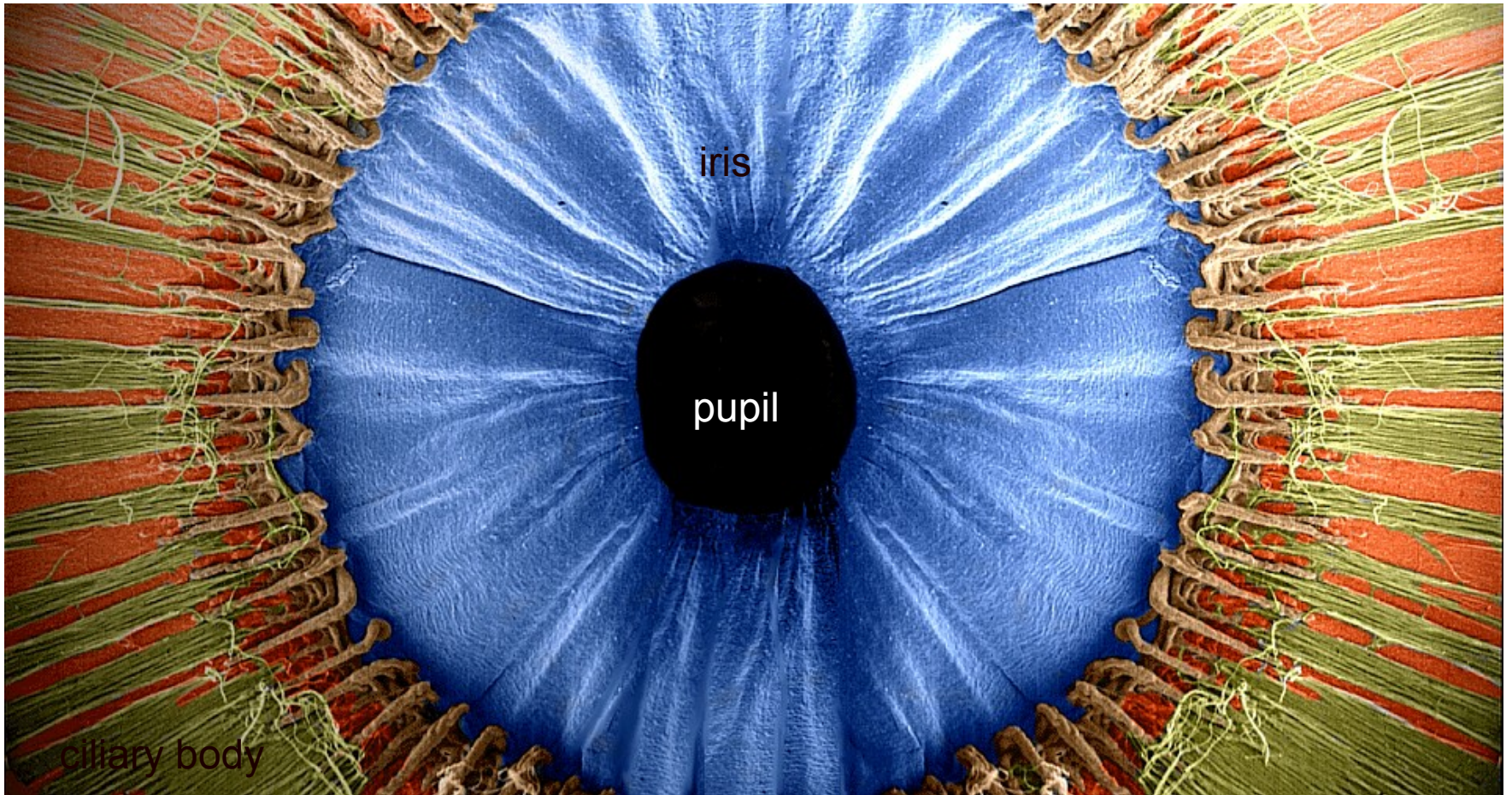
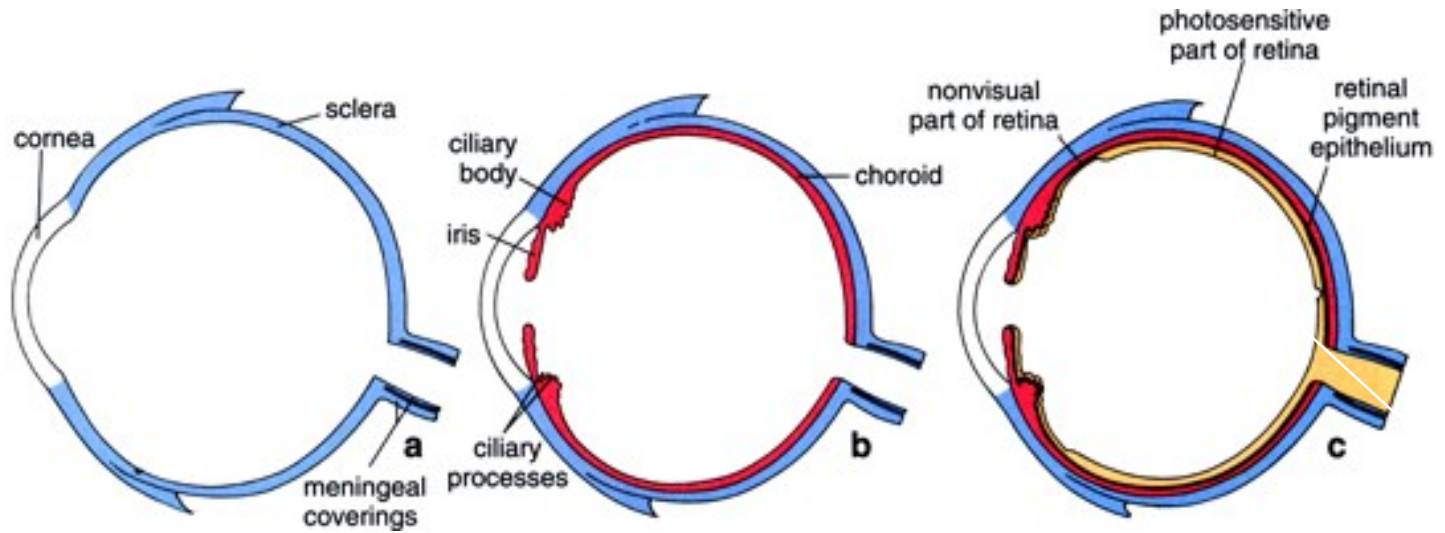


Eye

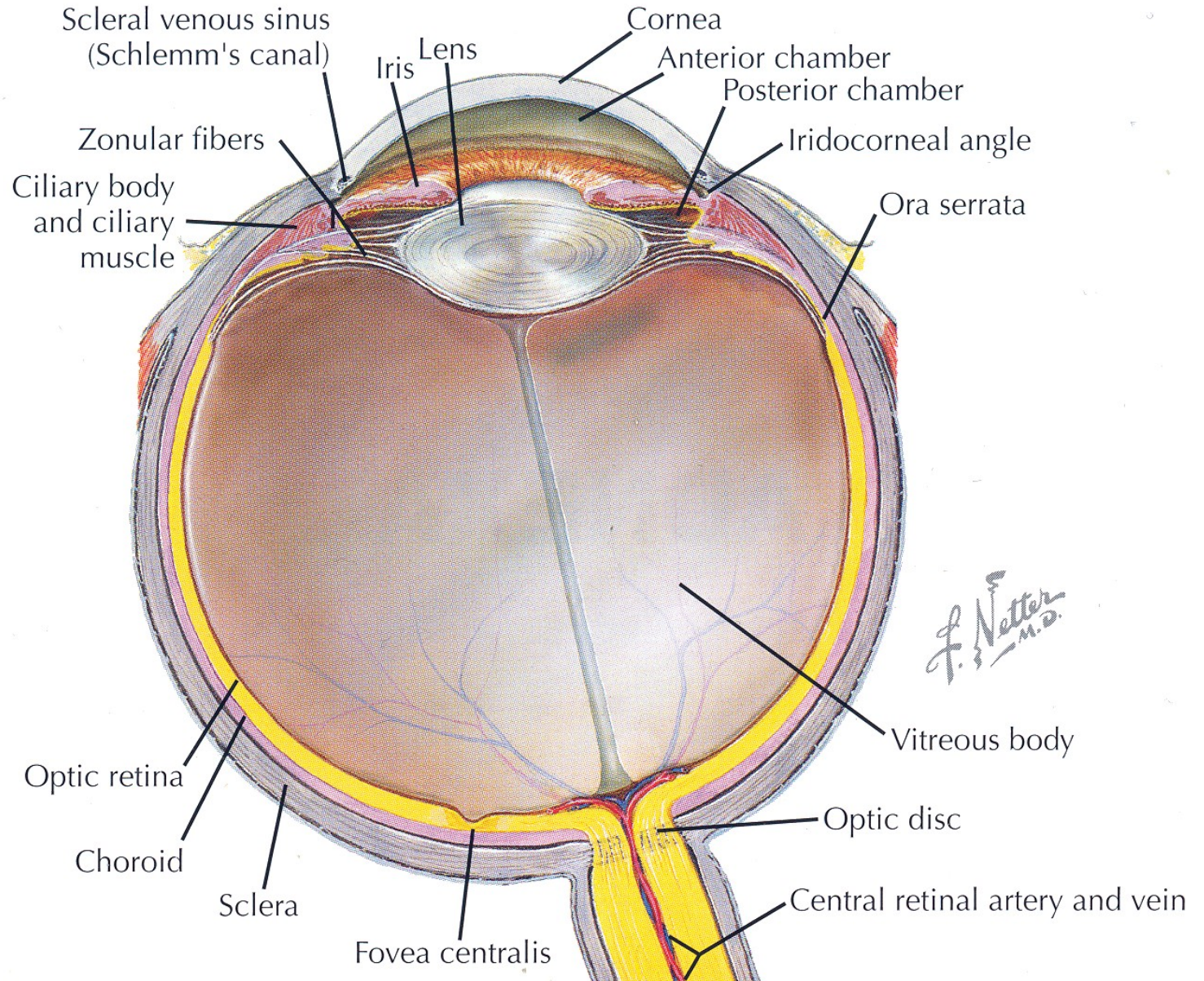


Eyeball



Eyeball

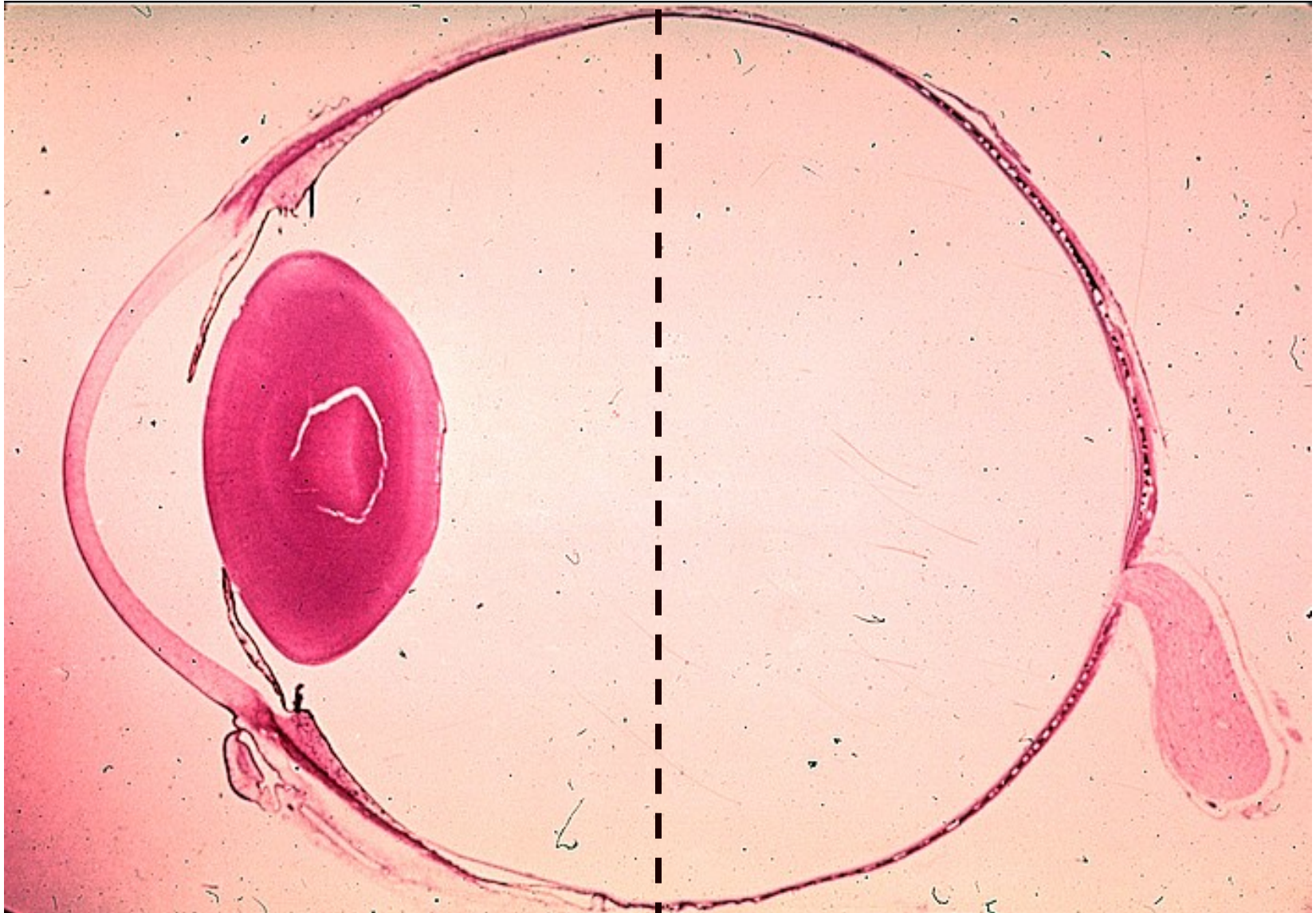
▼ Horizontal section.



Eyeball in LM

anterior segment

posterior segment



Eyeball



Three layers of the eye

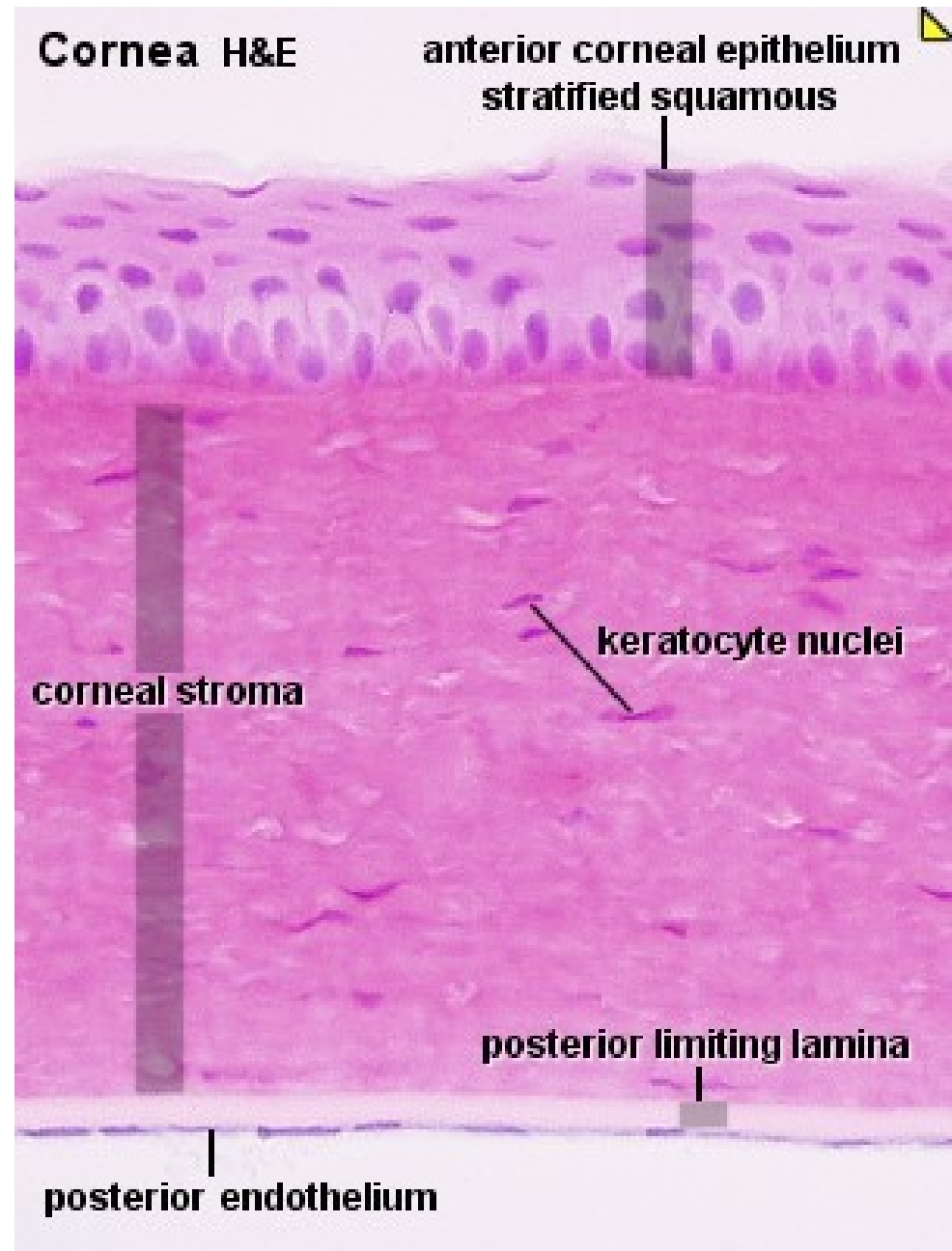
1. Multilayer inner **retina**
2. Middle **choroid** – pigmented, vascular
3. Outer **sclera** – dense fibrous c . t.

Fibrous tunic - tunica externa oculi

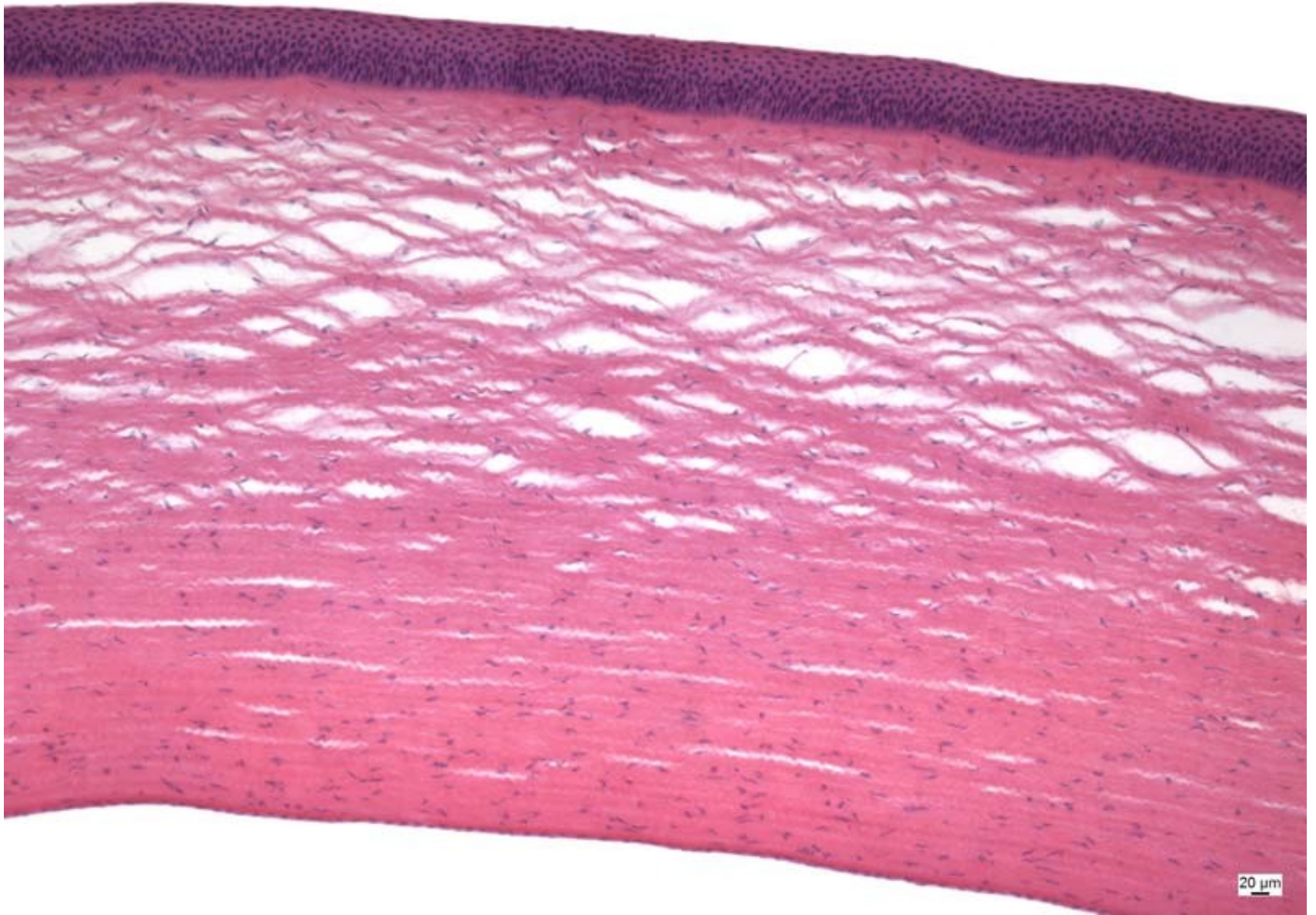


Cornea

- Stratified squamous epithelium
- Bowman's membrane-anterior limiting lamina
- Substantia propria corneae
 - 200 - 250 layers of regularly organized collagen fibrils
 - fibrocytes /keratocytes/
- Descemet's membrane-posterior limiting lamina
 - the basement membrane of the posterior endothelium
- Posterior endothelium
 - simple squamous epithelium

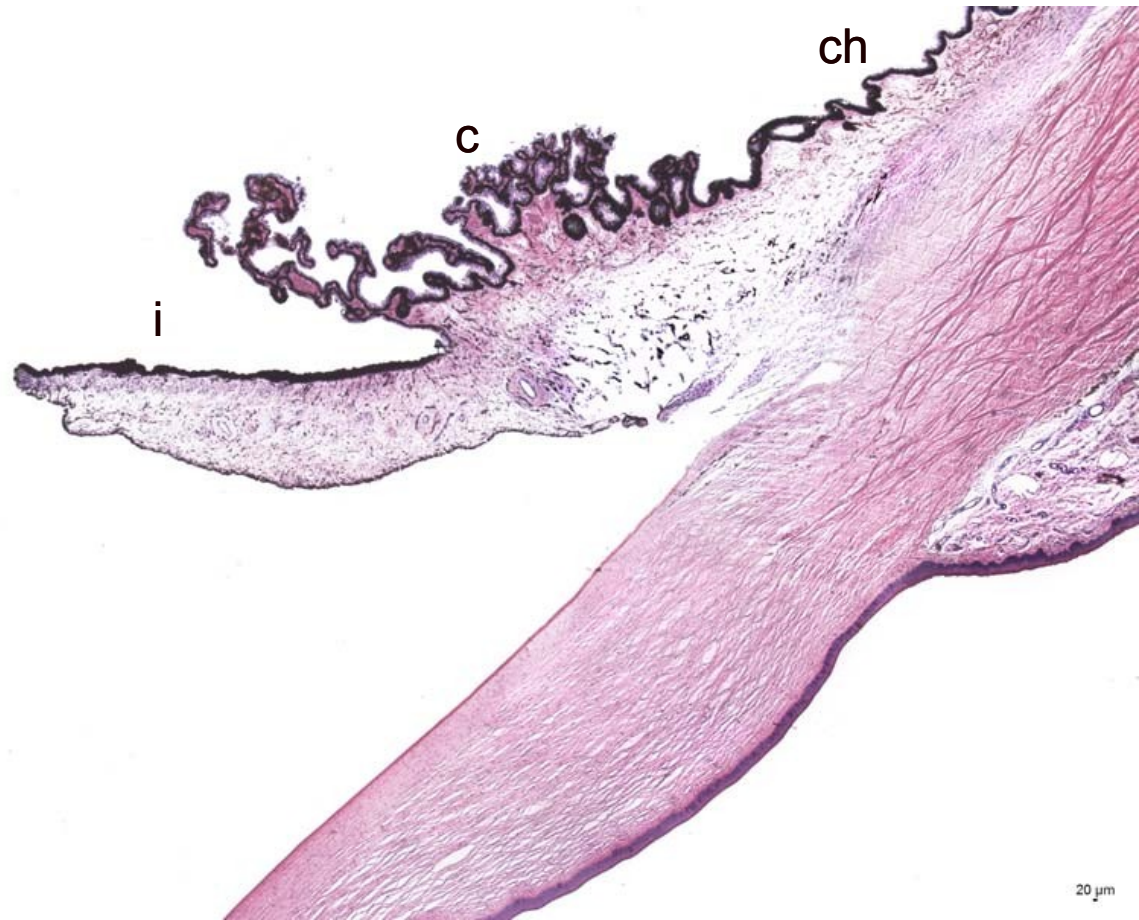


Cornea



Vascular tunic - tunica media oculi

- Choroid
 - loose c.t. with network of blood vessels, numerous pigment cells
- Ciliary body
 - loose c.t. with smooth muscle cells – *musculus ciliaris /accomodationis*
 - ciliary processes – generate aqueous humor
- Iris
 - central opening of the eye – the *pupil*



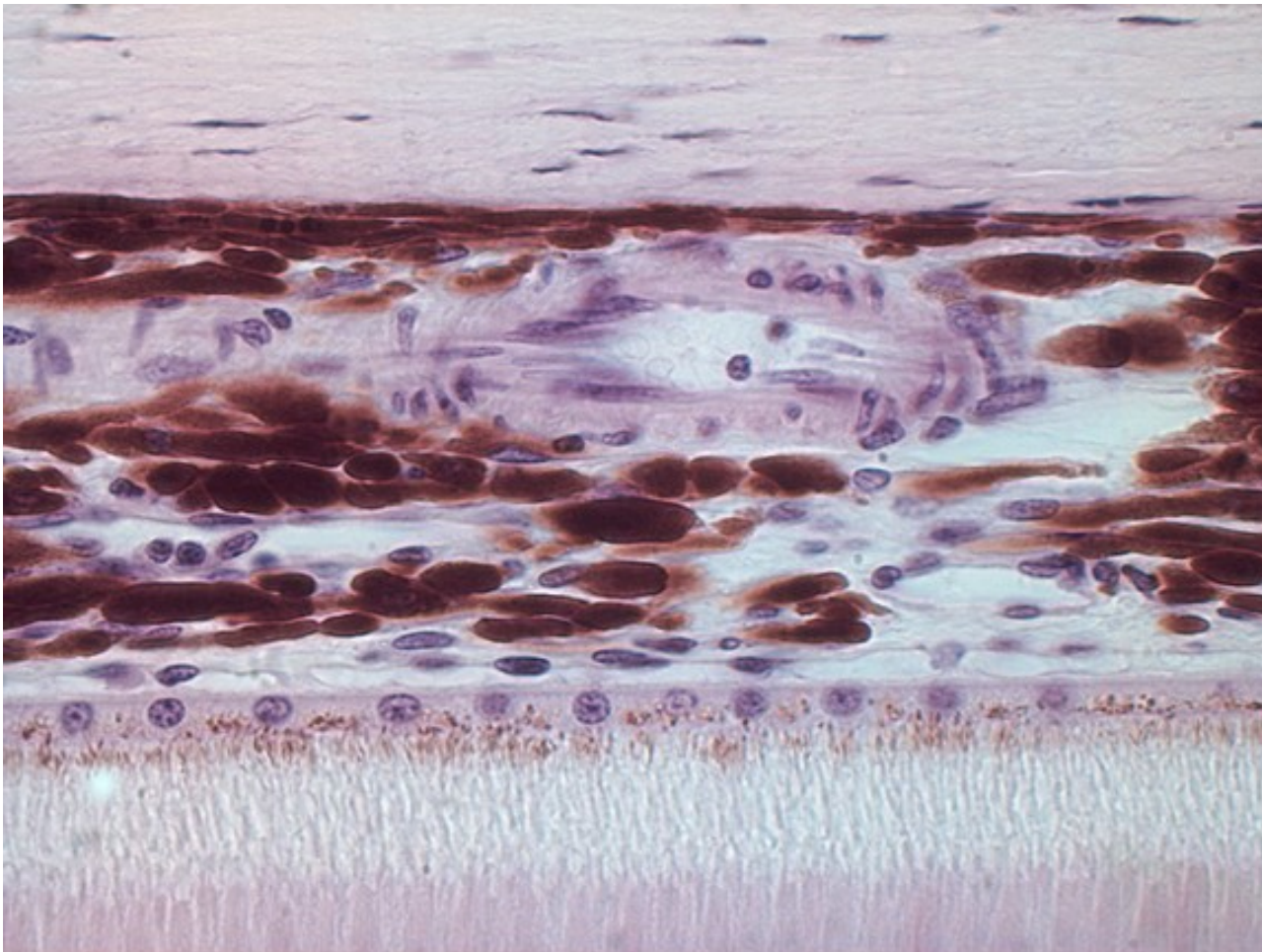
Choroid

- Lamina suprachoroidea /lamina fusca sclerae/
- Lamina vasculosa
- Lamina chorocapillaris
- Lamina vitrea /Bruch 's membrane/

sclera

choroid

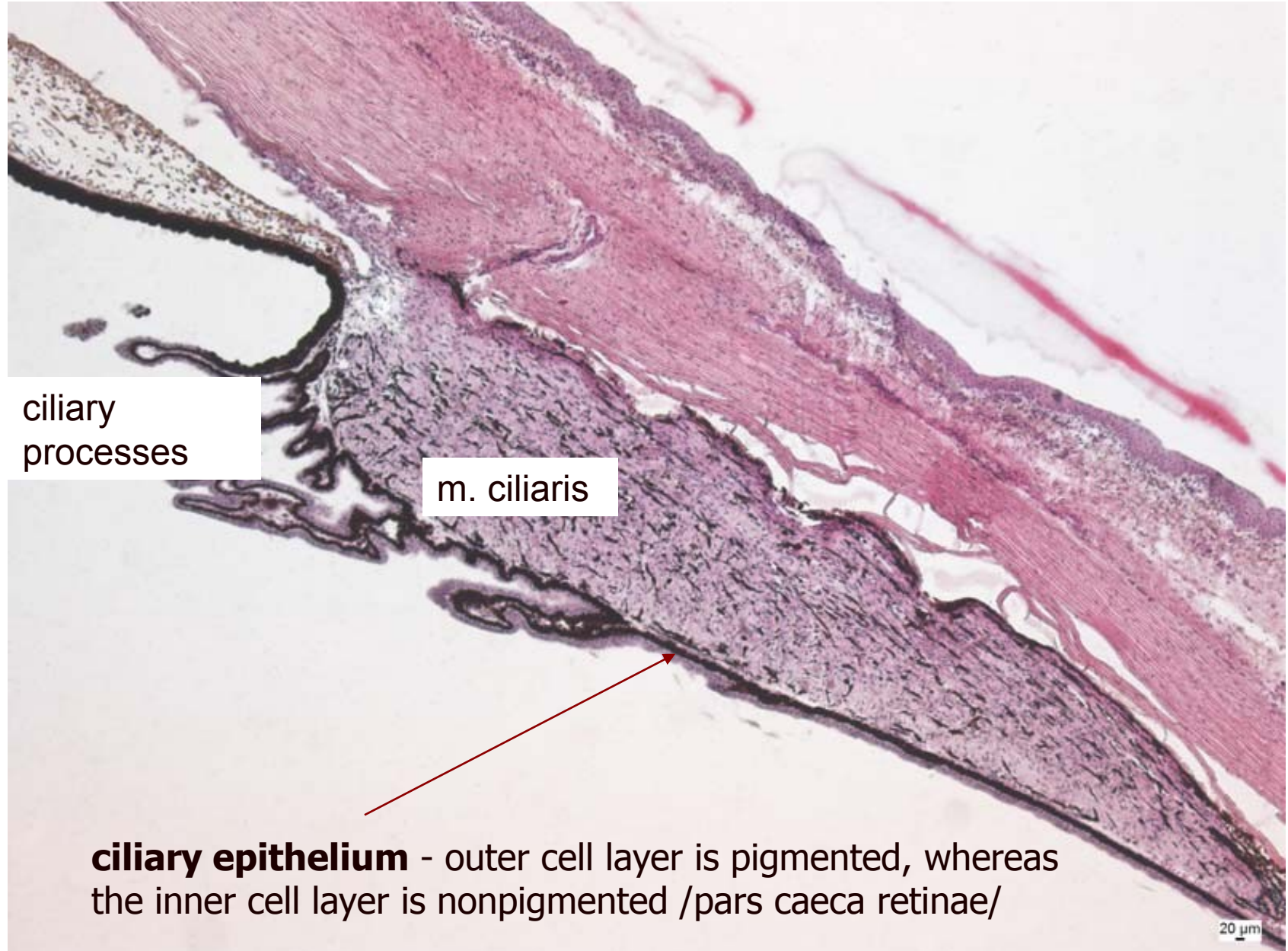
retina



Choroid



Ciliary body - structure



Ciliary body

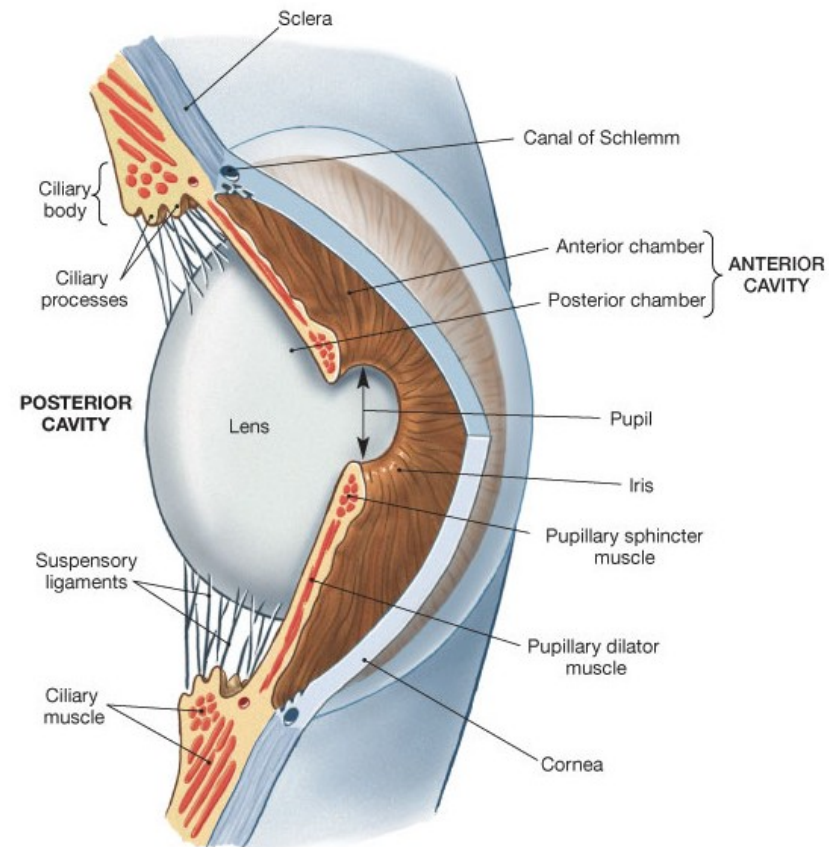
Two functions

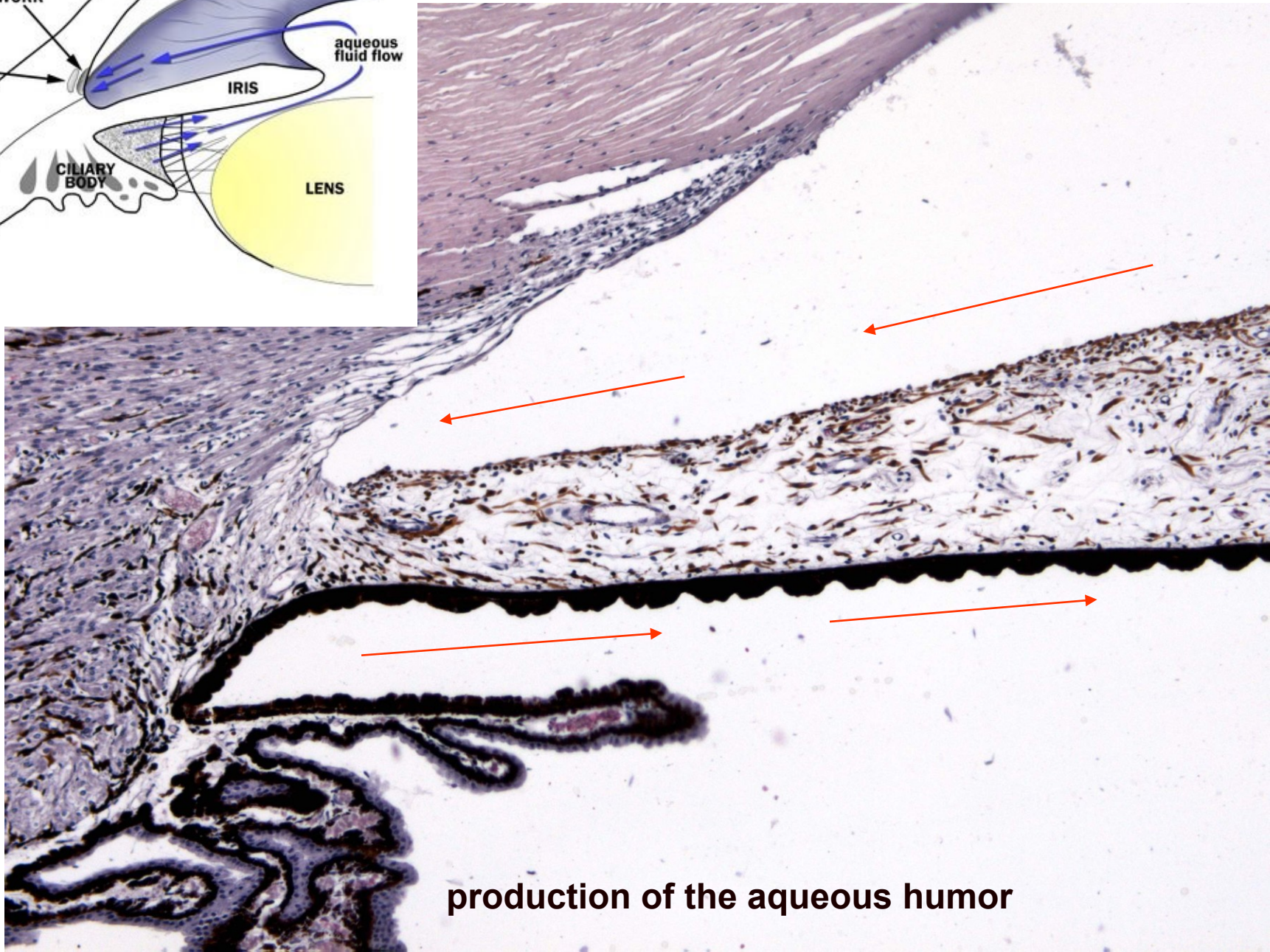
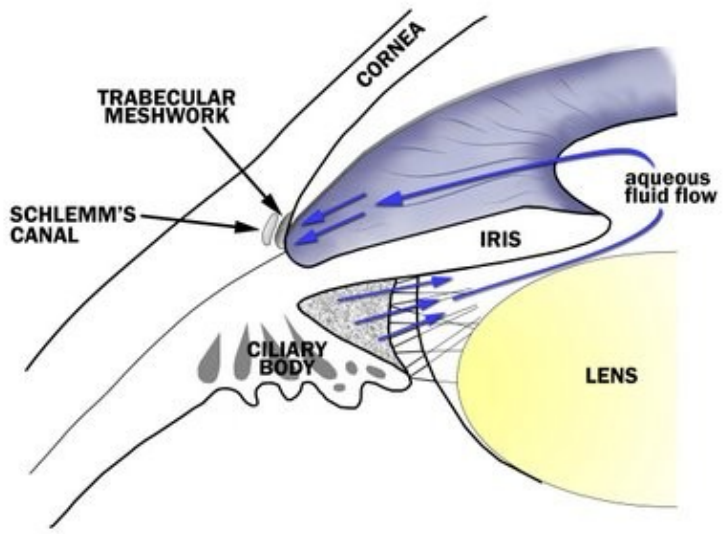
- accommodation
- production of the aqueous humor

ACCOMODATION

from the ciliary processes extend fibers towards the lens - fibres are called *zonular fibres*

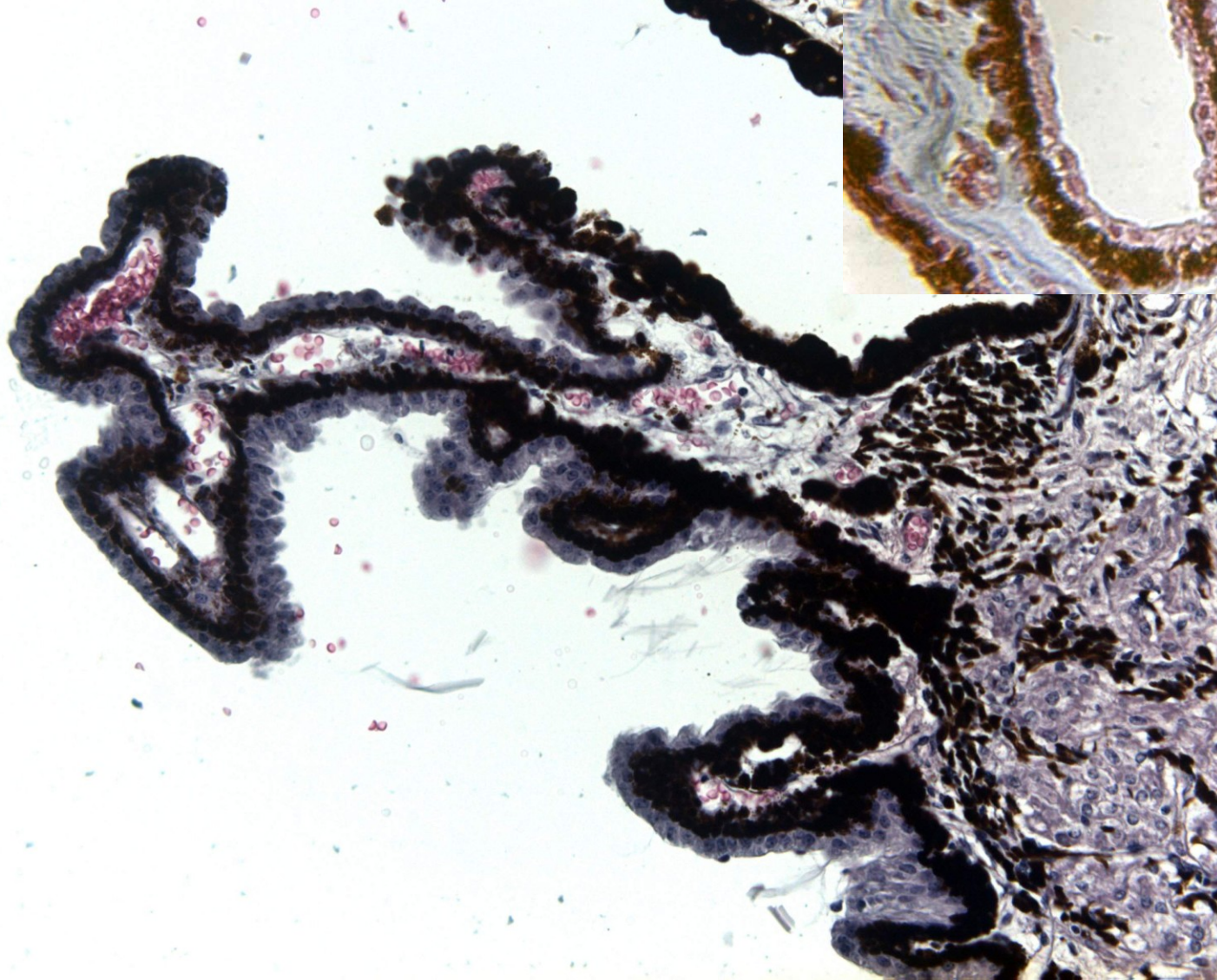
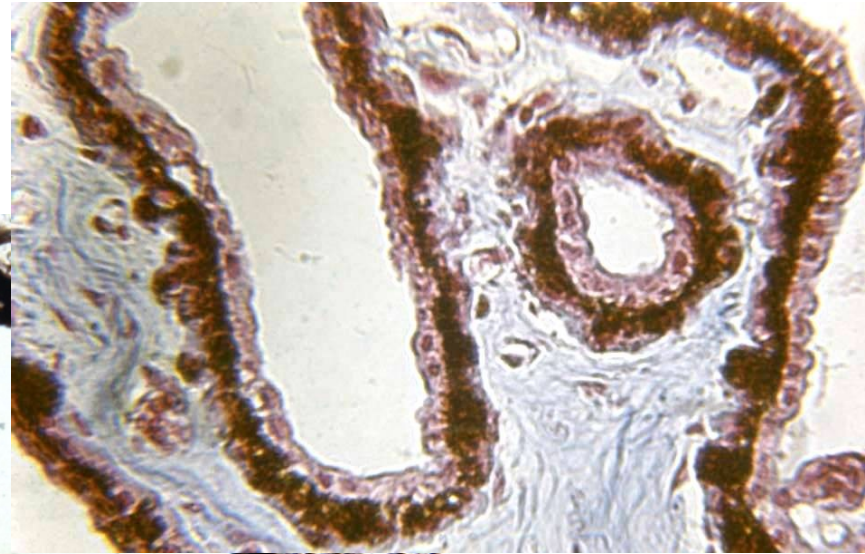
contraction of the m. ciliaris reduces the tension of the zonule fibres and result in a thickening of the lens which focusses on close objects - **accomodation**





production of the aqueous humor

Ciliary processes



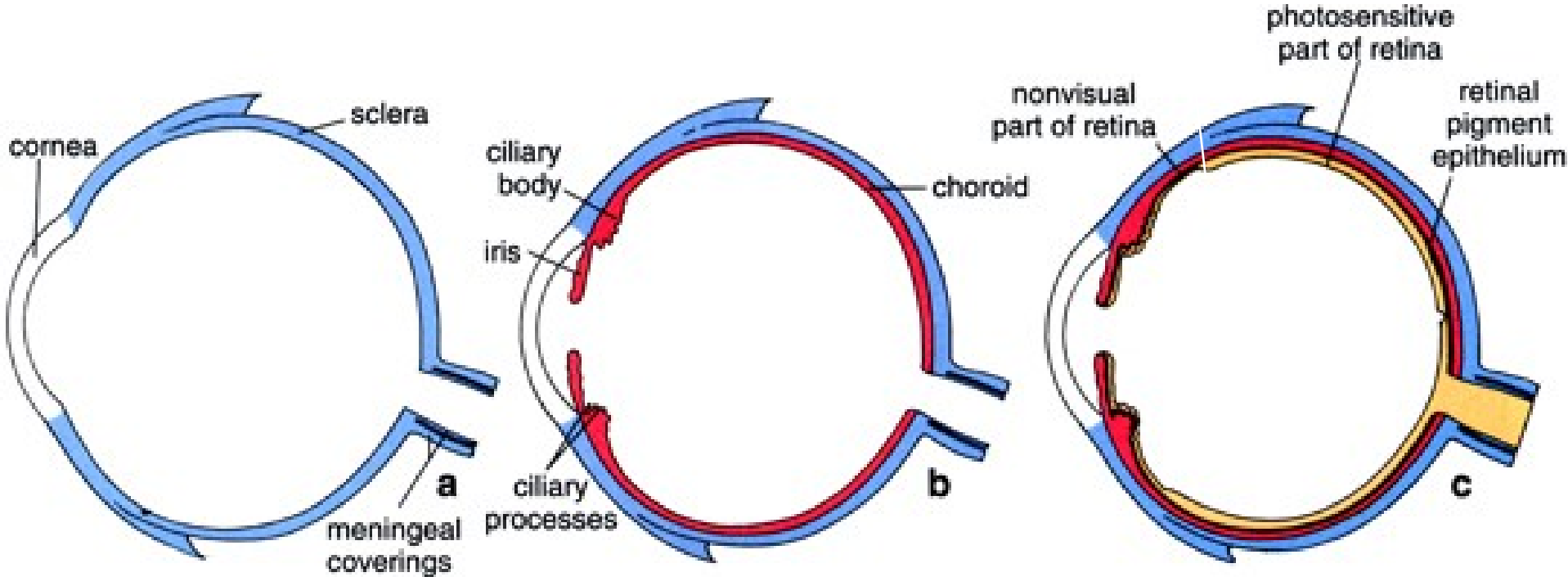
Iris

- Anterior epithelium
discontinued layer
- Anterior border layer
pigment cells
- Stroma iridis
gelatinous c.t., numerous
pigment cells
surrounds the pupil are
smooth muscle cells which
form the annular sphincter
pupillae muscle
- Posterior border layer
m. dilator pupillae
/myoepithelial cells/
- Posterior epithelium
one layer pigmented cells



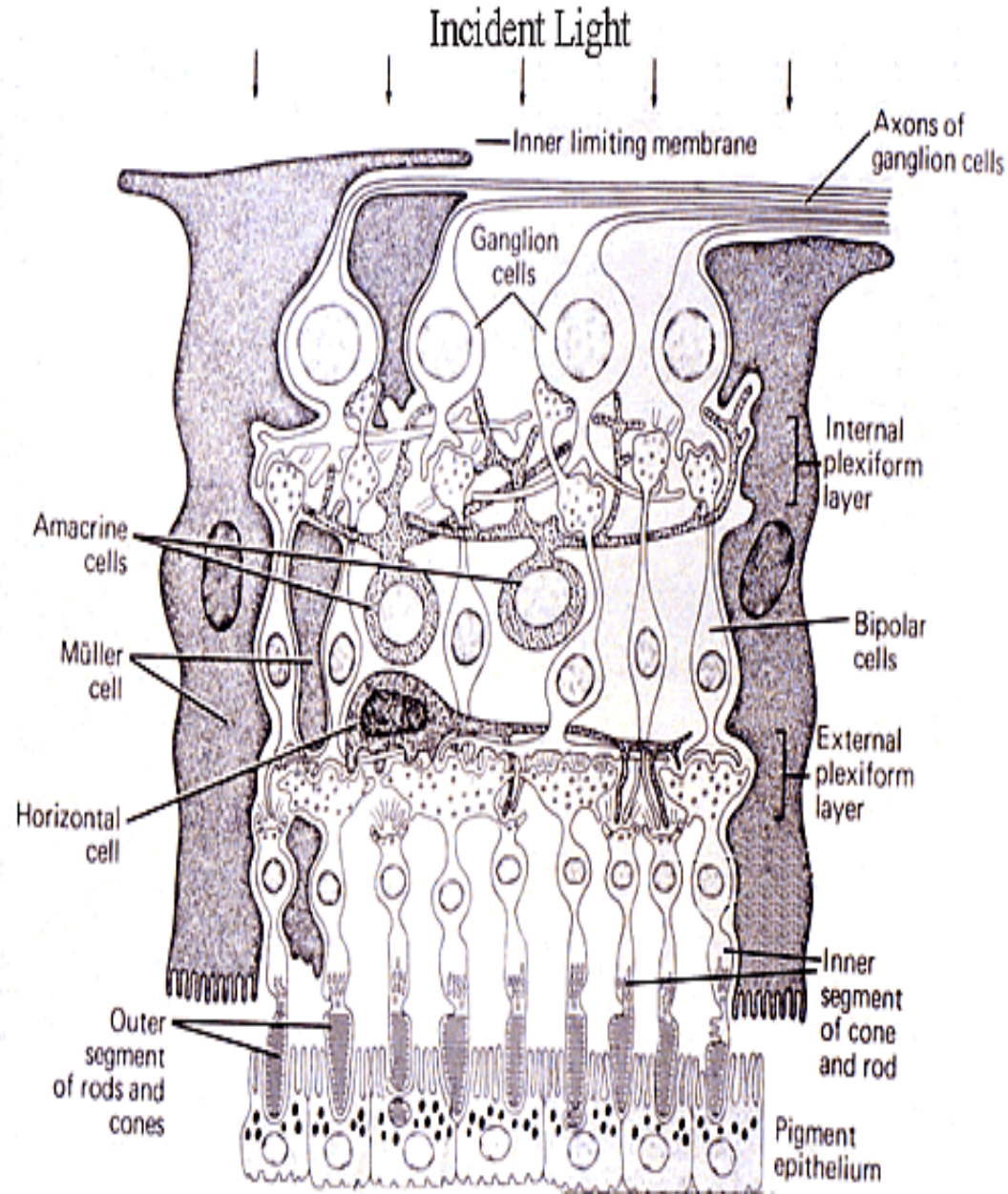
Retina

ora serrata

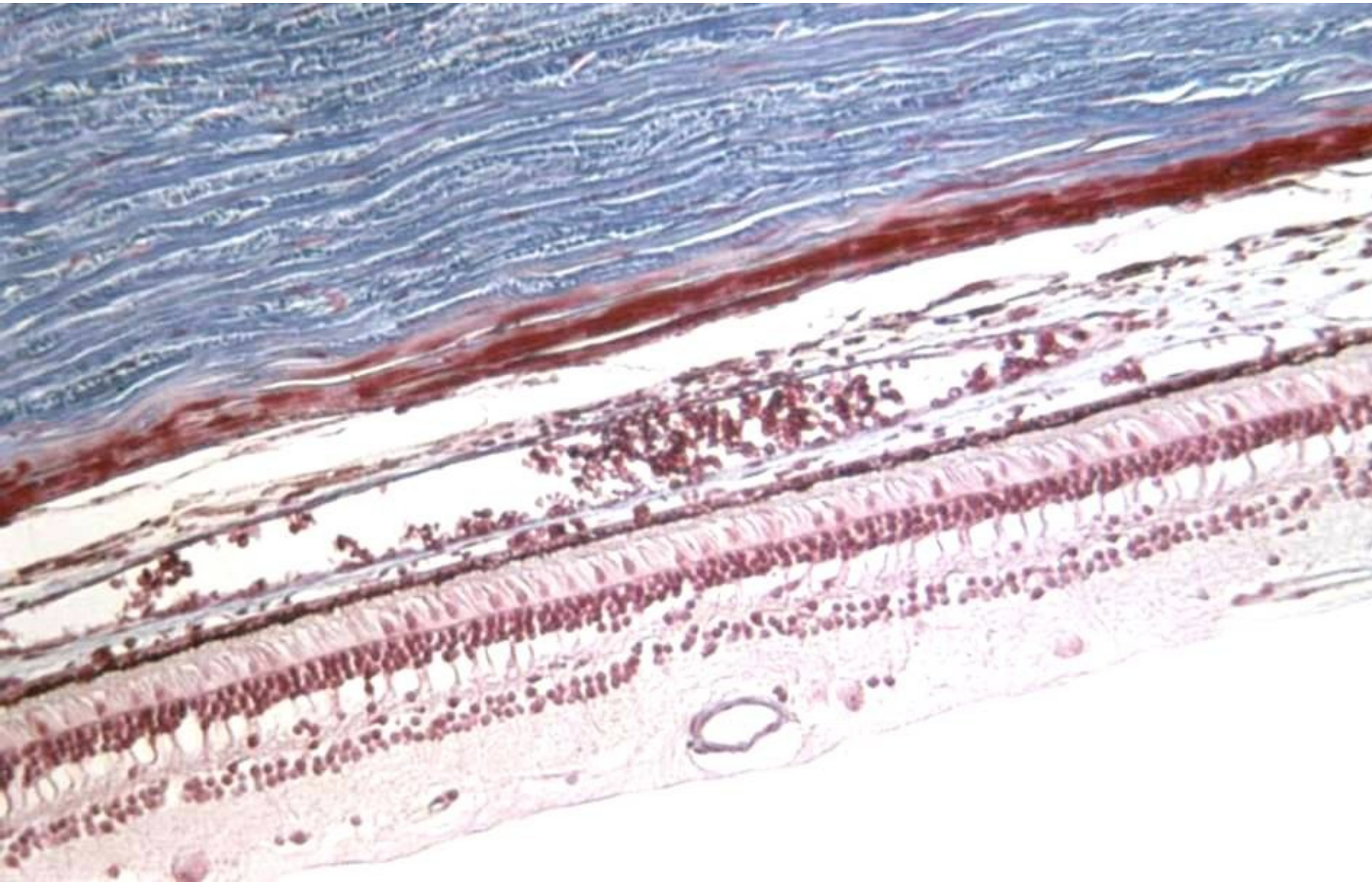


Retina (neural tunic) – cell types

- Pigment cells
- Neurons
 - 1st neuron = rod cells and cone cells
 - 2nd neuron = bipolar cells
 - 3rd neuron = ganglion cells (multipolar)
 - interneurons
 - horizontal cells
 - amacrine cells
- Neuroglia
 - Müller cells – occupy practically the entire retina, part between outer and inner limiting membrane (which are formed by their cell bases)

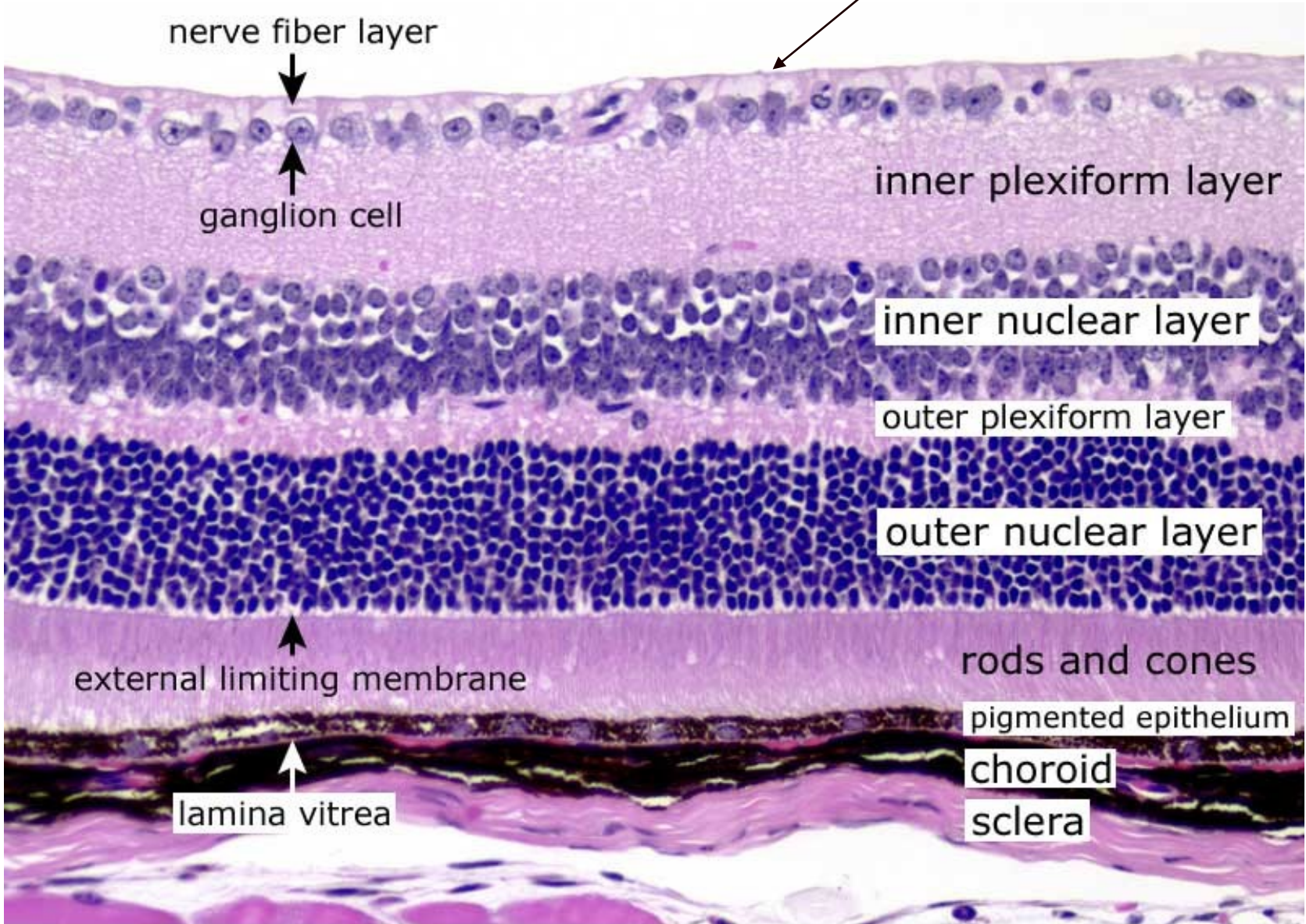


Sclera – Choroidea - Retina

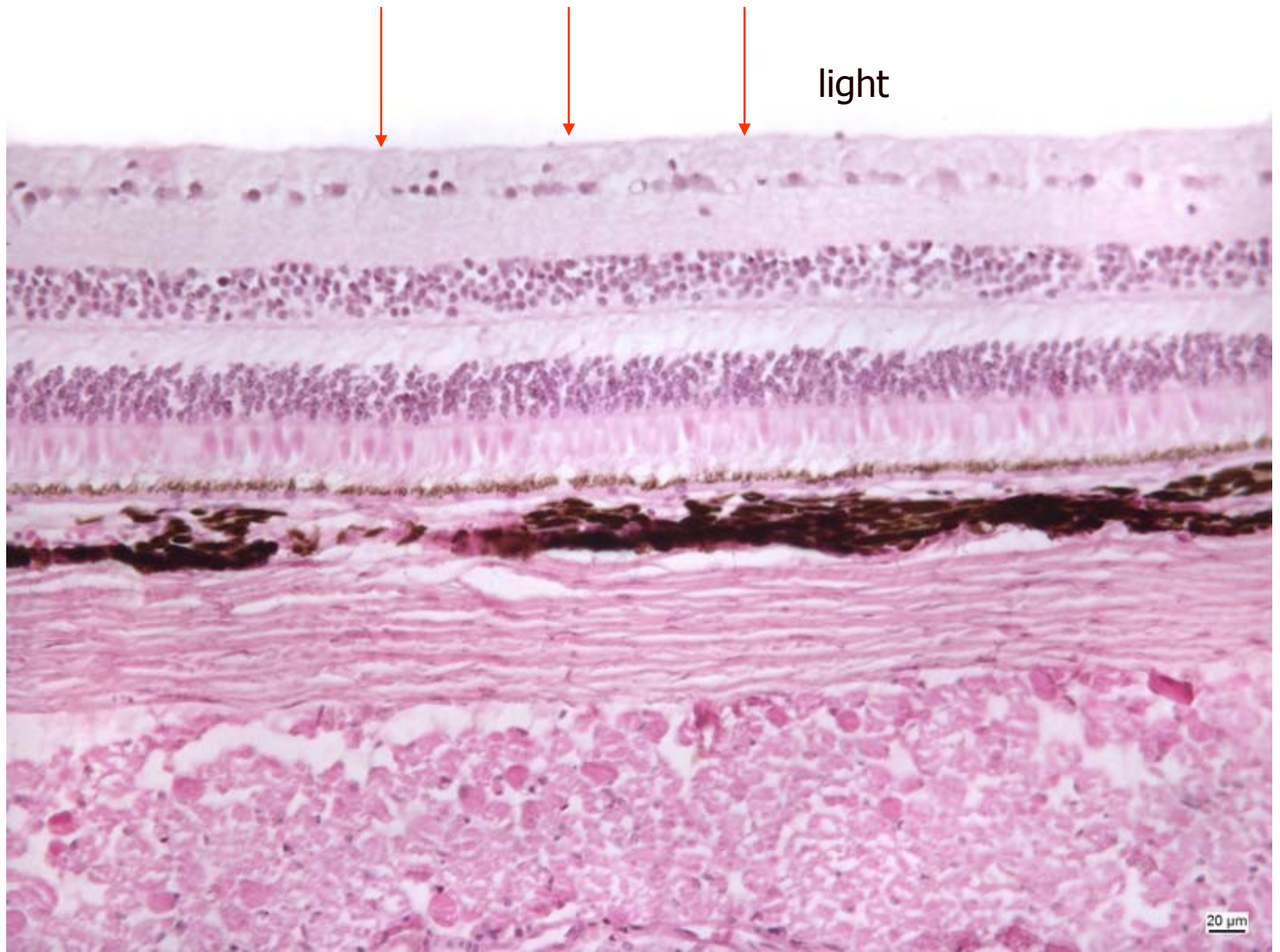


Retina

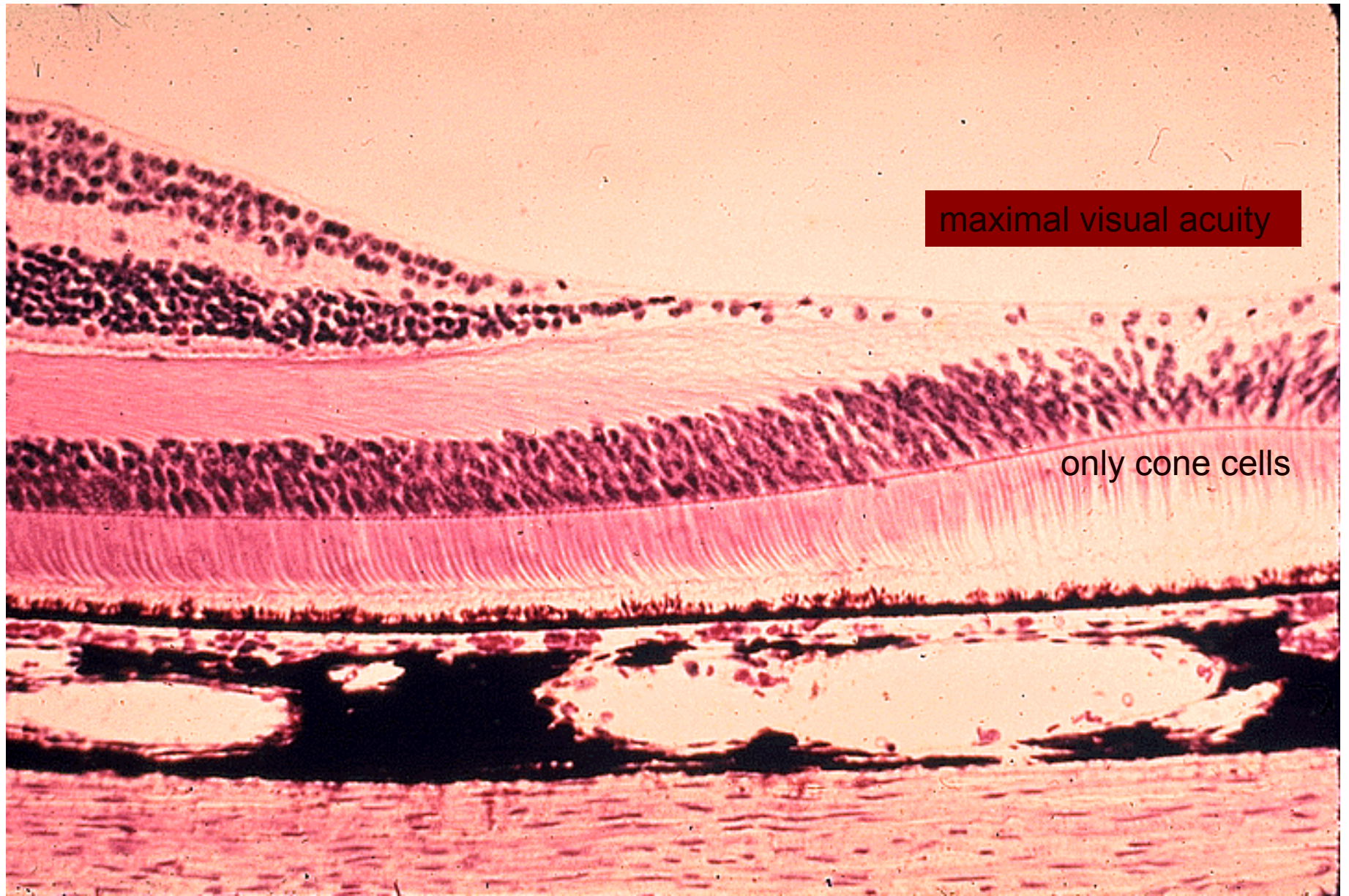
10 layers



Retina



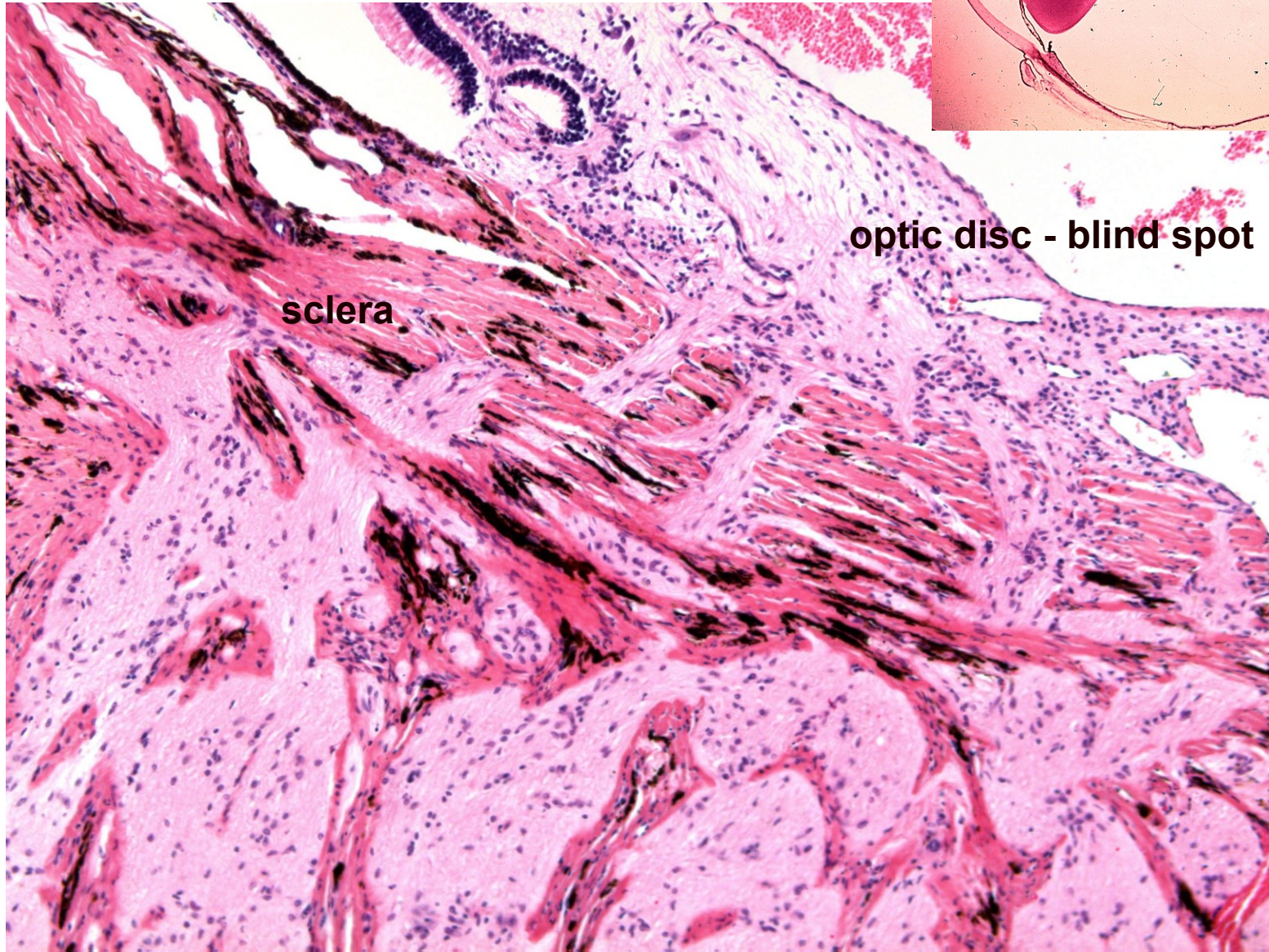
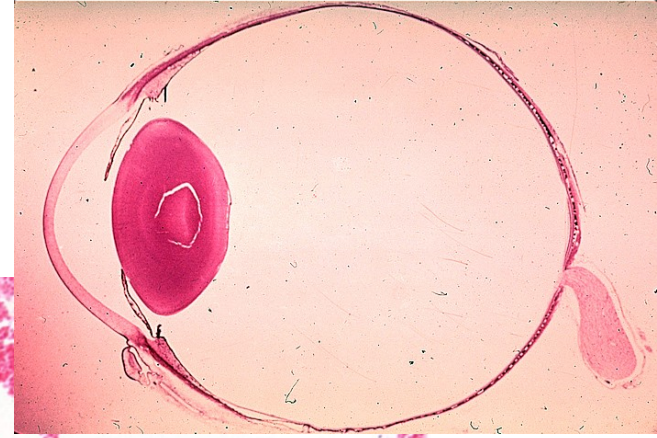
Retina - fovea centralis



maximal visual acuity

only cone cells

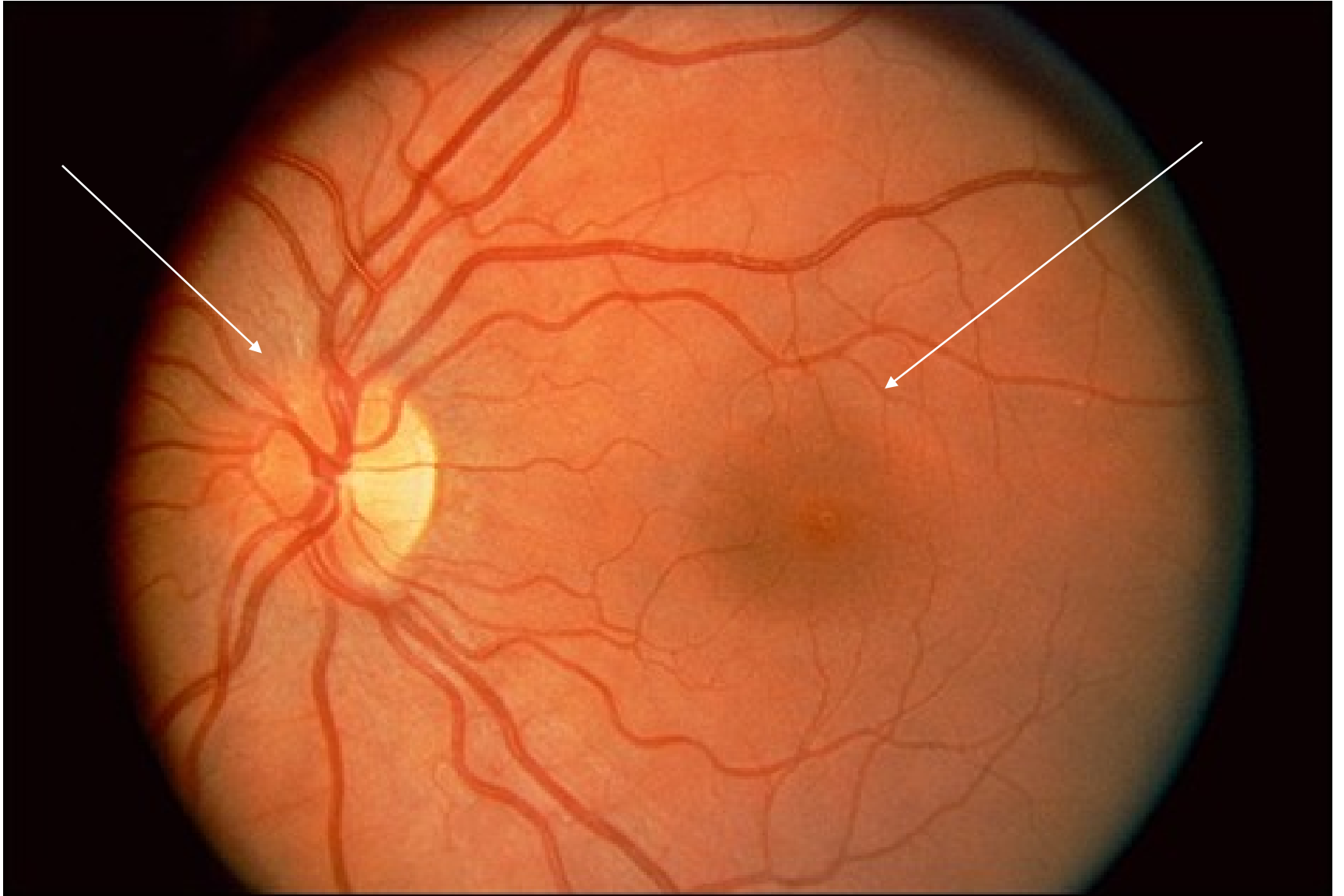
Retina - discus nervi optici



sclera

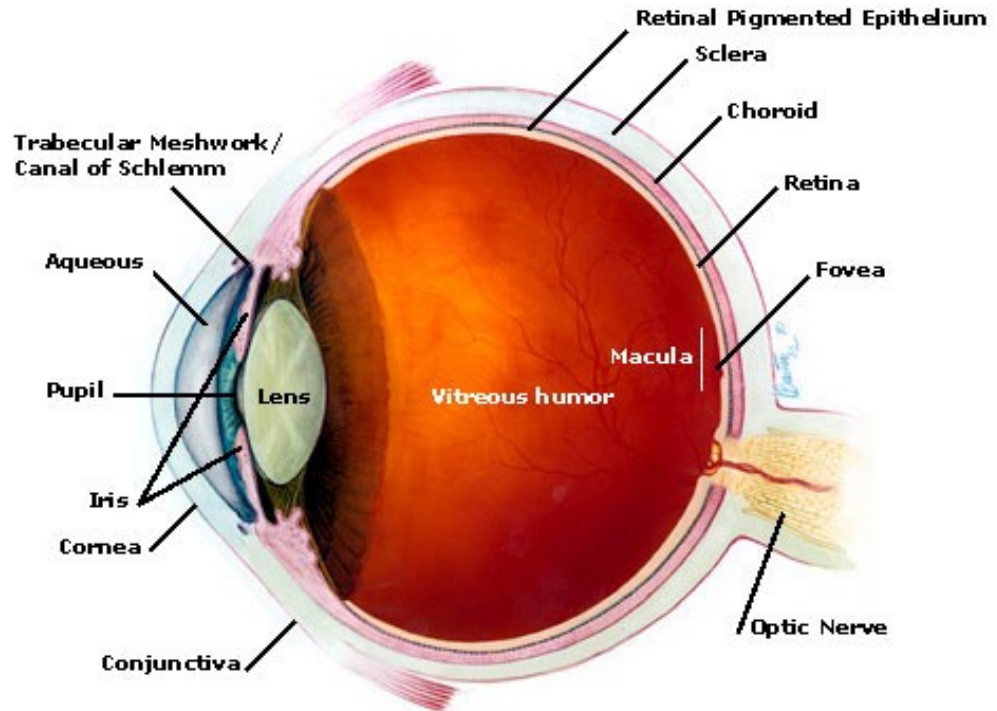
optic disc - blind spot

Retina



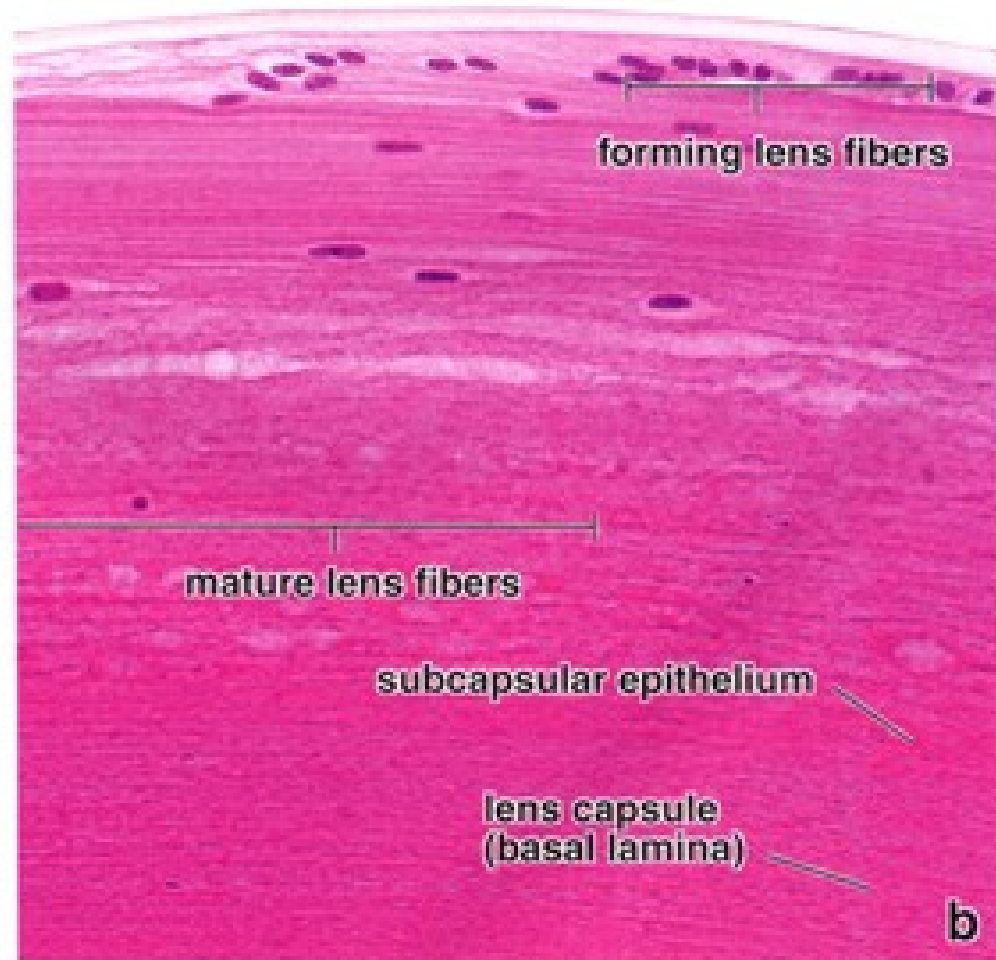
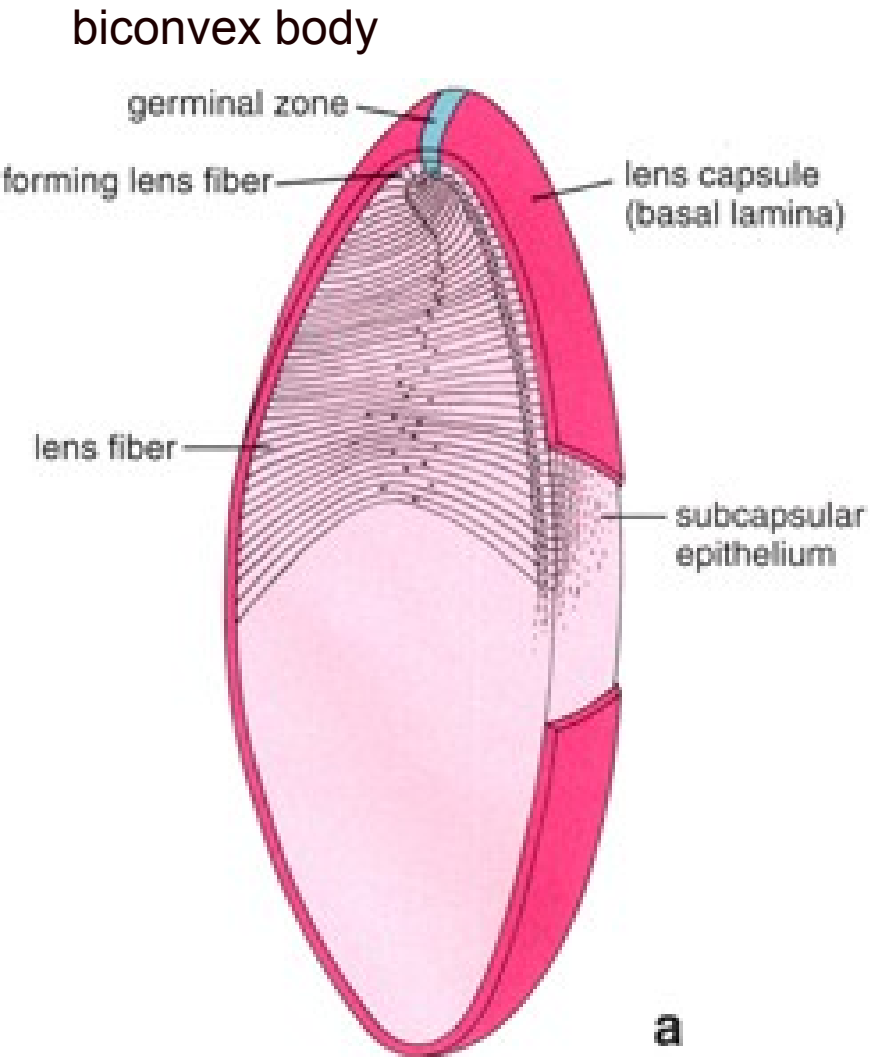
Refractive media

- Cornea
- Aqueous humor
- Lens
- Vitreous body



Refractive media are characterized by high transparency and refractivity.

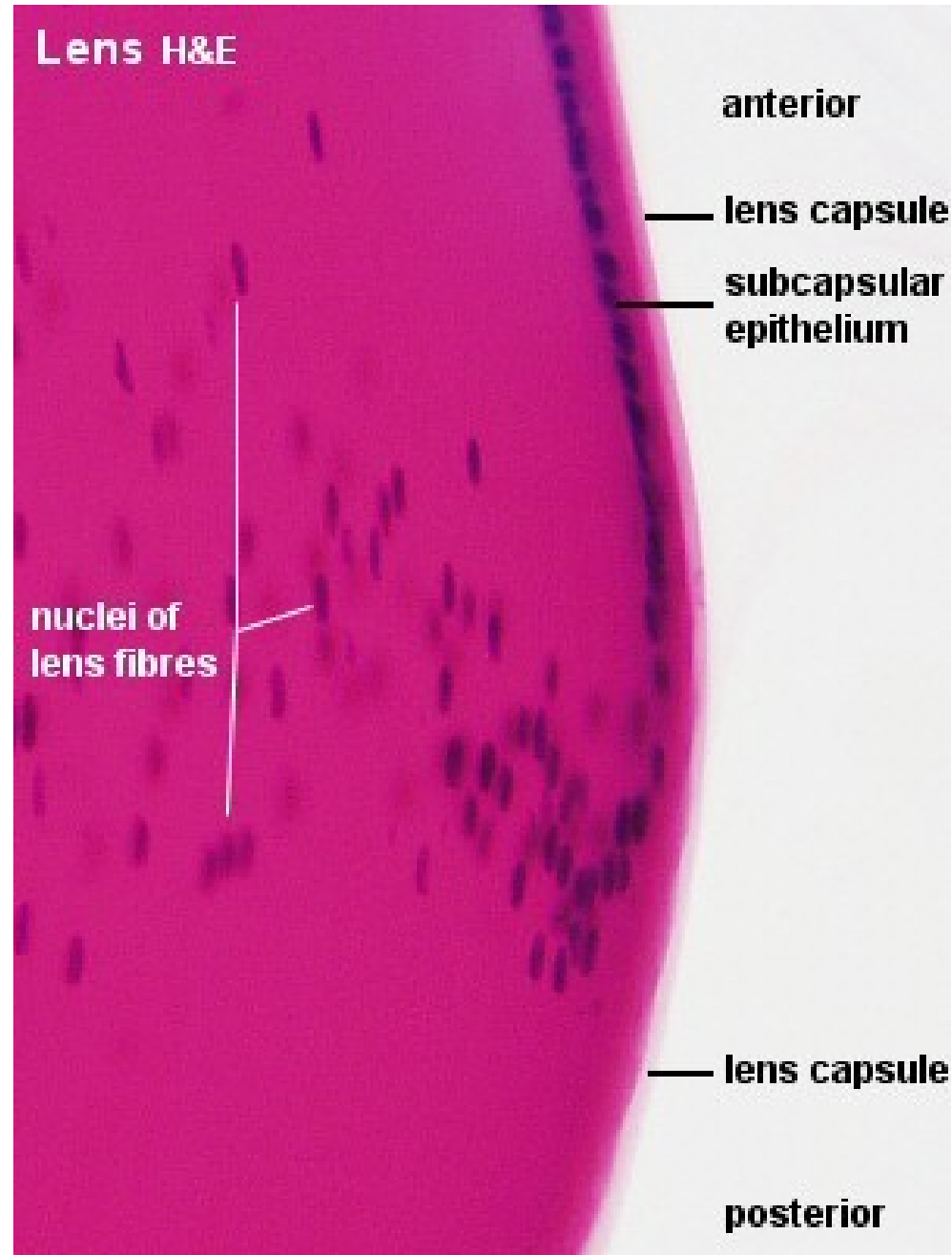
Lens



The **lens fibers** are highly specialized cells that differentiate from lens epithelium cells.

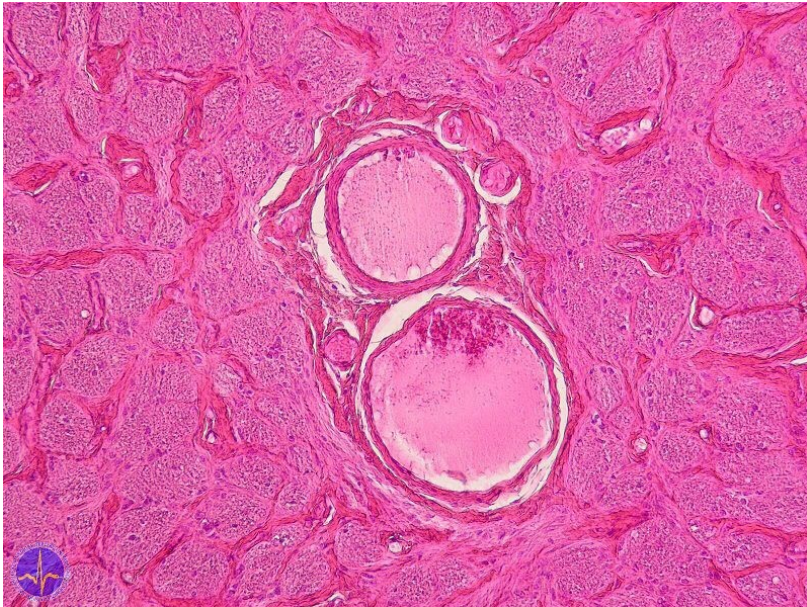
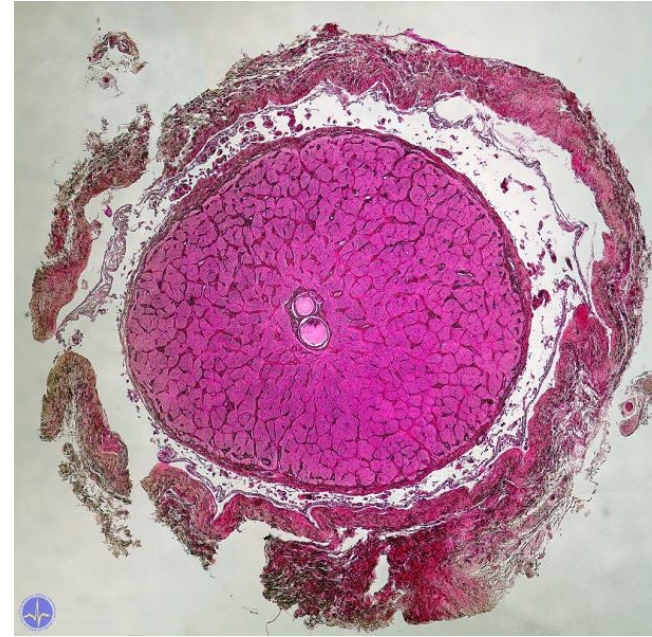
Lens

- *lens capsule*
 - is generated by the cells of the subcapsular epithelium
- *subcapsular epithelium*
 - anterior and lateral parts → stayes
 - posterior part → lens fibers
- *lens fibres*
 - very long (up to 12 mm), hexagonal cells, form the body of the lens
 - lens fibres are nucleated in the soft, outer *cortex of the lens*
 - lens fibres located deeper lose their nuclei and become part of the harder *nucleus of the lens*

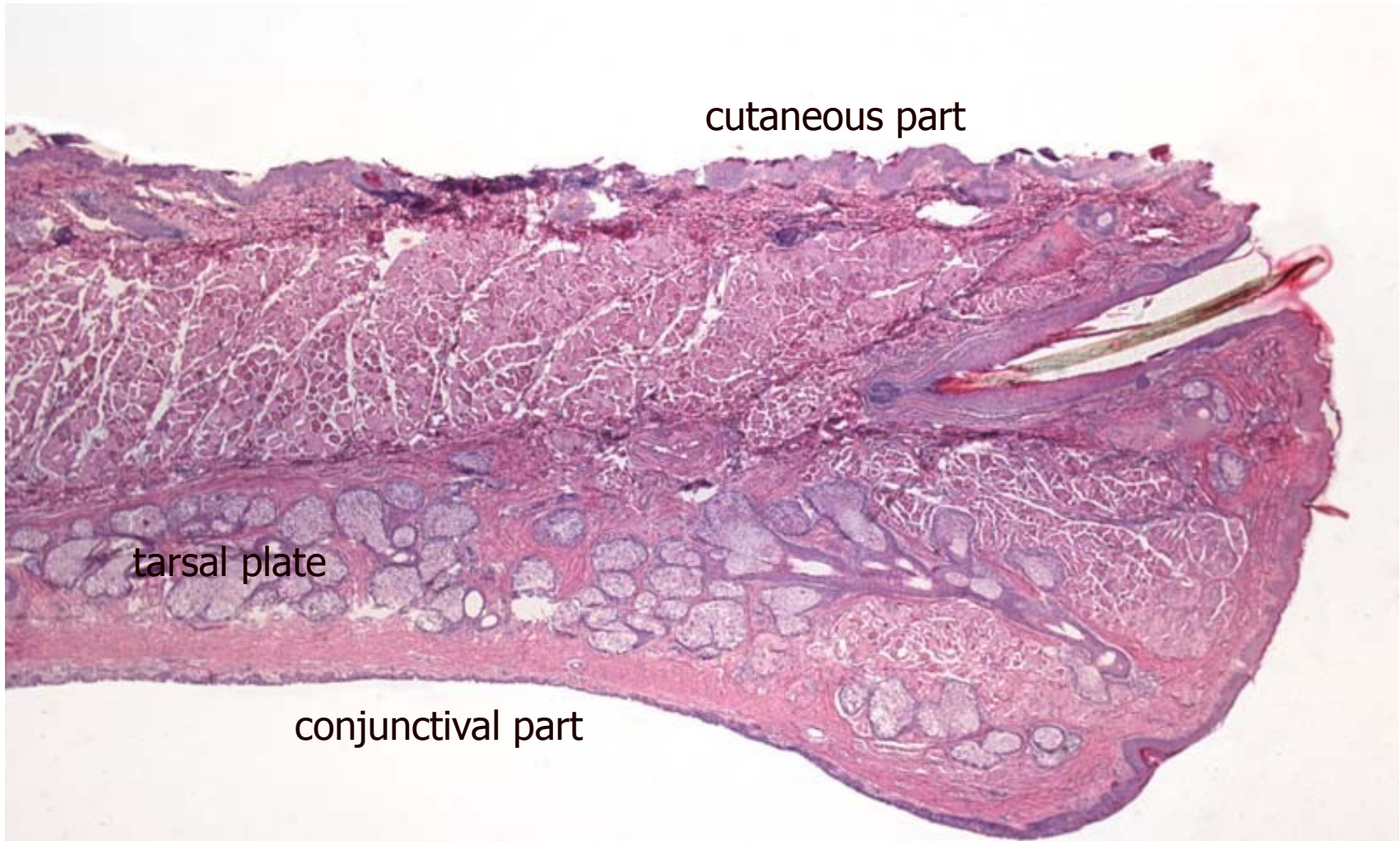


Fasciculus opticus – optic nerve

- is surrounded by the **three meninges**
- c.t. septa, which arise from the pia mater, separate the fibre bundles in the optic nerve
- the axons in the optic nerve are supported by astrocytes and **oligodendrocytes**, microglia is also present



Eyelid



cutaneous part

tarsal plate

conjunctival part

Meibomian glands – tarsal /sebaceae/

Zeiss glands /gl. sebaceae ciliares/

Moll glands /gl. sudoriferae ciliares – apocrine/

Eyelid /palpebra oculi/



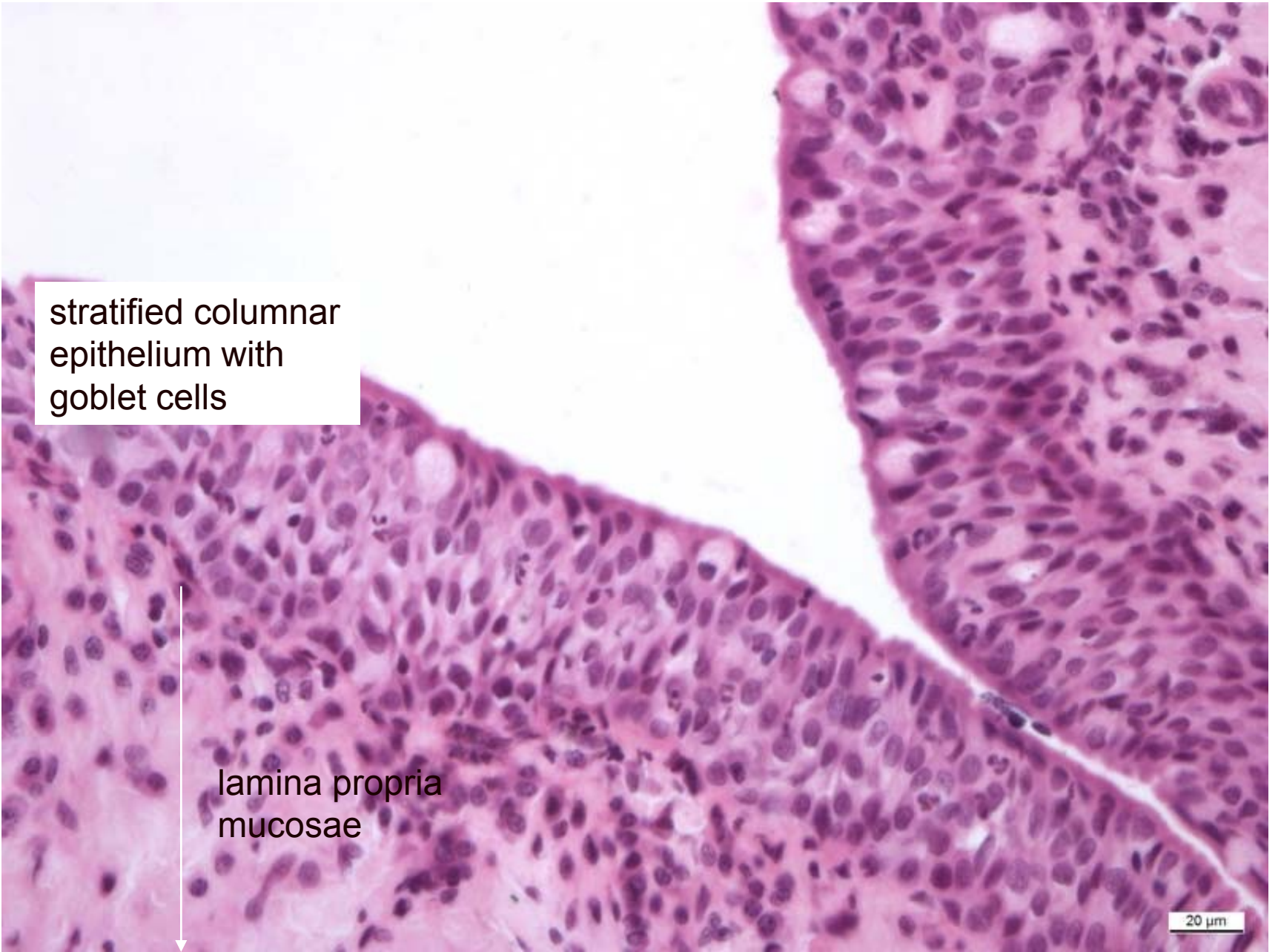
tarsal plate and tarsal Meibomian glands
/sebaceae/

Conjunctiva

stratified columnar
epithelium with
goblet cells

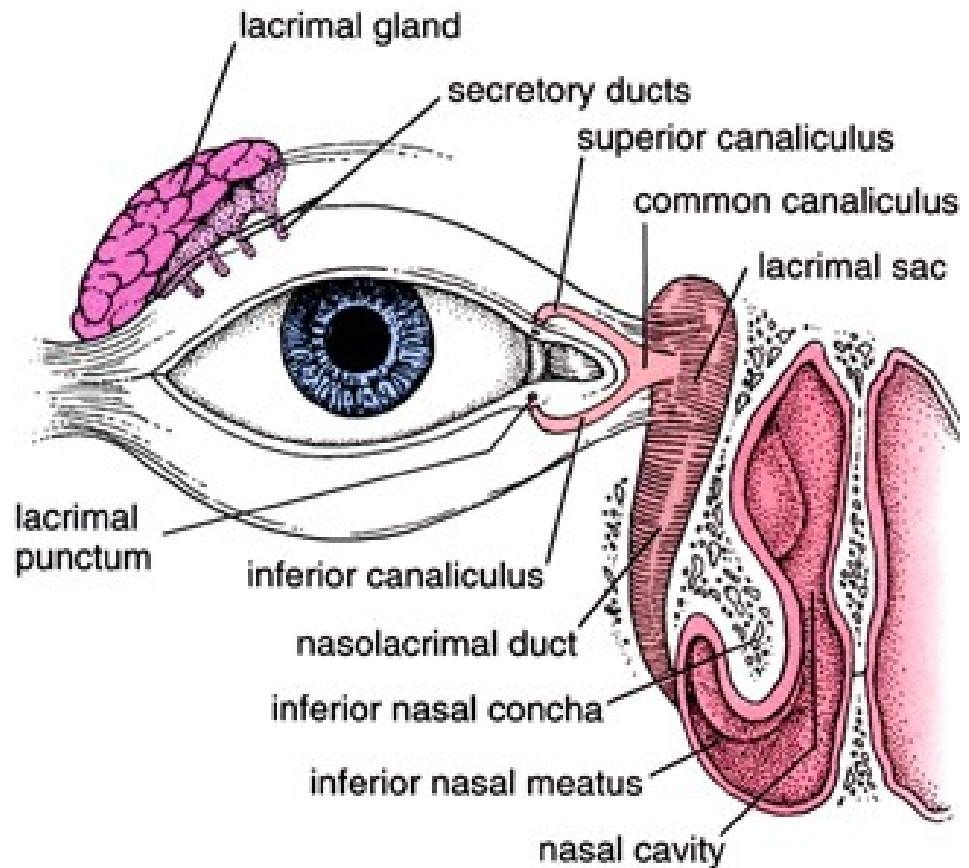
lamina propria
mucosae

20 μ m

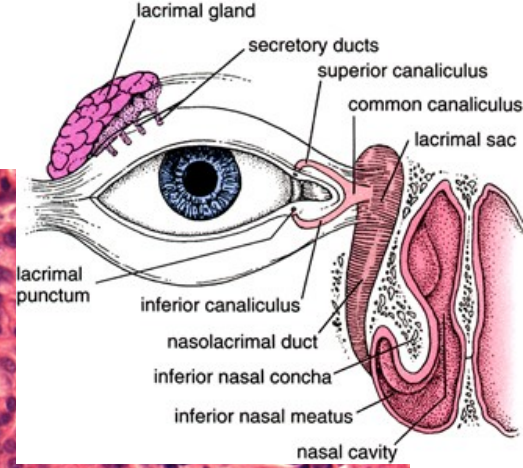
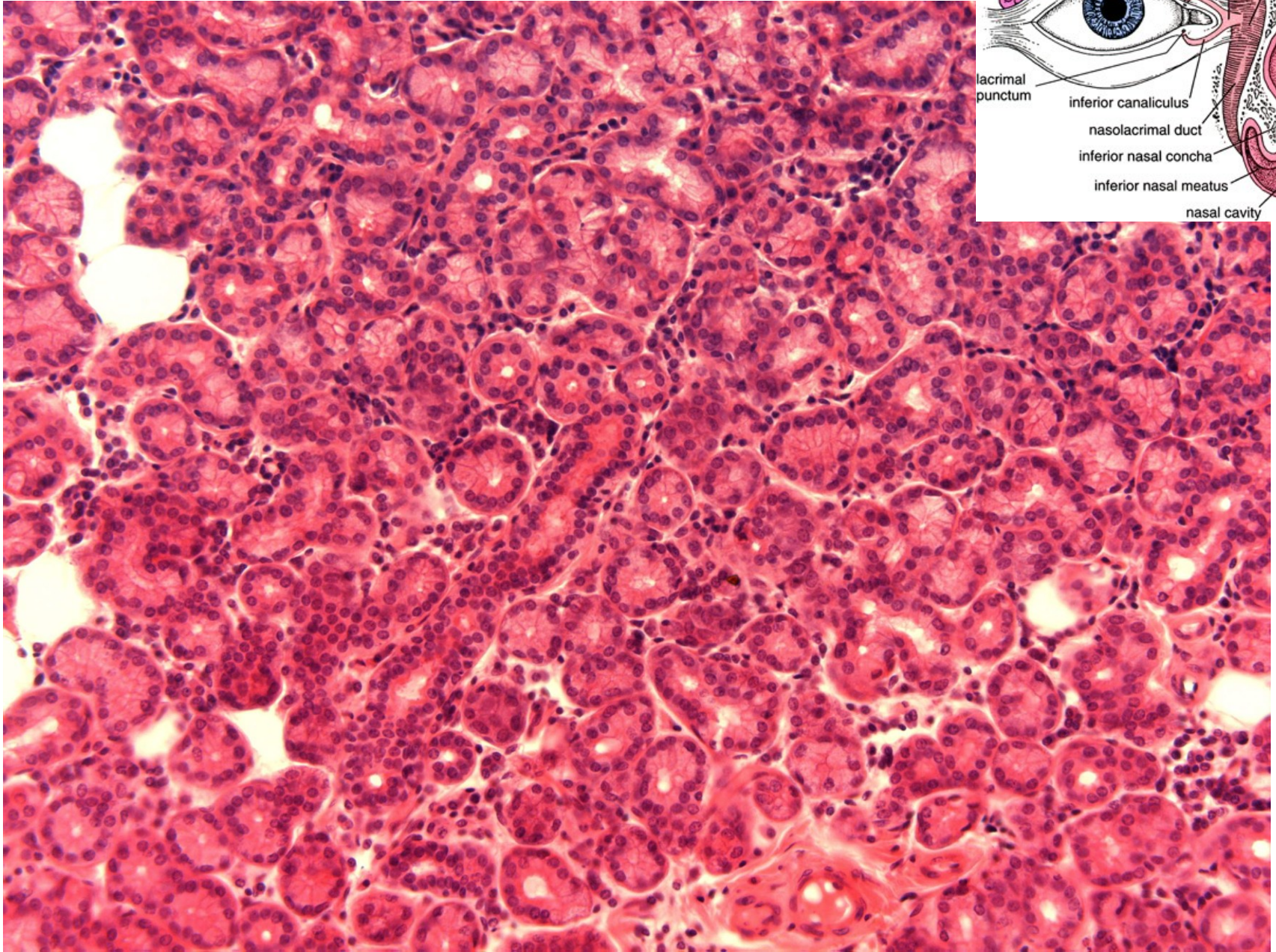


Lacrimal apparatus

- lacrimal gland
 - compound tubuloalveolar gland producing a lysozyme-rich serous fluid
- lacrimal canaliculi
 - superior
 - inferior
 - length: 8 mm, lined with s.s.epi
- lacrimal sac
- nasolacrimal duct
 - opens into the meatus inferior
 - lined with a pseudostratified ciliated epi



Lacrimal gland



Eye – list of slides

- 88. Anterior eye segment
- 89. Posterior eye segment
- 90. Fasciculus opticus
- 91. Palpebra
- 92. Glandula lacrimalis

