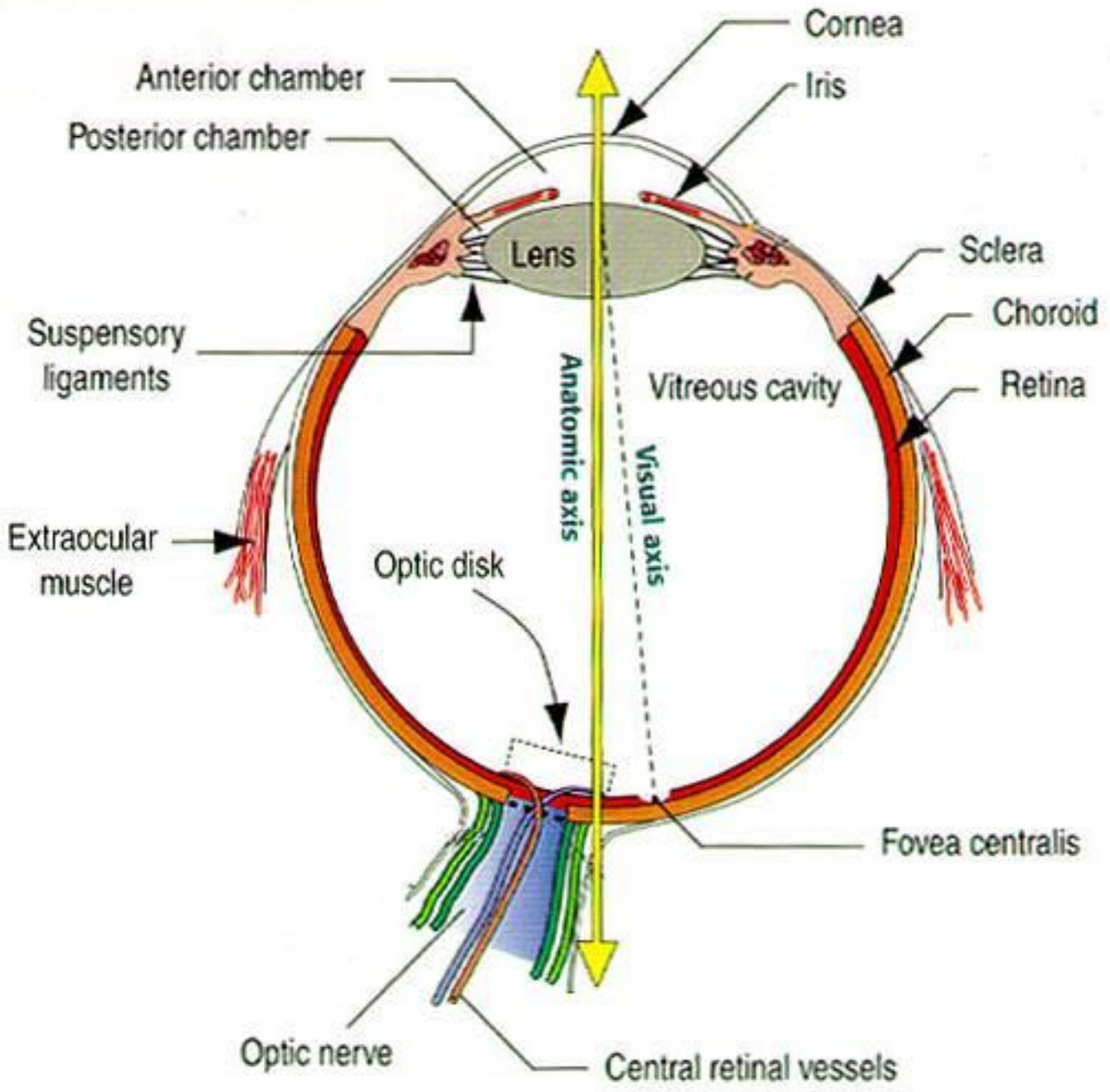
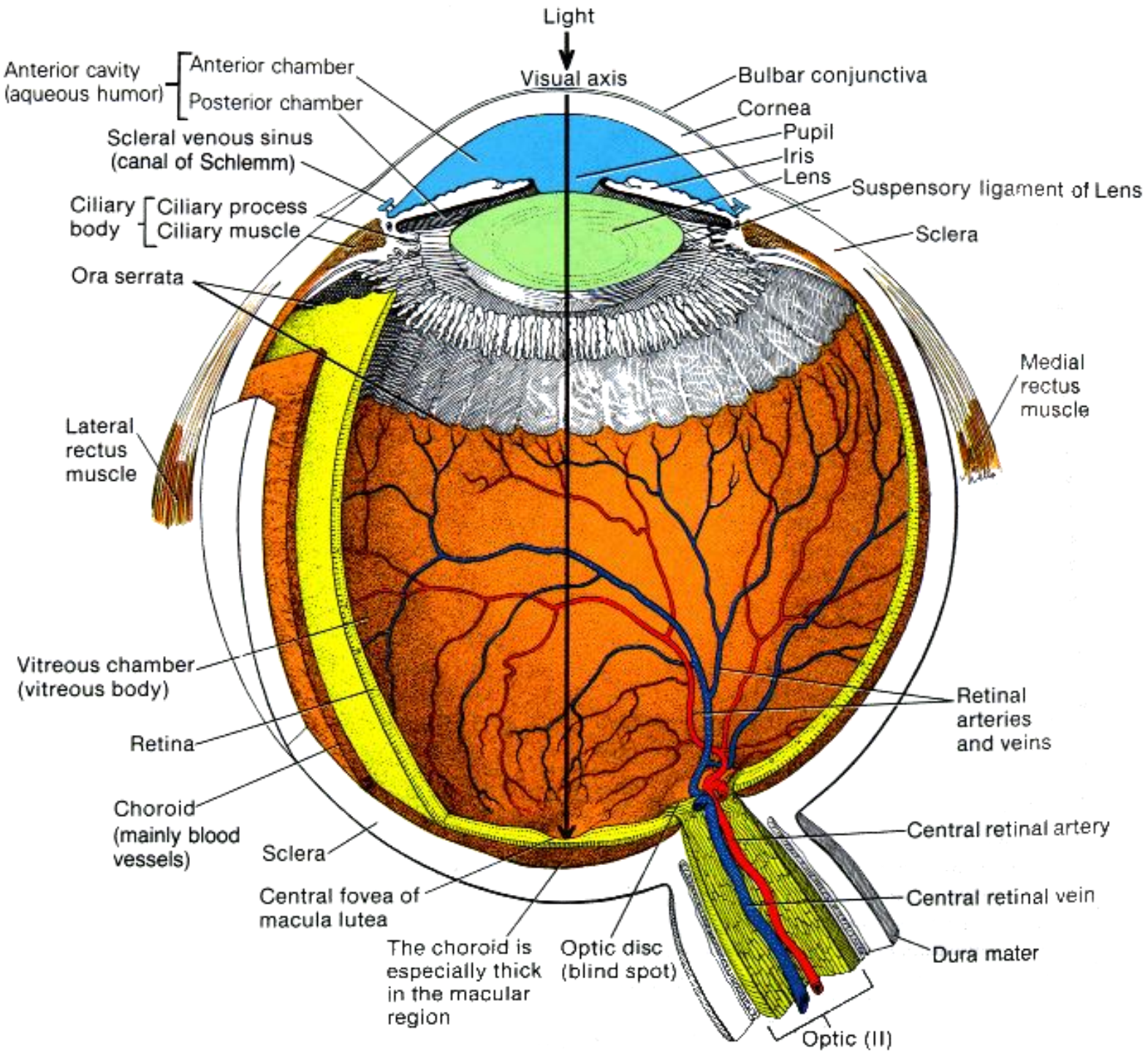
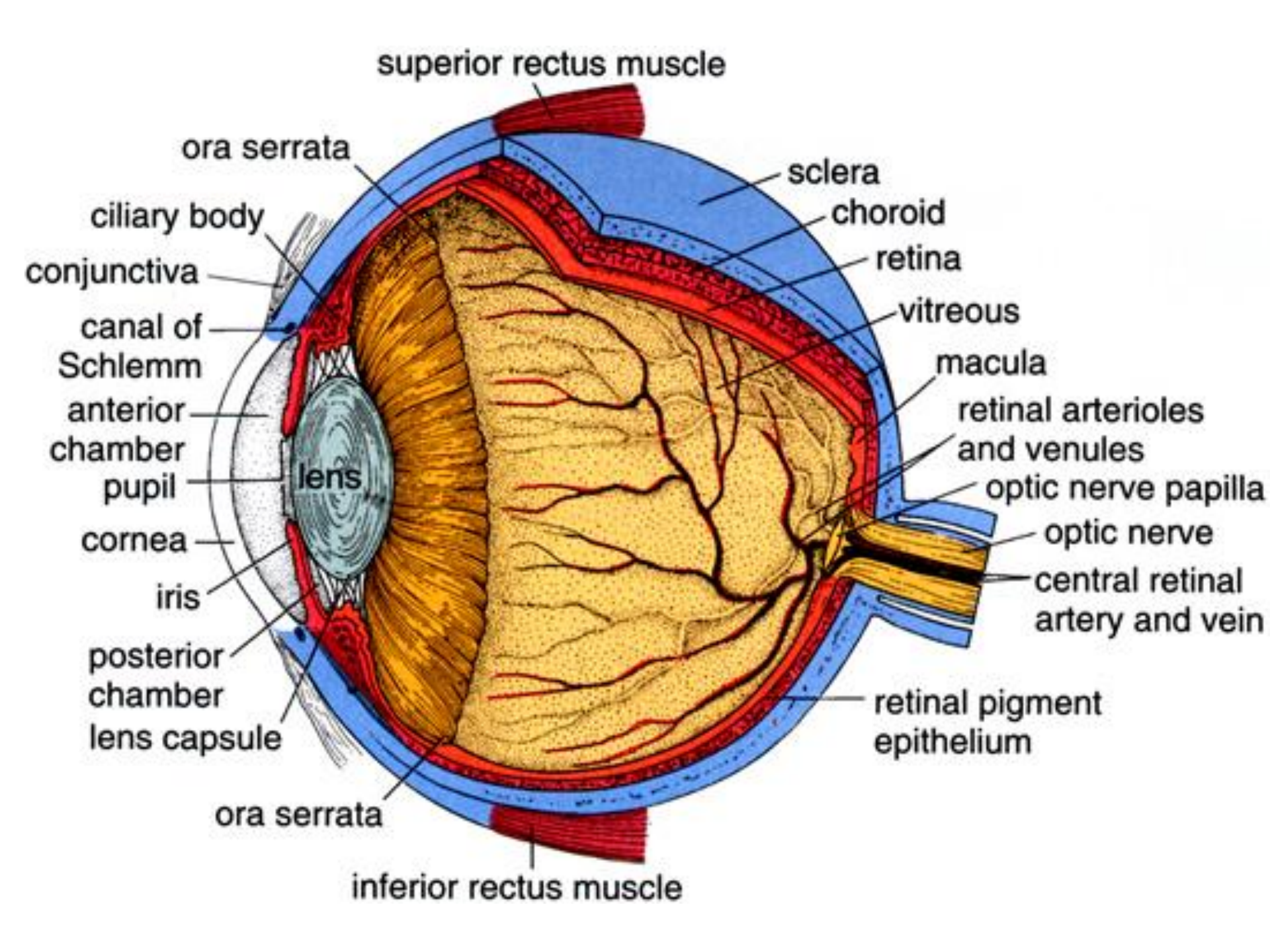
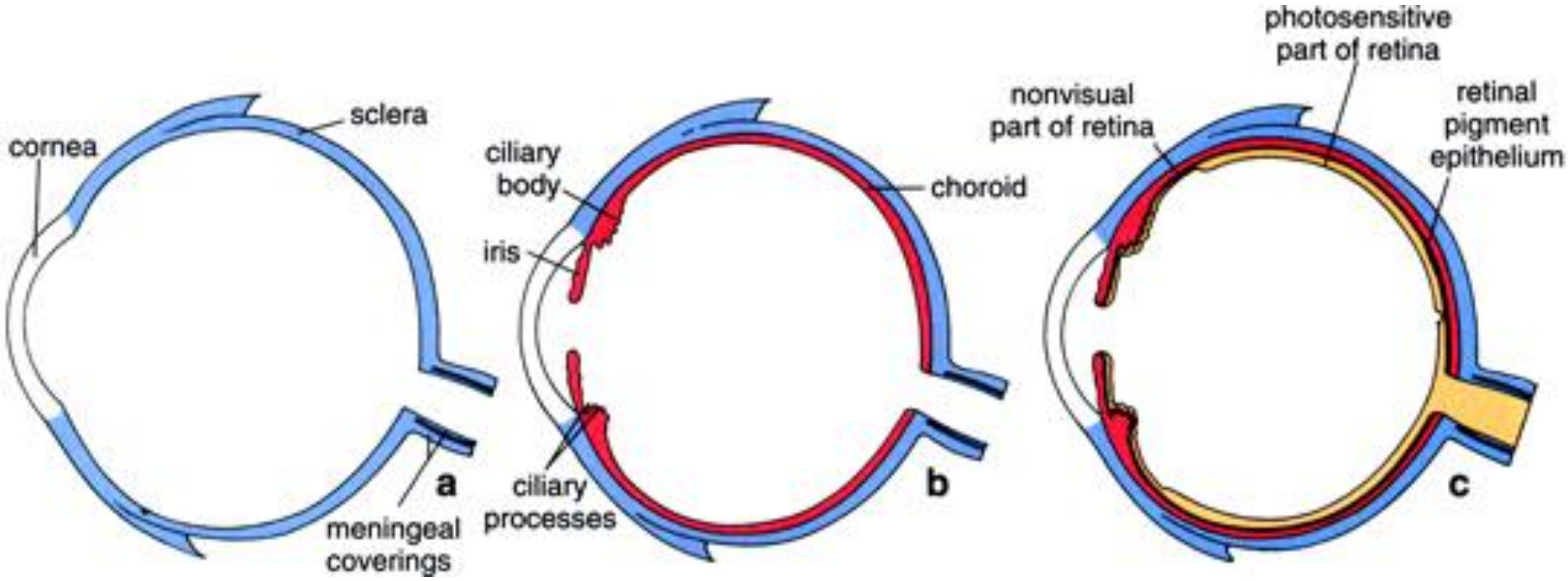
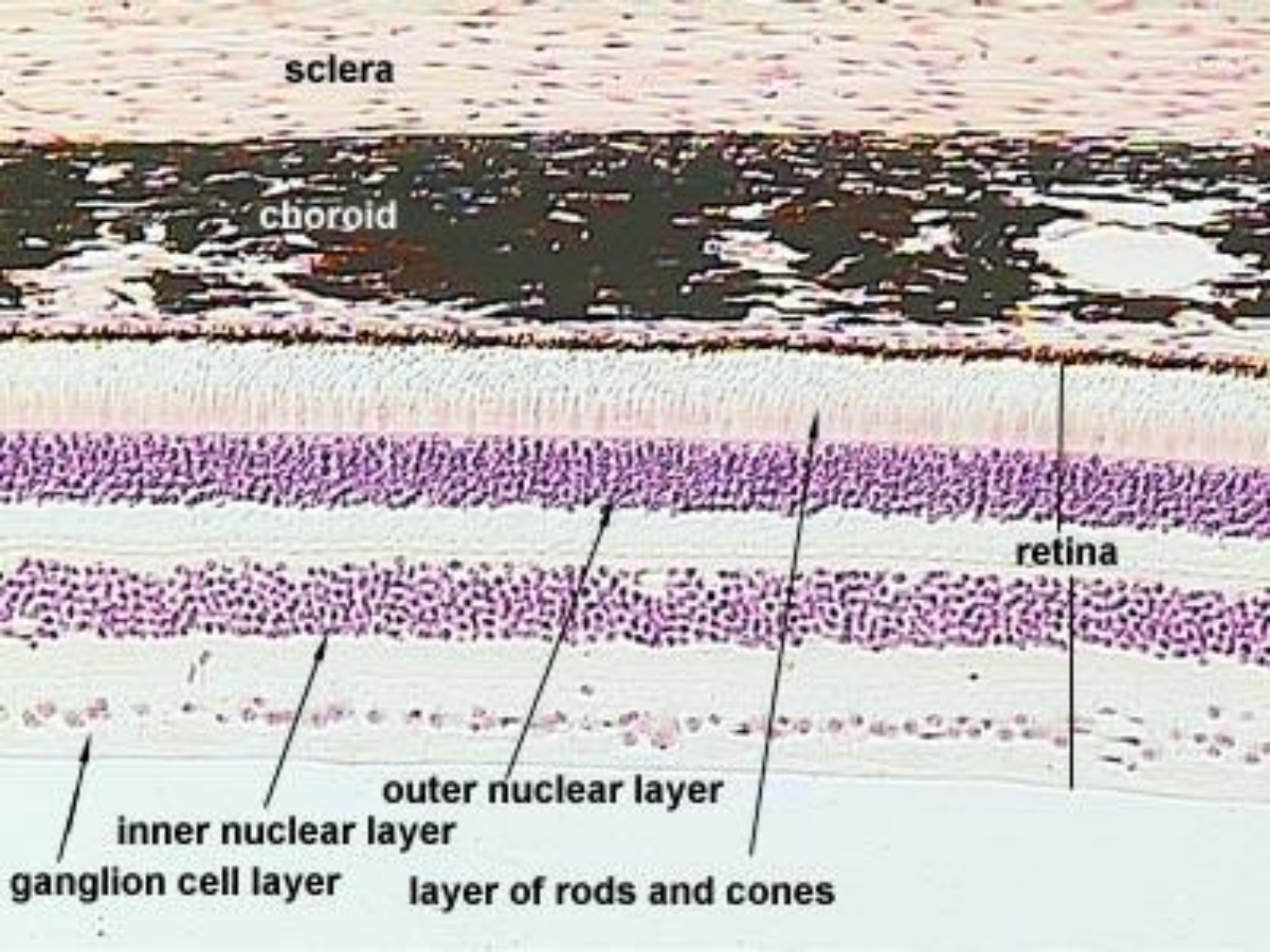
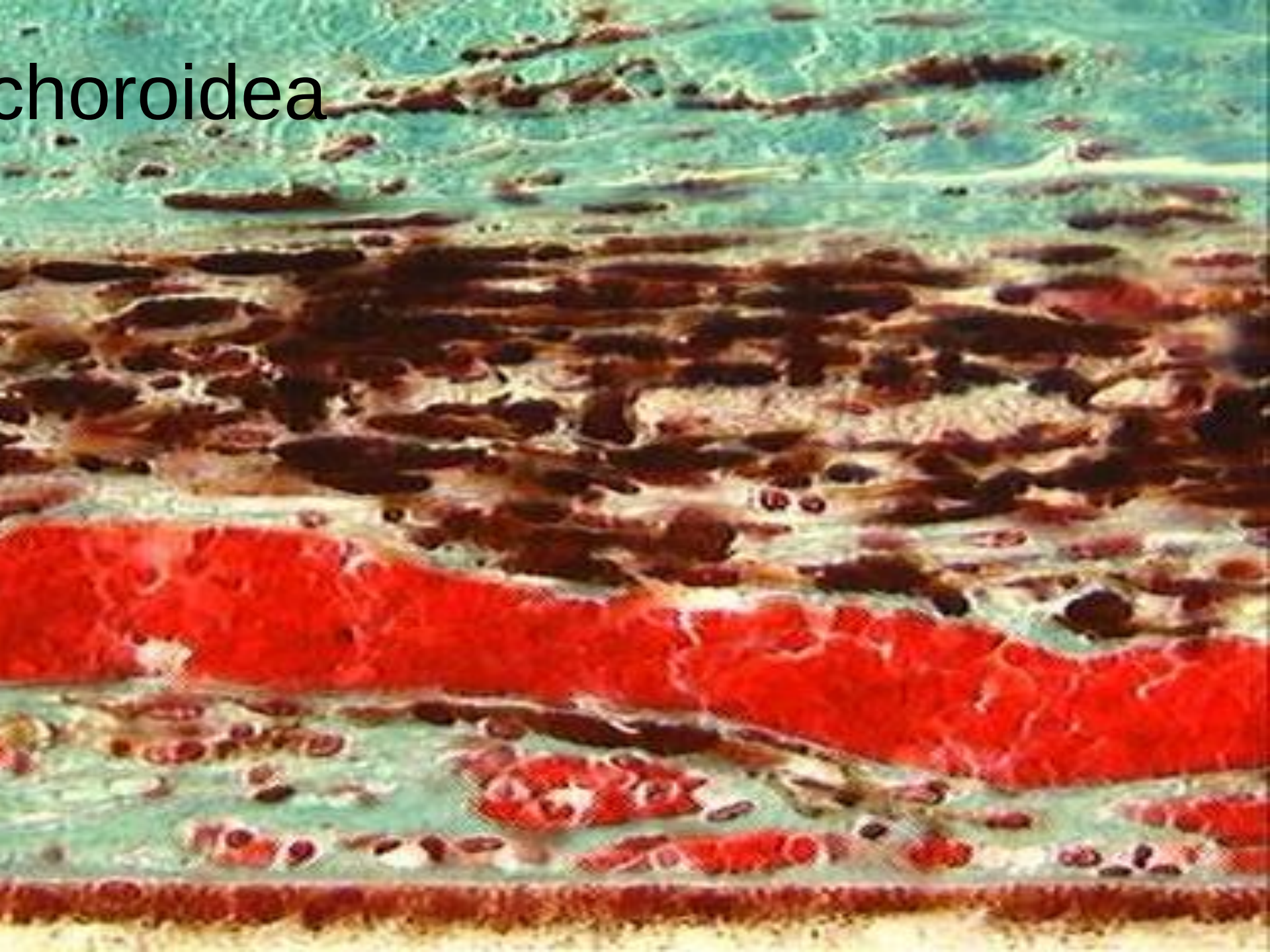

Cornea
Anterior chamber
Iris
Posterior chamber
Lens
Sclera
Choroid
Suspensory ligaments
Anatomic axis
Vitreous cavity
Retina
Visual axis
Extraocular muscle
Optic disk
Fovea centralis
Optic nerve
Central retinal vessels

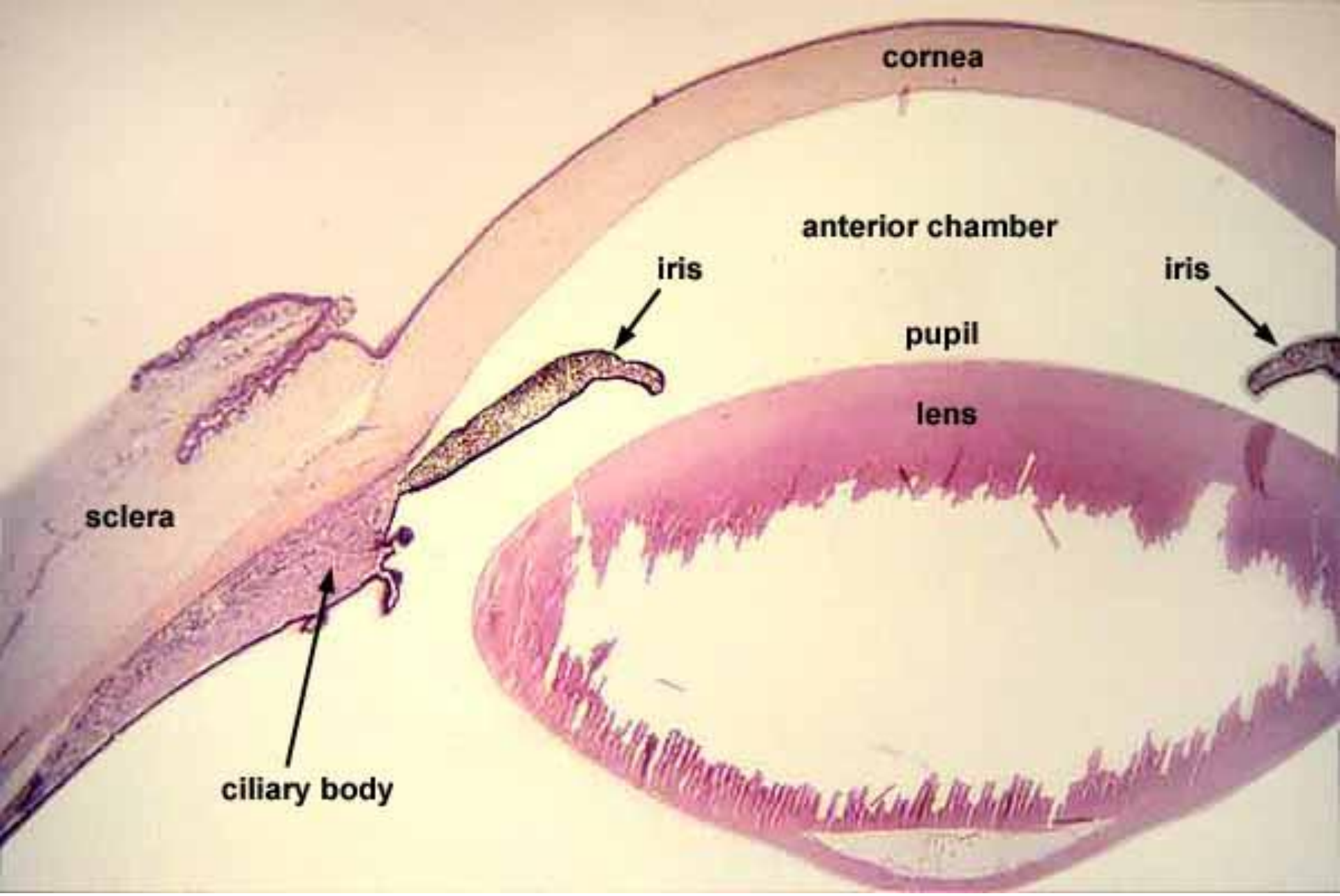

Light
Visual axis
Anterior cavity (aqueous humor)
Anterior chamber
Posterior chamber
Scleral venous sinus (canal of Schlemm)
Ciliary body
Ciliary process
Ciliary muscle
Ora serrata
Lateral rectus muscle
Vitreous chamber (vitreous body)
Retina
Choroid (mainly blood vessels)
Sclera
Central fovea of macula lutea
The choroid is especially thick in the macular region
Optic disc (blind spot)
Bulbar conjunctiva
Cornea
Pupil
Iris
Lens
Suspensory ligament of Lens
Sclera
Medial rectus muscle
Retinal arteries and veins
Central retinal artery
Central retinal vein
Dura mater
Optic (II)


superior rectus muscle
ora serrata
ciliary body
conjunctiva
canal of Schlemm
anterior chamber
pupil
cornea
iris
posterior chamber
lens capsule
ora serrata
inferior rectus muscle
lens
sclera
choroid
retina
vitreous
macula
retinal arterioles and venules
optic nerve papilla
optic nerve
central retinal artery and vein
retinal pigment epithelium

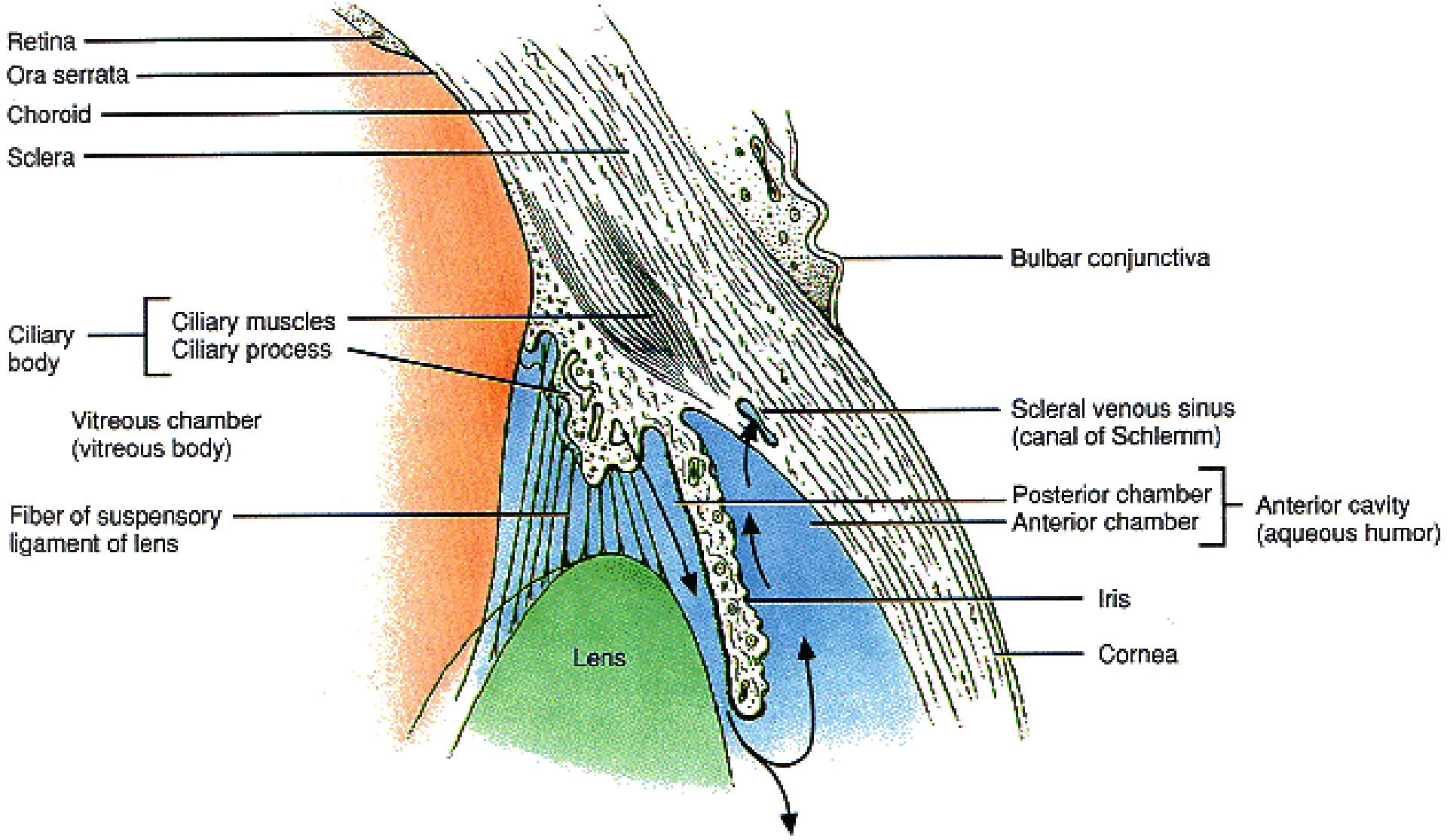

cornea
sclera
meningeal coverings
a
ciliary body
iris
ciliary processes
choroid
b
nonvisual part of retina
photosensitive part of retina
retinal pigment epithelium
c

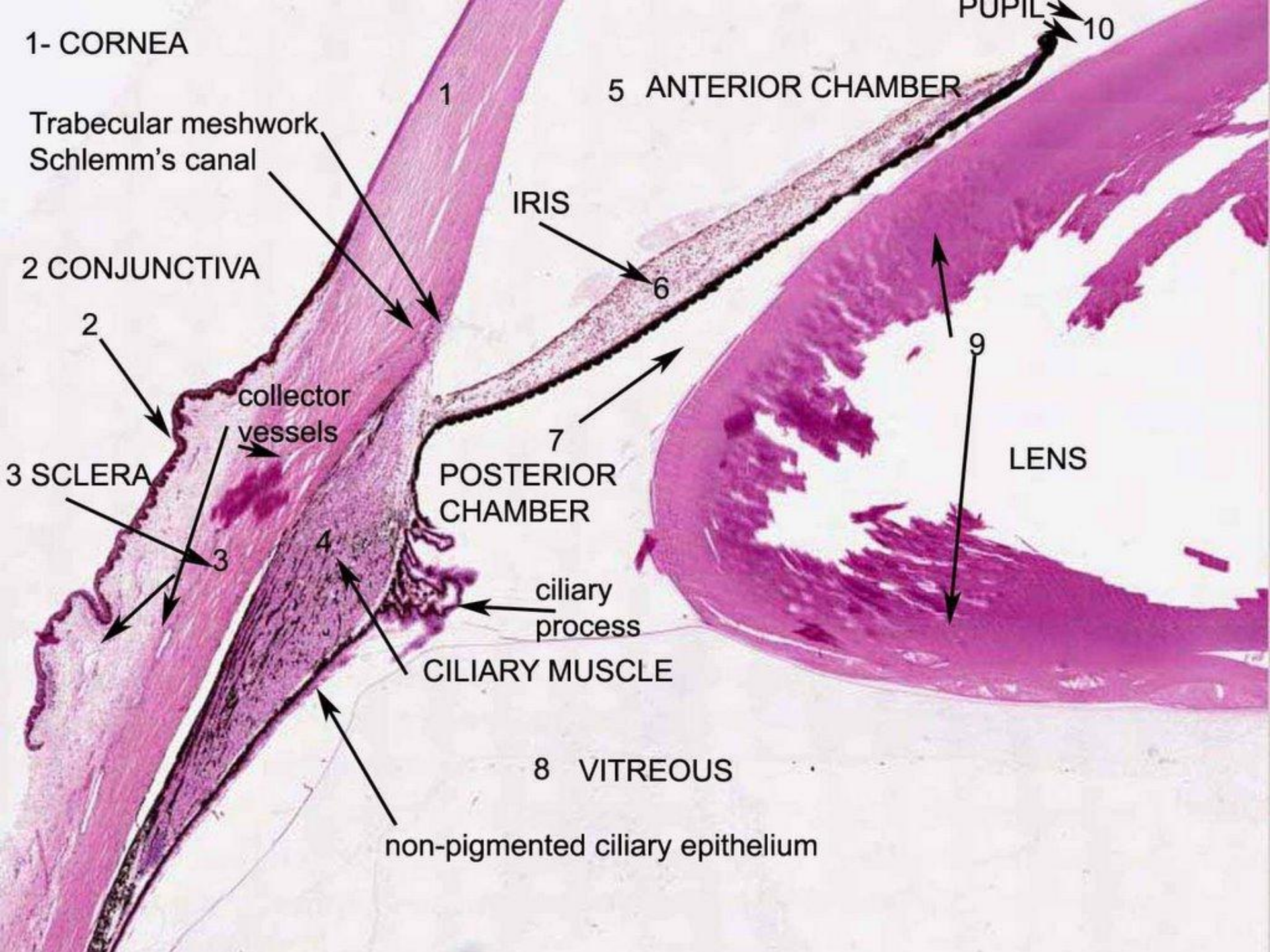

sclera
choroid
retina
outer nuclear layer
inner nuclear layer
ganglion cell layer
layer of rods and cones

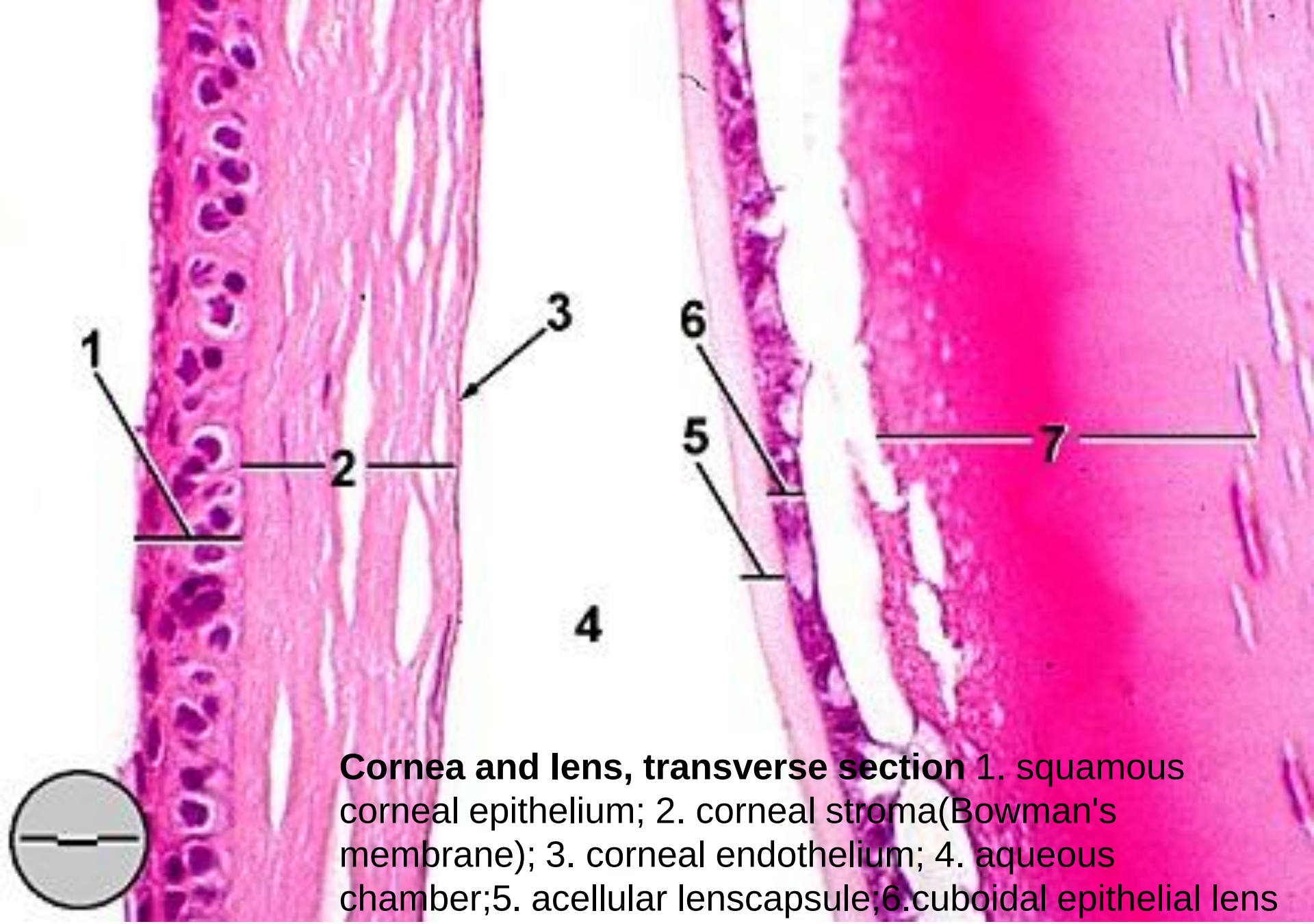

choroidea


cornea
anterior chamber
iris
iris
pupil
lens
sclera
ciliary body

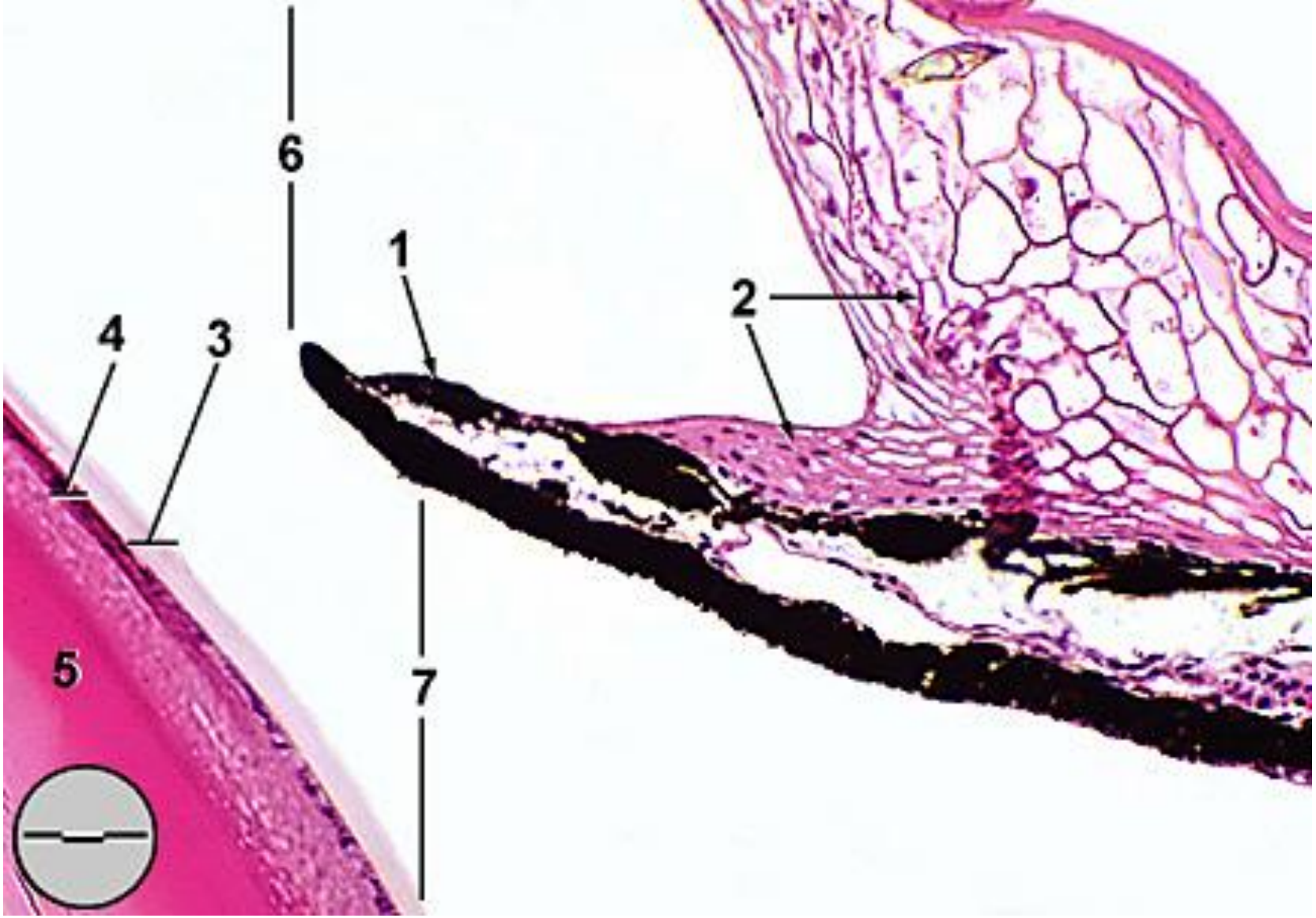
1. Epithelium (cornea)
2.Stroma (cornea)
3. Descemet's membrane and endothelium (cornea)
4. Anterior chamber
5. Iris
6. Lens
7. ciliary body
8. sclera


Retina
Ora serrata
Choroid
Sclera
Bulbar conjunctiva
Ciliary body
Ciliary muscles
Ciliary process
Vitreous chamber
(vitreous body)
Scleral venous sinus
(canal of Schlemm)
Fiber of suspensory
ligament of lens
Posterior chamber
Anterior chamber
Anterior cavity
(aqueous humor)
Iris
Lens
Cornea

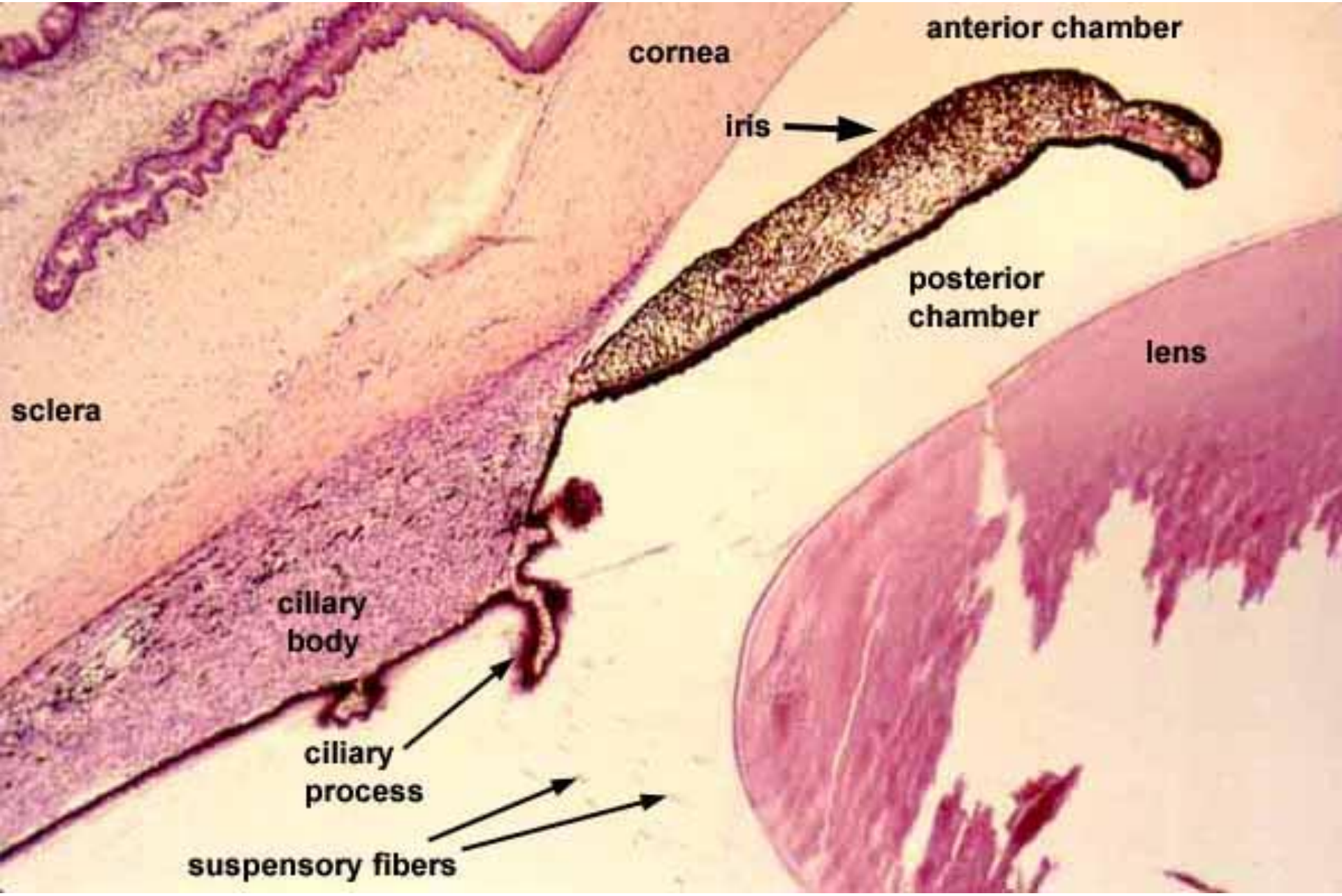

1- CORNEA
1
Trabecular meshwork
Schlemm's canal
2 CONJUNCTIVA
2
collector
vessels
3 SCLERA
3
4
ciliary
process
CILIARY MUSCLE
non-pigmented ciliary epithelium
PUPIL
10
5 ANTERIOR CHAMBER
IRIS
6
7
POSTERIOR
CHAMBER
9
LENS
8 VITREOUS

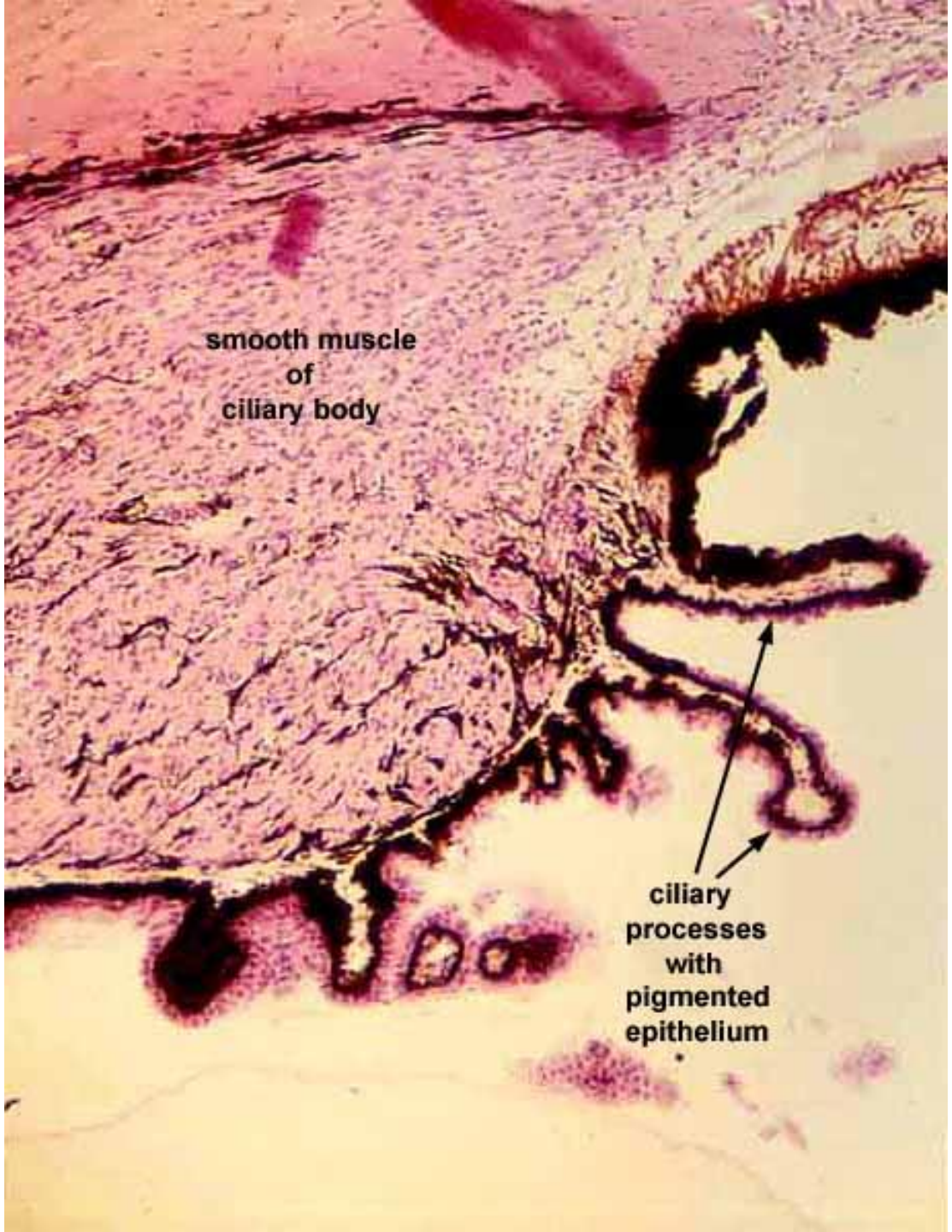


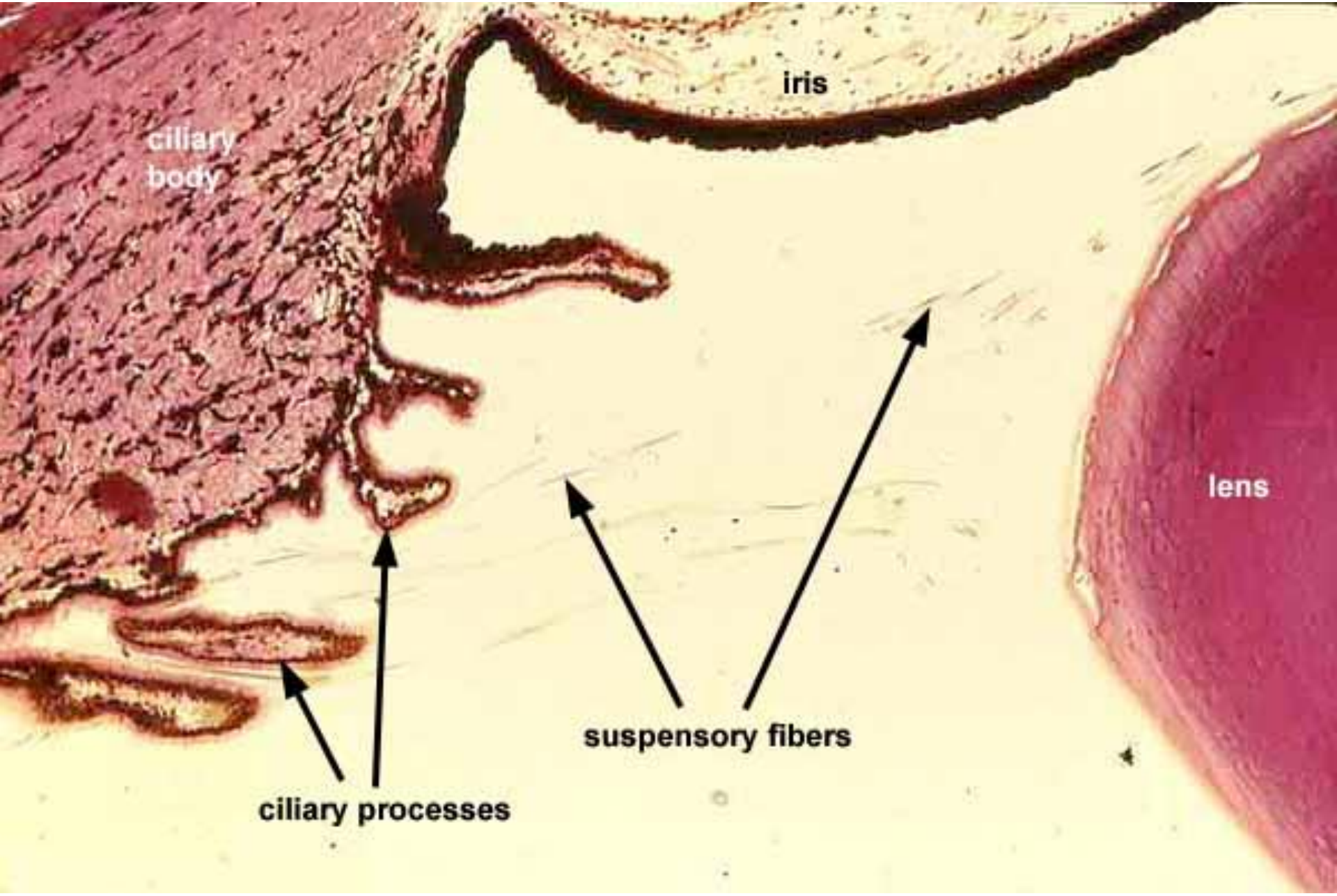
Cornea and lens, transverse section 1. squamous corneal epithelium; 2. corneal stroma(Bowman's membrane); 3. corneal endothelium; 4. aqueous chamber;5. acellular lenscapsule;6.cuboidal epithelial lens cells;7 lensfibers

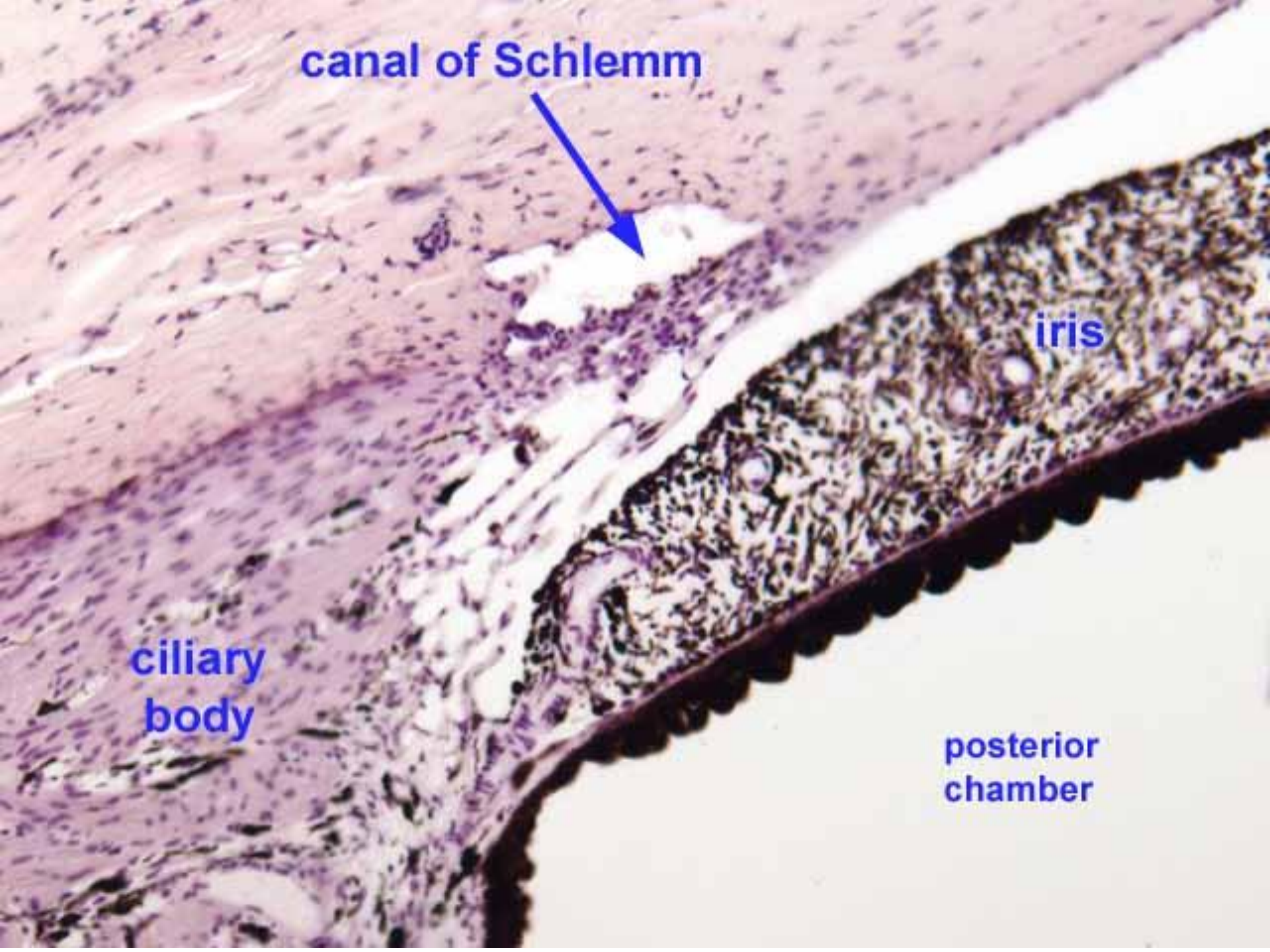


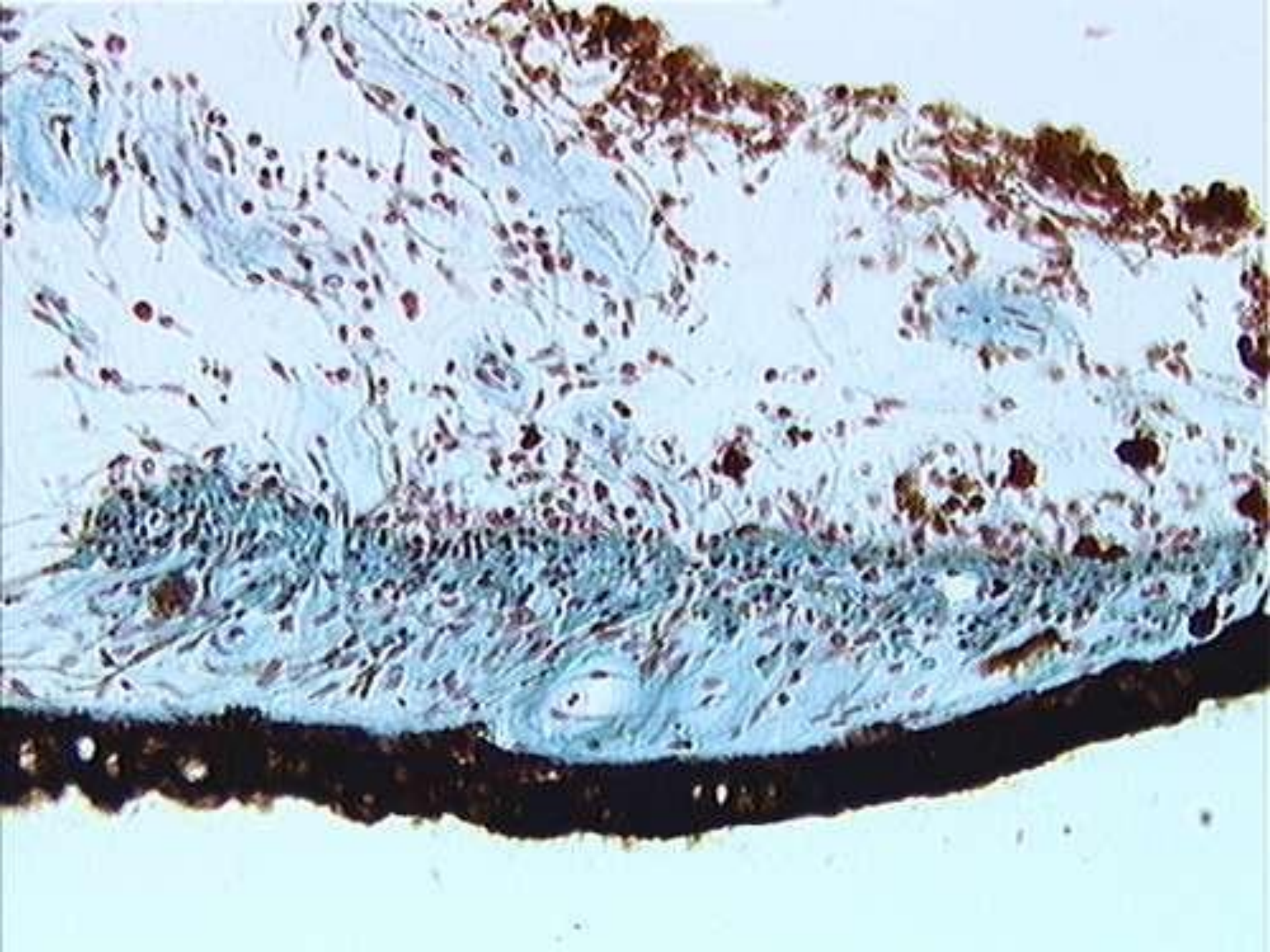
Iris and lens, transverse section (Bouins, H&E, Bar = 33.6 µm).
1. iris; 2. corneal stroma; 3. lens capsule; 4. cuboidal lens epithelium; 5. lens fibers; 6. aqueous chamber; 7. vitreous chamber.

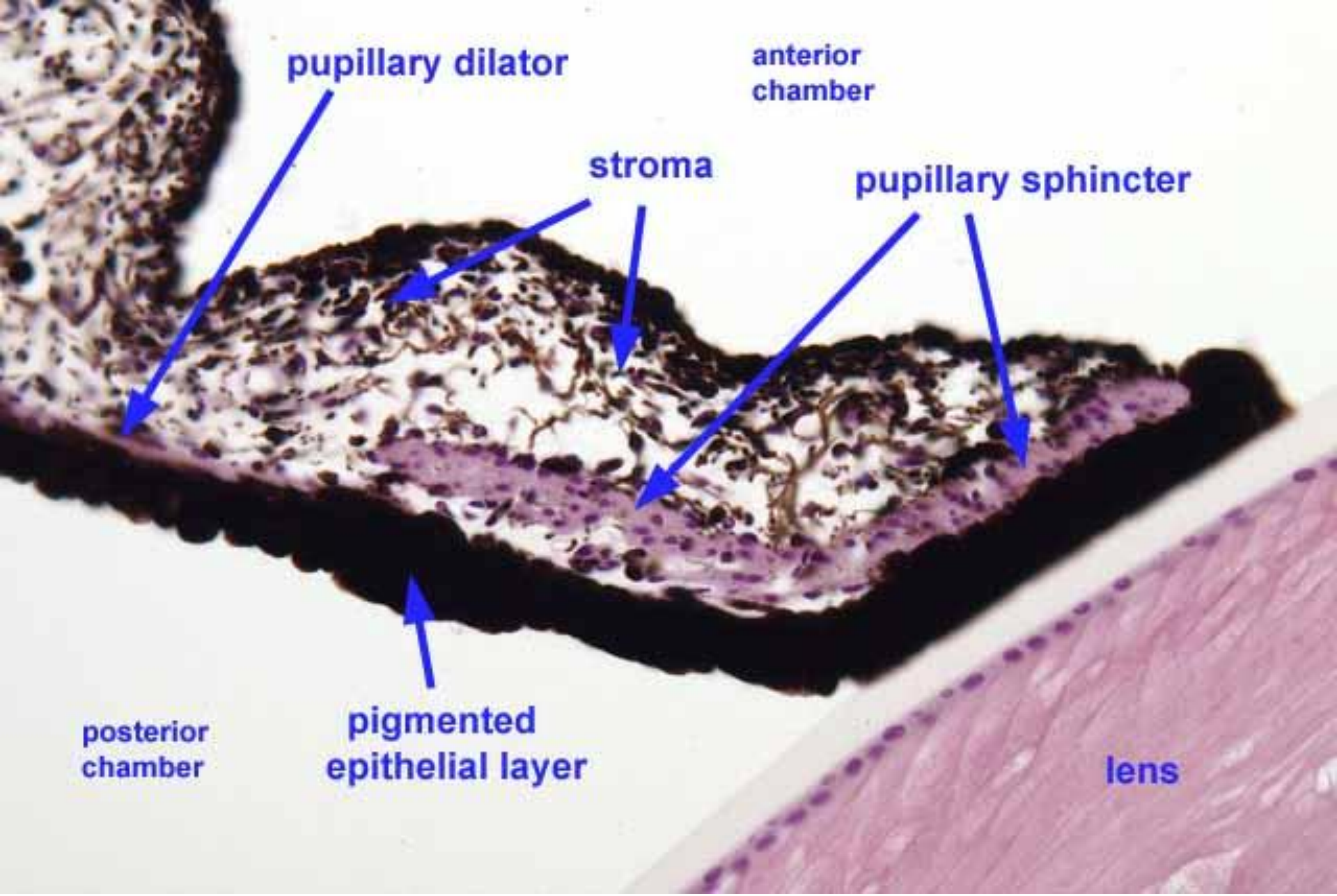

anterior chamber
cornea
iris
posterior chamber
lens
sclera
ciliary body
ciliary process
suspensory fibers

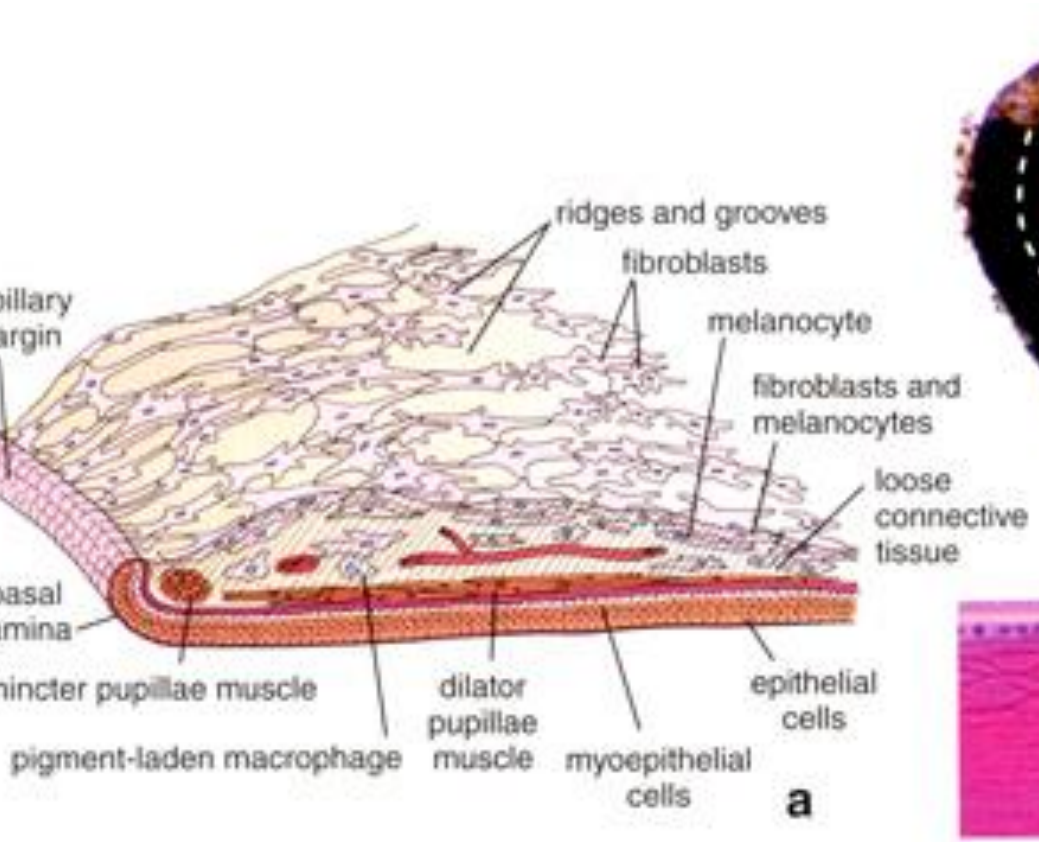

smooth muscle
of
ciliary body
ciliary
processes
with
pigmented
epithelium

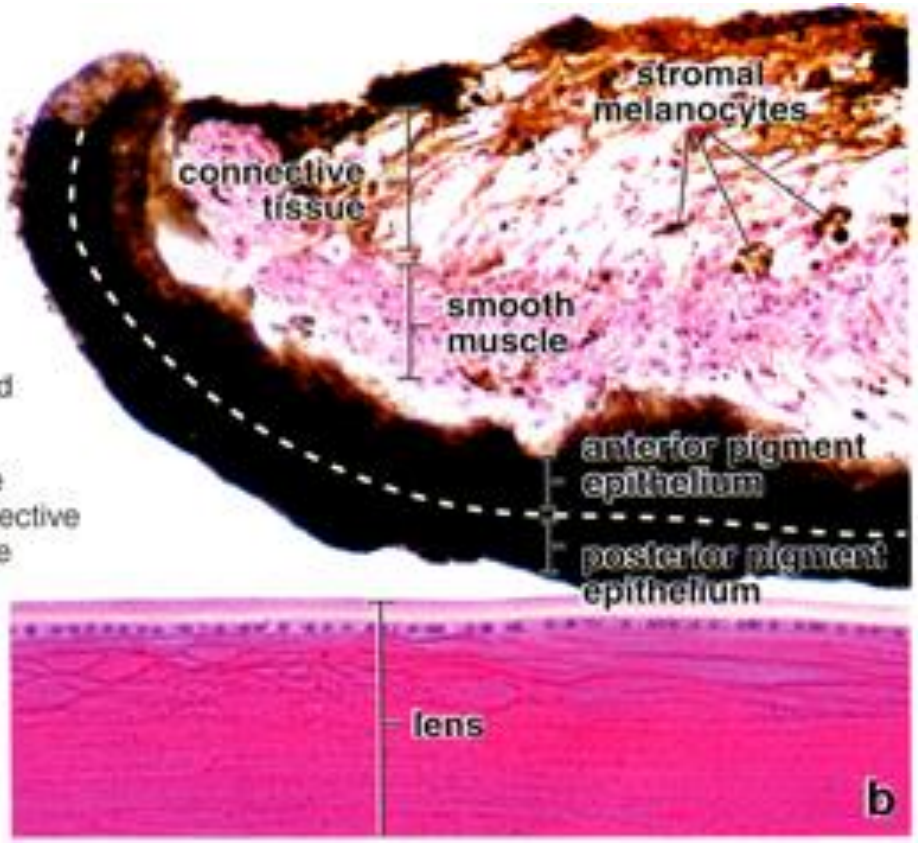

iris
ciliary body
lens
suspensory fibers
ciliary processes

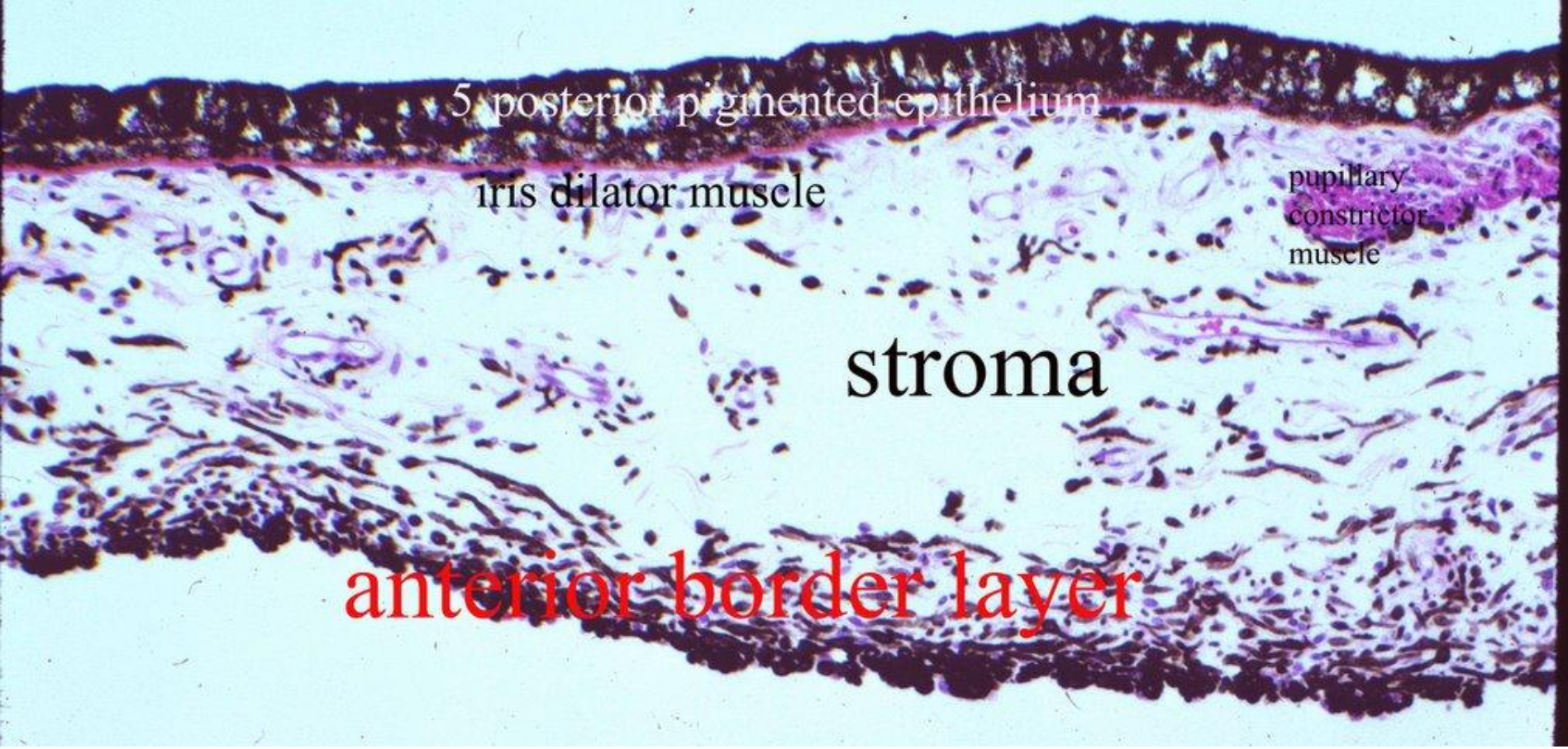

canal of Schlemm
iris
ciliary
body
posterior
chamber

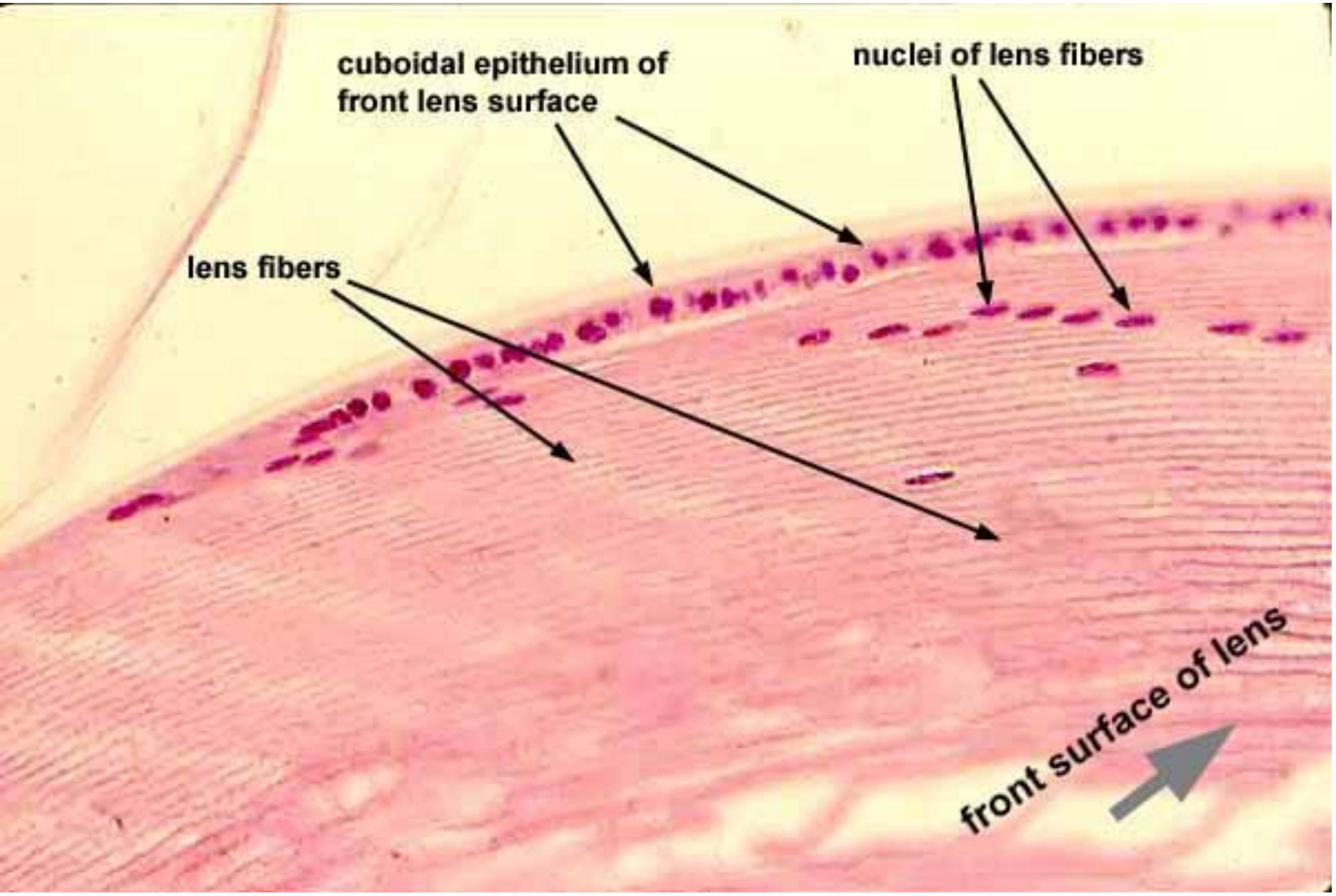



pupillary dilator
anterior chamber
stroma
pupillary sphincter
posterior chamber
pigmented epithelial layer
lens


ridges and grooves
fibroblasts
melanocyte
fibroblasts and melanocytes
loose connective tissue
illary
rgin
asal
mina
hincter pupillae muscle
pigment-laden macrophage
dilator pupillae muscle
myoepithelial cells
epithelial cells
a


stromal melanocytes
connective tissue
smooth muscle
anterior pigment epithelium
posterior pigment epithelium
lens
b

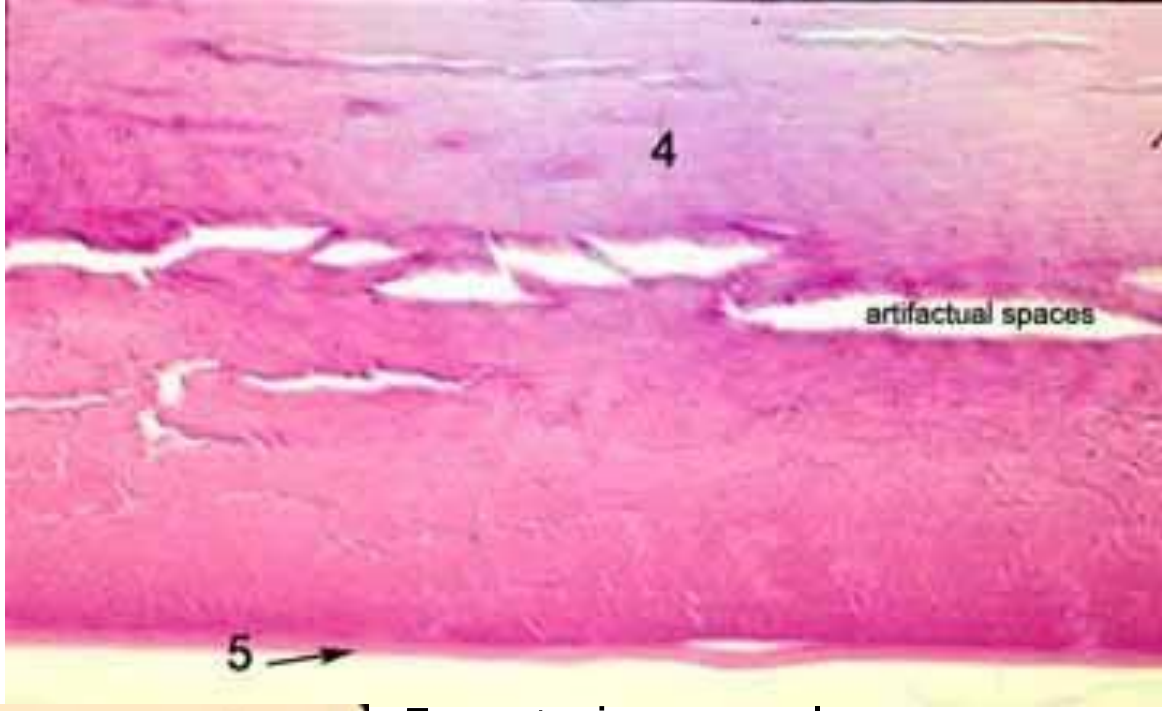

5 posterior pigmented epithelium
iris dilator muscle
pupillary constrictor muscle
stroma
anterior border layer


cuboidal epithelium of
front lens surface
nuclei of lens fibers
lens fibers
front surface of lens

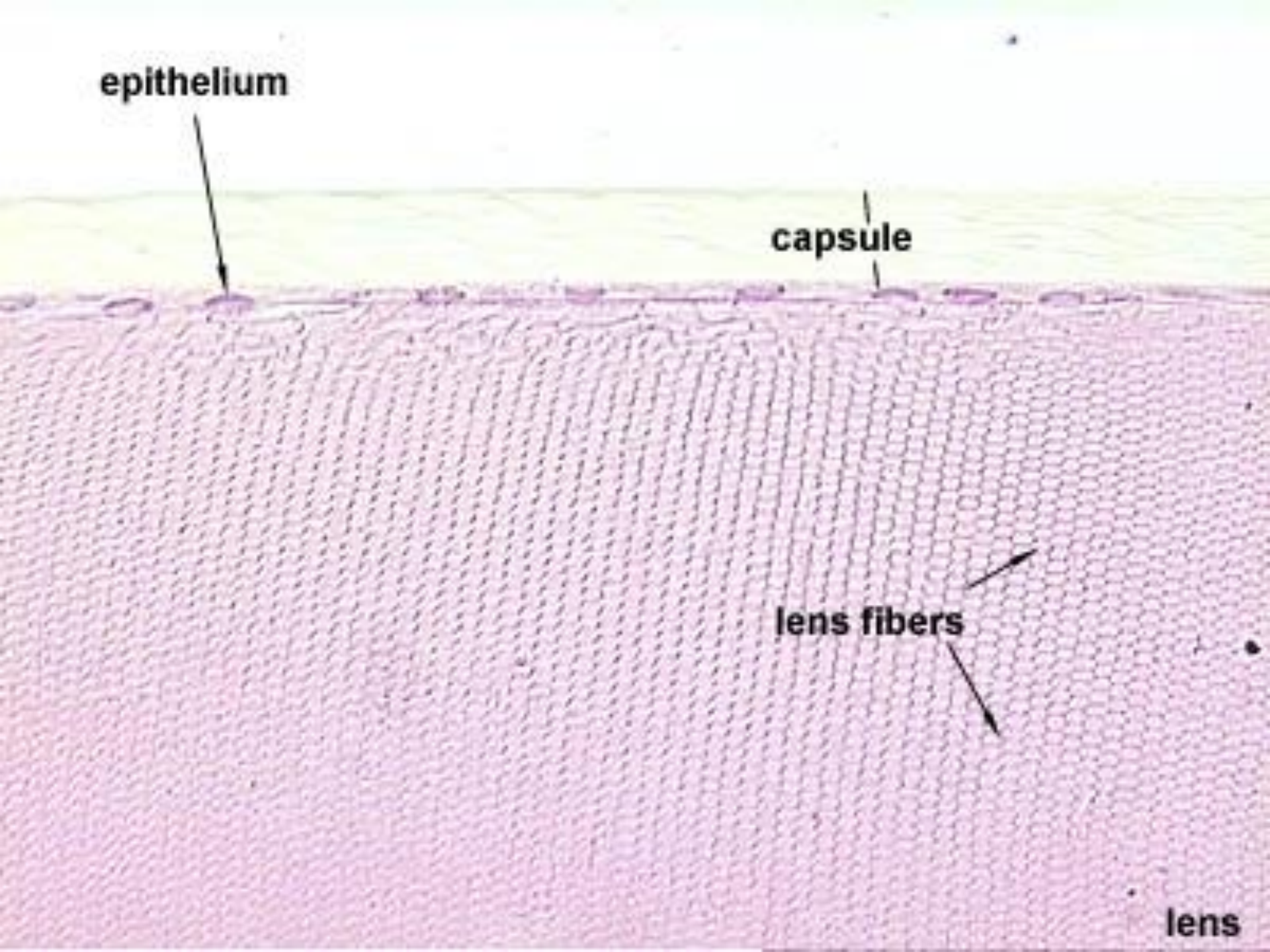
1.the capsule

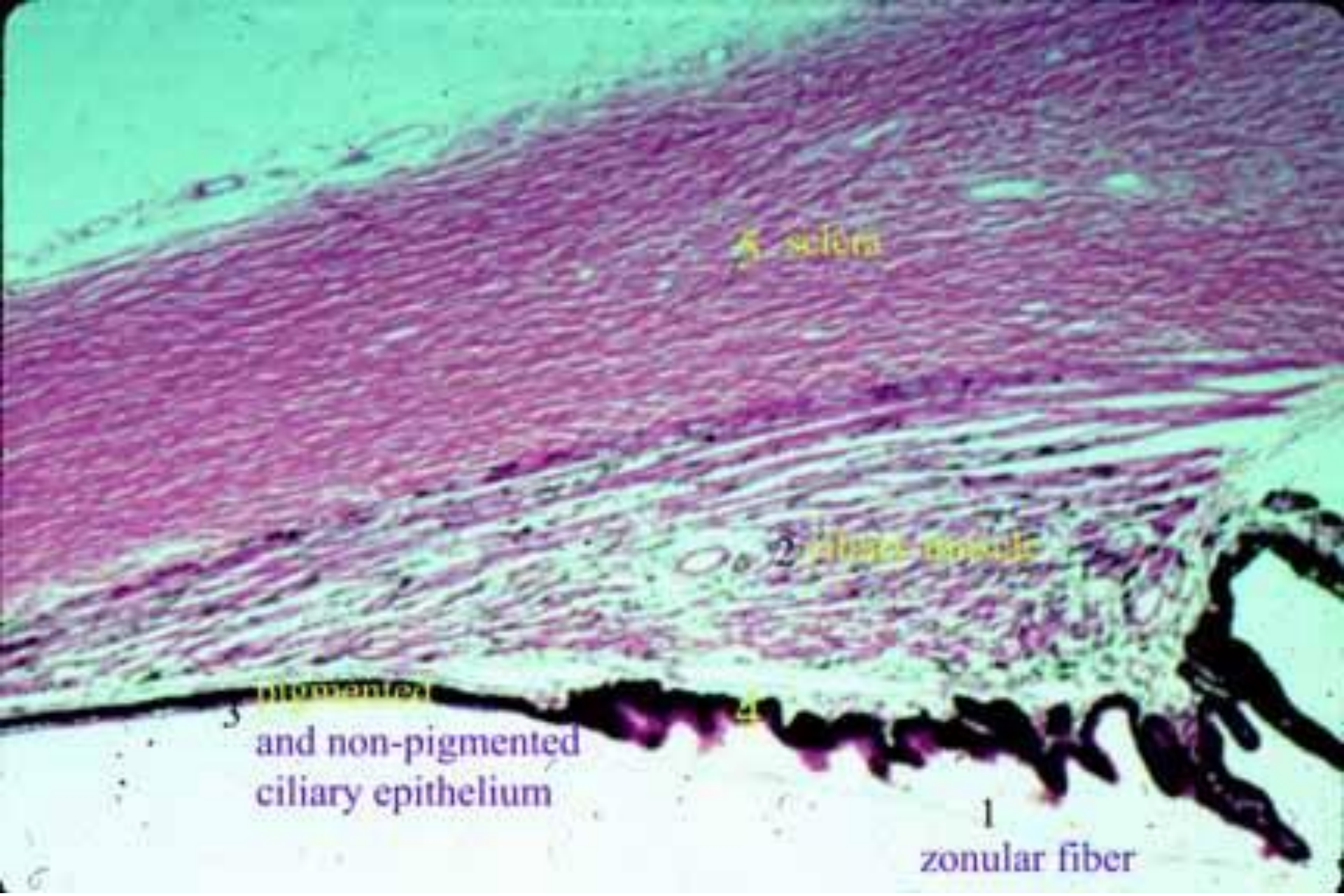
2. cuboidal epithelial cells

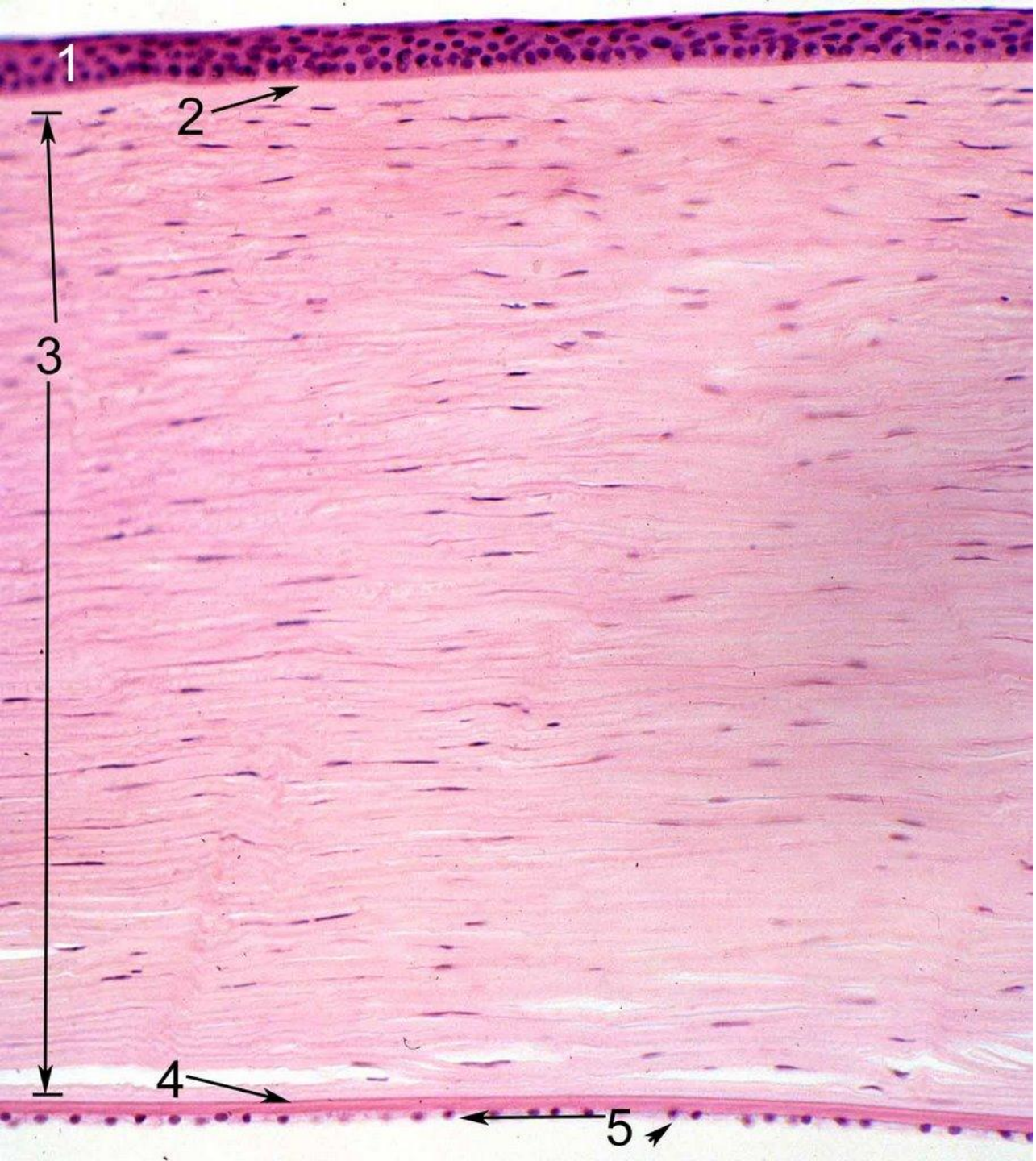
3. In the center (#3 in photomicrograph) tightly packed cells have lost their nuclei and become packed by special transparent proteins (crystallins) to form so-called lens fibers



5.posterior capsule


epithelium
capsule
lens fibers
lens


and non-pigmented
ciliary epithelium
1
zonular fiber



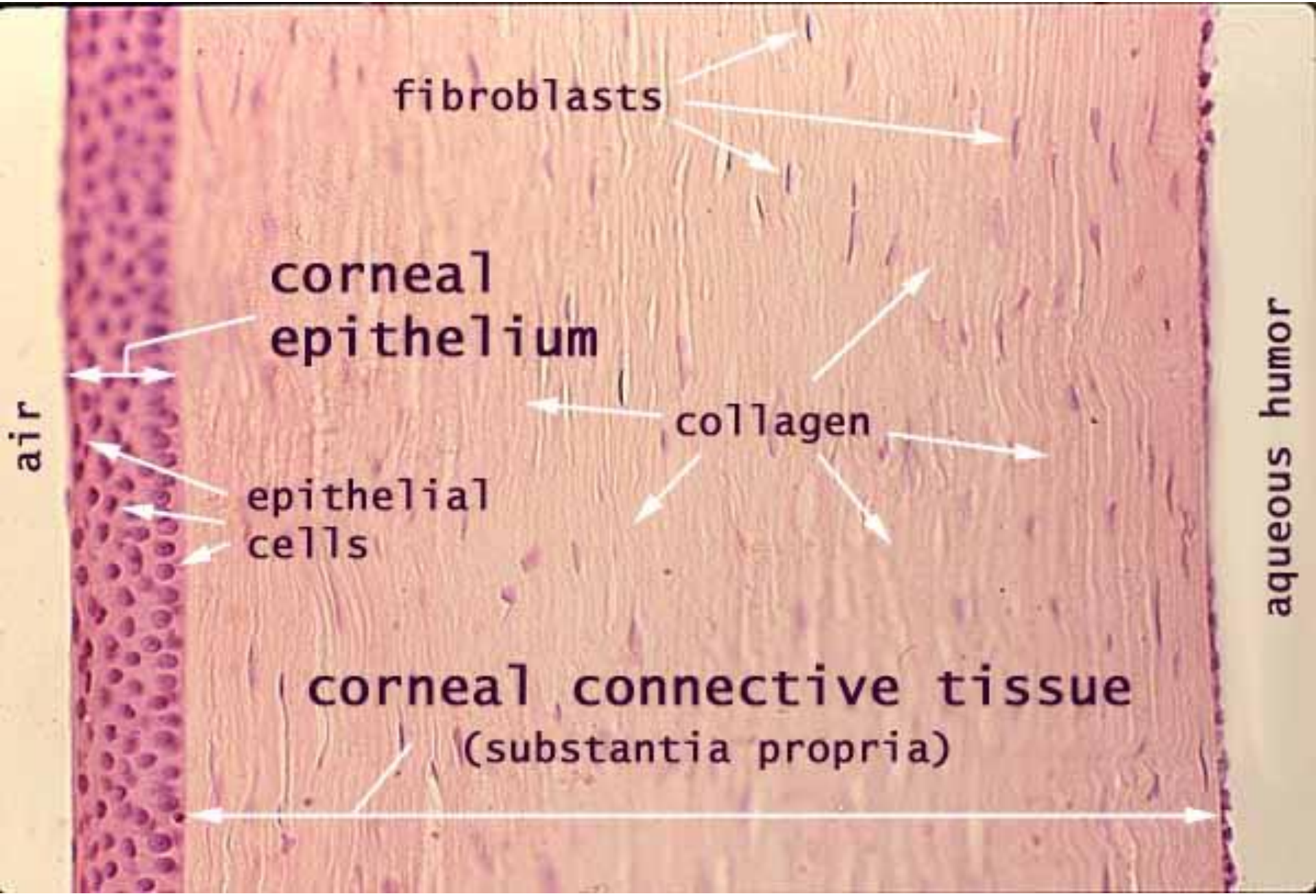
1.Corneal epithelium

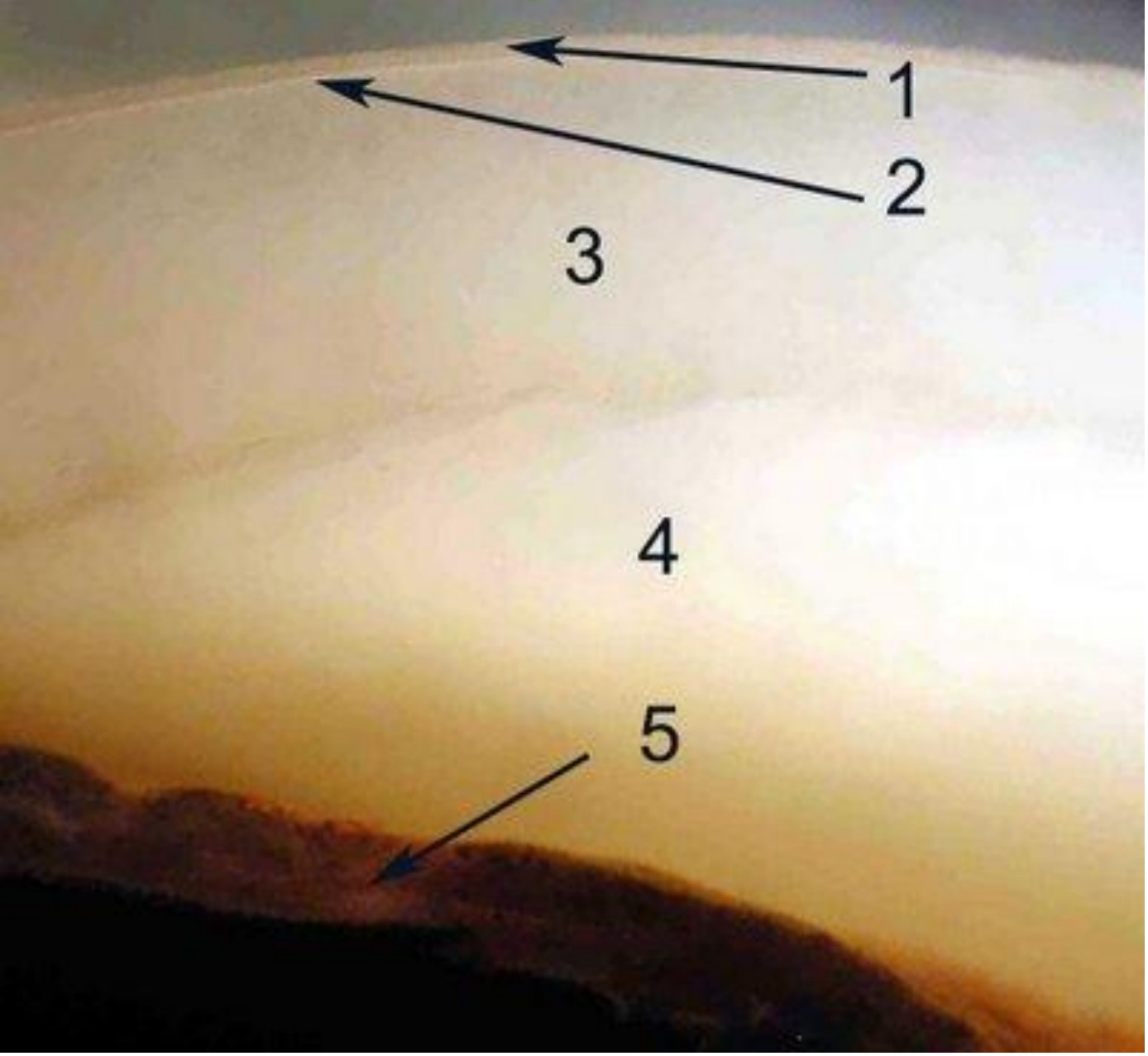
2.Bowman’s membran)

3.Corneal stroma

4.Descemet’s membrane

5. Corneal endothelium


fibroblasts
corneal
epithelium
collagen
epithelial
cells
corneal connective tissue
(substantia propria)
air
aqueous humor



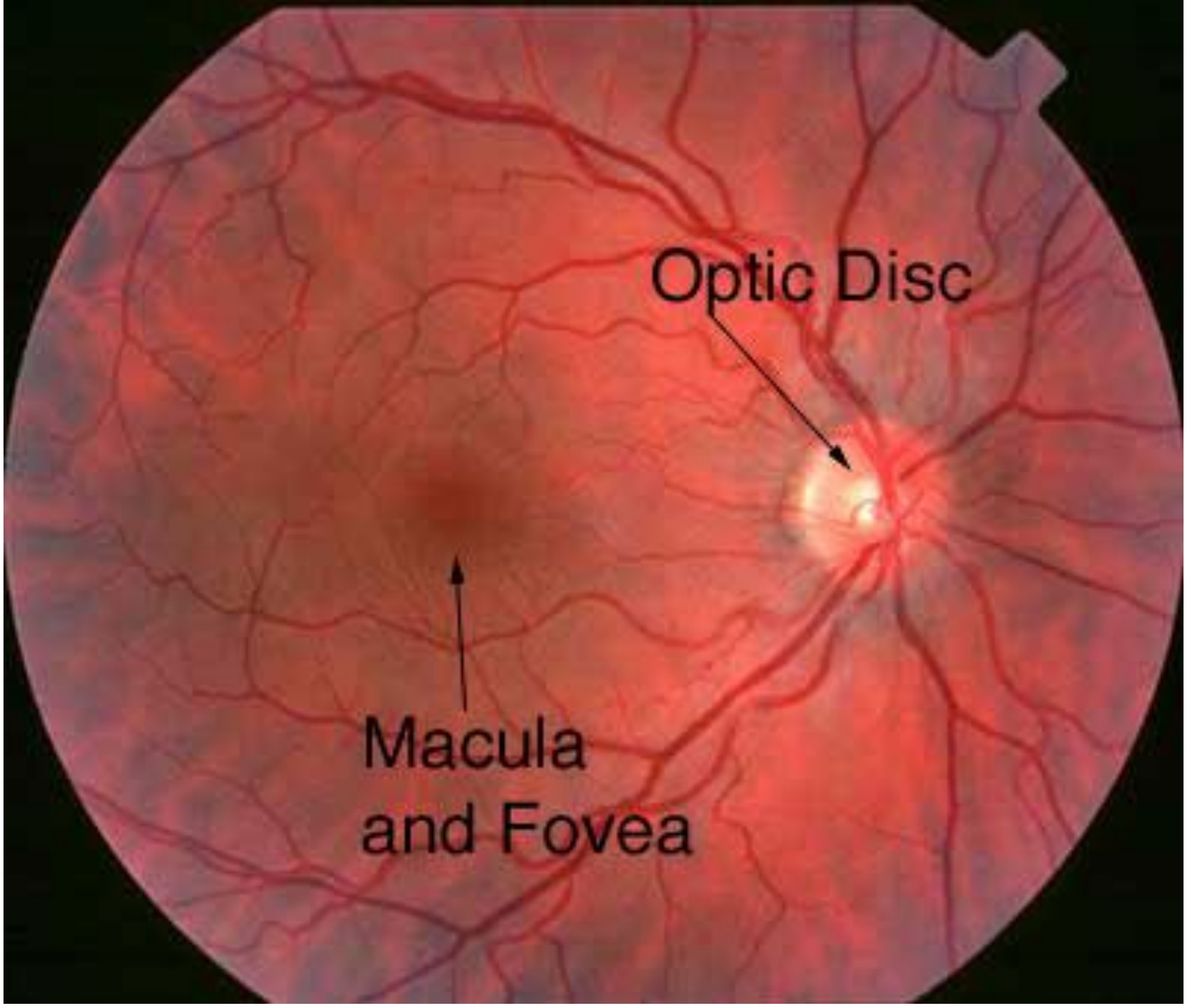
1.Kornea epiteli

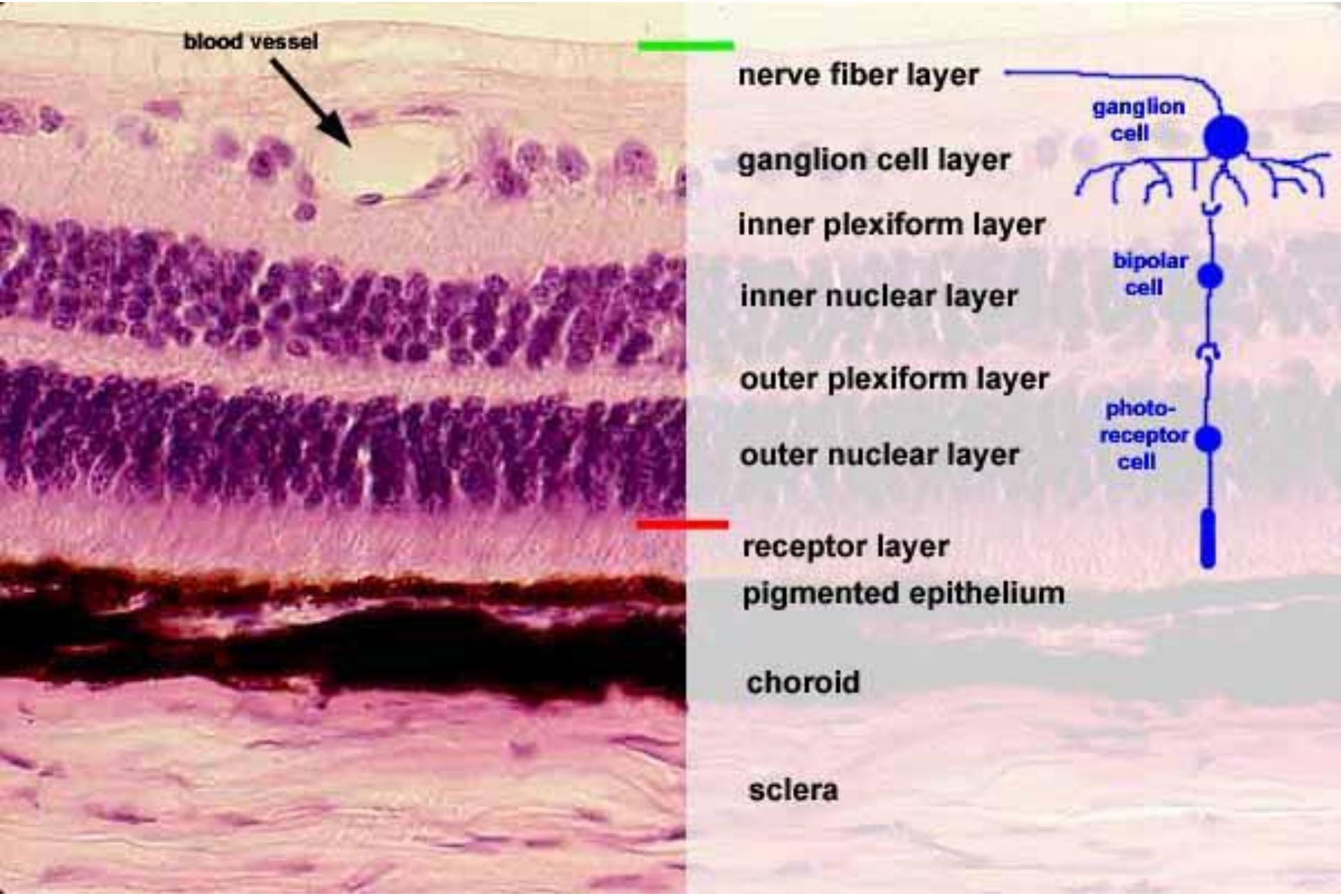
2.Bowman membranı

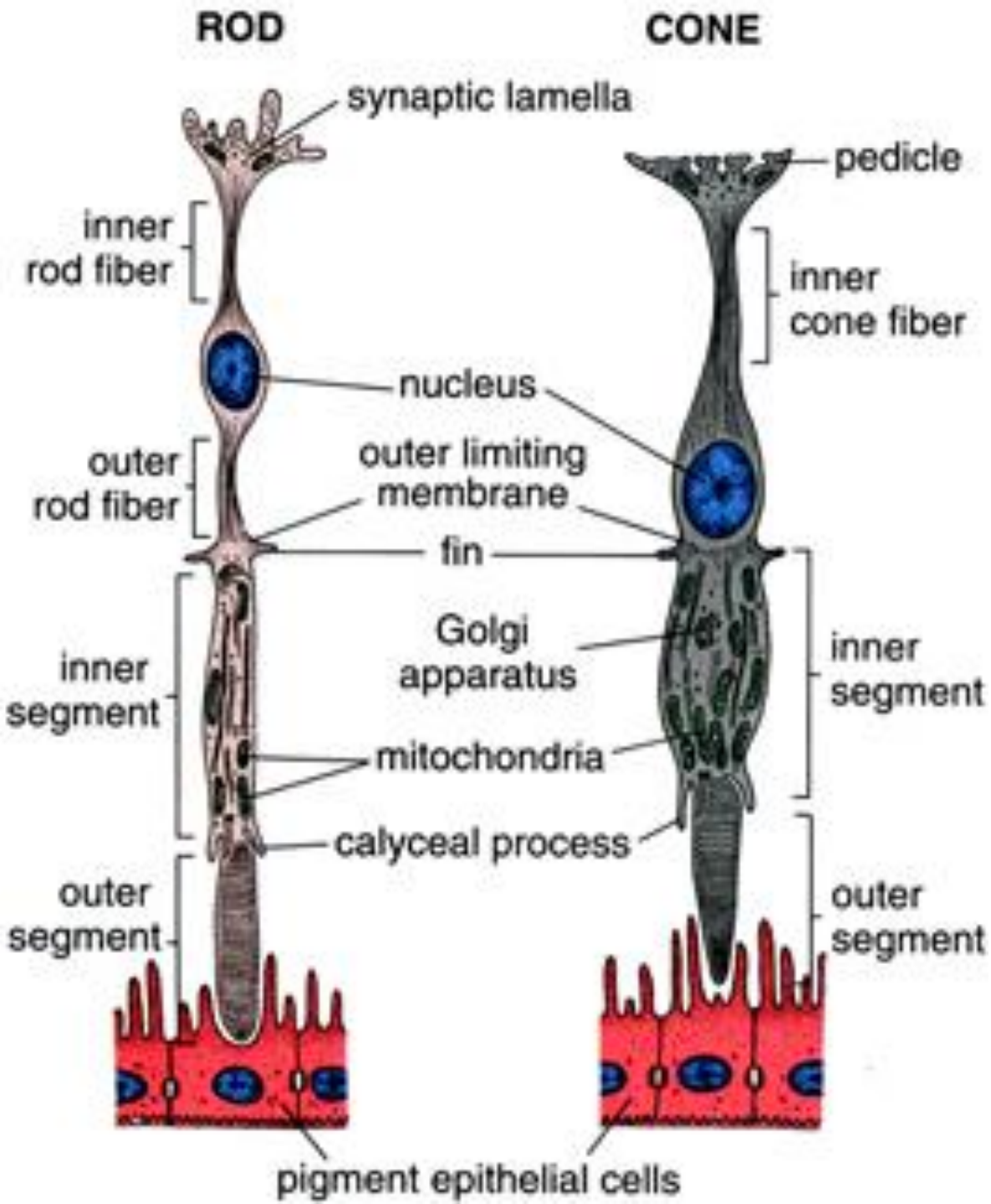
3.Stroma

4.Ön göz kamerası

5.İris

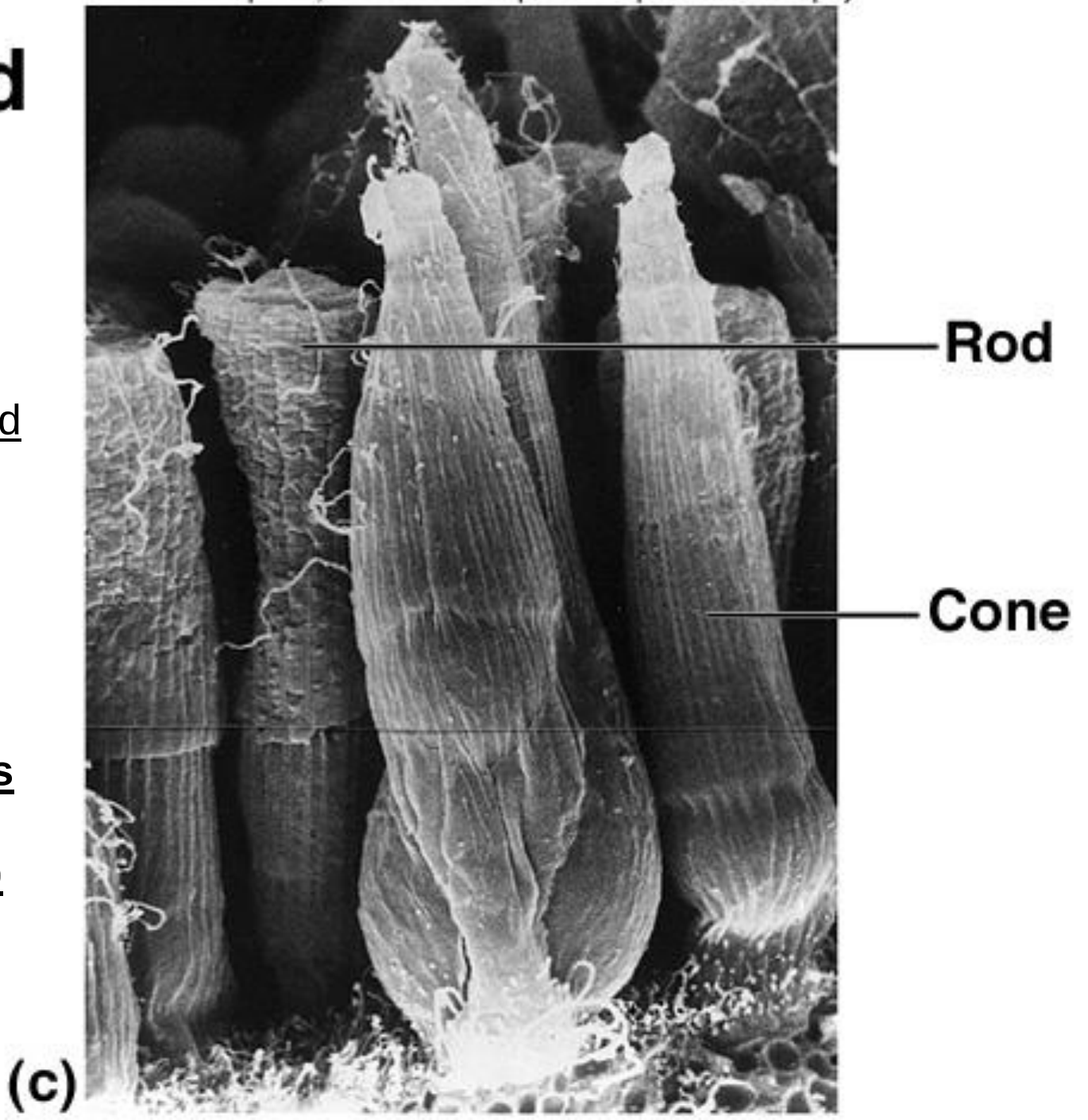

Optic Disc
Macula
and Fovea

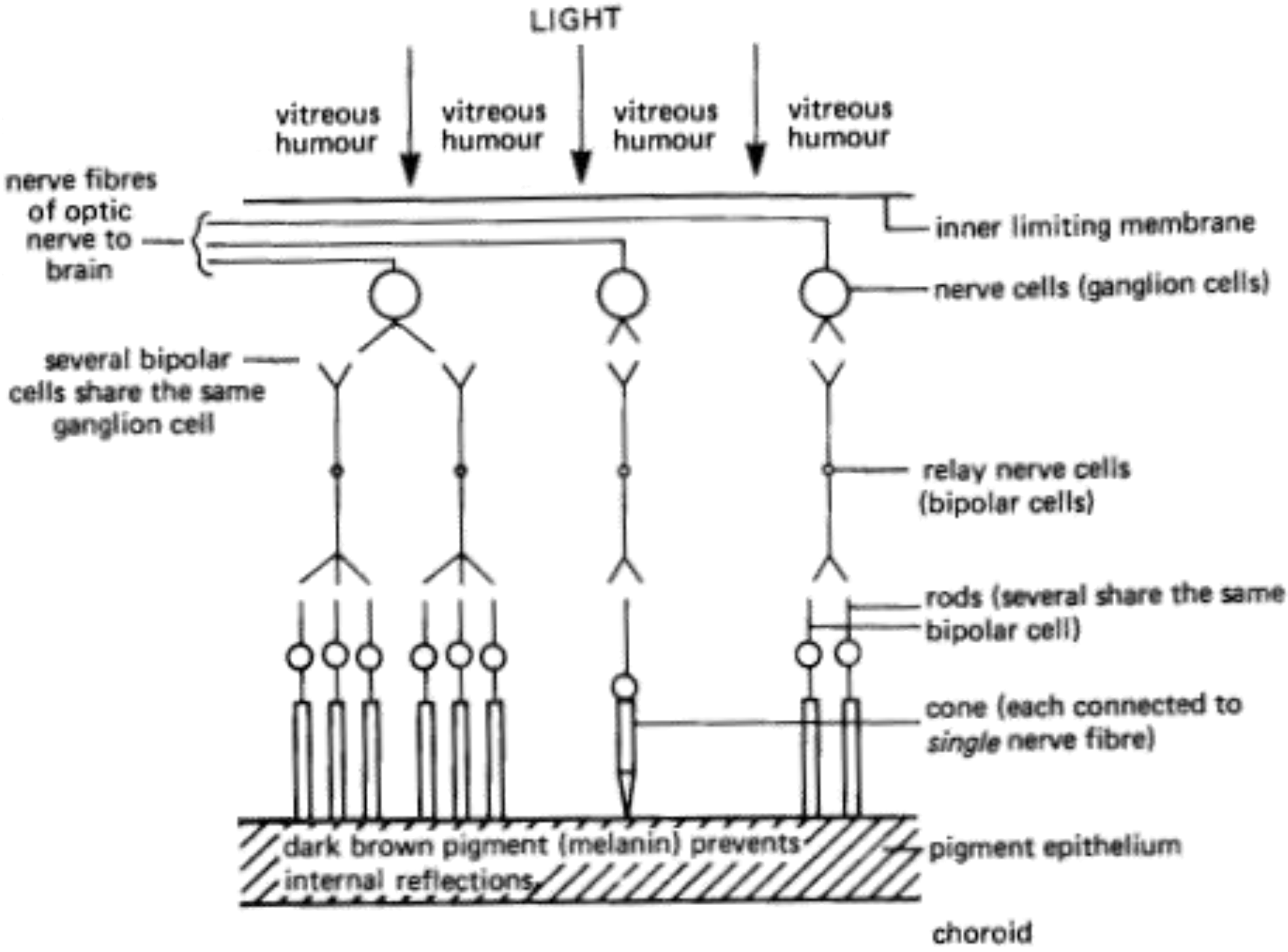

blood vessel
nerve fiber layer
ganglion cell layer
inner plexiform layer
inner nuclear layer
outer plexiform layer
outer nuclear layer
receptor layer
pigmented epithelium
choroid
sclera
ganglion cell
bipolar cell
photo-receptor cell

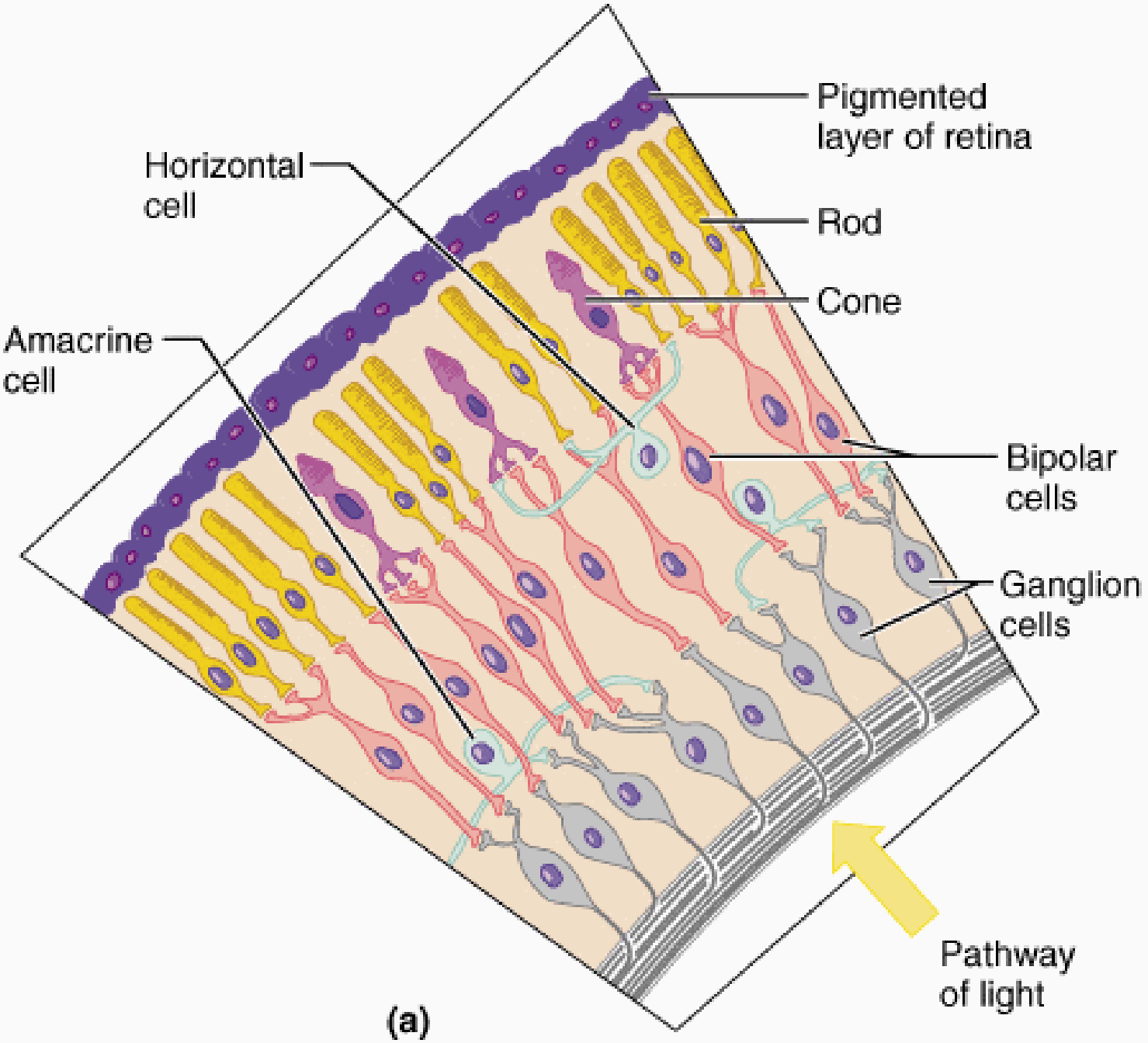

ROD
CONE
synaptic lamella
pedicle
inner rod fiber
inner cone fiber
nucleus
outer rod fiber
outer limiting membrane
fin
Golgi apparatus
inner segment
inner segment
mitochondria
calyceal process
outer segment
outer segment
pigment epithelial cells

Rods and Cones

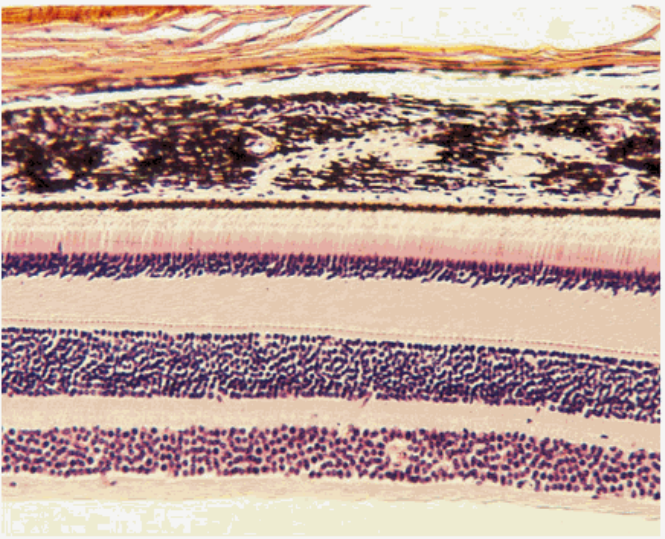
- A). **Rods:**
- Low light and peripheral vision receptors. Black and white vision.
- B)**. Cones**
- Operate in bright light and provide color vision and visual acuity.
- **Types of cones**
- **Pigment B (blue)**
  Pigment G (green)
  Pigment R (red)



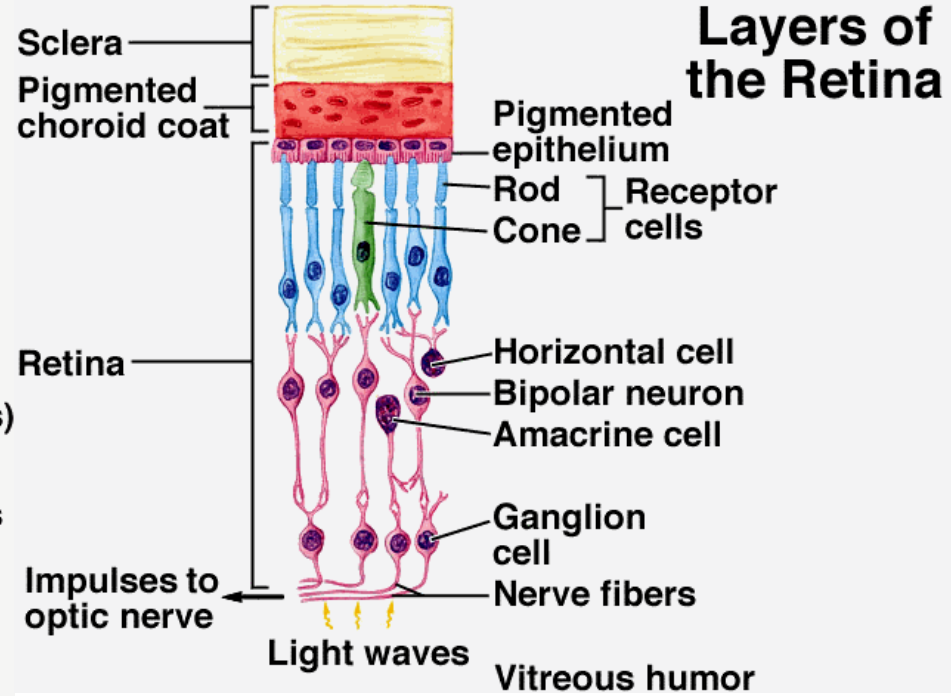

LIGHT
vitreous humour
vitreous humour
vitreous humour
vitreous humour
nerve fibres of optic nerve to brain
inner limiting membrane
nerve cells (ganglion cells)
several bipolar cells share the same ganglion cell
relay nerve cells (bipolar cells)
rods (several share the same bipolar cell)
cone (each connected to *single* nerve fibre)
dark brown pigment (melanin) prevents internal reflections
pigment epithelium
choroid

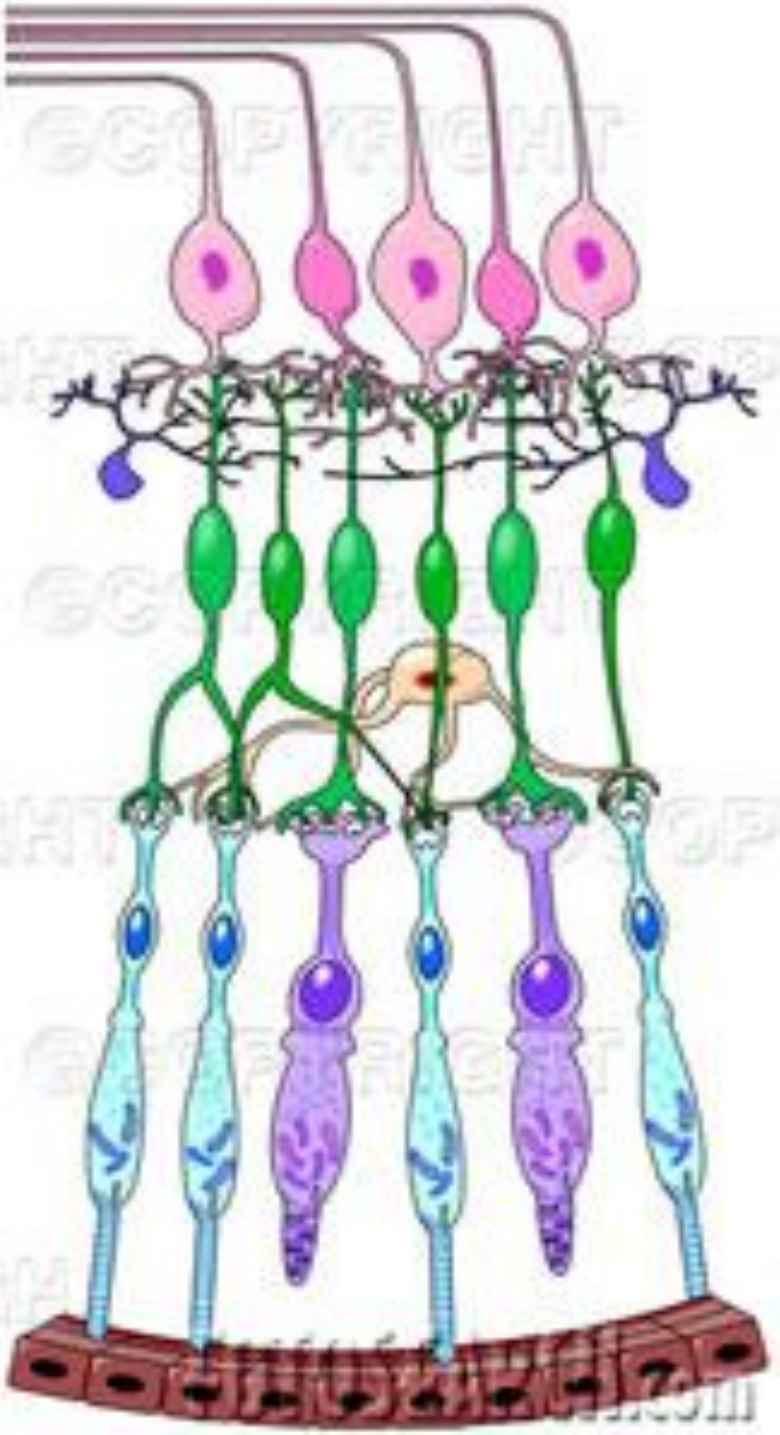


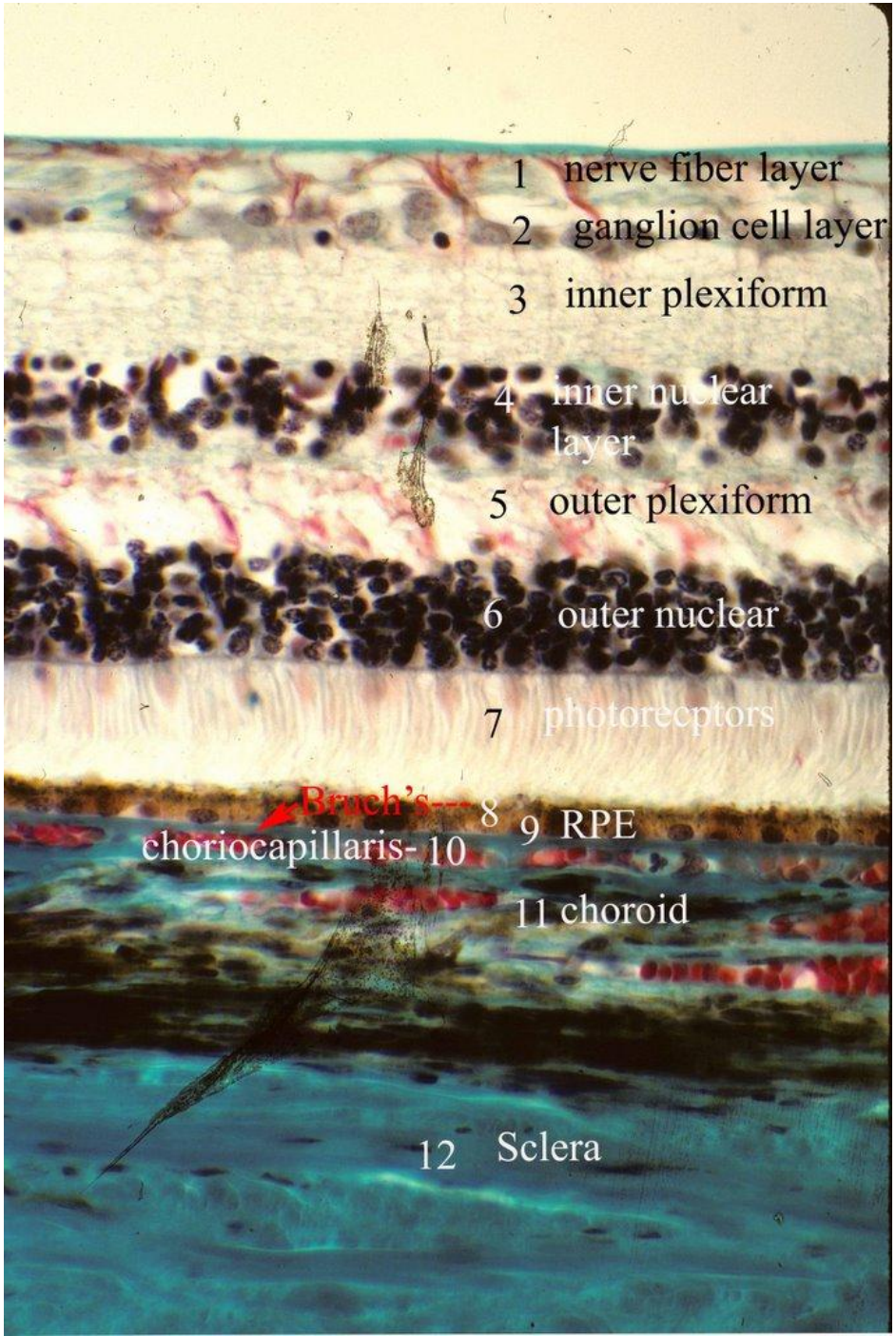
Layers of the Retina

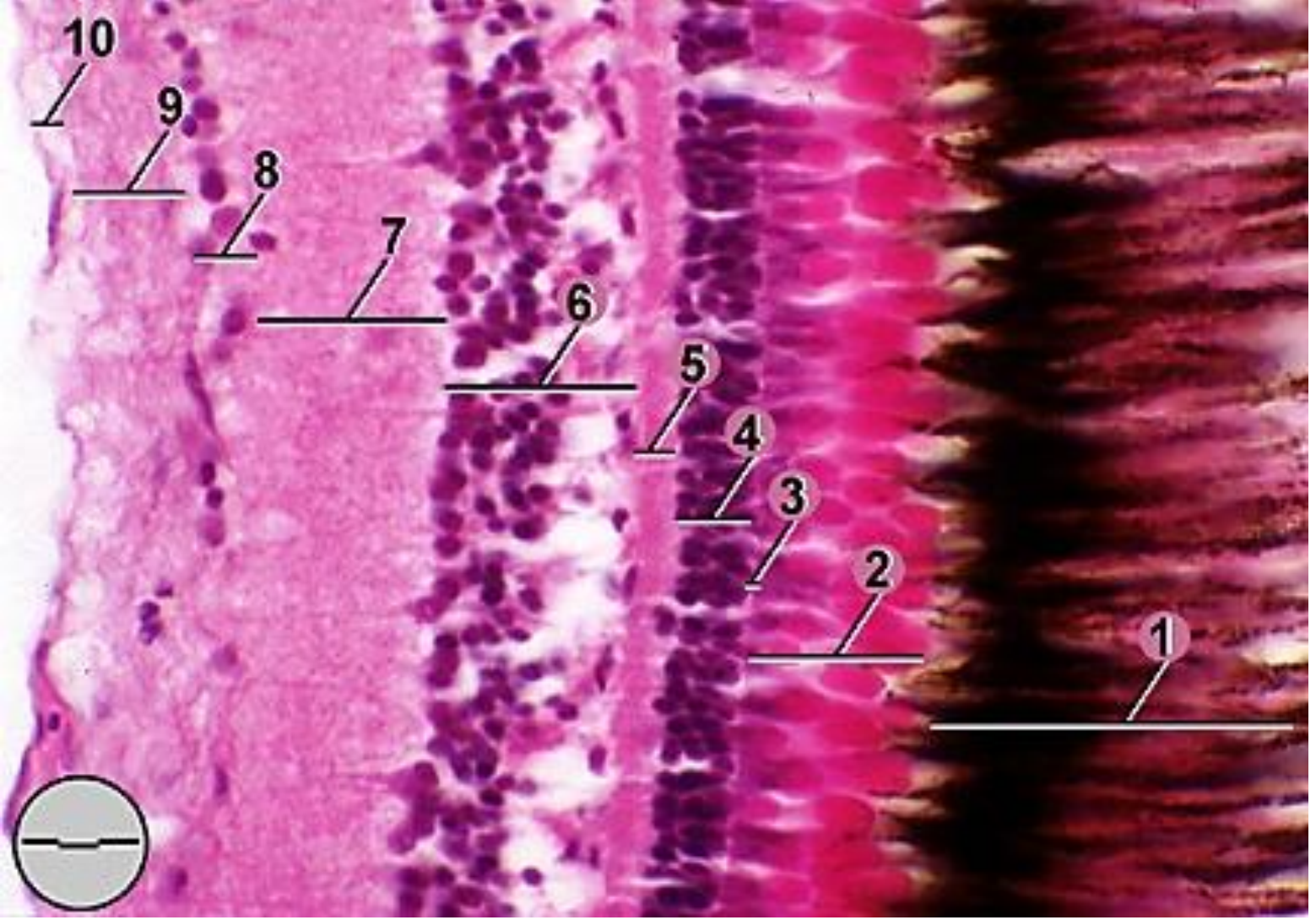


Layers of the Retina






1 nerve fiber layer
2 ganglion cell layer
3 inner plexiform
4 inner nuclear layer
5 outer plexiform
6 outer nuclear
7 photoreceptors
Bruch's---
choriocapillaris- 10
8
9 RPE
11 choroid
12 Sclera

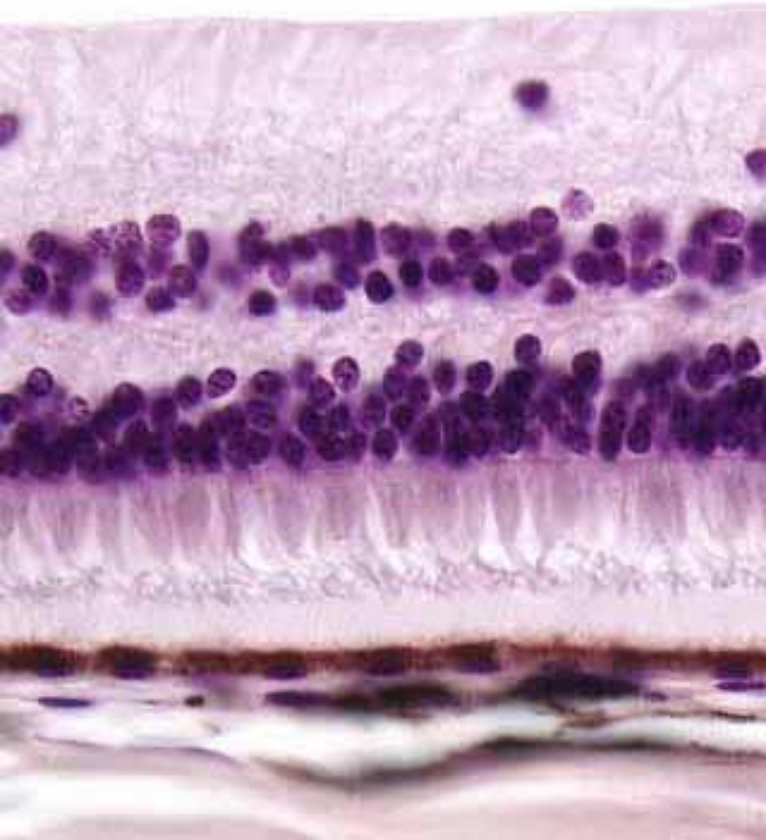


Retina, transverse section (Bouins, H&E, Bar = 20.5 µm).

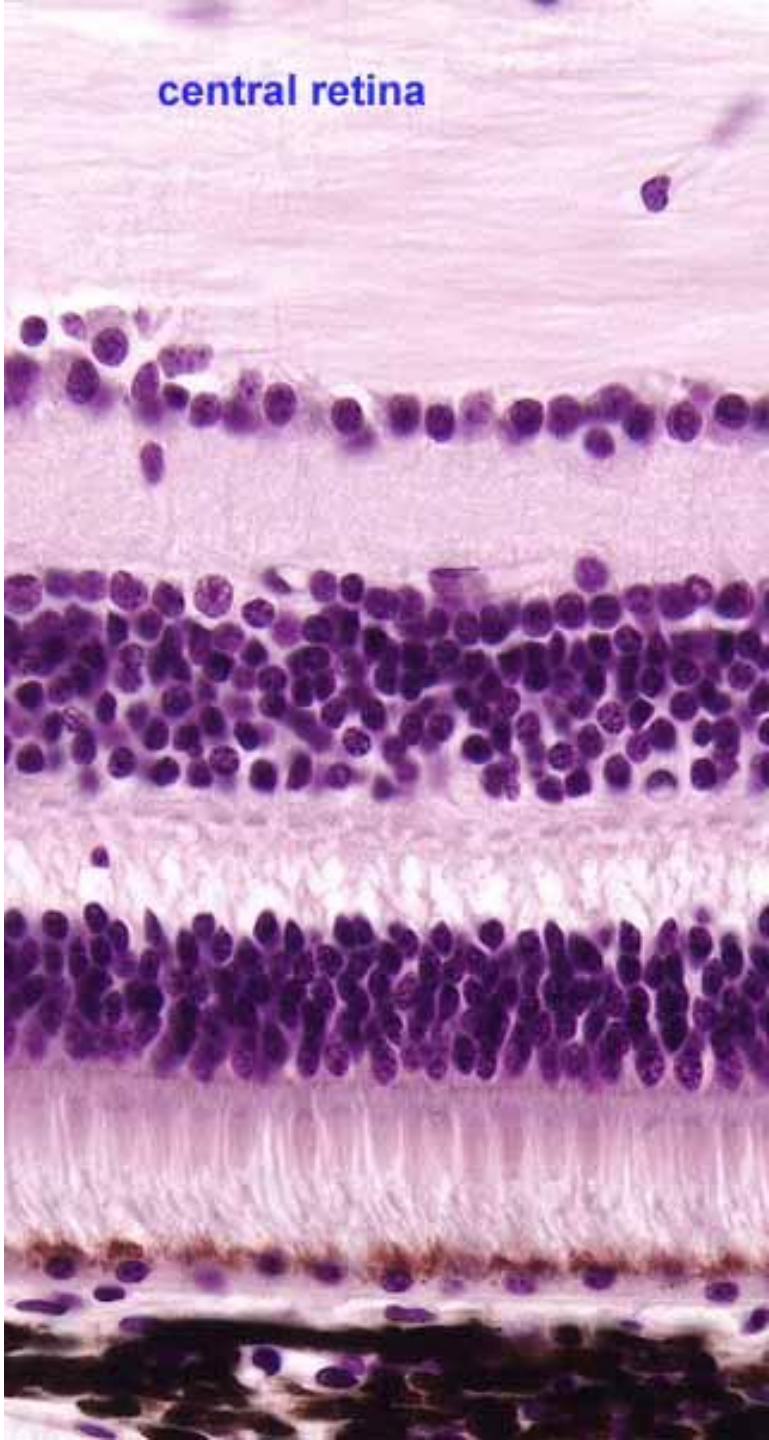
1. pigment epithelium; 2. photoreceptor layer (cones and rods); 3. outer limiting membrane; 4. outer nuclear layer; 5. outer plexiform layer; 6. inner nuclear layer; 7. inner plexiform layer; 8. ganglion cell layer;

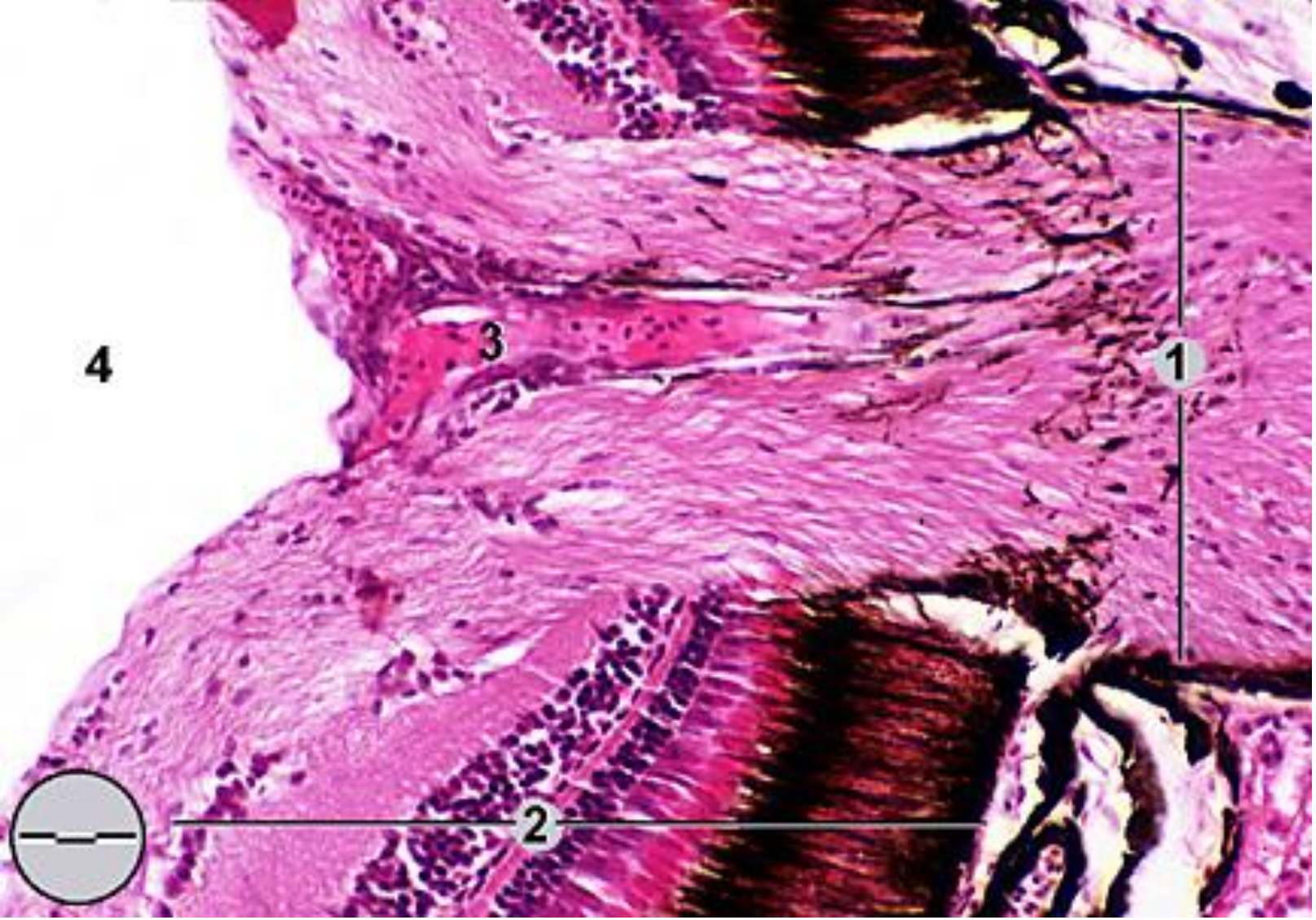
9. nerve fiber layer; 10. inner limiting membrane.

peripheral retina



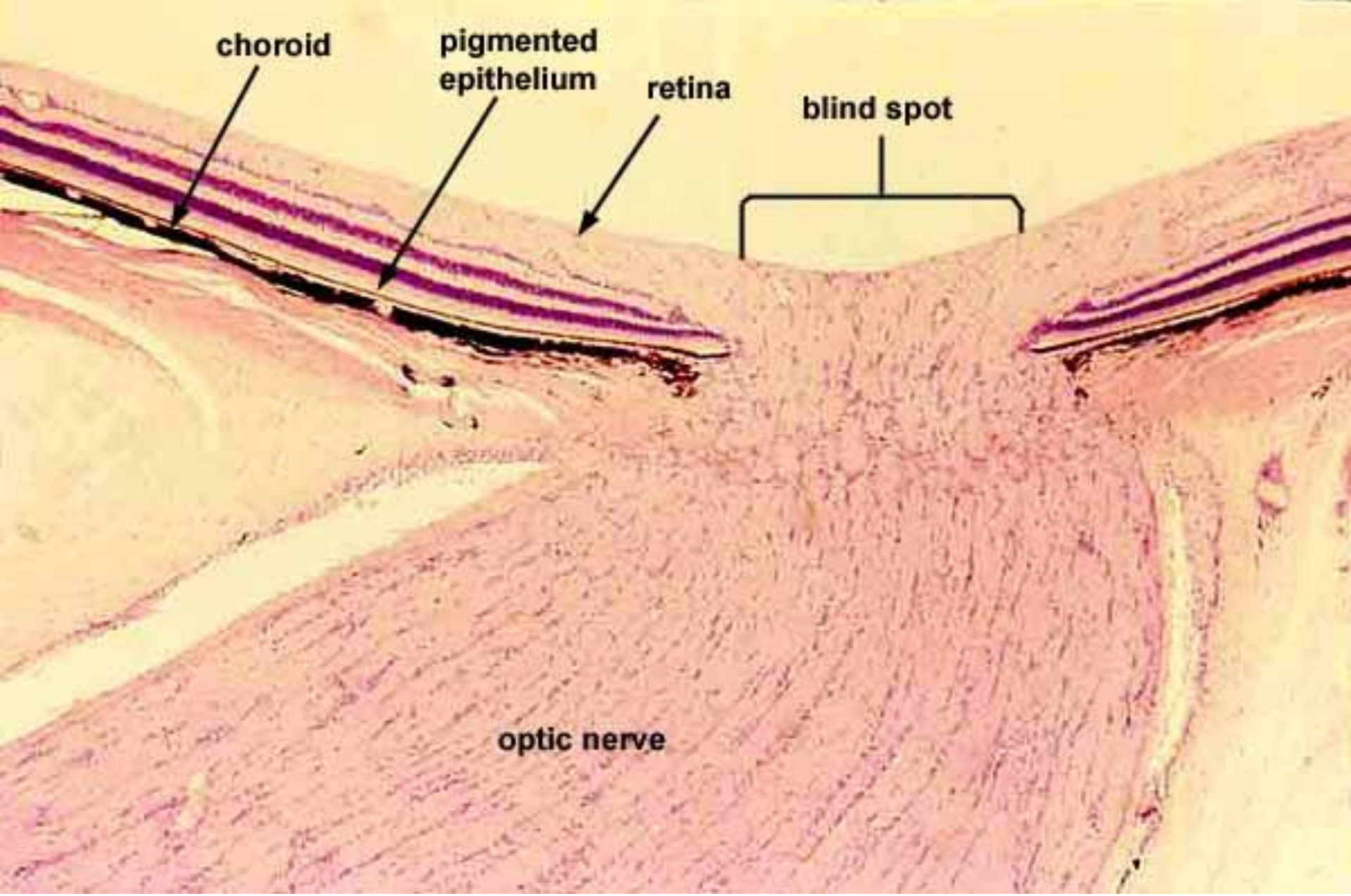
central retina





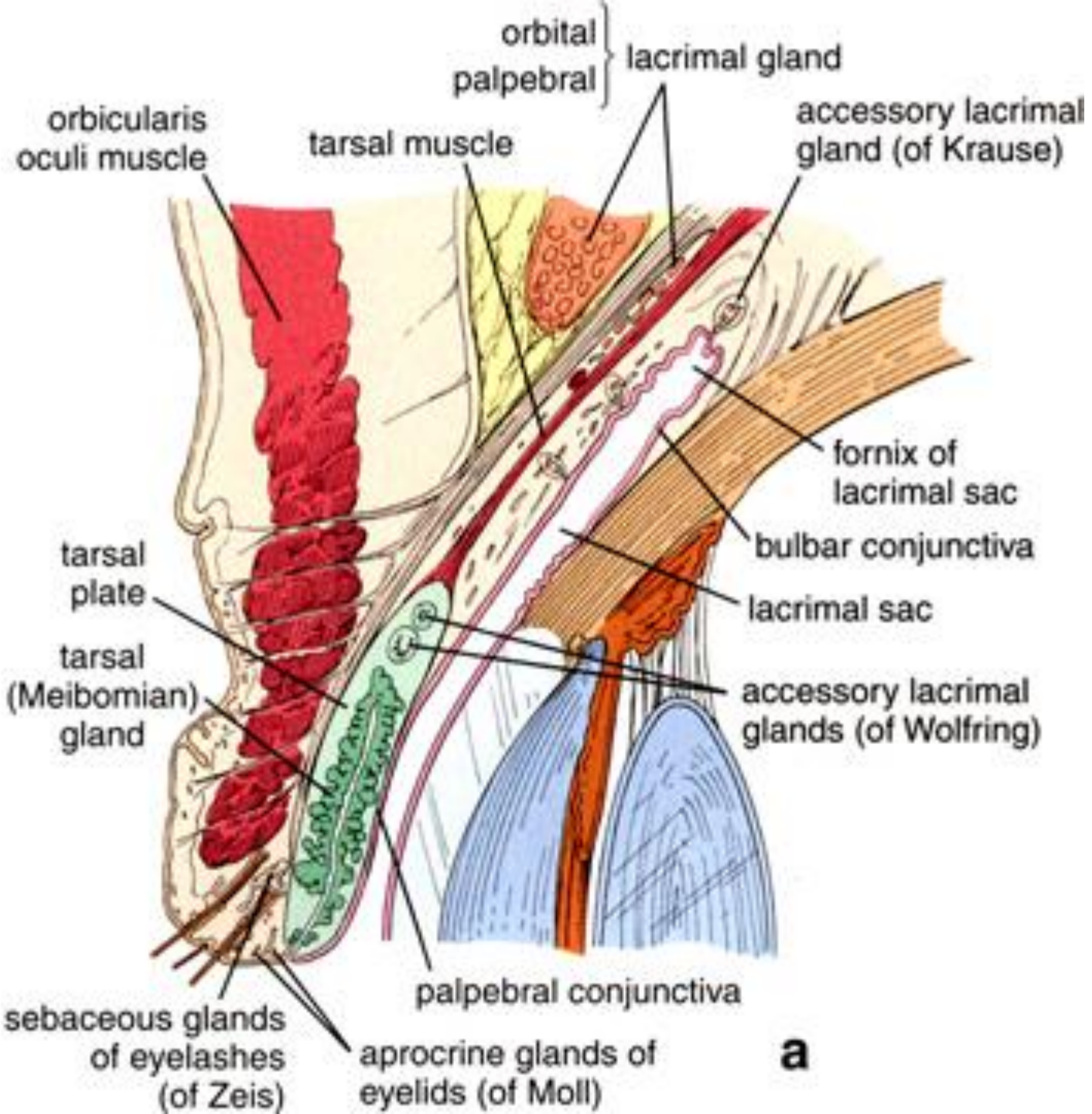
Optic nerve, sagittal section (Bouins, H&E, Bar = 32.4 µm).

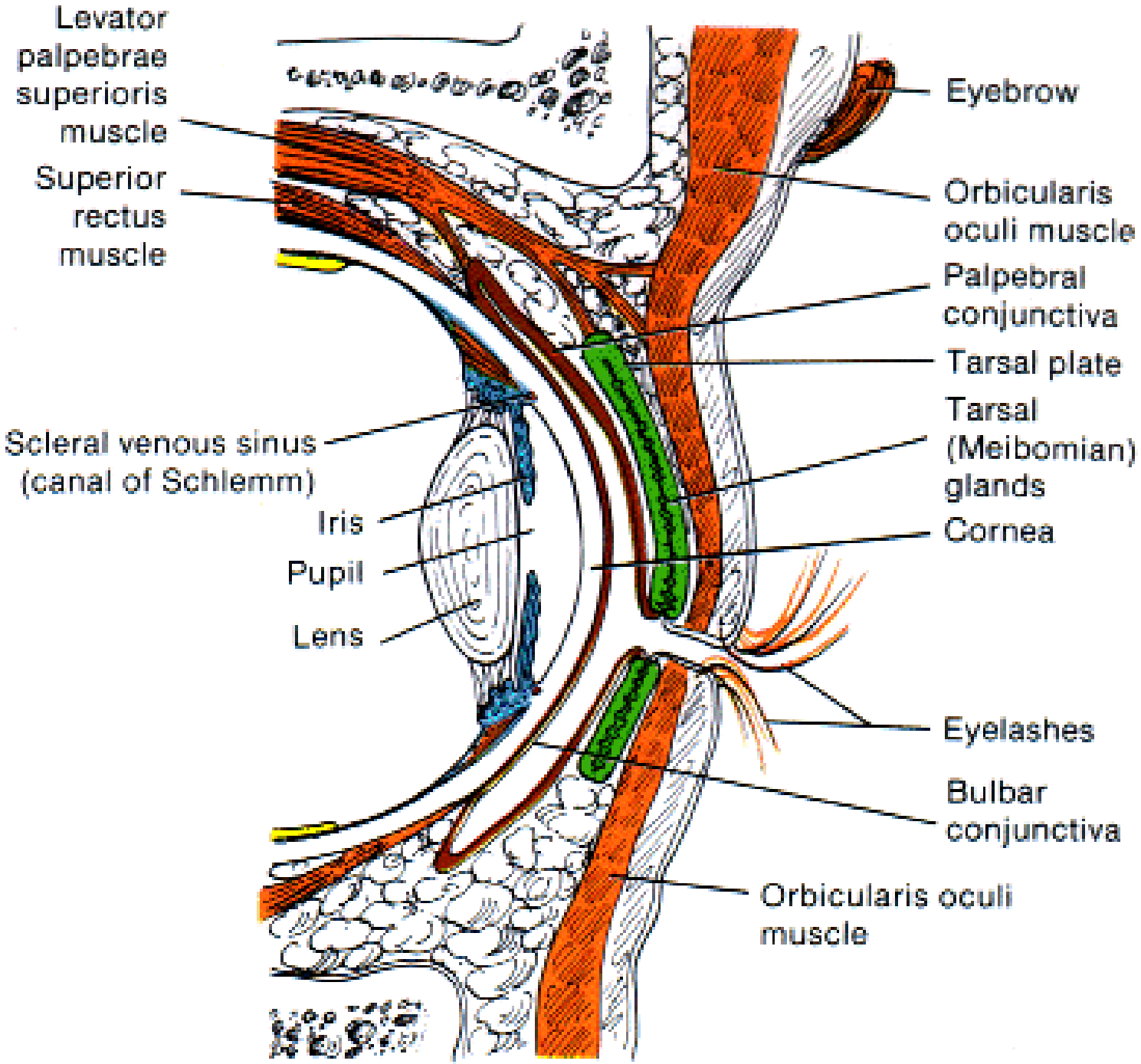
1. optic nerve; 2. retina; 3. vein; 4. vitreous chamber.

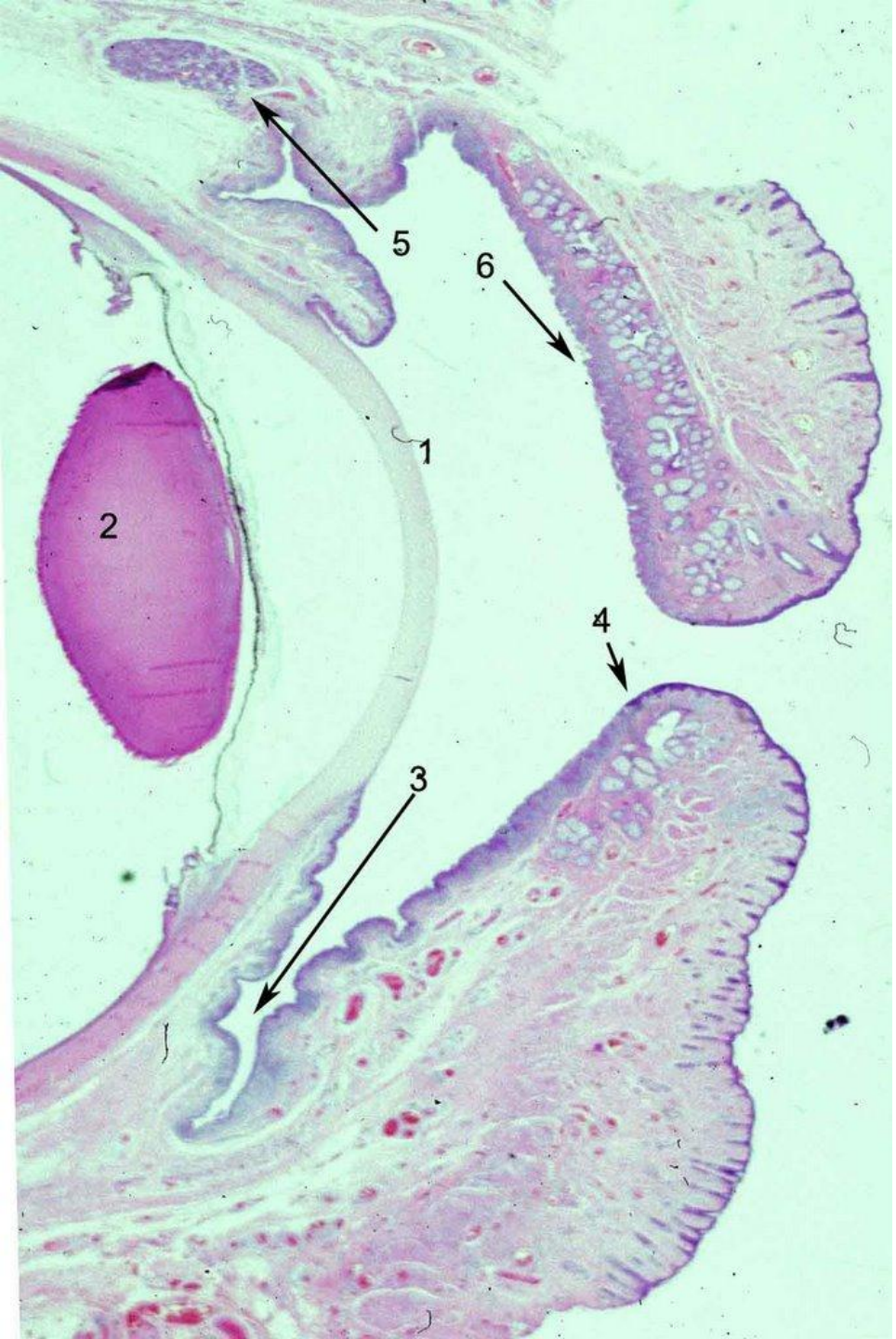

choroid
pigmented epithelium
retina
blind spot
optic nerve

Eye, transverse section (Formalin, H&E, Bar = 335 µm).

1. cornea; 2. lens; 3. iris; 4. retina; 5. optic nerve; 6. choroid body (reté mirabile); 7. sclera (w/ cartilage).


orbital
palpebral
lacrimal gland
orbicularis oculi muscle
tarsal muscle
accessory lacrimal gland (of Krause)
fornix of lacrimal sac
bulbar conjunctiva
lacrimal sac
tarsal plate
tarsal (Meibomian) gland
accessory lacrimal glands (of Wolfring)
palpebral conjunctiva
sebaceous glands of eyelashes (of Zeis)
aprocrine glands of eyelids (of Moll)
a


Levator palpebrae superioris muscle
Superior rectus muscle
Scleral venous sinus (canal of Schlemm)
Iris
Pupil
Lens
Eyebrow
Orbicularis oculi muscle
Palpebral conjunctiva
Tarsal plate
Tarsal (Meibomian) glands
Cornea
Eyelashes
Bulbar conjunctiva
Orbicularis oculi muscle


5
6
1
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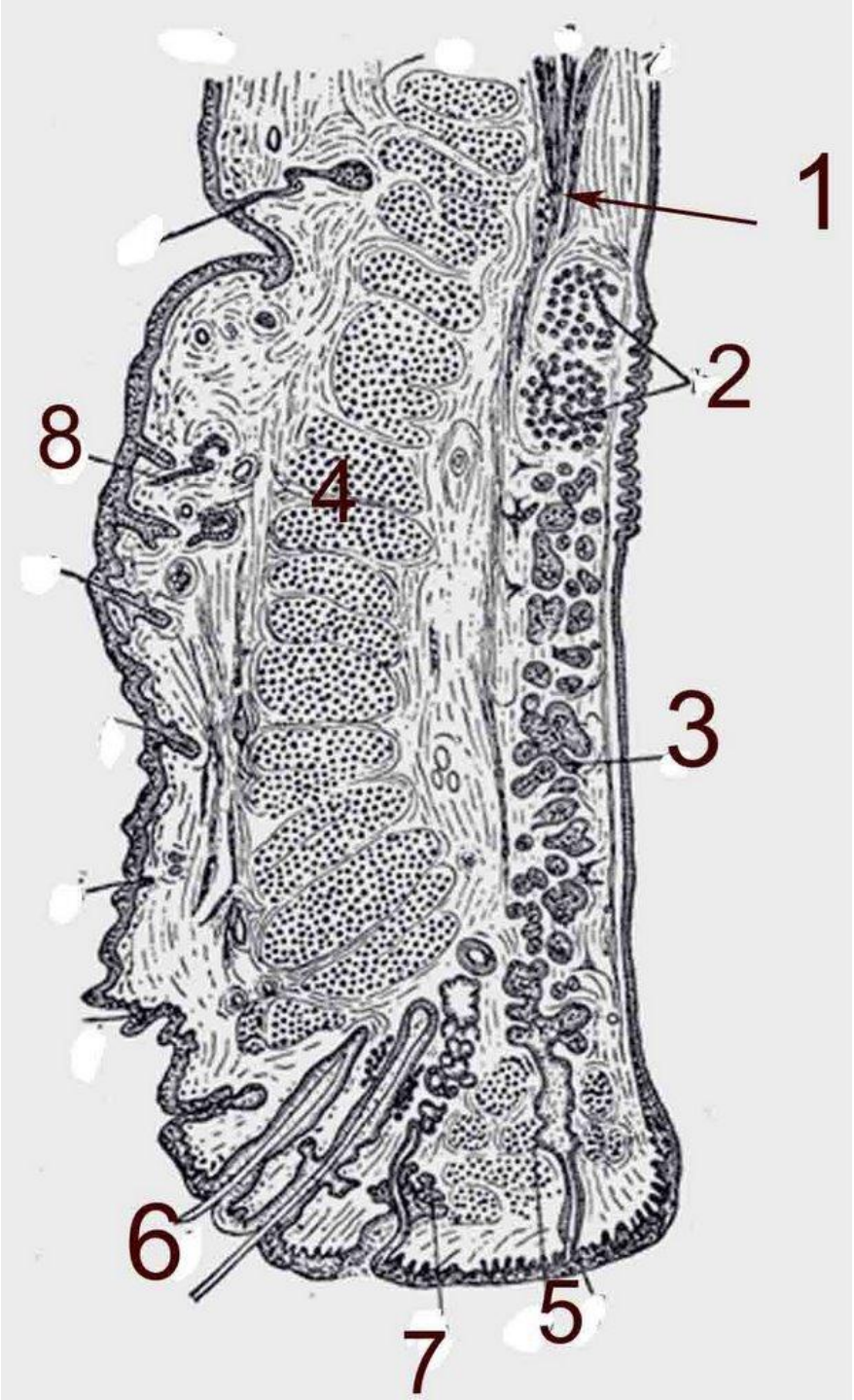
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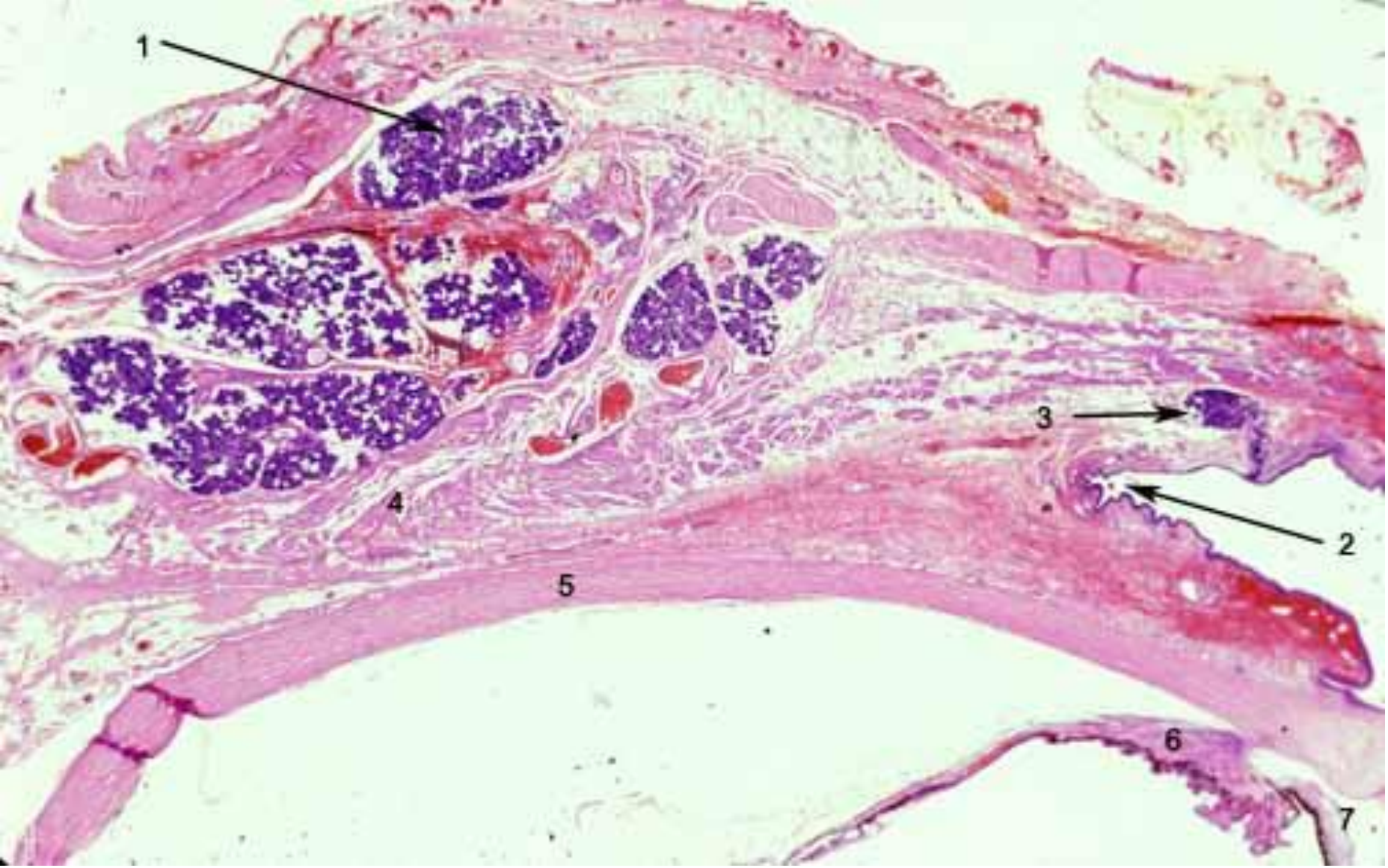
- A coronal section of both eyelid and the eye are shown to the left. The cornea (1) and lens (2) provide orientation.
  The fornix (3) has more redundant conjunctiva. The marginal conjunctiva(4) and tarsal conjunctiva (6) are indicated. The palpebral portion of the lacrimal gland (5) is also shown in this photograph. The composition of each of these regions varies in the Goblet cell density within the epithelium. In addition, note the greater length of the tarsus and higher number of Meibomian glands in the upper eyelid compared to the lower eyelid. This has implications for the origin of sebaceous carcinoma. This photograph also give a view of the cross section of the eyelid and the alert student will notice the skin externally and orbicularis muscle.

1- skin surface; 2 fat and fascia; 3 orbicularis oculi; 4 levator aponeurosis; 5 tarsal plate; 6 conjunctival surface; 7 Meibomian ducts; 8 glands of Moll; 9 accessory lacrimal gland of Wolfring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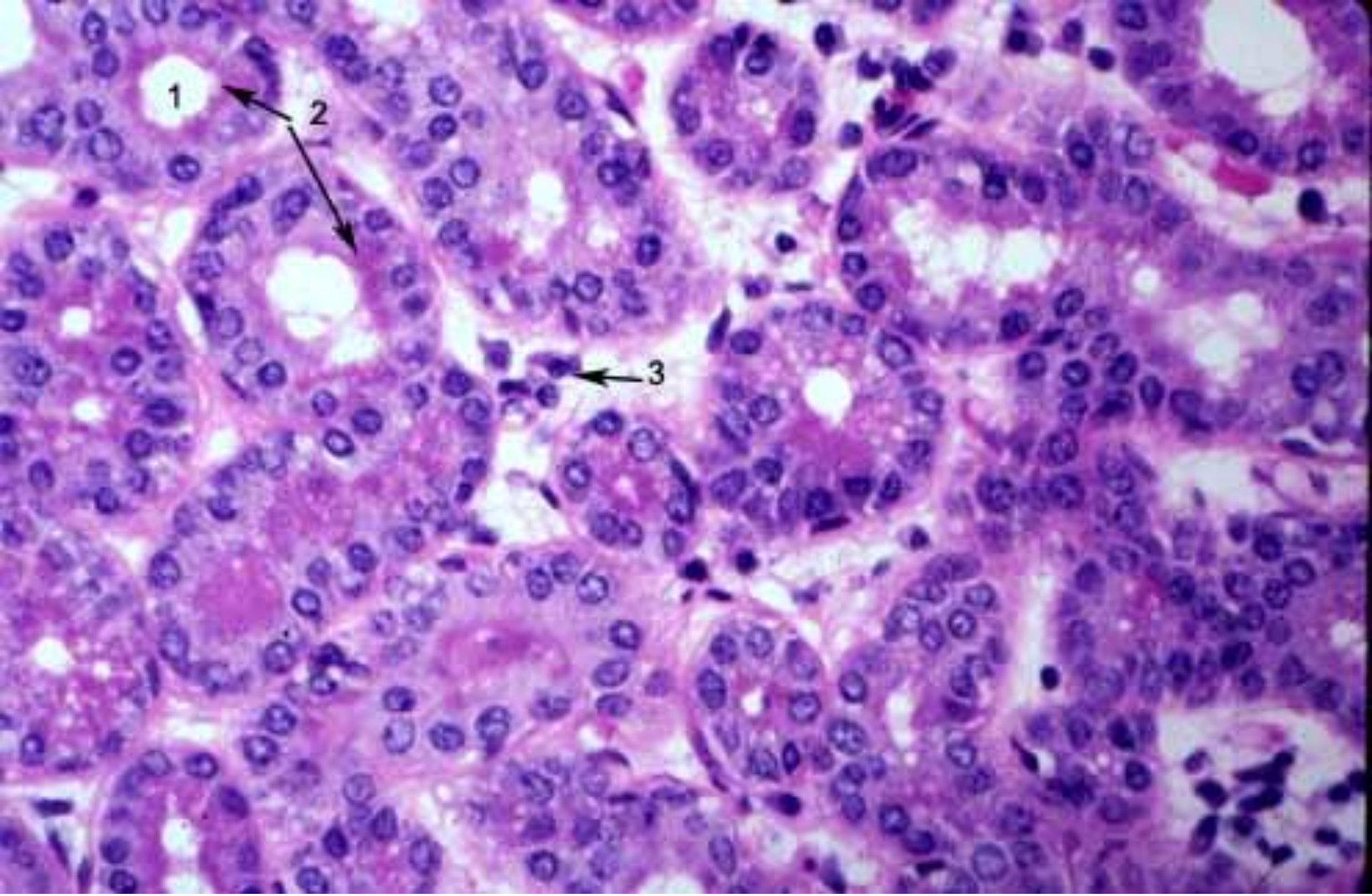
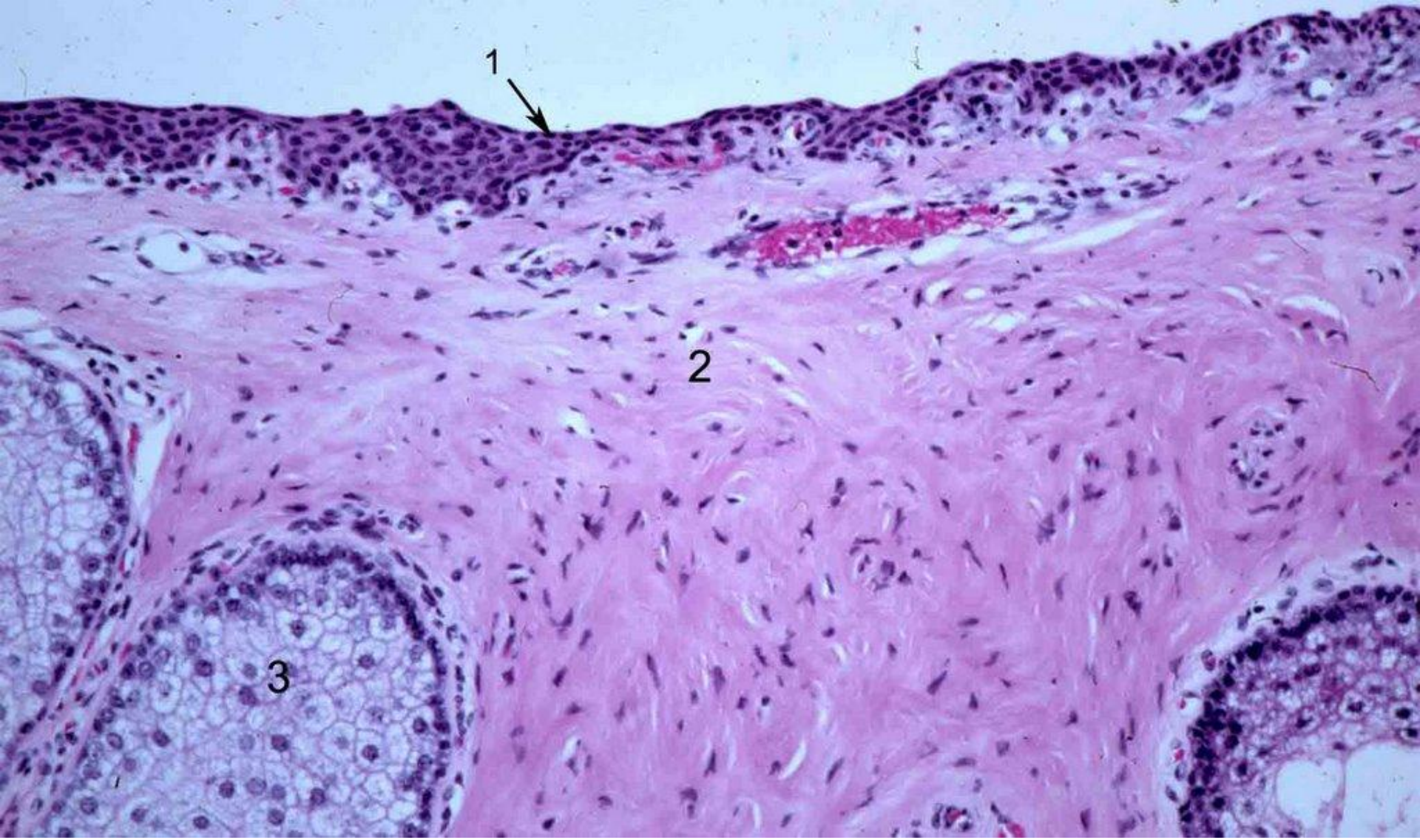
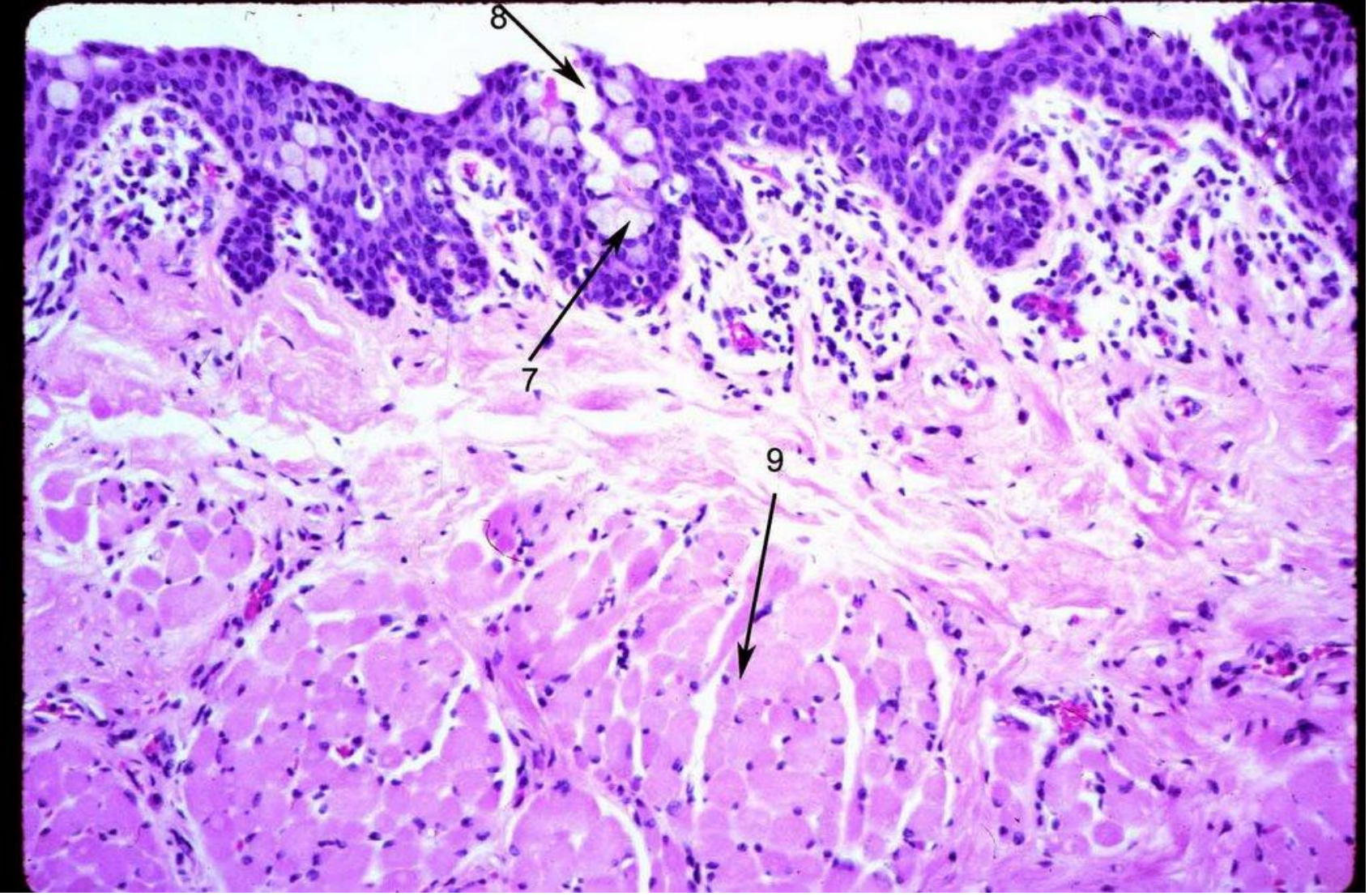
- Photomicrograph (above) shows a low power image of an exenteration specimen that has the eye intact with the adnexal structures. The lobules of the orbital portion of the lacrimal gland (1) are near the orbital septum but lie under the levator muscle (4). The fornix of the upper eyelid (2) lies immediately adjacent to the accessory lacrimal gland of Krause(3). The glands of Krause are accessory lacrimal glands having the same structure as the main gland. They are placed deeply in the subconjunctival connective tissue (mainly) of the upper fornix between the tarsus and the inferior lacrimal gland, of which they are offshoots. There are some 42 in the upper and 6 to 8 in the lower fornix. They are thus found largely on the lateral side. Their ducts unite into a rather long duct or sinus which opens into the fornix. Similar glands are found in the caruncle. The Glands of Wolfring or Ciaccio are also accessory lacrimal glands, but larger than the glands of Krause. There are 2 to 5 in the upper lid situated actually in the upper border of the tarsus about its middle between the extremities of the tarsal glands or just above the tarsus. The excretory duct is large and short and lined by a basal layer of cubical cells and a superficial layer of cylindrical cells like the conjunctiva on which it opens. The sclera (5), ciliary body(6) and iris (7)


1
2
3

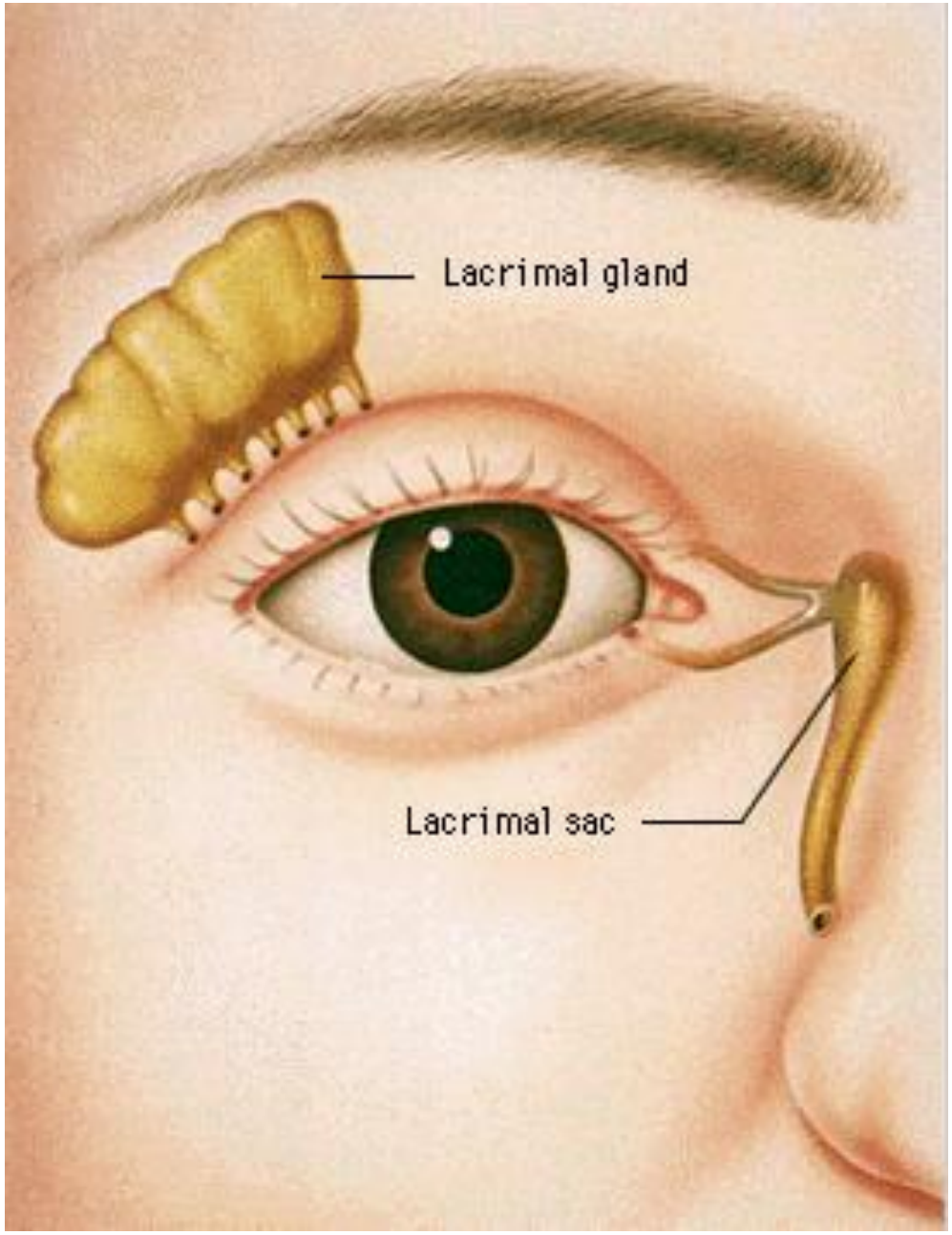
- Photomicrograph (above) shows a higher magnfication of a human lacrimal gland complete with acinar structures that contain lumens (1) and protein rich acinar cells that secrete lysozyme, tear lipocalin, lactoferrin and IgA. The reddish granules are secretory vesicles replete with protein. Some lumens are filled with prtotein that is being secreted. Lymphocytes and plasma cells are scattered in the interstitium.
  The lacrimal gland situated above and lateral to the eye in the orbit secretes the tears and into ducts in upper fornix. The lacrimal gland and its tears exist in animals which live in air. Fish do not have lacrimal gland. The lacrimal gland consists of an orbital or superior portion; and a small palpebral or inferior portion; which are continuous. The orbital portion is lodged in its fossa on the anterior and lateral part of the roof of the orbit. It is shaped like an almond.
  The lacrimal gland consists of a lobules and is a tubulo-racemose gland with short branched gland tubules somewhat similar to the parotid. The acini consist of two layers of cells placed on a thin hyaline basement membrane and surrounding a central lumen. The basal cells are myoepithelial in character while the acinar cells are cylindrical, and secrete fluid into a series of ducts of increasing size until becoming the excretory duct.

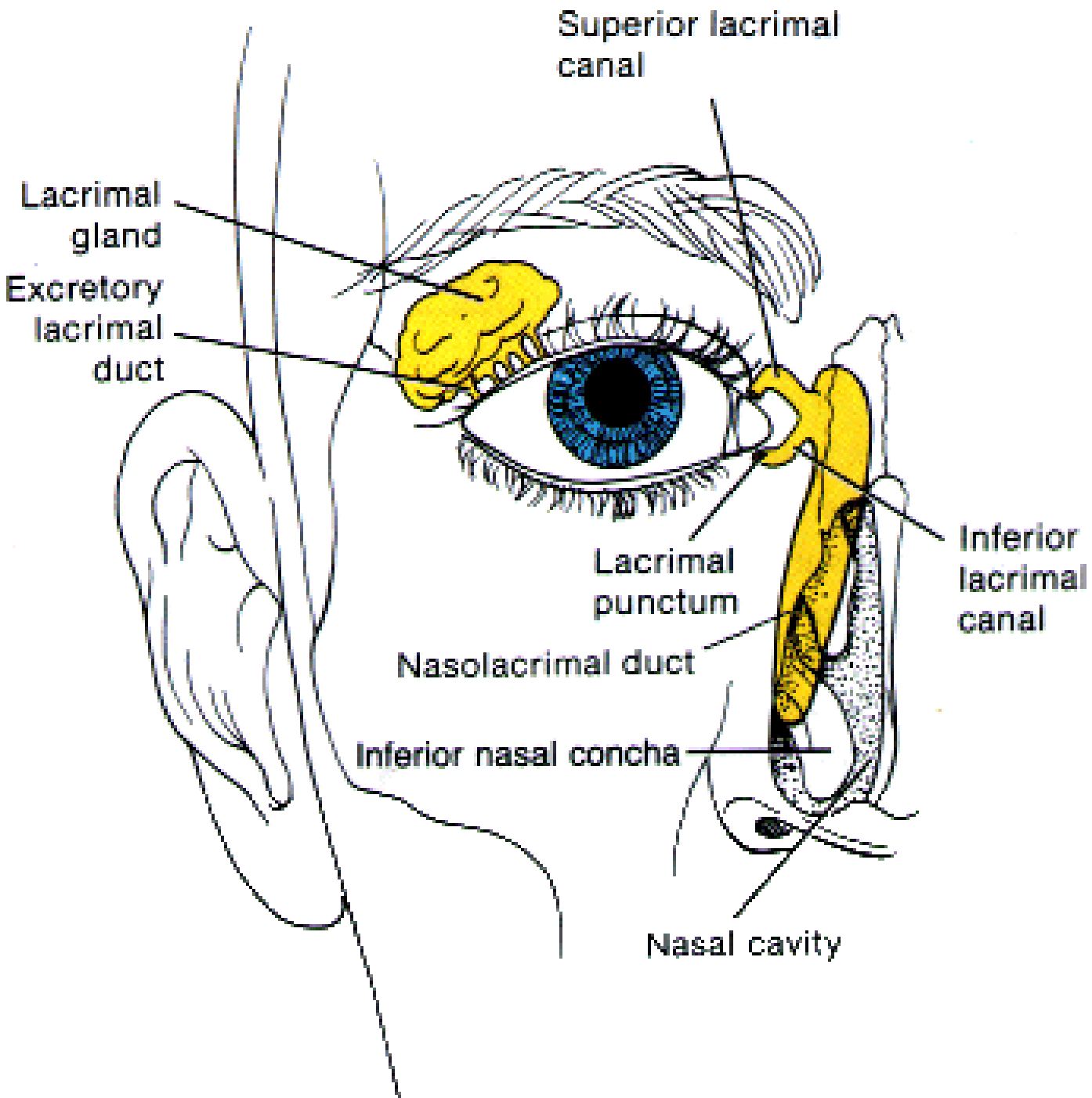


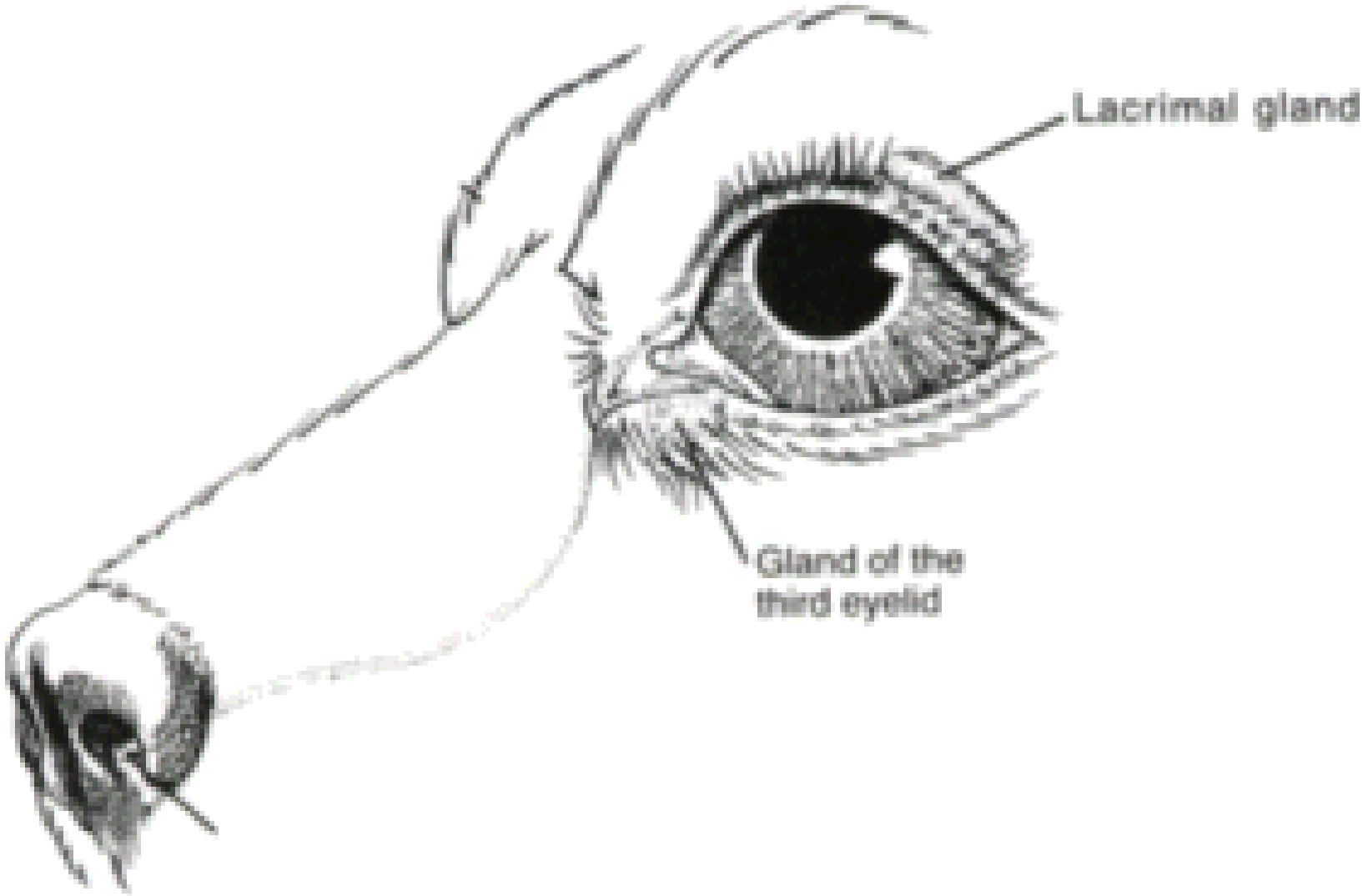
The tarsal conjunctiva shows a stratified squamous epithelium (1) that has few Goblet cells (none seen here) overlying a very dense fibrous stroma, tarsus (2). Meibomian glands are embedded in the tarsus.

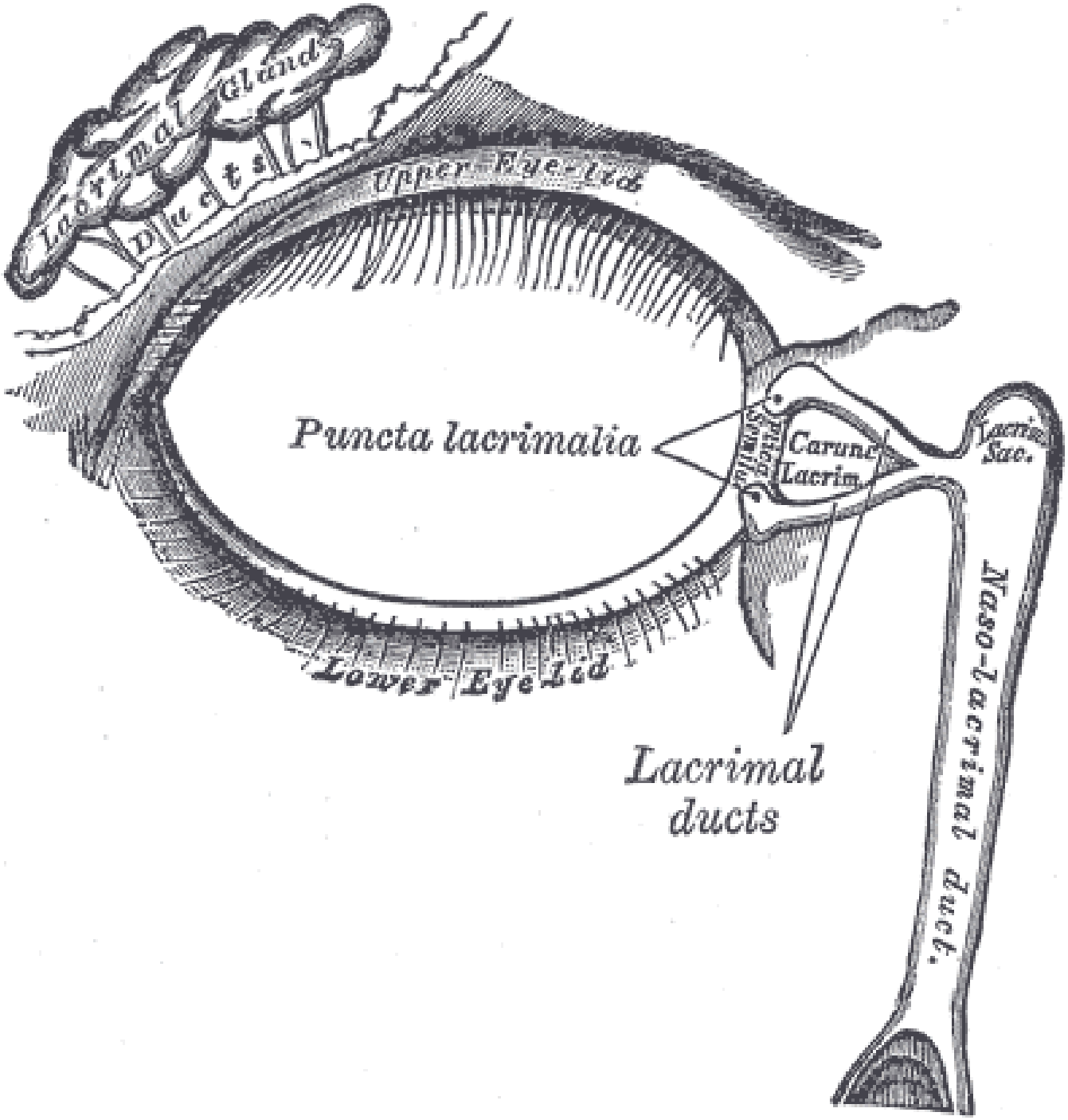


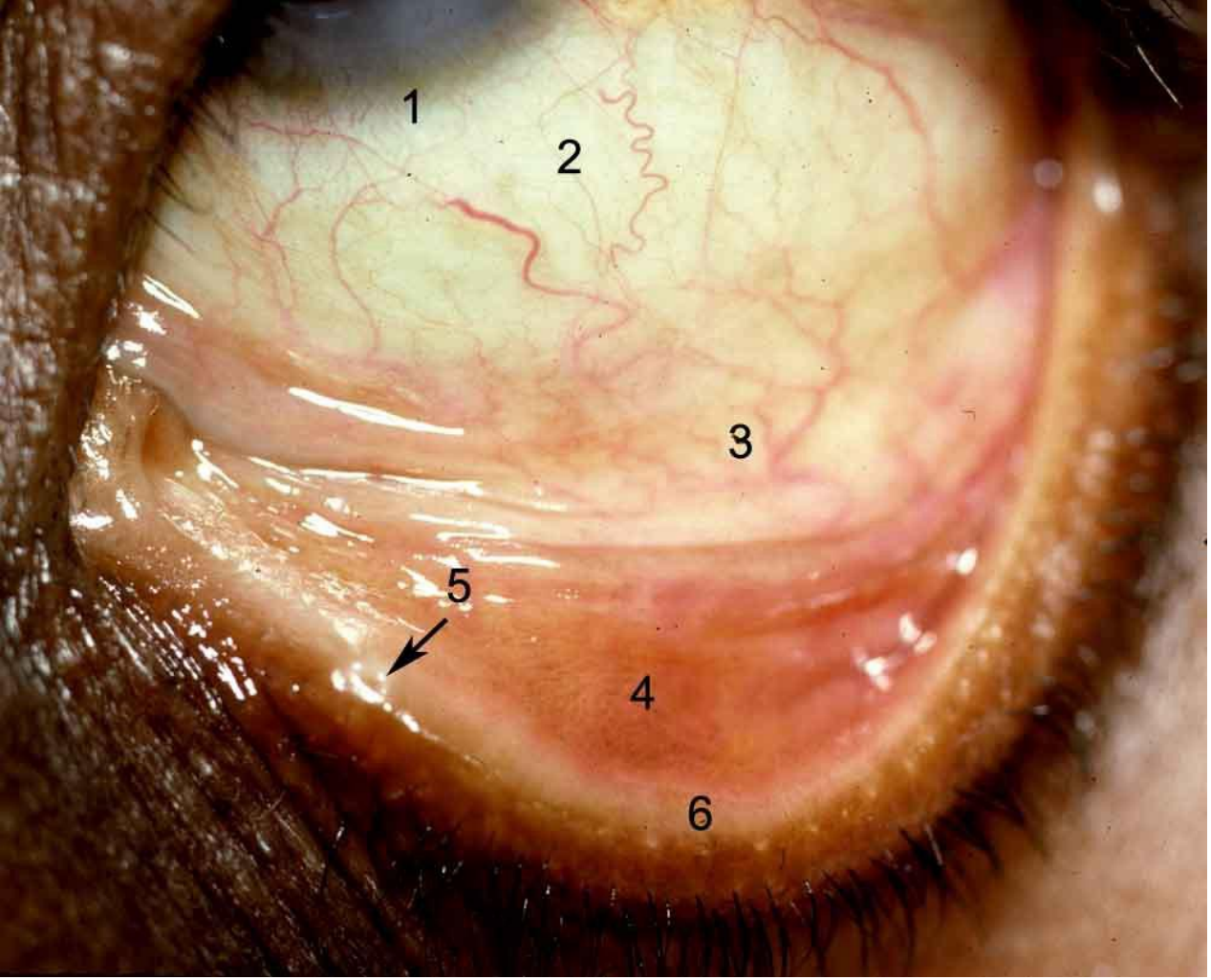
This photomicrograph from the fornix shows numerous goblet cells (7) in infoldings of conjunctiva that form the pseudoglands of Henle (8). Striated muscle (9) is seen beneath the substantia propria.


Lacrimal gland
Lacrimal sac


Superior lacrimal canal
Lacrimal gland
Excretory lacrimal duct
Lacrimal punctum
Inferior lacrimal canal
Nasolacrimal duct
Inferior nasal concha
Nasal cavity


Lacrimal gland
Gland of the
third eyelid

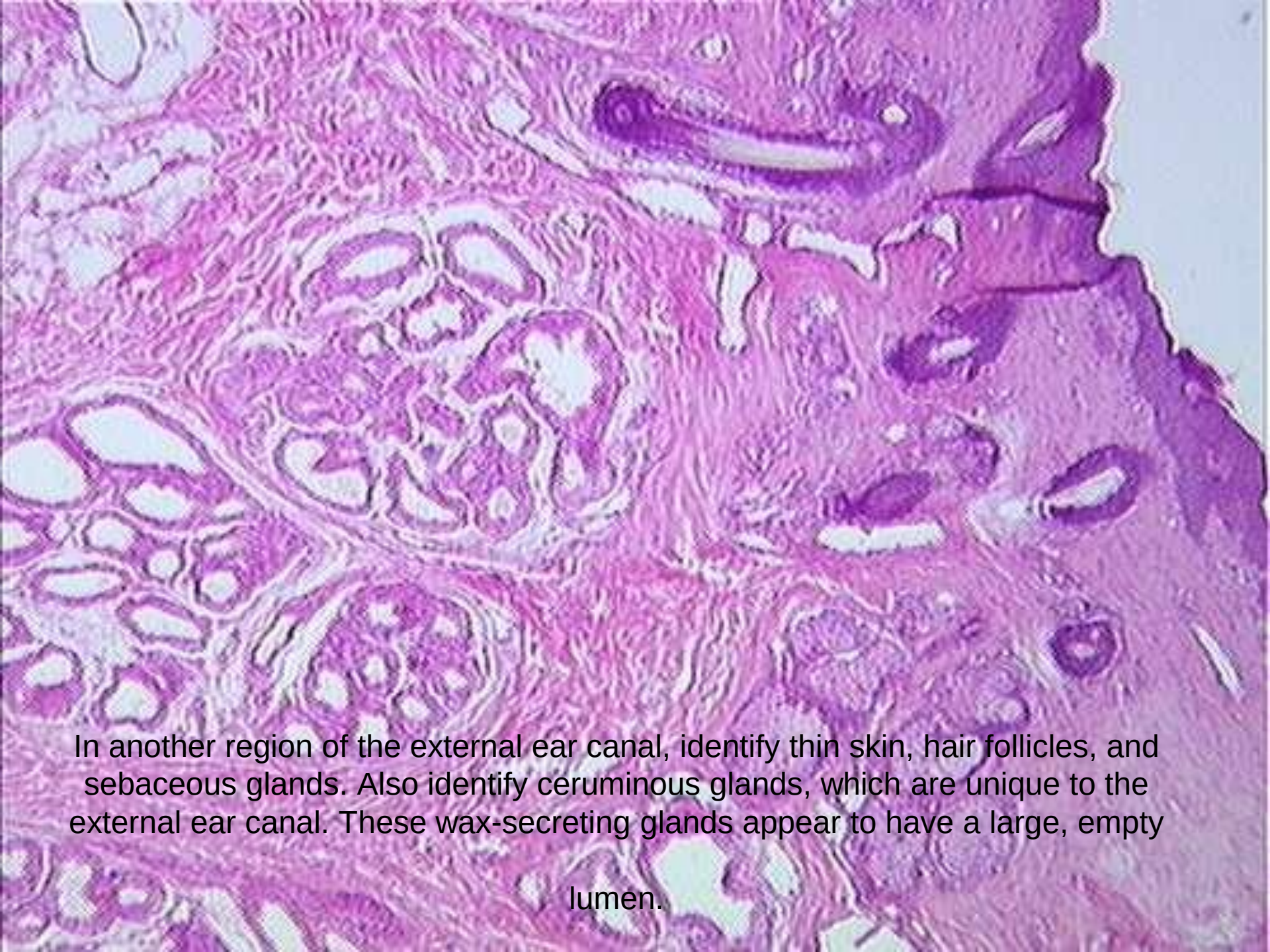

Lachrymal Gland
Ducts
Upper Eye-Lid
Puncta lacrimalia
Caruncula Lachrim.
Lachrym. Sac.
Naso-Lachrimal duct.
Lower Eye Lid
Lacrimal ducts



The limbus (1) is the junction of the conjunctiva and cornea. The bulbar conjunctiva (2) covers the eyeball and extends into the recess created by forniceal conjunctiva (3). The tarsal conjunctiva (4) covers the tarsus. The marginal conjunctiva (6) is at the eyelid margin where the epithelium will begin to be keratinized. The punctum (5) is also shown.


External
Ear Canal

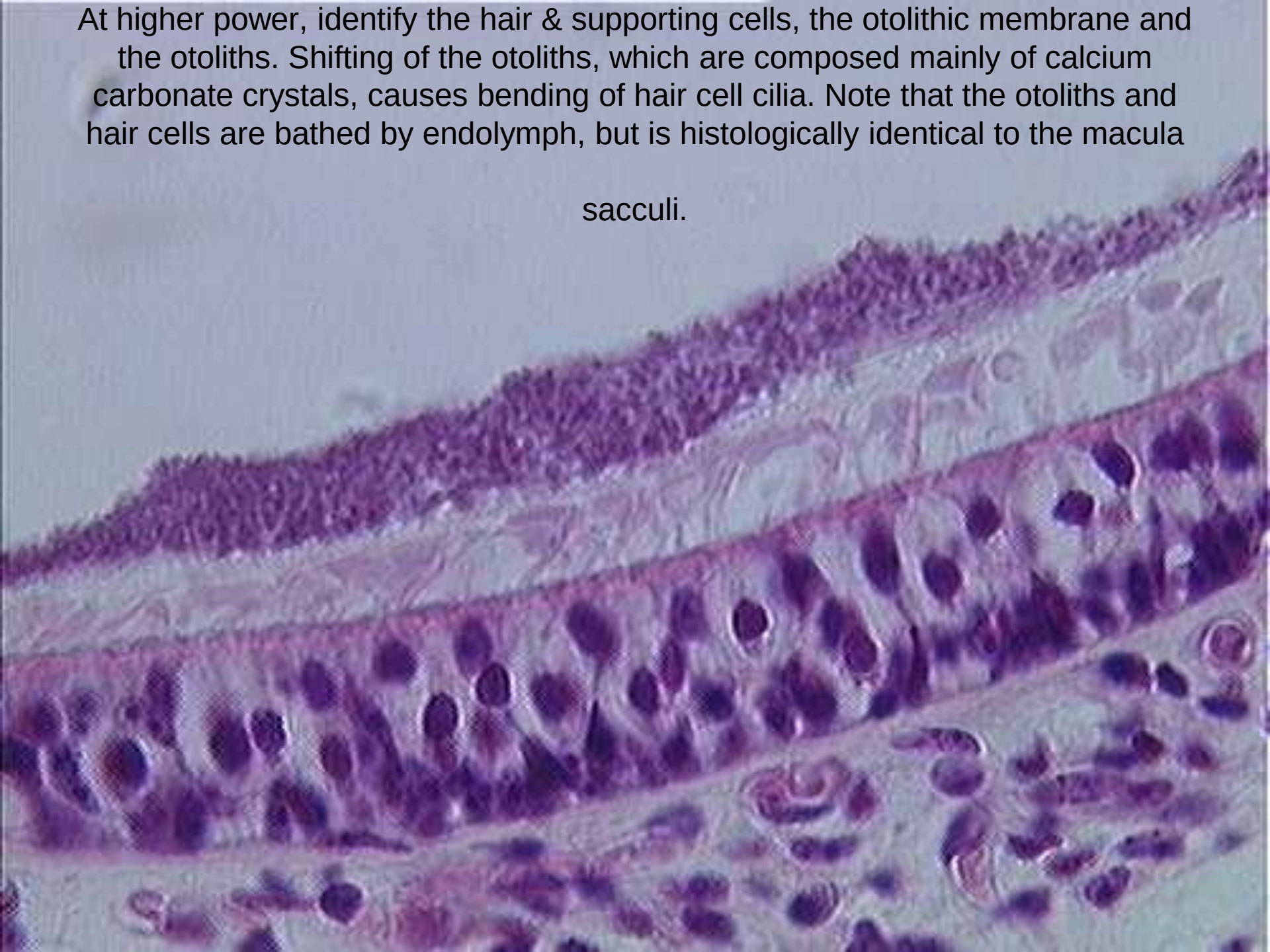
The thin skin of the external ear canal with hair follicles. Note the presence of the cartilage of the auricle

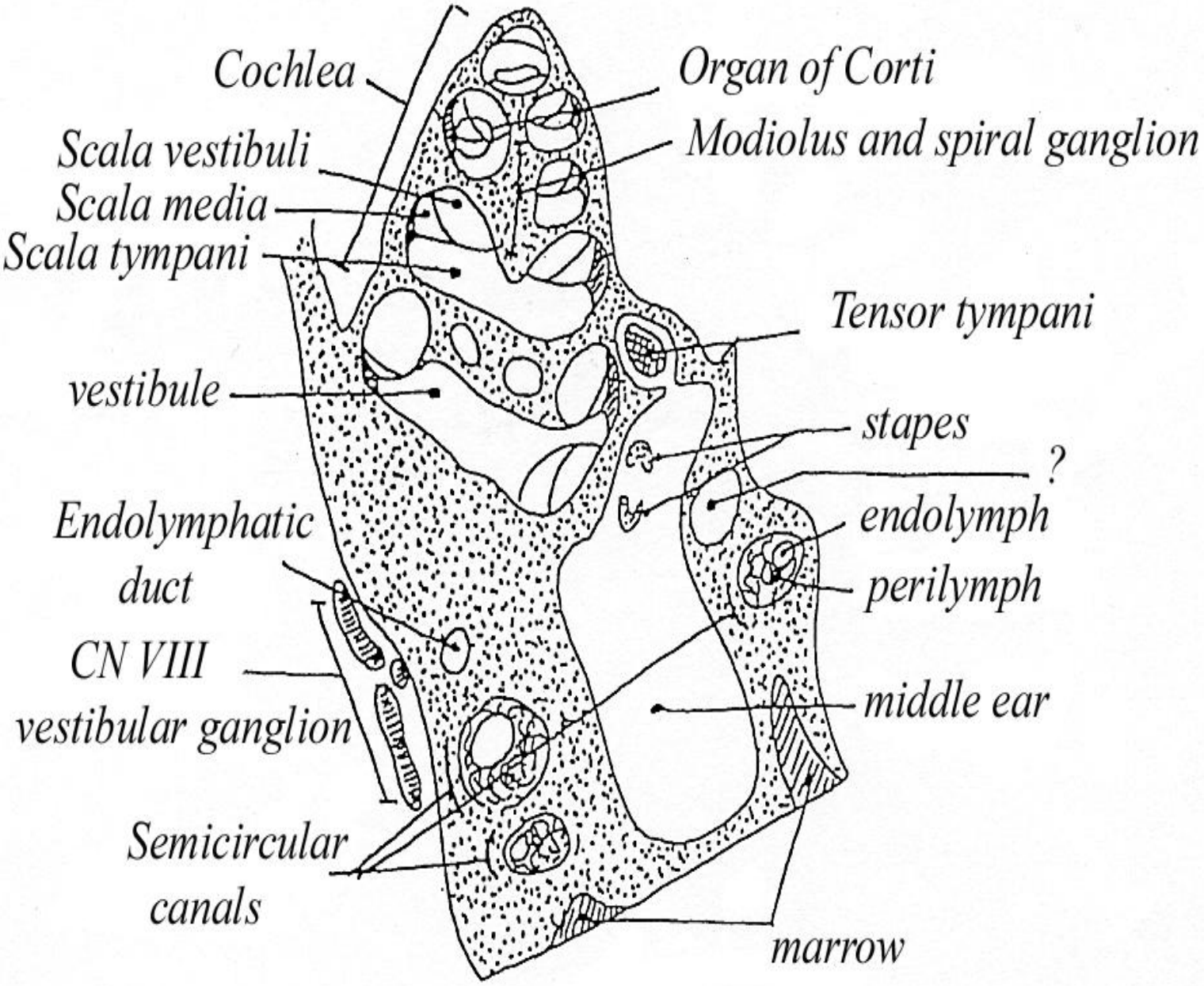


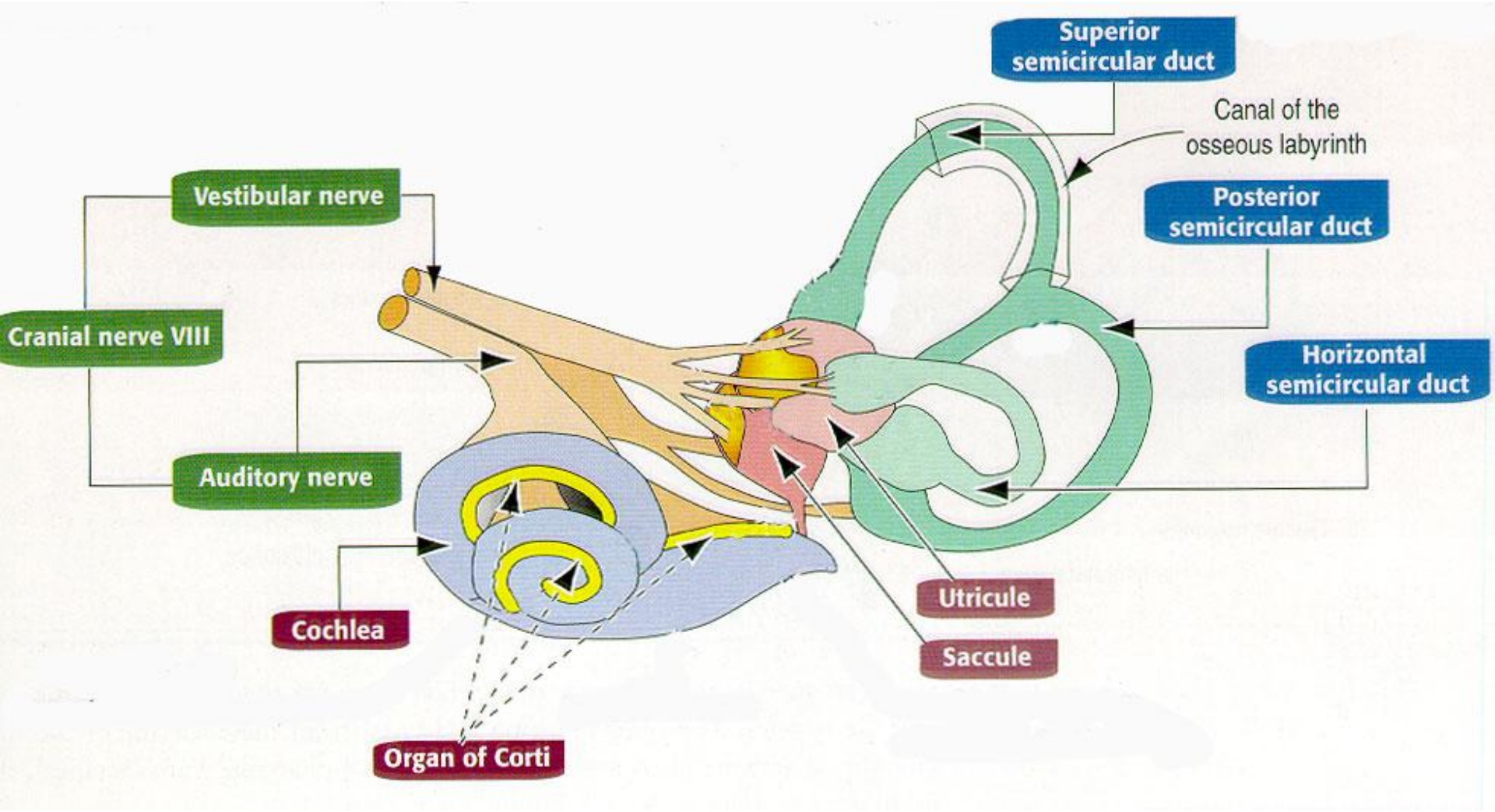
In another region of the external ear canal, identify thin skin, hair follicles, and sebaceous glands. Also identify ceruminous glands, which are unique to the external ear canal. These wax-secreting glands appear to have a large, empty lumen.

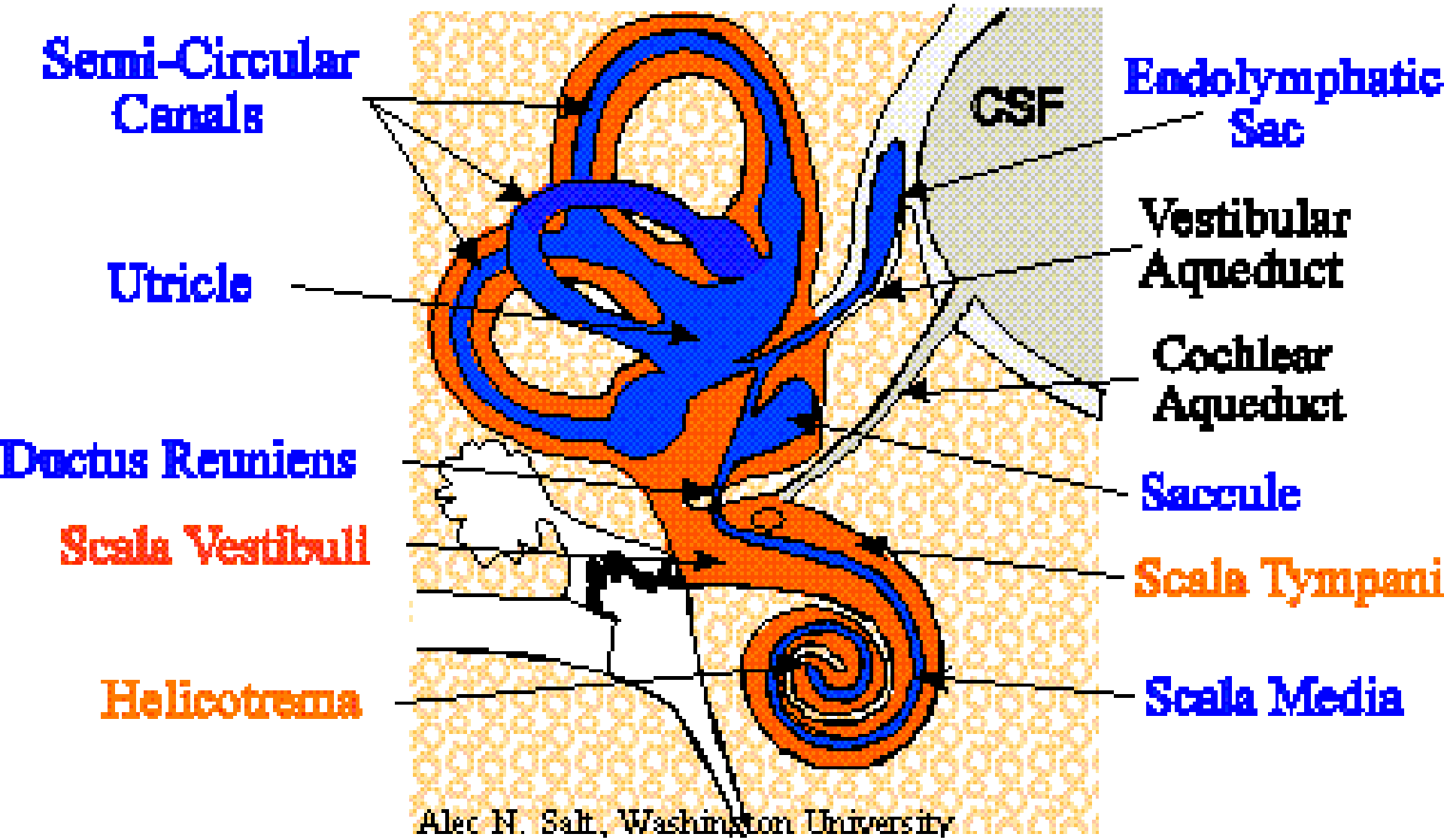
At higher power, identify the hair & supporting cells, the otolithic membrane and the otoliths. Shifting of the otoliths, which are composed mainly of calcium carbonate crystals, causes bending of hair cell cilia. Note that the otoliths and hair cells are bathed by endolymph, but is histologically identical to the macula

sacculi.

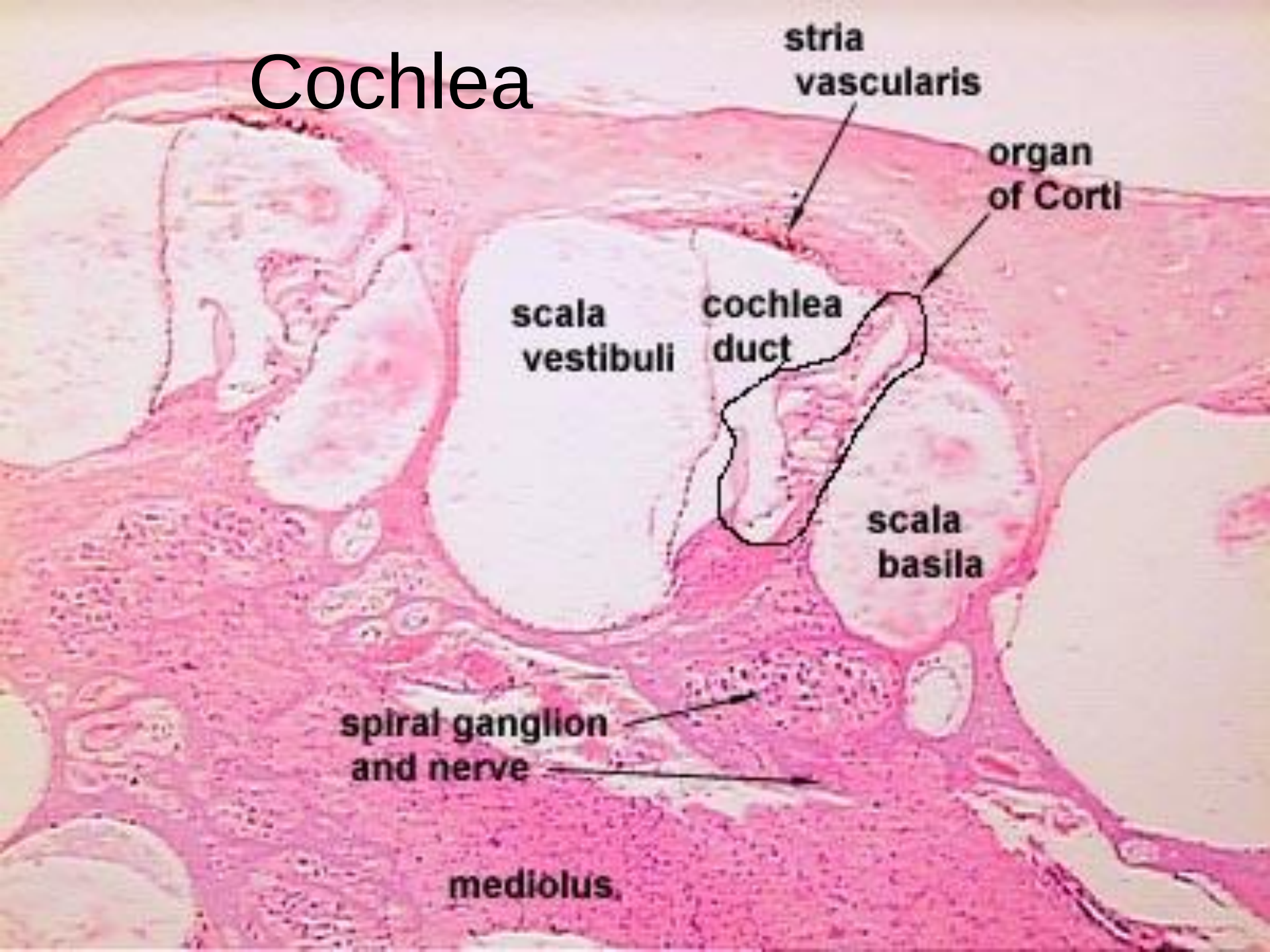


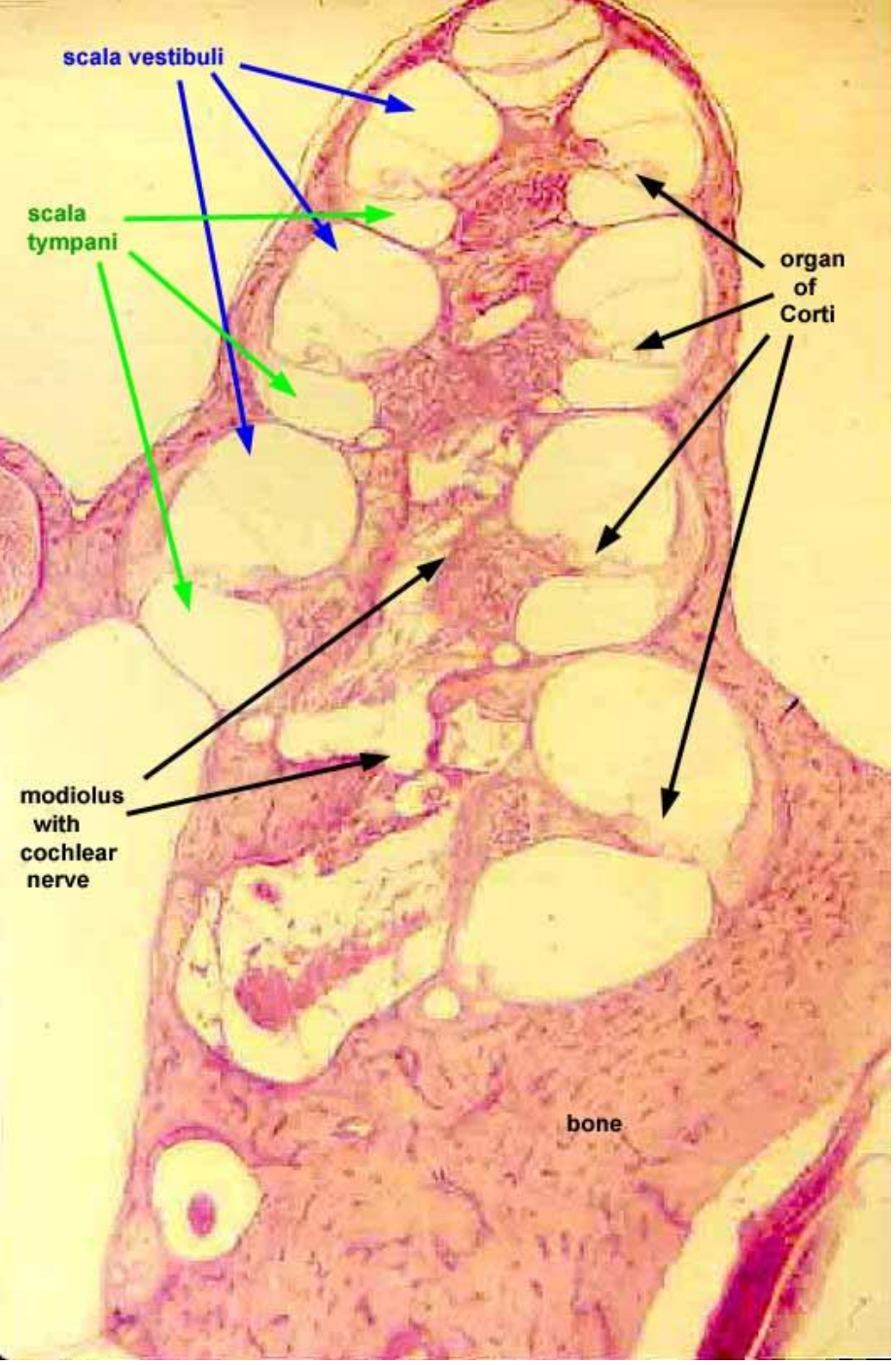

Cochlea
Organ of Corti
Scala vestibuli
Modiolus and spiral ganglion
Scala media
Scala tympani
Tensor tympani
vestibule
stapes
?
endolymph
Endolymphatic duct
perilymph
CN VIII vestibular ganglion
middle ear
Semicircular canals
marrow

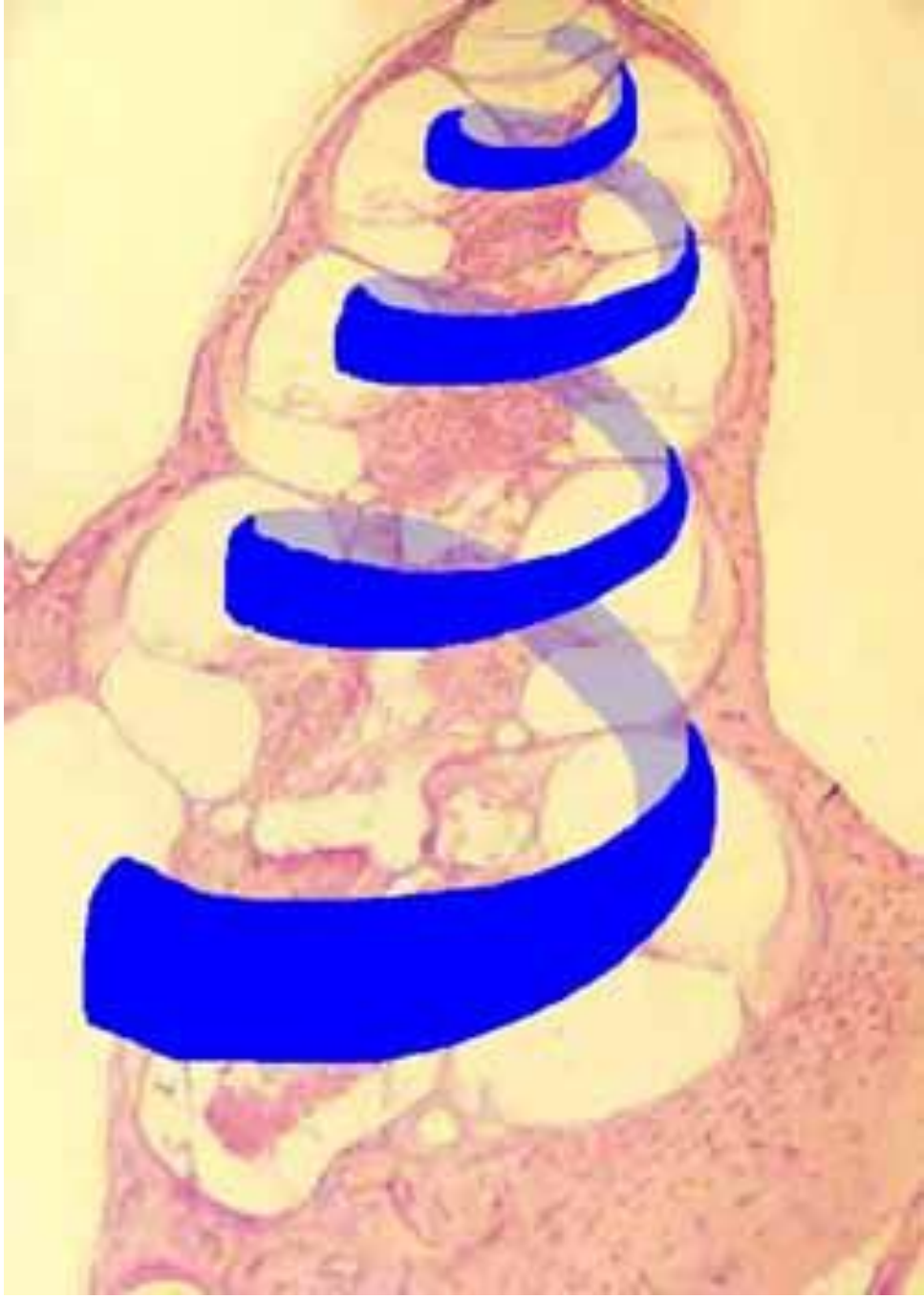

Superior semicircular duct
Canal of the osseous labyrinth
Vestibular nerve
Posterior semicircular duct
Cranial nerve VIII
Horizontal semicircular duct
Auditory nerve
Utricule
Cochlea
Saccule
Organ of Corti


Semi-Circular Canals
Utricle
Ductus Reuniens
Scala Vestibuli
Helicotrema
CSF
Endolymphatic Sac
Vestibular Aqueduct
Cochlear Aqueduct
Saccule
Scala Tympani
Scala Media
Alec N. Salt, Washington University

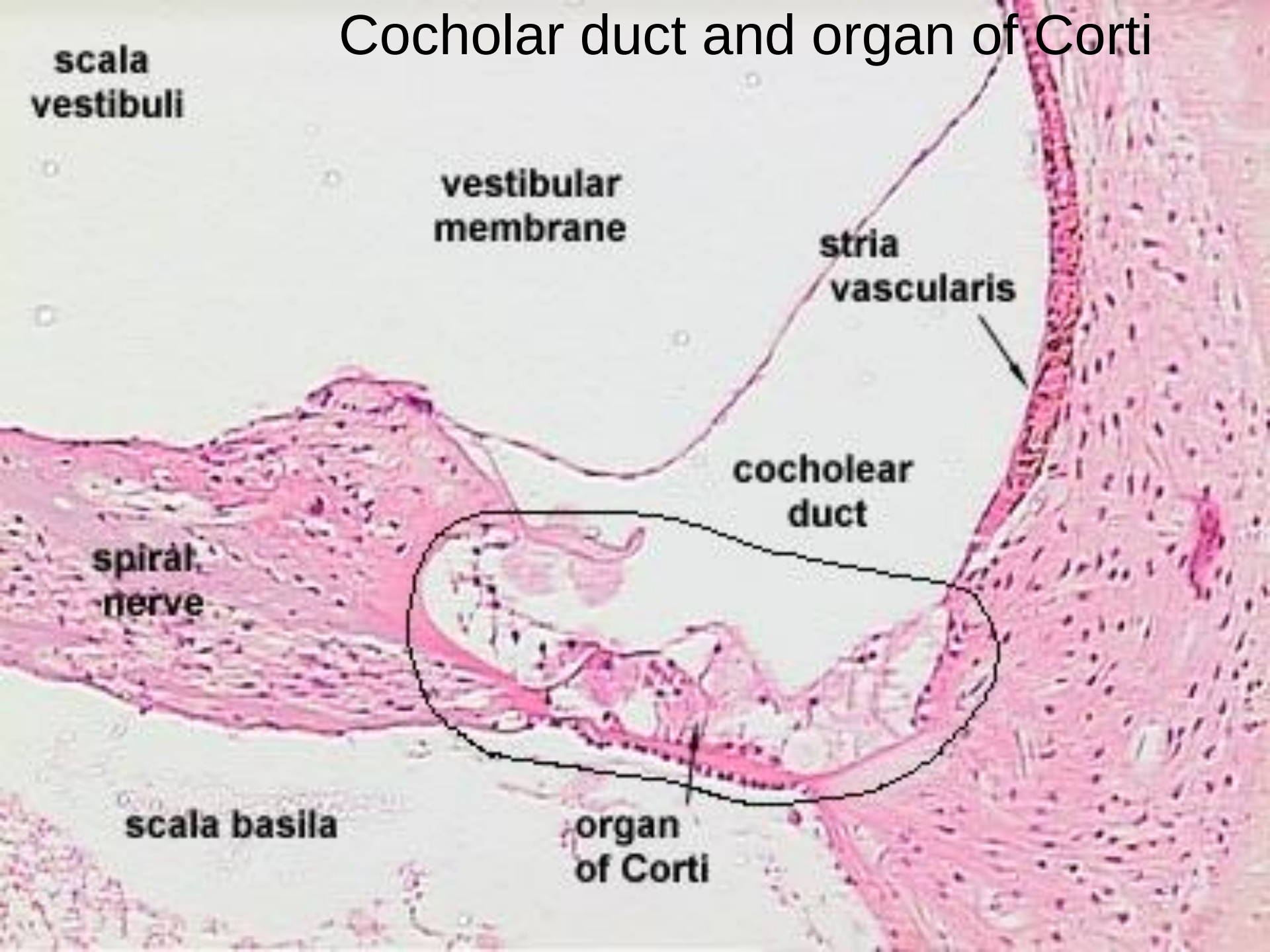
Cochlea


stria
vascularis
organ
of Corti
scala
vestibuli
cochlea
duct
scala
basila
spiral ganglion
and nerve
mediolus

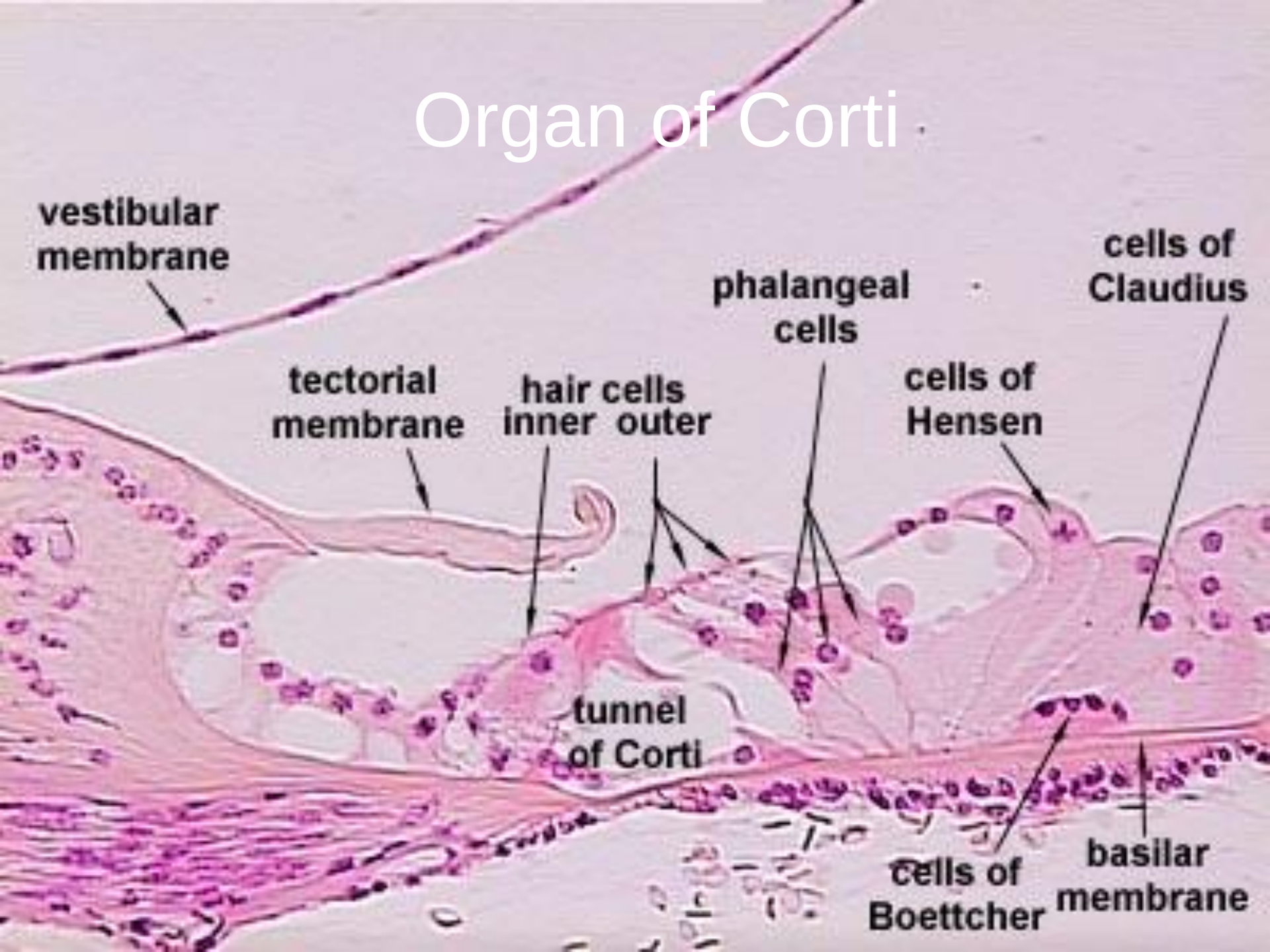

scala vestibuli
scala tympani
organ of Corti
modiolus with cochlear nerve
bone

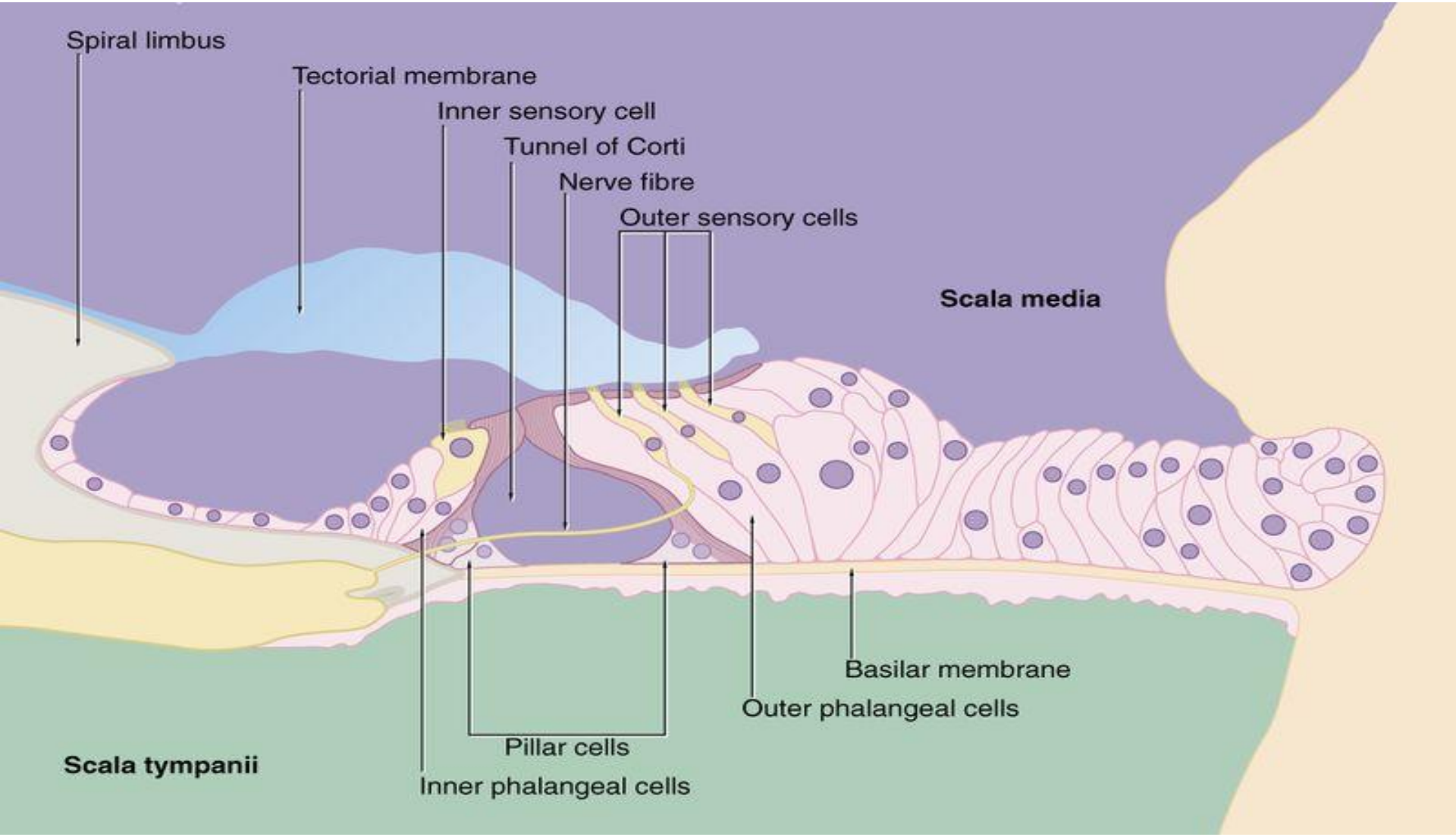


Cocholar duct and organ of Corti

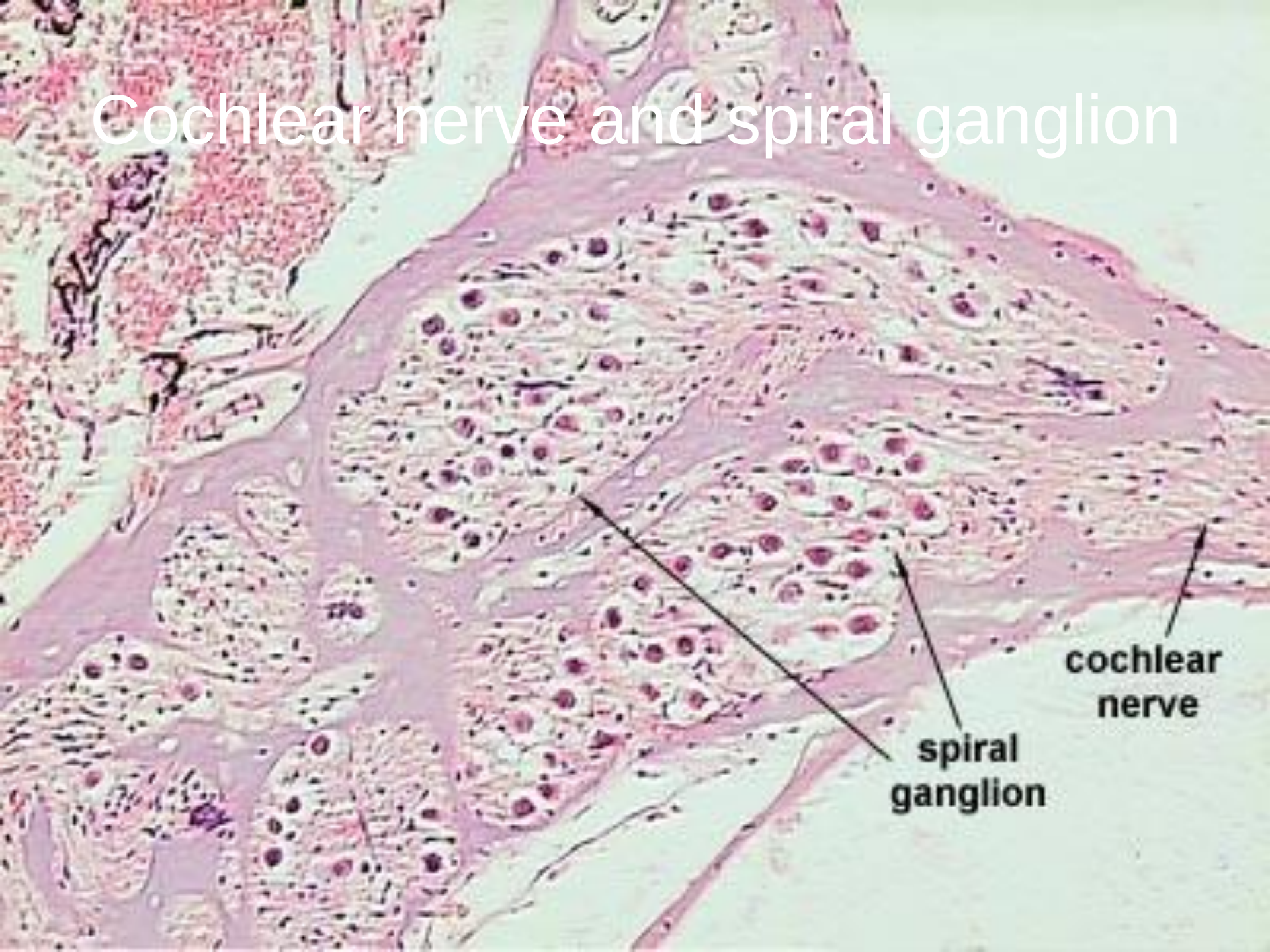


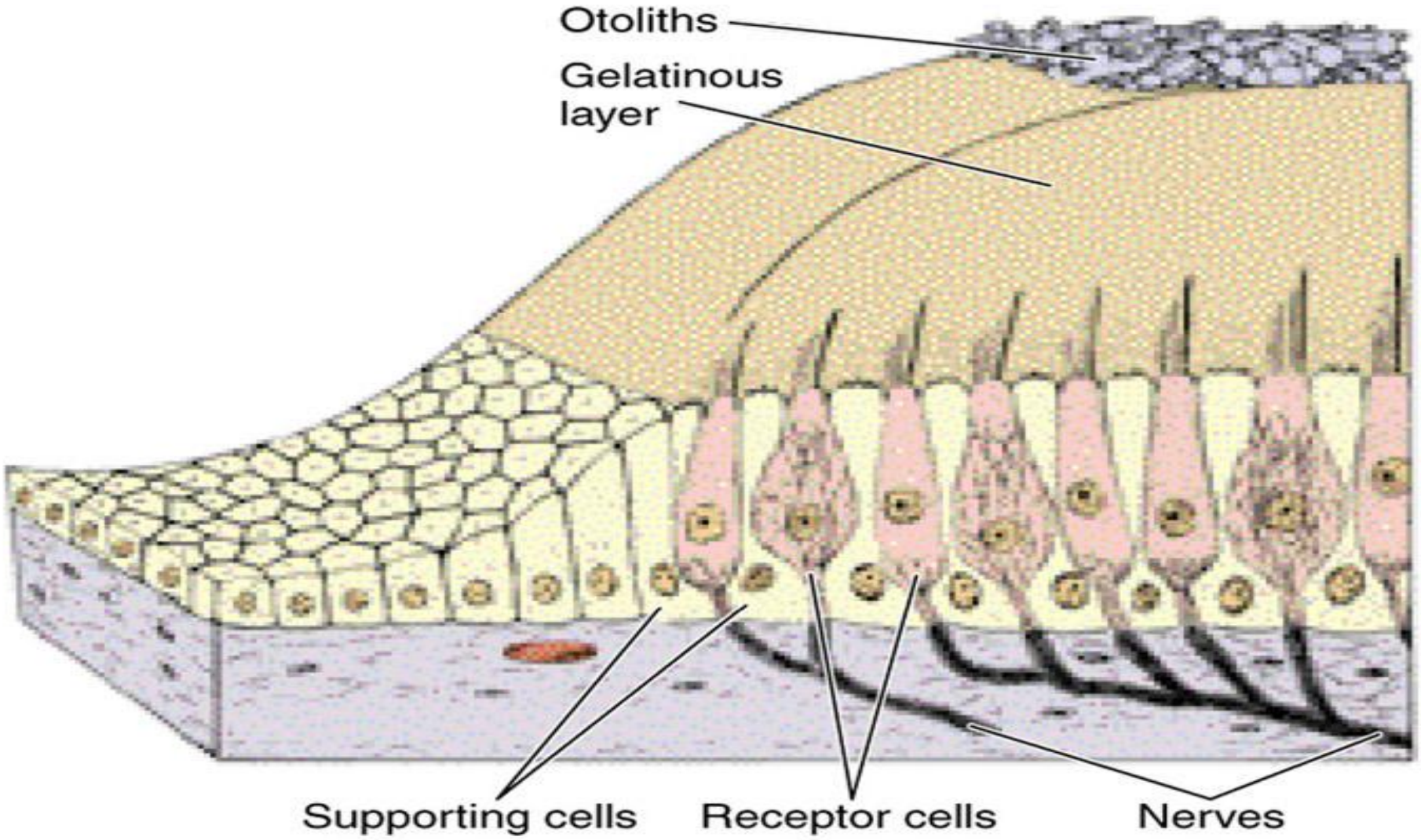
Organ of Corti



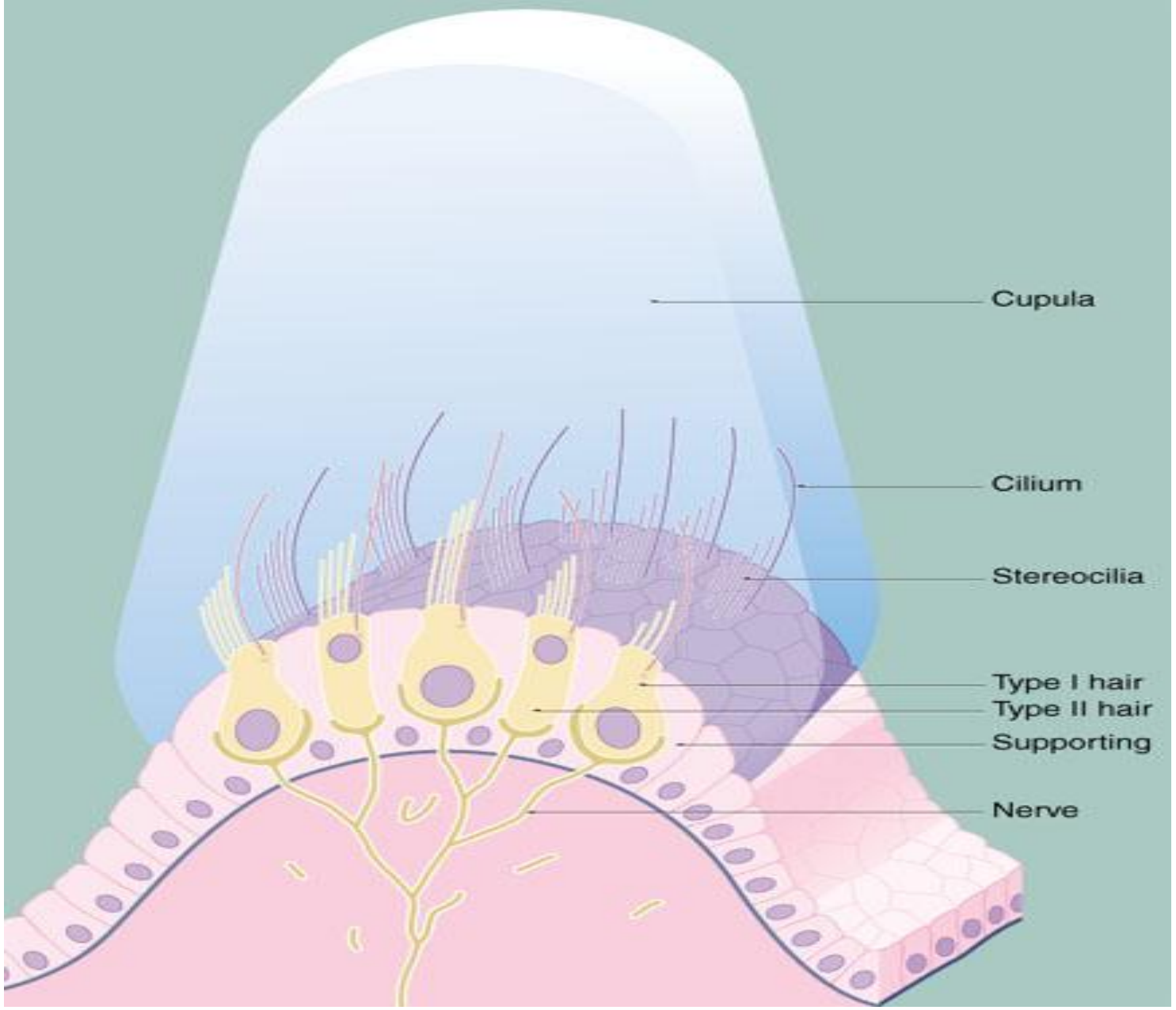

Spiral limbus
Tectorial membrane
Inner sensory cell
Tunnel of Corti
Nerve fibre
Outer sensory cells
Scala media
Basilar membrane
Outer phalangeal cells
Pillar cells
Scala tympanii
Inner phalangeal cells

Cochlear nerve and spiral ganglion




Otoliths
Gelatinous layer
Supporting cells
Receptor cells
Nerves

Maculae



Crista Ampullaris

KAYNAK LİSTESİ

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2. Temel Histoloji (Ed. Aytekin Özer, 2011)
3. Genel Histoloji (Mahmut Sağlam, R.Nuri Aştı, Aytekin Özer 2001)
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5. Histoloji (Ercan Artan 1988)
6. Textbook of Histology (Leeson Leeson Paparo 1981)
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10. Moleculer Biology of the Cell (Bruce Alberts, Denis Brg, Julian Lewis, Martin Reff, Keith Roberts, James D. Welson 1989)
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13. A Brief Atlas of Histology (Thomas leeson, C. Roland Leeson 1979)
14. Oral Histology: Development, Structure and Function (Ten Kate, Arnold Richard 1980)
15. Bloom and Fawcett a Textbook of Histology (Fawcett, Don W 1986)