SENSE ORGAN

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EYE

fibrous globe

lens

photosensitive cells

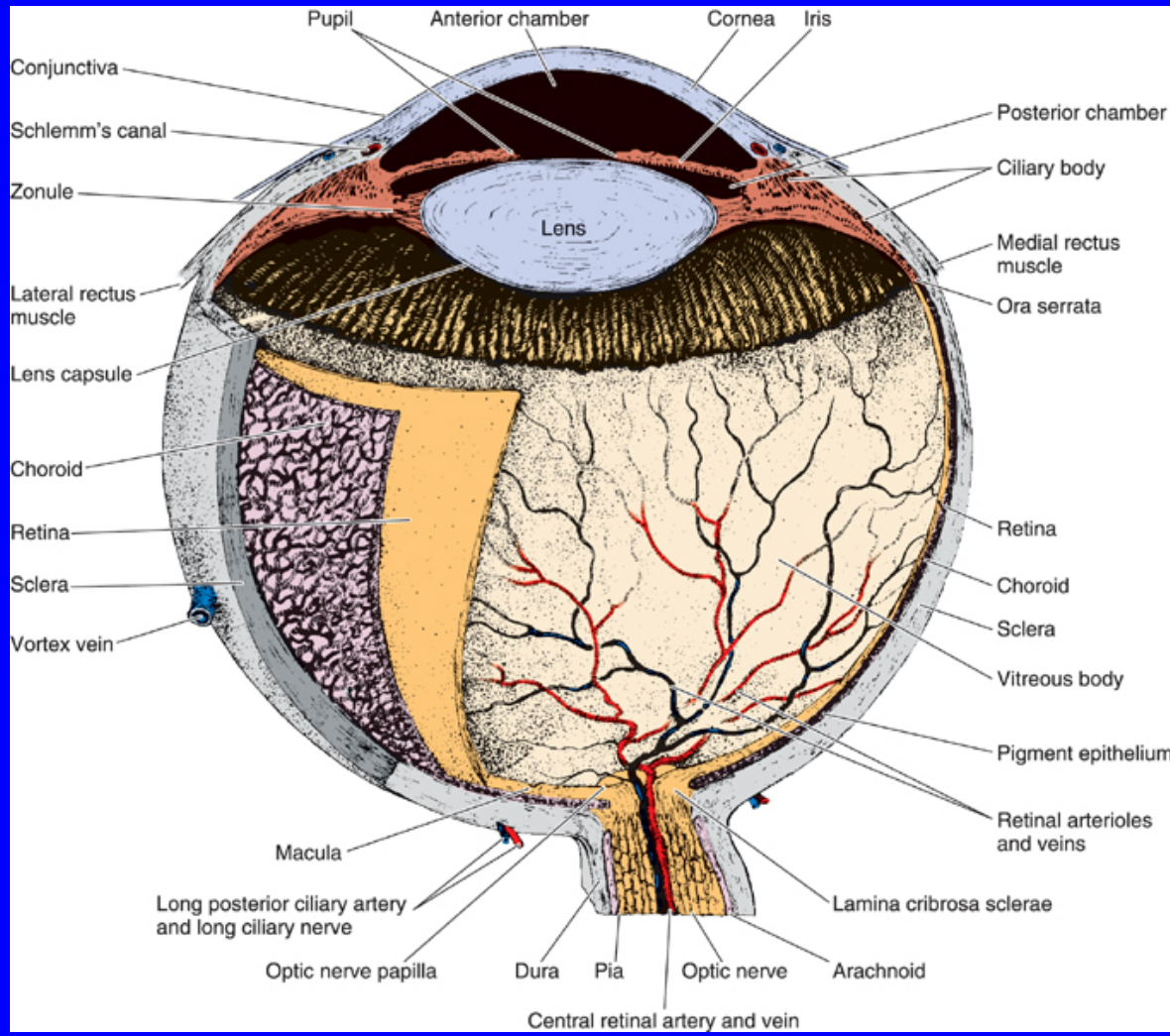
a system of cells and nerves

3 concentric layers

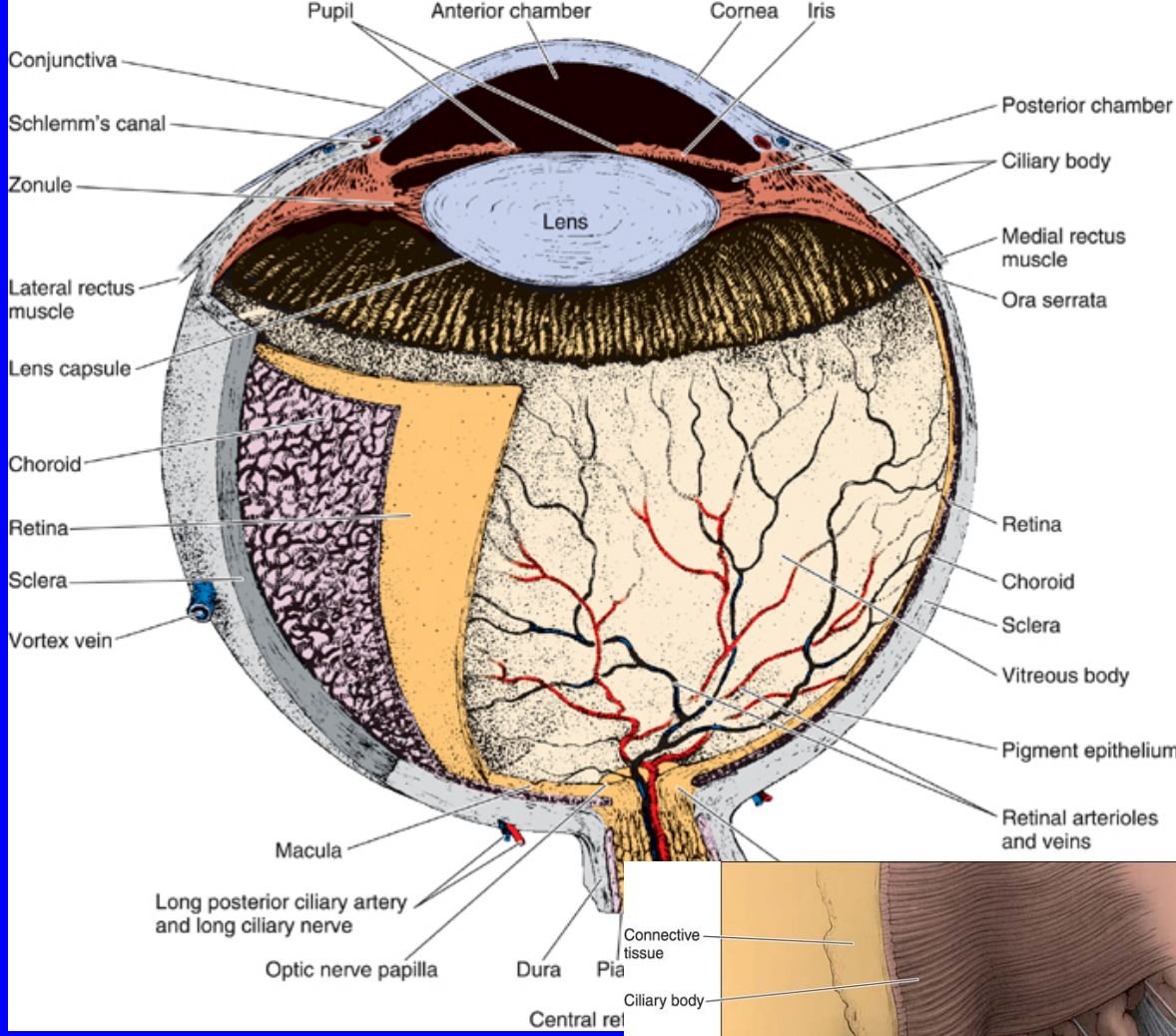
the sclera and the cornea

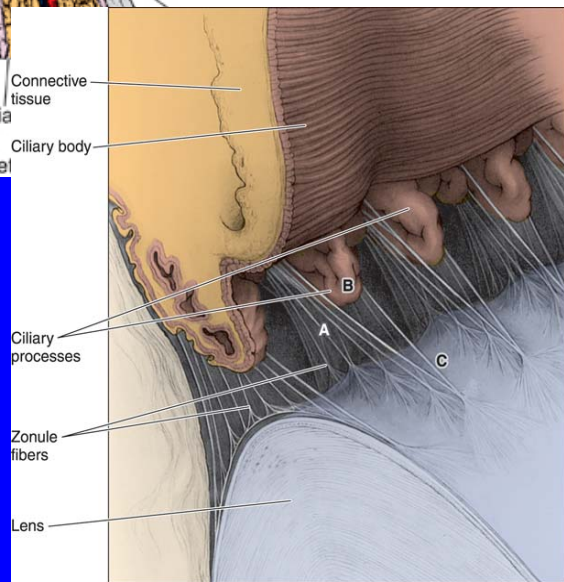
choroid, ciliary body, and iris

retina



- lens
- zonule
- ciliary body
- iris
- pupil
- anterior chamber
- posterior chamber
- vitreous space
- aqueous humor
- vitreous body





wall of eye balls

external layer :

1. cornea

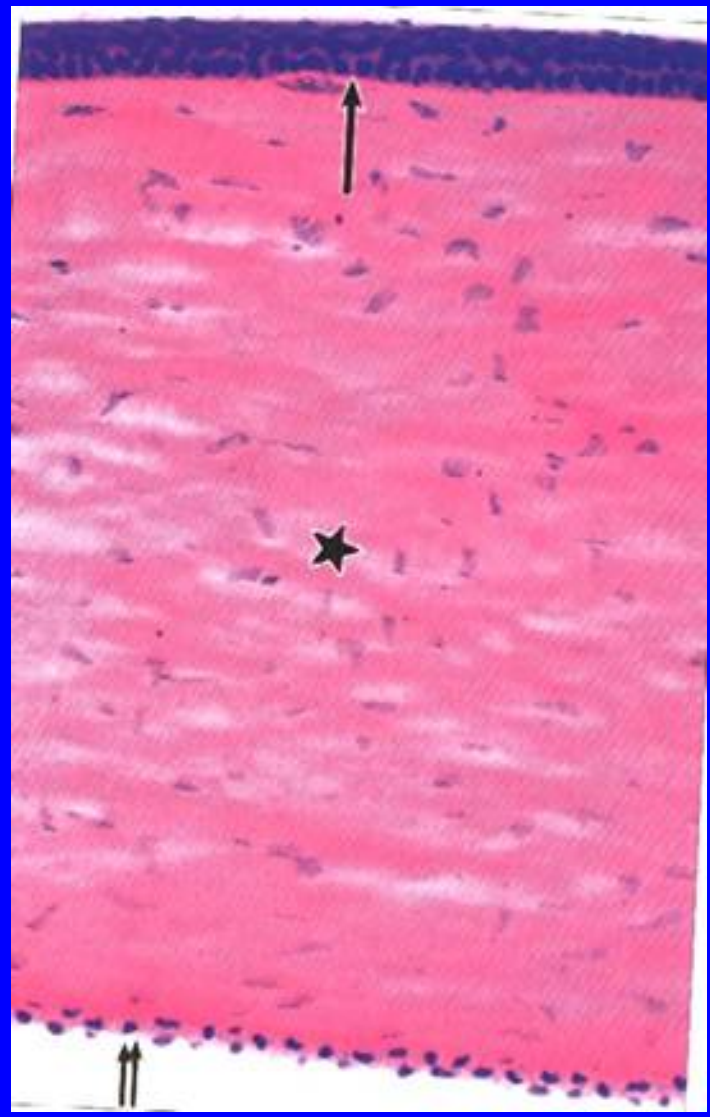
(1) corneal epithelium:

(2) Bowman’s membrane:

(3) stroma:

(4) Desemet’s membrane：

(5) corneal endothelium：



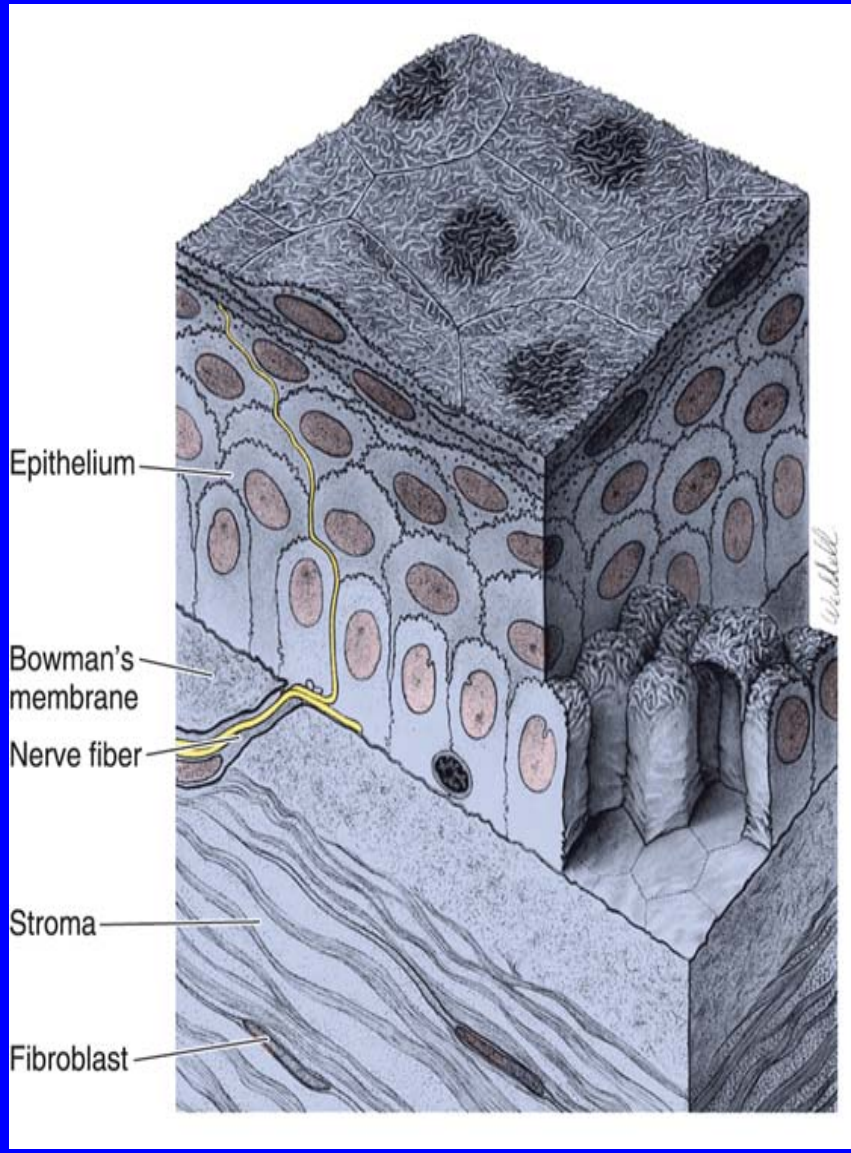
(1) corneal epithelium:

(2) Bowman’s membrane:

(3) substantial propria(stroma):

(4) Desemet’s membrane：

(5) corneal endothelium：



The reason of the transparency of the cornea :

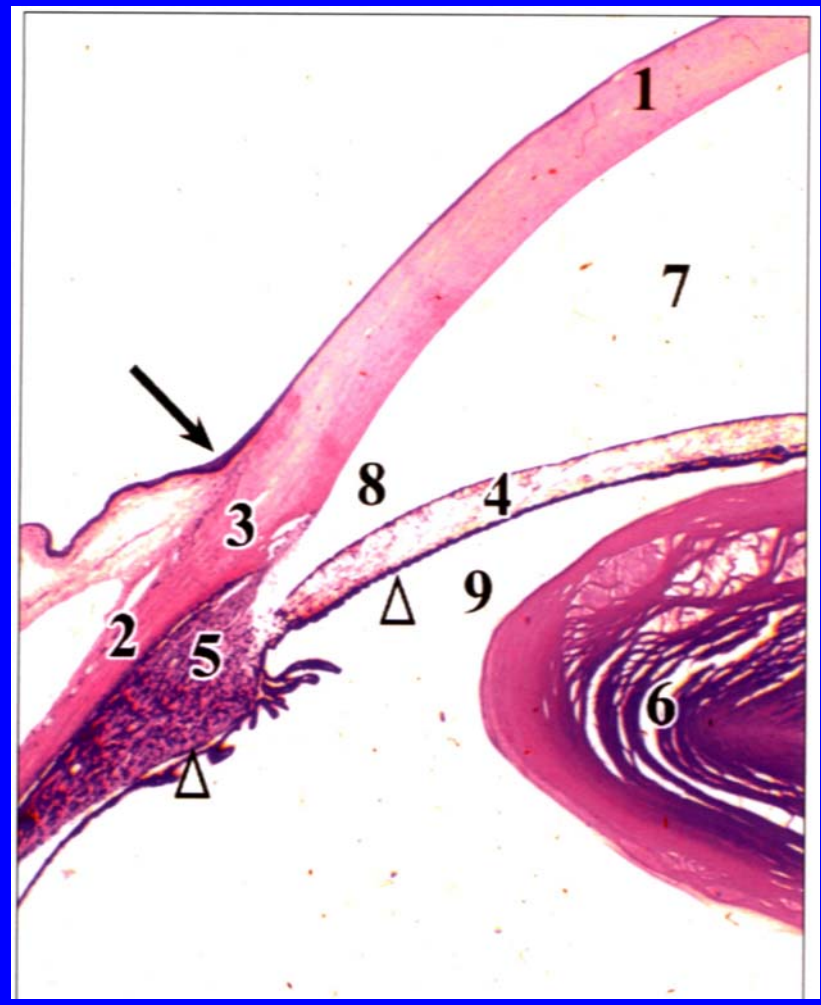
1. the absence of blood vessels
2. the non-pigmented epithelium
3. the regular organisation of collagen fibrils in the stoma
4. the transparent nature of the ground substance, and the maintenance of the state of hydration of the ground substance.

2. Sclera

Dense connective tissue

Corneal limbus

Trabecular meshwork Schlemm's canal

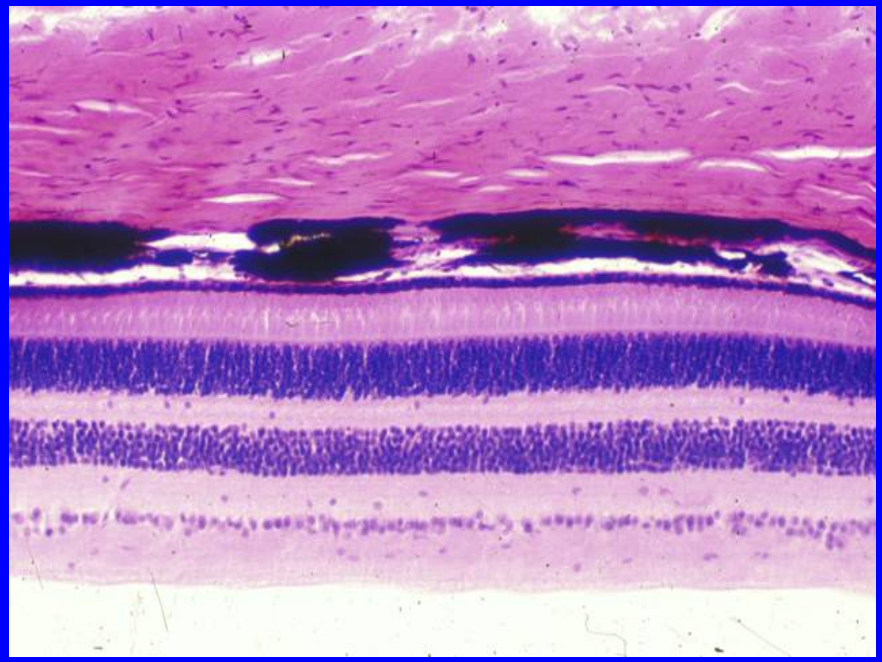


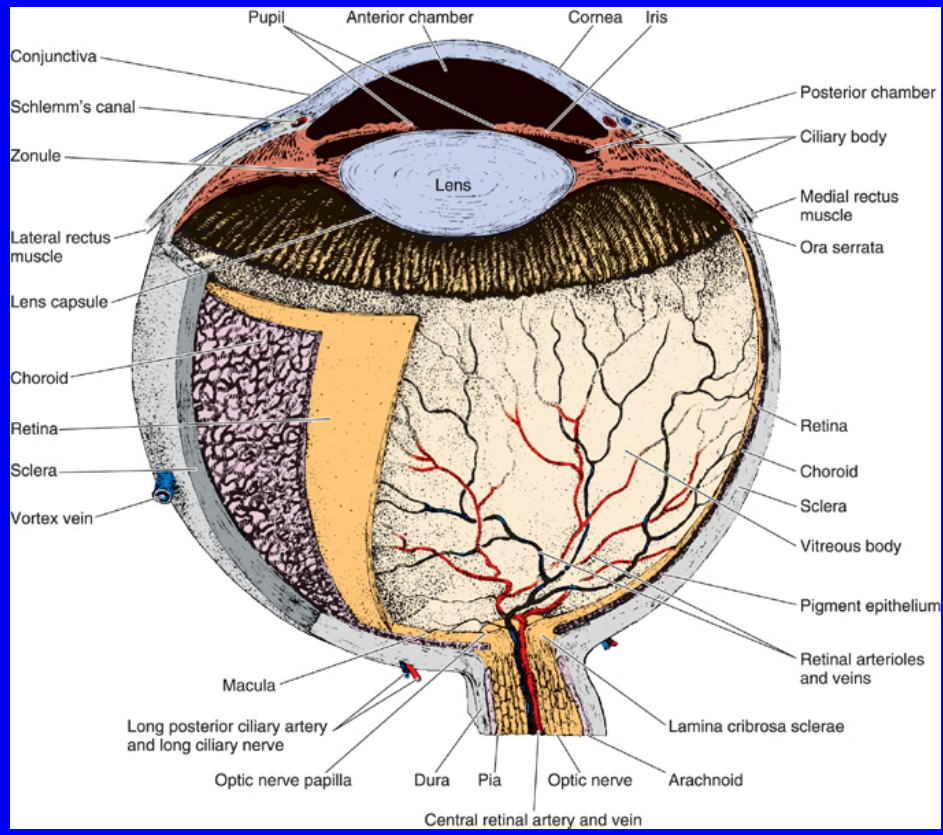
Vascular tunic (uvea)

1. choroid

loose connective tissue

abundant blood vessel and pigment cells





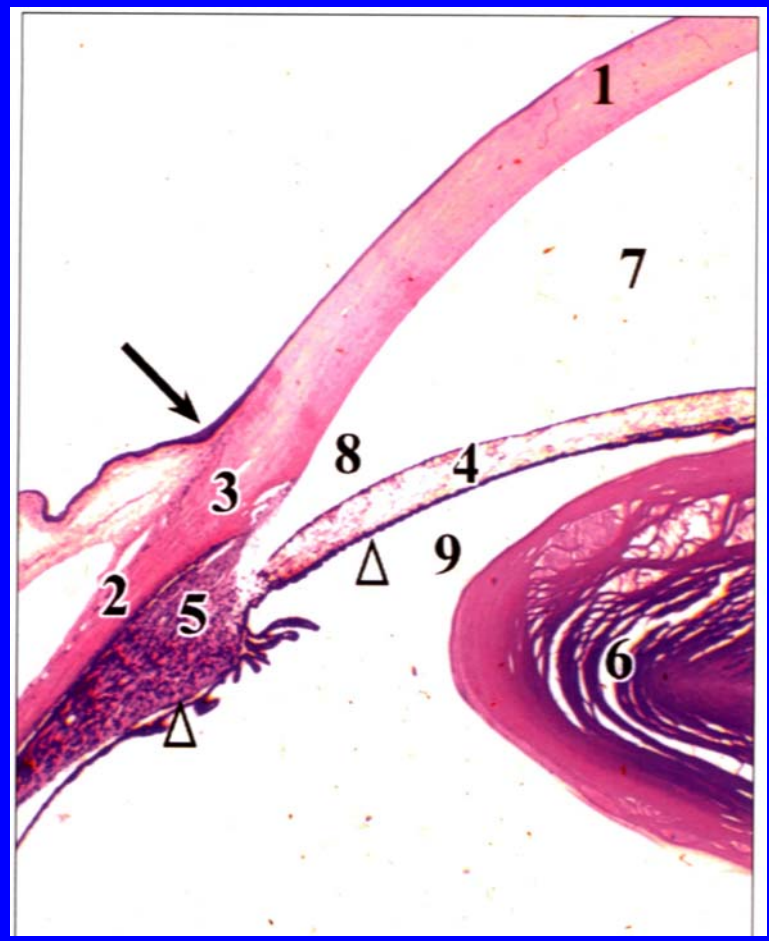
2. ciliary body

The ciliary body is an anterior expansion of the choroid at the level of the lens.

It forms a complete ring

It forms a triangle

in transverse section.



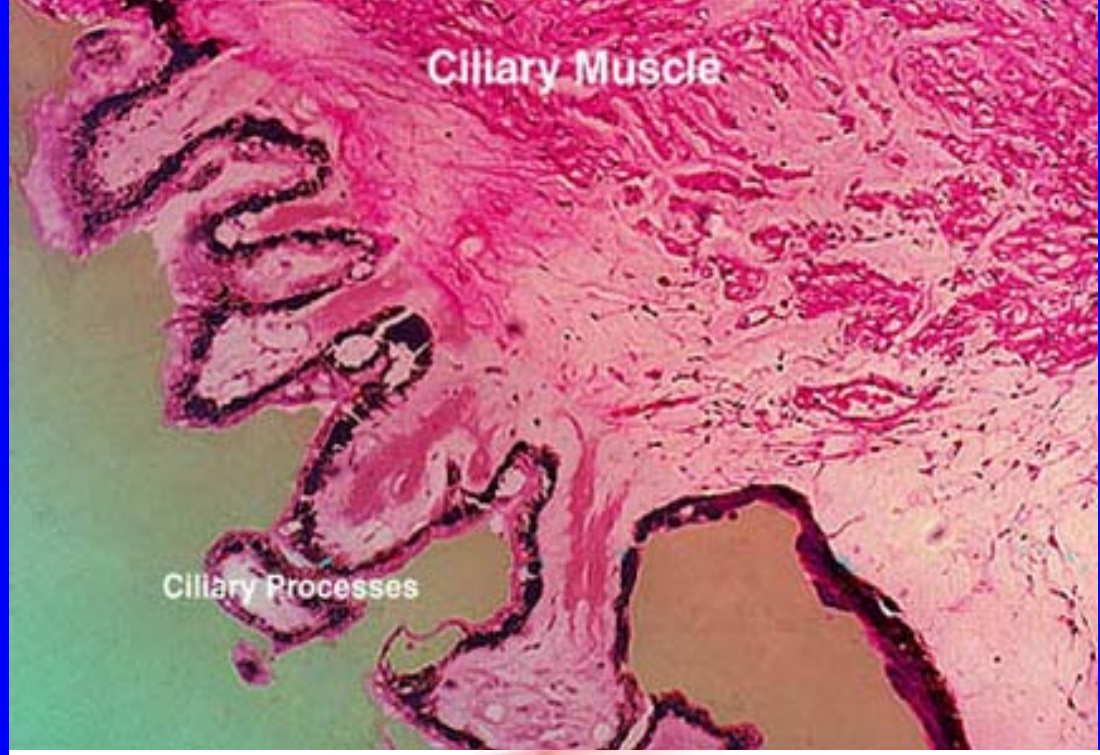
2. ciliary body

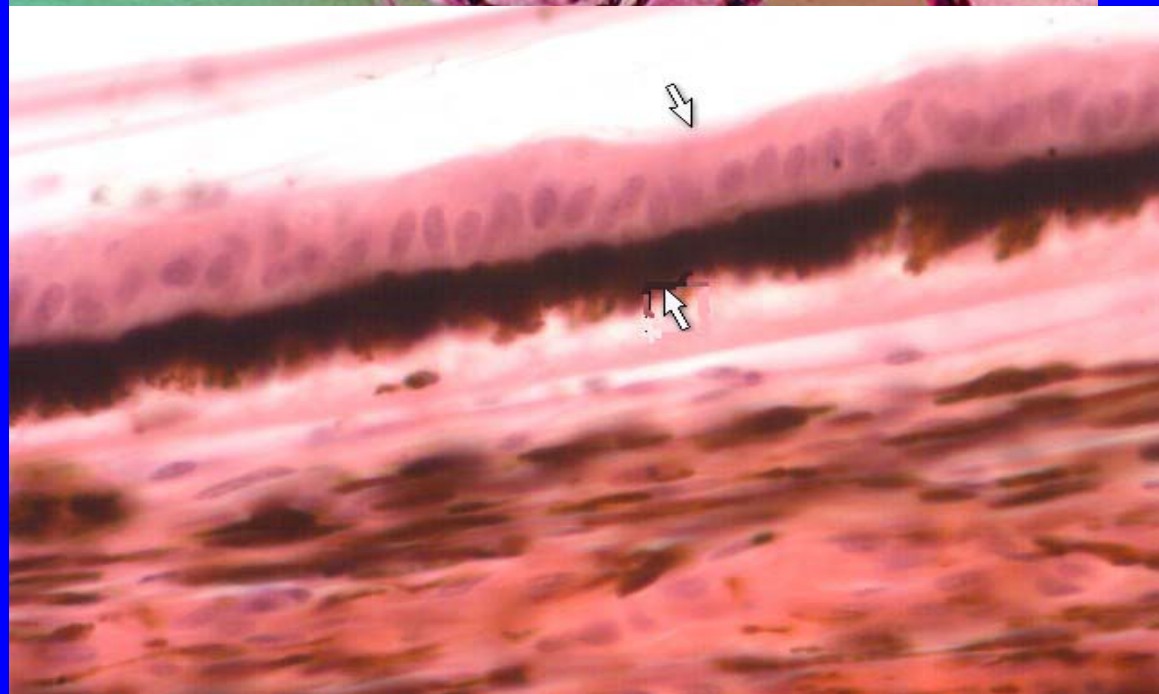
（1）ciliary muscle:

（2）ciliary body epithelium:

internal sublayer(outer) unpigmented, cuboidal

external sublayer highly pigmentea

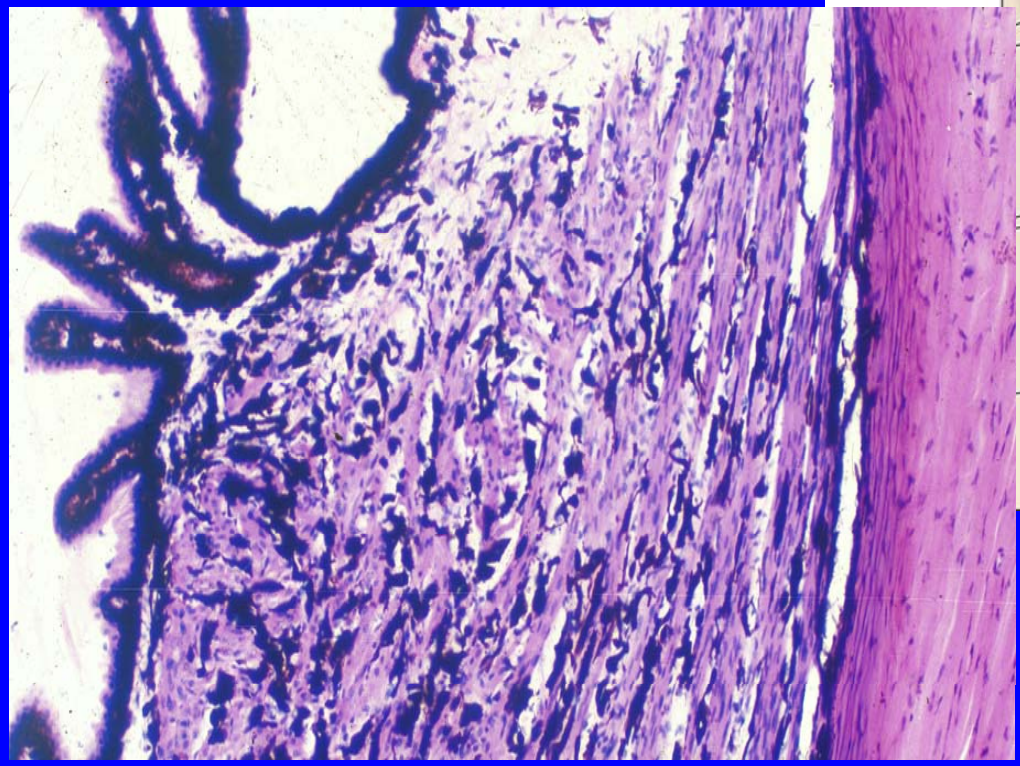


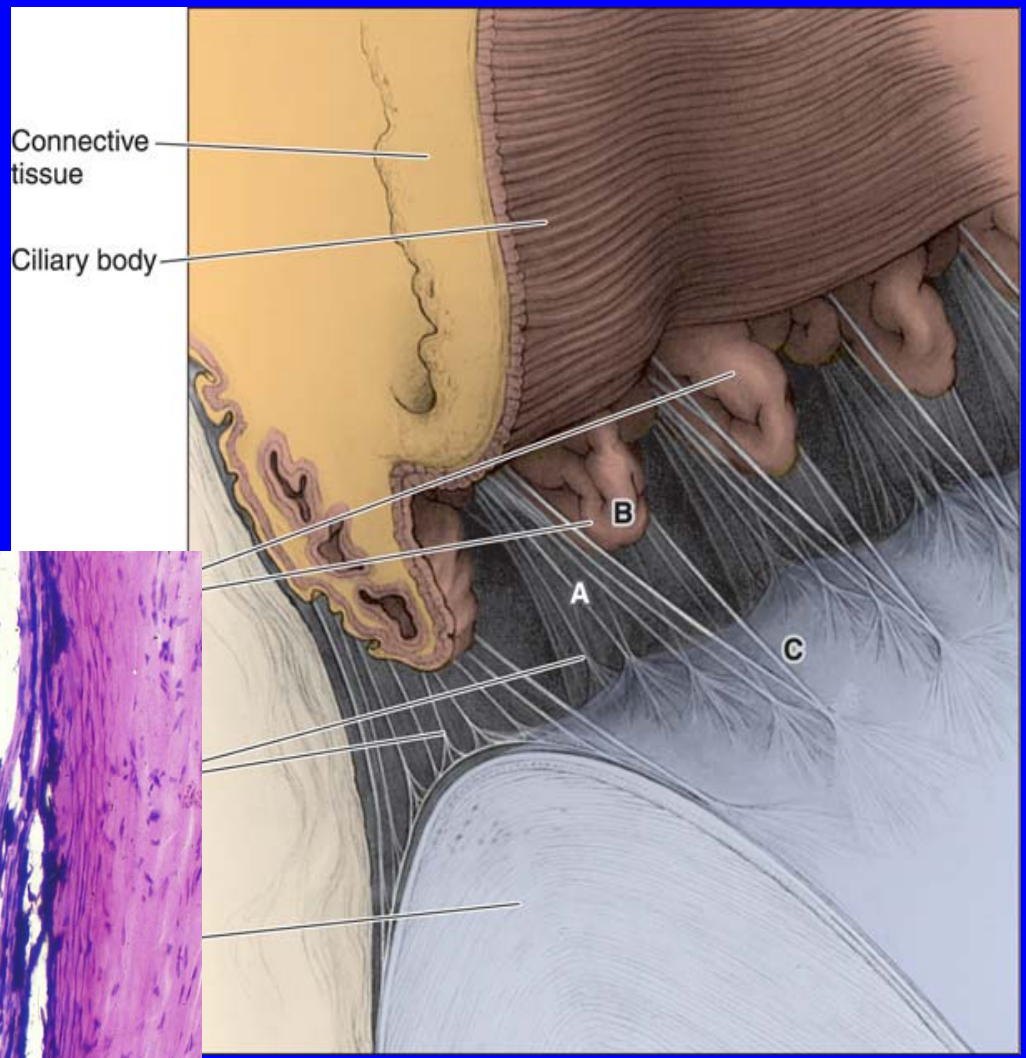


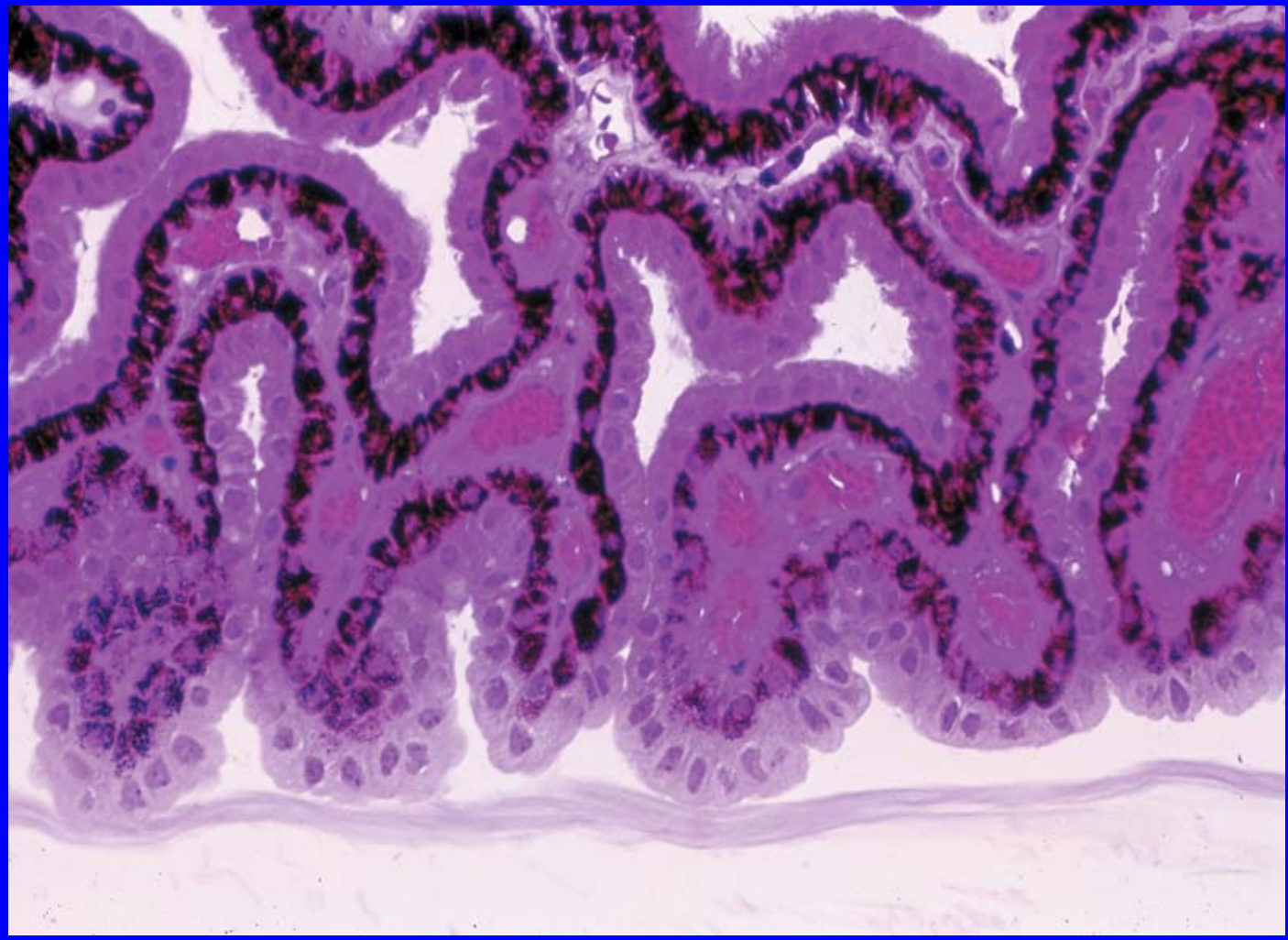
2. ciliary body

Ciliary processes

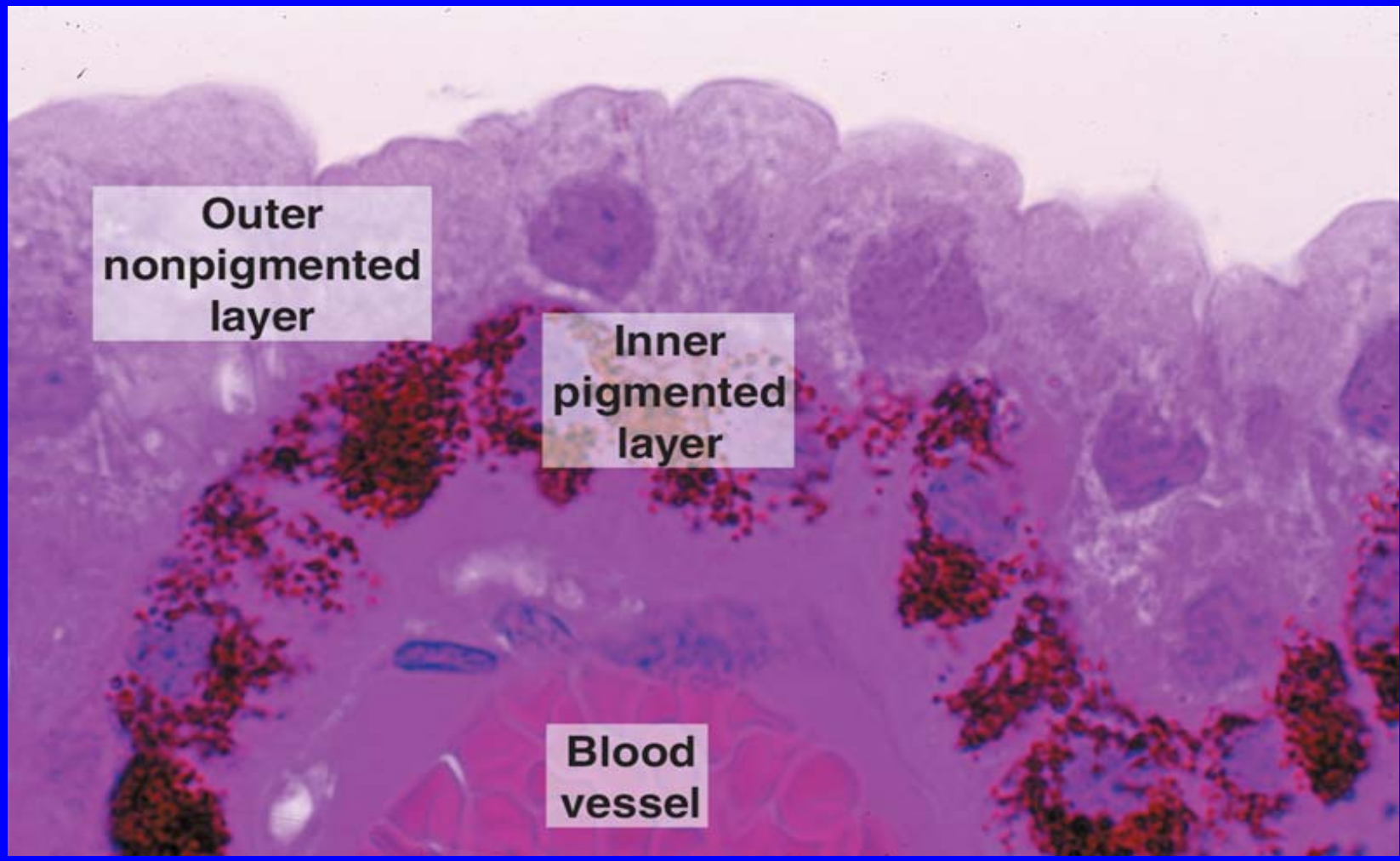
Ciliary zonule







Section of ciliary processes showing their double layer of pigmented and nonpigmented epithelial cells. Note also the core of connective tissue. PT stain. Medium magnification.



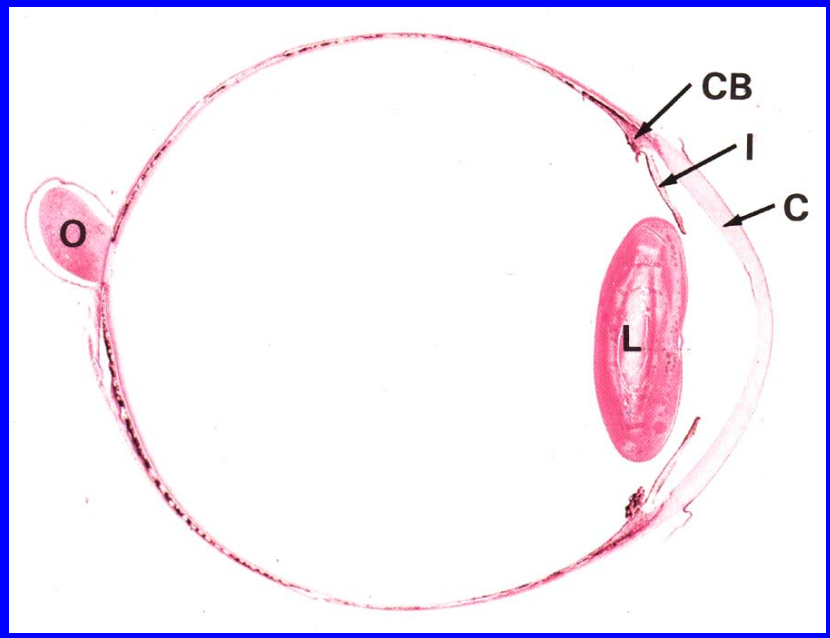
Section of a ciliary process. Note the dark granules of melanin located in the cytoplasm of the inner epithelial cells. The outer epithelium is devoid of melanin. PT stain. High magnification.

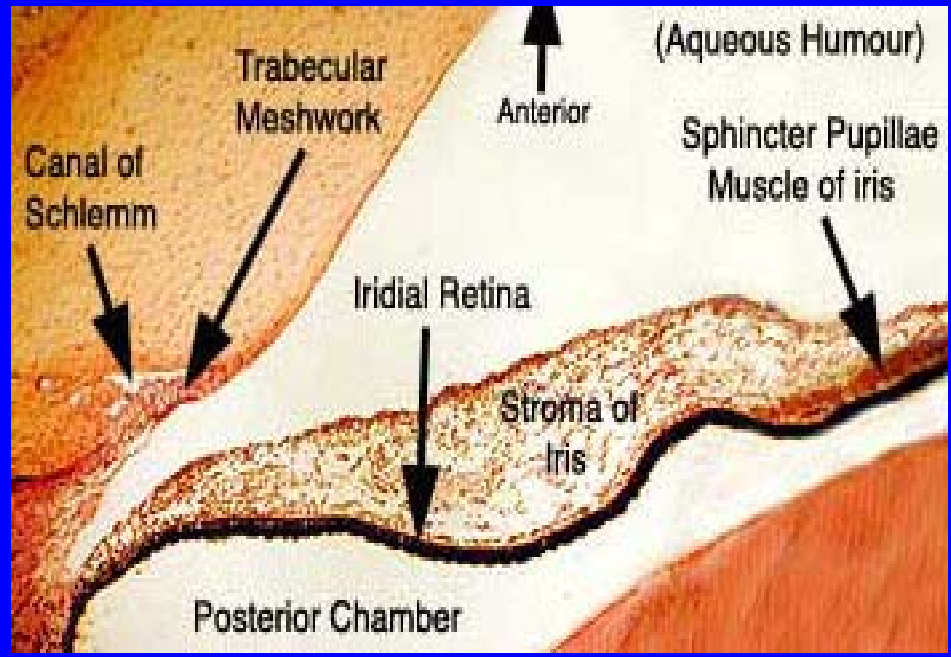
3. Iris

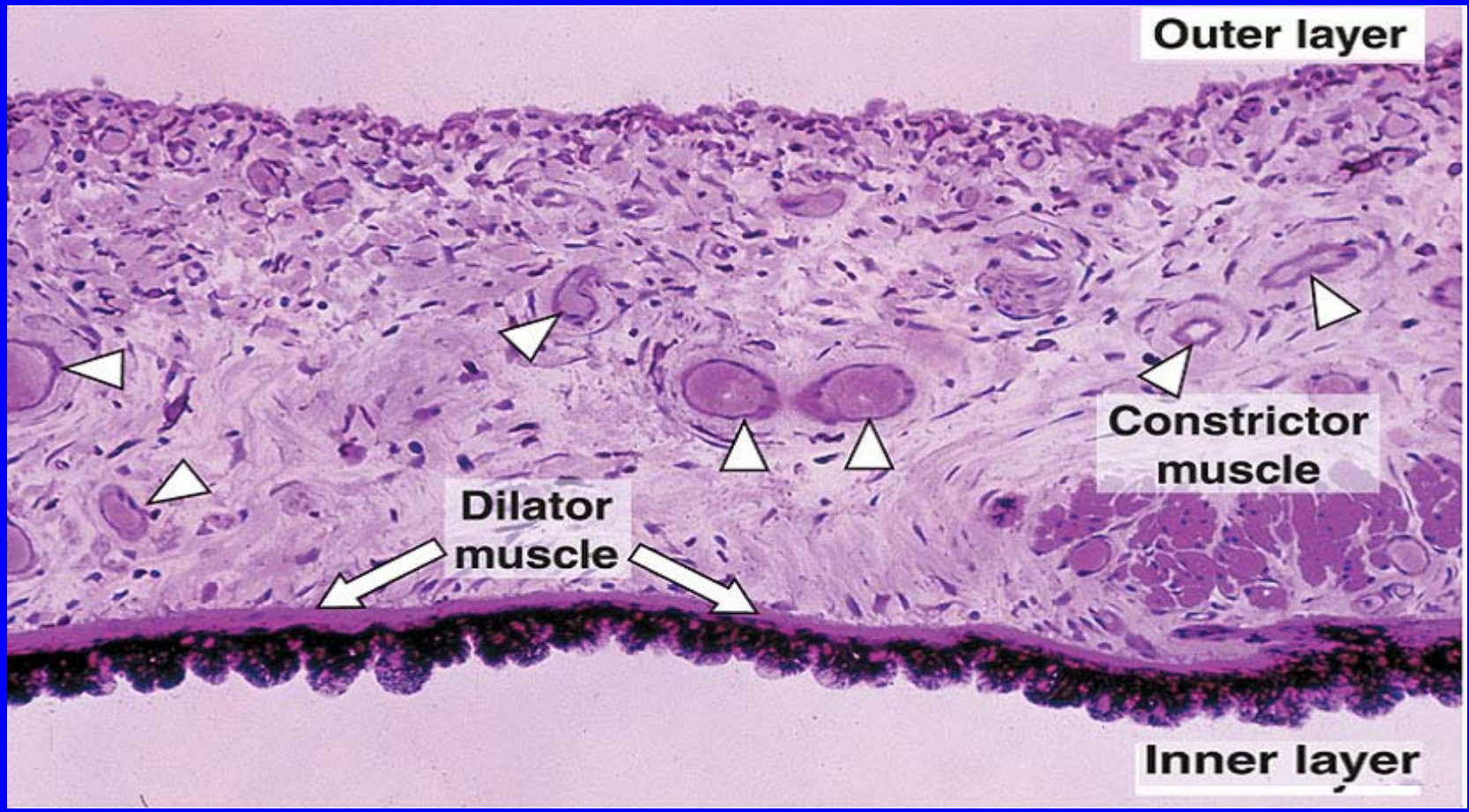
pupil

mainly composed of loose connective tissue

abundant vessel and pigmental cells







Section of iris, a structure consisting of a core of connective tissue highly vascularized in certain regions (arrowheads). The outer layer contains fibroblasts and very few pigmented cells (not seen in this photomicrograph). In contrast, the inner covering layer is heavily pigmented to protect the eye's interior from stray light. Dilator and constrictor (sphincter) pupillary muscles control the diameter of the pupil. PT stain. Medium magnification.

retina: high differentiation nervous tissue

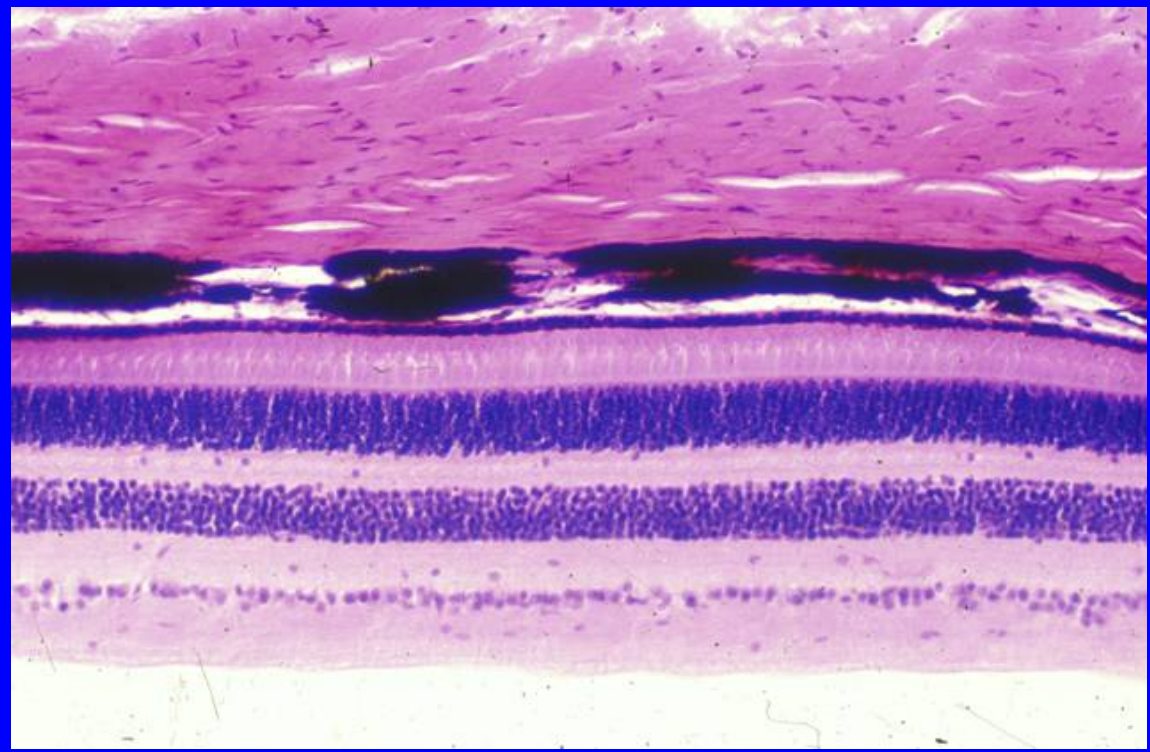
4 layers of cells：

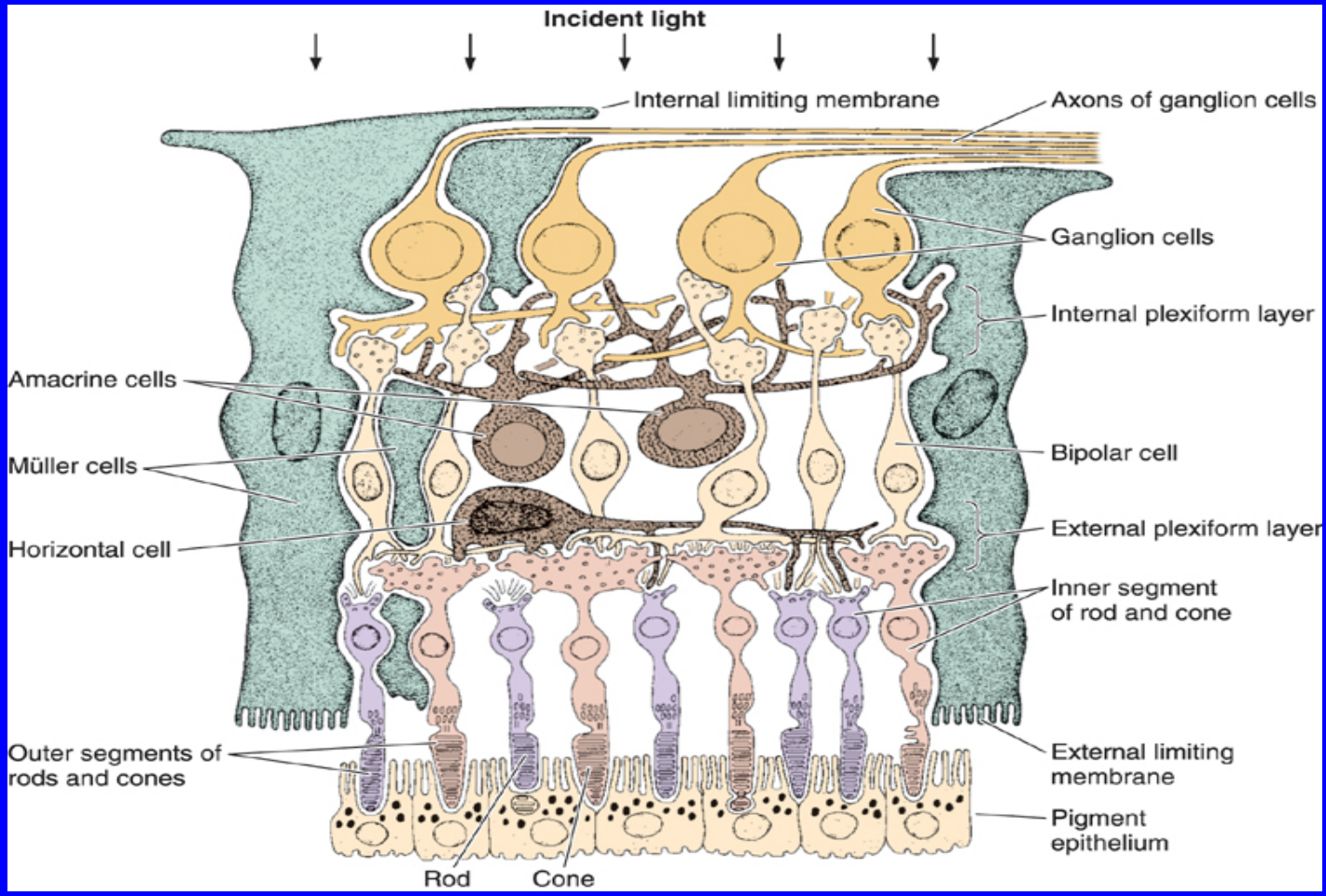
(1) Pigment epithelium

(2) Visual cells

(3) Bipolar cells

(4) Ganglion cells



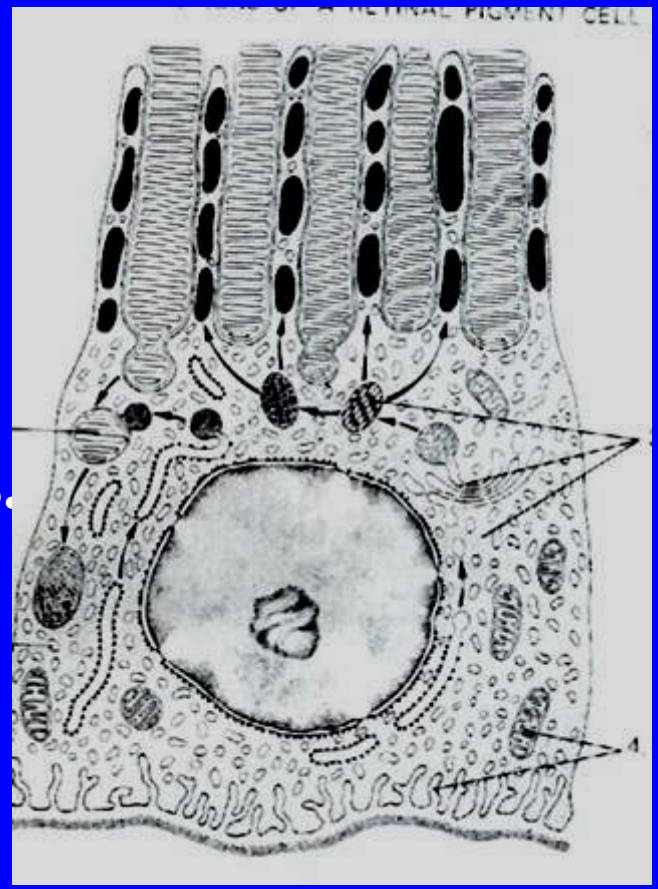


The three layers of retinal neurons. The arrows indicate the direction of the light path. The stimulation generated by the incident light on rods and cones proceeds in the opposite direction.

（1）pigment epithelium：

The apical cytoplasm contains large quantities of melanin granules, and the apical regions of the cells send out processes which project between the rod and cone processes.

function： The pigment granules absorb light and prevent reflection.



（2）visual cell：

rod cells:

EM: inner segment:

mitochondia, RER, Golgi complex and microtubules

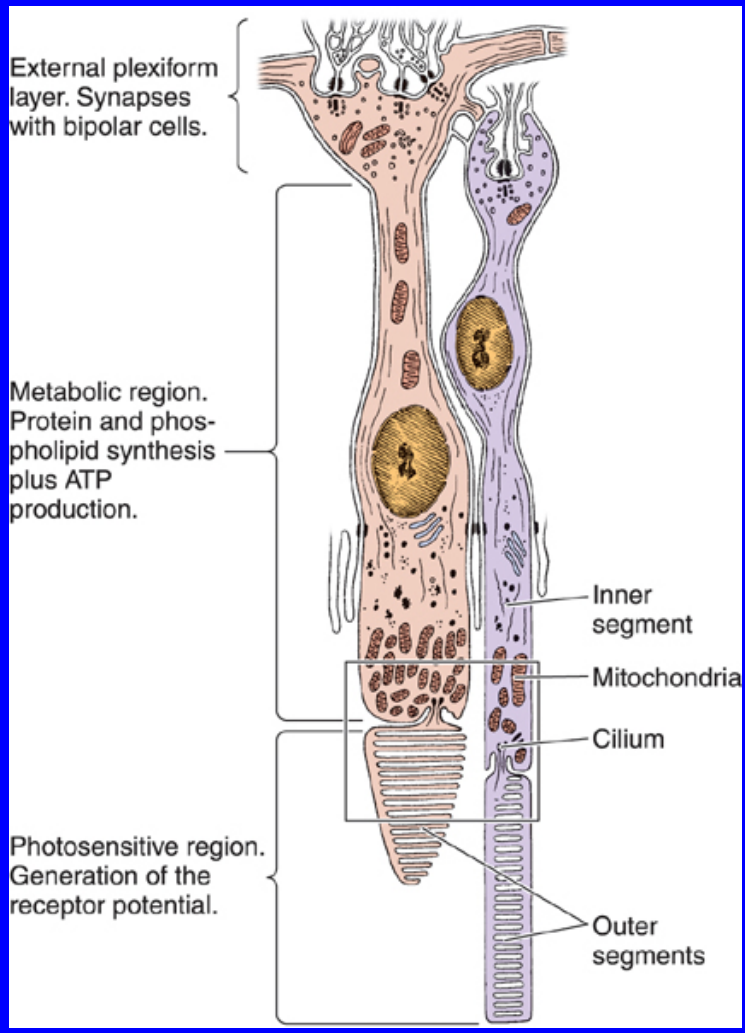
outer segment:

membranous disk

rhodopsin (11-cisretinal and opsin) Vitamine A

cone cells：

membranous disk, three kinds of cone cells, visual pigment (iodopsin)

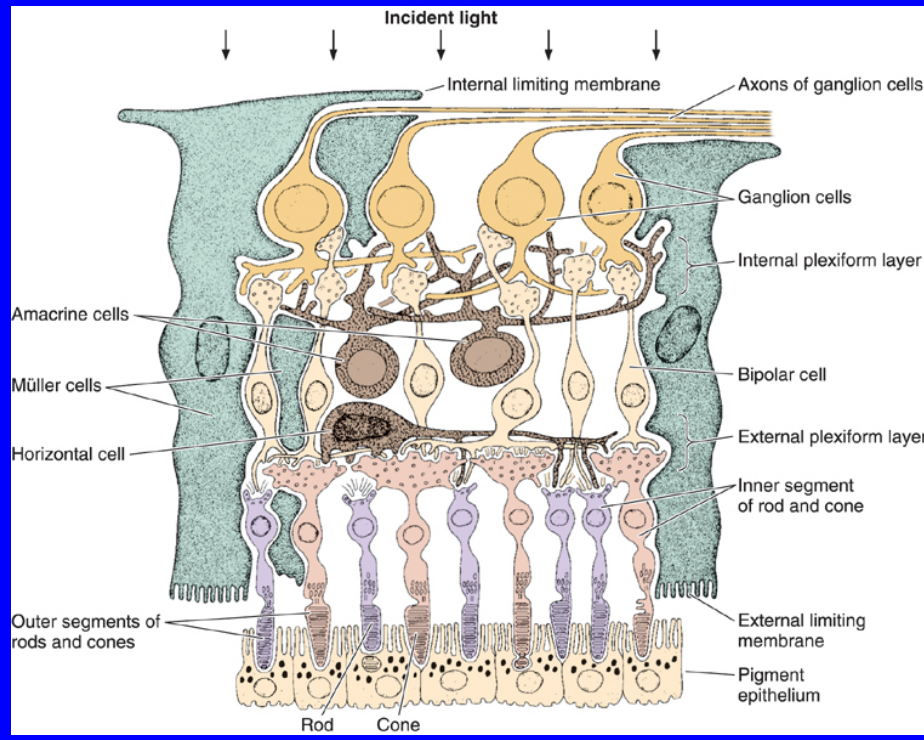


（3）bipolar cells：

（4）ganglion cells:

radial neuroglia cells: called Müller cells

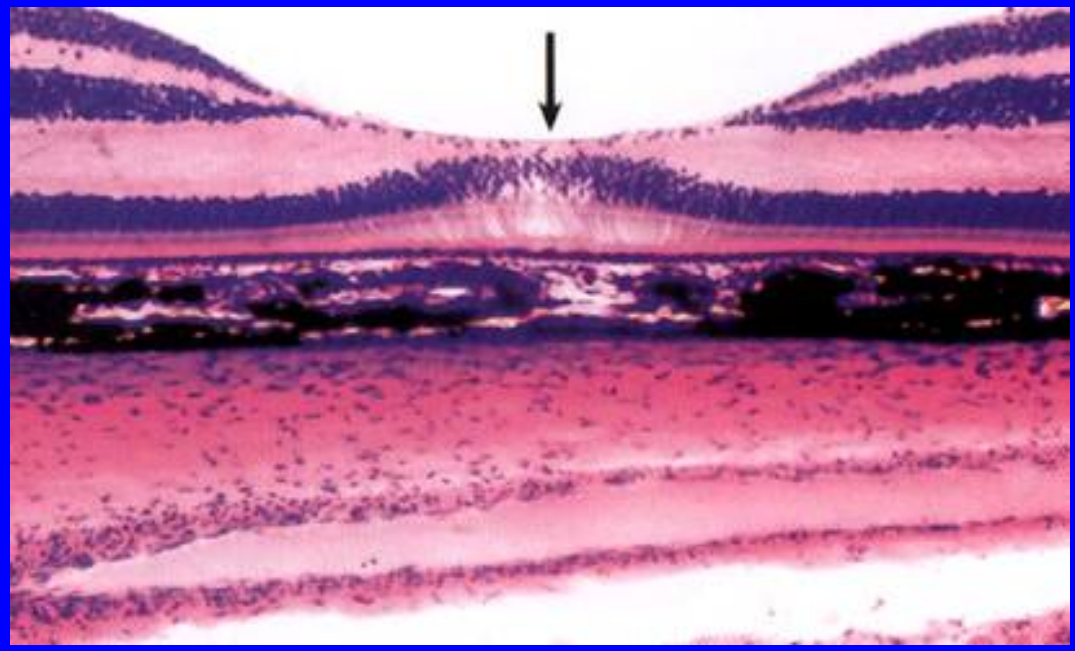
The processes form internal and external limiting membrane



fovea centralis

visual center no the rod cells

This area is known as the yellow spot. In the centre of this yellow spot is a shallow depression, termed the fovea centralis. Here, all the layers of the retina are absent except the pigment epithelium and the sensitive layers, in which only cones are present. The fovea is therefore the area of most clear vision.



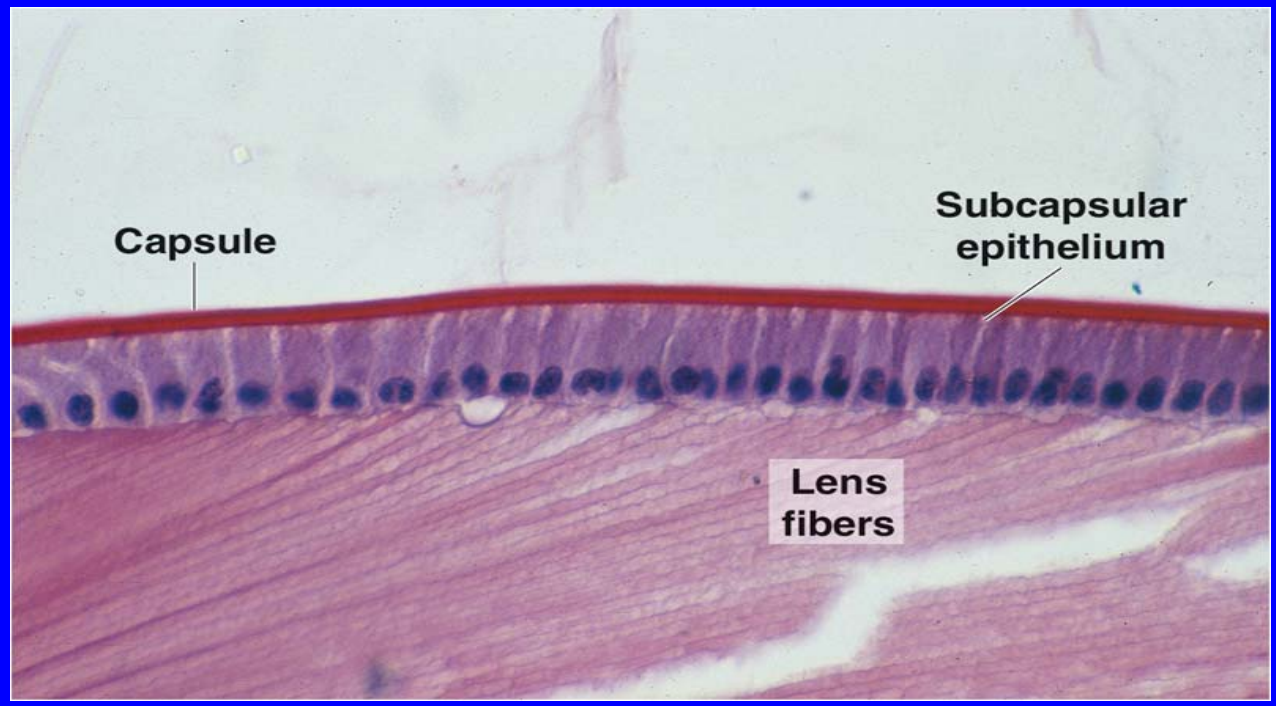
INCLUSION OF EYE BALL

1. lens:

capsule：

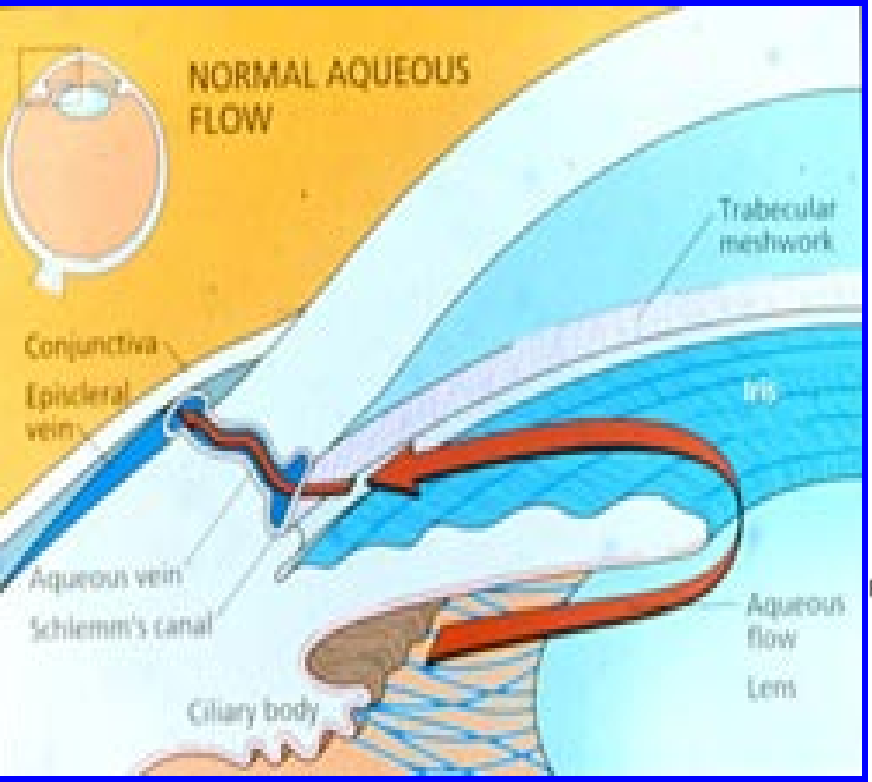
epithelium:

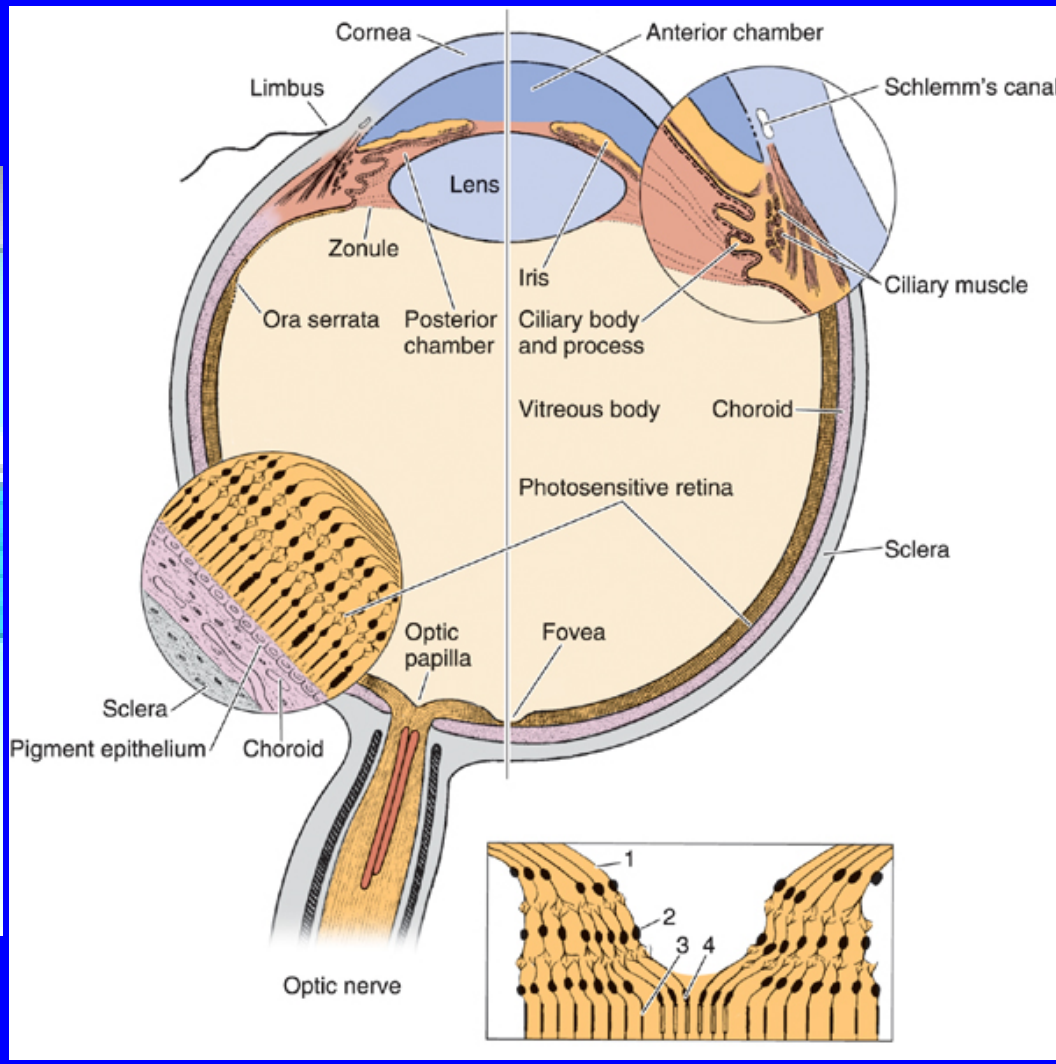
fiber：



Section of the anterior portion of the lens. The subcapsular epithelium secretes the lens capsule, which appears stained in red. The lens capsule is a thick basement membrane containing collagen type IV and laminin. Below the subcapsular epithelium, note the lens fibers, which are cells that have lost their nuclei and organelles, becoming thin, elongated, transparent structures. Picrosirius-hematoxylin. Medium magnification.

2. vitreous body:
3. aqueous humor:
circulation of aqueous humor





summary

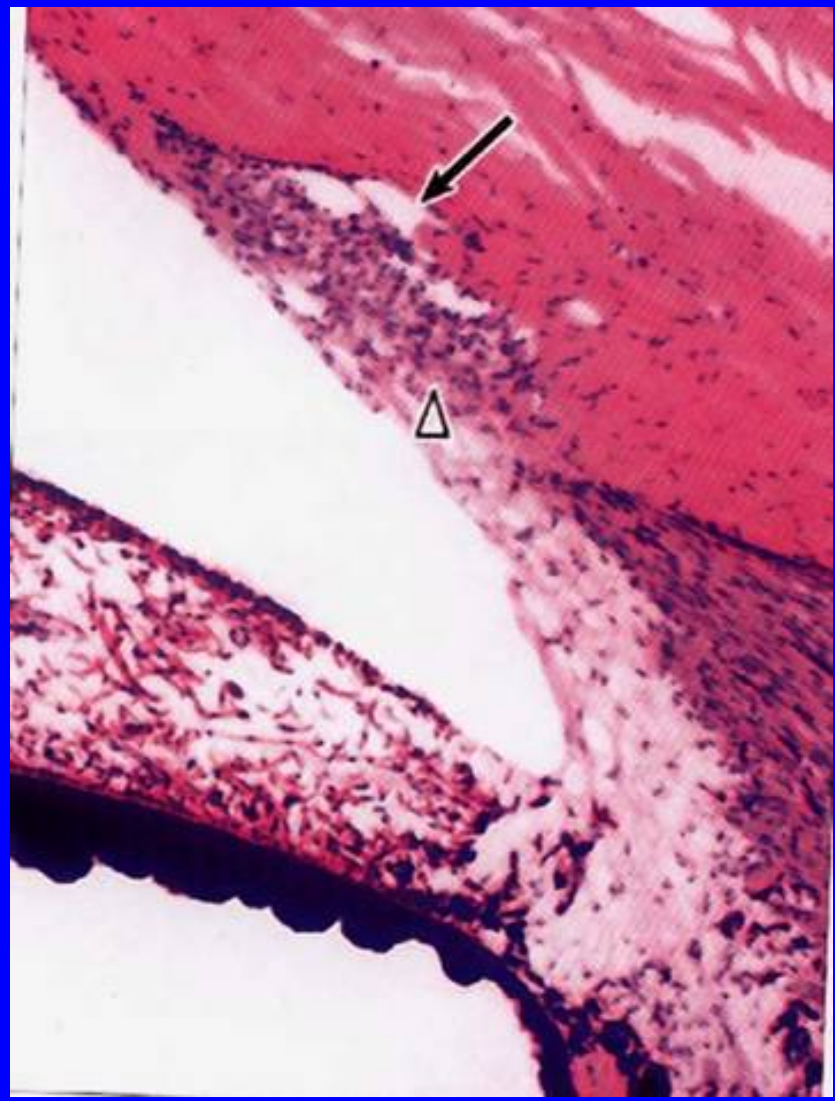
- 1. The structure and functions of every layer of eyeball wall;
- 2.source and circulatory passages of aqueous humor;
- 3.the structure and functions of lens, ciliary zonule and vitreous body

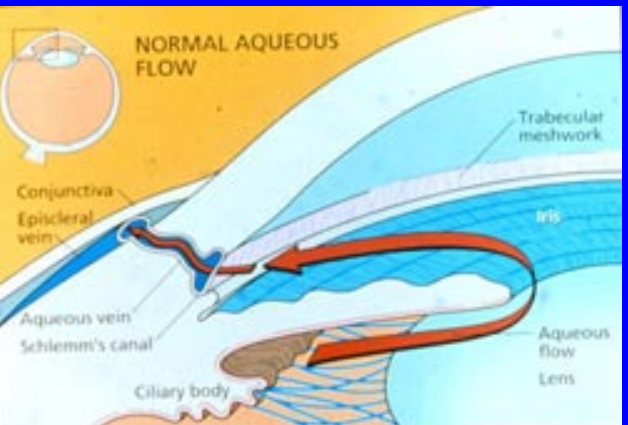
Accessory Structure of The Eye

1. eyelid
   （1）skin
   （2）subskin tissue
   （3）musicularis
   （4）tarsus：tarsal glands
   （5）conjunctiva

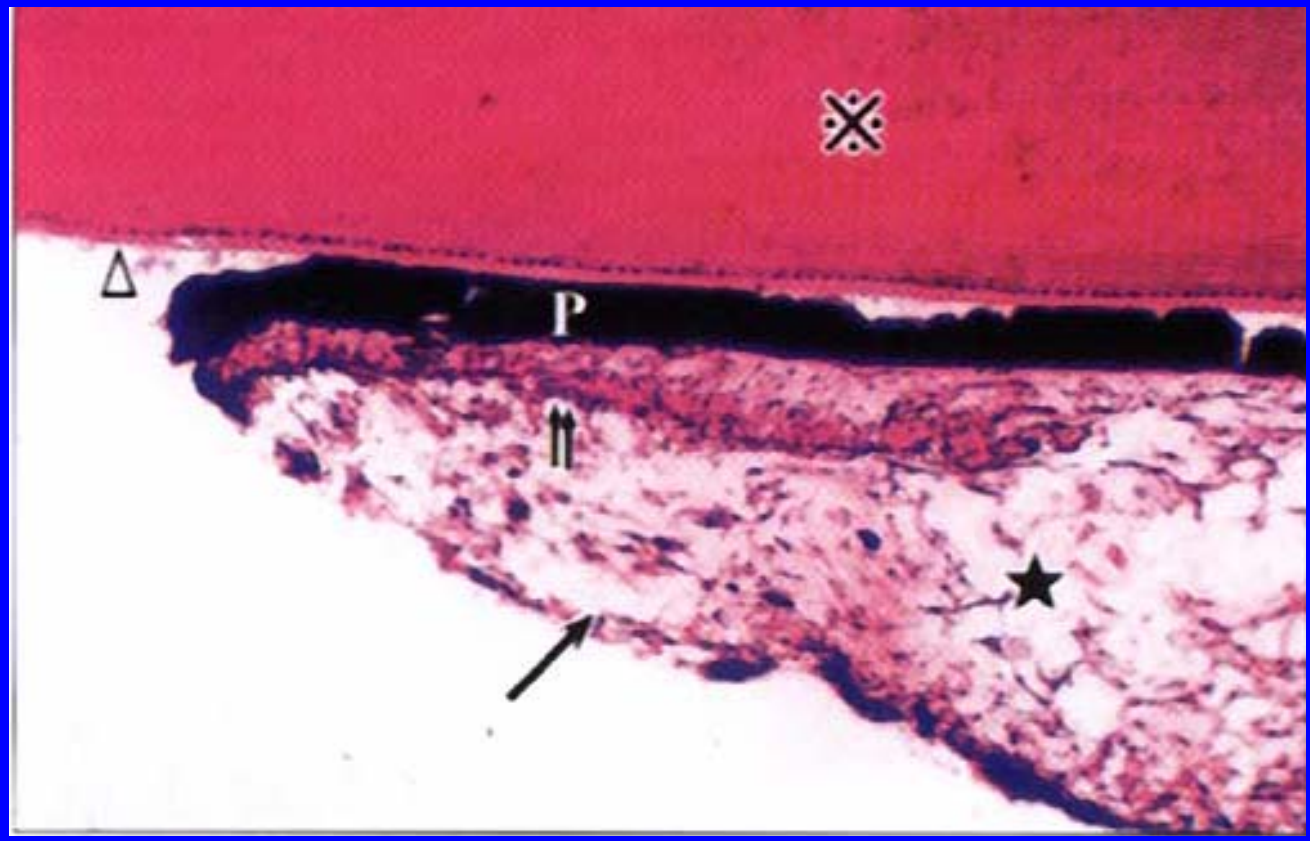
irregular endothelium-lined channels formed the trabecular meshwork

the trabecular meshwork, merge to form Schlemm's canal

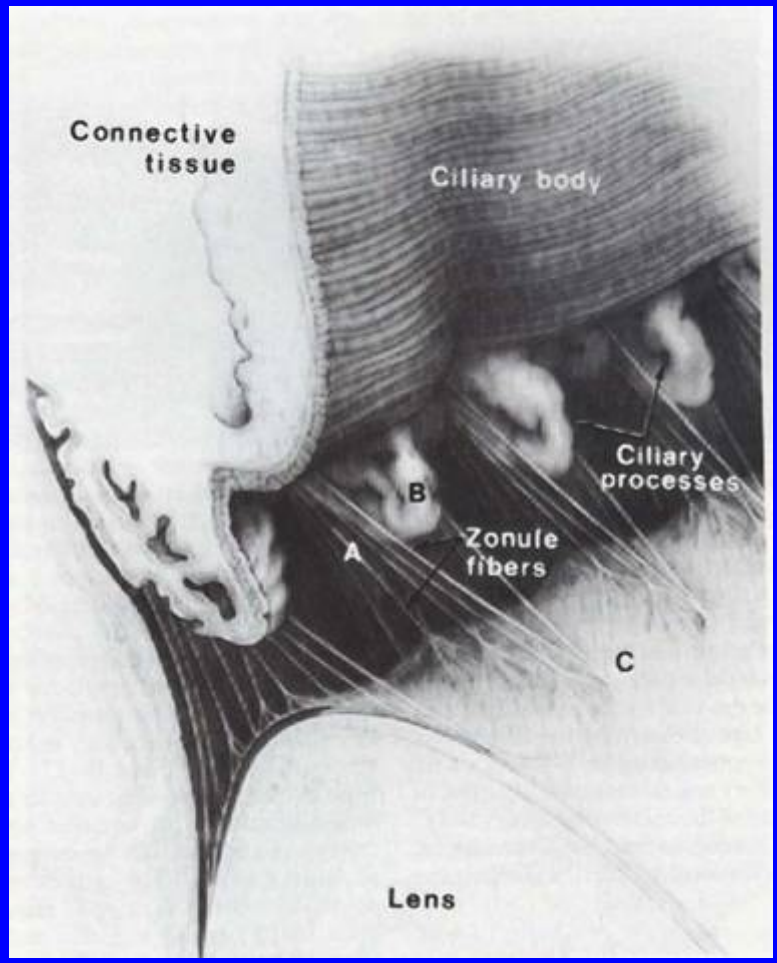




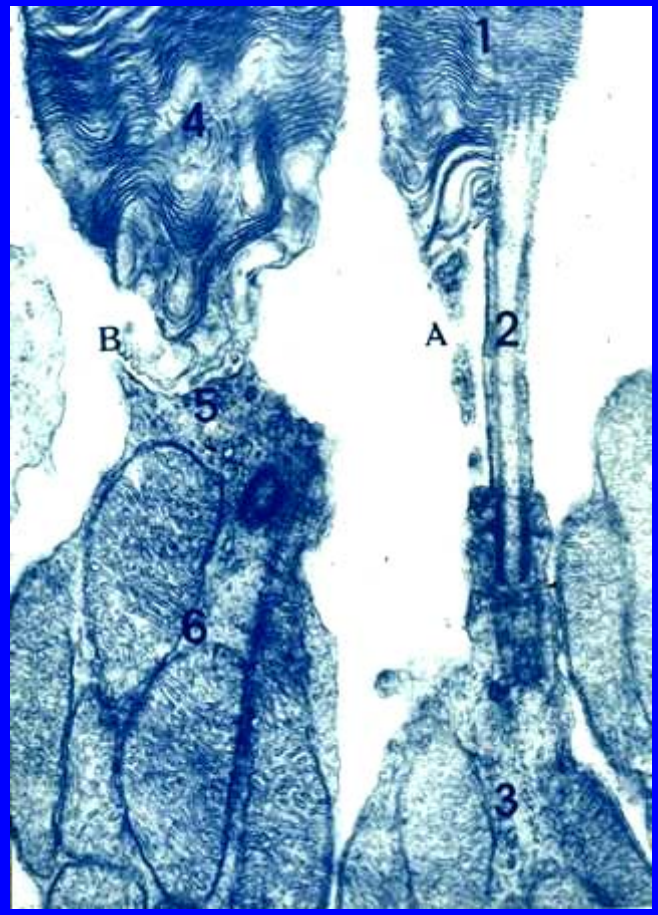
corneal limbus

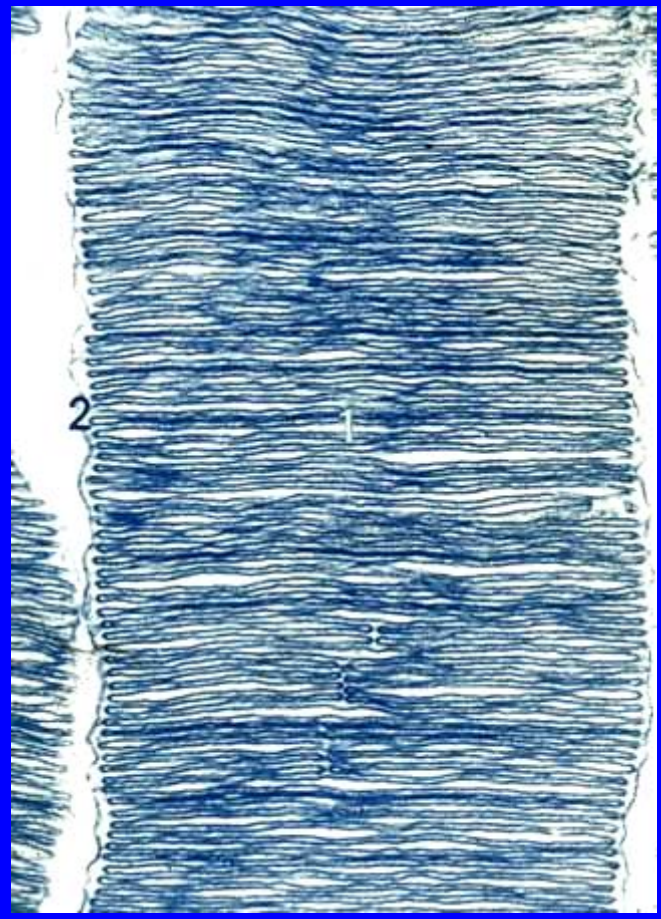


Iris in HE

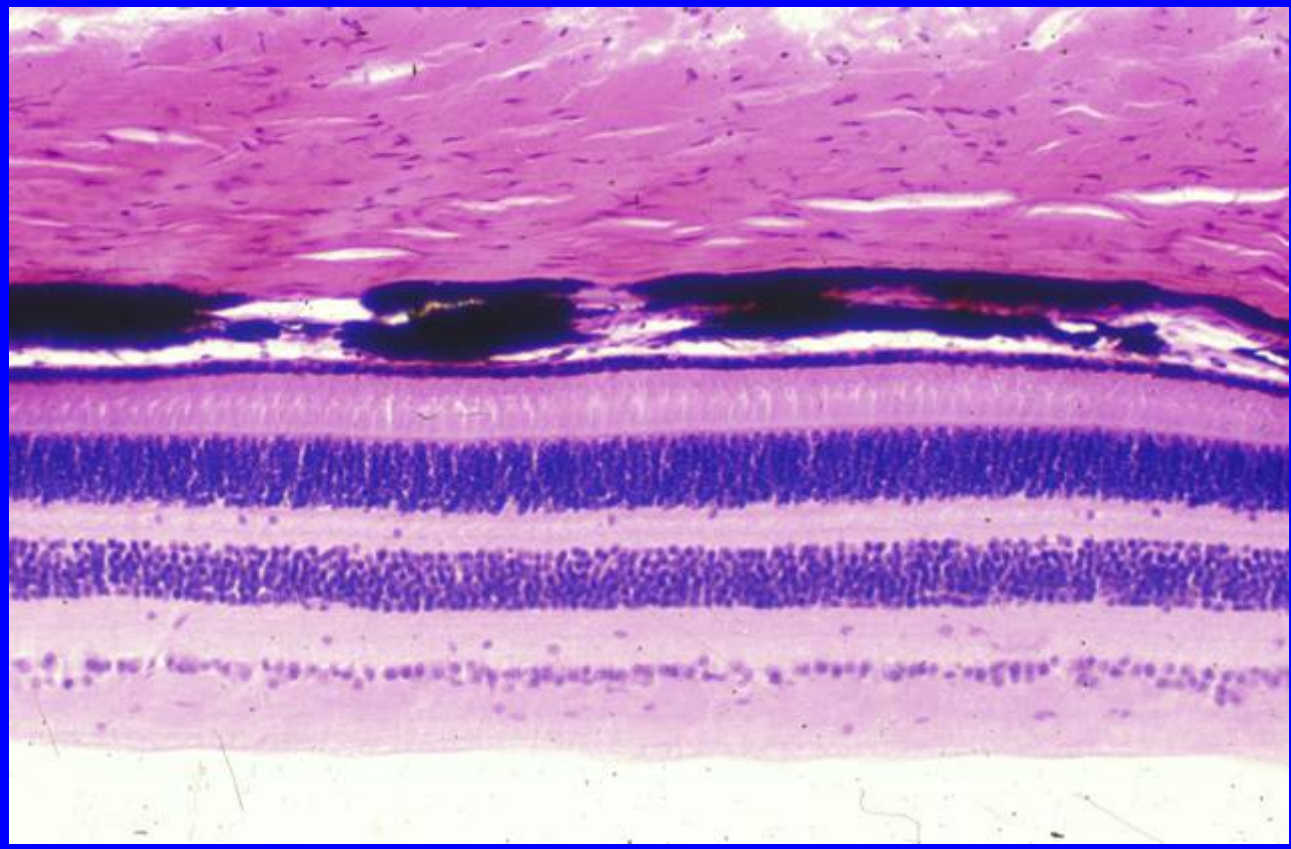


cilliary body



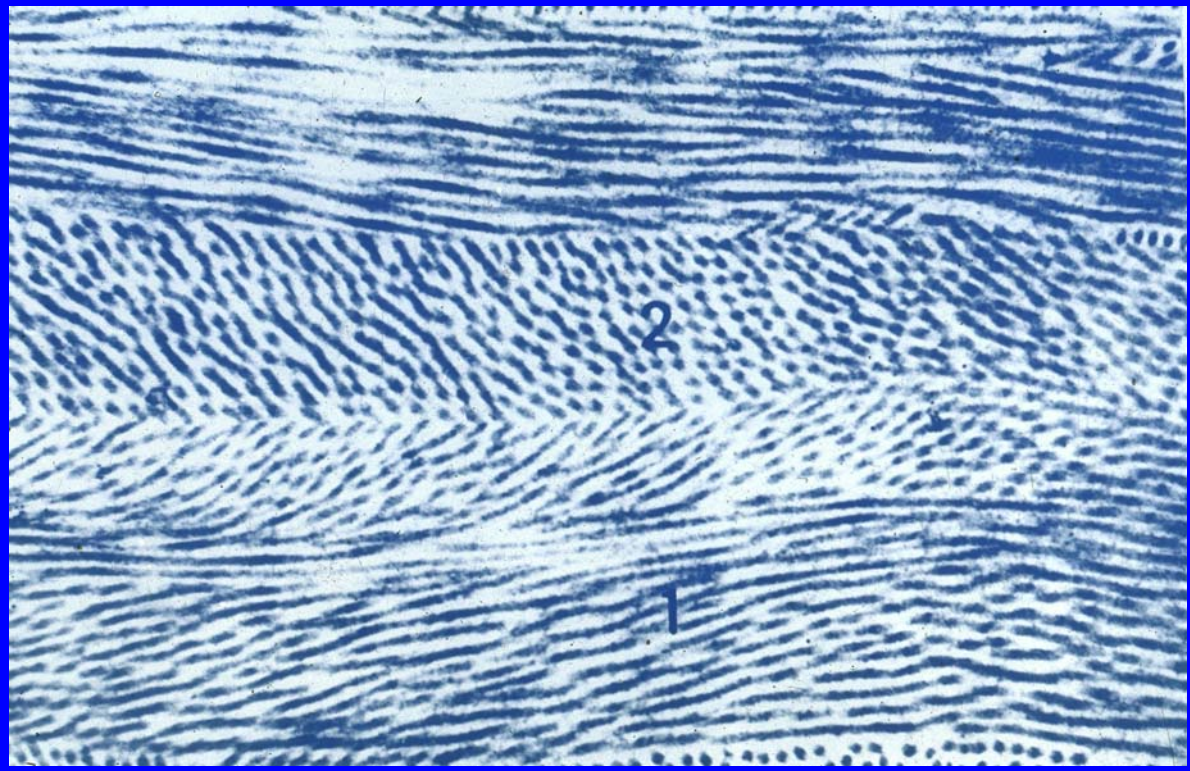


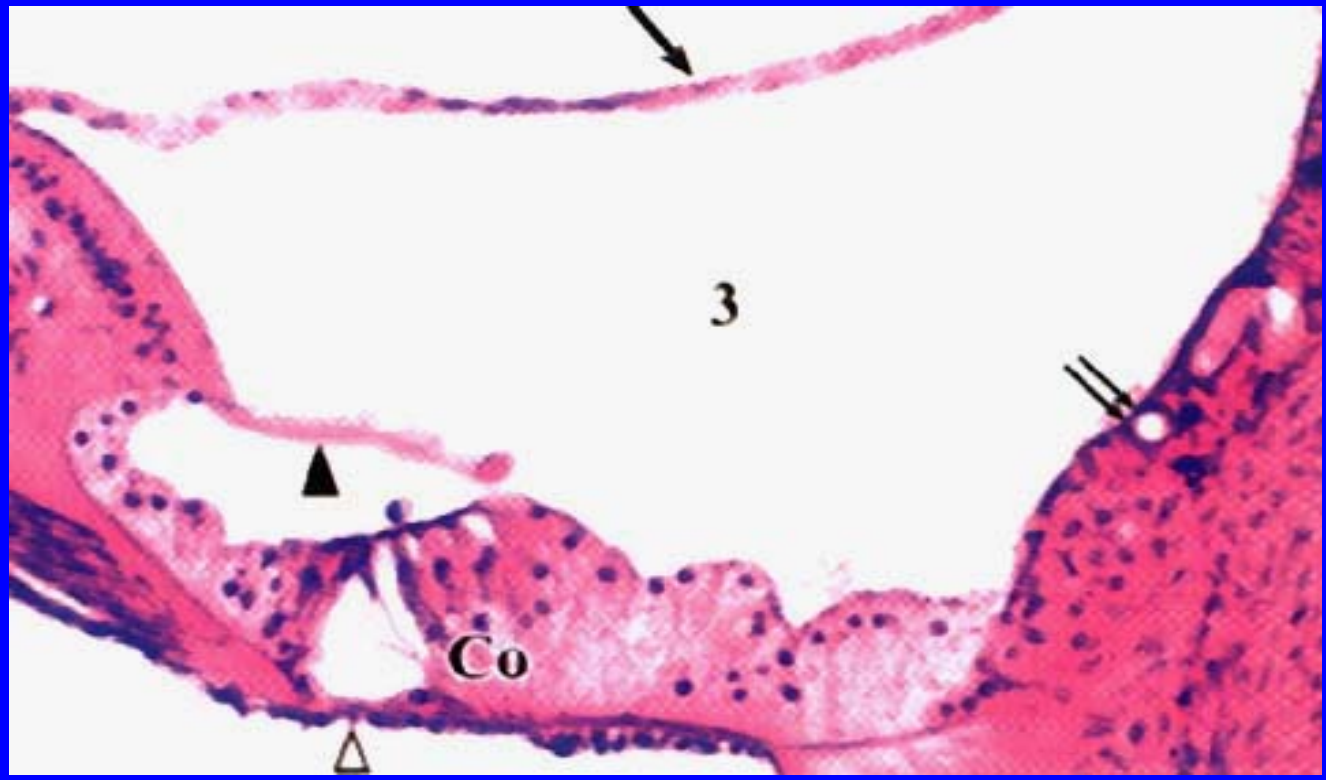
membranous disc



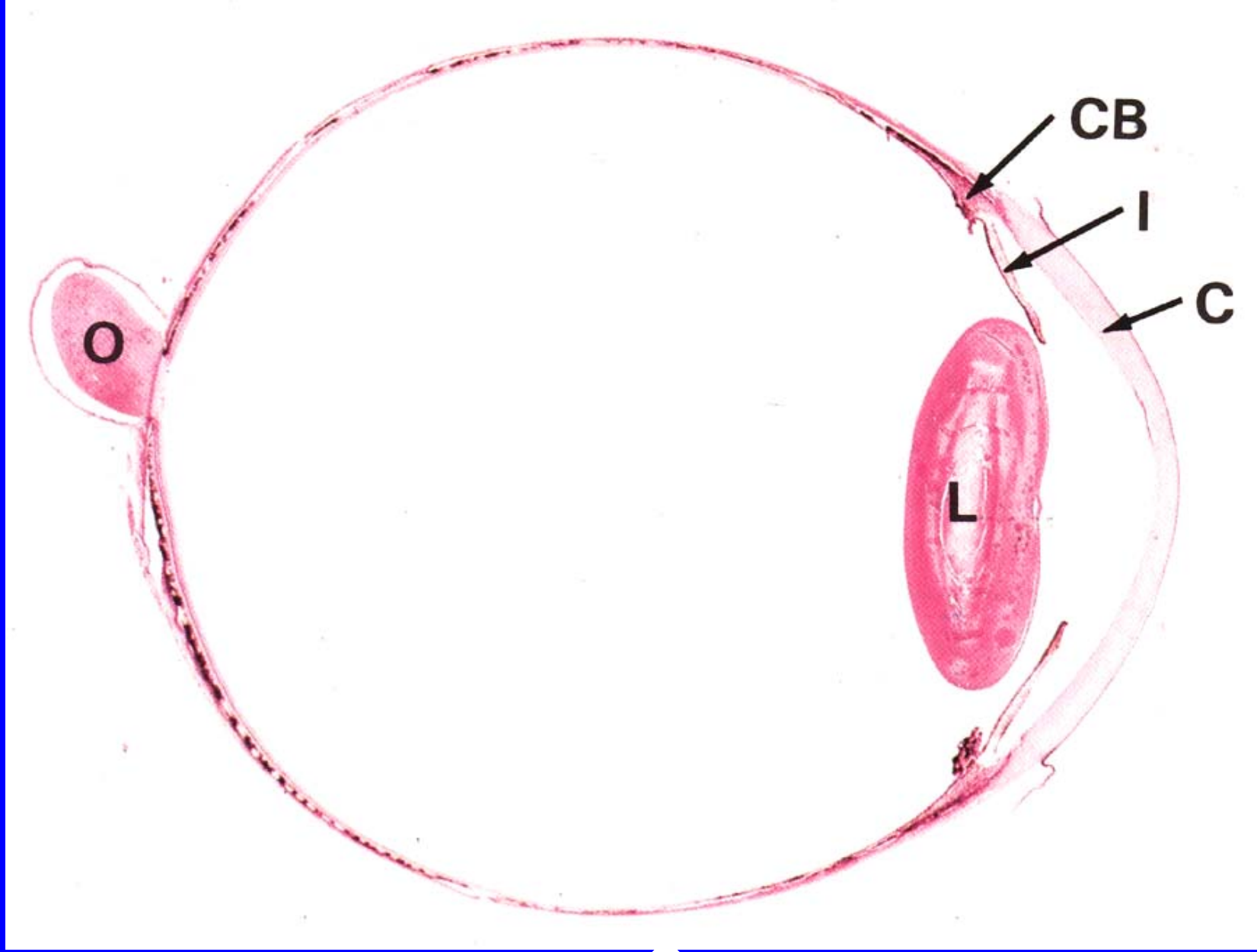
posterior portion of eye ball

substantia propria(stroma):



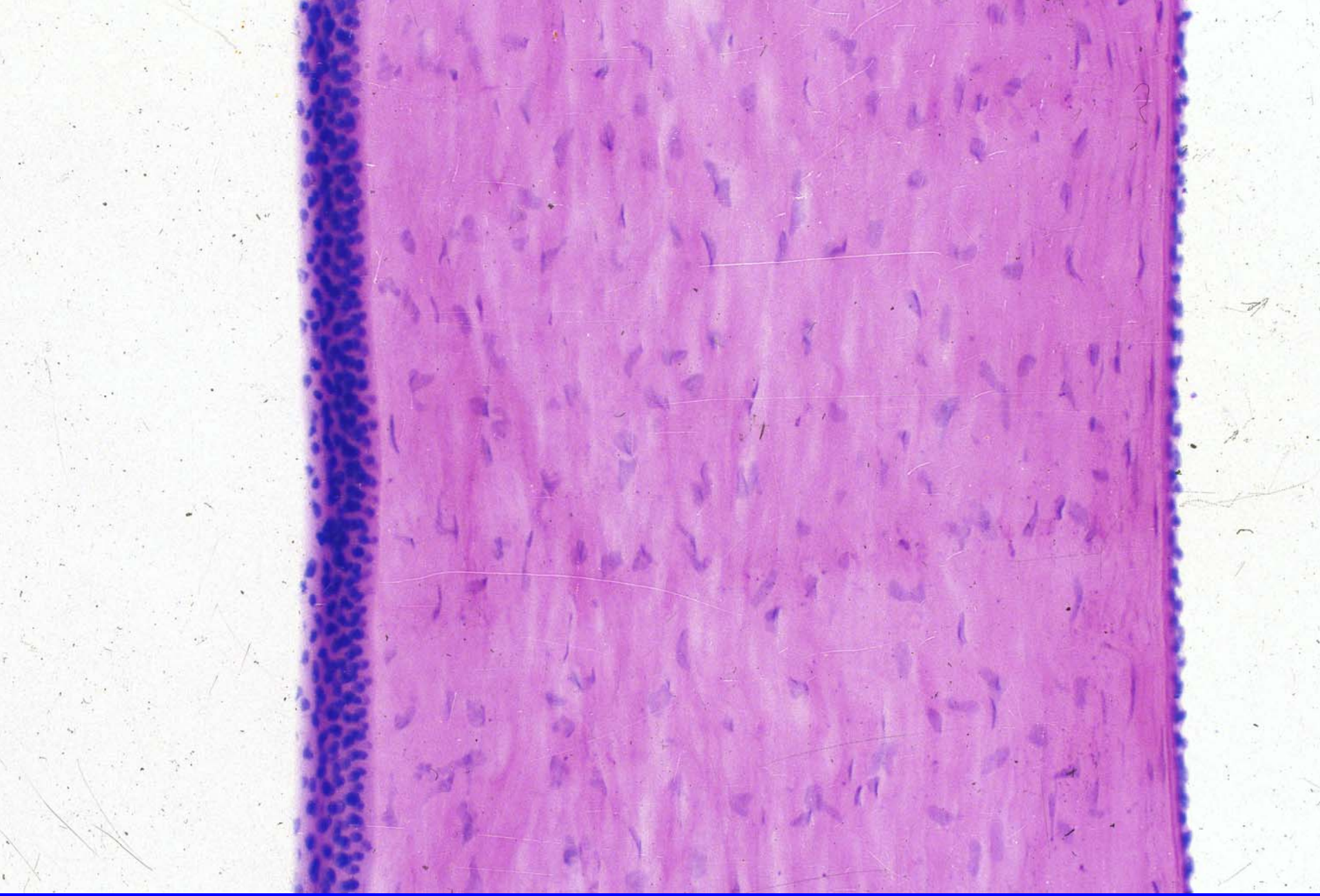


spiral organ

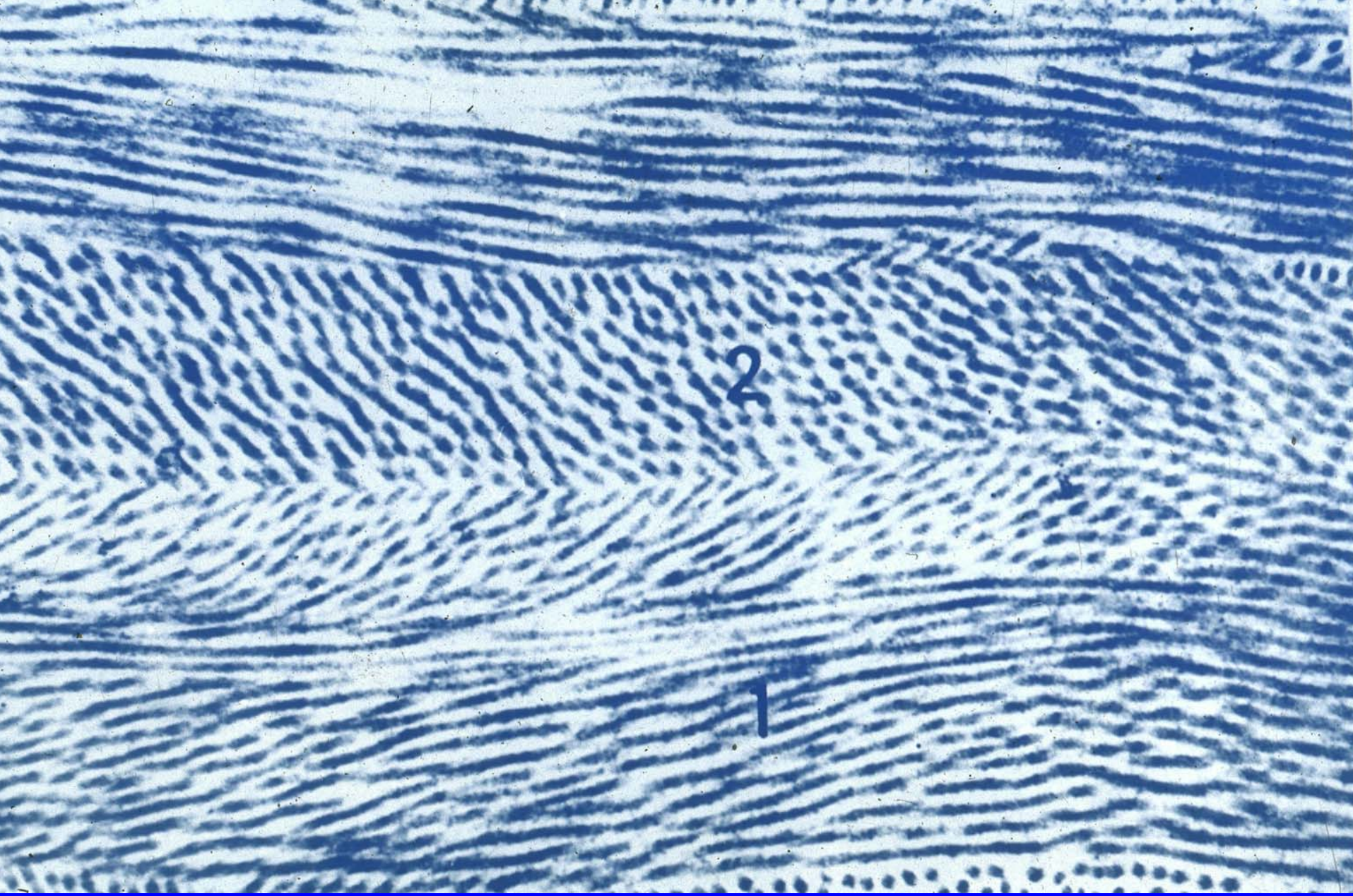


Eyeball

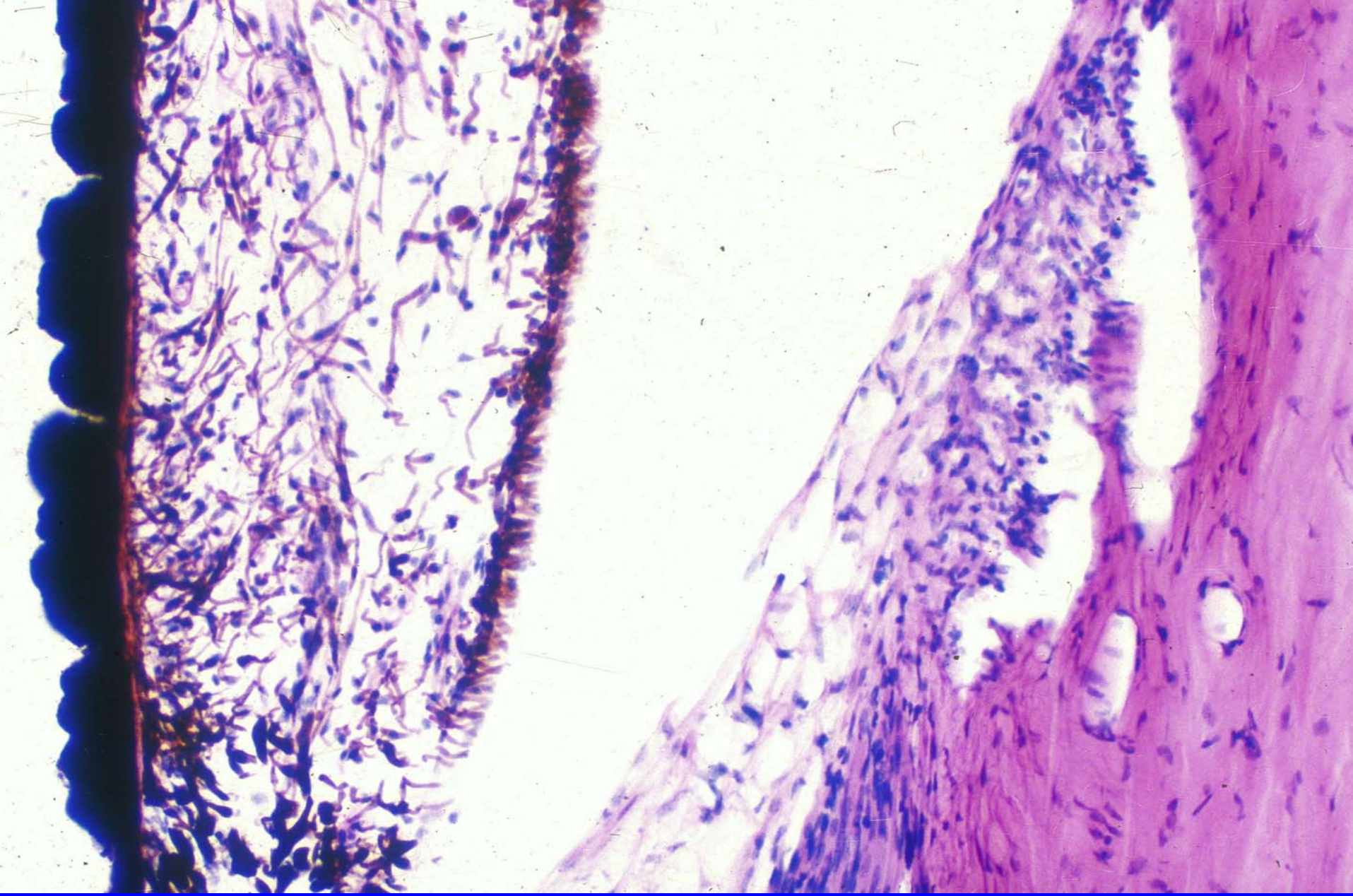
posterior half of the eyeball



cornea

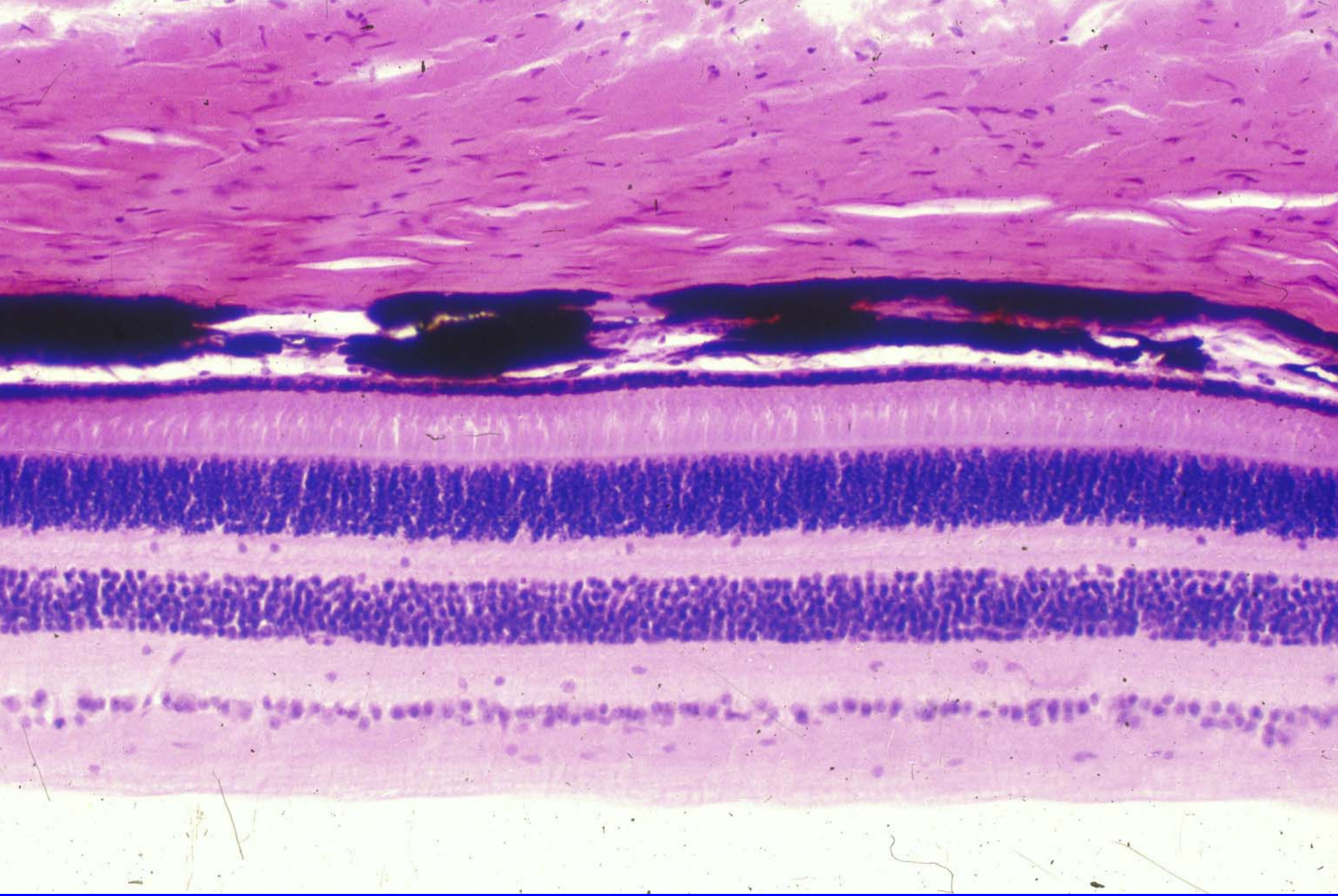


cornea

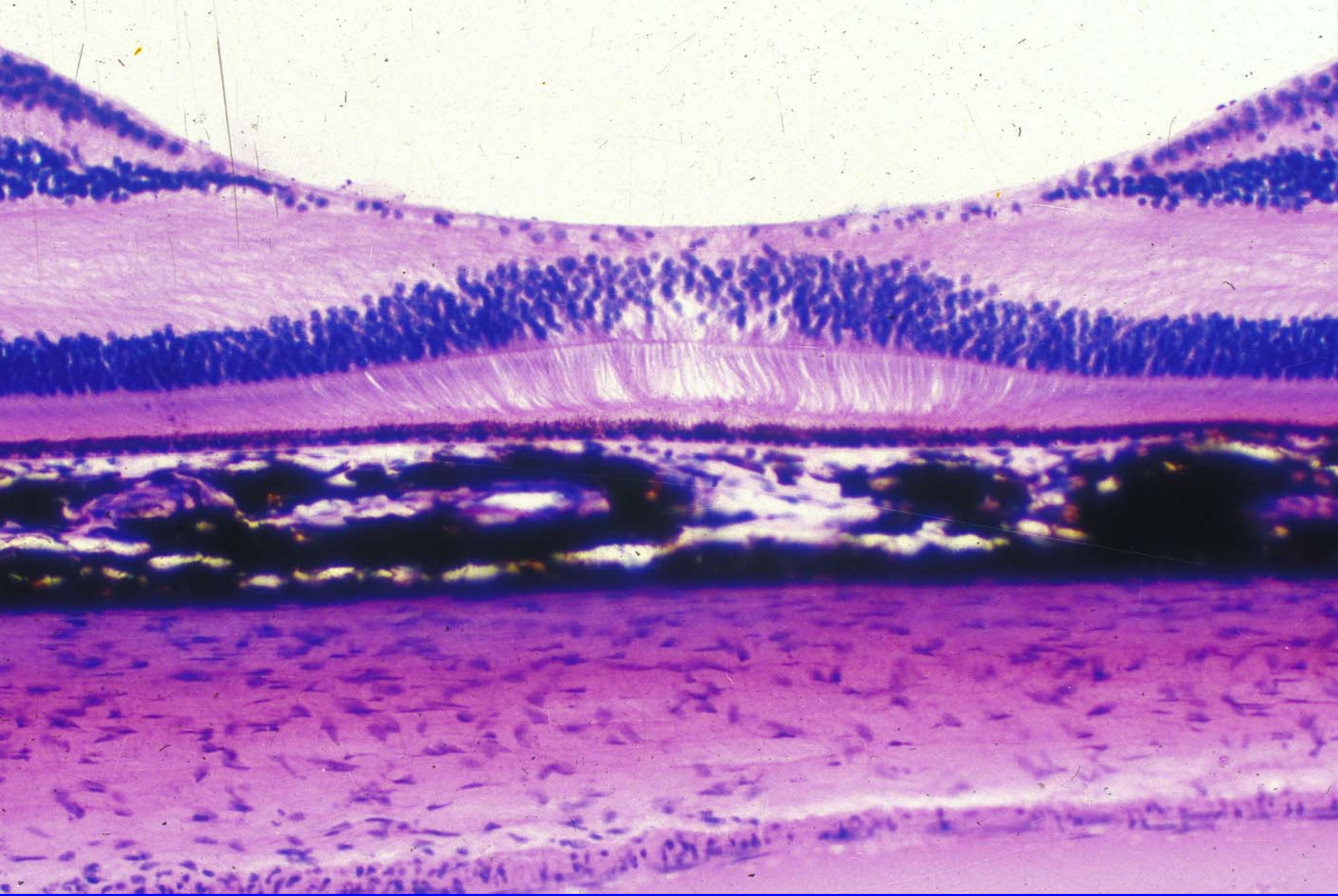


Iris,trabecular meshwork and sinus venosus sclerae

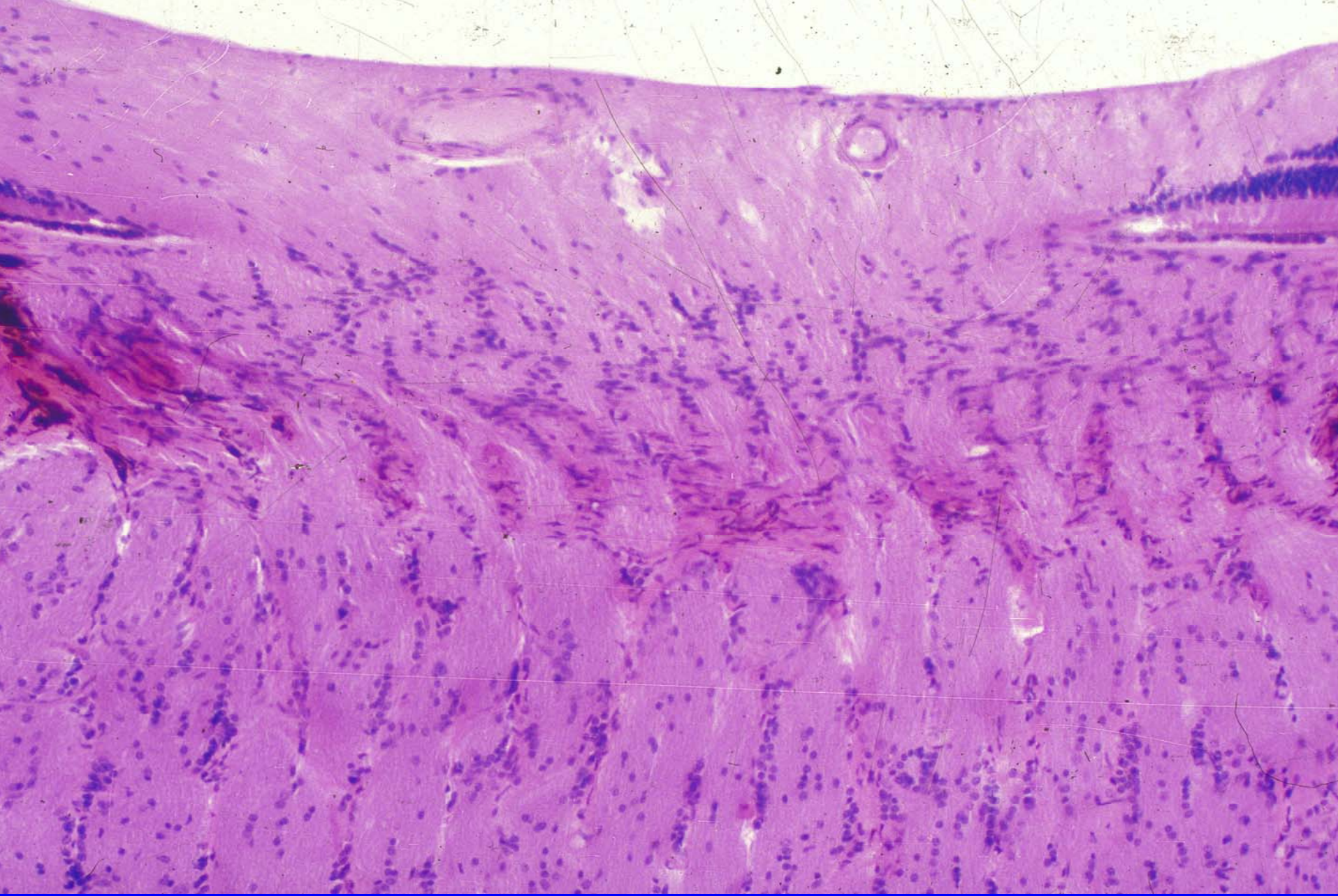
posterior half of the eyeball



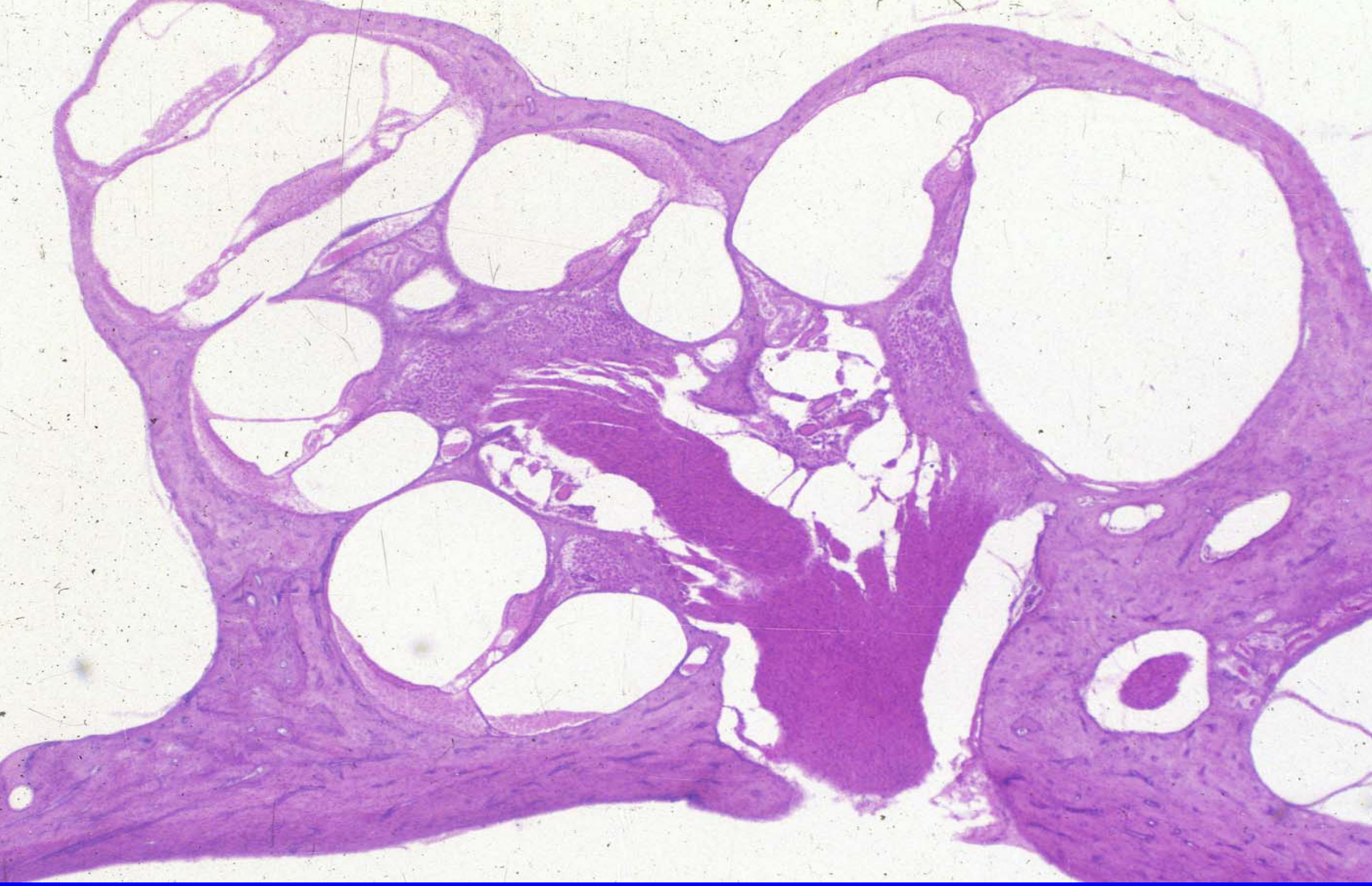
Retina



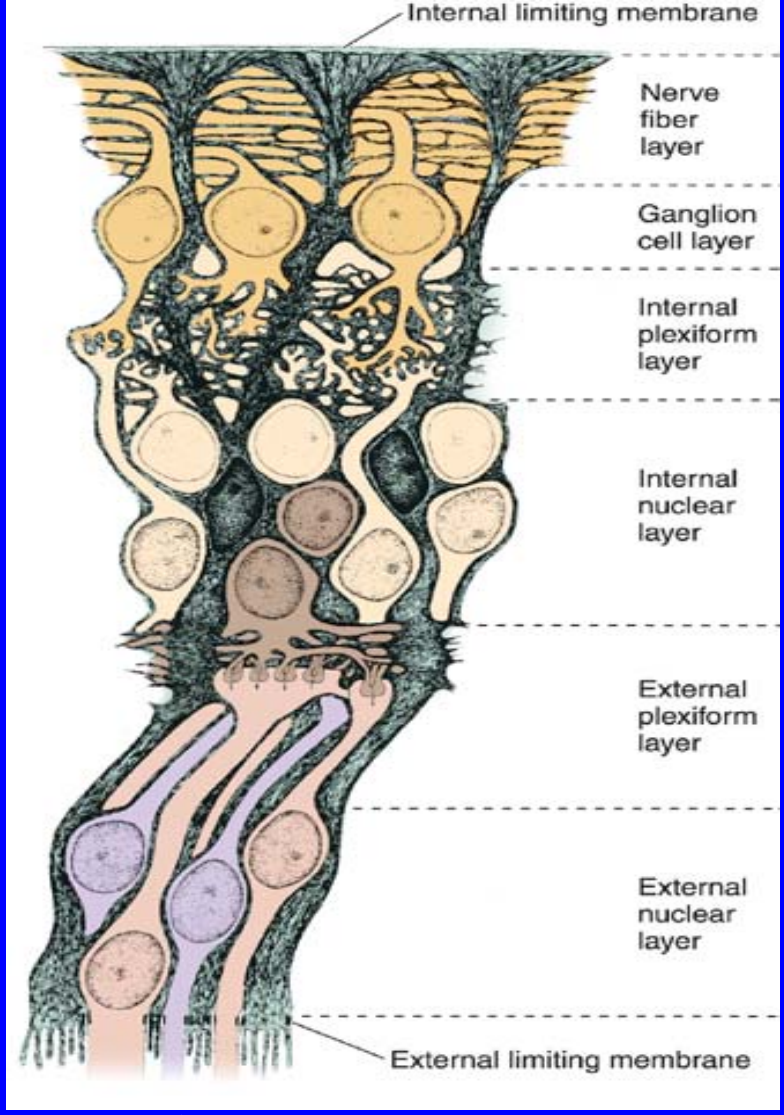
Central fovea



Papilla of optic nerve



Inner ear



The close association of M黧ler cells with neural elements in the sensory retina. M黧ler cells (dark fibrous cells) appear to be structurally and functionally equivalent to the astrocytes of the central nervous system, in that they envelop and support the neurons and nerve processes of the retina.