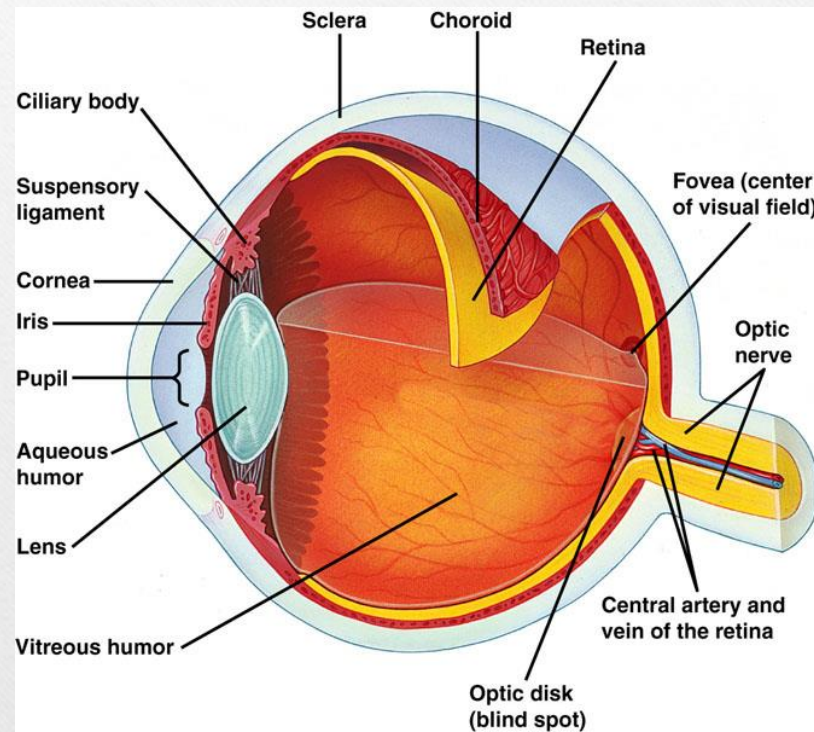


The Eye & The Action (Receptor) Potential

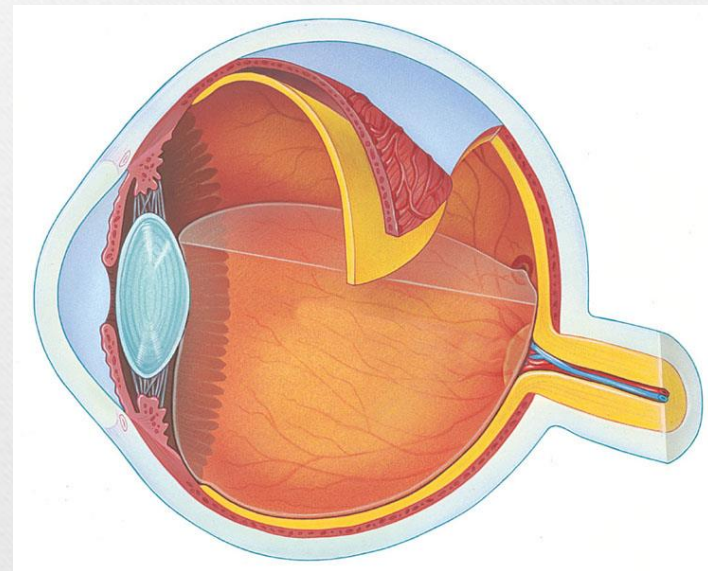
Packet #18

Structure of the Eye



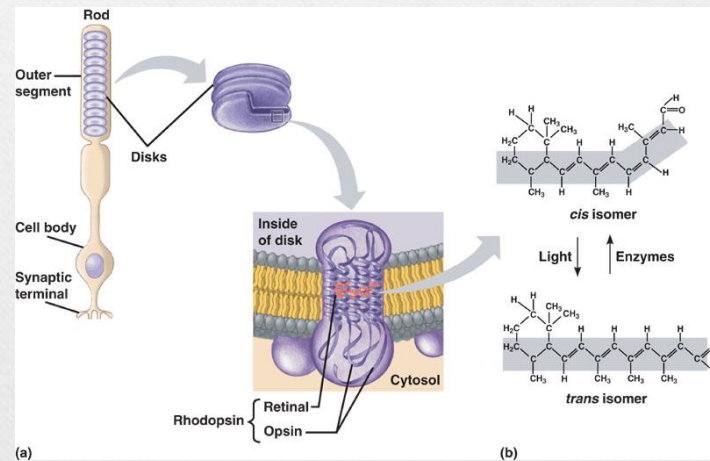
The Retina

- Contains two types of photoreceptors
 - Rods
 - Black and white vision
 - Cones
 - Color vision
- These photoreceptors connect to a series of neurons that ultimately lead to the optic nerve which ultimately leads to the brain.



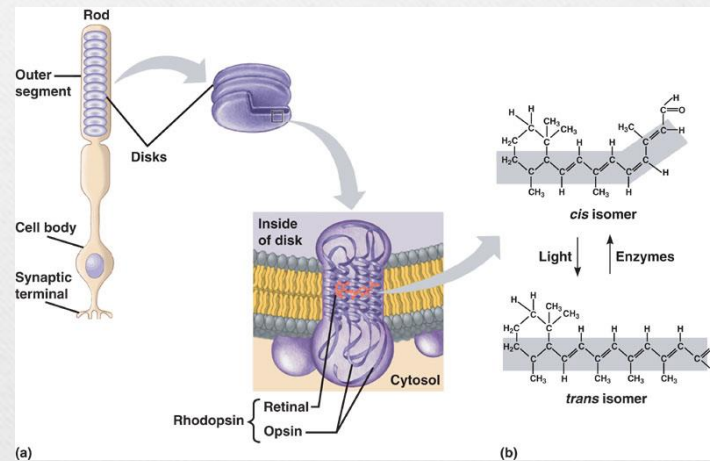
The Structure of the Rod

- Contains disks that has the protein called rhodopsin within the disk's membrane.
- Rhodopsin
 - Contains two polypeptide chains called retinal and opsin.



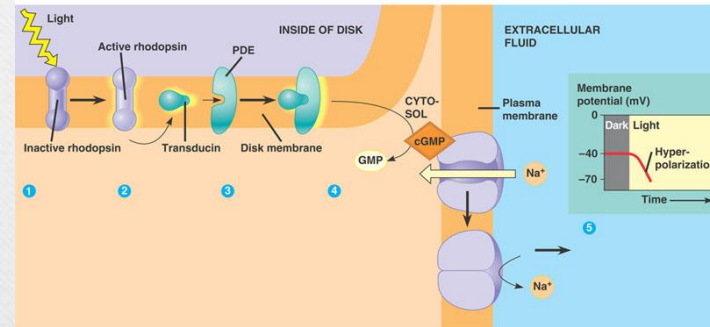
Retinal

- Exists in two forms
 - Cis isomer
 - Exists when there is absence of light
 - Trans isomer
 - Exists when there is a presence of light



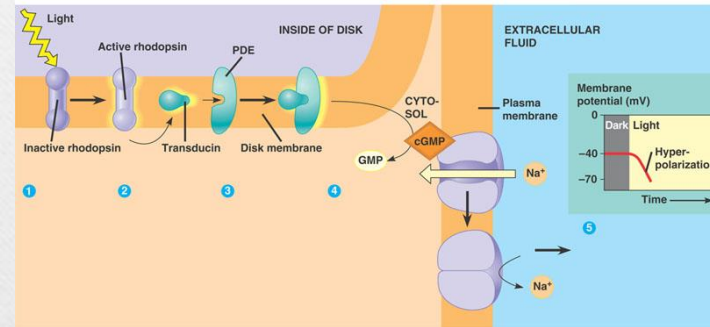
The Production of a Receptor Potential in a Rod Cell

- The presence of light isomerizes retinal—which activates rhodopsin.
 - What type of enzyme would be used to make the change?
 - Retinal changes from the cis form to the trans form.
 - Ultimately causes rhodopsin to become active.



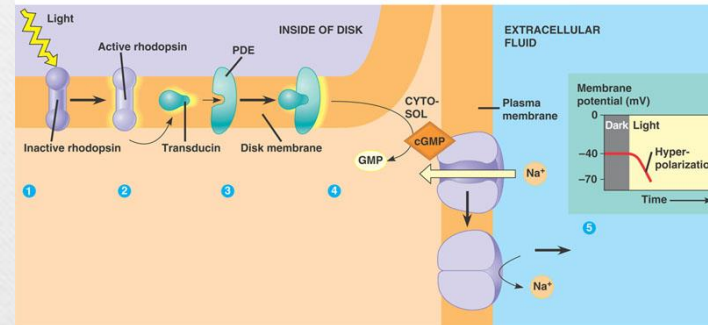
Production of a Receptor Potential II

- Rhodopsin is active



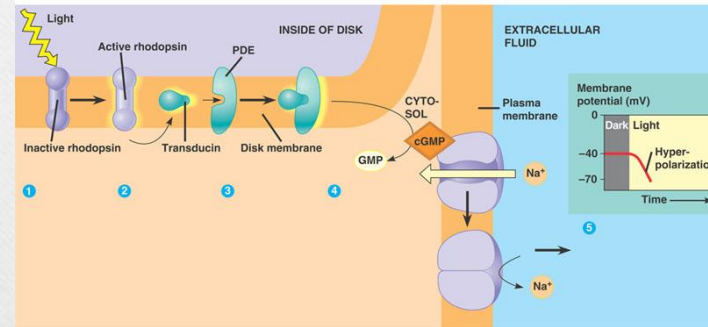
Production of a Receptor Potential III

- Active rhodopsin activates a G protein.
- The G-protein is called transducin.



Production of a Receptor Potential IV

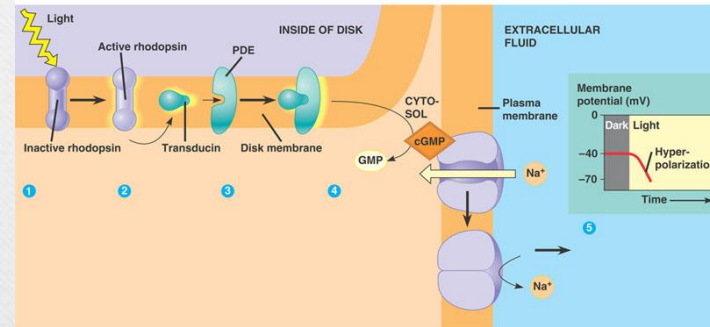
- Transducin activates the enzyme phosphodiesterase (PDE).



Production of a Receptor Potential

V

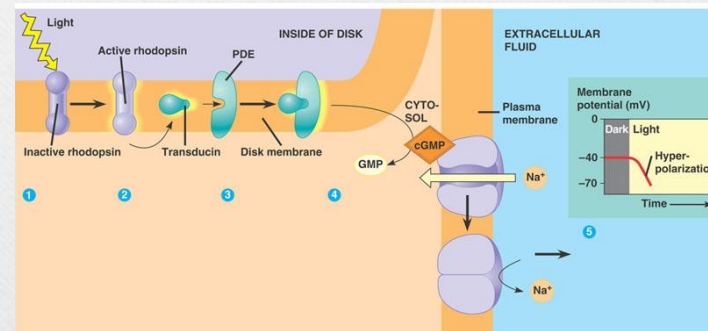
- Activated PDE detaches cyclic guanosine monophosphate (cGMP) from Na^+ channels in the plasma membrane by hydrolyzing cGMP to GMP.



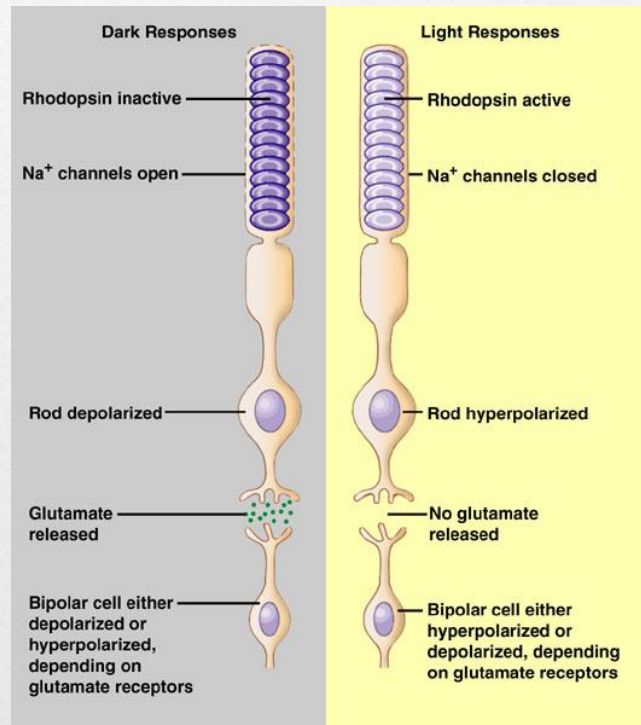
Production of a Receptor Potential

VI

- The sodium channels close when cGMP detaches. The membrane's permeability to Na^+ decreases, and the rod hyperpolarizes.



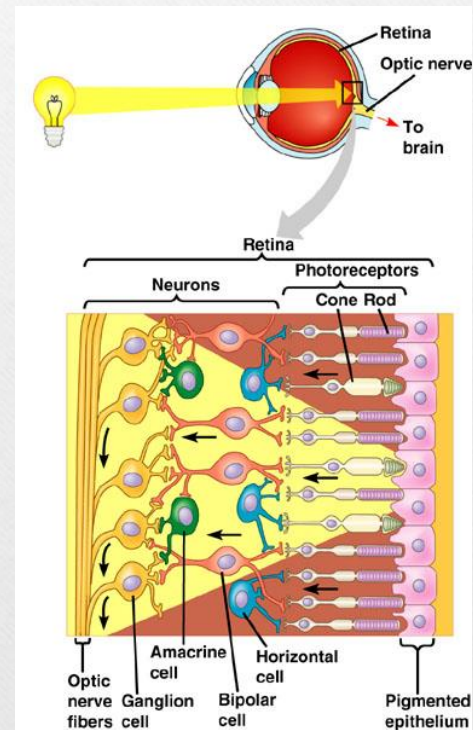
The Big Picture



Production of a Receptor Potential

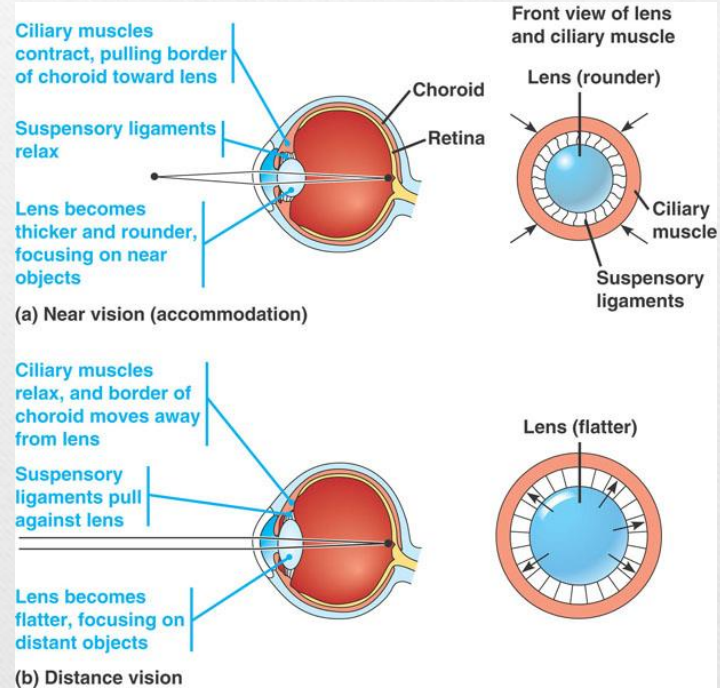
VII

- The action potential moves along a series of nerve cells.
 - Horizontal
 - Bipolar
 - Amacrine
 - Ganglion cell
- The message ultimately reaches the optic nerve fibers which lead to the brain.



Homework

- Know how the eye focuses.
- Know the cause of near and far sightedness.



Review
