

Sehraia

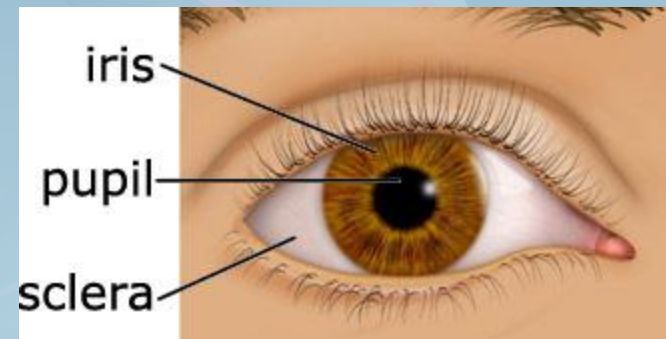


Vision
1-The eye & Refraction
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- Anatomy of the eye:

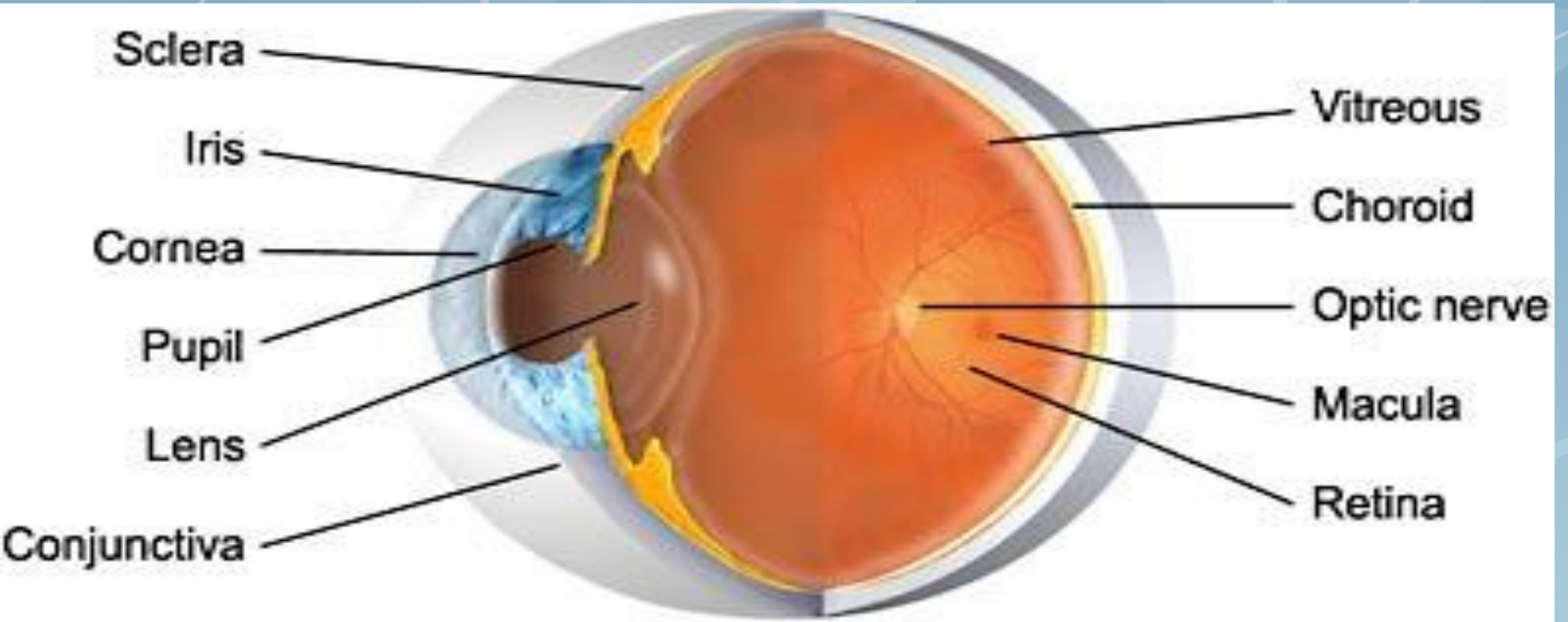
- **1- Sclera** (for protection- spherical appearance)-
- **-choroids** inside sclera (BV to supply retina with blood)
- - post 2/3 of choroid has retina innermost layer



2- cornea (modified ant 1/6 of sclera) to allow light to enter the eyes, transparent , avascular.

--Refractive or dioptric power **40-45 D at its anterior surface.**



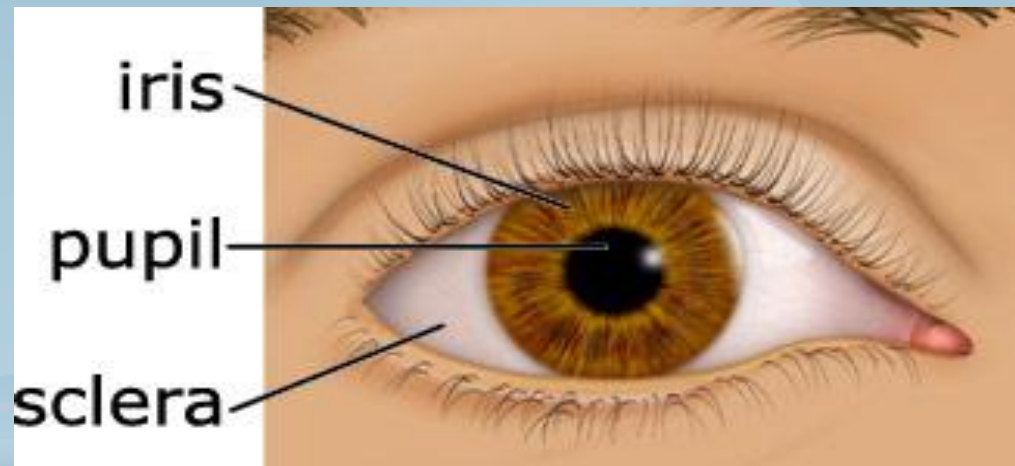


3- conjunctiva

- transparent membrane cover ant surface of eye,reflected on inner surface of eye lids
- Covered with thin film of tears for protection,wetness, cleaning



- **4- pupil** / behind center of cornea, allow light to enter the eye
- **5- Iris** colored part (radial muscle dilates the pupil (by sympathetic) + circular muscles constrict the pupil (by parasympathetic)).



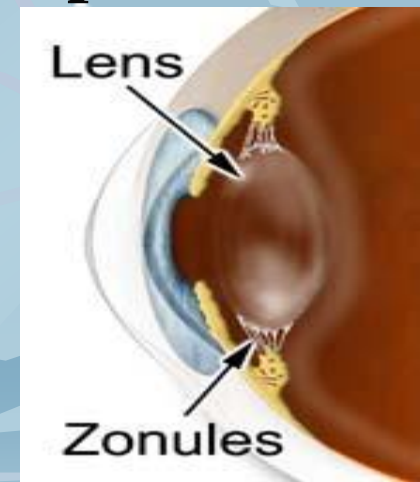
6-ciliary muscles (body)

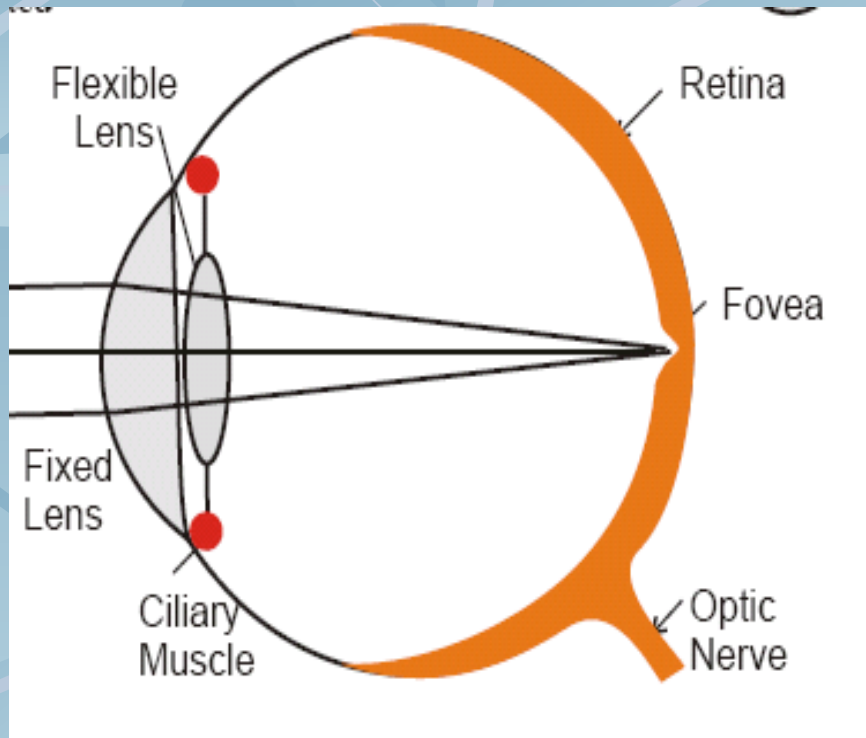
thick ant part of choroid to which attached suspensory ligaments (zonule**)**

7- lens (transparent, biconvex, semisolid, diopteric power 15-20 D, held in place by zonule (lens ligament) attached to ant part of ciliary body (choroid)

Q.what is cataract?

8- Uvea = choroid + iris + ciliary muscles





-Anterior chamber of the eye /

...between iris & cornea.

-posterior chamber of the eye /

....between iris & ciliary muscles

- Iris between both

Refractive media of the eye:-

1-Cornea (greatest refraction of light)

- dioptric power 40-45 D at ant surface
- (2/3 refractive power of eye)

2-Aqueous humour

--(fluid produced by ciliary body ---to post chamber-----to pupil---to ant chamber----to canal of schlemm at angle of ant chamber---to veins

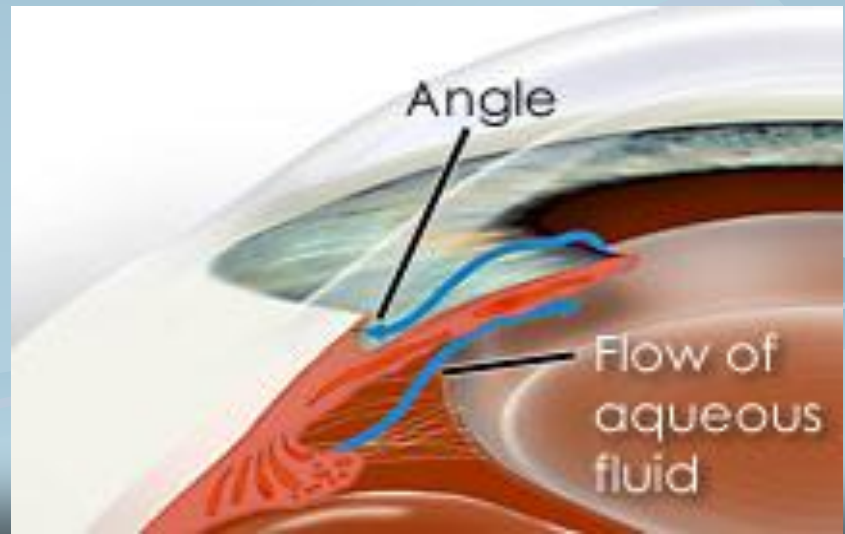
Function//

- -nourishing retina & other eye structures
- -causes intraocular pressure 10-20mm Hg

What is glaucoma ?

(intraocular pressure more than 20mm Hg)

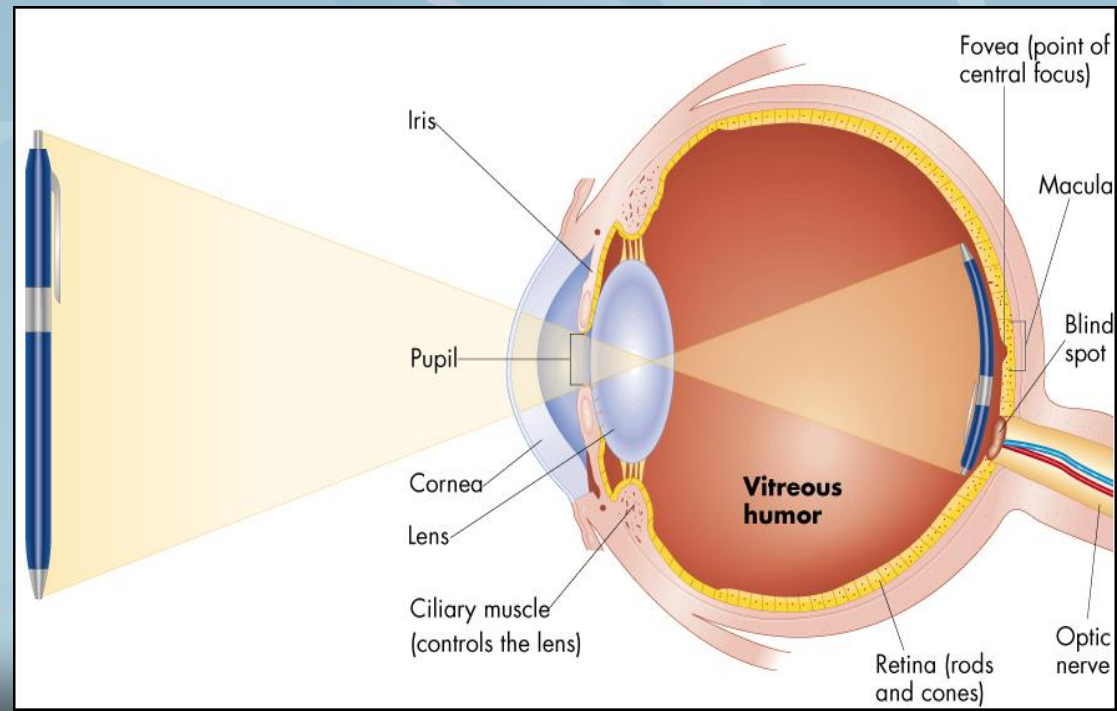
-Why it causes damage of optic nerve?



3-lens:- dioptric power 15-20 D

-(1/3 refractive power of eye) , more important than cornea. why?

4-Vitreous humour (between retina & lens for nourishing retina & keep spheroid shape of the eye)



External protection of the eye

1- bony orbit

2- lids blinking keep cornea moist

3 -conjunctiva

4-tears from lacrimal gland has antibacterial, lubricating effect , keep cornea moist & clear.)

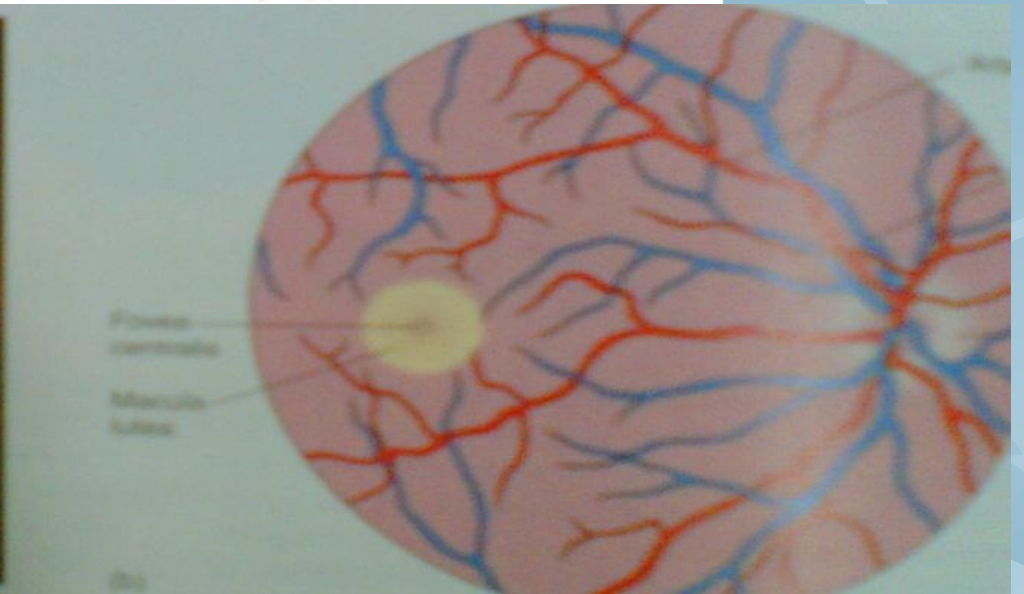
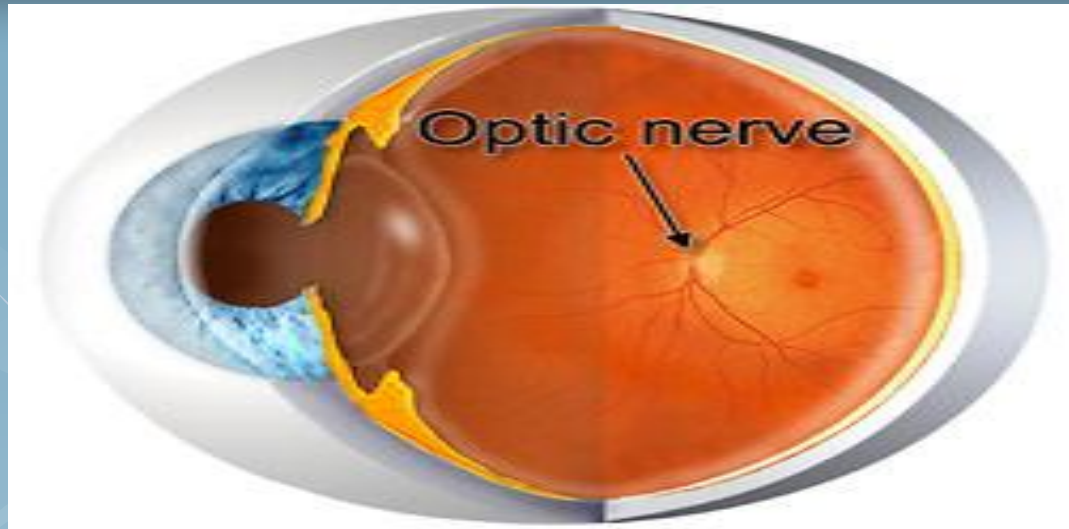
RETINA

1-Photoreceptors (RODS + CONES)

2-OPTIC DISC (blind spot. Why?)

- 3mm medial & above post pole of eye
- optic nerve leave & retinal bld vessles enter + no photoreceptors)

3-FOVEA CENTRALIS :-depression in macula lutea - yellow pigmented spot at post pole of eye + only cones + high visual acuity + for colors vision & details detection



BINOCULAR VISION for :-

- 1- Large visual field**
- 2- cancel the effect of blind spot**
- 3- stereoscopic vision**
- 4- one eye lesion does not affect vision**

- **Principles of optics:-**
- -Biconvex lens(**converge**) & biconcave lens(**diverge**)
- **Diopter** (measure of refractive power = RF) = $1 / \text{Principal focal distance}$ **in meters**
- Exp/ if Principal focal distance of a lens is 25cm, so its R.P= $1/ 0.25 \text{ meter} = 4\text{D}$
- **Emmetropic eye**;-normal eye has image on retina,has dioptric power 60D
- **Lens-retina** distance =15mm
- The greater the curvature of the lens, the greater the refractive power of the eye.

■ Errors of refraction:-

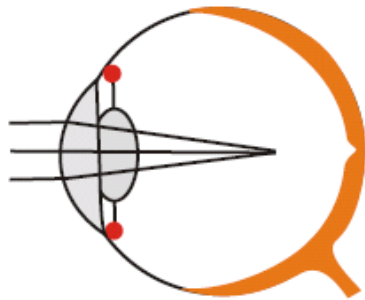
■ 1-Hypermopia (hyperopia = farsightedness)

- (small eyeball, focus behind retina,
- Headache & blurred vision
- -continuous accommodation to bring image on retina
—muscular effort--- cause headache, prolonged
convergence by accommodation-----squint
- correction by biconvex lens

■ 2-Myopia(nearsightedness)

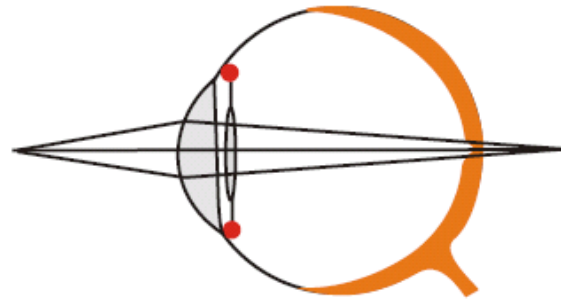
- (genetic, large eye ball, long anteroposterior
diameter, or extensive close work as in studying----
-cause focus in front of retina
- correction by biconcave lens to diverge rays before
strike lens

b) The shape of the lens



lens too round

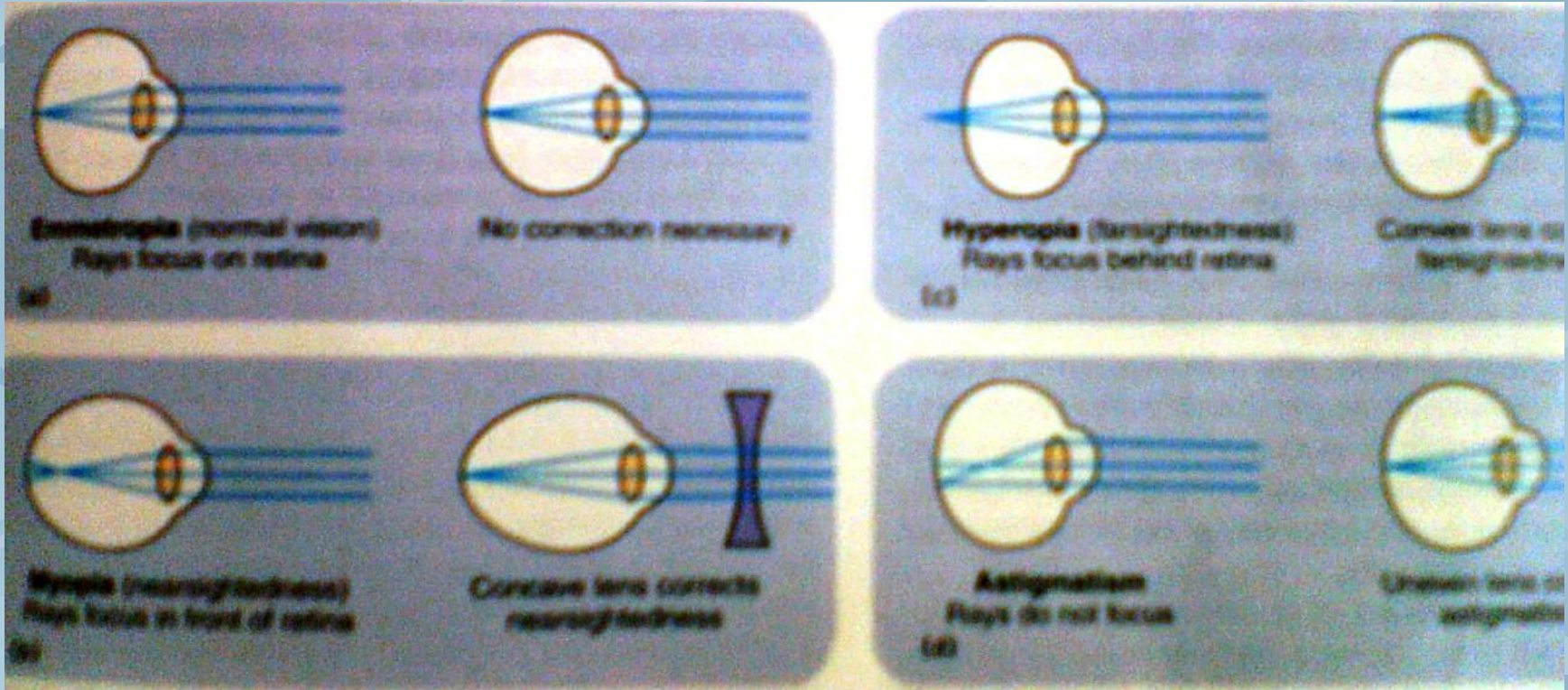
Either of the above
produces someone who
cannot focus on far targets
(near-sighted)
and who needs a concave lens.



lens too flat

Either of the above
produces someone who
cannot focus on near targets
(far-sighted)
and who needs a convex lens.





- **LAYERS OF RETINA (10 layers), the most important are :-**
- **1-pigment cell layer (vit A) (outermost layer)**
.what is its value?
- **(absorb light & prevent its reflection back)**
- **2- rods & cones (their outer & inner segments),**
but not cell bodies(rods 120 million & cones 6 million) - describe their distribution.)

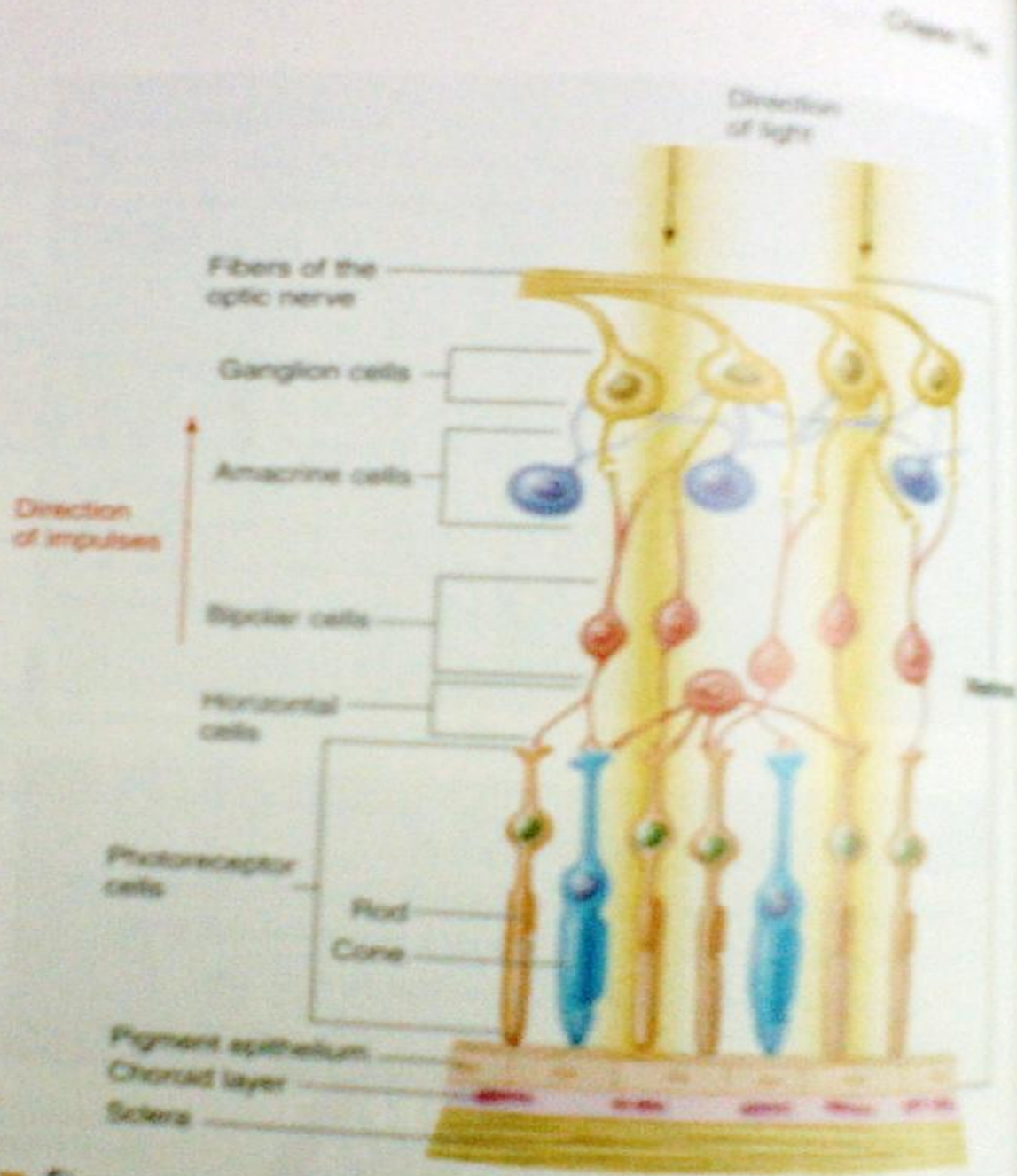


Figure 10.35 Layers of the retina. Since the retina is inverted, light must pass through all the layers of the retina before reaching the photoreceptors.

- **3-outer nuclear layer**(cell bodies of rods & cones)
- **4-outer plexiform layer** mainly of Horizontal cells.
- **5-Inner nuclear layer** (bipolar cells)
- **6-inner plexiform layer**.(amacrine cells)
- **7-Ganglion cell layer**
- **8-Optic nerve fibers** (1.2 million fibers)

- **-# Horizontal cells (outer plexiform layer)**
- **(Make synaptic connections with receptors**
- # Amacrine cells (inner plexiform layer)**
- (make synaptic connections with ganglion cells)**

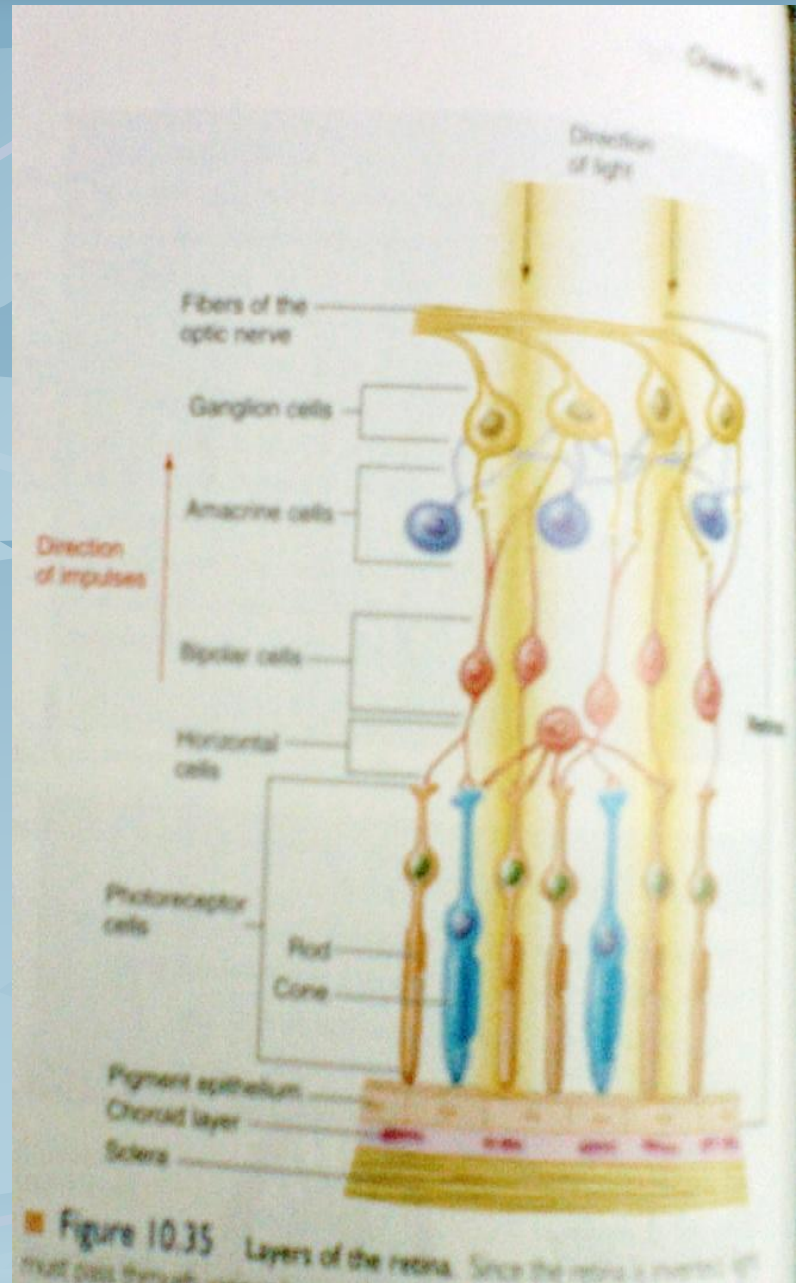
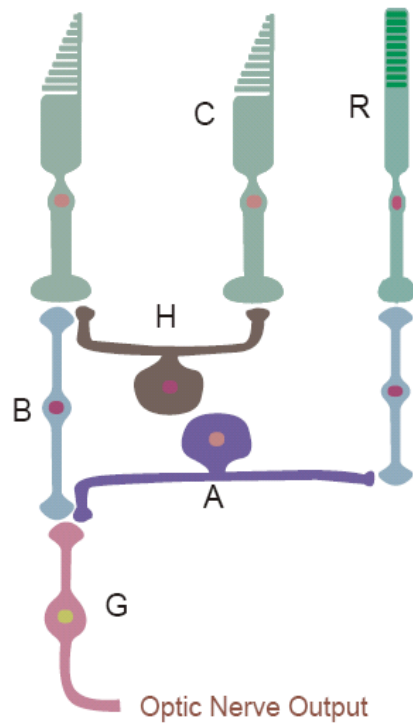


Figure 10.35 Layers of the retina. Since the retina is inverted, light must pass through...

- Light absorbed by pigment cell layer that contain melanin pigment
- impulses pass from rods & cones to rest of layers finally to ganglion cell layer ----- to optic nerve

