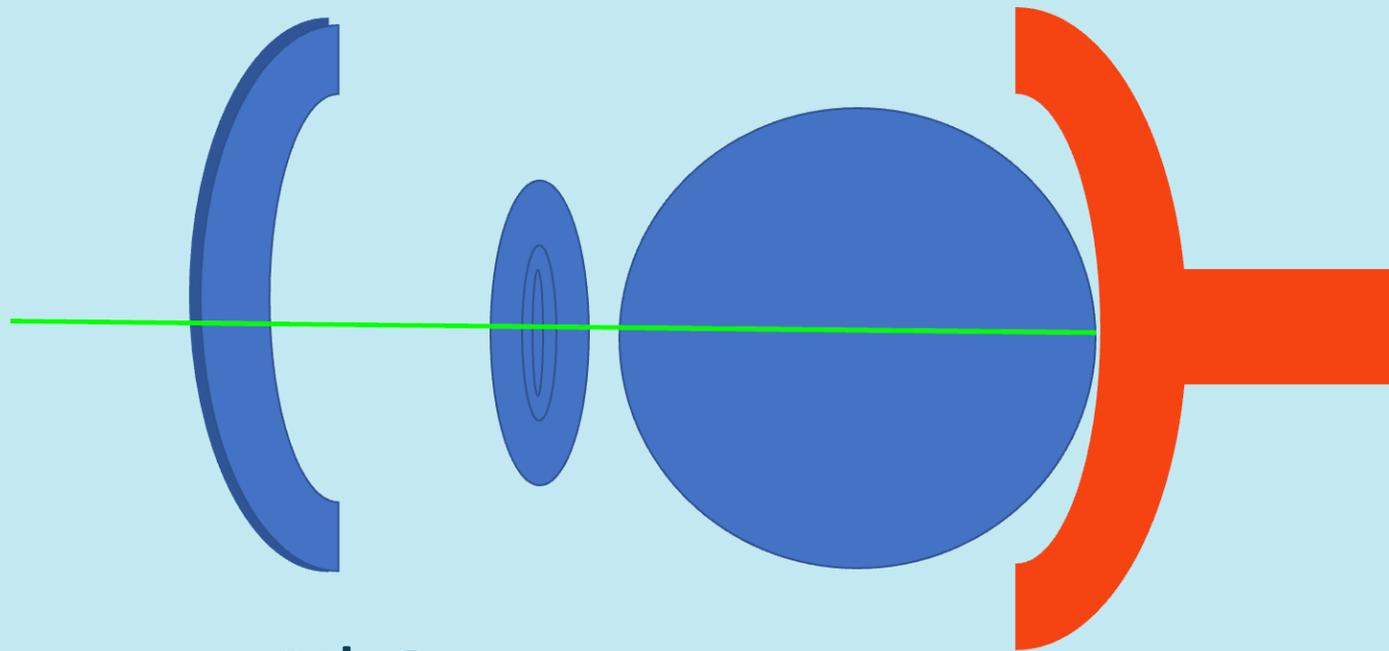
regular

smooth

centered
normal tilt

clear

No VS floaters



1st 6 mo



2nd 6 mo

Optimizing The Eye

Brain Optimizing Image

Educating Patients on the Advanced IOL Journey

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