

The Photon's Odyssey

A Journey Through the Biology of Sight

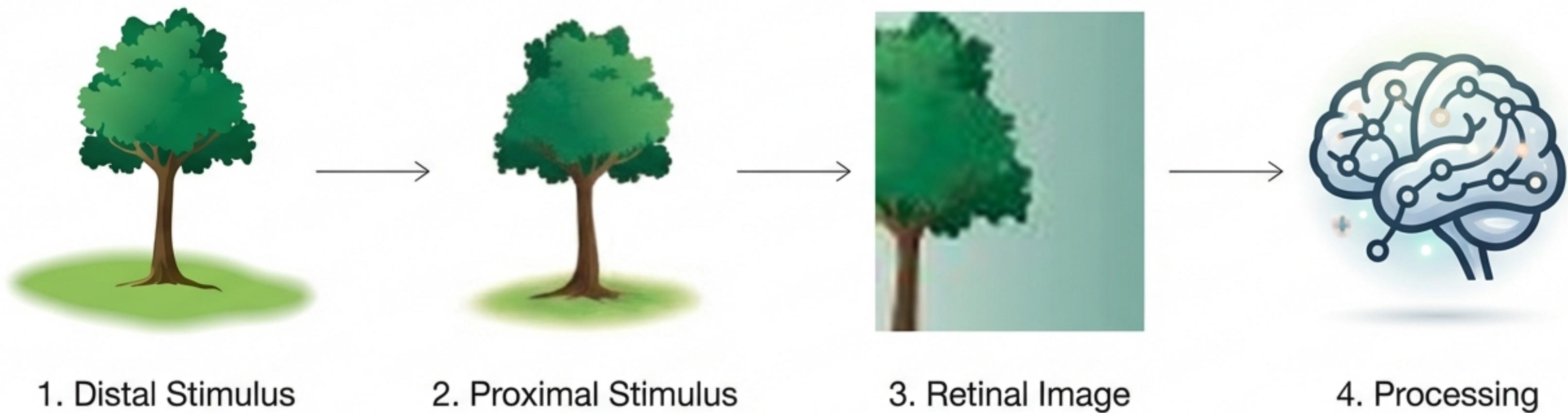
Light Means Connection

“Light is so basic... but to me, it means I can see.”

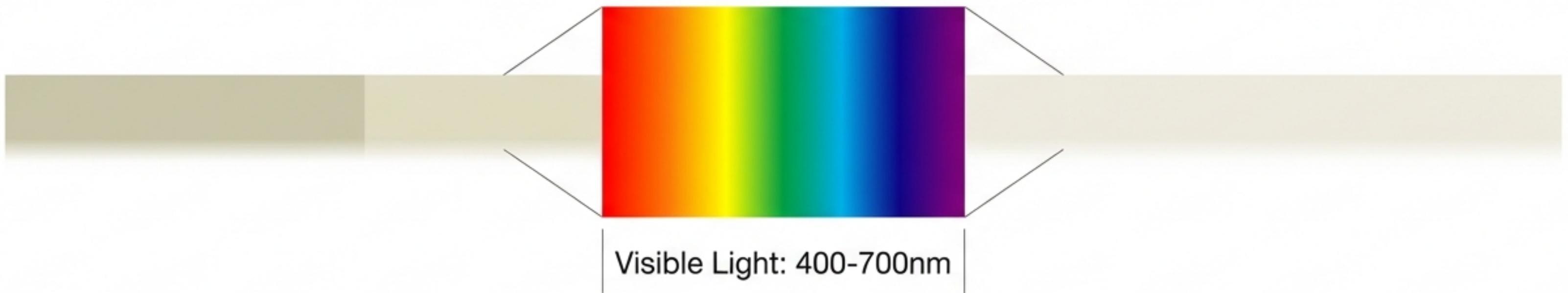
— Larry Hester

Blind for 33 years due to retinitis pigmentosa, Larry Hester was among the first to receive a bionic eye implant, allowing him to perceive light and visual patterns again.

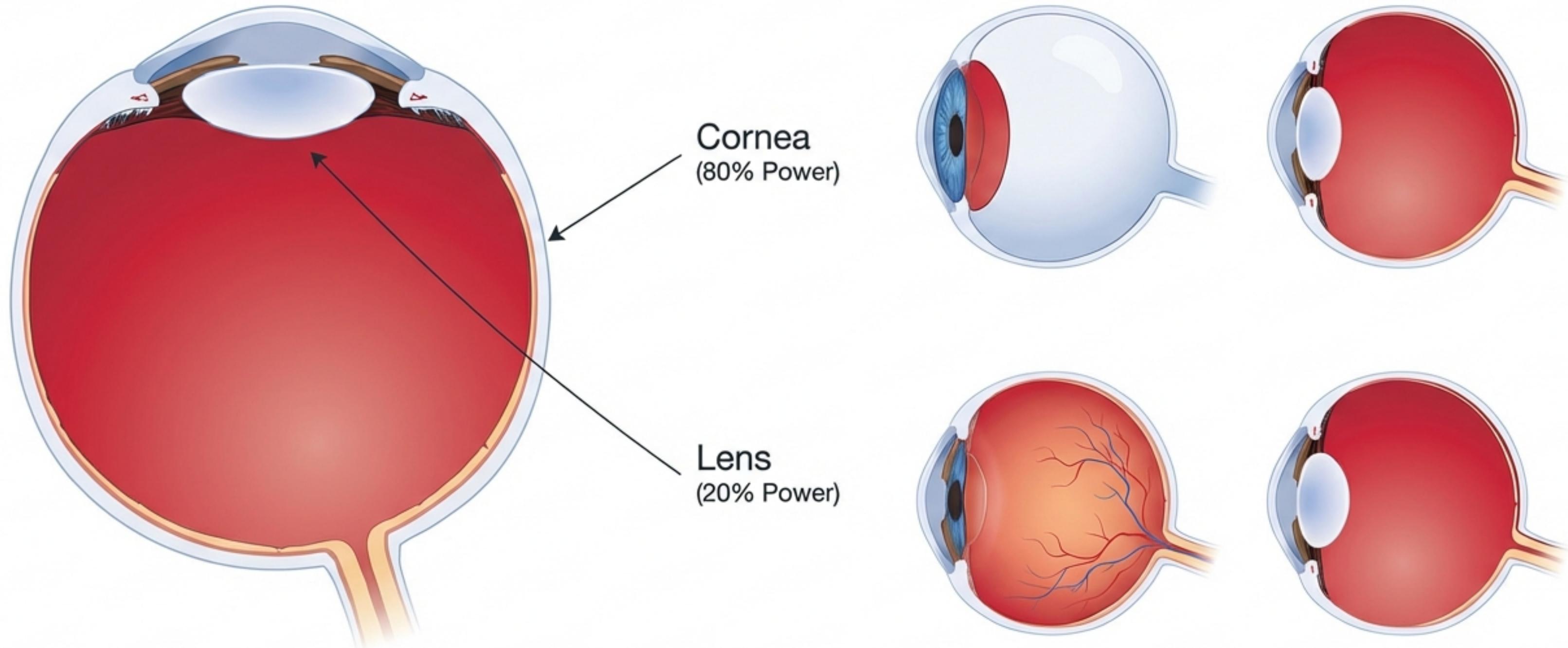
From Stimulus to Signal



A Sliver of Reality



The Anatomy of the Camera



Dynamic Focus: Accommodation



Near Focus



Far Focus

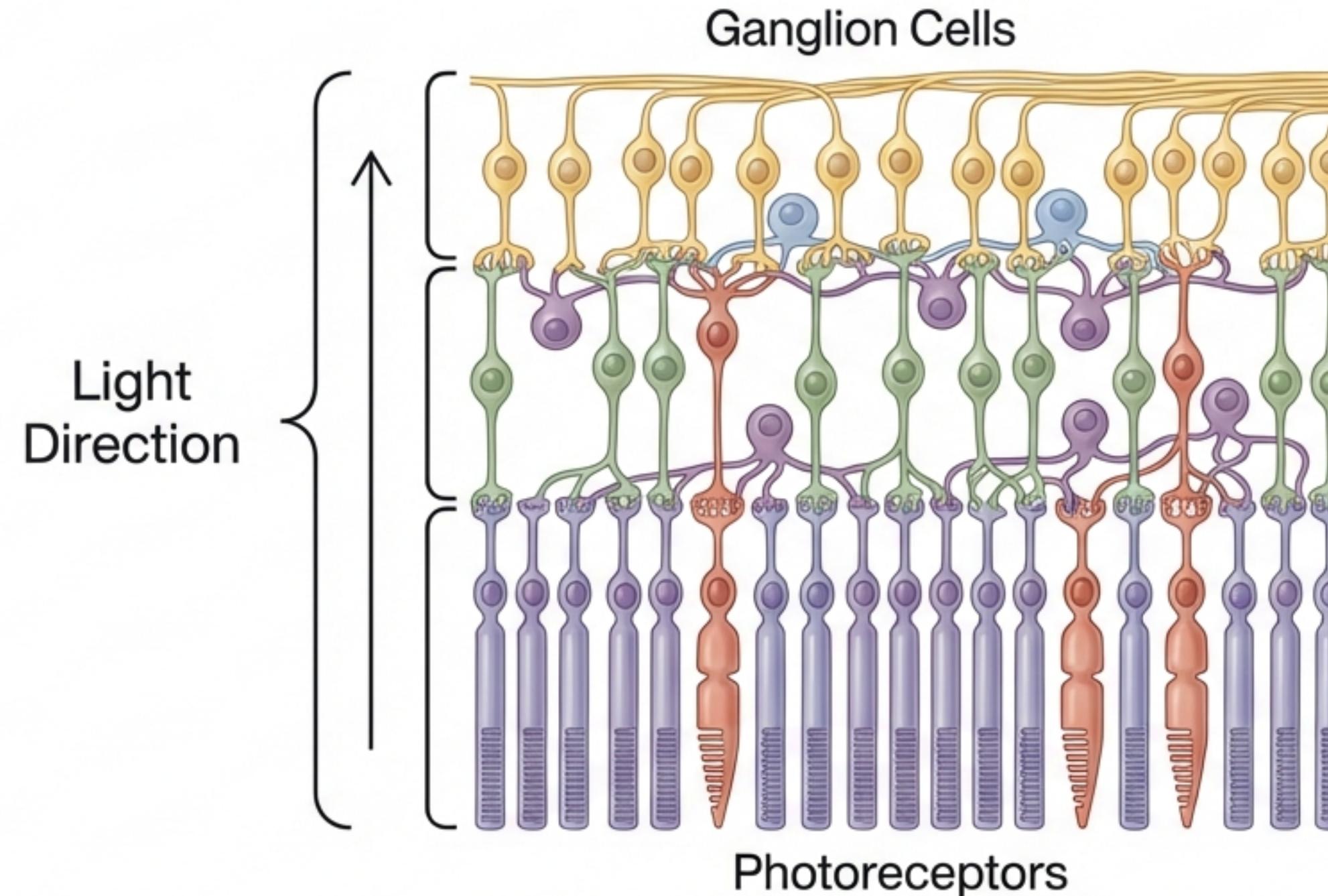


Reference

The ciliary muscles tighten to thicken the lens, shifting the focal point.

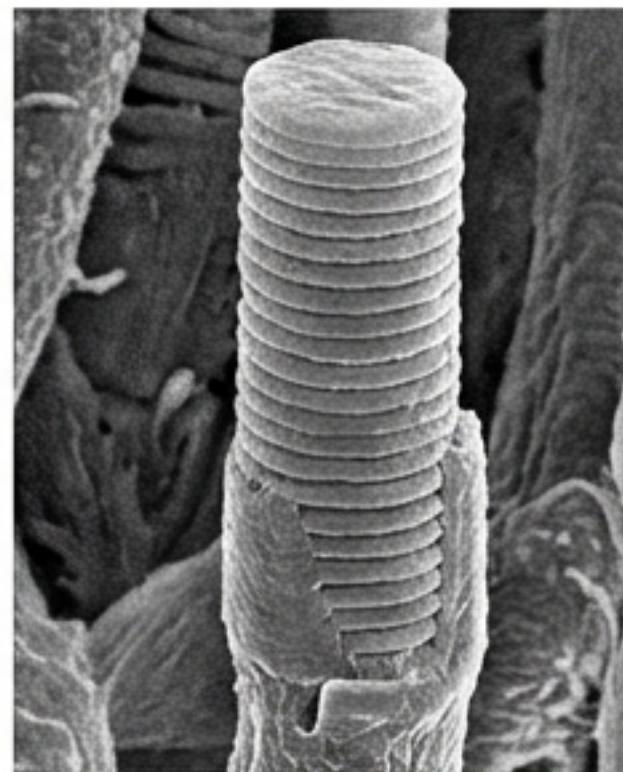
The Retina

A network of neurons, not just a film.



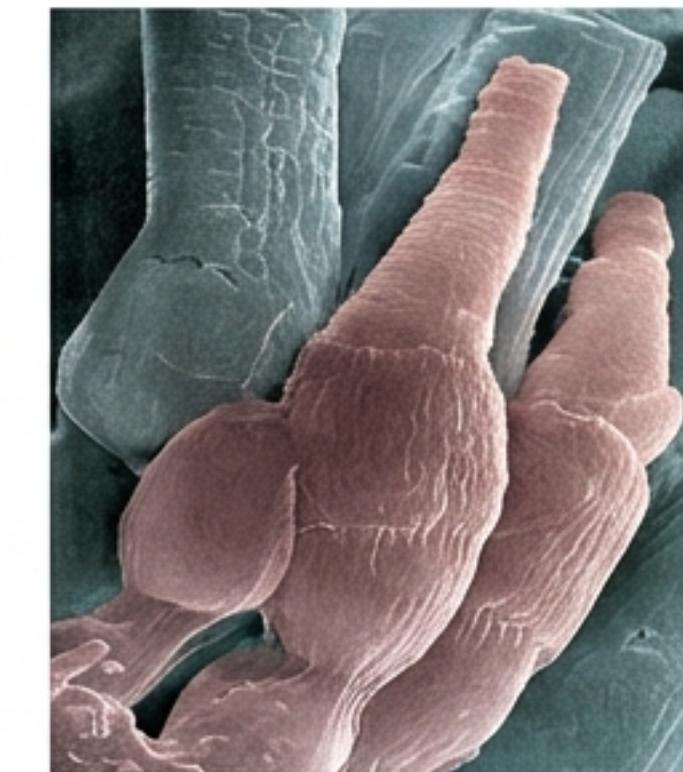
The Hardware: Rods vs. Cones

RODS (120 Million)



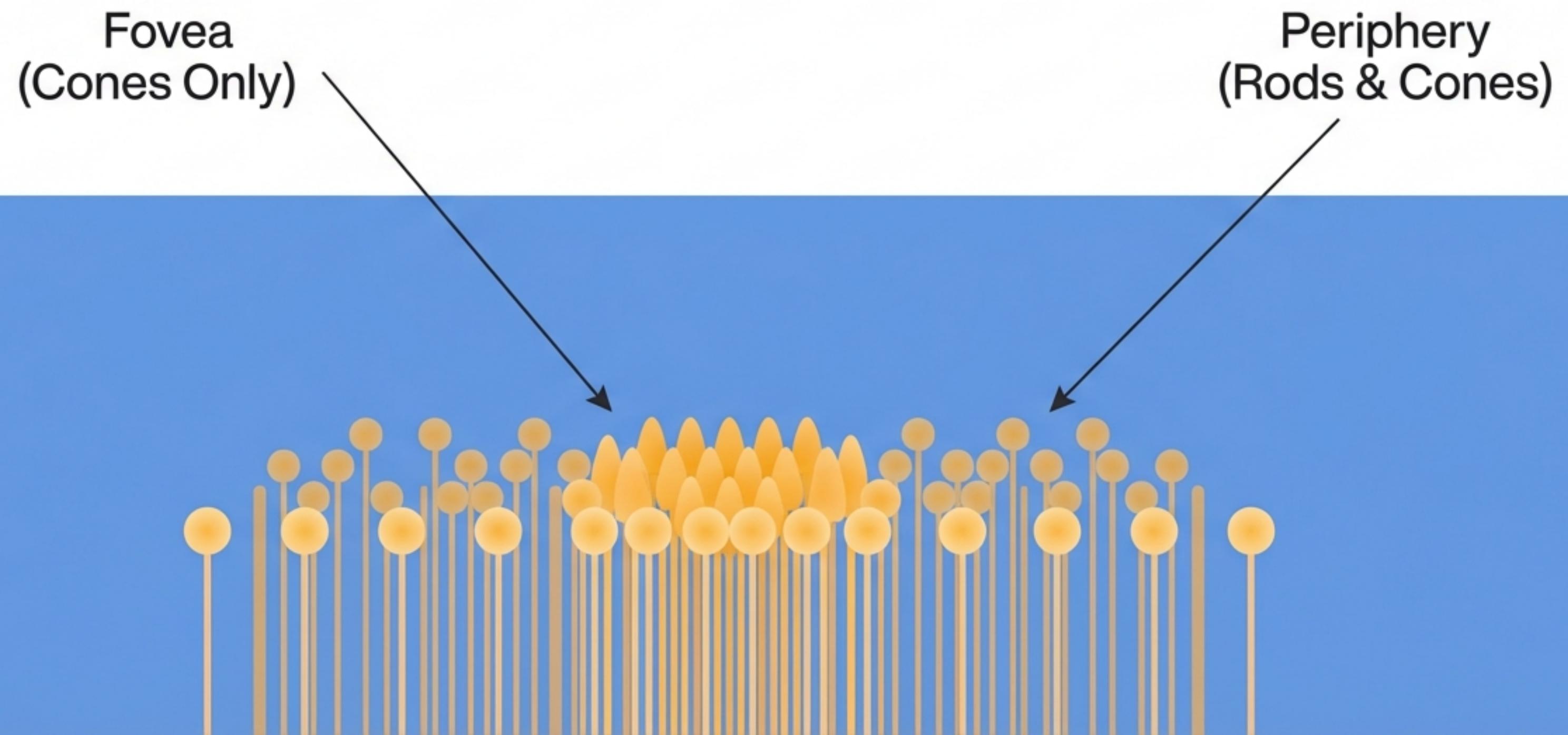
Night Vision
Low Resolution
Achromatic

CONES (6 Million)

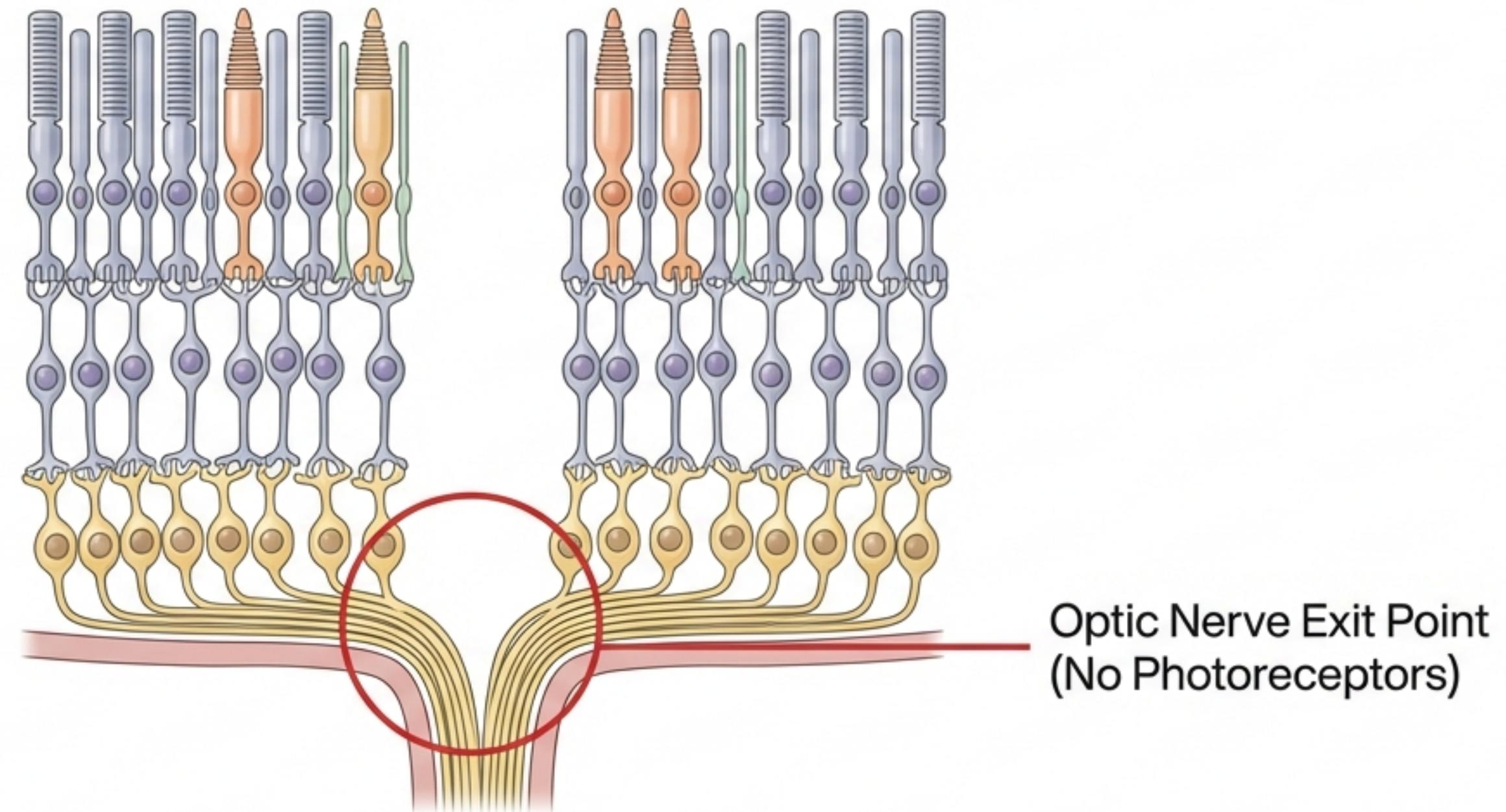


Day Vision
High Resolution
Color

The Fovea & The Periphery



The Blind Spot



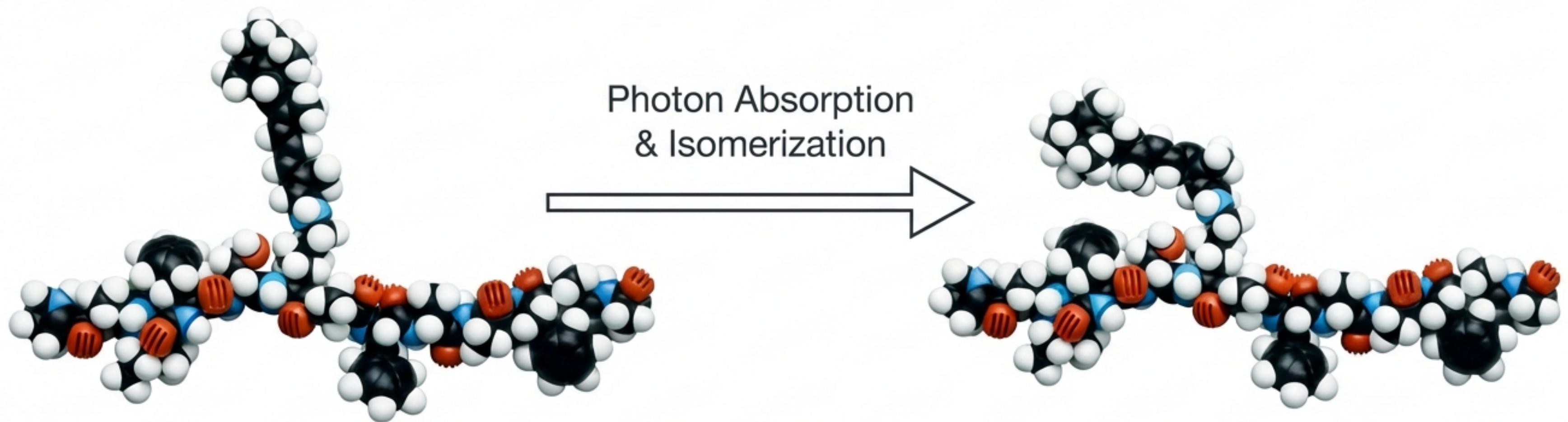
A Glitch in the Matrix

Interactive Experiment

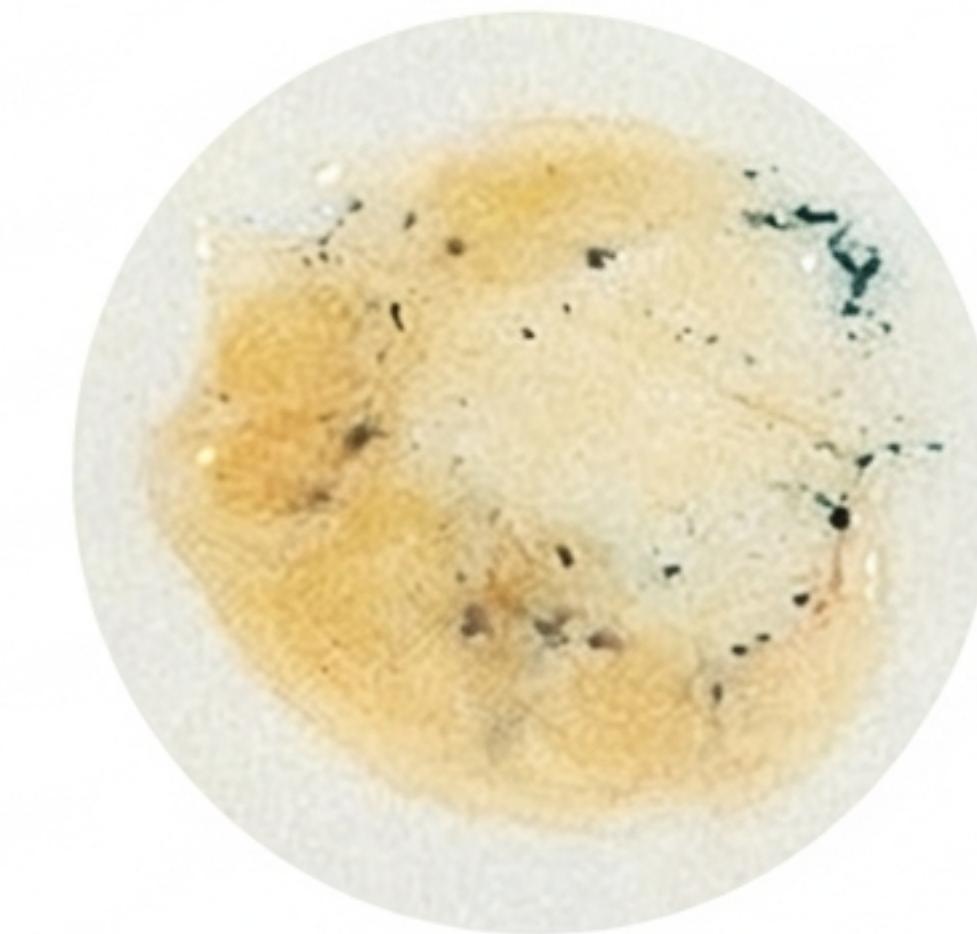
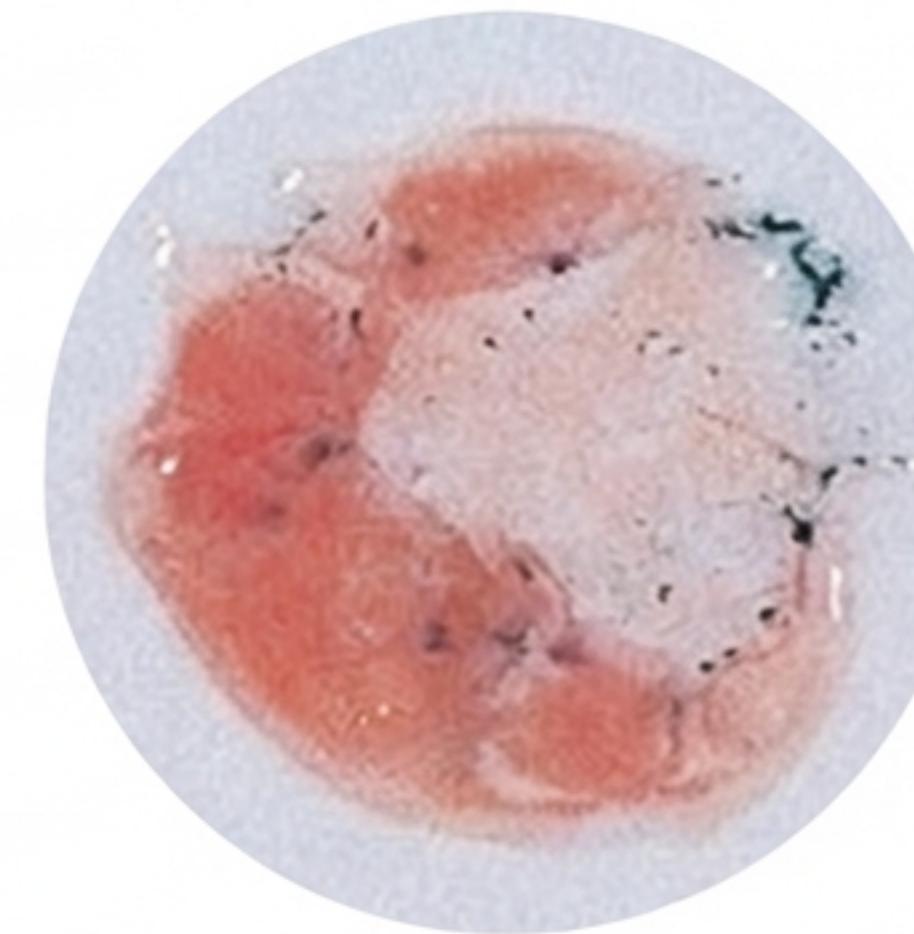
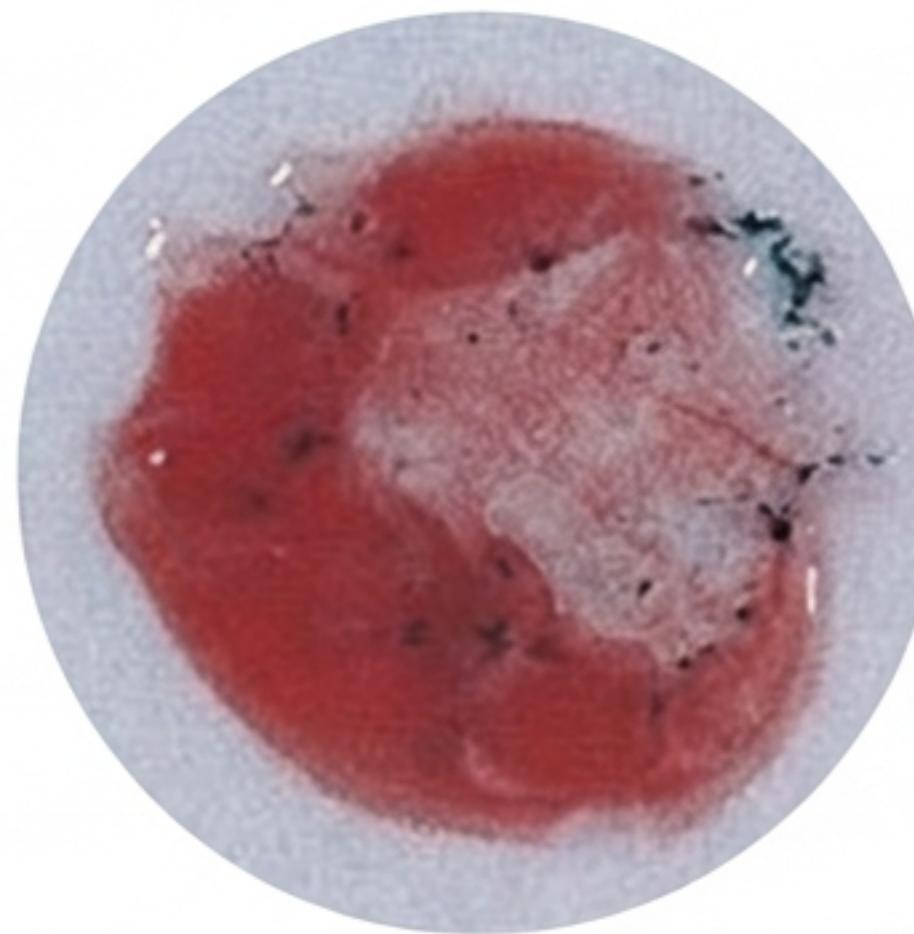


Close your **RIGHT** eye. Focus on the Cross. Move your head slowly toward the screen. The Circle will vanish.

Transduction: The Spark

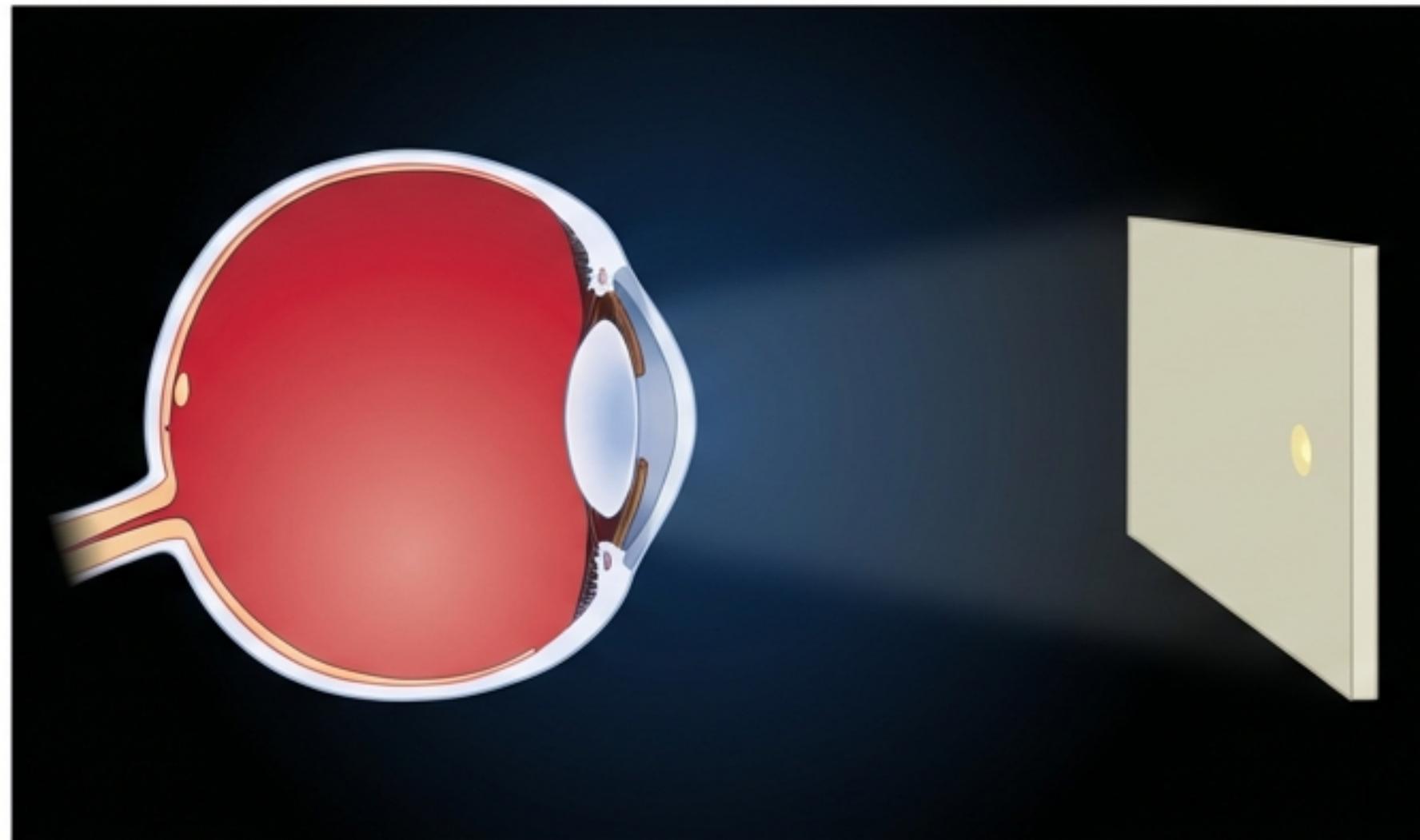


Visual Pigment Bleaching



Time in Light

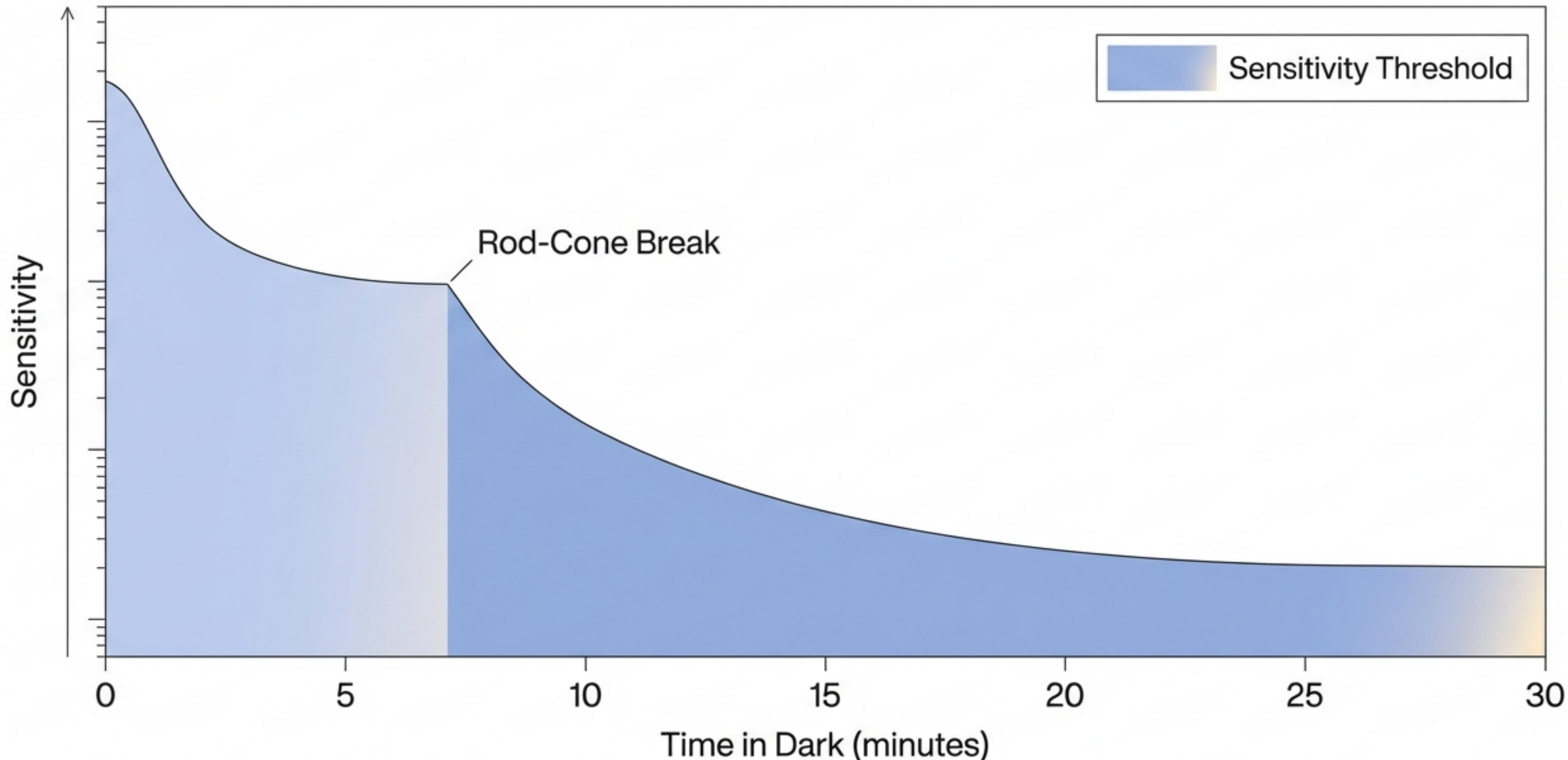
Adapting to the Dark



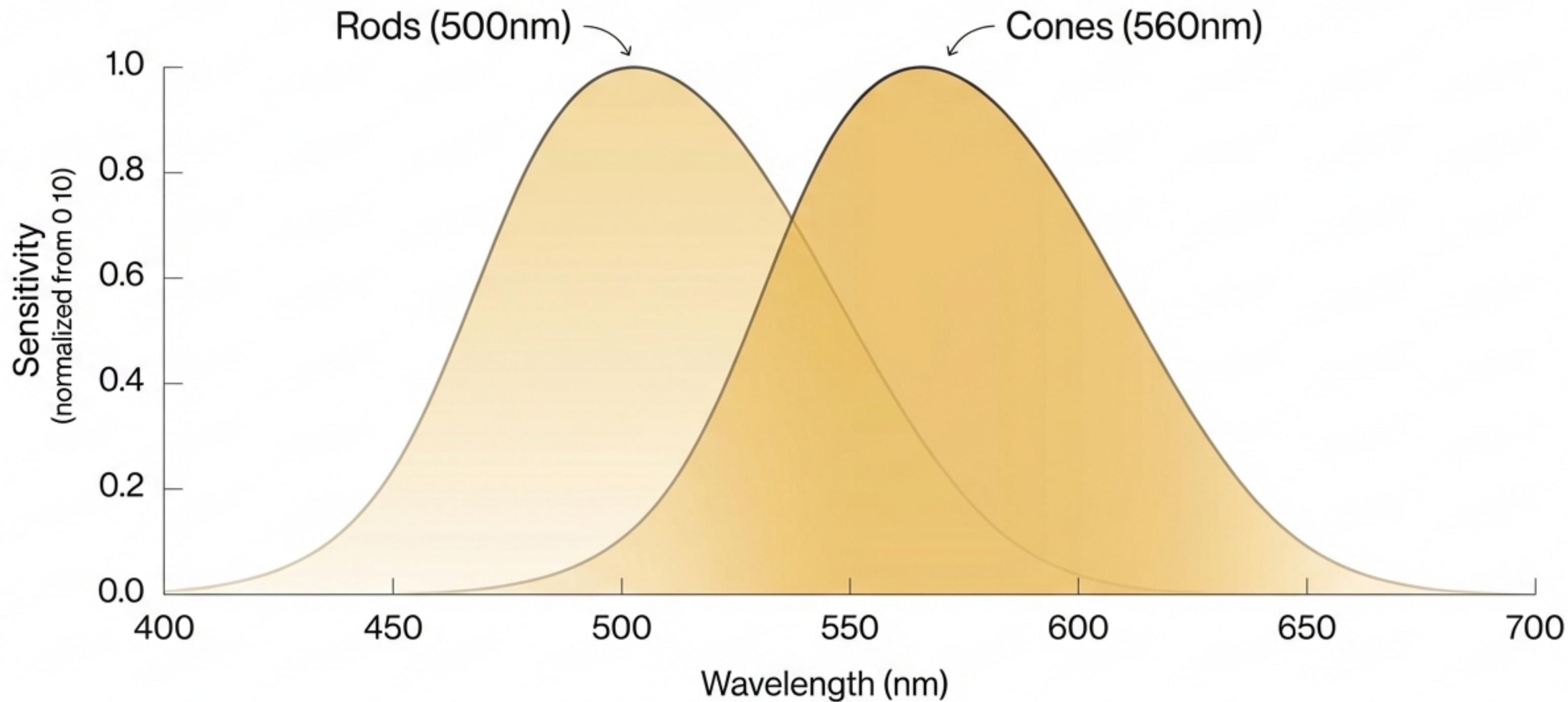
Visual Pigment Regeneration

The chemical “reset” required
to see in low light.

The Dark Adaptation Curve



Spectral Sensitivity

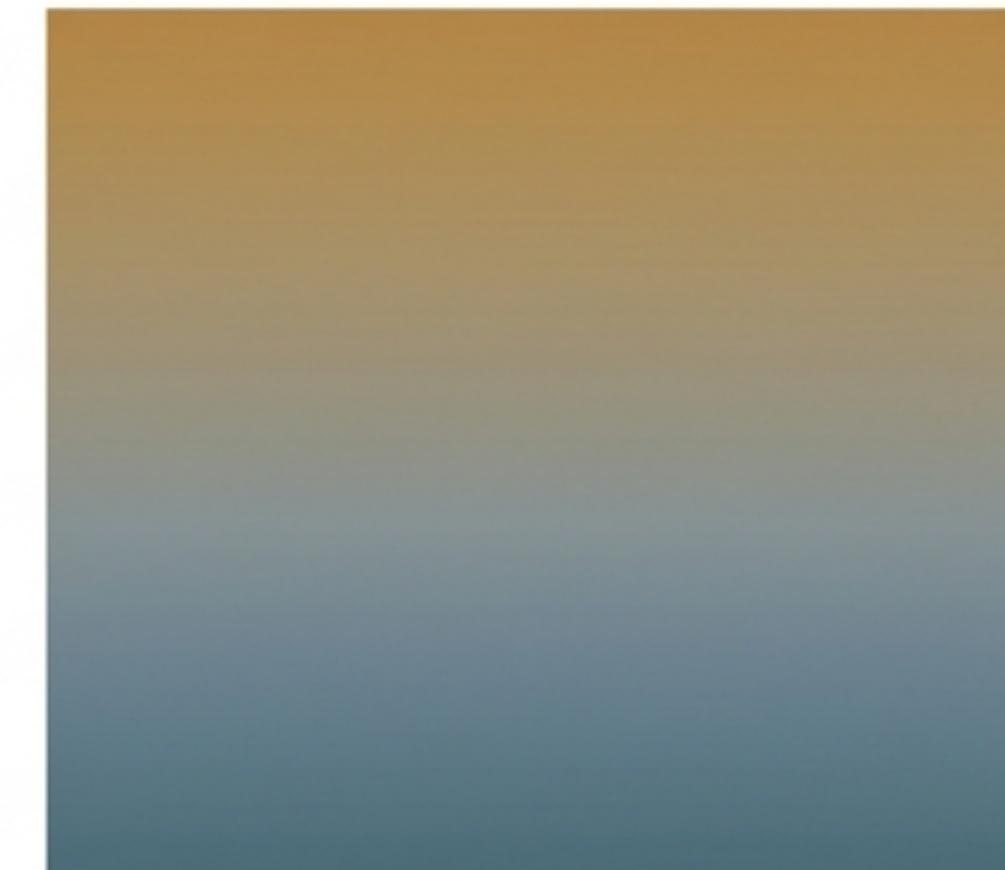


The Purkinje Shift

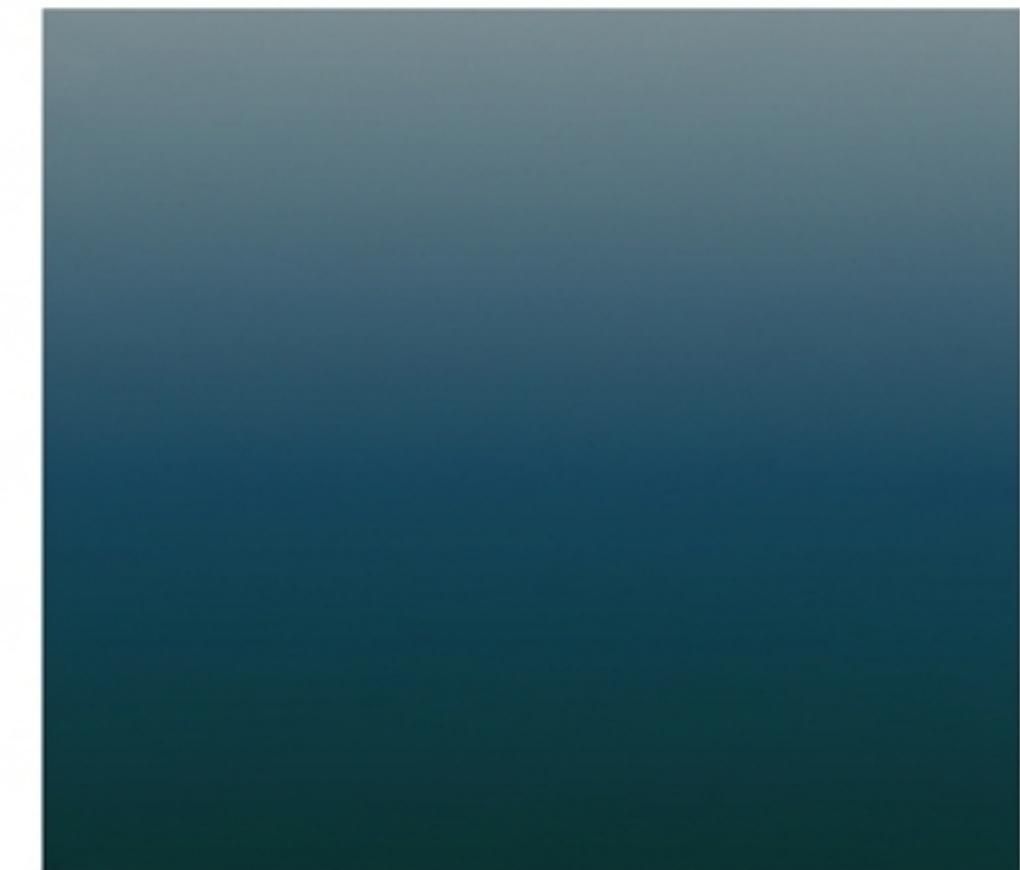
Daylight (Cone Dominance)



Dusk (Shift)



Night (Rod Dominance)

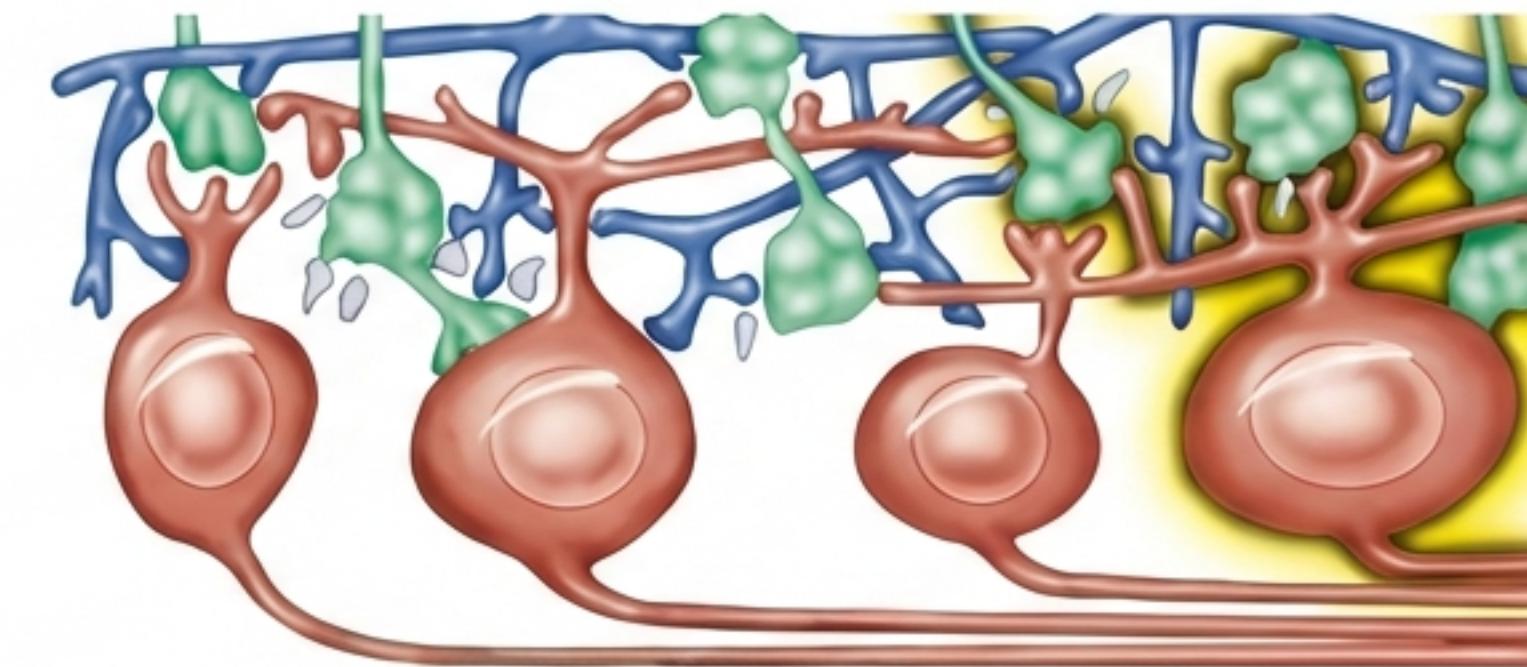


As light dims, sensitivity shifts from yellow-red (cones) to blue-green (rods).

The Neural Circuit



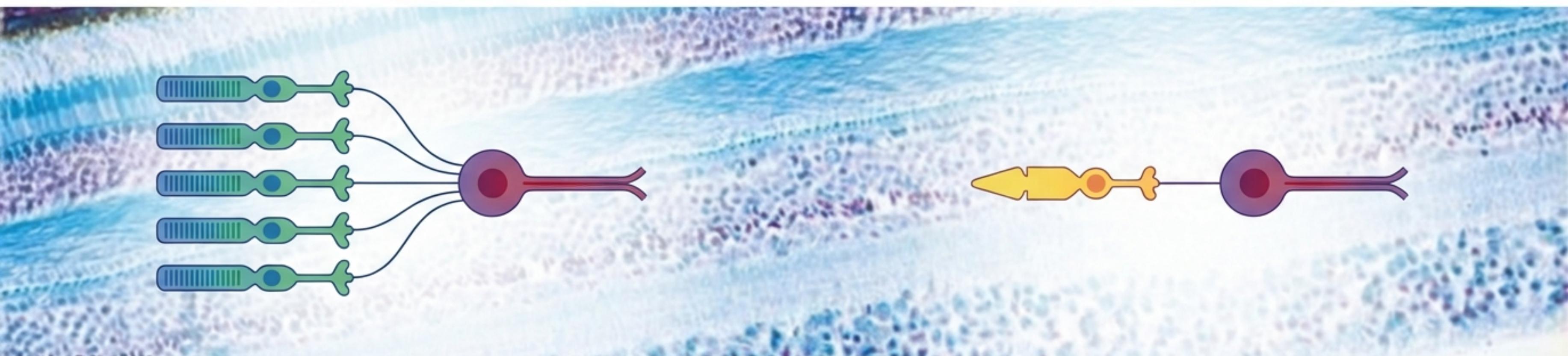
Vertical Pathway



Lateral Processing

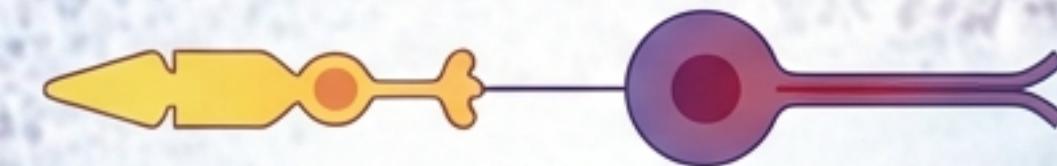
Convergence: Sensitivity vs. Detail

High Convergence (Rods)



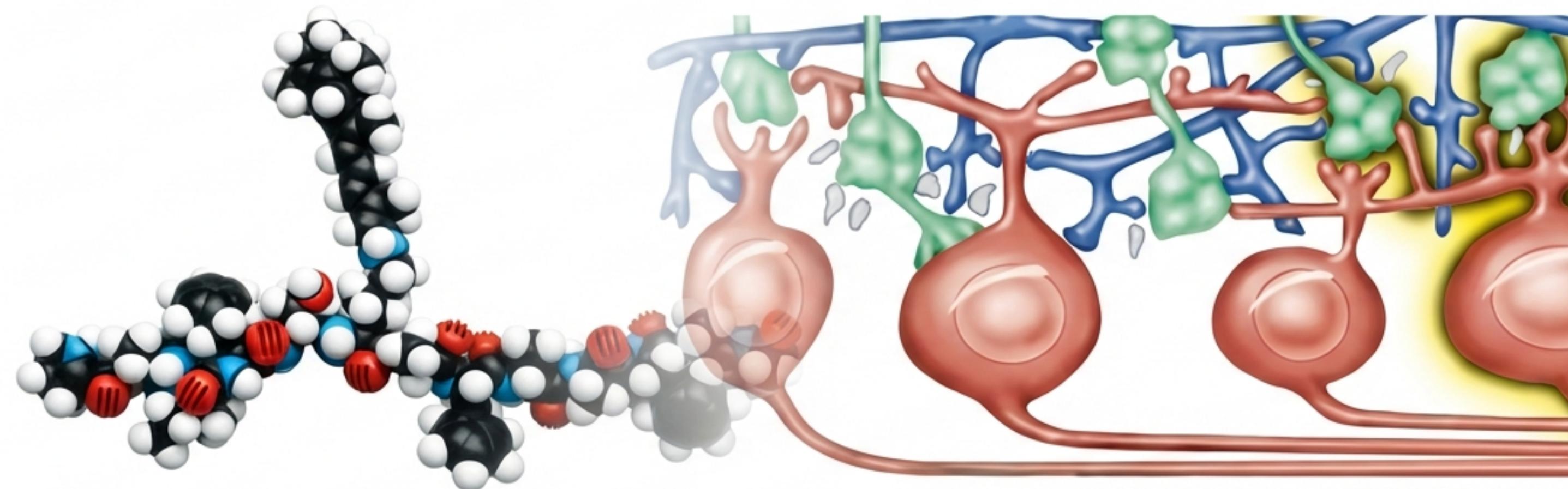
High Sensitivity

No Convergence (Cones)



High Detail

The Transmutation of Light



- 1. Focus**
- 2. Transduction**
- 3. Adaptation**
- 4. Processing**

Our experience of reality is determined by the machinery of the eye.