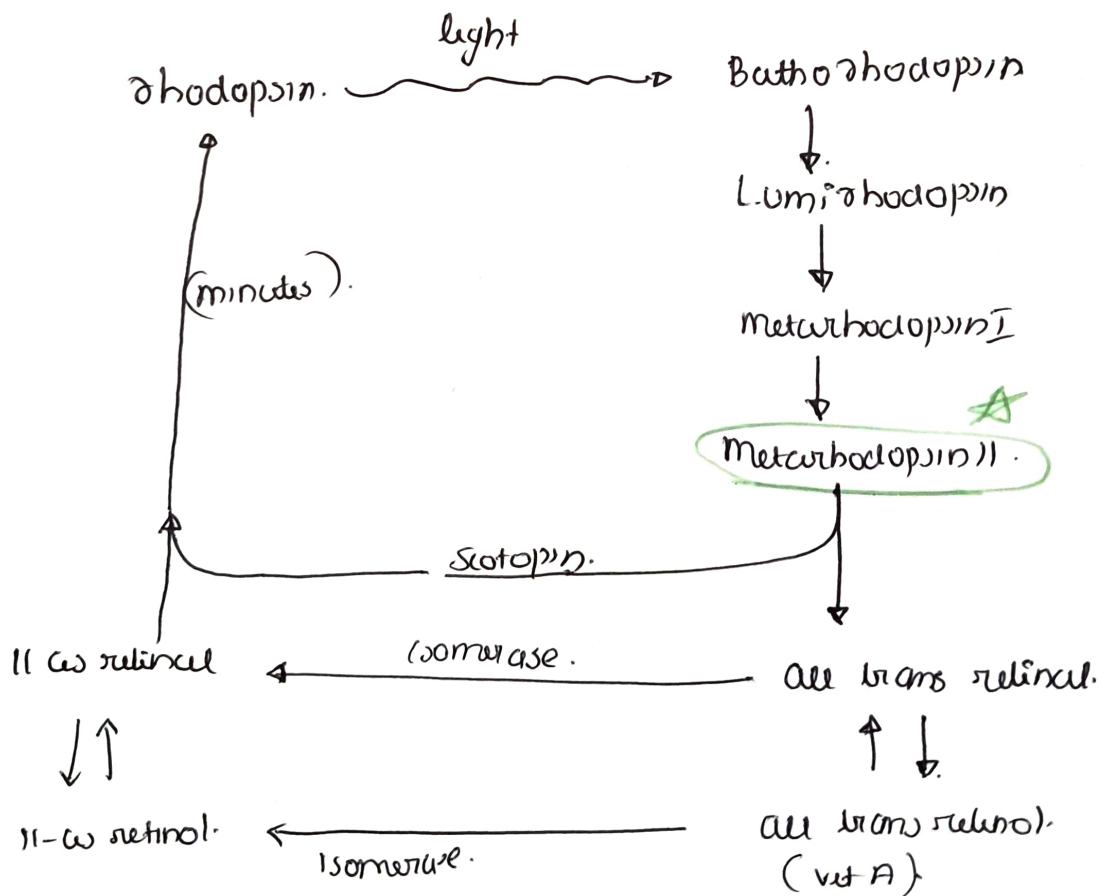


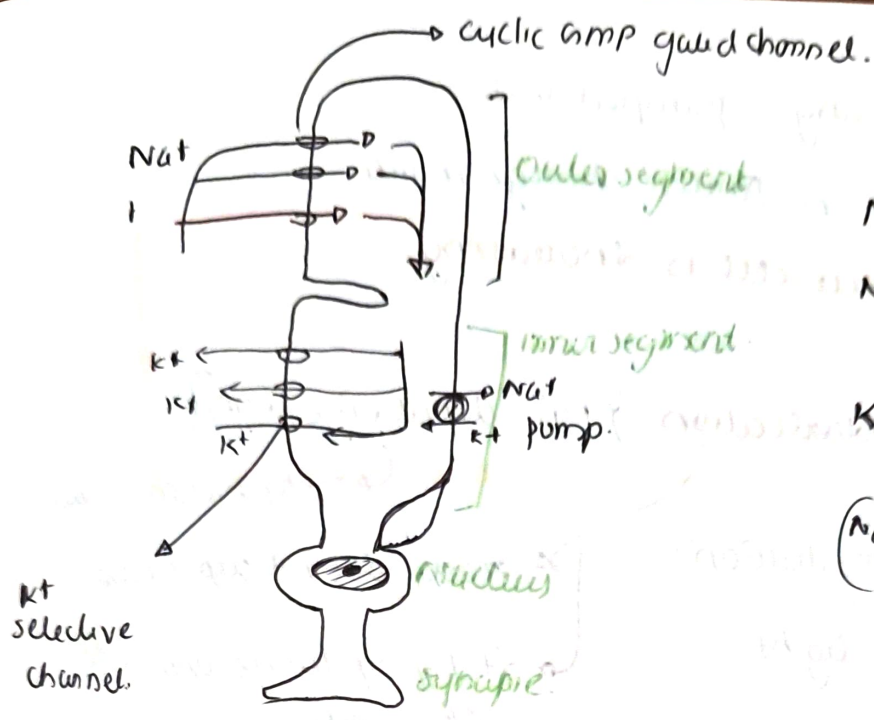
## Visual Cycle.

- rods contain a photosensitive pigment called rhodopsin
- rhodopsin is also called visual purple.
- It is a combination of scotopsin & 11 cis retinal.
- Exposure to light causes conversion of

11 cis retinal  $\rightarrow$  all-trans retinal.

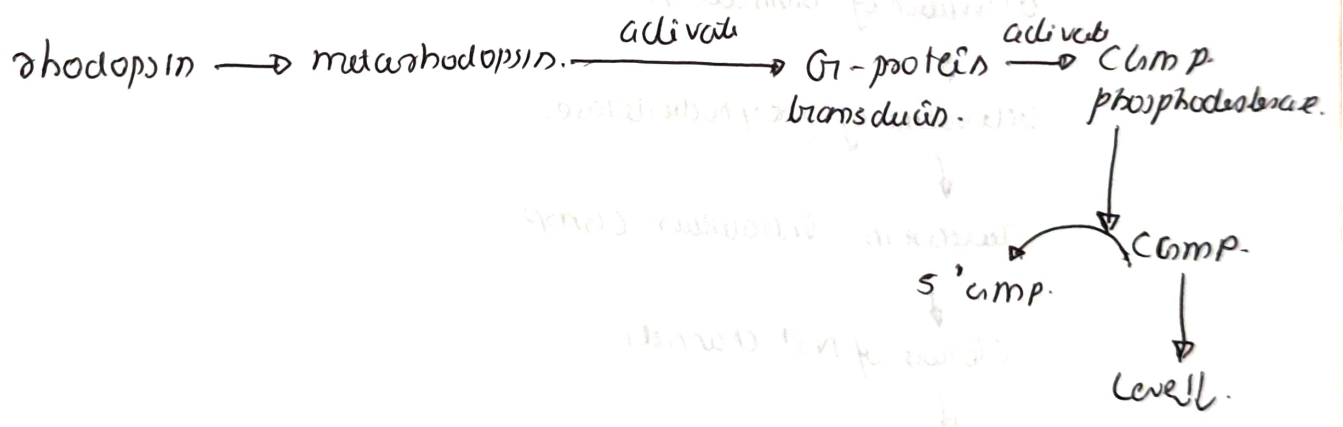
- It has a peak sensitivity to light @ 505 nm.





Normally,  
 $\text{Na}^+$  enters through  
 cyclic GMP gated channels  
 $\text{K}^+$  leaves by  $\text{K}^+$  selective  
 channels.  
 ( $\text{Na}^+-\text{K}^+$  pump is working)  
 opposite

when light falls



cyclic GMP gated  $\text{Na}^+$  channels will close

∴ When light falls,  $\text{Na}^+$  stop entering inside cell.  
 due to closure of cyclic GMP gated  $\text{Na}^+$  channels.

This process is called Signal transduction

•  $\text{Na}^+$  is also being pumped out.

• So net decrease in positive charge inside

∴ -ve ty inside cell is increasing.

hyperpolarization { not depolarization }

↳ -ve ty should reduce.

Photo transduction:

Incident light:

↓  
formation of metarhodopsin II.

↓  
activation of transducin.

↓  
activation of phosphodiesterase.

↓  
decrease in intracellular cAMP.

↓  
closure of  $\text{Na}^+$  channels

↓  
hyperpolarization.

↓  
decreased release of

synaptic neurotransmitter.

↓  
creates a response in bipolar cell.

rods doesn't depolarize

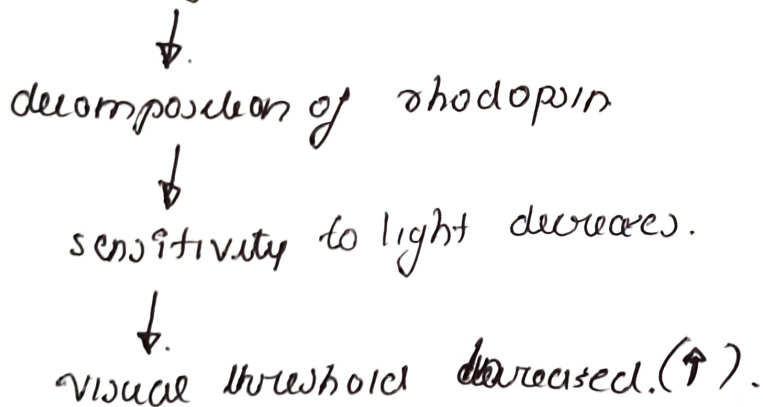
↳ hyperpolarize unlike other cells.

## Light & Dark adaptation

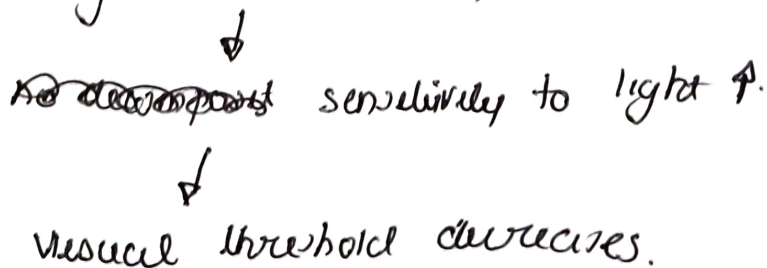
- Dark adaptation and its cause.
- Light adaptation.
- Dark adaptation incl. Cause.
- physiological significance.
- Clinical.

# Dark adaptation is the process by which a person is able to see in dim light after entering from bright surroundings.  
take about 20 minutes.

Cause). In Bright light.

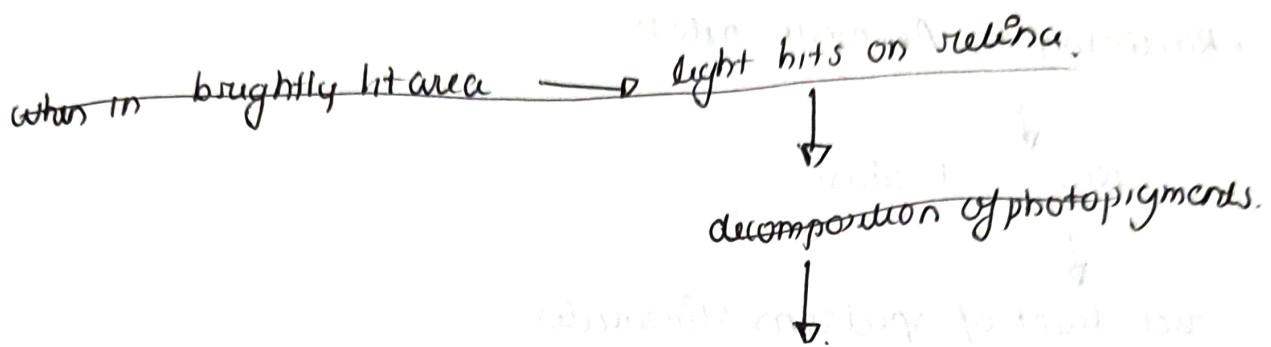


When entering in dark room,



This increase in light sensitivity and decrease in visual threshold is called dark adaptation.

## Dark adaptation Curve.



There are two components.

- ① Fast response: The first rapid drop in visual threshold occurs due to dark adaptation of cones. duration is 4-5 minutes. sensitivity ↑ 100 times.
- ② Slow response: Further gradual drop in visual threshold due to dark adaptation of rods, 20-25 min. x1000-10,000 times, time for dark adaptation depends on time taken for resynthesis of rhodopsin.

### Changes

- pupil dilation
- rhodopsin resynthesis

## Applied

• Radiologists, Aircraft pilots

↓  
wear red glass.

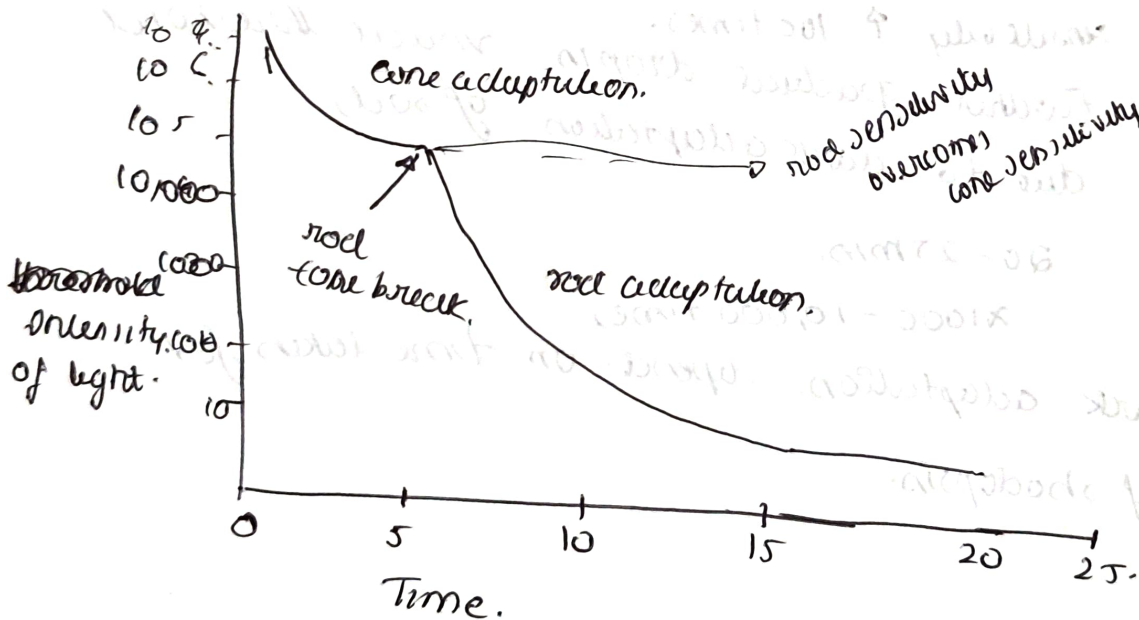
↓  
red light of spectrum stimulates.

sooner slightly & allow cones to function well.

↓.

red goggles see well in brightly lit areas  
as well as dim lighted area.

## Dark adaptation Curve.



On vitamin A deficiency, rhodopsin cannot be resynthesised.

∴ dark adaptation prolonged.

↓  
night blindness.

## Light adaptation

- process by which eyes get adapted to  $\uparrow$  illumination (when entering from dark  $\rightarrow$  bright)

$\downarrow$   
more disappearance of dark adaptation.

$\downarrow$   
max 5 minutes.

Causes  $\rightarrow$  1) reduced sensitivity of cones.

due to rhodopsin breakdown.

2) Constriction of pupil.

reduces qty of light entering eye.