



Ocular anatomy

anatomy of the
eye ball

anatomy of the
adenexa

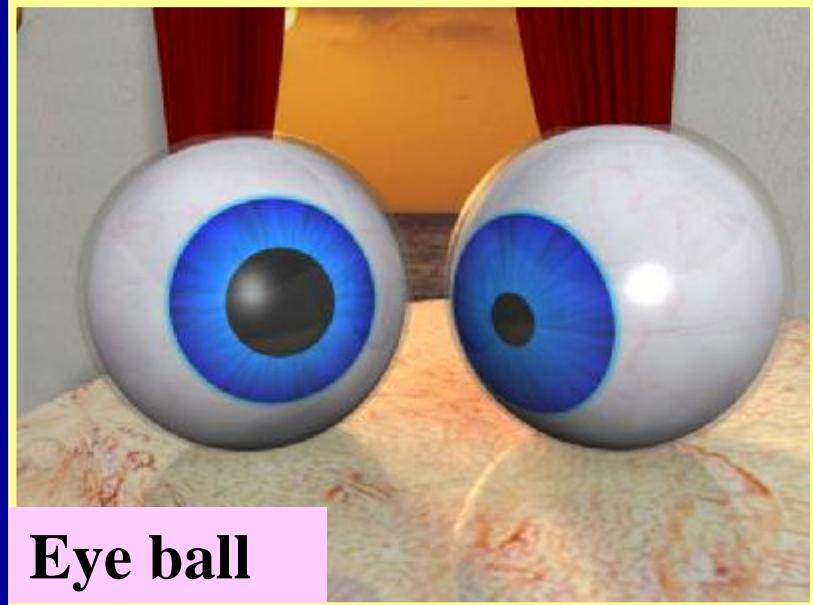
1. lid
2. conjunctiva
3. lacrimal system

Next lesson

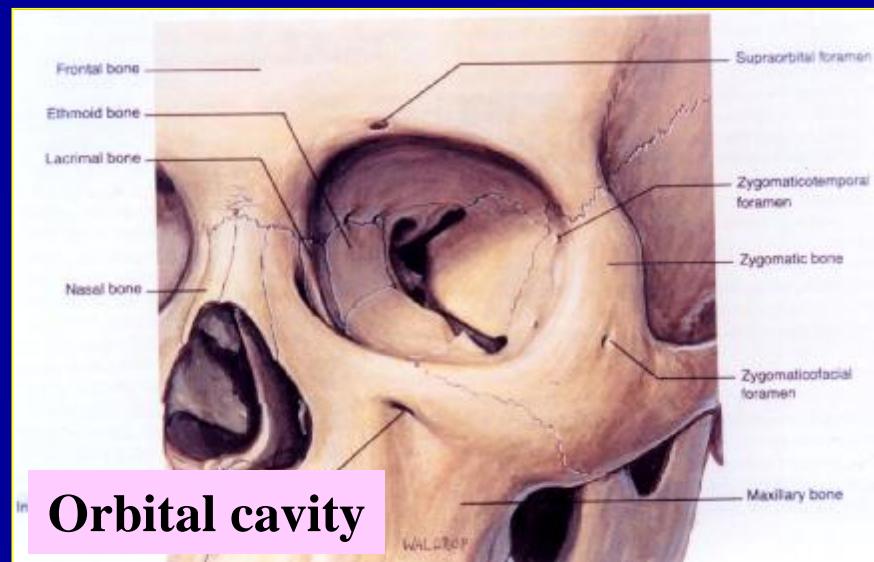
Anatomy of the eyeball

Eye ball

- Spherical structure
- 7 cm³ in volume
- 24 mm in A-P in diameter
- Presents inside a bony cavity (**orbital cavity**) which is 30 cm³ in volume

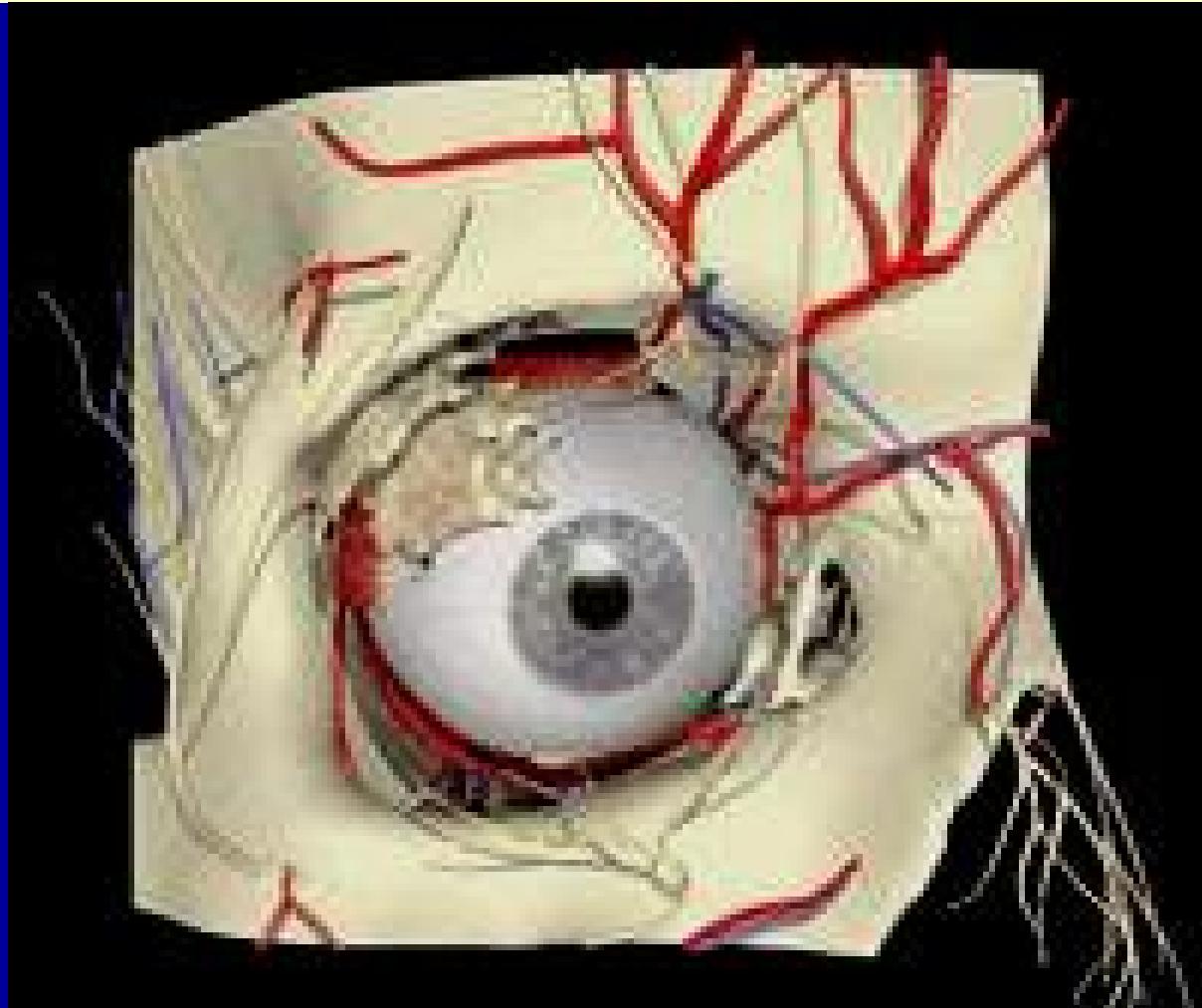


Eye ball

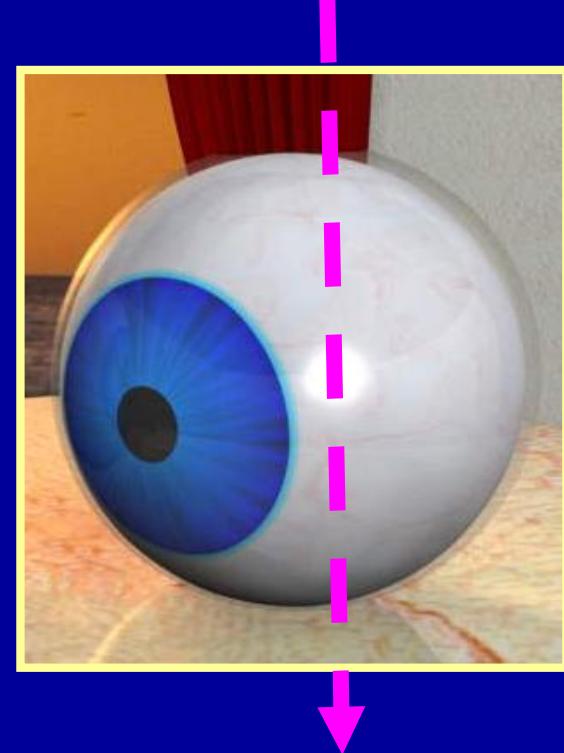


Orbital cavity

The eye presents inside the orbital cavity

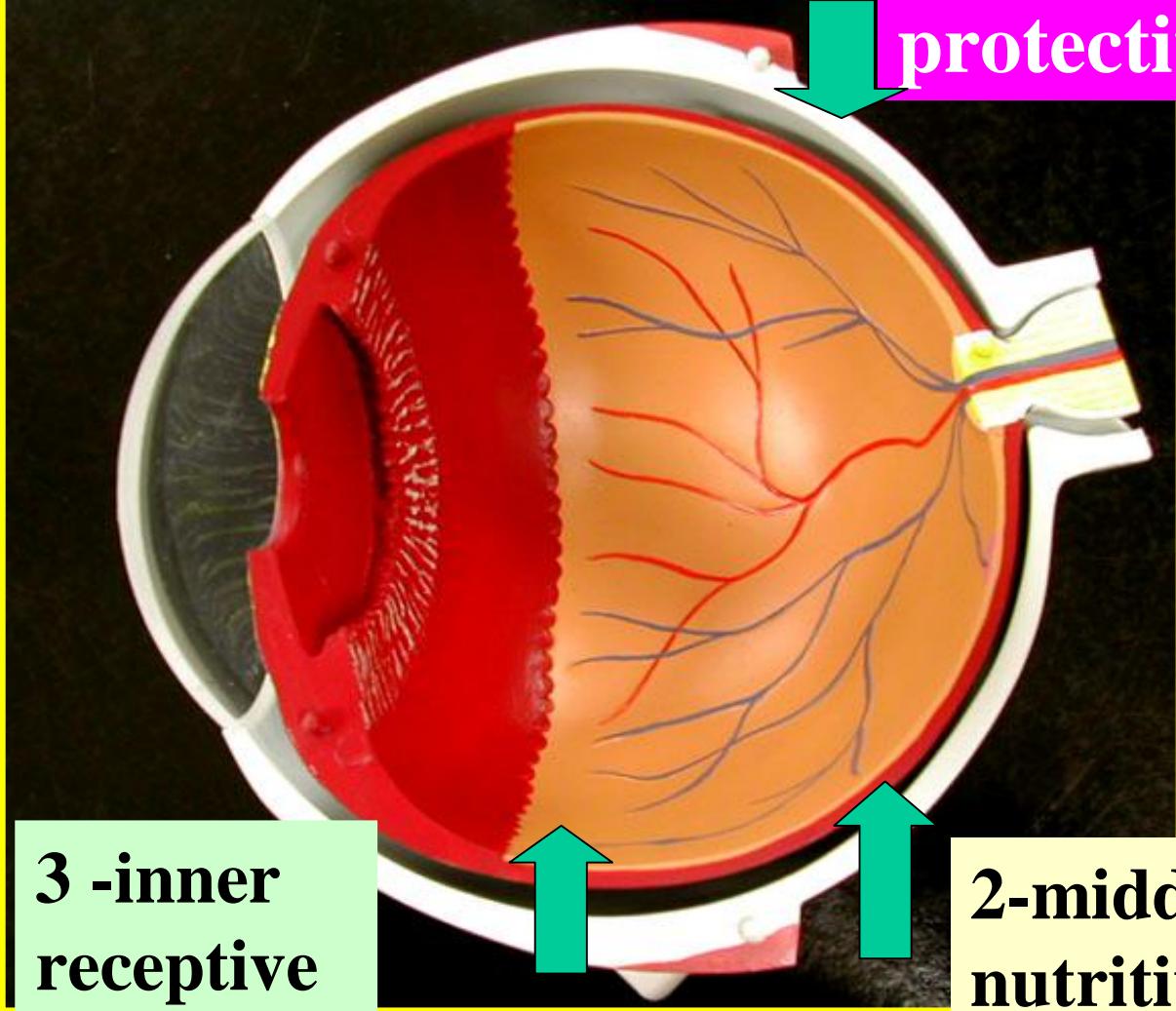


Internal structure of the eye



3 coats

1-outer
protective



3 -inner
receptive

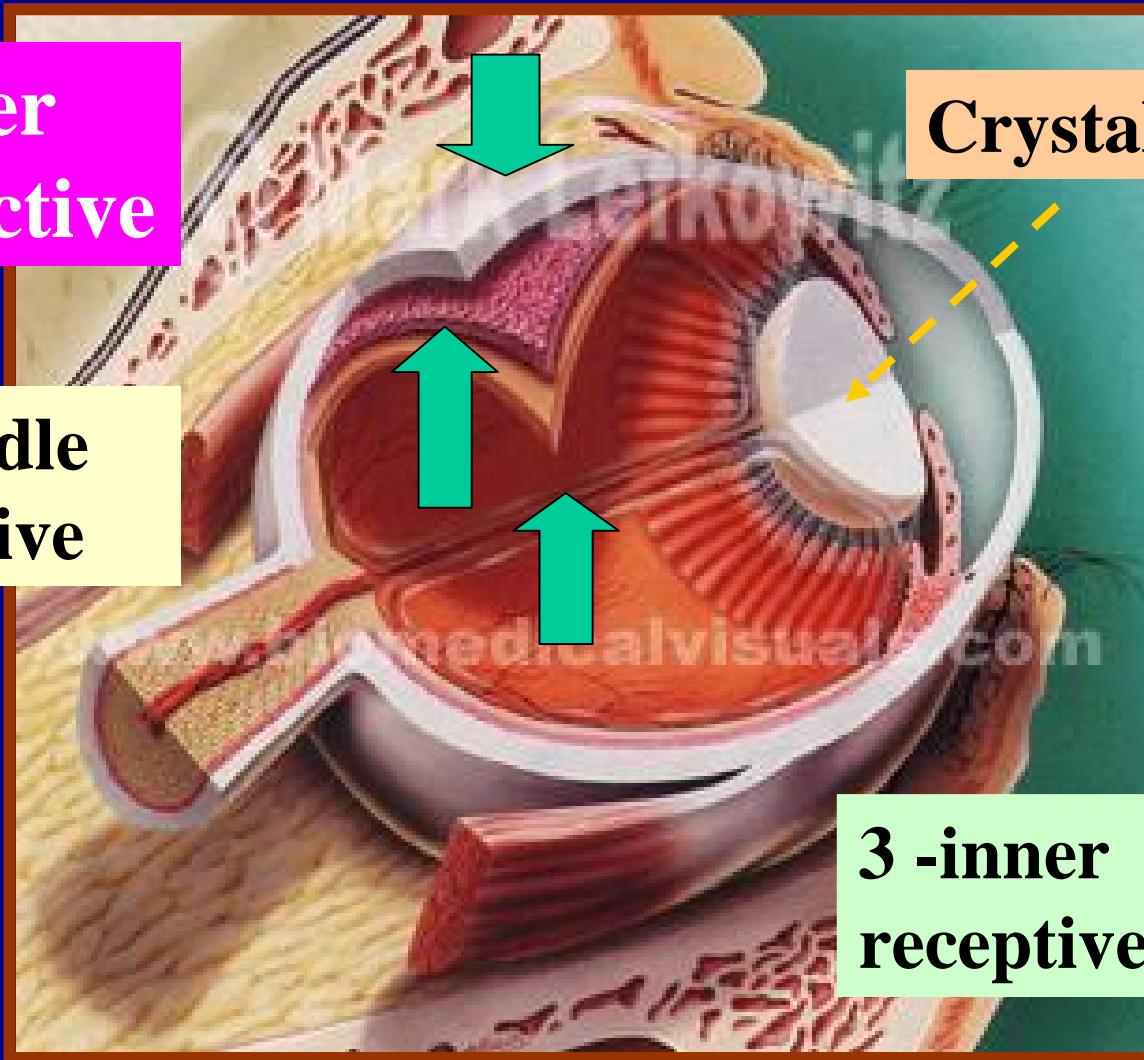
2-middle
nutritive

**1-outer
protective**

**2-middle
nutritive**

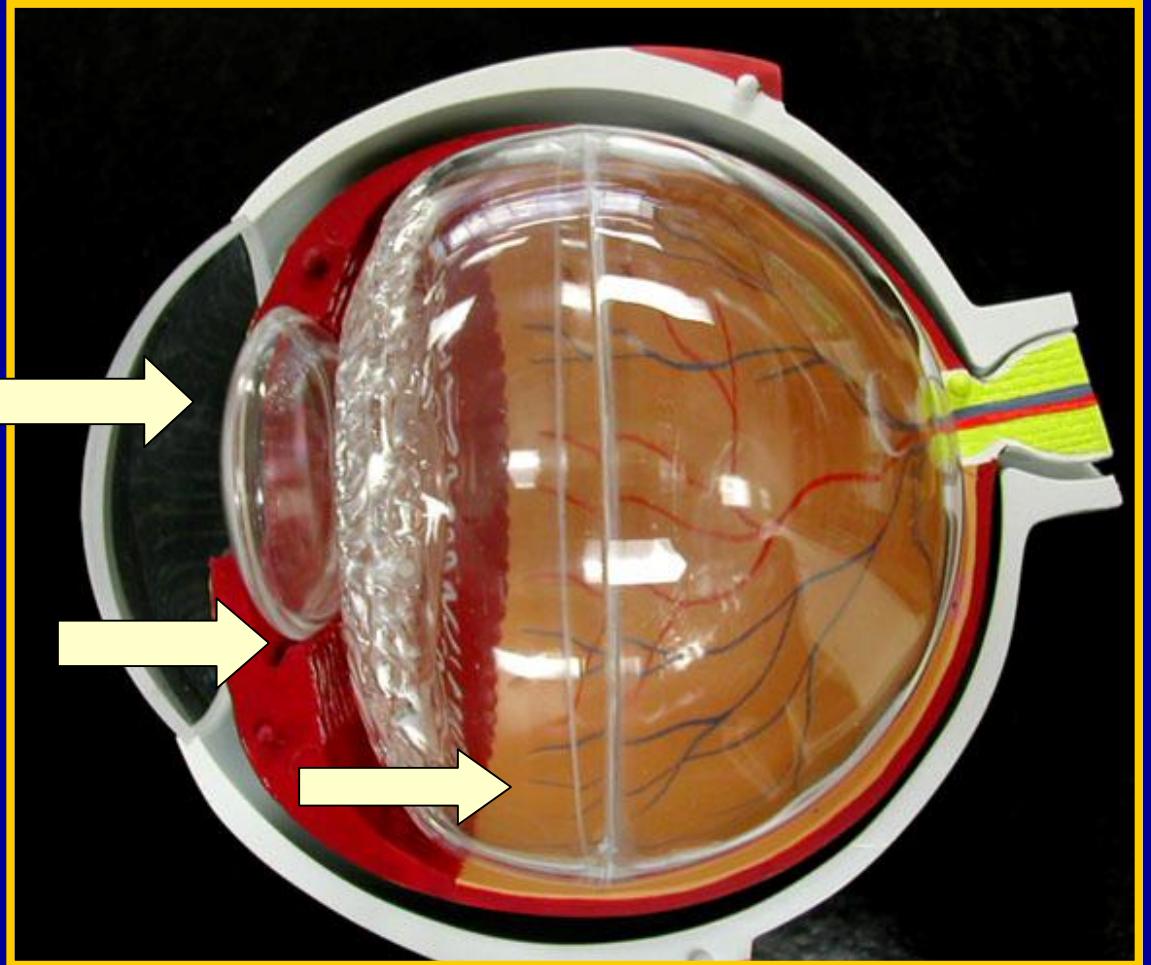
Crystalline lens

**3 -inner
receptive**

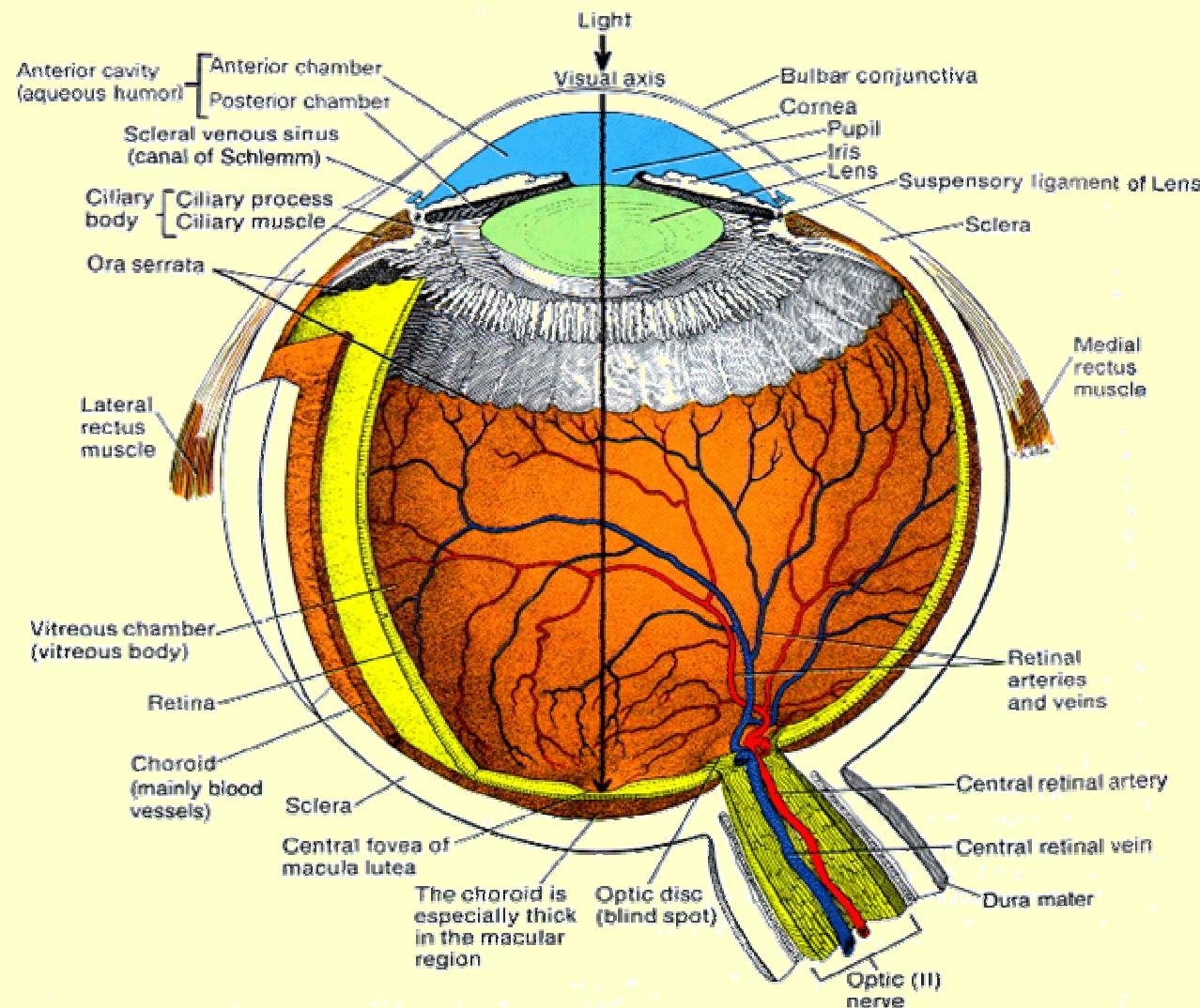


3 cavities

- **Anterior chamber**
(aqueous humour)
- **posterior chamber**
(aqueous humour)
- **vitreous cavity**
(vitreous gel)



3 coats & 3 cavities



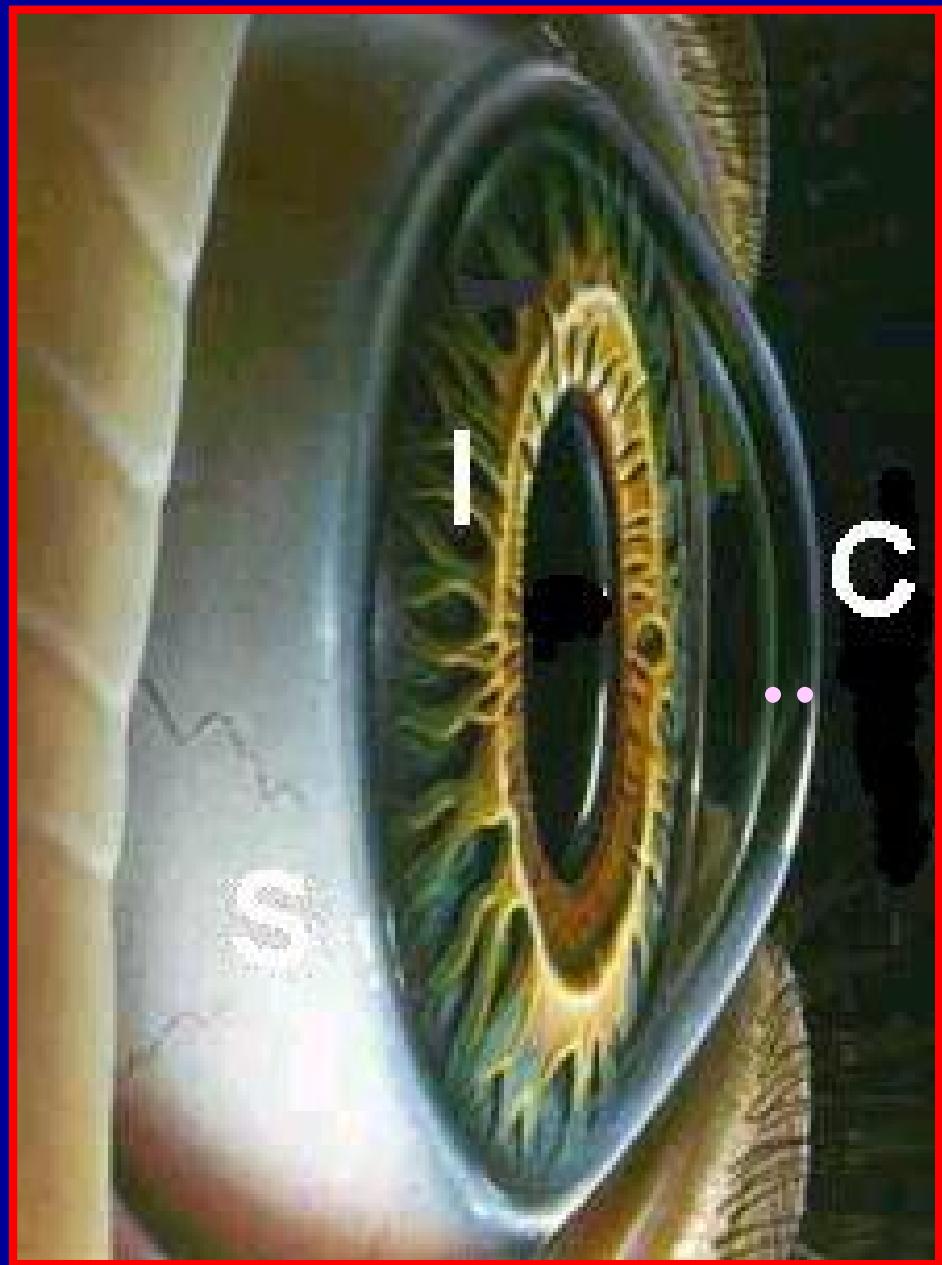


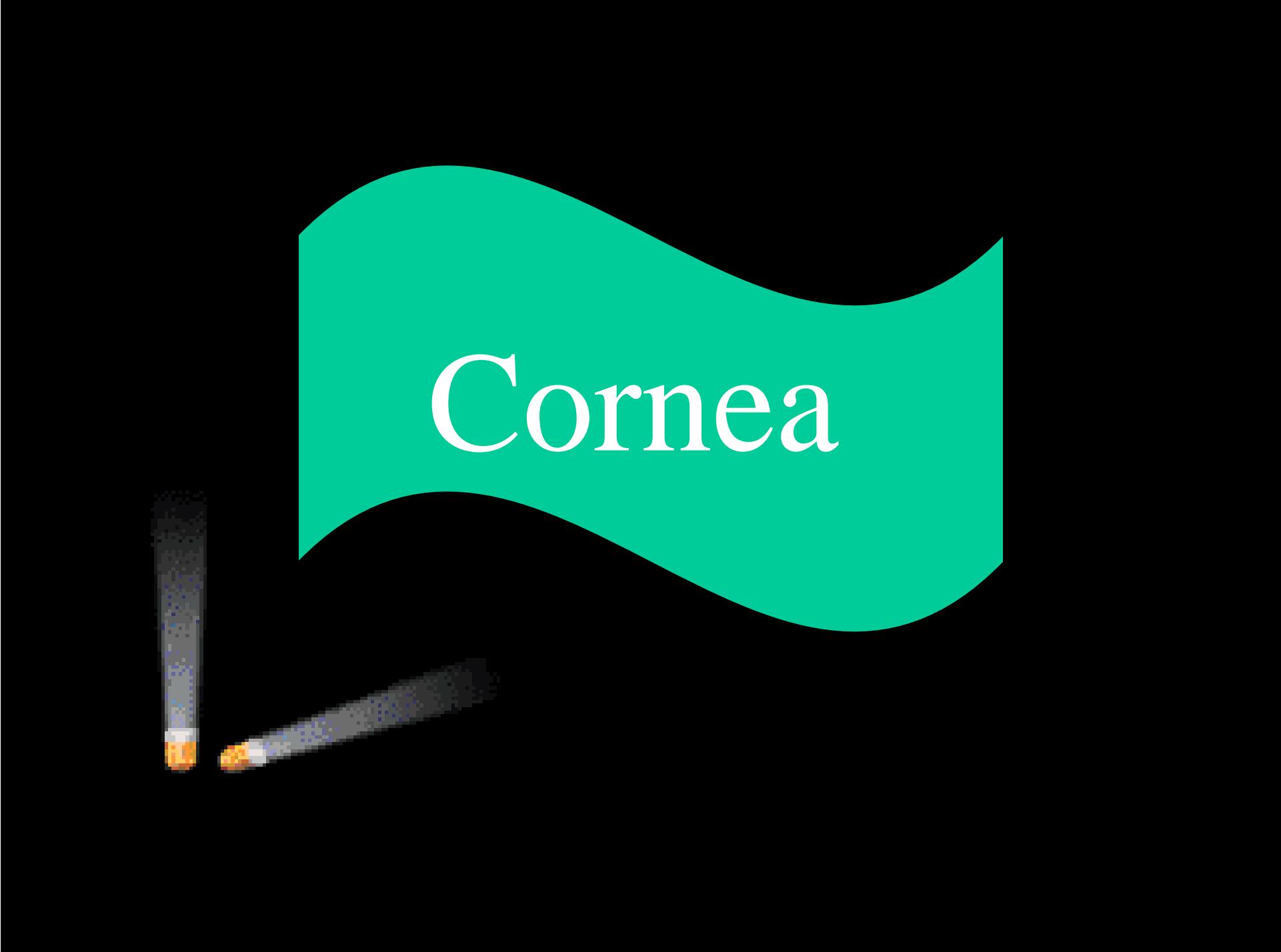
1-Anatomy of outer coat

a-Cornea (ant. 1/6)

b-Sclera (post. 5/6)

c-limbus (transition zone)





Cornea

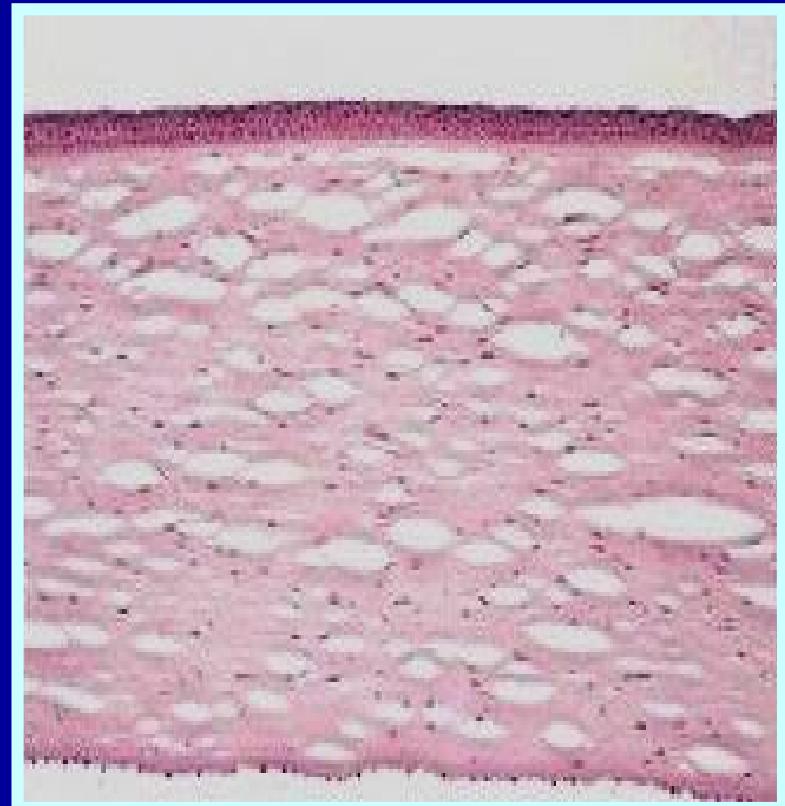


Outer coat of the eye

Cornea

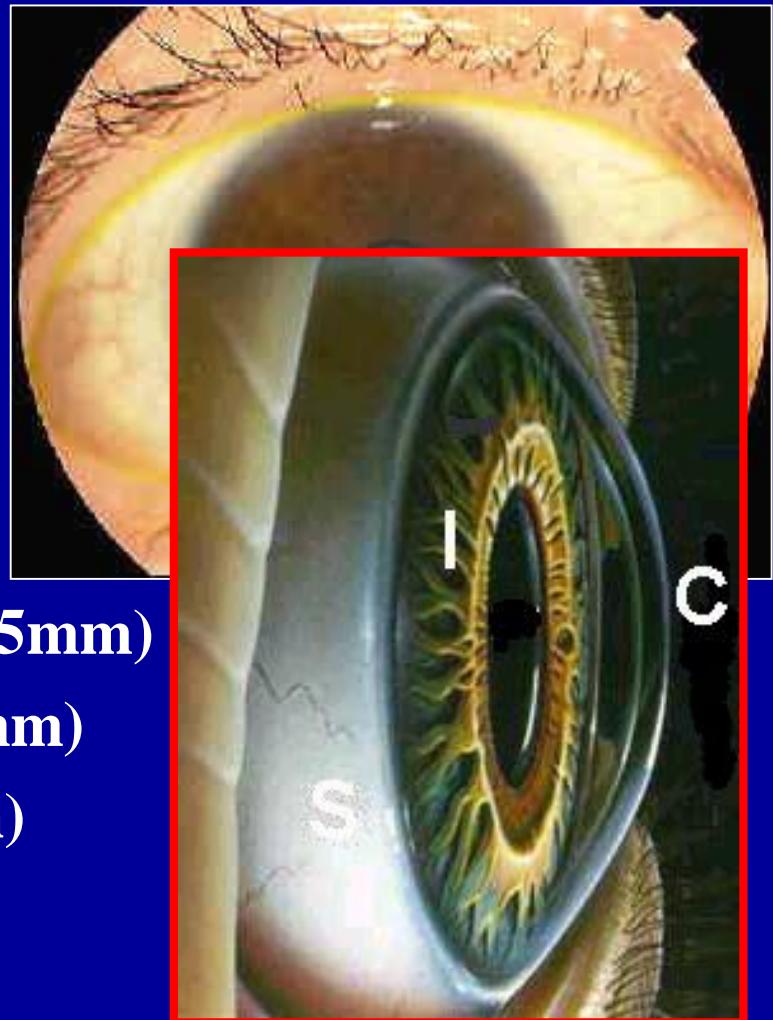
Macroscopic

Microscopic

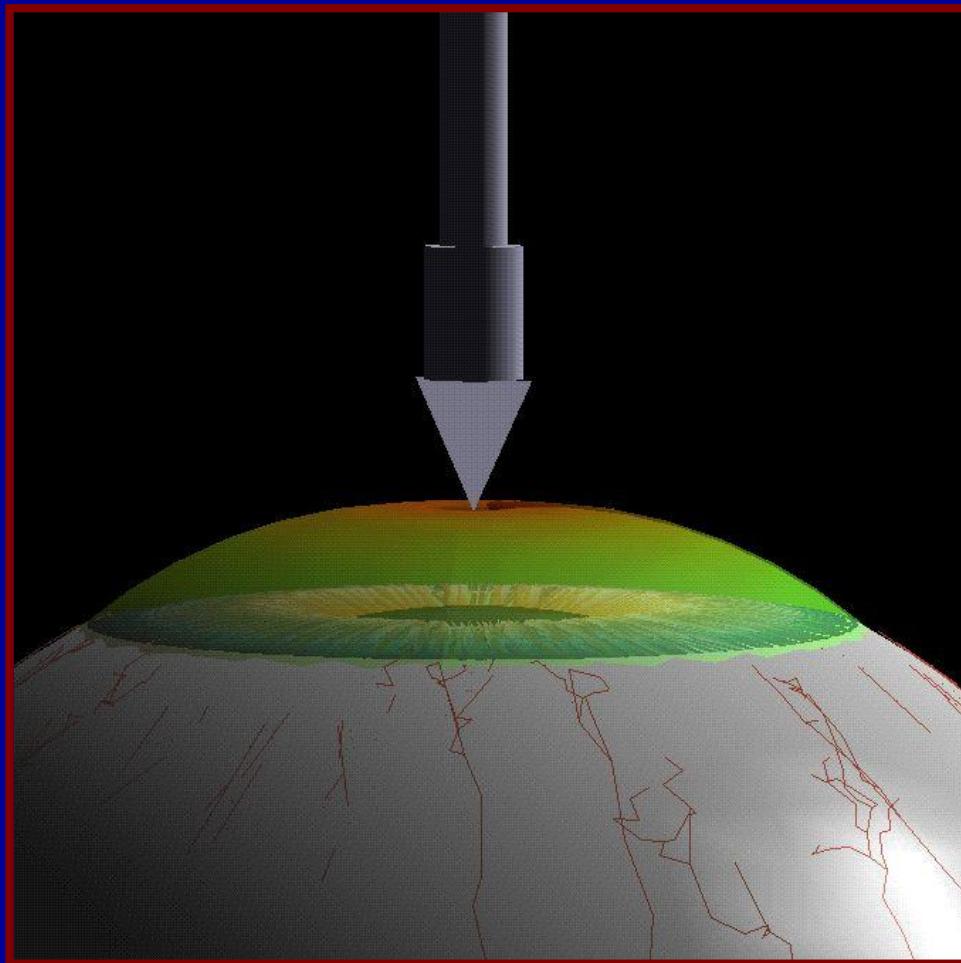


Macroscopic structure of the cornea

- Transparent
 - Avascular
 - Highly sensitive
 - Has Lusture
-
- Thick at the periphery:0.7mm -0.9mm, thinner in the centre (0.5mm)
 - Horizontal diameter (11-11.5mm)
 - Vertical diameter (10.5-11 mm)
 - Curved

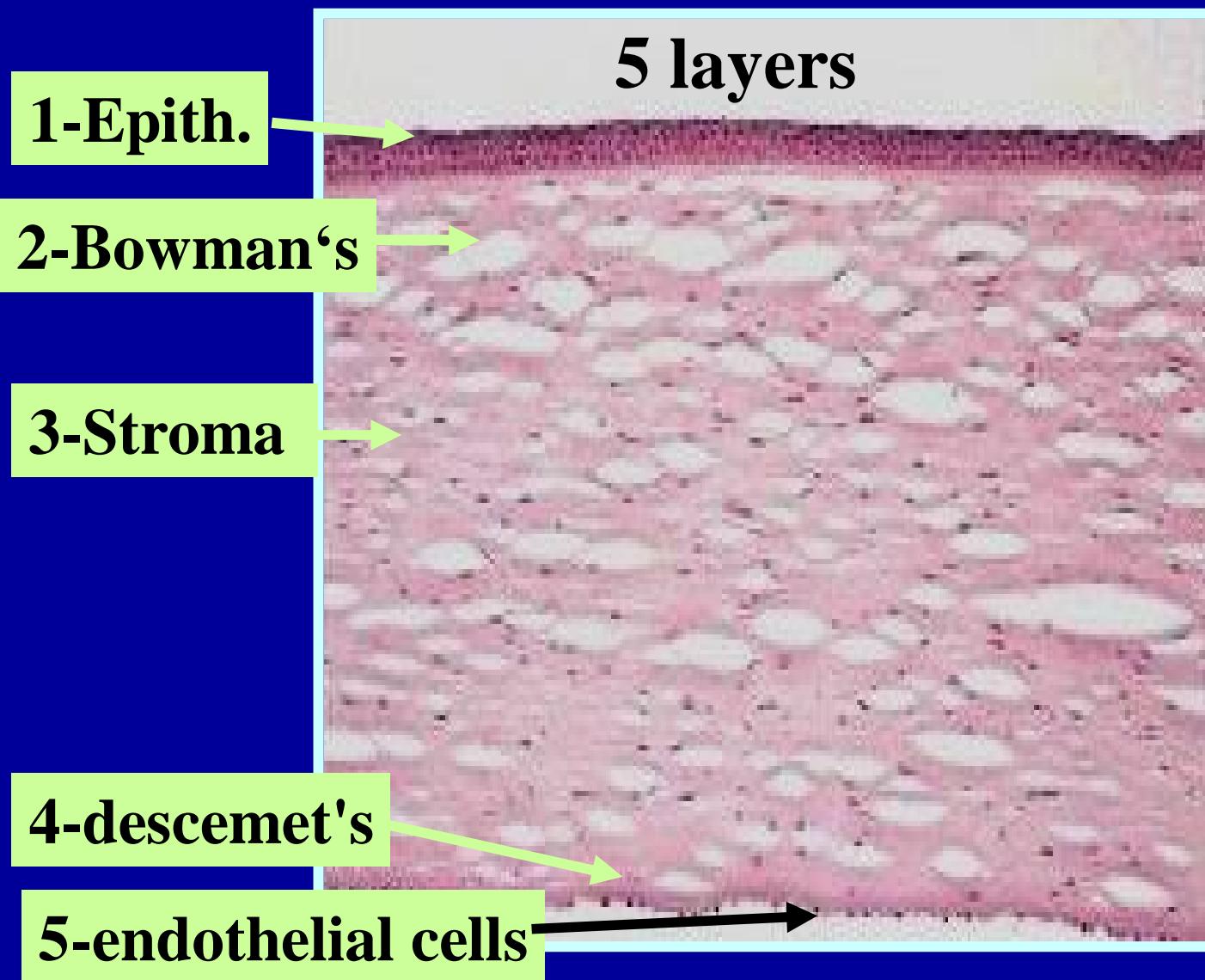


Remember !!



Cornea
↓
ant.:
Tear film
&
post.:
Aqueous
humour

Microscopic structure of the cornea



Microscopic structure of the cornea

1- Epithelium :

- * Stratified squamous epith non keratinized
- * 5-6 layers (basal is tall columner)
- * it has the ability to regenerate (limbus)

2-Bowman‘ s membrane (10-12um)

- * Hyaline
- * Acellular
- *Cannot regenerate

Microscopic structure of the cornea

3- Stroma: (500 um)

- * 90% of the cornea
- * Collagen fibres
 - uniform in diameter, constant distance in between
- light scattering
- * Has high capacity to absorb water
- * The regulation or corneal hydration is the function of the endothelial pump



Microscopic structure of the cornea

4-Descemet's membrane:

Basement membrane of the endothelial cells, elastic, resistant, tough

5- Endothelial cells

Single layer of hexagonal cells



Cornea (1-avascular)

nutrition:



1. diffusion from limbal capillaries
2. diffusion from aqueous (glucose)
3. diffusion from tears: 85% O₂

Cornea (2-Highly sensitive)

nerve supply: nasociliary nerve

cornea (3-transparent)???

*Anatomical:

- 1.it does not contain opaque structures
no keratin, no b.v., no myelin sheath
- 2.regular arrangement of c.t.in stroma
- 3.smooth anterior surface

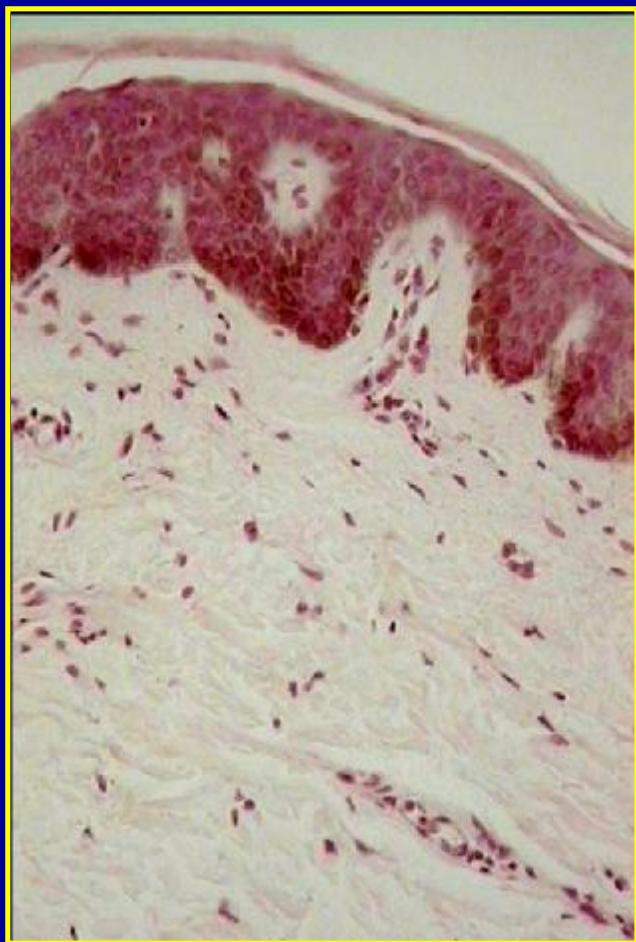
*physical

uniform arrangement of the collagen lamellae.

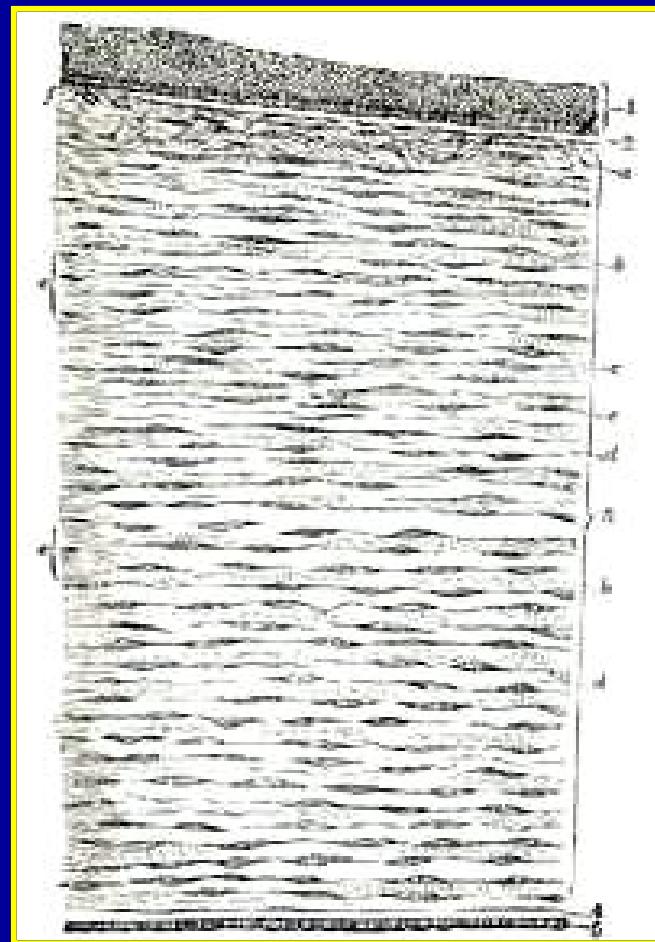
*physiological

corneal lamellae are not fully hydrated

cornea (transparent)???



skin



cornea

Cornea (4-luster)

1-healthy intact epithelium

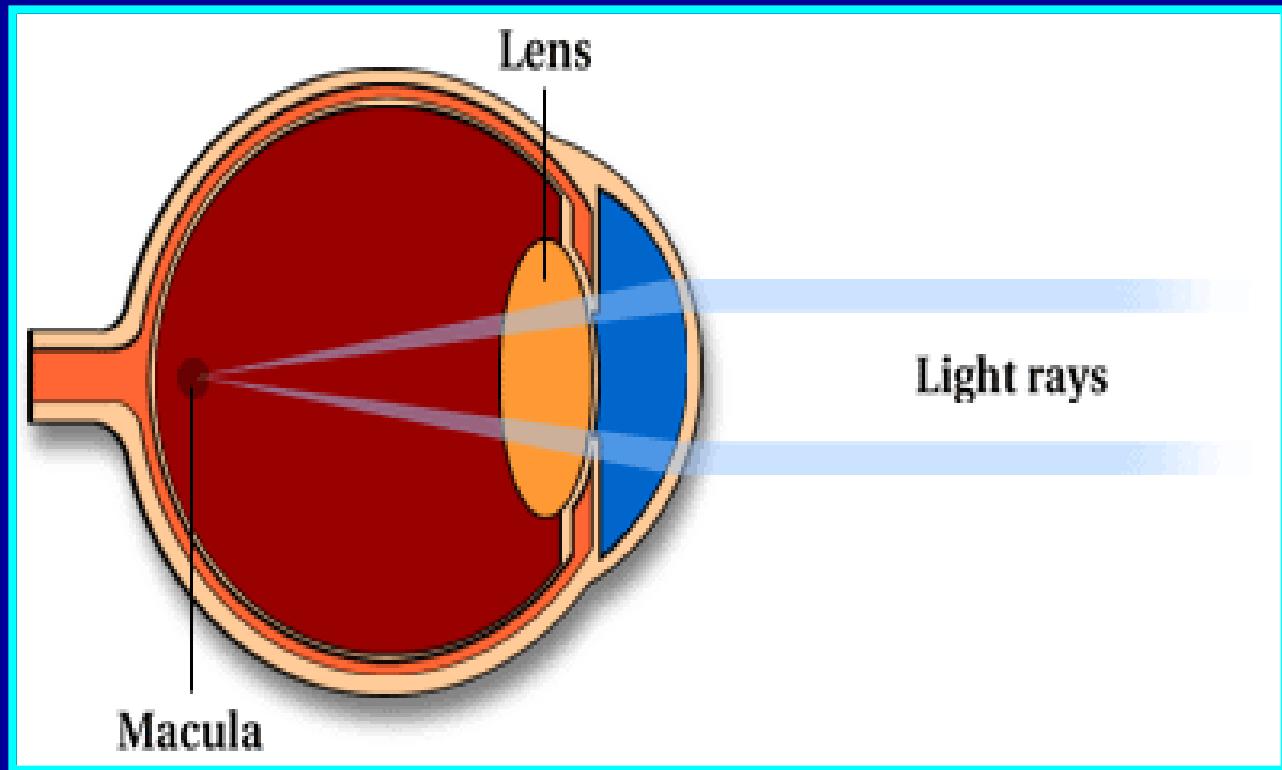
2-intact tear film

function:

main refractive organ D.p:42 Diopters

Q: what is the total refractive power of the eye?

Anatomy of the cornea



Function:vision

Sclera



Macroscopic structure of the Sclera

- Outer coat of the eye (posterior 5/6)
- Site of insertion of extraocular muscle
- Blocks extraneous light from entering globe
- white collagenous appearing structure



Microscopic structure of the sclera

4 layers from superficial to deep

1-episclera

2-sclera proper

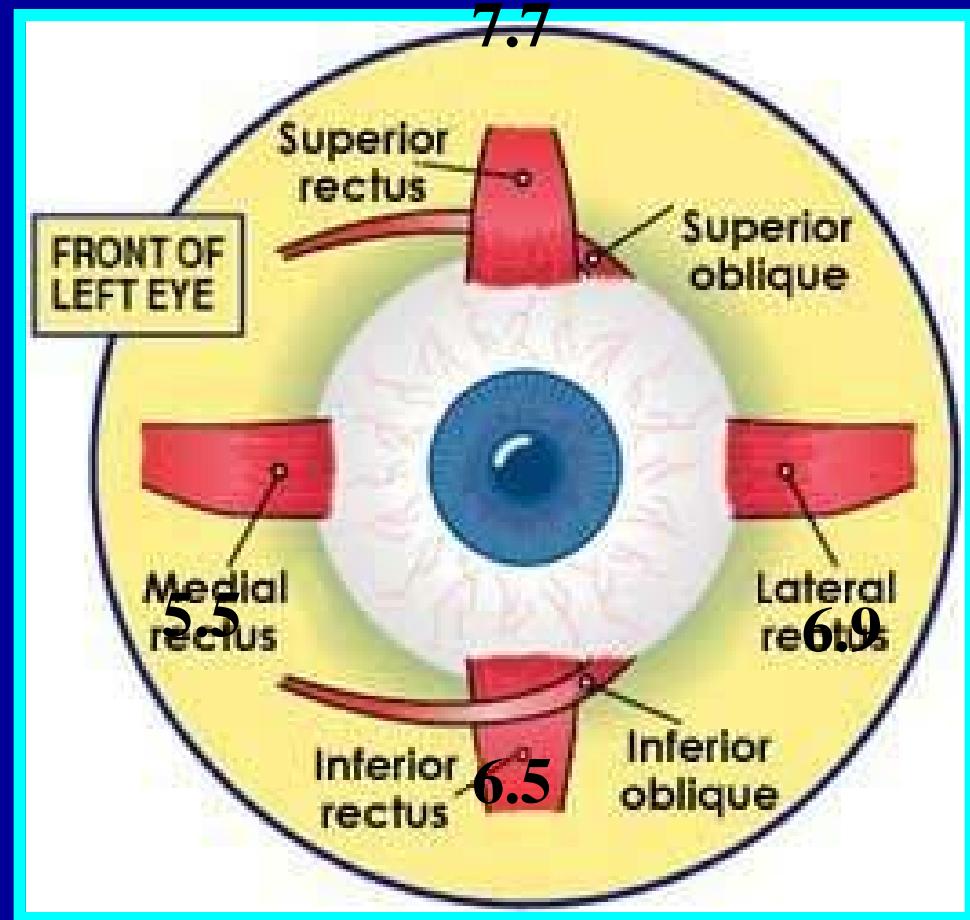
3-lamina fusca

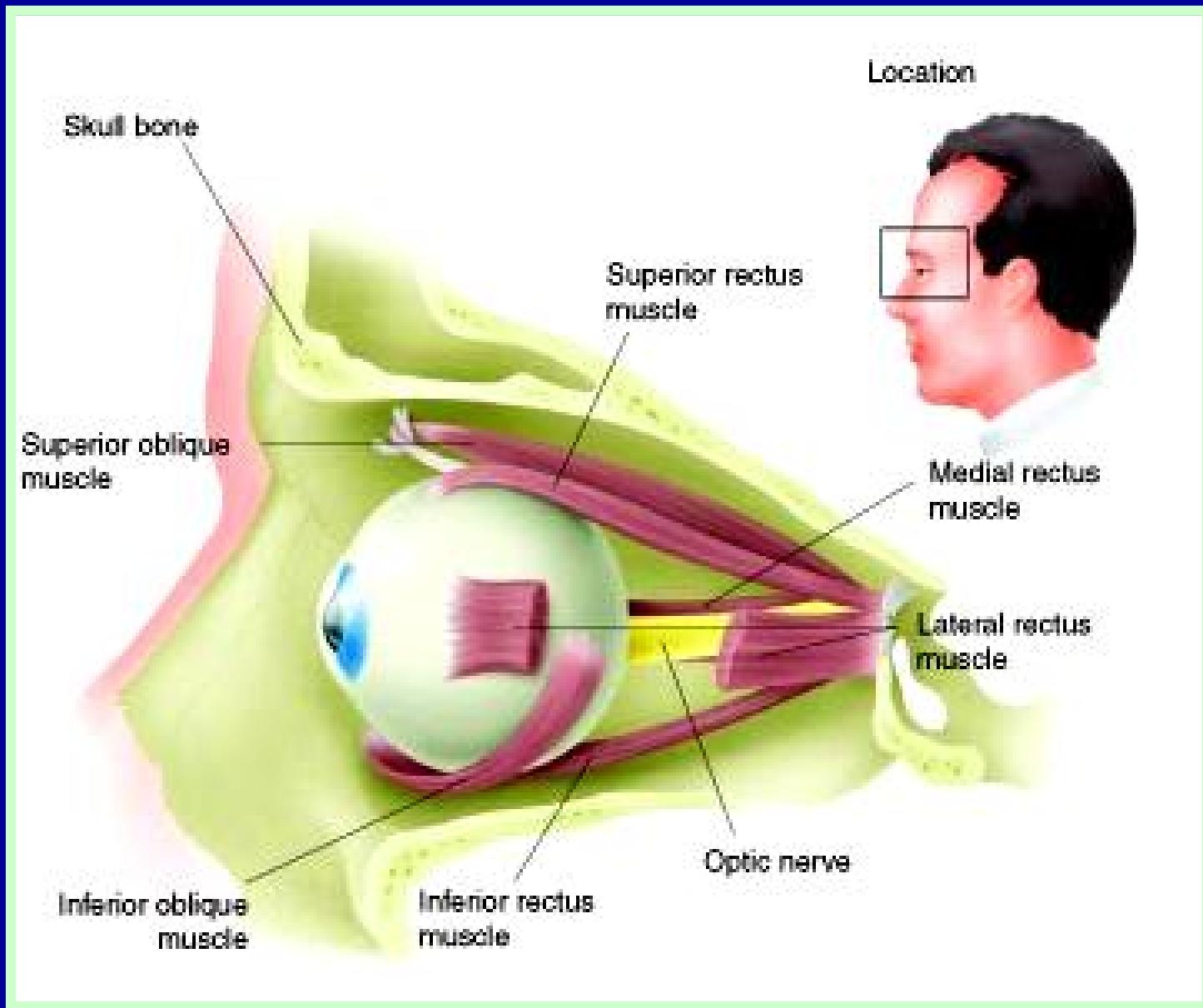
4-supraciliary and suprachoroidal space

Functions of the sclera

1-Protective

2- attachment
to
EOMs







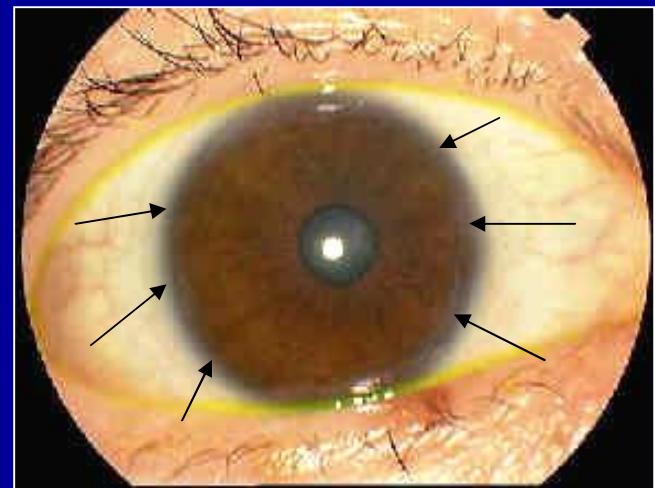
Limbus





Characters of limbus

- Richly vascularized
- Contains stem cells (responsible for corneal epithelial regeneration)







**Let us go to the
middle coat**

=

uveal tract



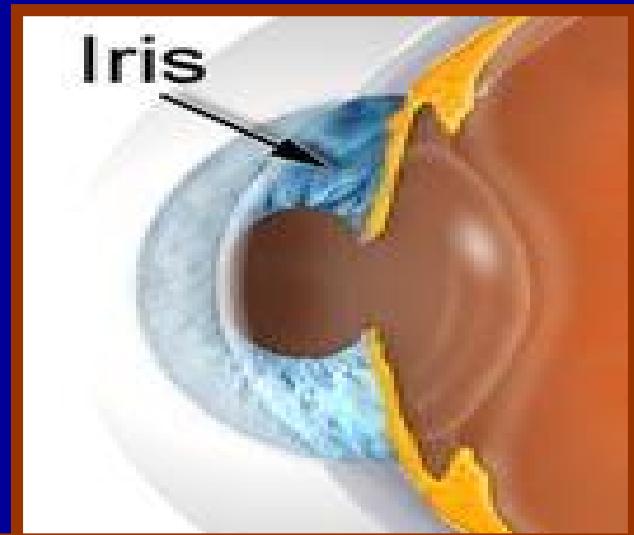
2-Anatomy of middle coat

- 1-Iris (ant. Part)
- 2-ciliary body (middle part)
- 3-choroid (post. part)



Iris

- Most anterior part of uveal tract
- Circular diaphragm w central hole
- Forms posterior wall of anterior chamber
- Lies in front of crystalline lens
- Colour differs acc. To melanin concentration
- Has 2 surfaces (ant & post).



Anterior surface(iris pattern)

Collarette: zigzag-like elevated circle 1.5mm from the pupil

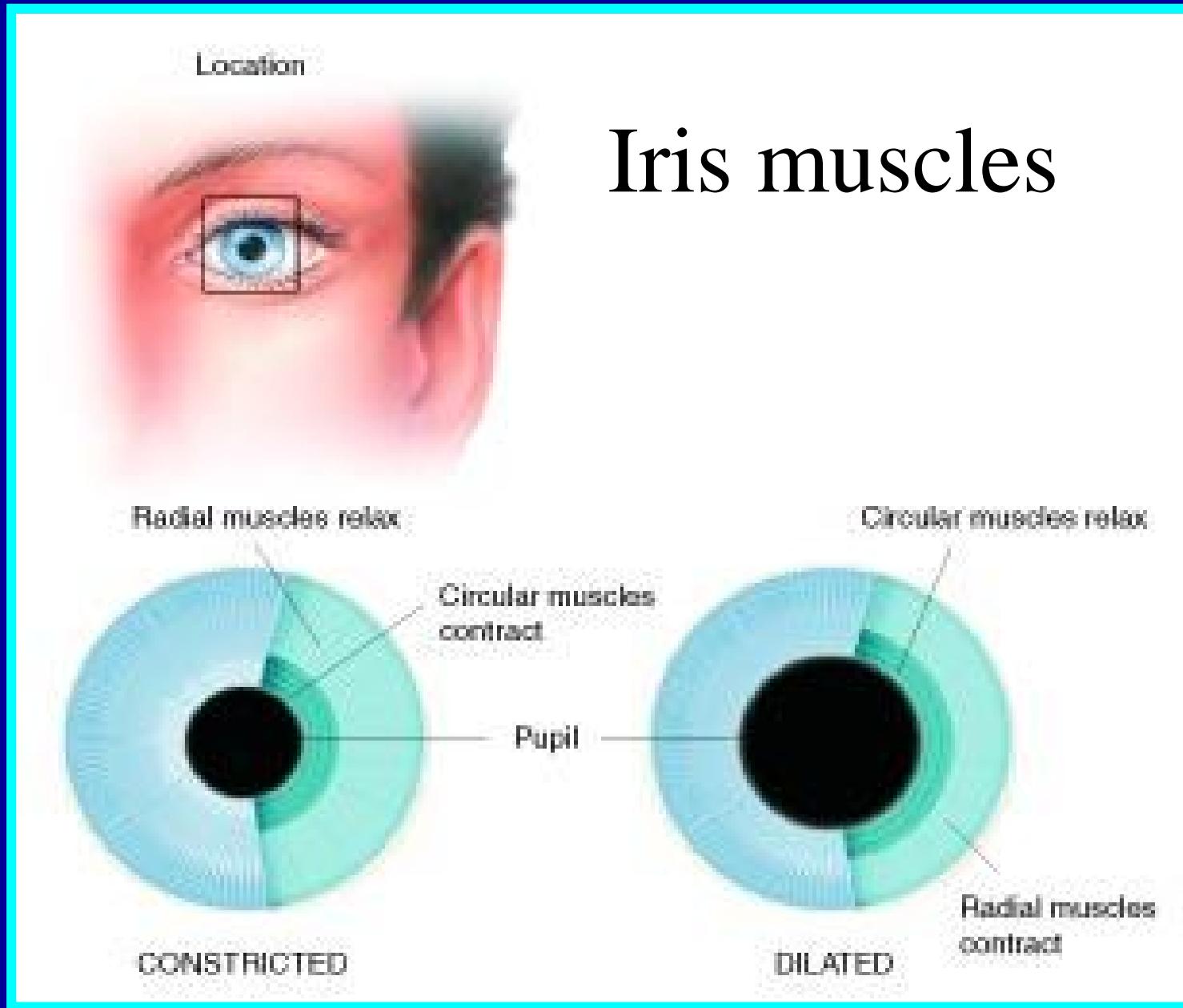
Iris crypts: depressions on the anterior iris surface



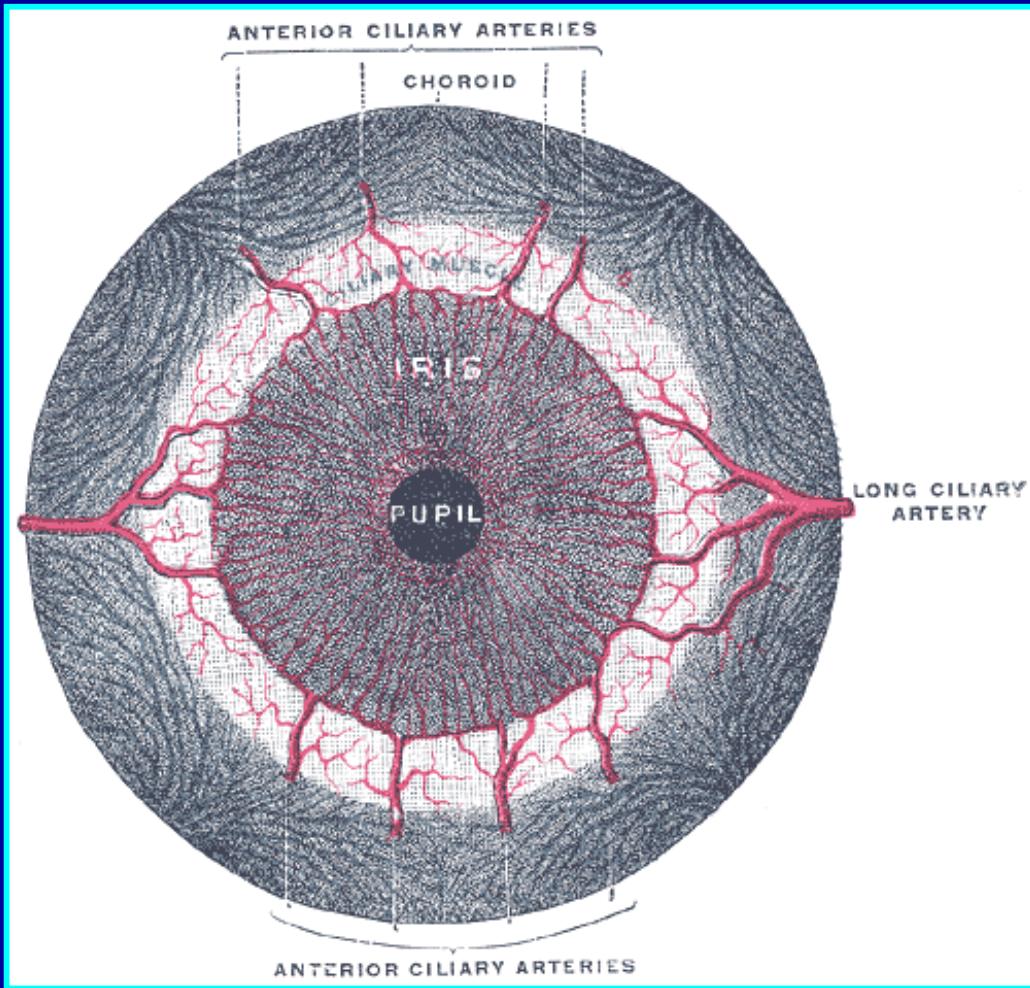
Posterior surface:
2 layers of pigmented epithelium

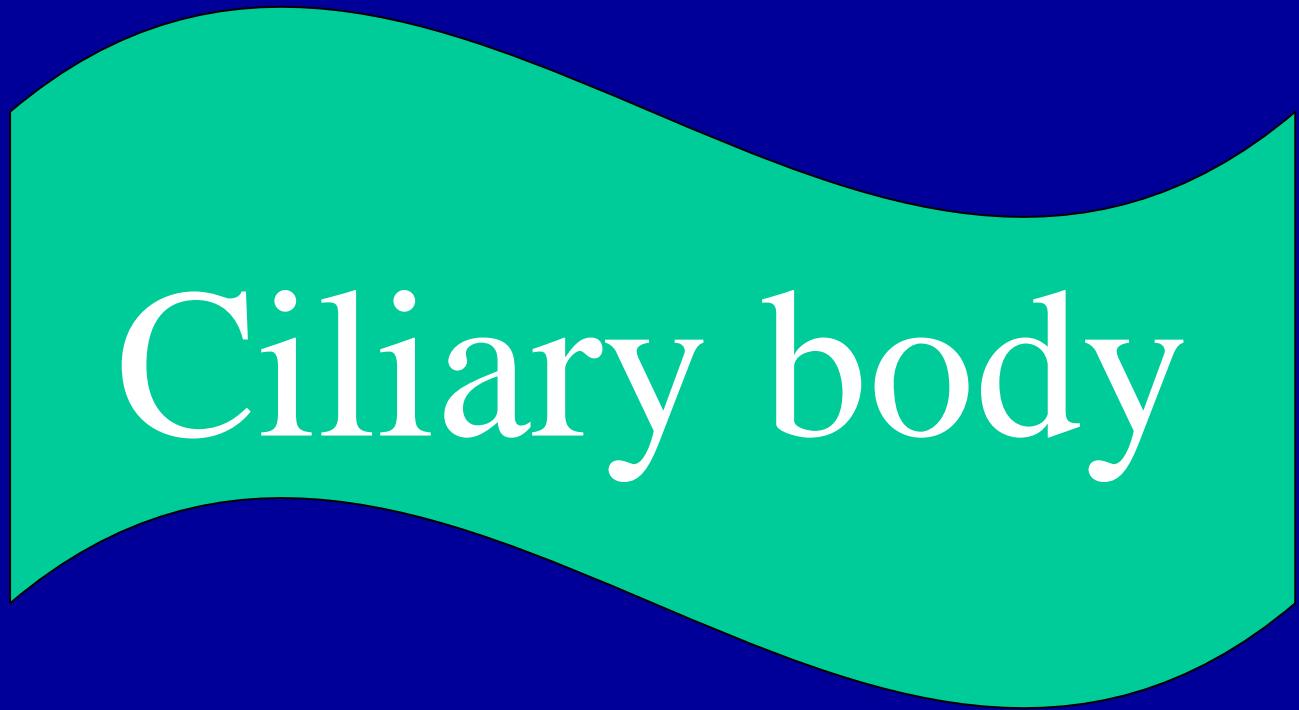


Iris muscles



Blood supply of the iris

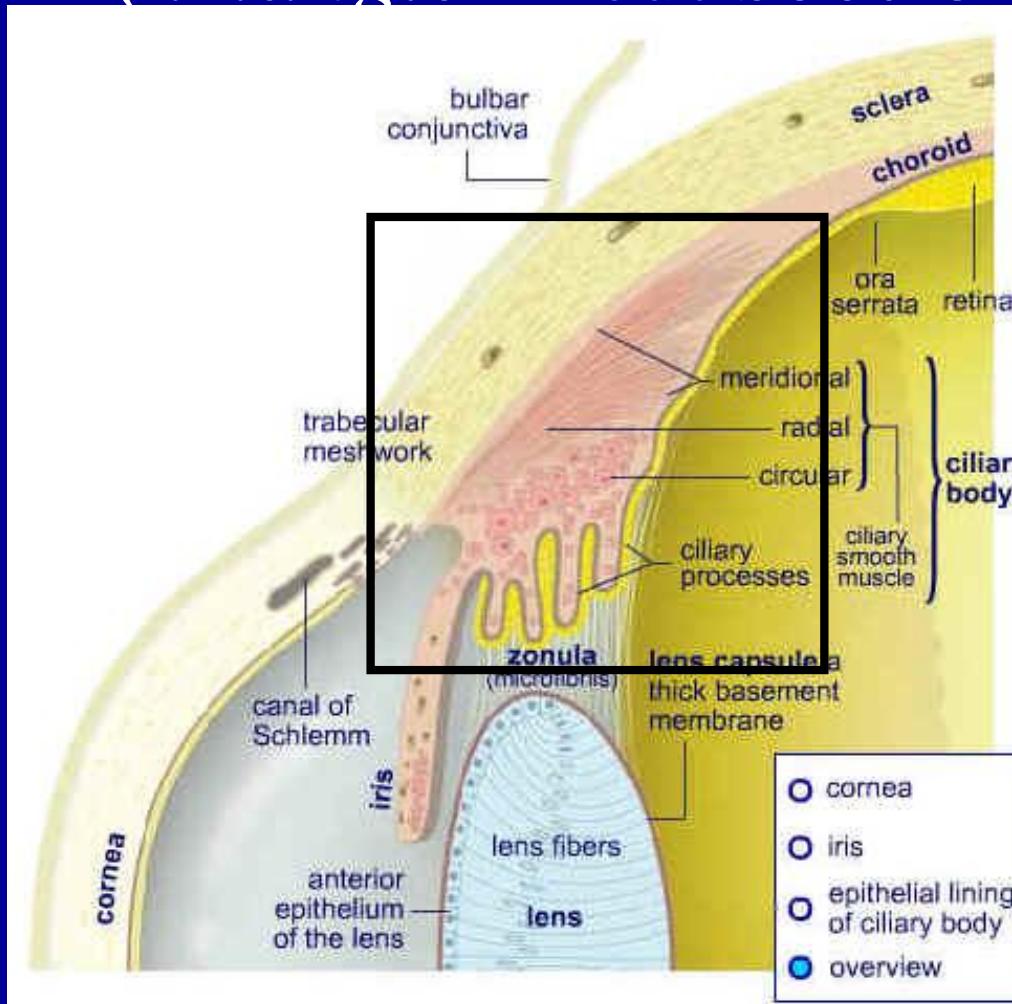




Ciliary body

Ciliary body

(triangle in cut section)



Ciliary body

1. Anterior surface:

iris root is attached to the middle 1/3



2. Outer surface:

smooth ,sep. from the sclera
by supraciliary space

3. Inner surface: 2 parts

- *pars plicata ant. 1/3
- *pars plana post. 2/3

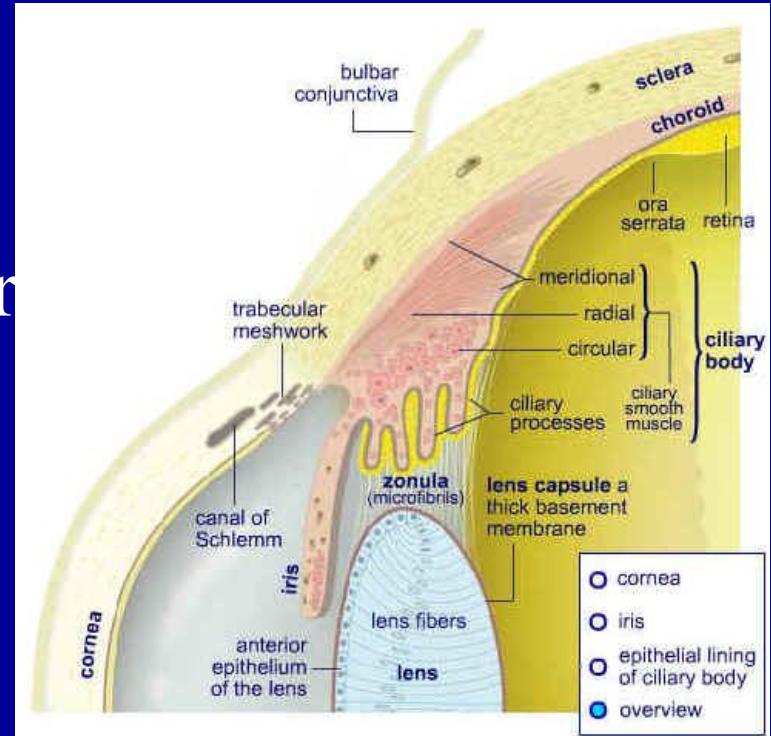
Ciliary body

Stroma

Ciliary muscle:
long./circular/oblique fibers
(parasympath. Supply)

Functions:

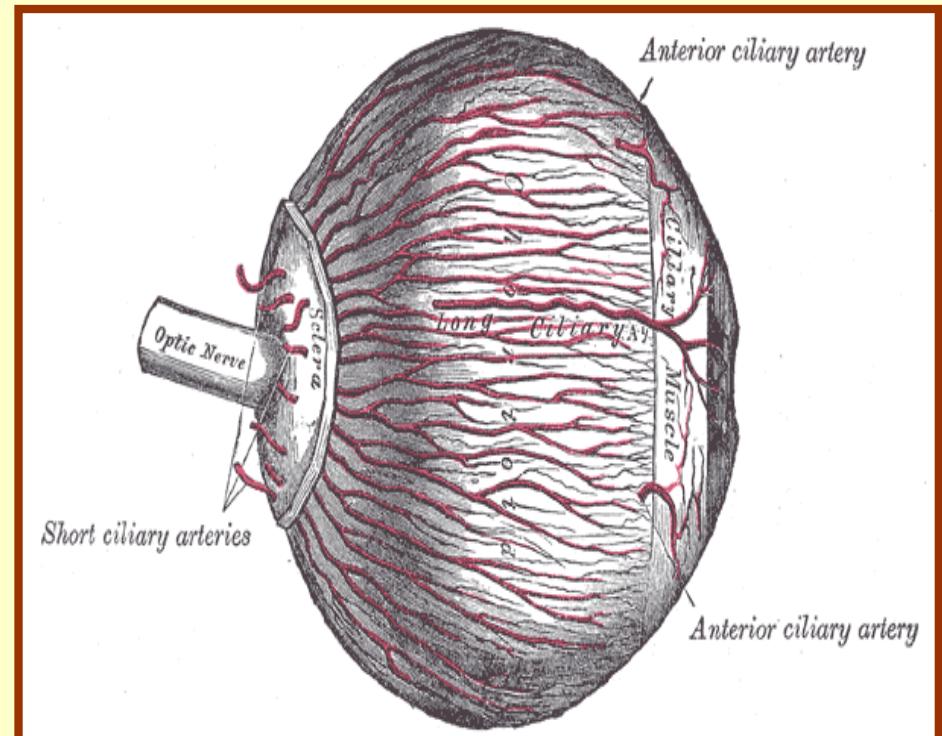
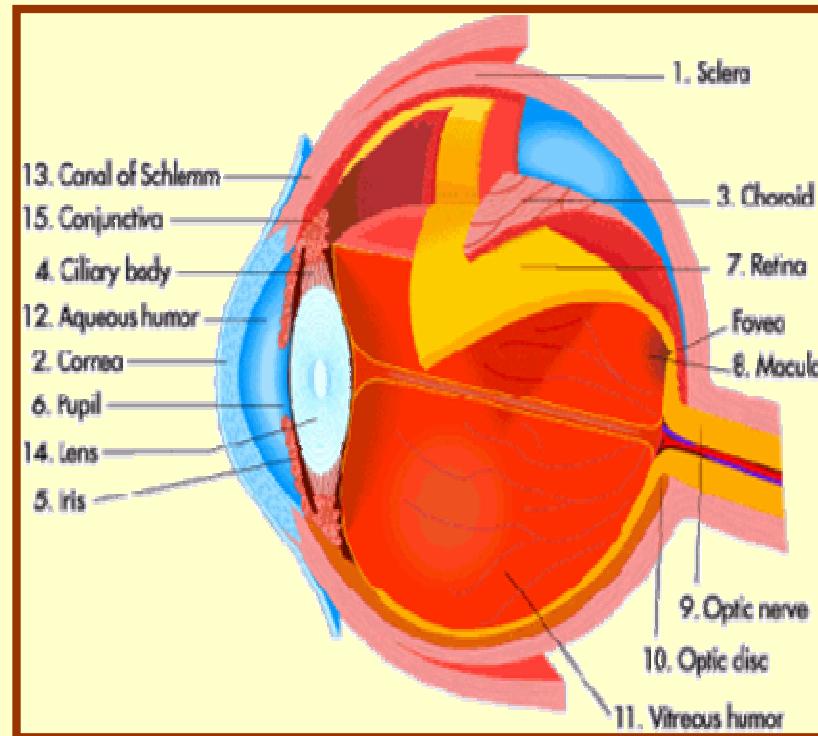
- aqueous production
- attachment for the lens
- accommodation



A diagram showing a cross-section of the eye wall. A thick, wavy green layer represents the choroid, situated between the retina (innermost layer) and the sclera (outermost layer).

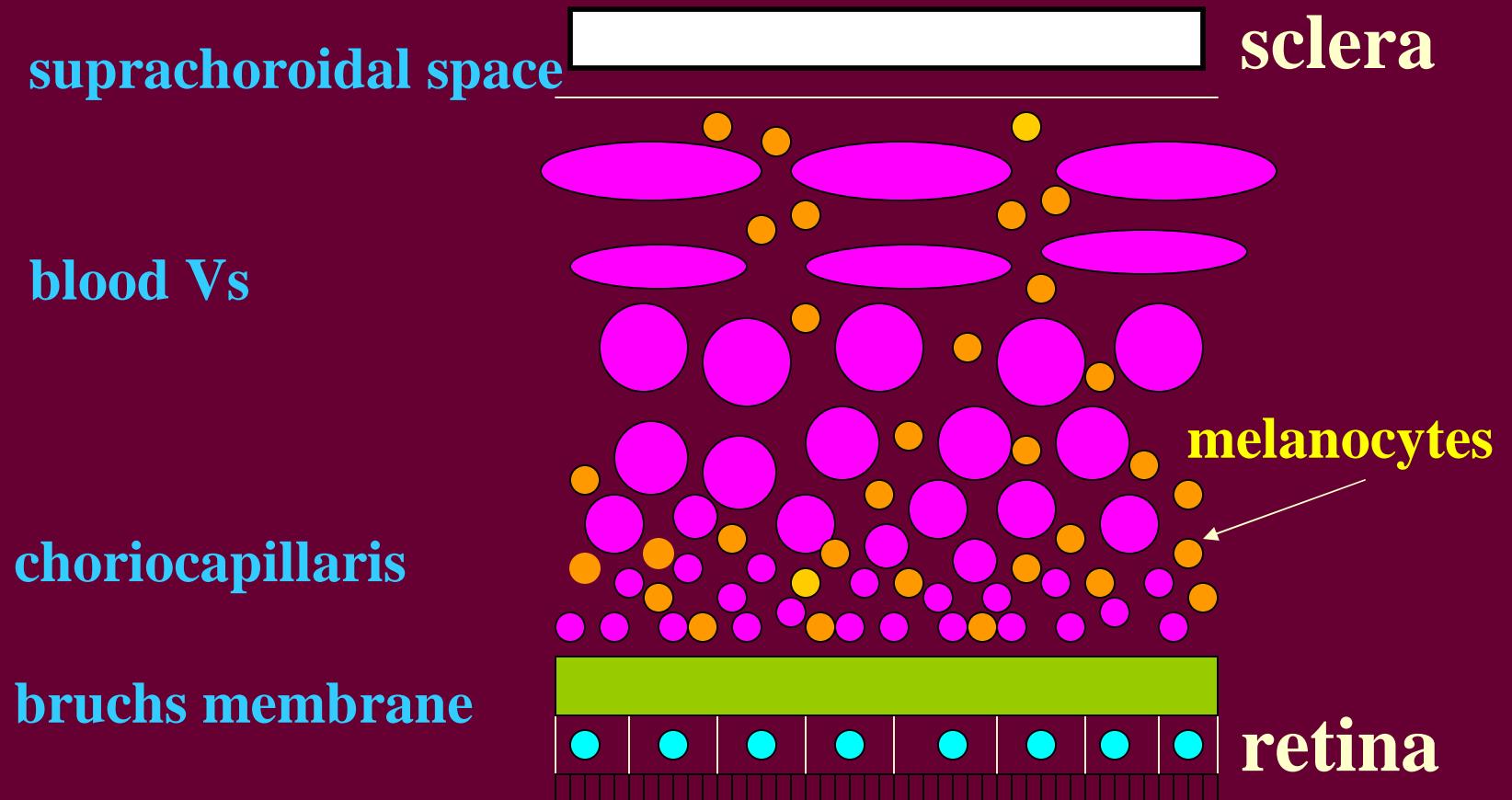
Choroid

Choroid



Anatomy of the choroid

- Choroid layers:



Functions of the choroid

- 1-blood supply to the outer 5 layers of the retina
- 2-blood supply to the all layers of fovea.
- 3-uveal pigments absorb light to prevent light scattering inside the eyeball.

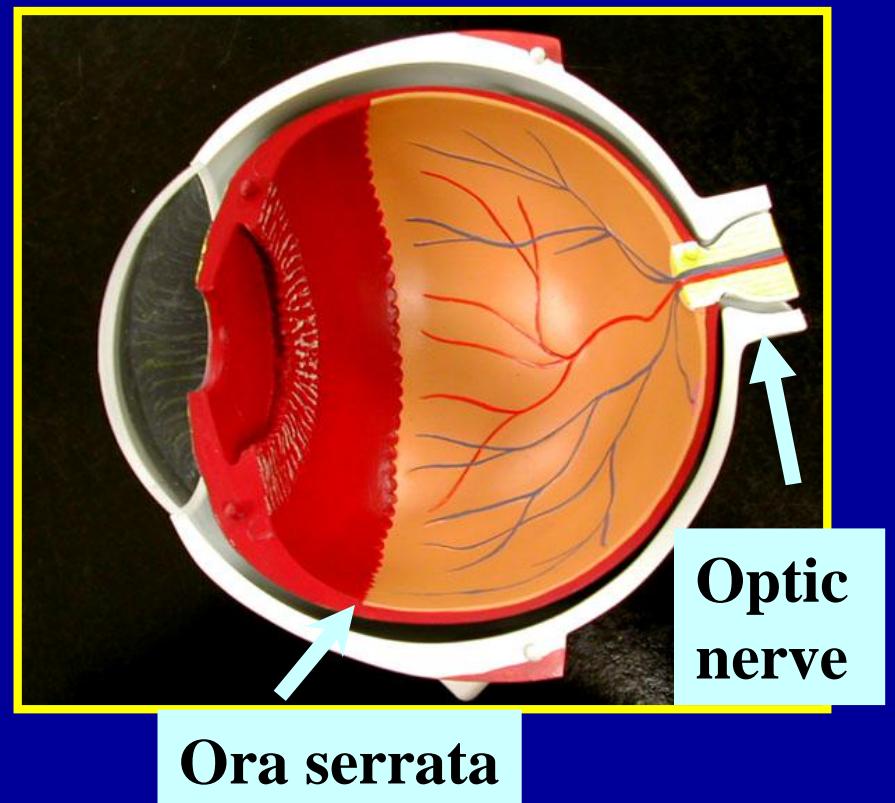


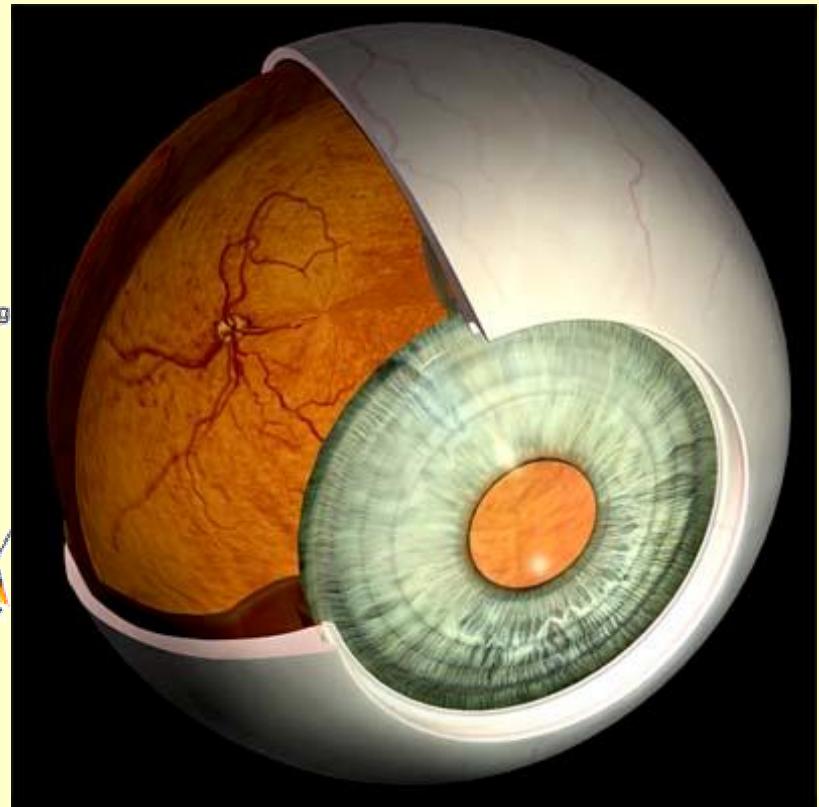
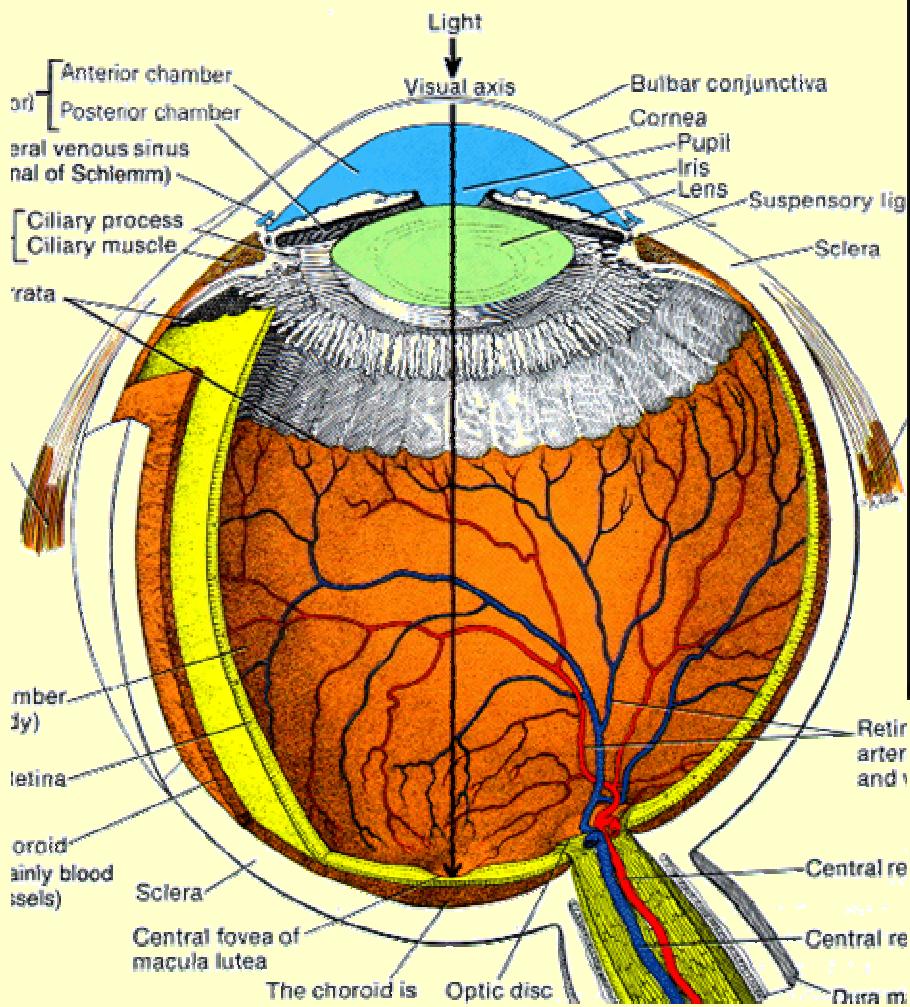
3-Anatomy of the inner coat

The retina

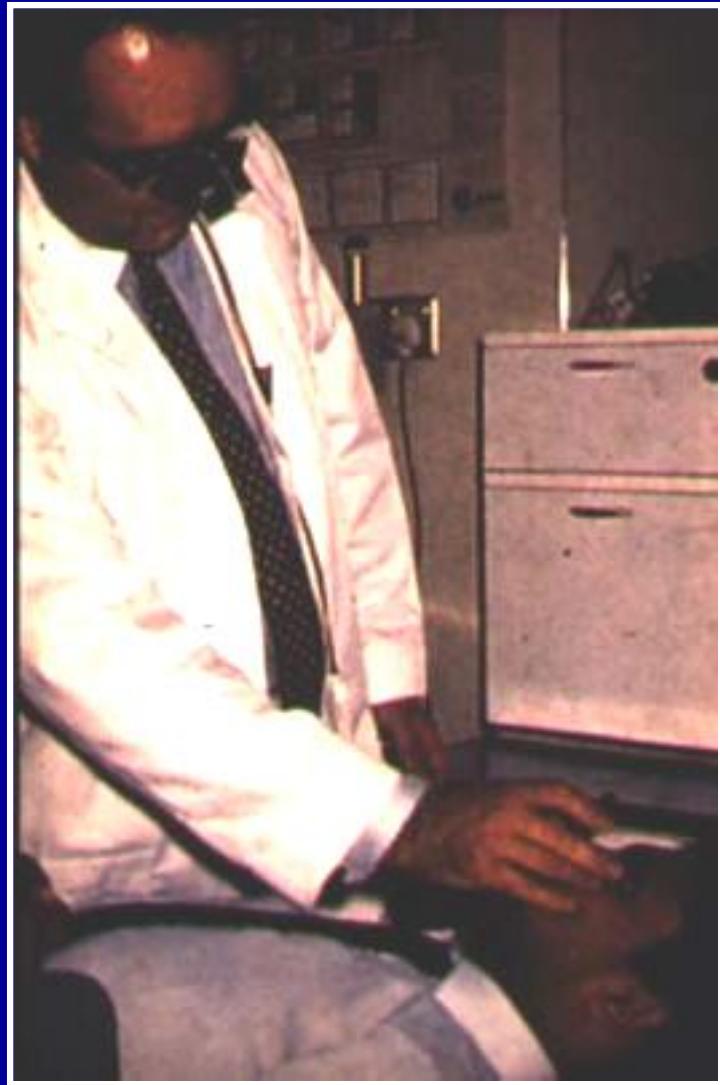
Macroscopic appearance of the retina

- Transparent membrane
- Between vitreous & choroid
- Extends from the optic nerve to continue ant. With the pig. epith. Of the ciliary body & iris



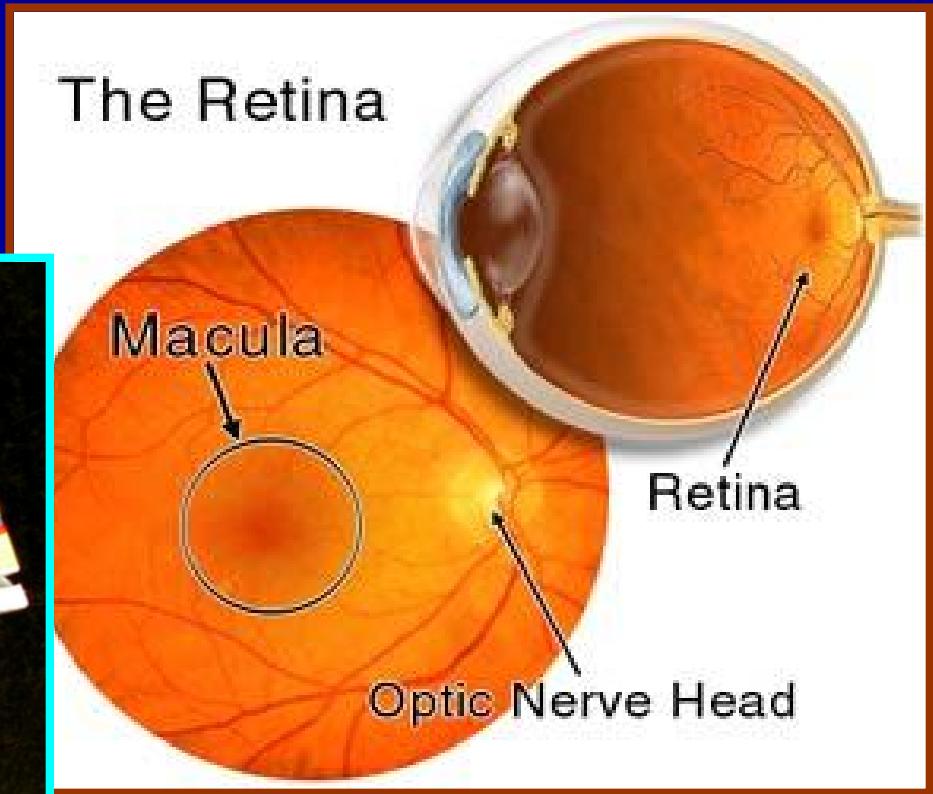
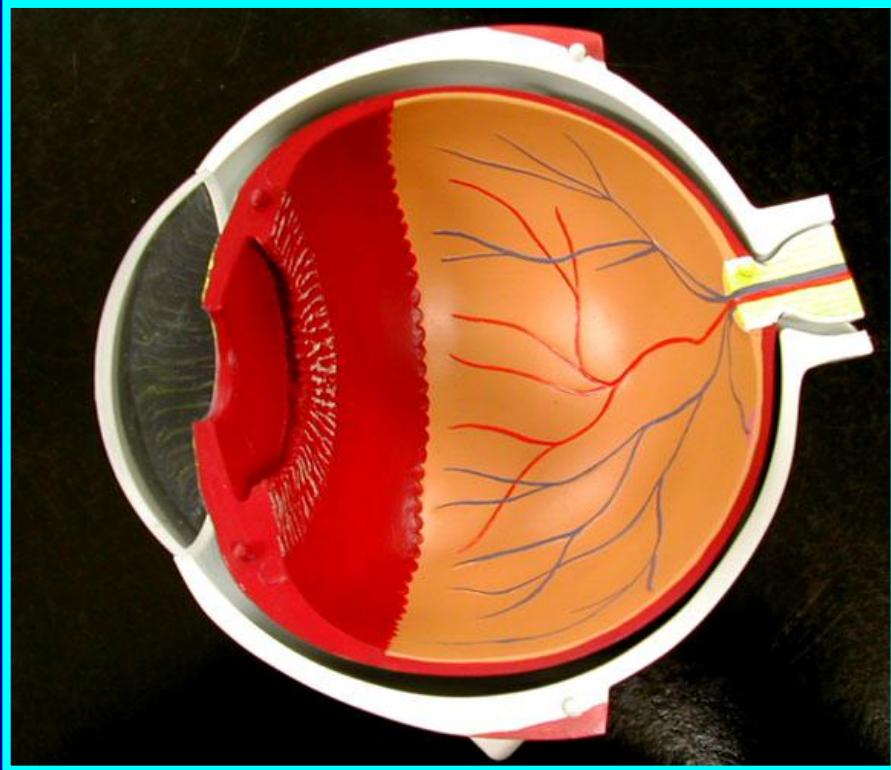


retina



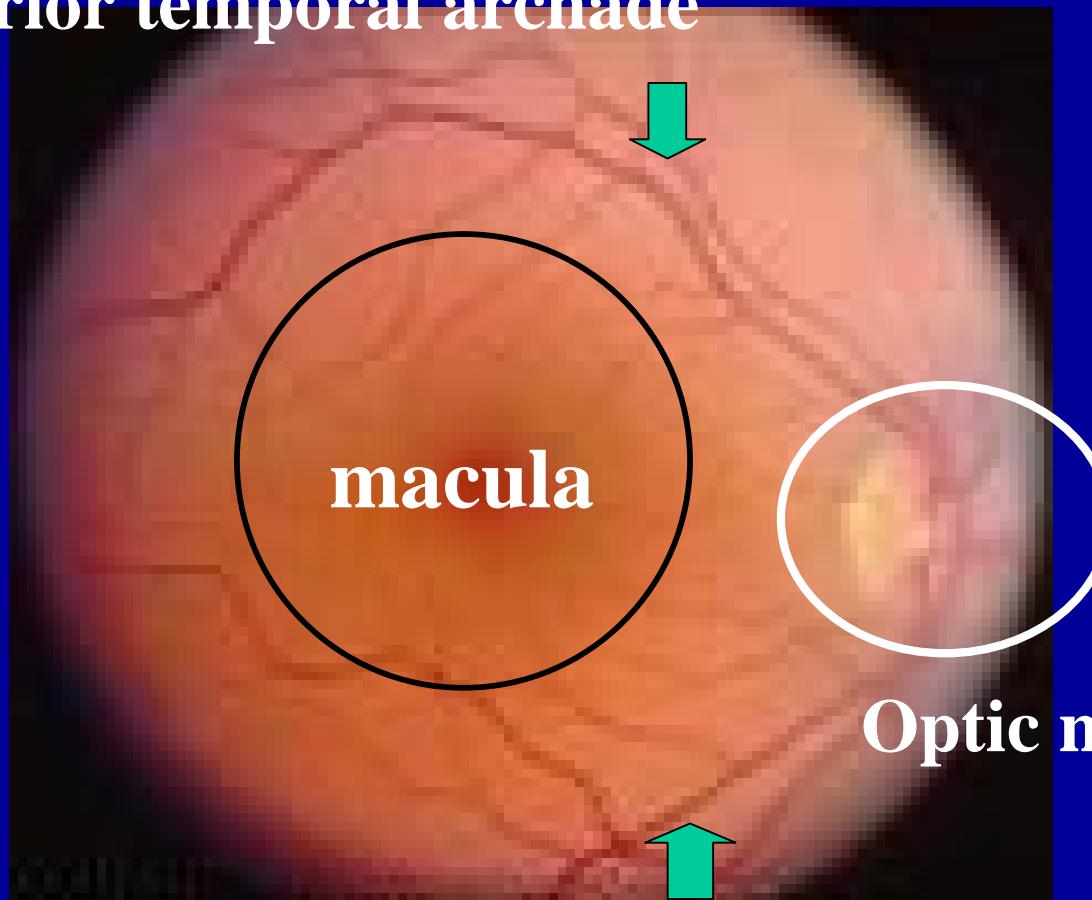
Inner coat (retina)

Mac



Inner coat (retina)

Superior temporal archade

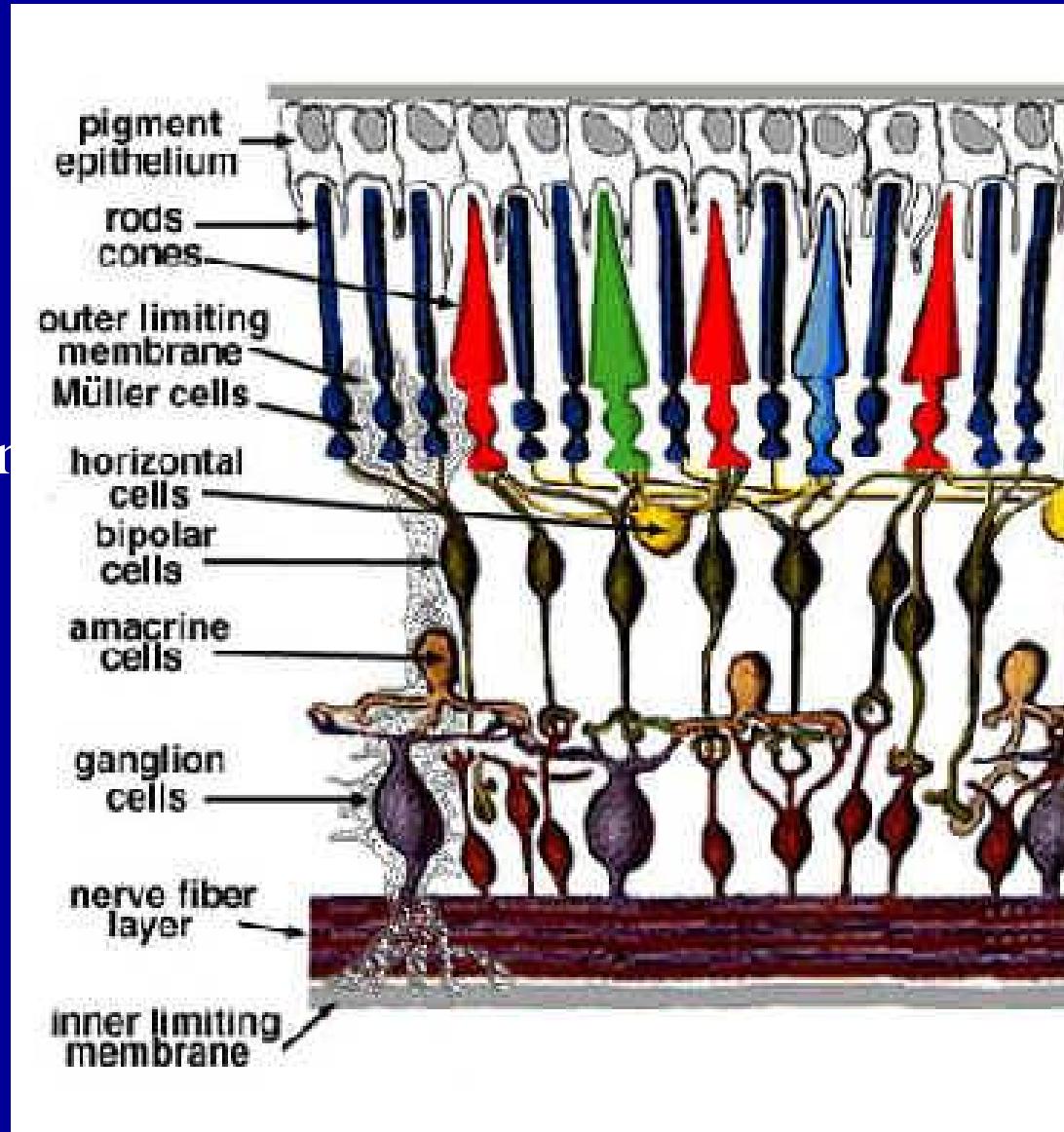


inferior temporal archade

Inner coat (retina)

Mic.: 10 layers

RPE
Photoreceptor layer
External limiting membrane
Outer nuclear layer
Outer plexiform layer
Inner nuclear layer
Inner plexiform layer
Ganglion cell layer
Nerve Fibre layer
Inner limiting membrane



Inner coat (retina)

blood supply:

outer 5 layers:choroid

inner 5 layers:central retinal artery

no nerve supply

Optic nerve



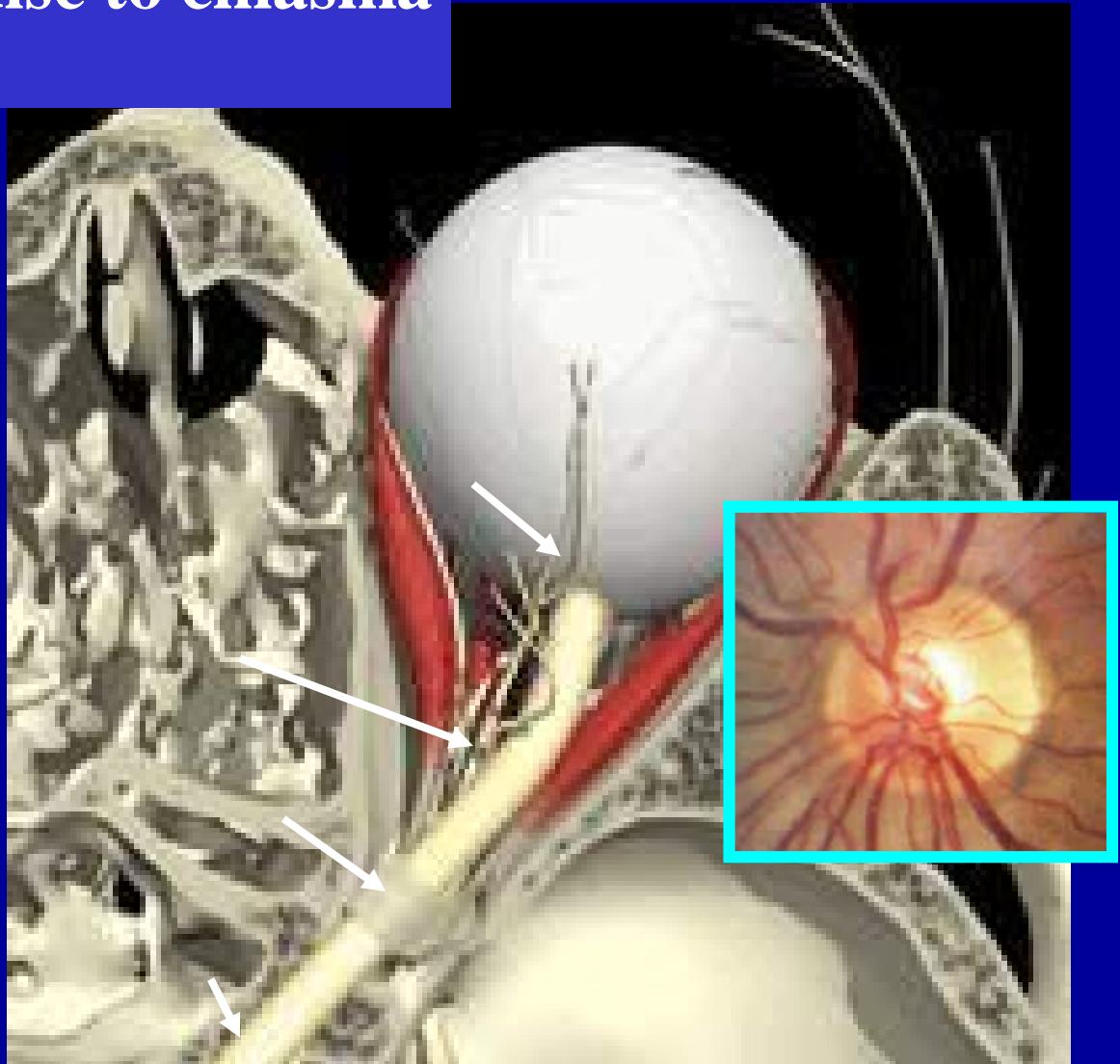
5 cms long
extends from disc to chiasma
4 parts

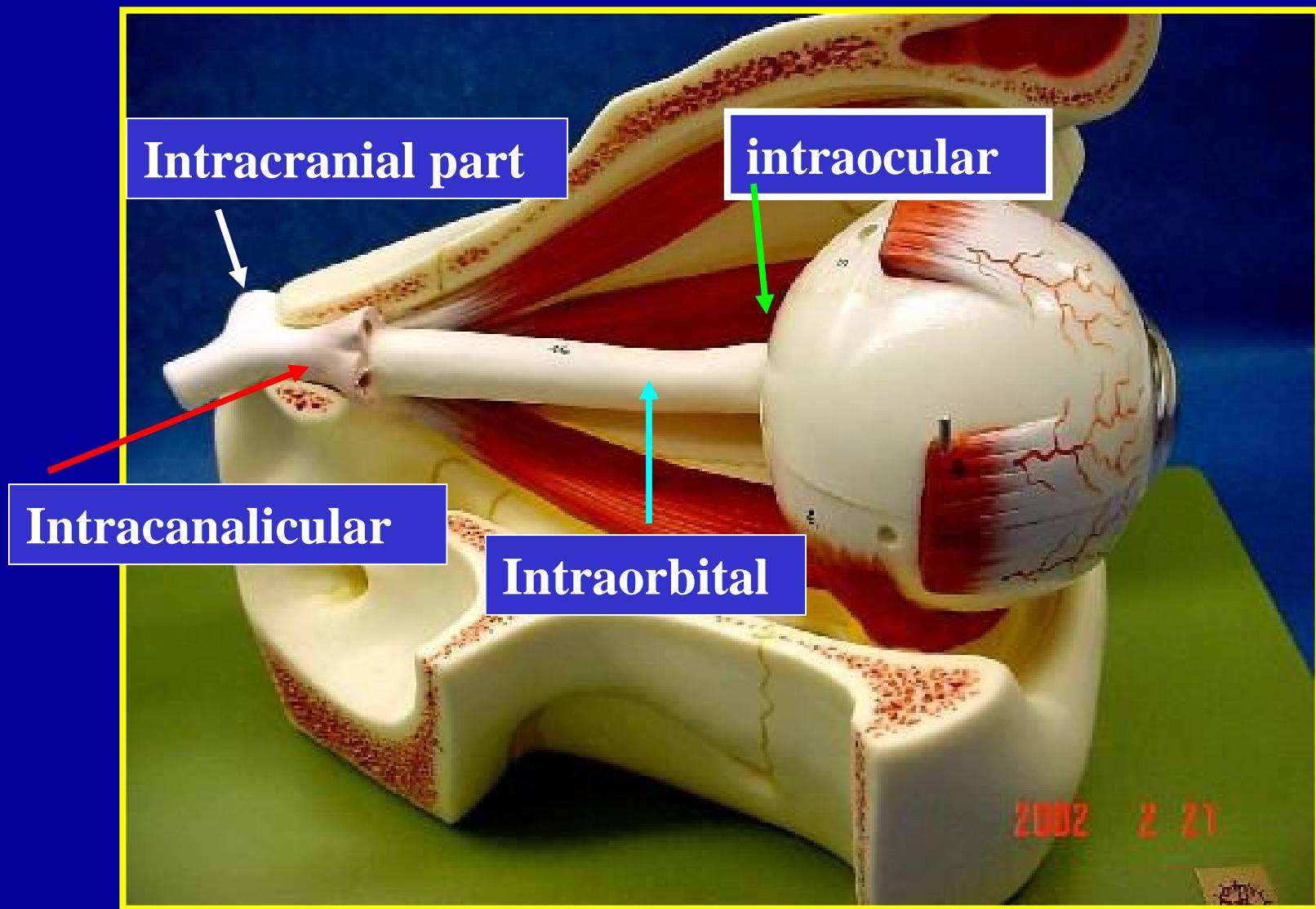
intraocular

Intraorbital

Intracanalicular

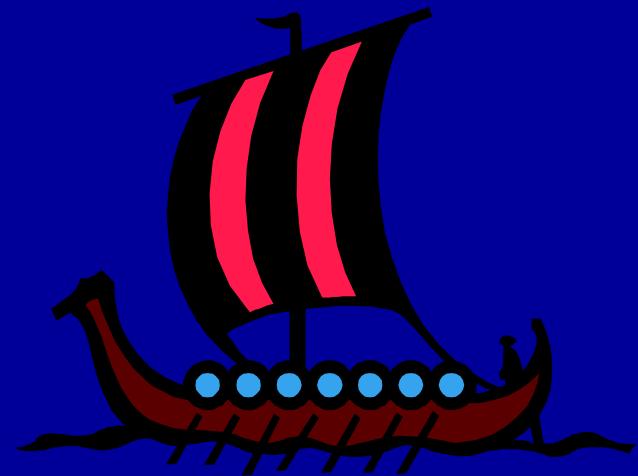
Intracranial part





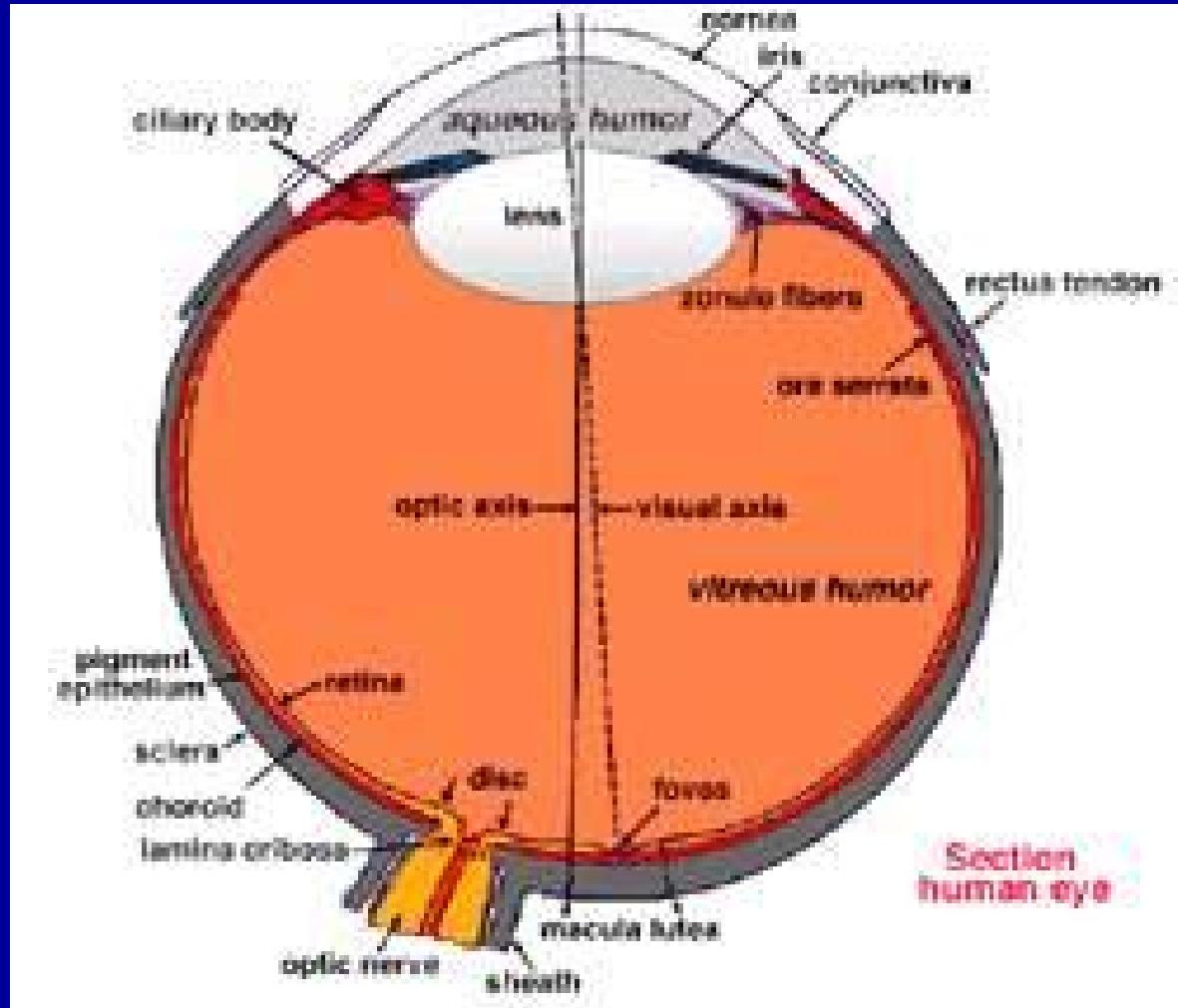
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Anatomy of



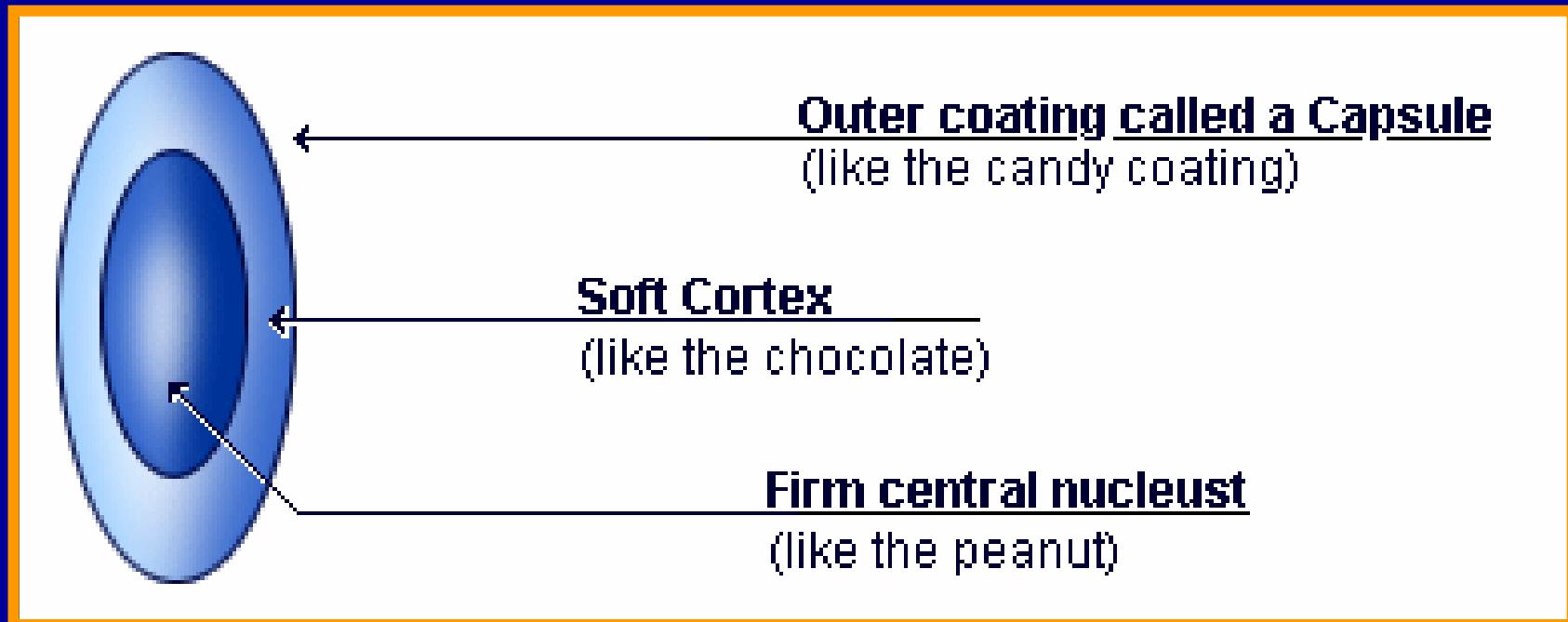
The crystalline lens

Crystalline lens



Crystalline lens

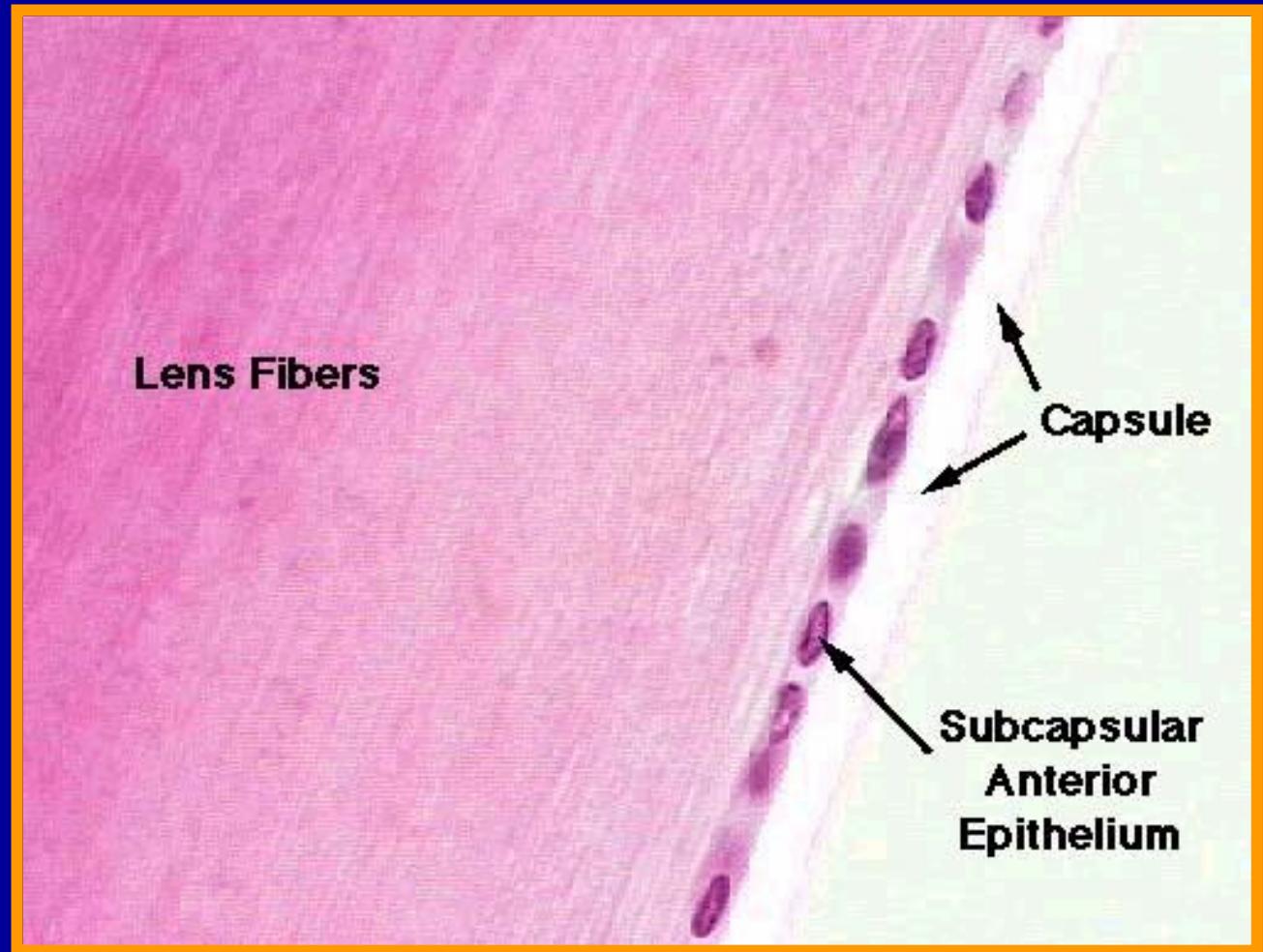
Mac



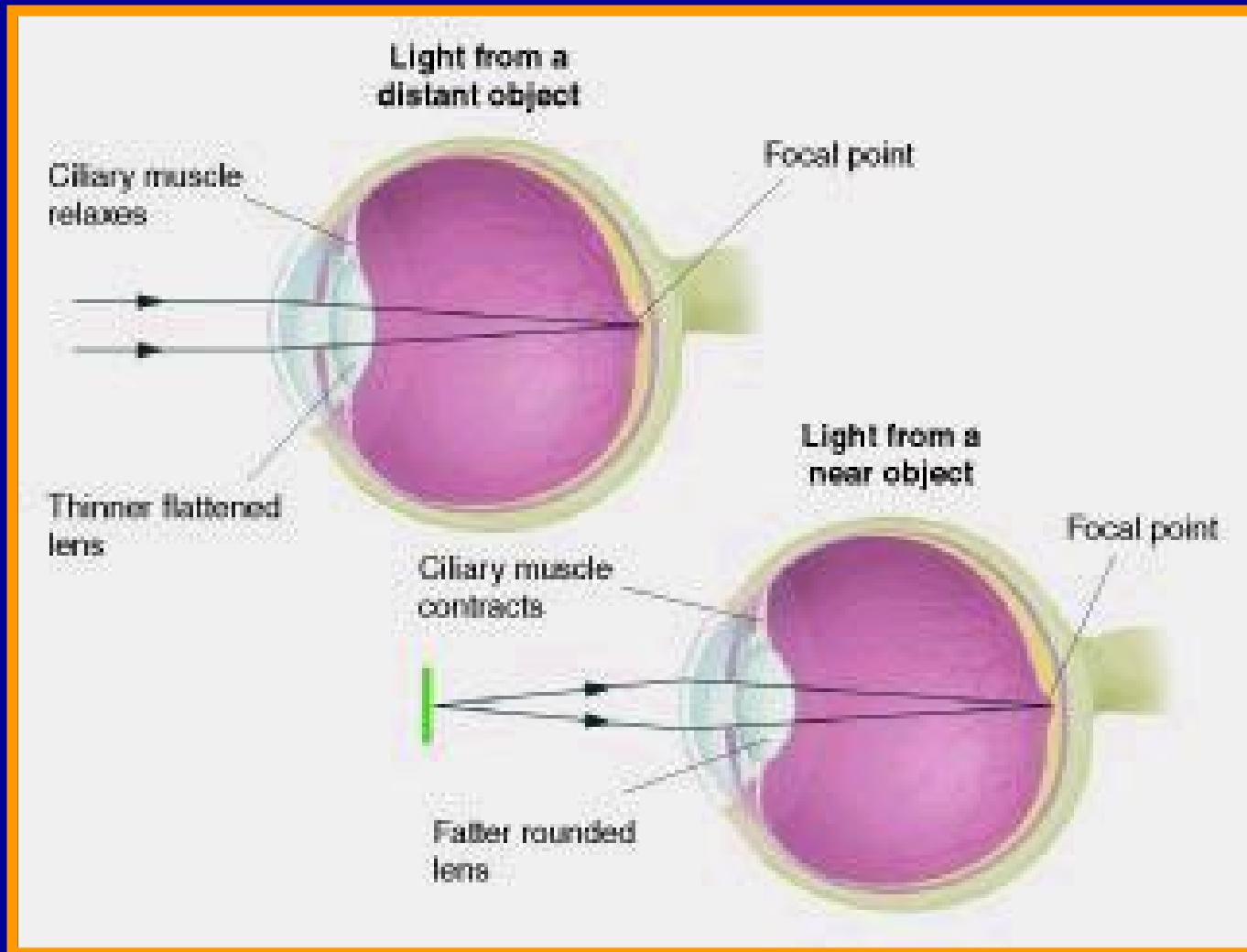
Crystalline lens

Mic:

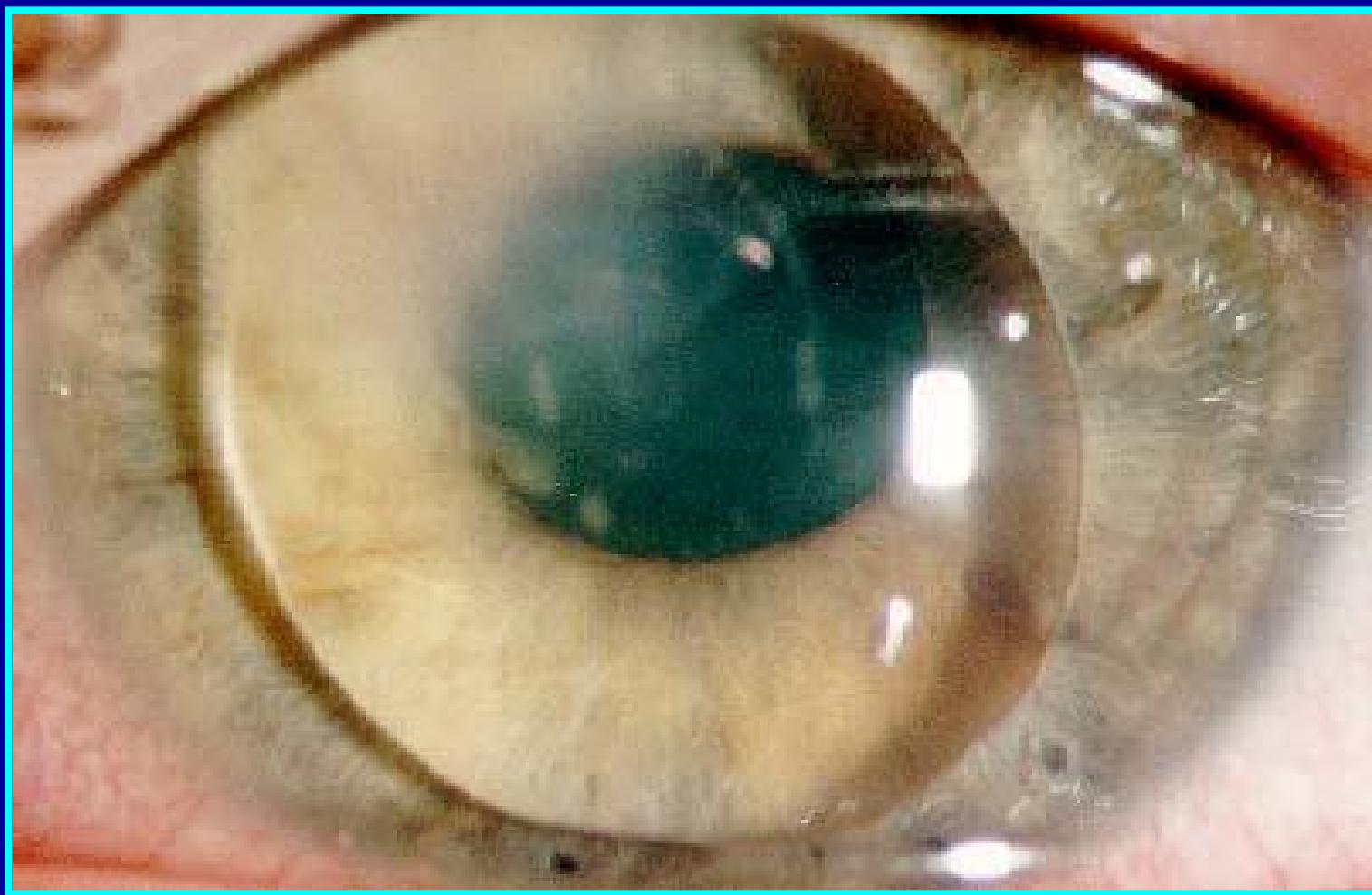
- Lens capsule
- lens epithelium
- lens fibers



Accommodation



Crystalline lens in A.Ch.

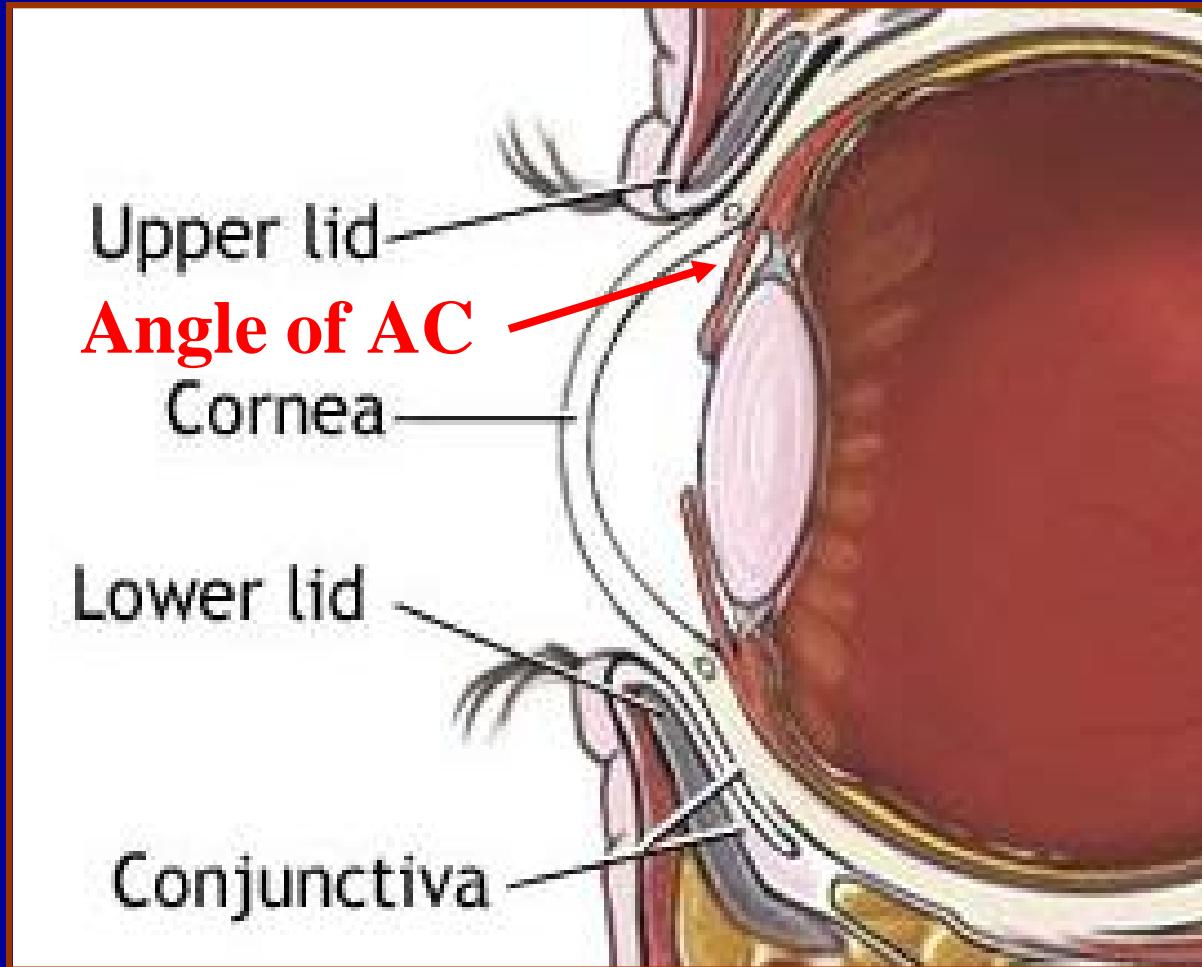


Anatomy of

Angle of anterior chamber



Angle of the anterior chamber



Angle of the anterior chamber

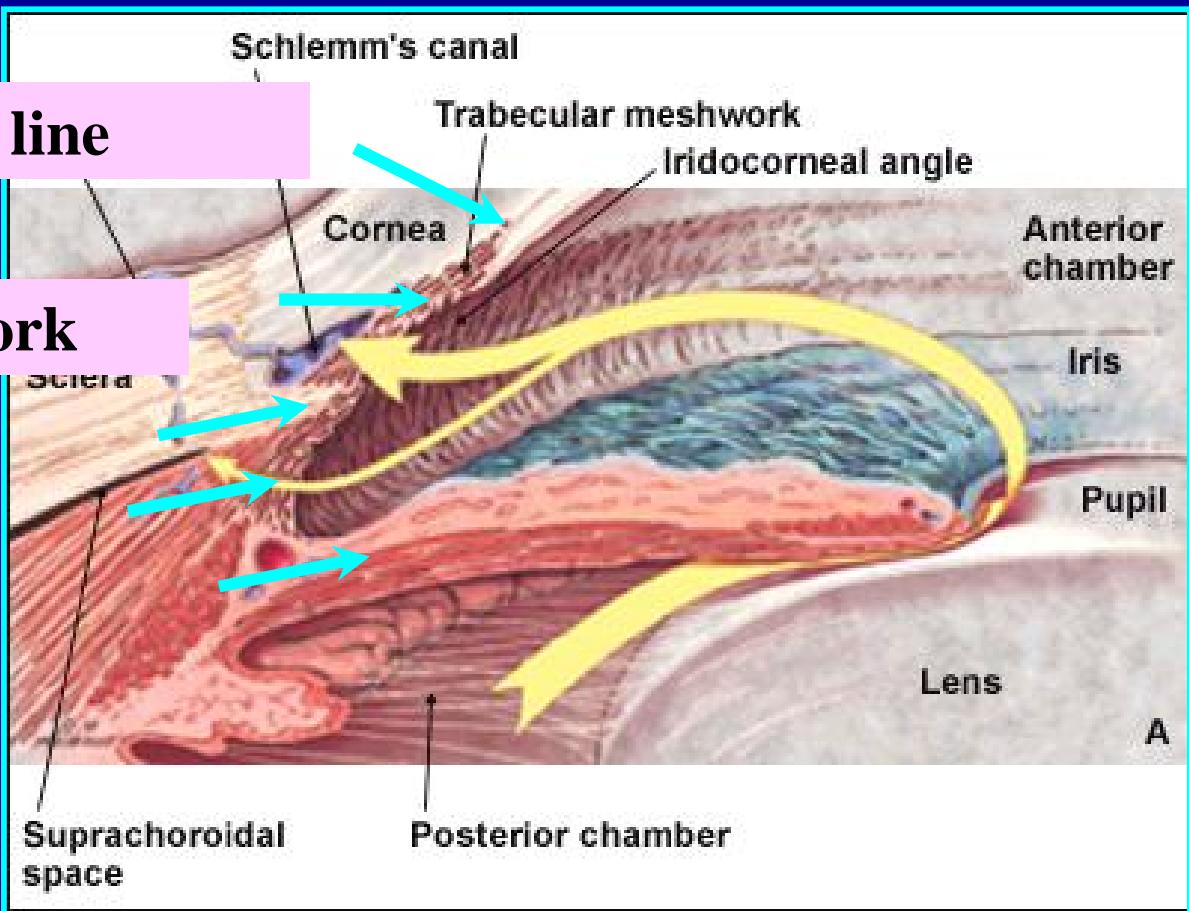
1-anterior schwalbe line

2-trabecular meshwork

3-scleral sponges

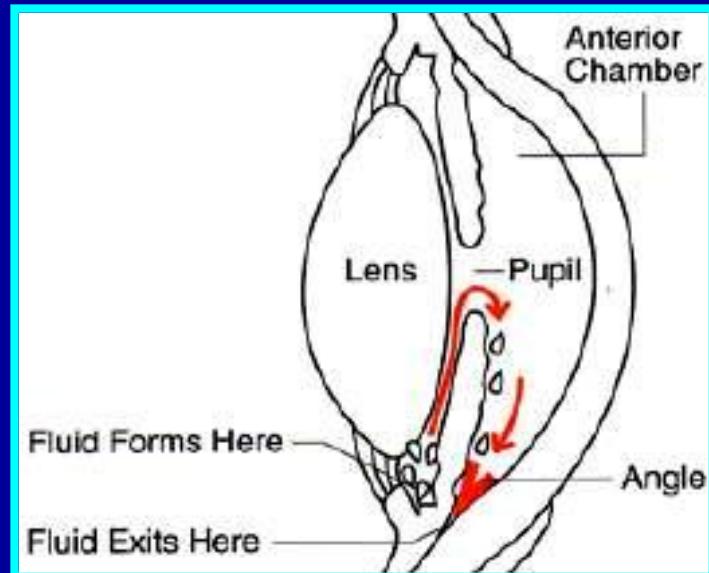
4-CB

5-iris root



Ocular physiology

- Aqueous production:
 - aqueous is secreted by ciliary processes.
 - It is first passes into the posterior chamber.
 - Then the aqueous access through the pupil.
 - Then it fills the anterior chamber.



Ocular physiology

- Aqueous drainage:
 - 1- aqueous is filtered through the trabecular meshwork presents in the angle of the anterior chamber

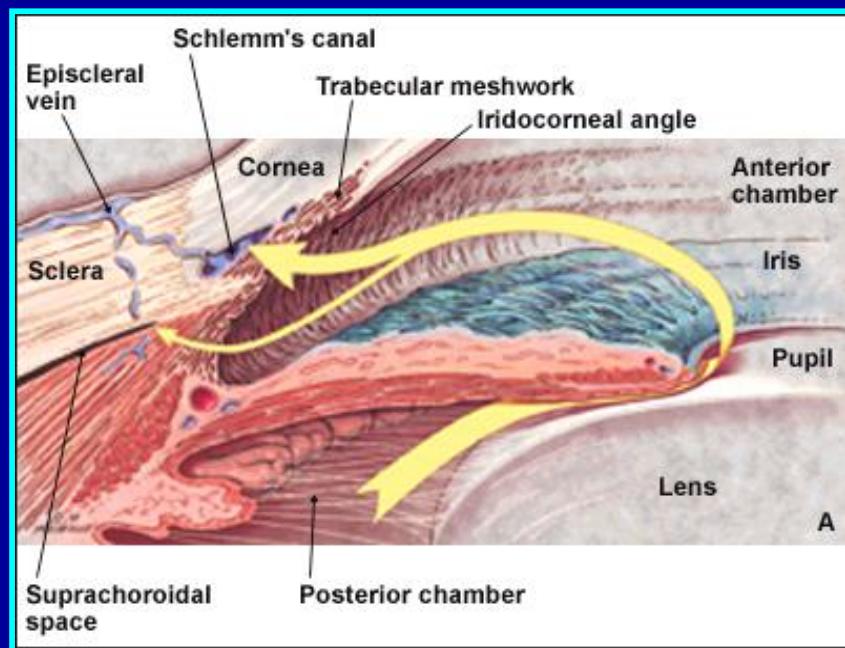


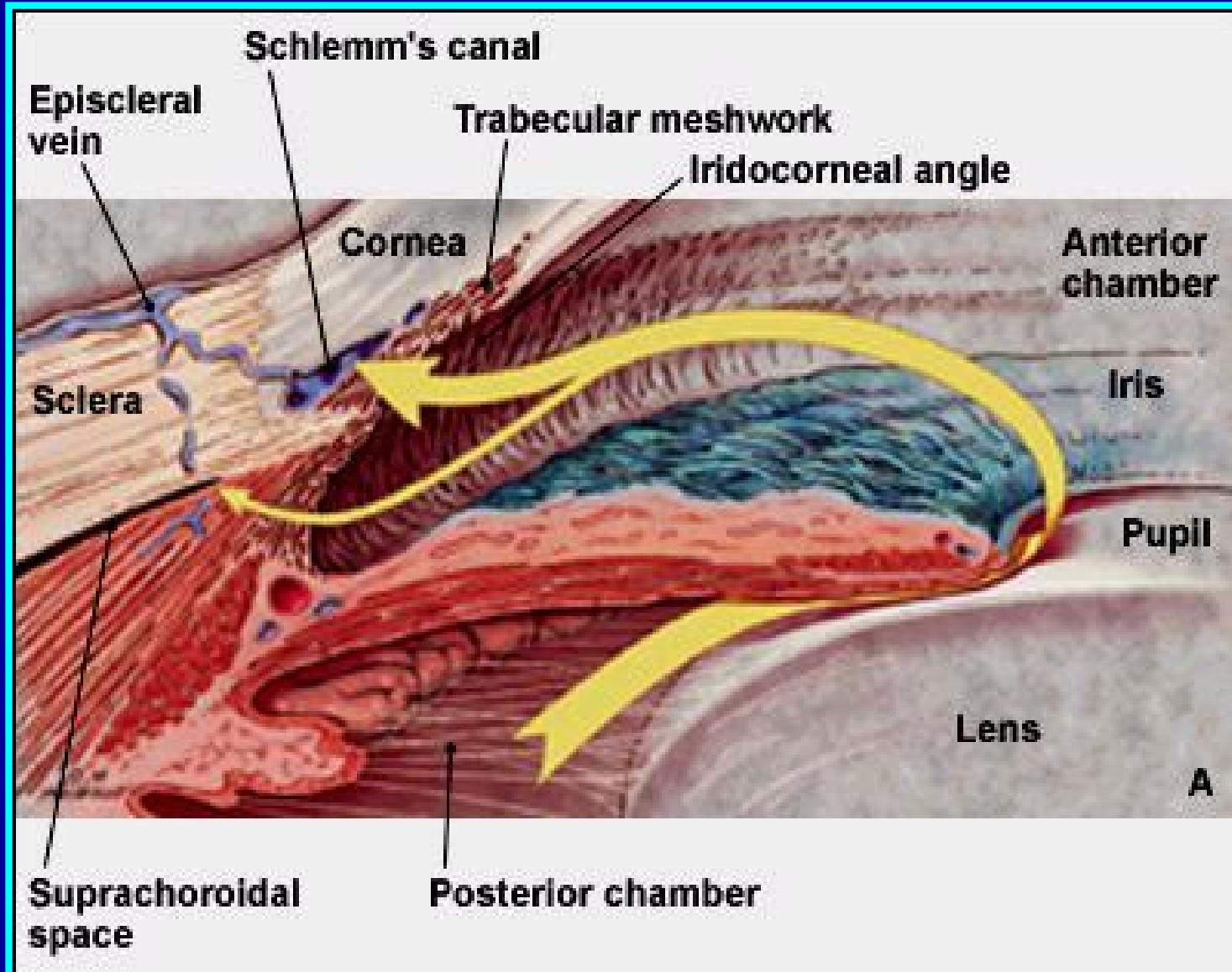
**Canal of schlemme
(inside sclera)**



**Collecting channels
& aqueous veins
(inside sclera)**

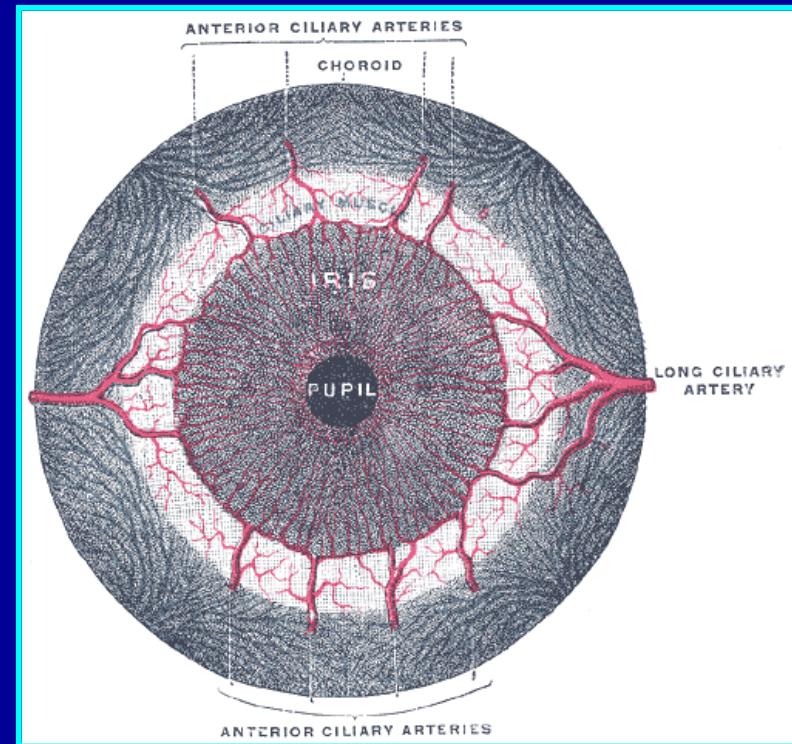
**Episcleral veins
on outer scleral surface**





Ocular physiology

- Aqueous drainage:
2-uveoscleral pathway 20%:



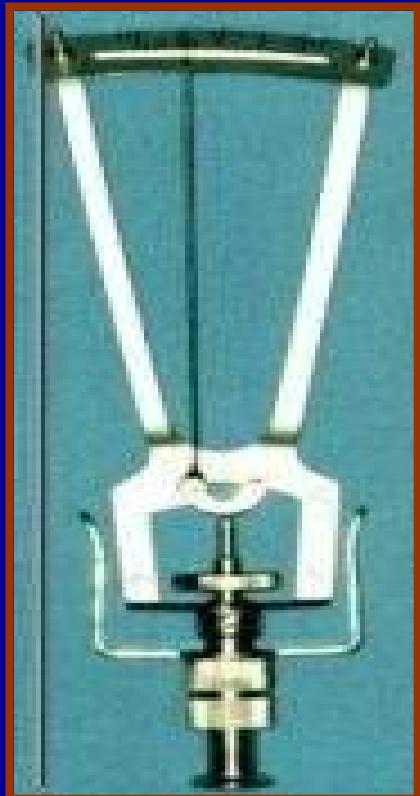
Importance

Functions of aqueous humor

- **Supplies avascular ocular tissues** (lens,cornea) with oxygen & nutrients and carries the waste products of their metabolism.
- **Regulates IOP:**
 - maintains regular shape of the eye.
 - Regulates perfusion of ocular tissues from the capillaries.
 - Range 10-21

Measurement of ocular tension

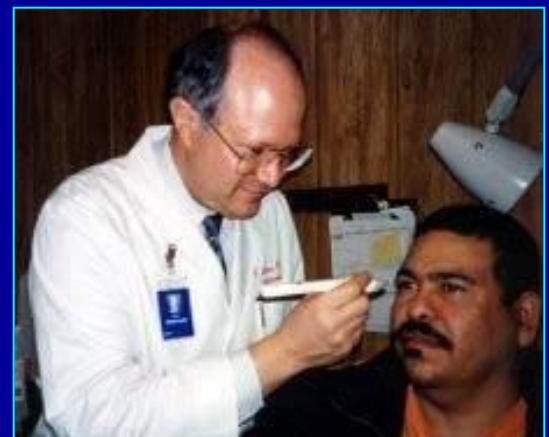
Tonometry



Schiotz indentation



Goldmann
applanation



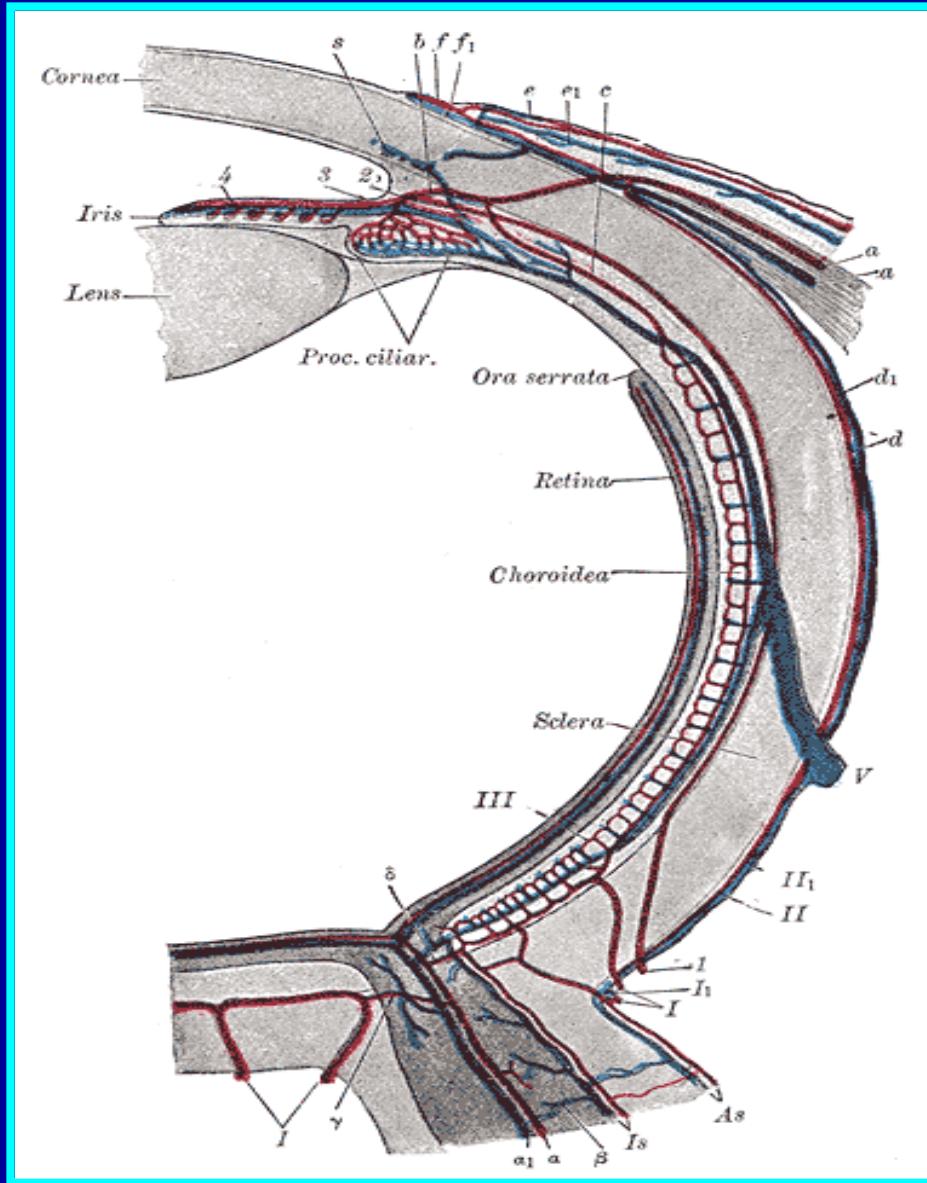
tonopen

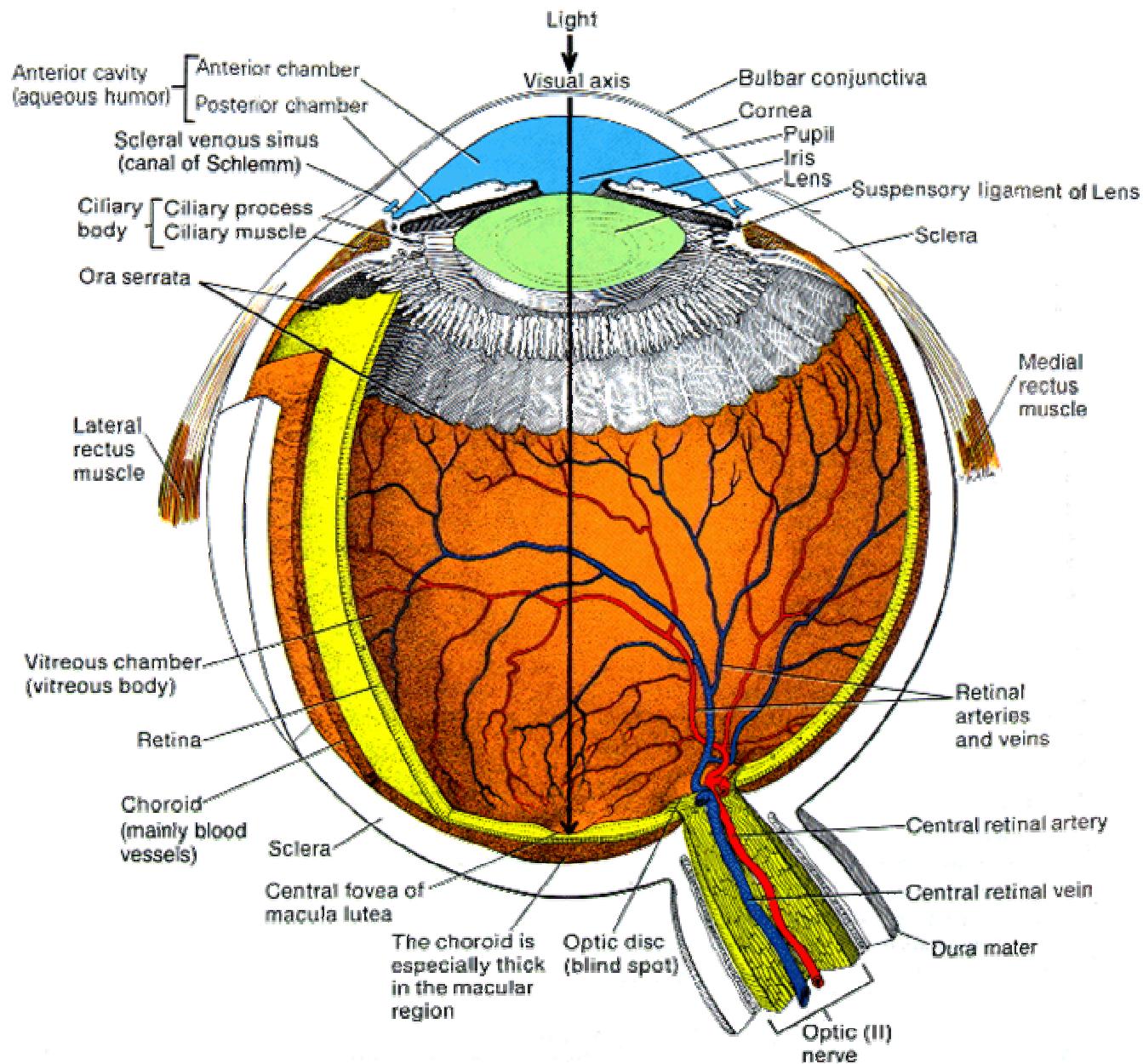
Measurement of ocular tension



airpuff

Blood supply of the eyeball





Blood supply of the eyeball

1. arterial

internal carotid artery → ophthalmic artery



Ciliary system

- * 7 ACA
- * 2 LPCA → CAIM in ciliary body distr.

To:

ciliary muscle.Ciliary processes.iris.

ant.choroid.

- * 10-20 SPCA

post. choroid

Retinal system

- CRA (end artery)
- CRV
- inner 5 layers of retina

Blood supply of the eyeball

2. venous

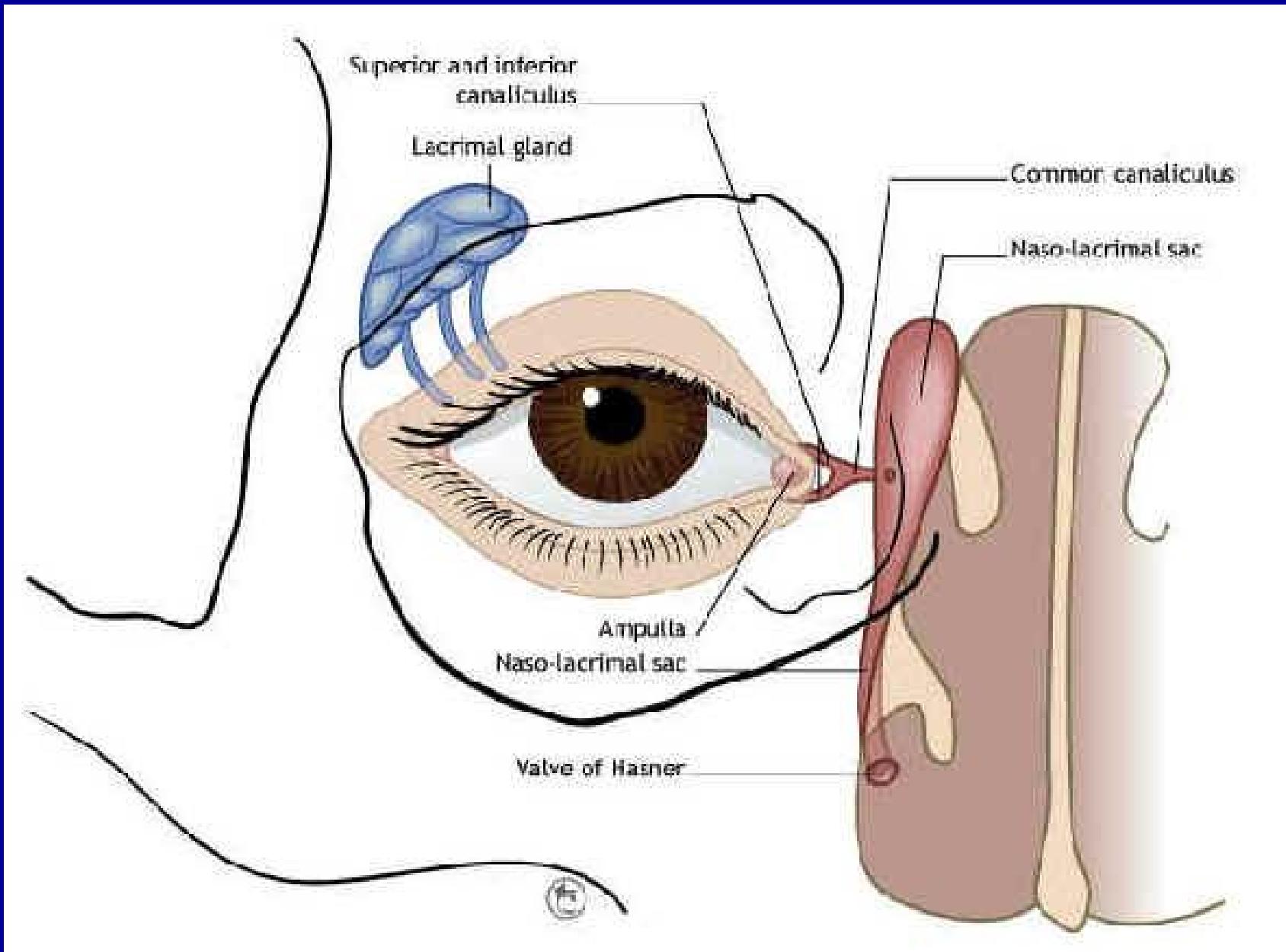
* vortex veins:

 all structures except ciliary muscle → SOV, IOV

* ACV:

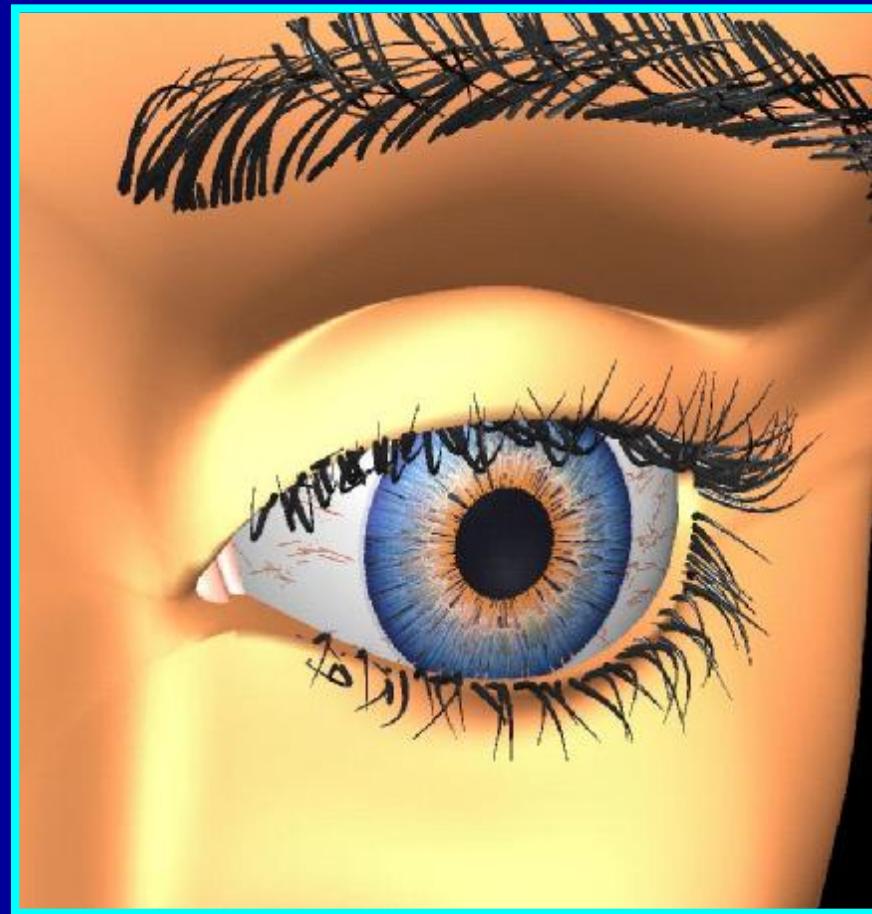
 ciliary muscle only → SOV, IOV

 SOV, IOV → cavernous sinus



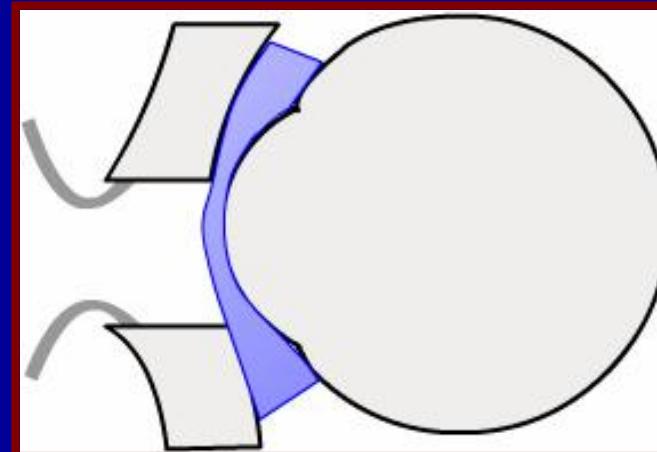
Adenexa

1. eye lids



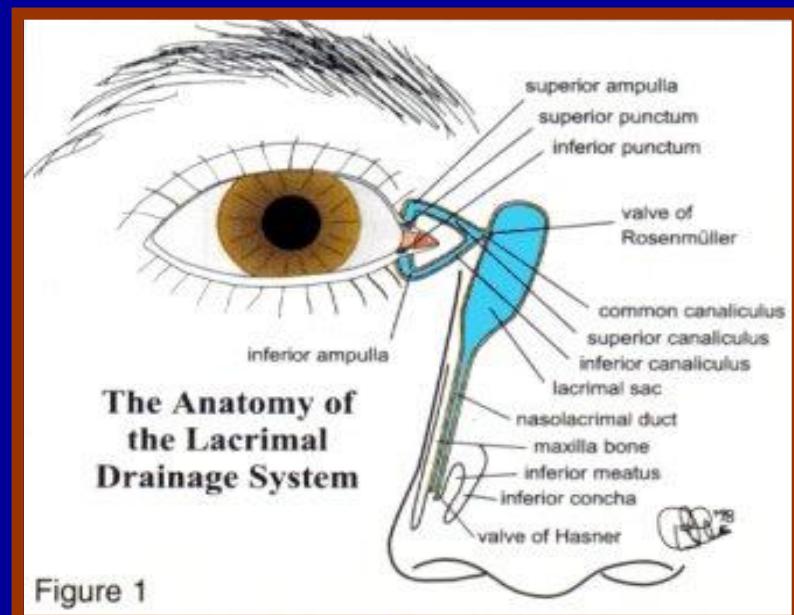
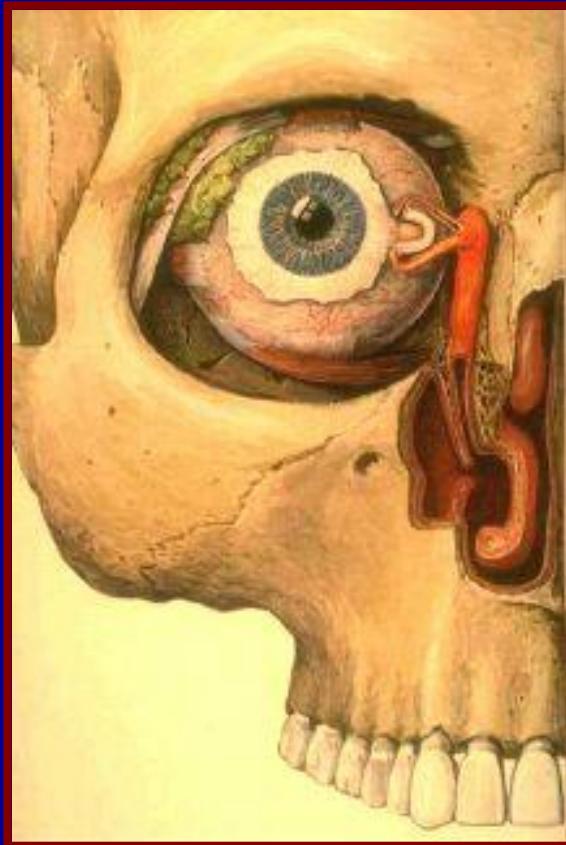
Adenexa

2.conjunctiva



Adenexa

3.lacrimal system(tear production & drainage)



A photograph of a sunset over a sandy beach. In the lower-left foreground, there is a small, dark green cactus plant growing out of the sand. The sky is filled with horizontal bands of pink, orange, and yellow, transitioning from a deep red at the top to a pale yellow near the horizon. The ocean is visible in the distance, meeting the sky.

Thank you