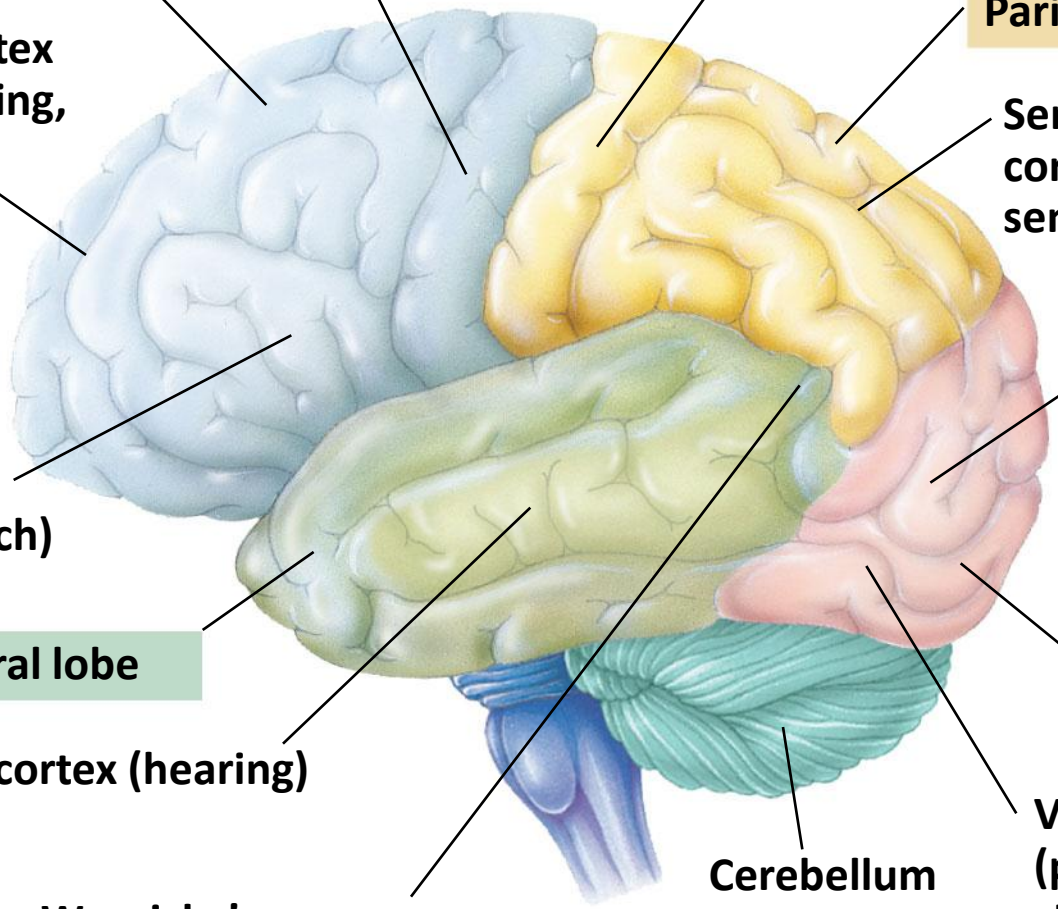
Nervous System: Part VI

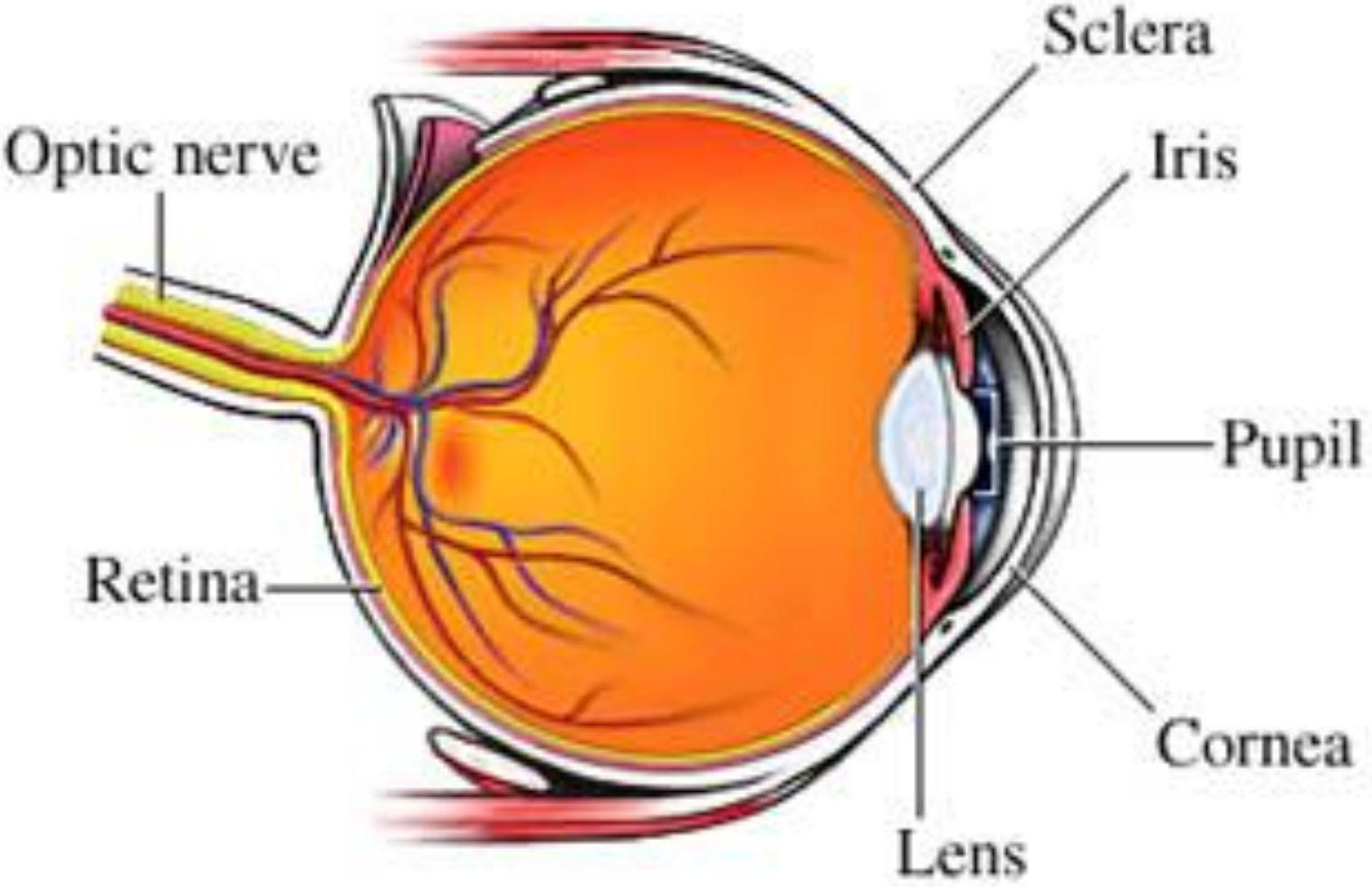
Specialized Receptors: Eyes and Ears

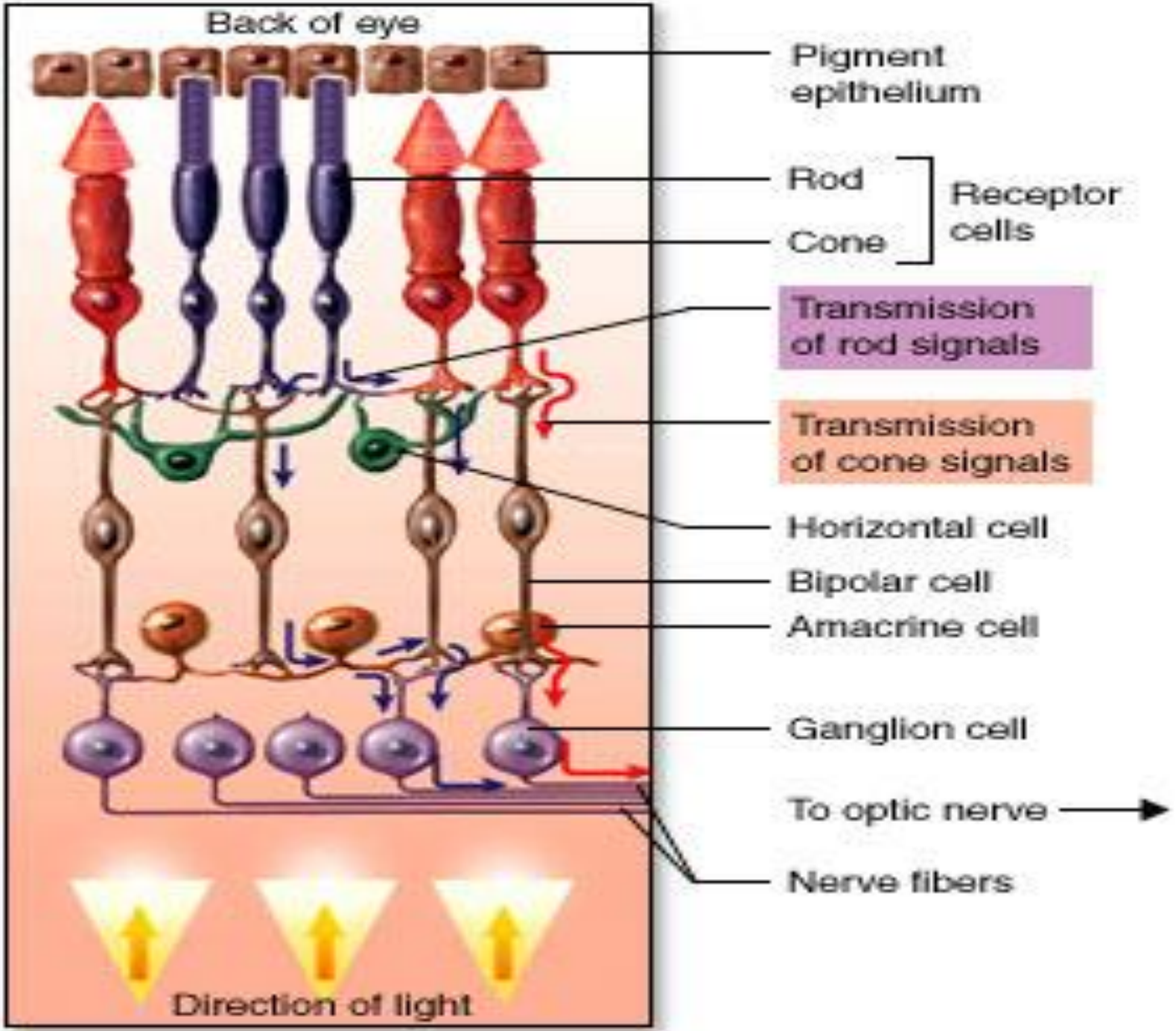
NATIONAL MATH + SCIENCE INITIATIVE

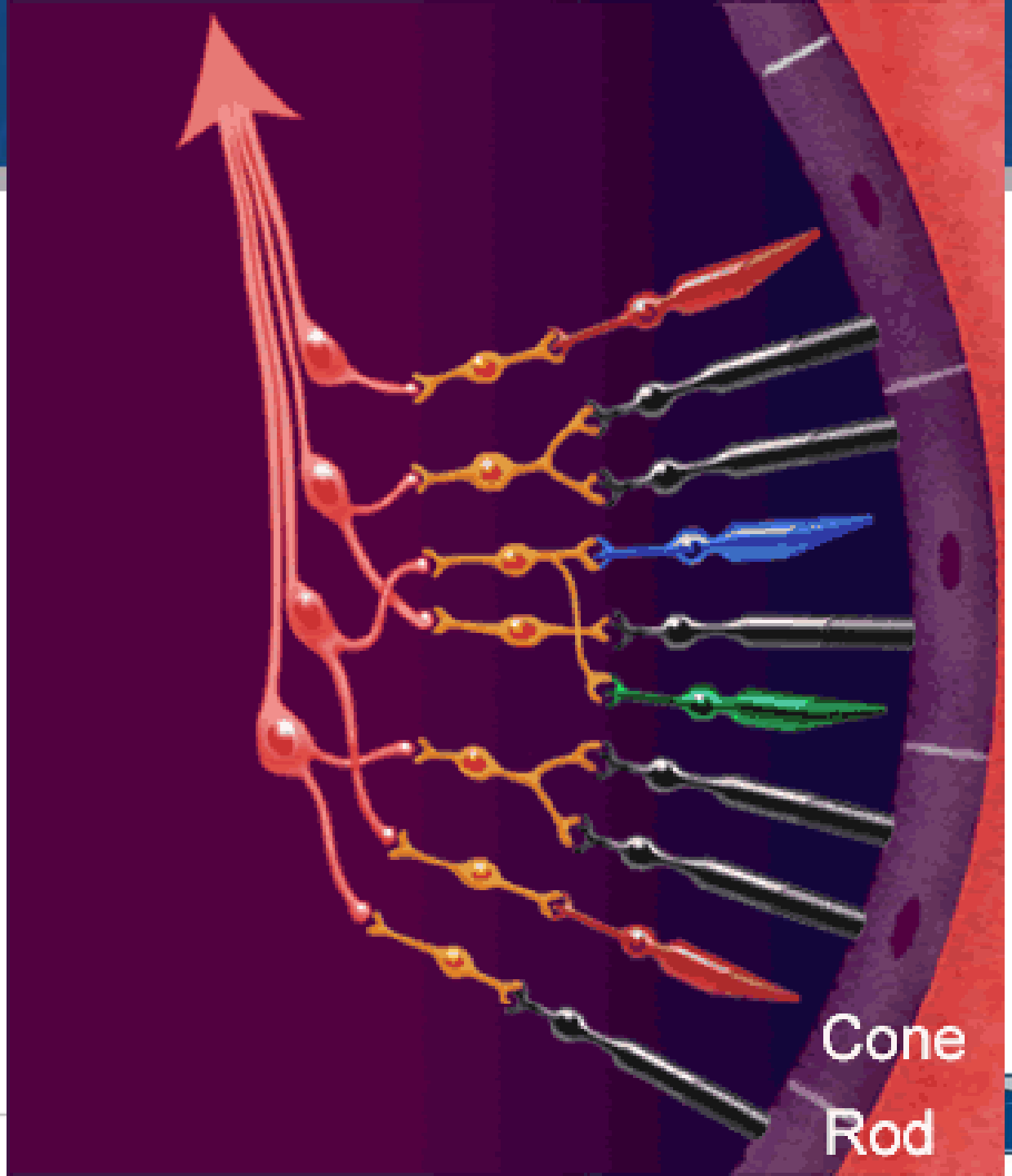


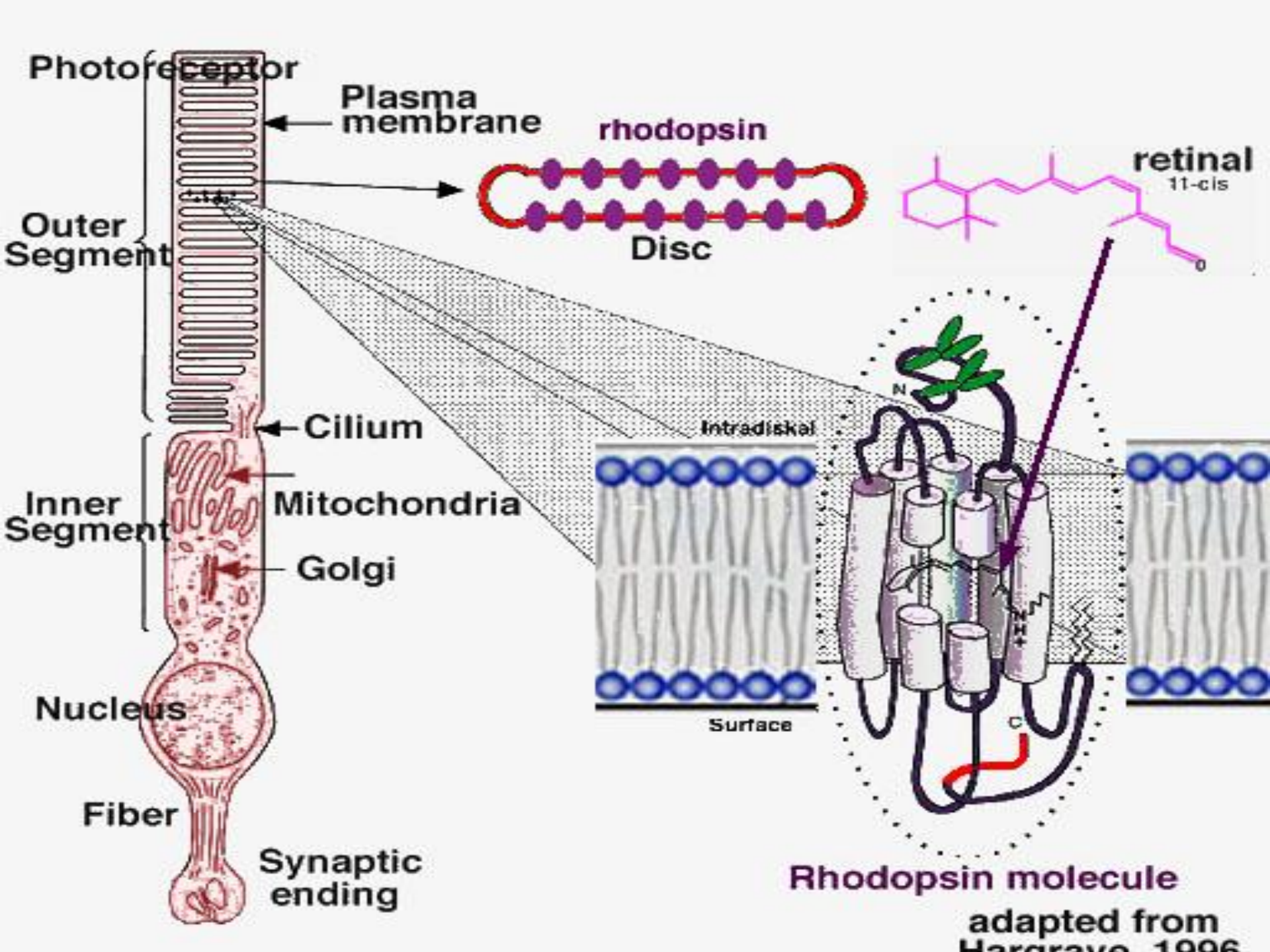
The Human Eye

The two chambered organ which takes in light waves, translates them into signals, and sends these signals to the brain.

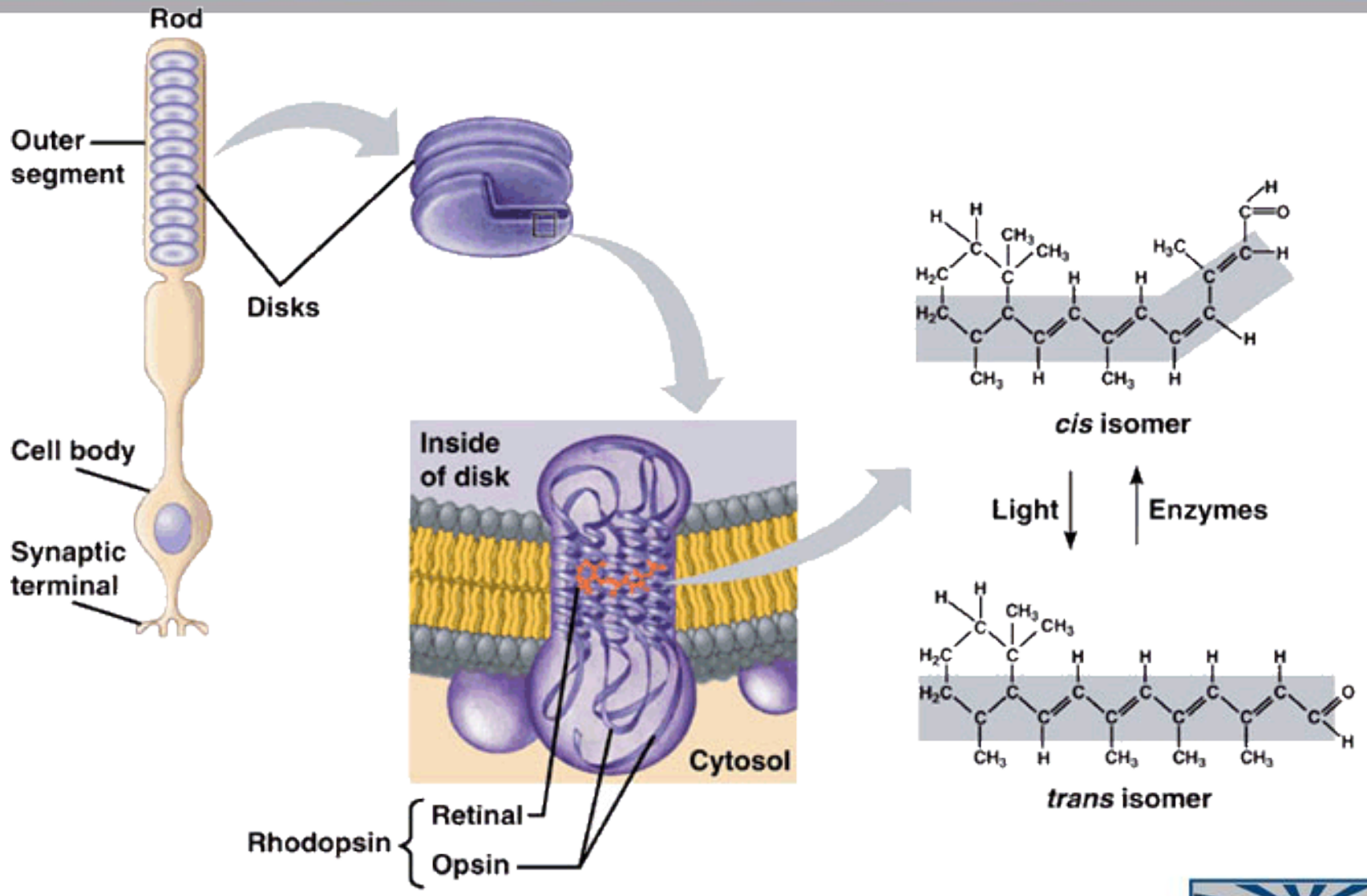



Back of eye
Pigment epithelium
Rod
Cone
Receptor cells
Transmission of rod signals
Transmission of cone signals
Horizontal cell
Bipolar cell
Amacrine cell
Ganglion cell
To optic nerve
Nerve fibers
Direction of light


Cone
Rod


Photoreceptor
Plasma membrane
rhodopsin
retinal
11-cis
Outer Segment
Disc
Cilium
Inner Segment
Mitochondria
Golgi
Nucleus
Fiber
Synaptic ending
Intradiskal
Surface
N
NH+
C
Rhodopsin molecule
adapted from Hargrave, 1996

Retinal


Rod
Outer segment
Disks
Cell body
Synaptic terminal
Inside of disk
Cytosol
Rhodopsin
Retinal
Opsin
(a)
cis isomer
Light
Enzymes
trans isomer
(b)

Sound Transduction in the Human Ear

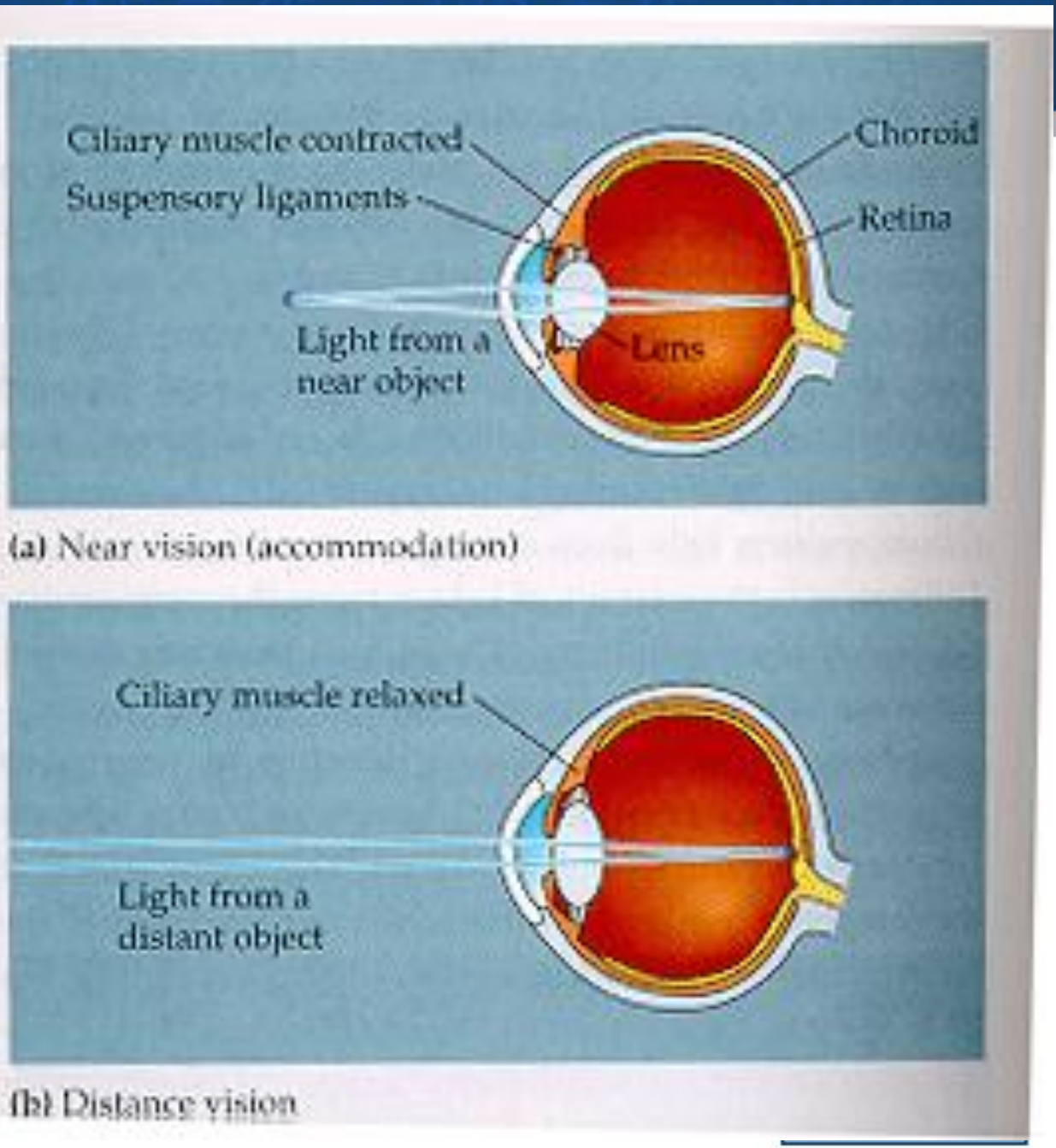
Photosensitivity

Why do you have a Blind Spot?

The Lens

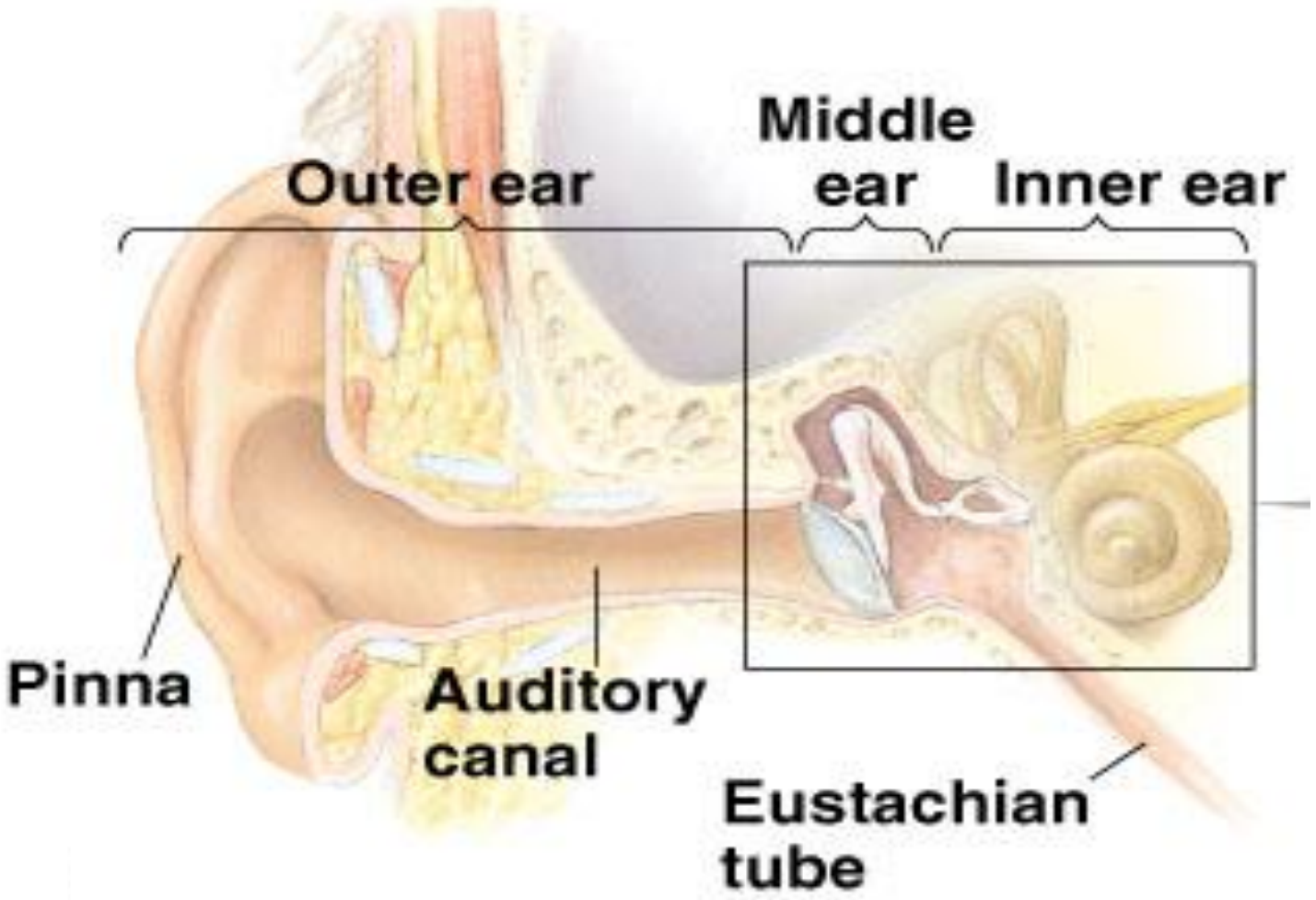
Near Vision
-spherical lens

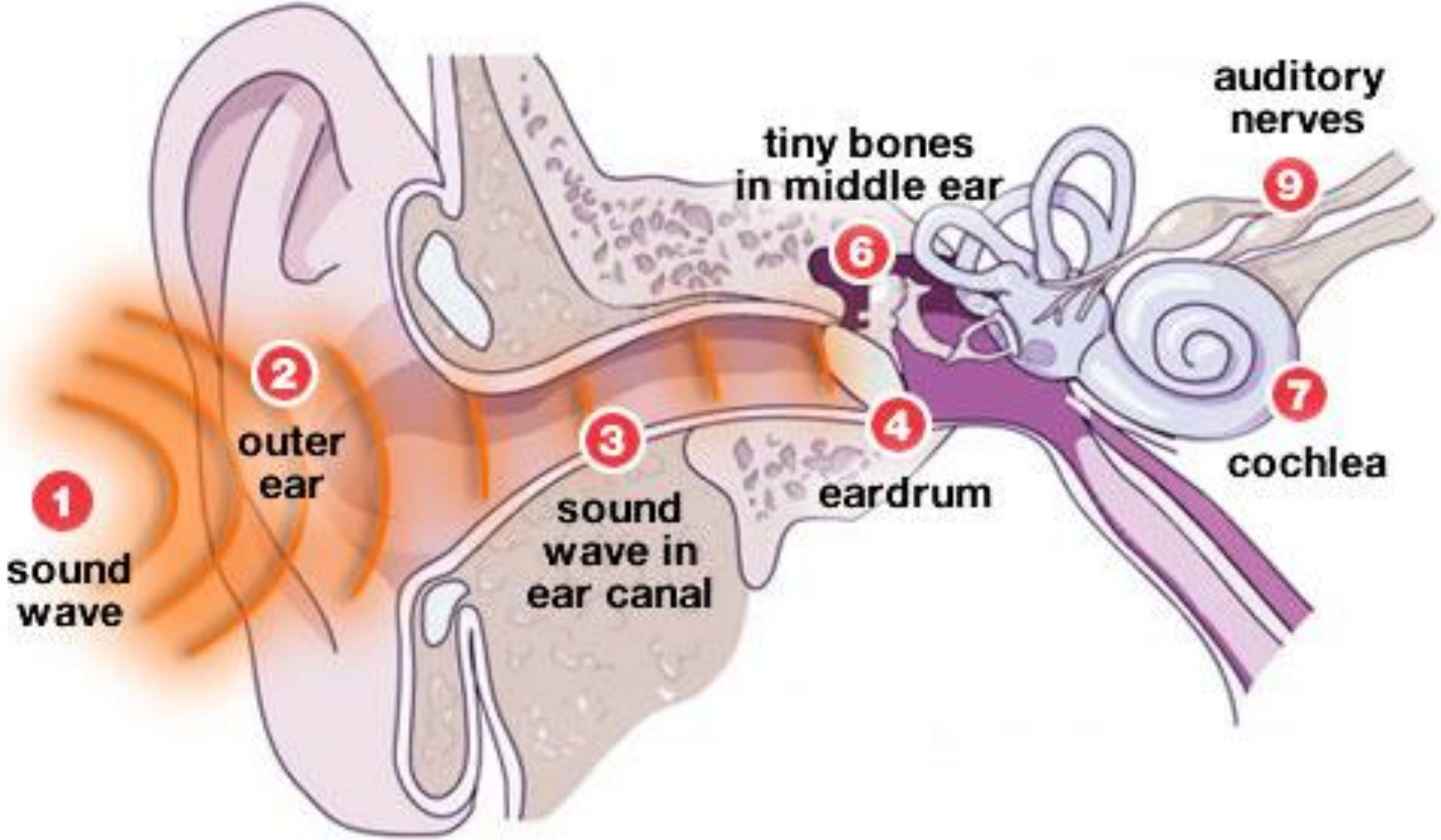
Distance Vision
-flattened lens



The Human Ear

The three part organ which takes in sound waves, translates them into signals, and sends these signals to the brain.


Middle
Outer ear
ear
Inner ear
Pinna
Auditory
canal
Eustachian
tube


auditory nerves
tiny bones in middle ear
9
6
2
outer ear
7
3
4
cochlea
1
sound wave
sound wave in ear canal
eardrum

Sound Transduction in the Human Ear

Sound Transduction
in the Human Ear

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