

STRUCTURE AND PHYSIOLOGY OF THE EYE

10Feb10

THREE LAYERS OF MATURE EYE (p 568)

1) FIBROUS TUNIC

- sclera** posterior 5/6ths darkly pigmented, many vessels, the **limbus** is where it joins the cornea
- cornea** anterior 1/5th greater curvature than sclera, gets O₂ fr air, nutrients fr aqueous humor

2) VASCULAR TUNIC

- choroid** richly vascularized, outer dark, pigmented layer, cuboidal epithelial cells, reduces reflection

ciliary body

ciliary muscle smooth m, regul lens shape

ciliary process manuf. aqueous humor

iris anterior portion of vascular tunic, muscular diaphragm

pupil (p 570) adjusted by constrictor (Psymp) and dilator muscles (symp)

3) NEURAL TUNIC

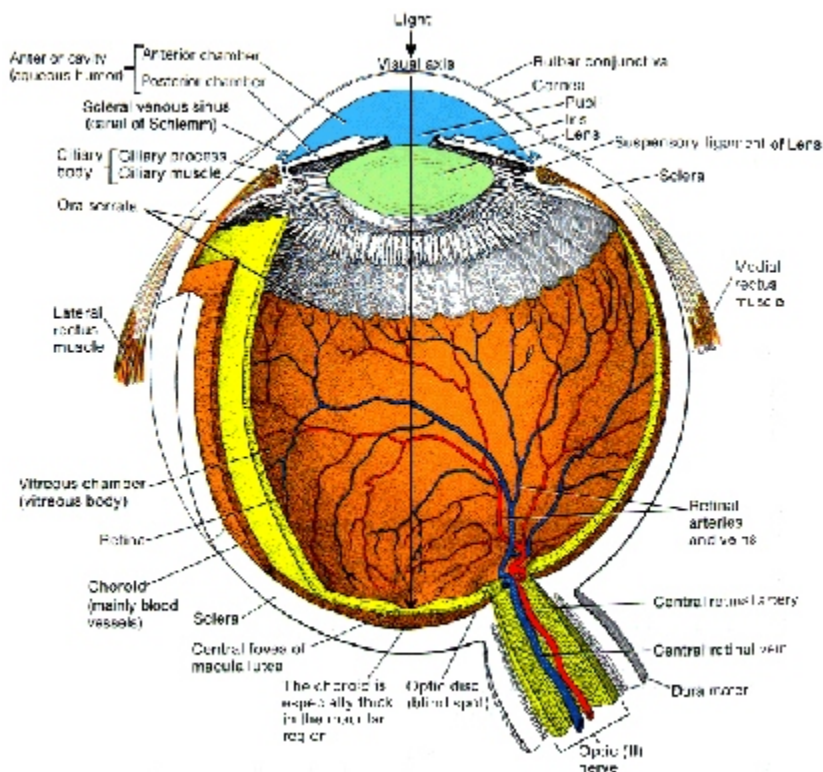
Retina: two layers:
pigmented layer

thin outer single layer of cuboid epithelium, in direct contact with the choroid

nervous layer inner of rods & cones, neural interconnections connect with optic nerve

optic disc blind spot where axons exit, circulatory system enters and exits

macula lutea optic center yellowish disc, center of it is **fovea centralis**, conc of cones



LENS outer epithelial layer, enveloping protein capsule inside thick gel-like fluid: 25%protein, 10% lipid

Cataract defective metabolism of lens, reducing agent glutathione may help.

Astigmatism irregularities of lens or cornea

Lens held in place by **suspensory ligaments**, tied to **ciliary muscle**

ANTERIOR CAVITY two chambers : **anterior chamber**, **posterior chamber** (p 574)

5-6 mL/day, filled with **aqueous humor** nourish the cornea

Canal of Schlemm drains back to the blood stream: intraocular pressure:

glaucoma hyper intraocular pressure, presses on optic nerve and blood vessels

POSTERIOR CAVITY filled with **vitreous humor**, transparent, semifluid, jelly-like

PHOTORECEPTORS: retina has highest O₂ consumption in body (p 579)

resolving power sensitivity function number/retina

Rods:	Low	high	B&W	125 mil/retina
cones:	high	low	color	7 mil/retina

Auxiliary pigments in cones: erythrolabe; chlorolabe; cyanolabe

fovea centralis, **macula lutea** high conc. of cones: resolving power

high, sensitivity low.

Neural arrangement:

many rods per bipolar, many bipolar per ganglion low resolv, high sens perhaps single cone per bipolar, single per ganglion, high resolv, low sensitivity

Rhodopsin: complex of opsin and *cis* retinal

light converts *cis* to *trans* retinal, dissociation of rhodopsin

dissociation causes generation of a nervous impulse.

uses ATP to convert *trans* back to *cis* retinal

Inadequate vitamin A leads to night blindness

Three kinds of visual accommodation:

- 1) pupil, for adjusting quantity of light to retina
- 2) conversion of trans to cis retinal in the dark: dark adaptation
- 3) lens, for focusing near or far

