

EYE AND EAR

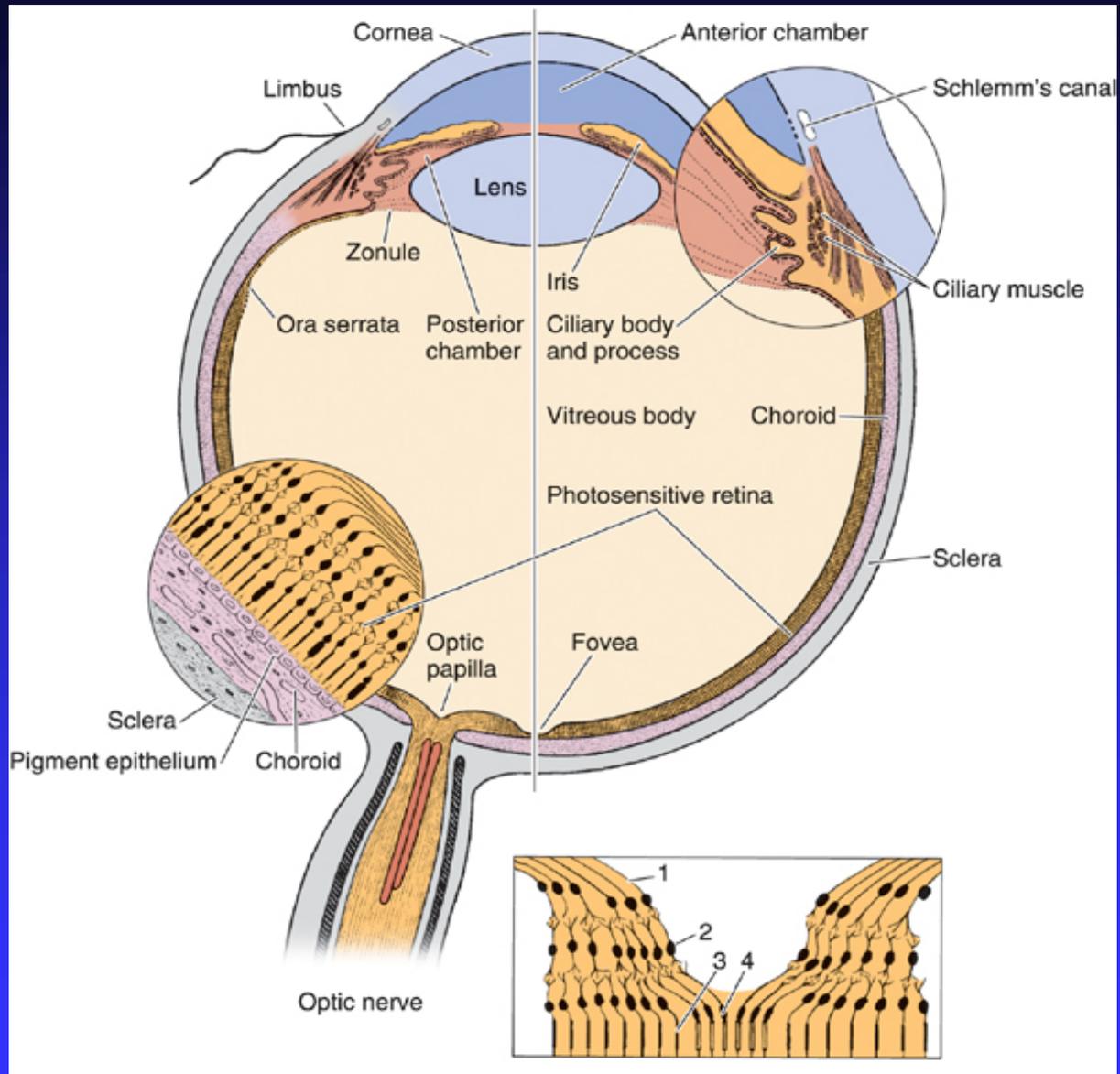
Dept. of Histology and Embryology

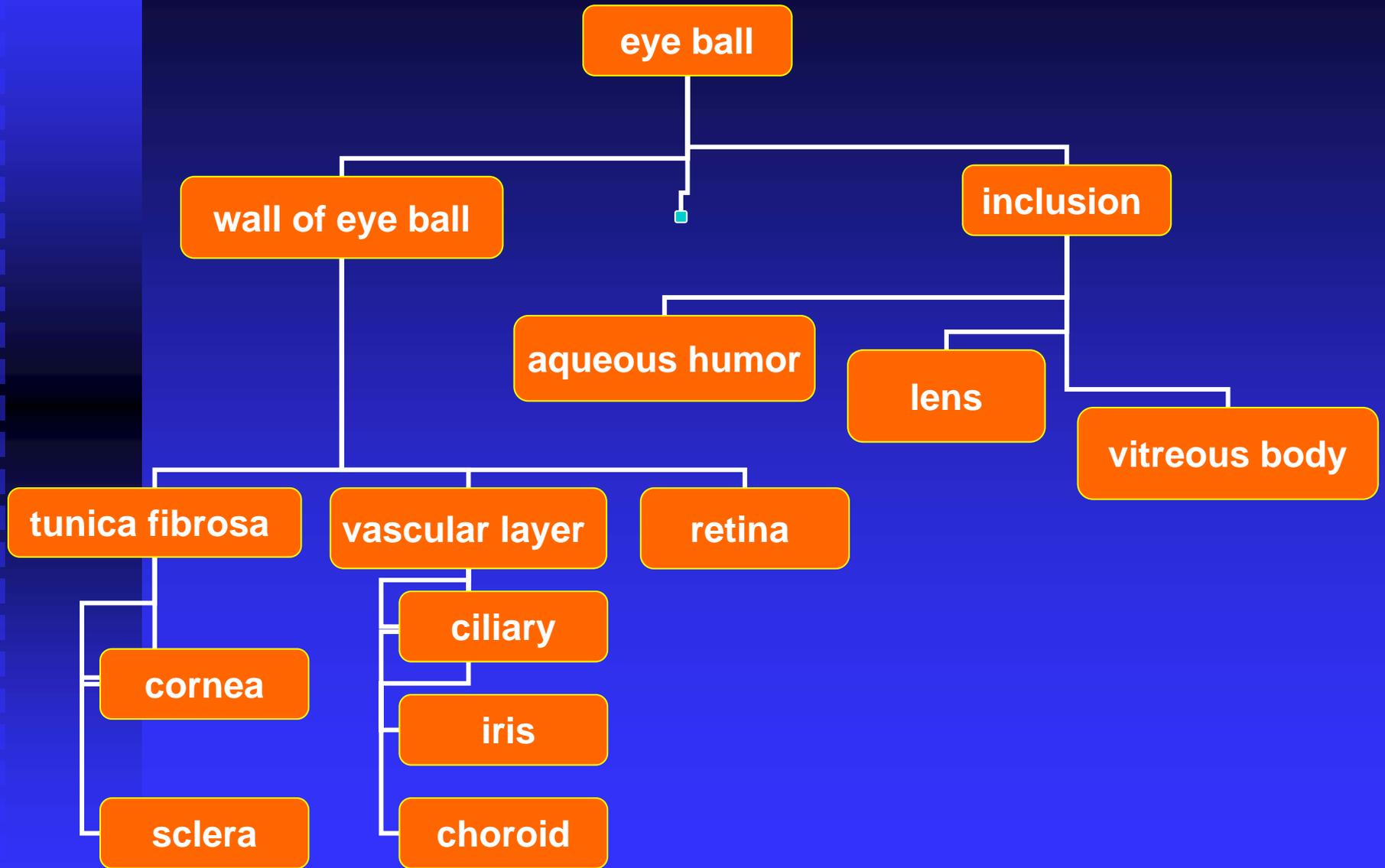
周 莉

1. Eye

- Including eye balls and accessory structure of the eye

Eye balls consist of wall of eye balls and inclusion





I . Wall of eye balls

1. Cornea

(1) corneal epithelium:

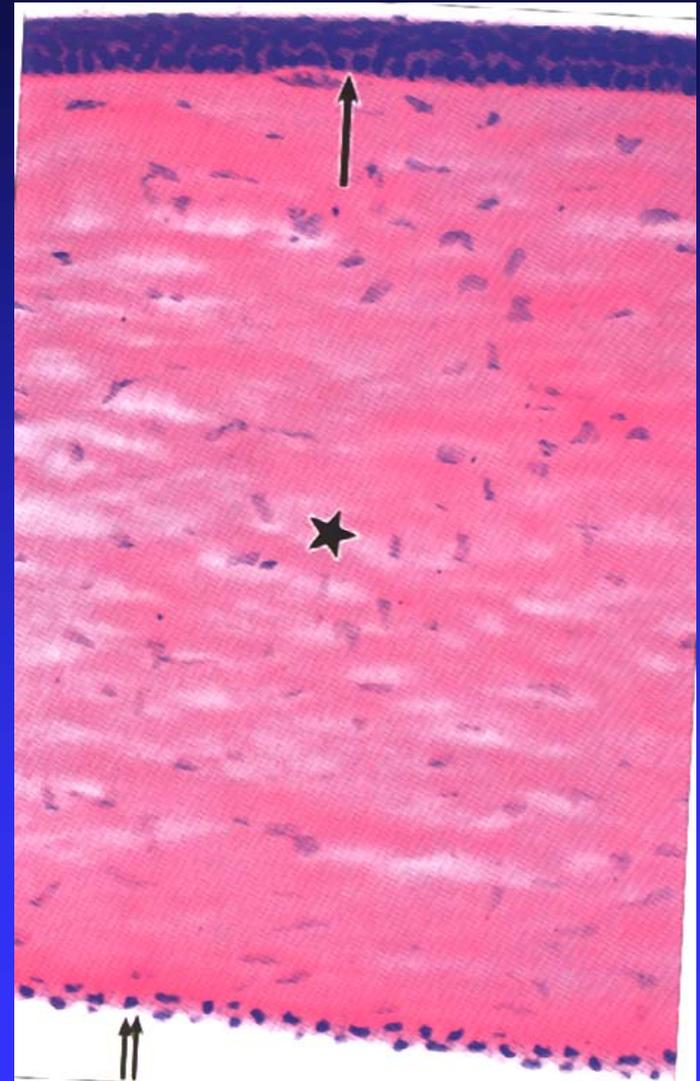
(2) anterior limiting lamina:

(3) corneal stroma:

(4) posterior limiting lamina:

(5) corneal endothelium:

What is cause of maintaining the transparency of the cornea?



2. Sclera

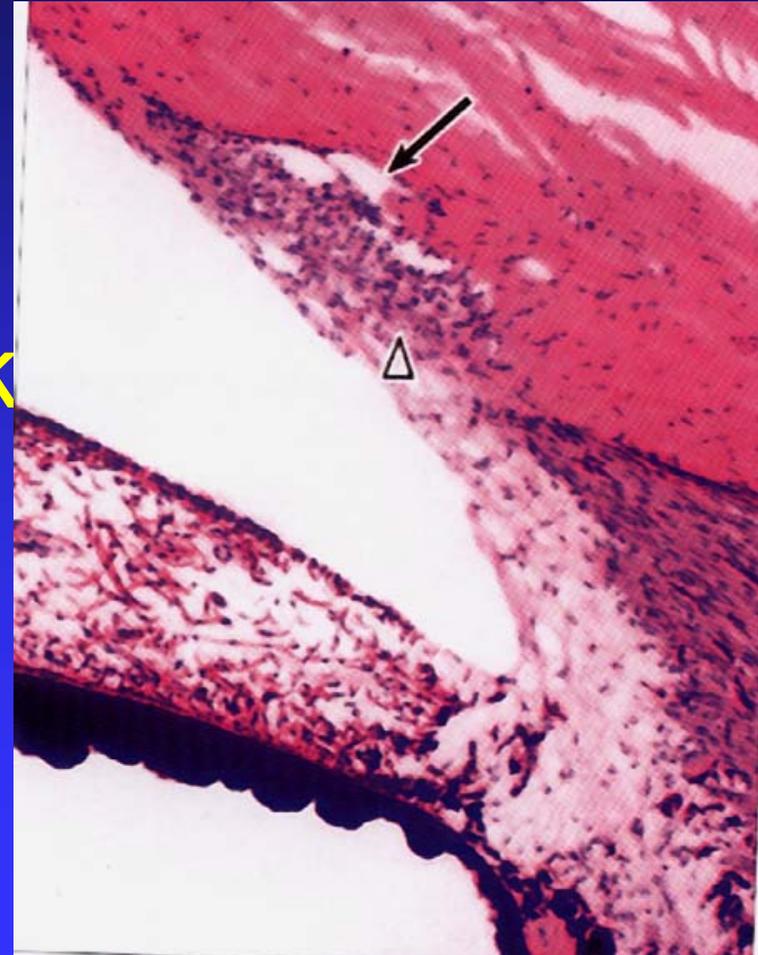
Dense connective tissue

Corneal limbus

Sinus venosus

Trabecular meshwork

Scleral spur



3. Iris

pupil

Iris is mainly composed of LCT with abundant vessel and pigmental cells

(1) anterior border layer:

(2) iris stroma:

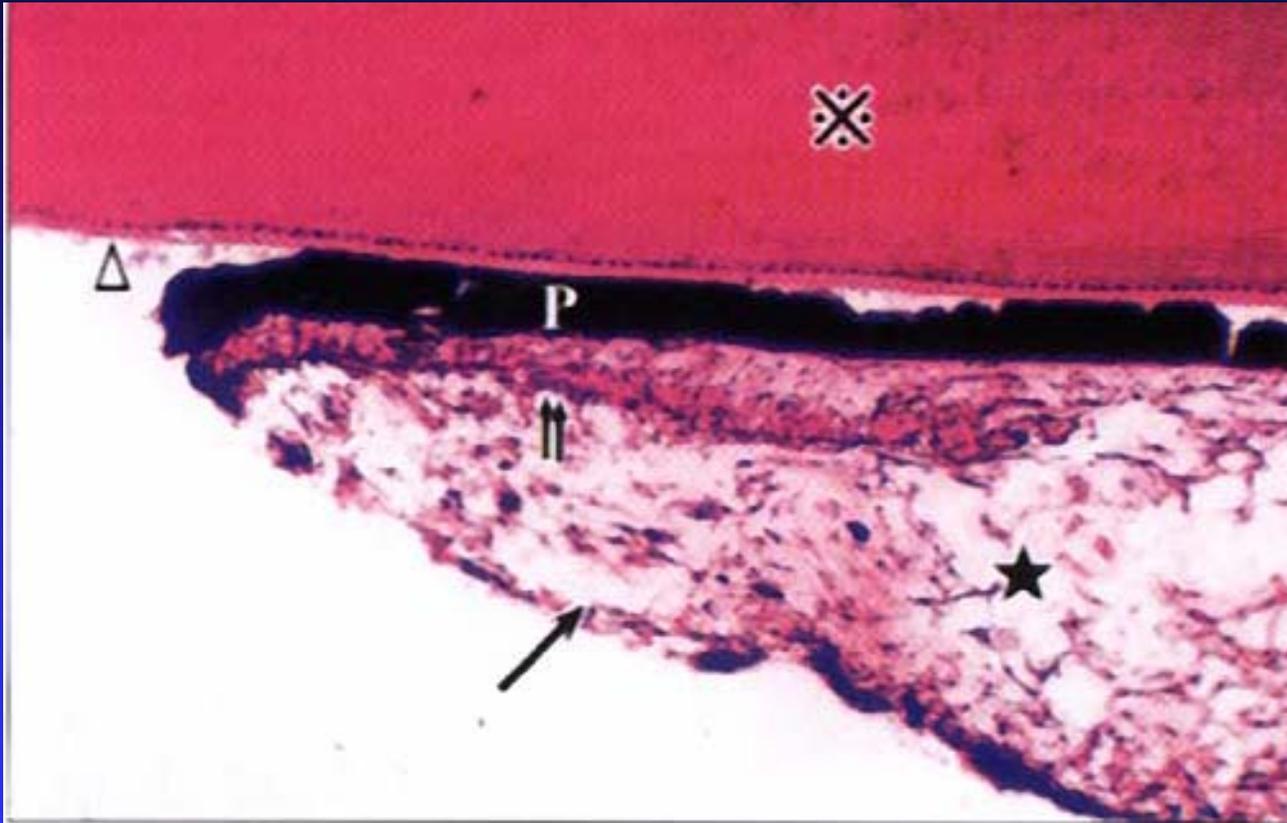
(3) iris epithelium:

① anterior epithelium

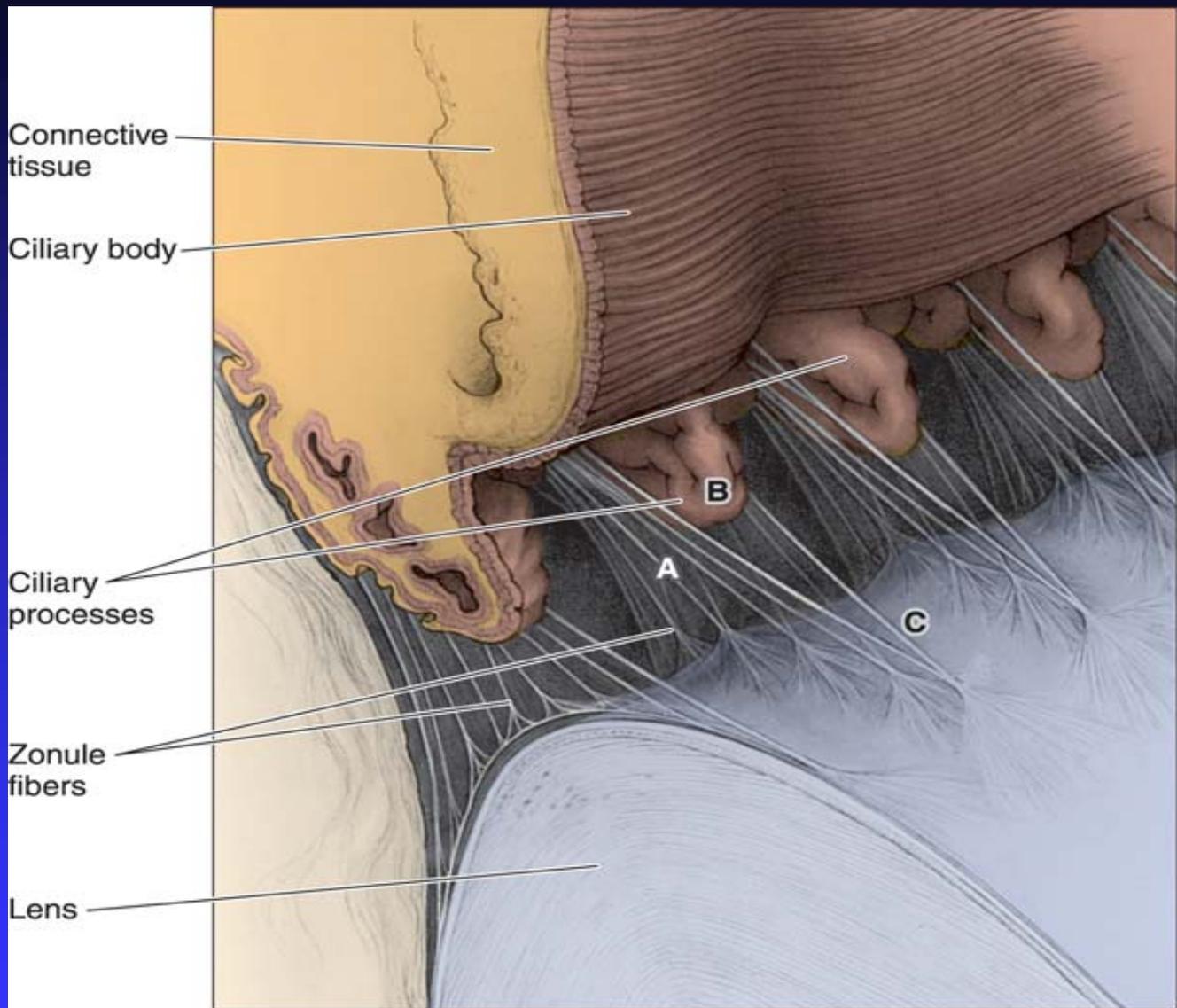
sphincter pupillae muscle,

dilator pupillae muscle

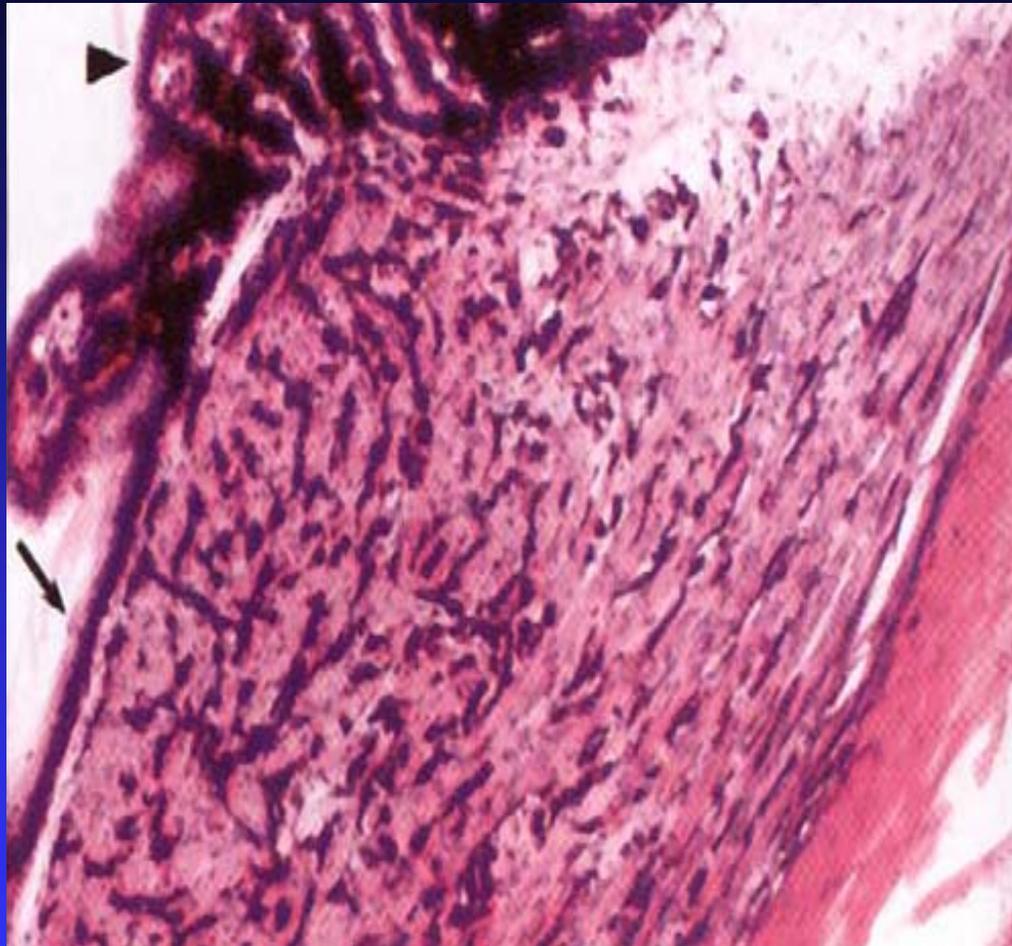
② posterior epithelium :



Iris



Ciliary body



Ciliary body in LM

5. Choroid

loose connective tissue with abundant blood vessel and pigment cells

6. Retina: high differentiation nervous tissue

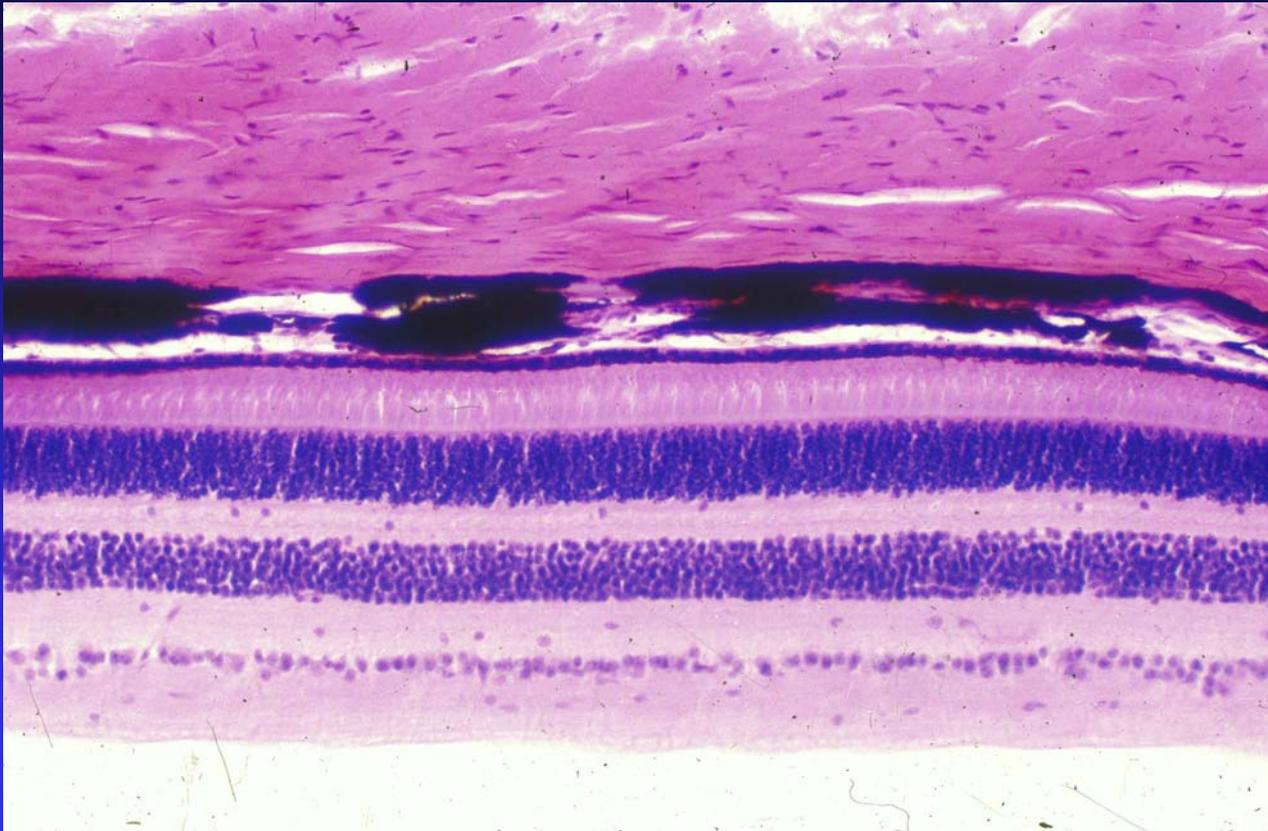
4 layers of cells:

(1) Pigment epithelium

(2) Visual cells

(3) Bipolar cells

(4) Ganglion cells



posterior portion of eye ball

Interneuron and glial cells

(1) pigment epithelium:

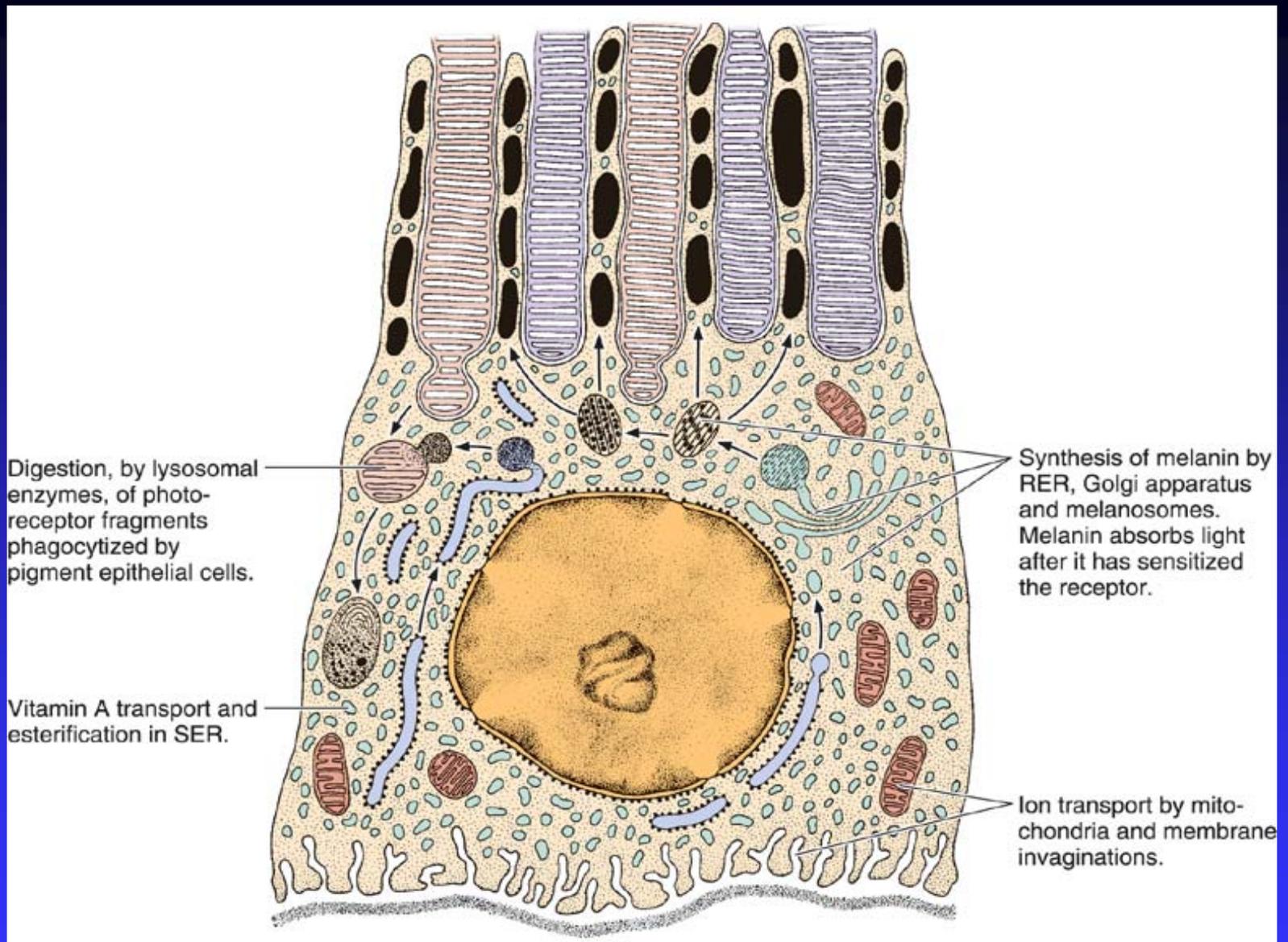
LM:

EM:

Function:

(2) Visual cell:

**bipolar neuron, the rod and the
cones, inner segment and outer
segment**



Pigment epithelia cell

EM: inner segment:

mitochondria RER

Golgi complex

outer segment:

membranous disk

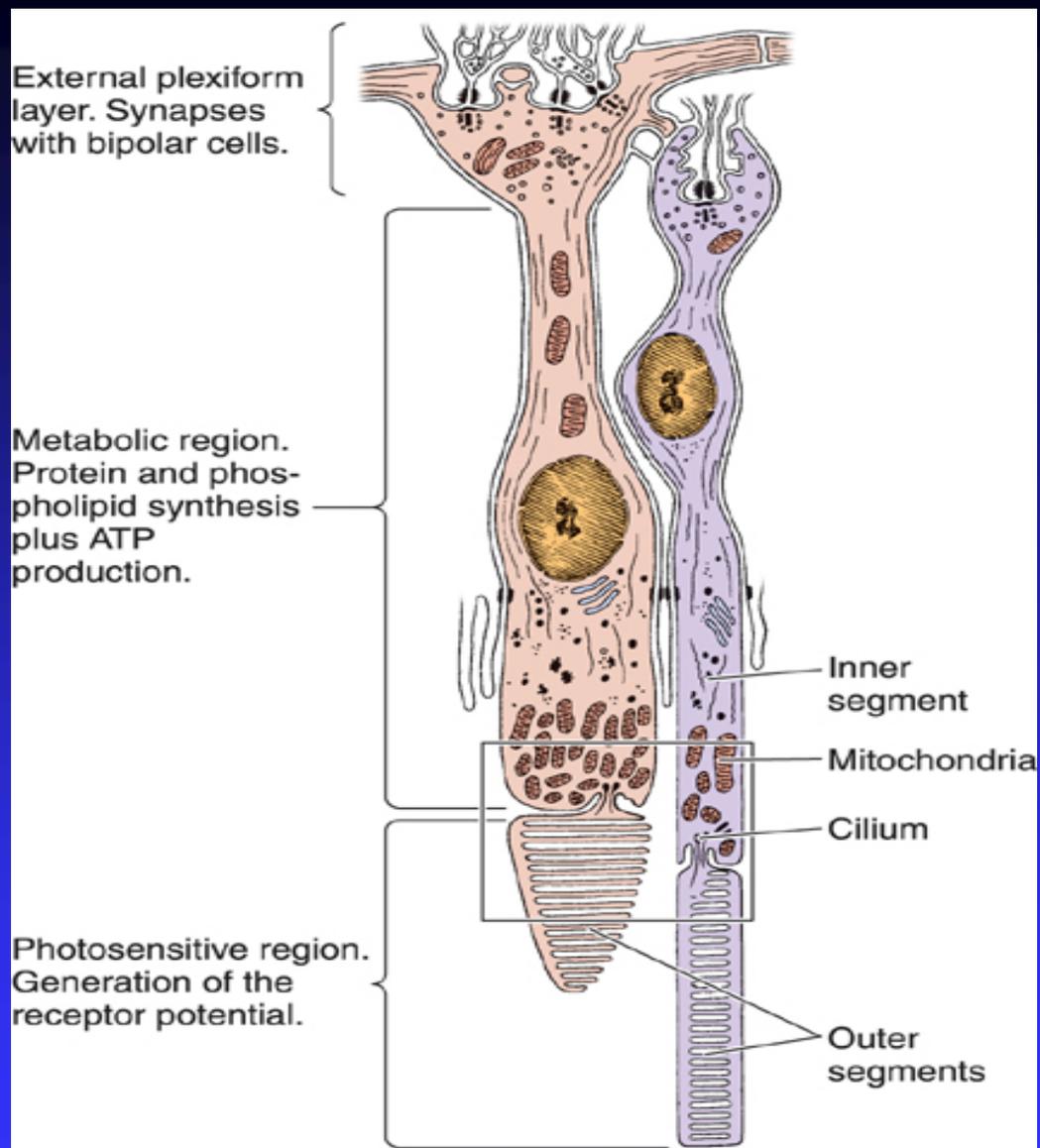
Rod cells: rhodopsin Vitamine A

(11-cisretinal and opsin)

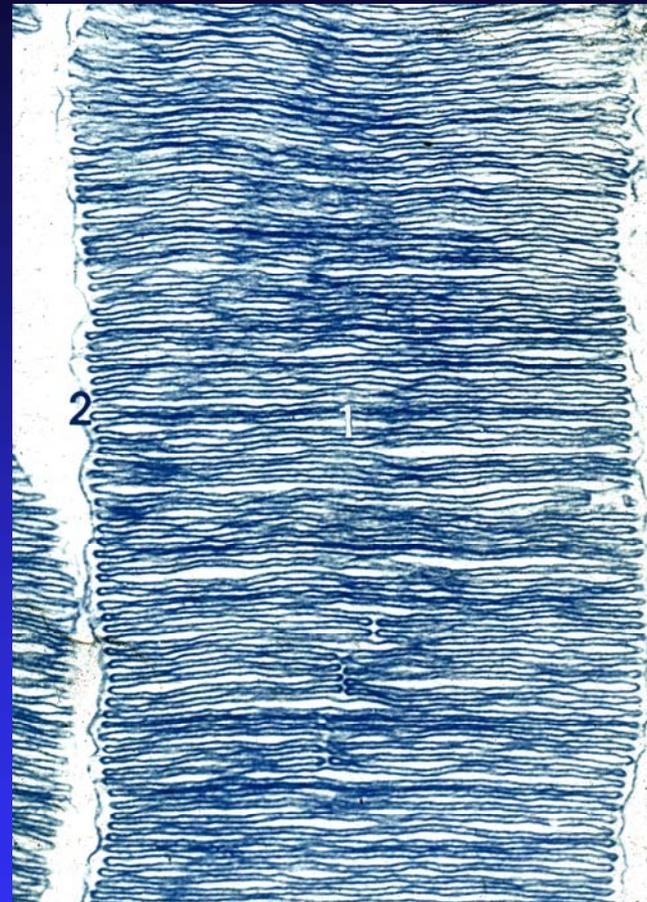
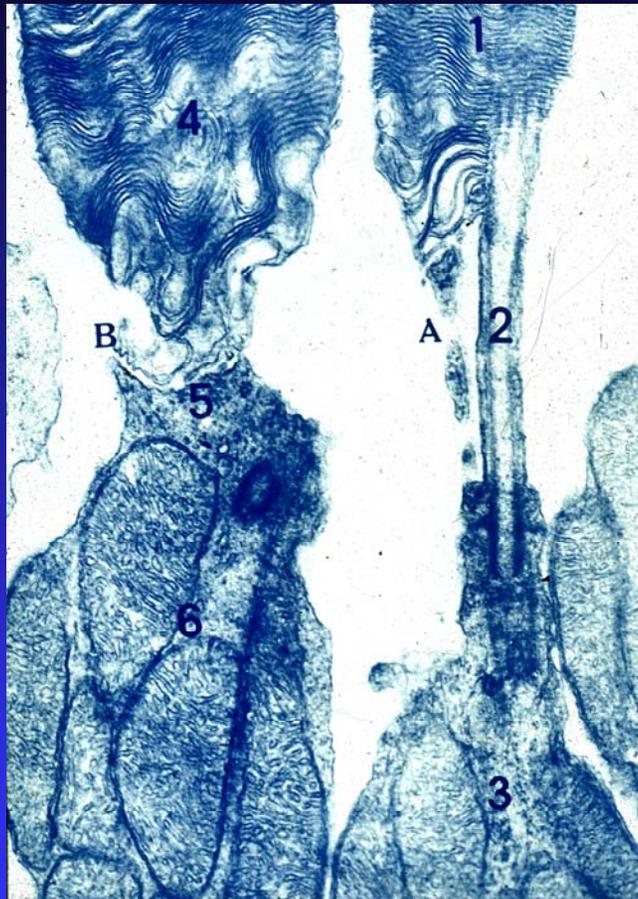
Function: Rod cells are sensitive to low levels of light, such as at dusk or nighttime.

Cone cells:

membranous disk-visual pigment
its maximum sensitivity is in the
red, green, or blue region of the
visible spectrum. Cones, sensitive
only to light of a higher intensity

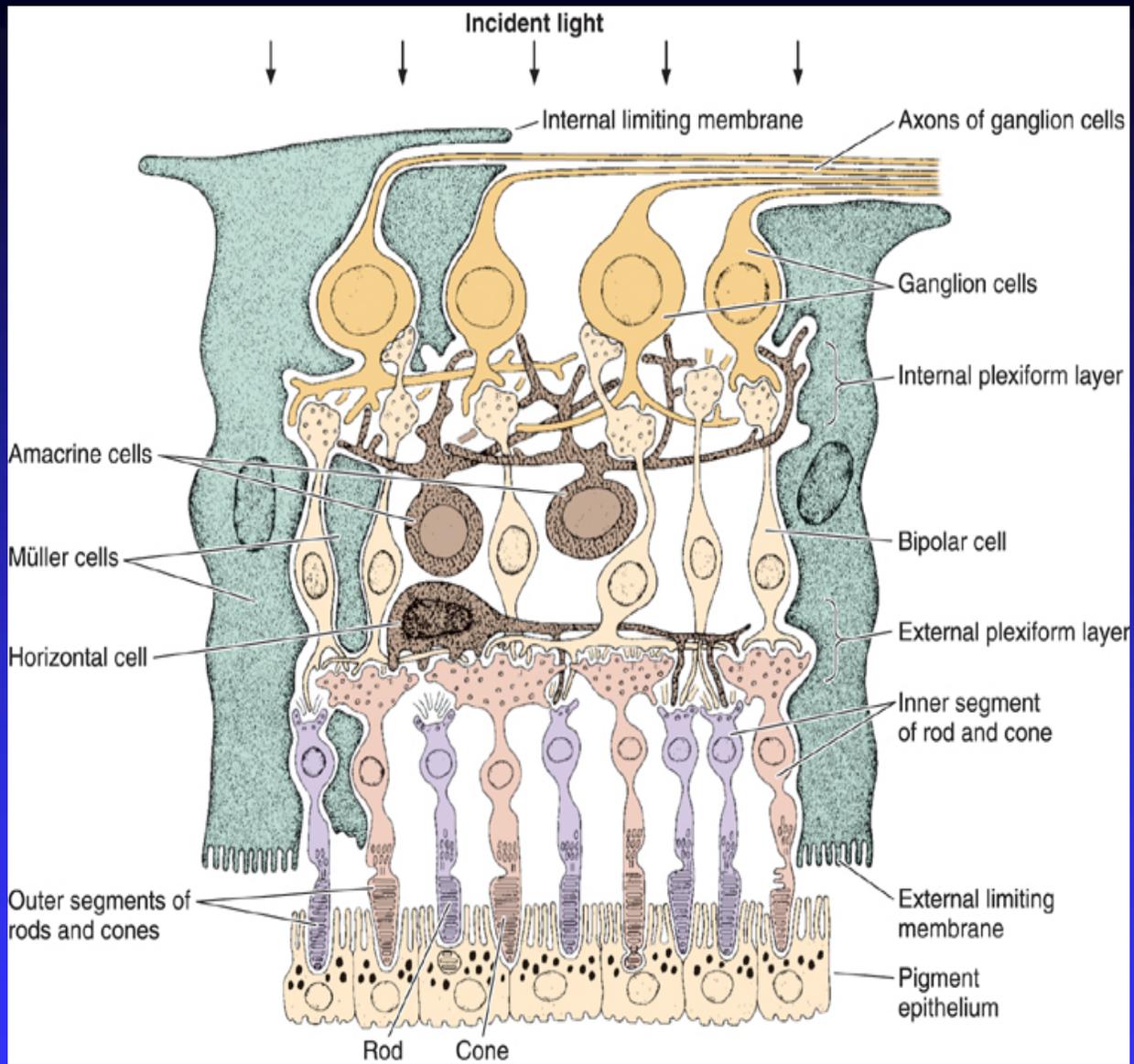


Rod cell and cone cell



membranous disc

- (3) Bipolar cells:
- (4) Ganglion cells:
- (5) Horizontal cells
amacrine cells
interplexiform cells
- (6) radial neuroglia cells
so called Müller cells:



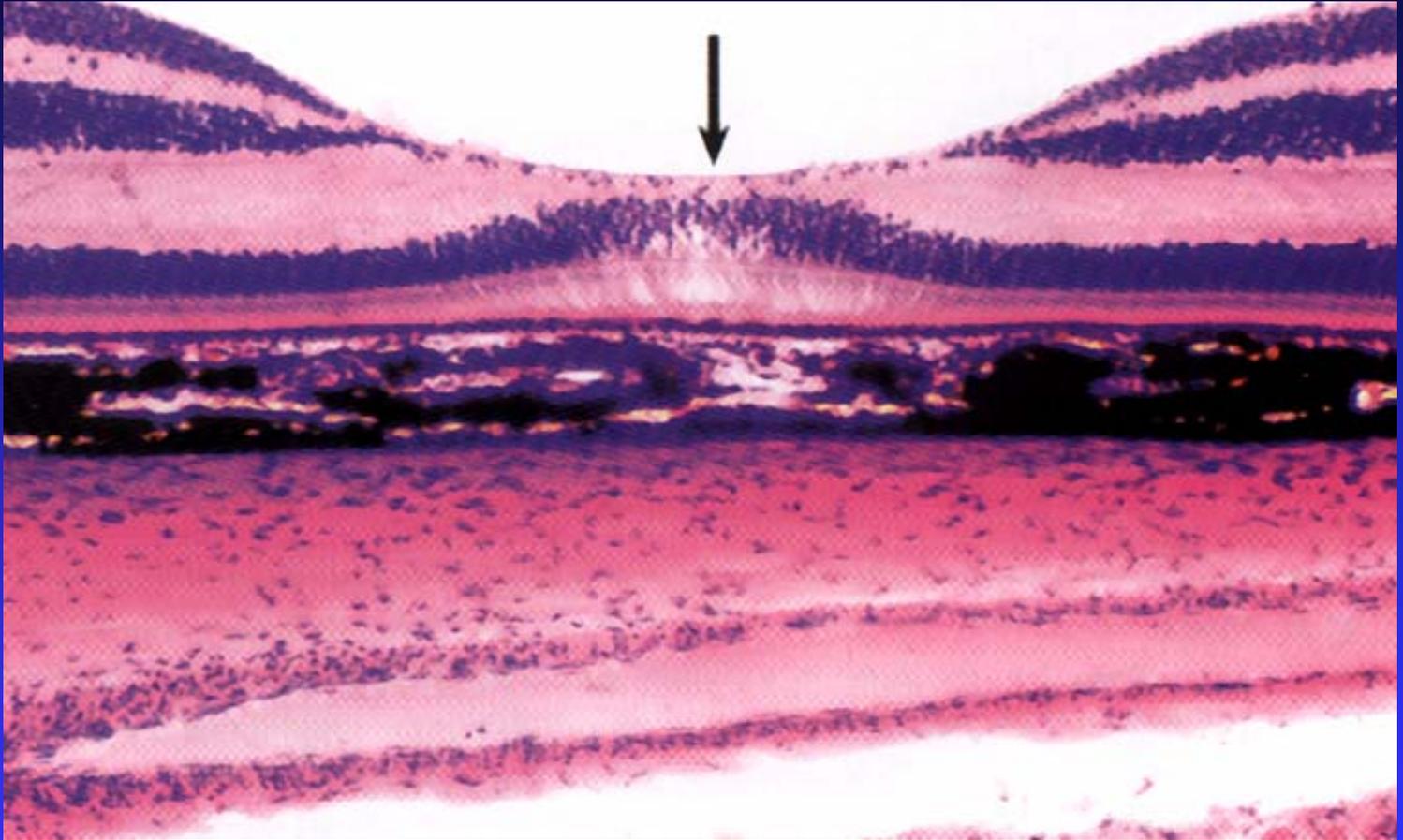
retina

(7) macula lutea and

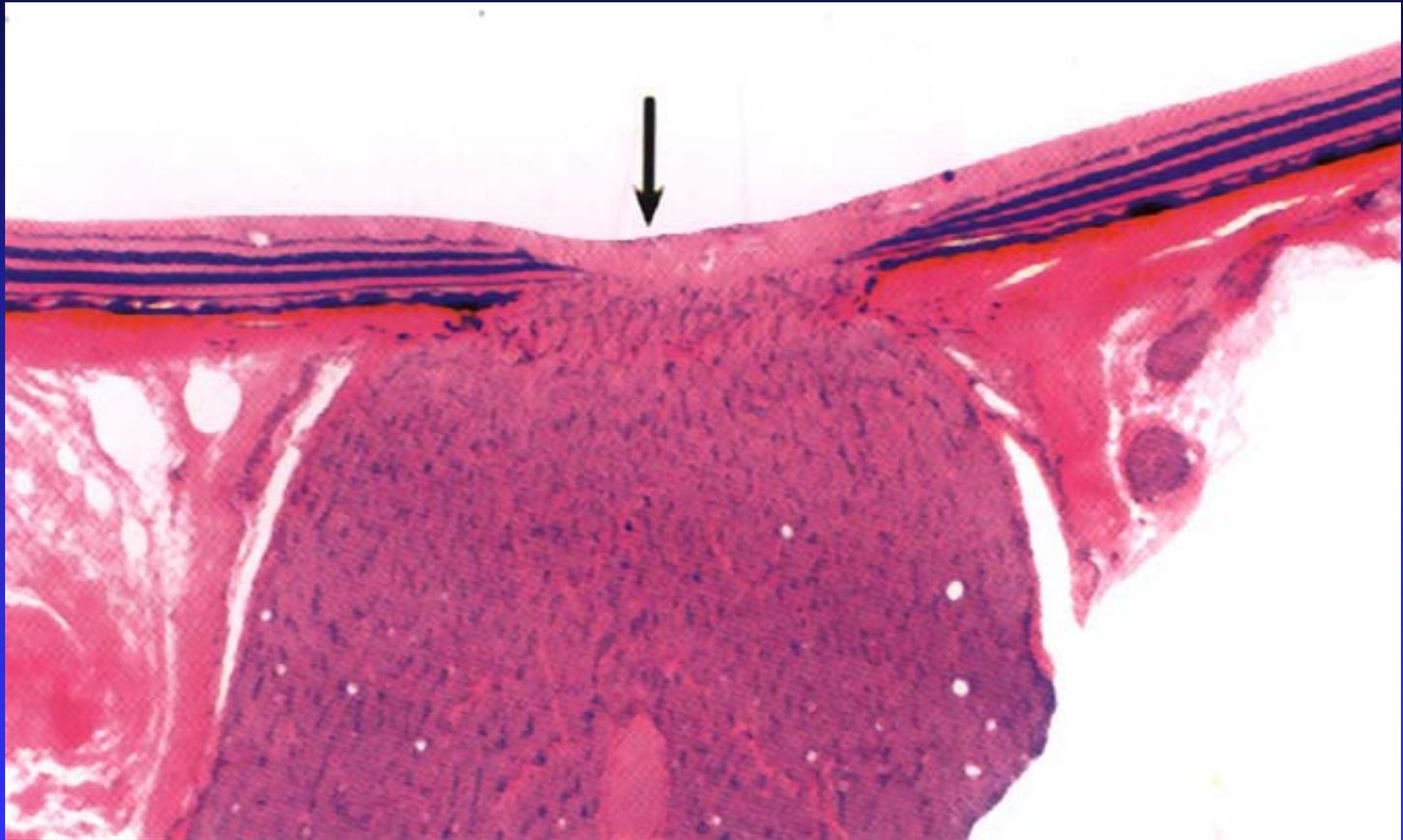
Central fovea (visual center)

no the rod cells, only cone cells

Papilla of optic nerve:



Macula lutea



Papilla of optic nerve

INCLUSION OF EYE BALL

1. lens

Lens capsule:

Lens epithelium:

Lens fiber:

2. vitreous body

3. aqueous humor

circulation of aqueous humor

Accessory Structure of The Eye

1. eyelid

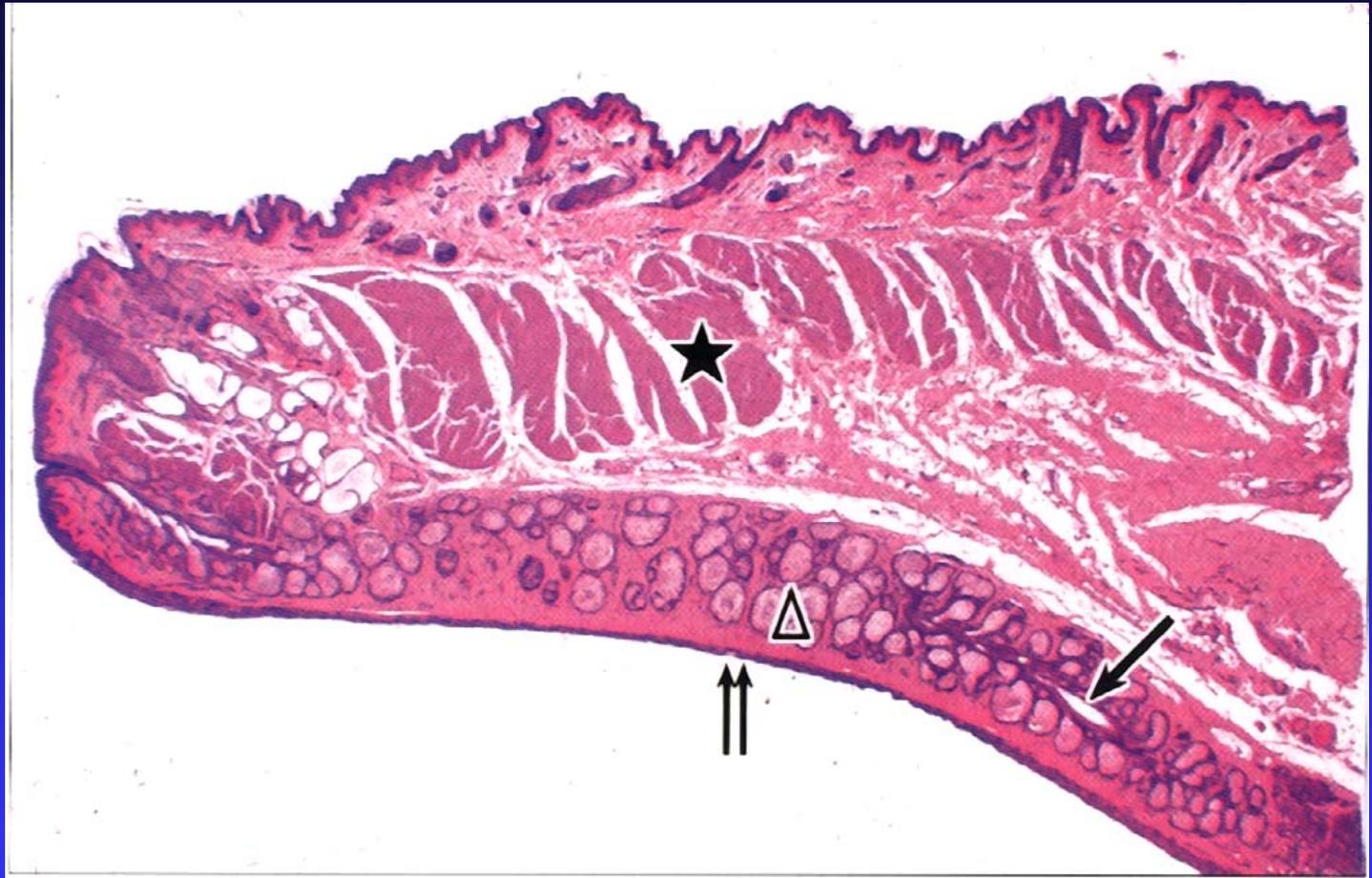
(1) skin

(2) subskin tissue

(3) muscularis

(4) tarsus: tarsal glands

(5) conjunctiva



Eyelid

EAR

1. External ear :

auricle, external auditory meatus
and tympanic membrane

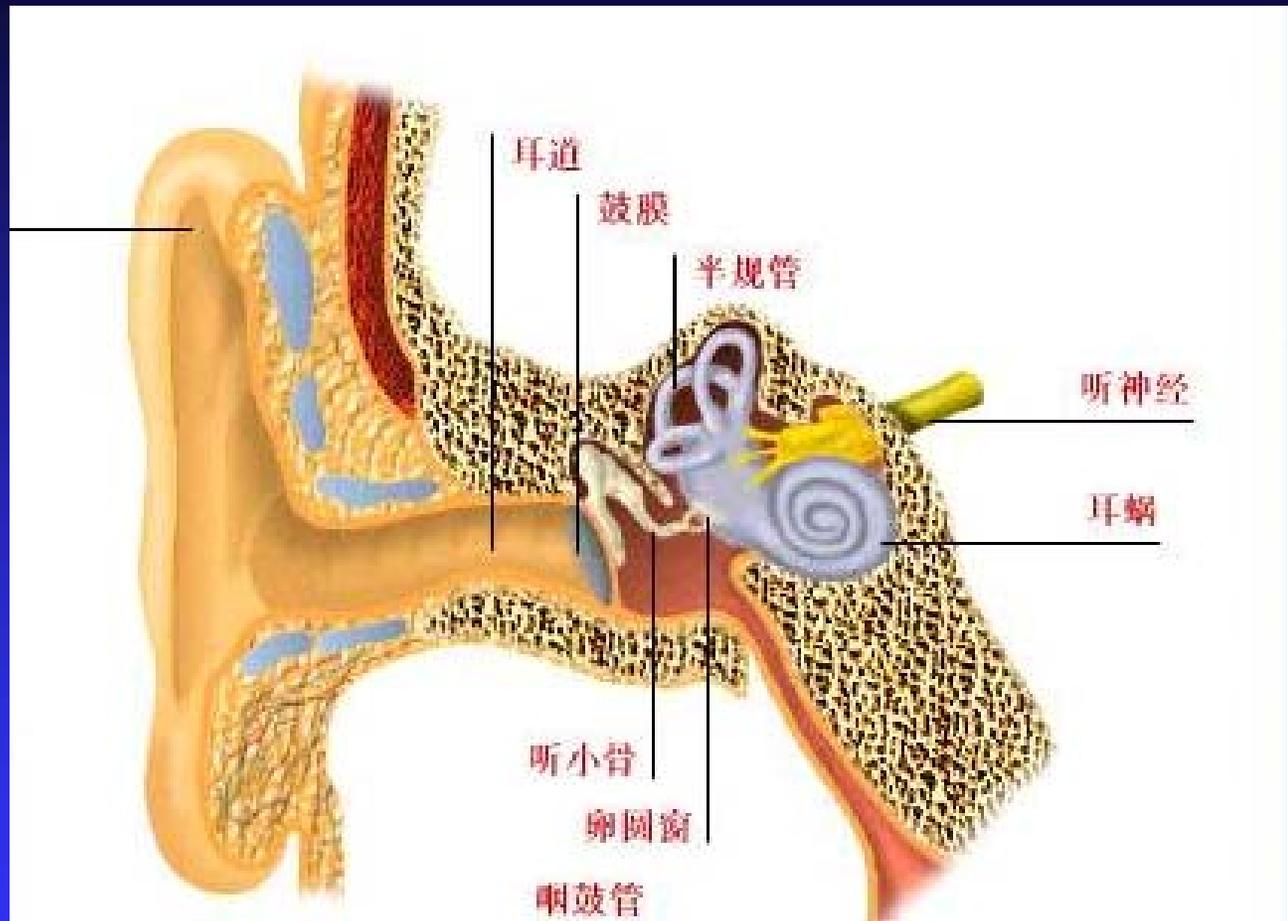
2. Middle ear:

tympanic cavity

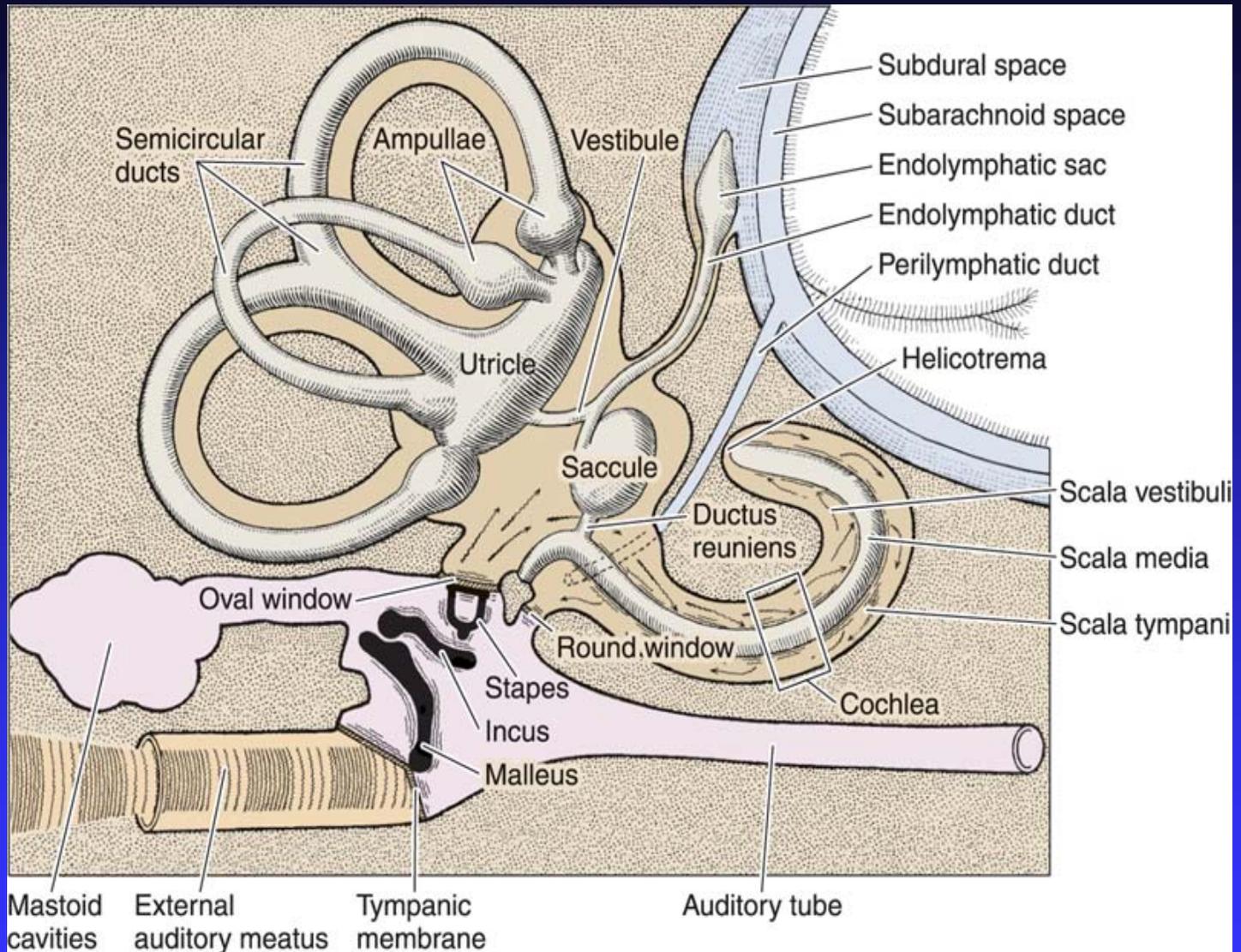
auditory ossicle

pharyngotympanic tube

3. Internal ear:



Ear



ear

(1) Osseous labyrinth

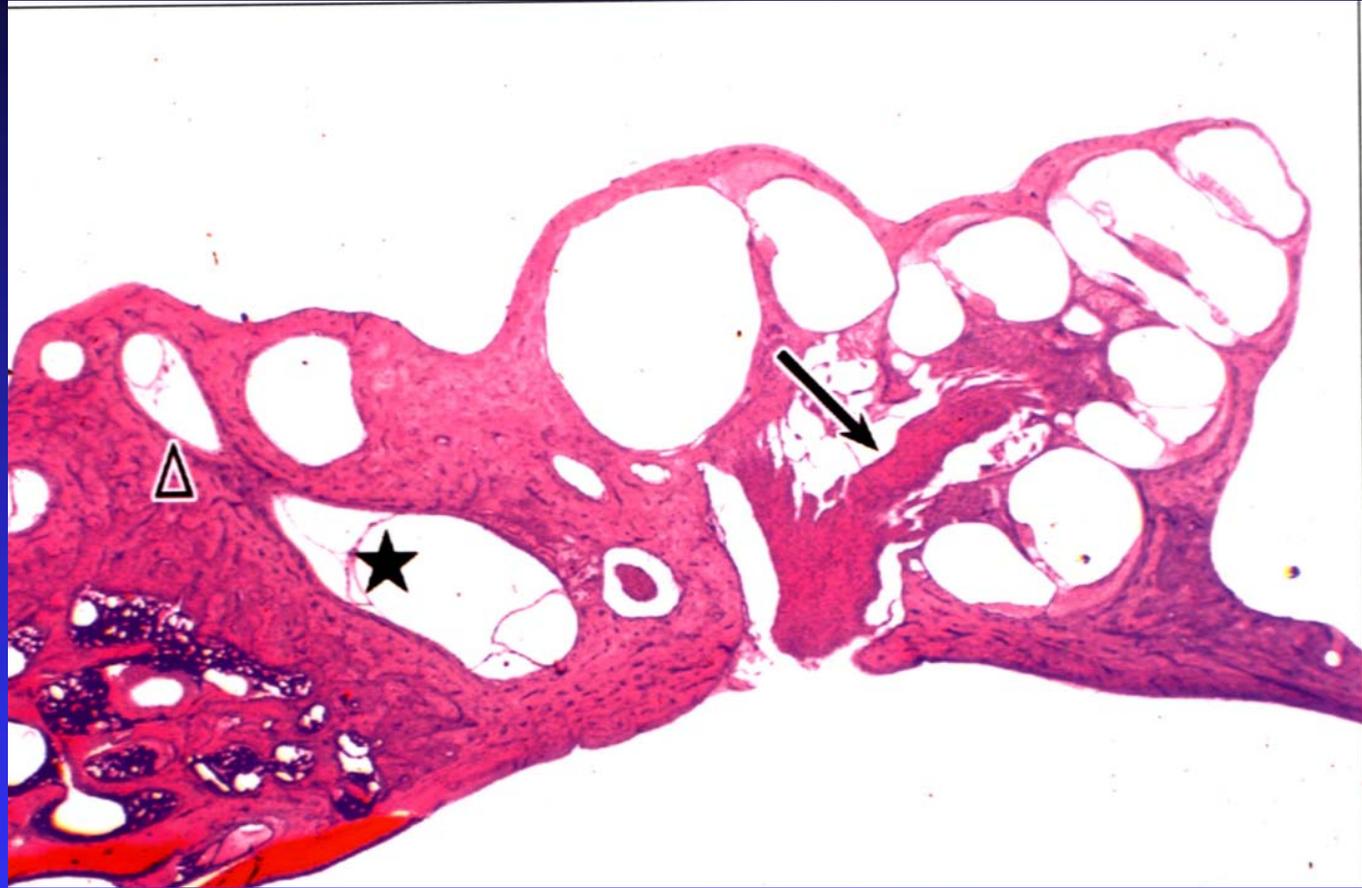
osteosemicircular canals

vestibule

cochlea

oval window

round window



cochlea

Cochlea: cochlea axis

osseous spiral lamina

spiral ligament

membranous spiral lamina

(basilar membrane)

(2) membranous labyrinth

Membranous semicircular canal

1) Crista ampullaris

Epithelium:

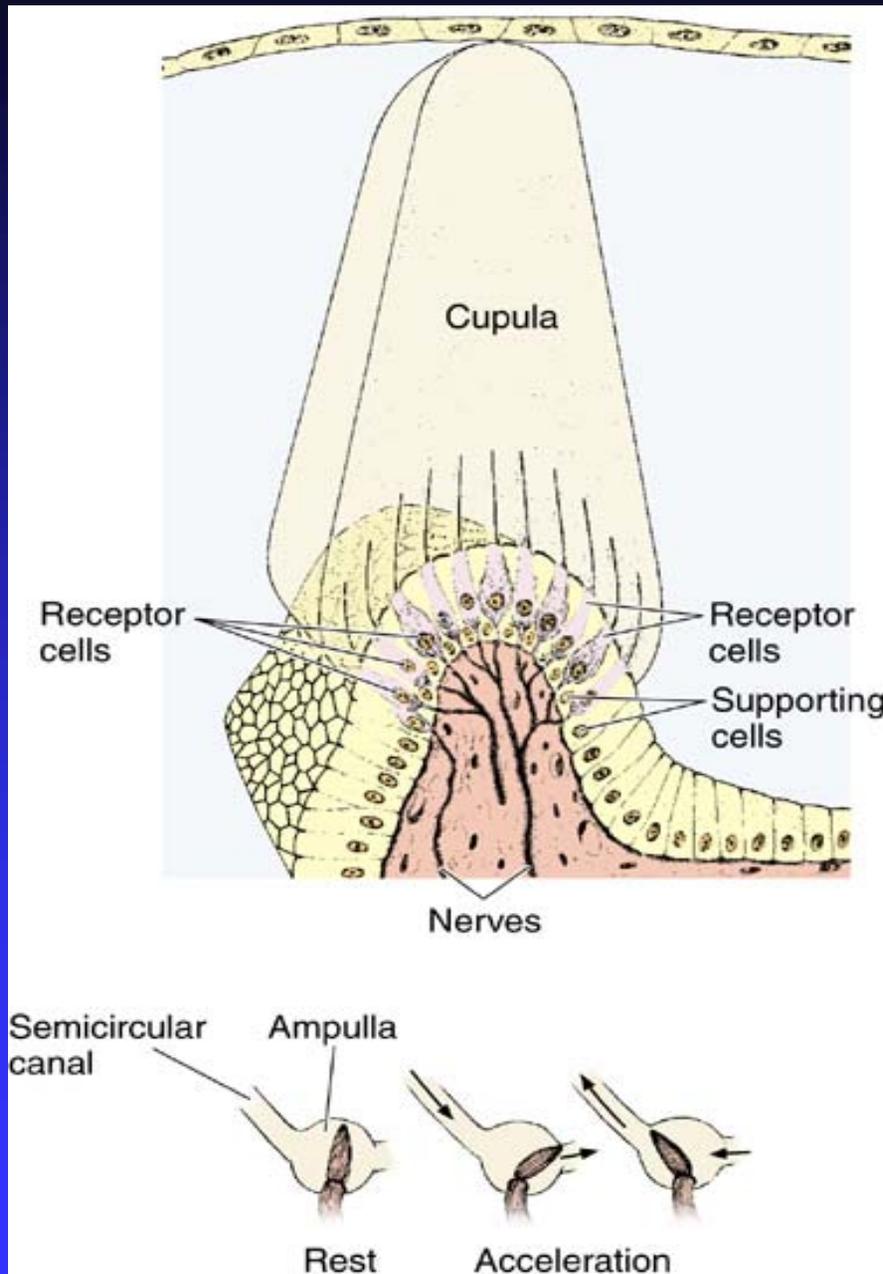
supporting cells:
cupula

hair cells:

Lamina propria:

Function:





2) macula utriculi and macula sacculi

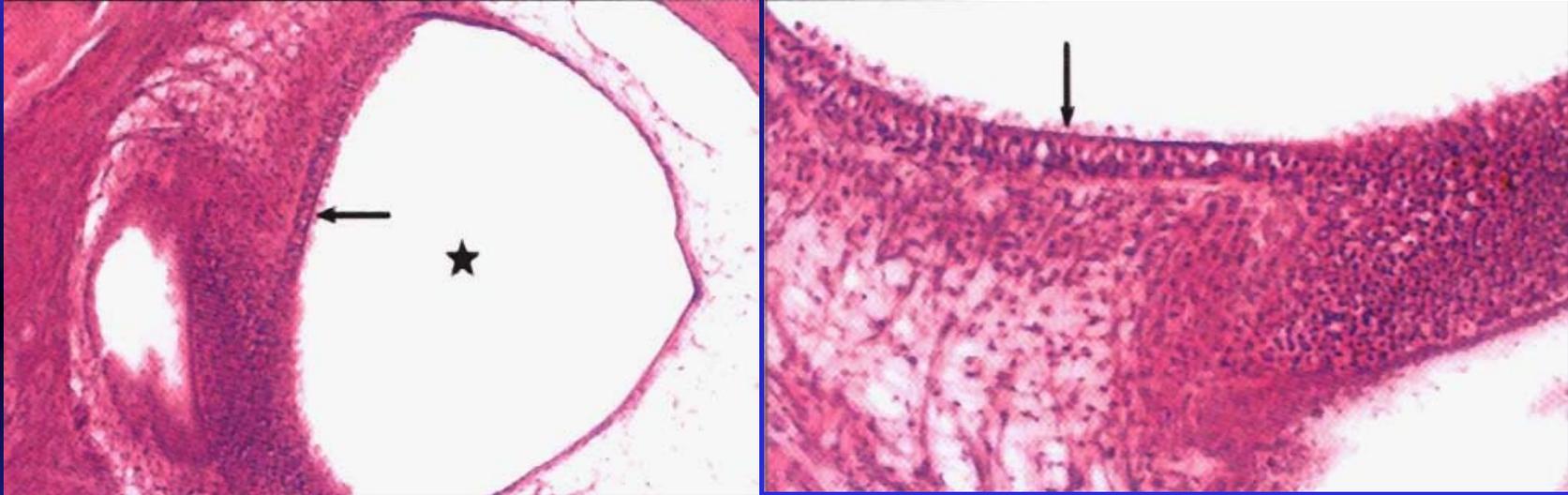
supportint cells:

hair cells:

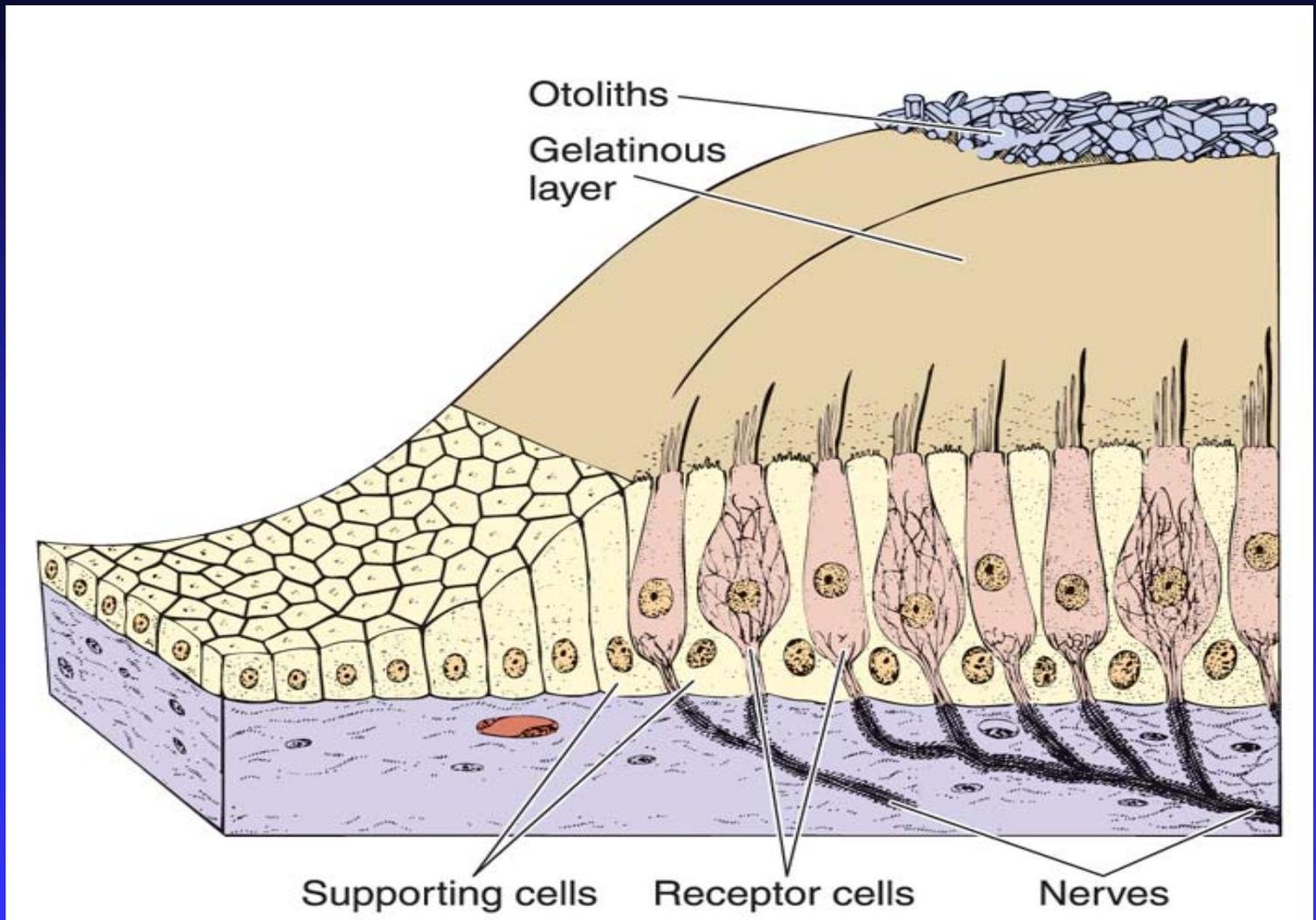
otolithic membrane:

otolithic (CaCO₃ crystal)

Function:



Macula acustica



macula acustica

3) Membranous cochlea

Three walls:

vestibular membrane

spiral ligament

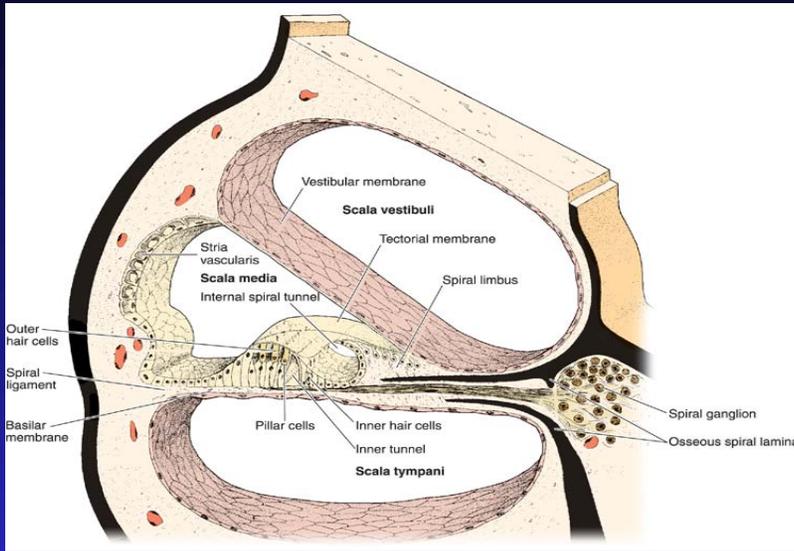
stria vascularis (function)

osseous spiral lamina

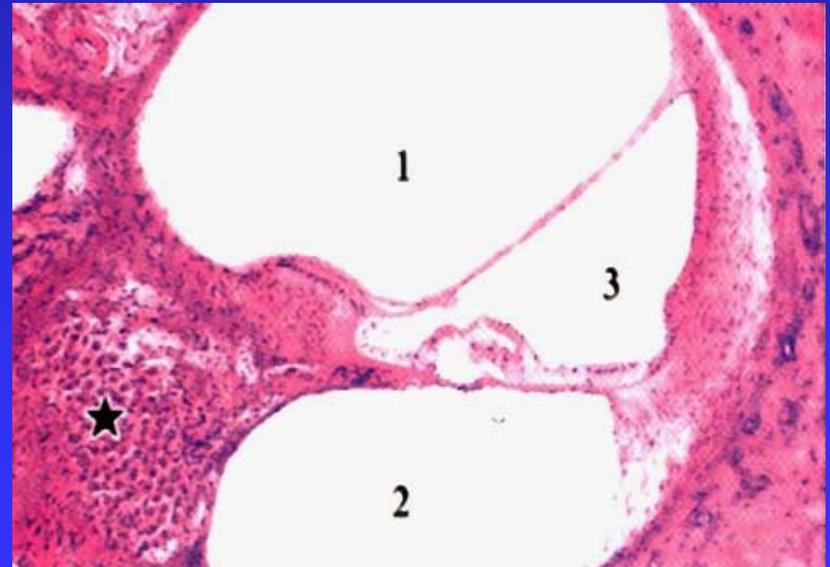
membranous spiral lamina

spiral limbus,

spiral organ (Corti organ)



Membranous cochlea



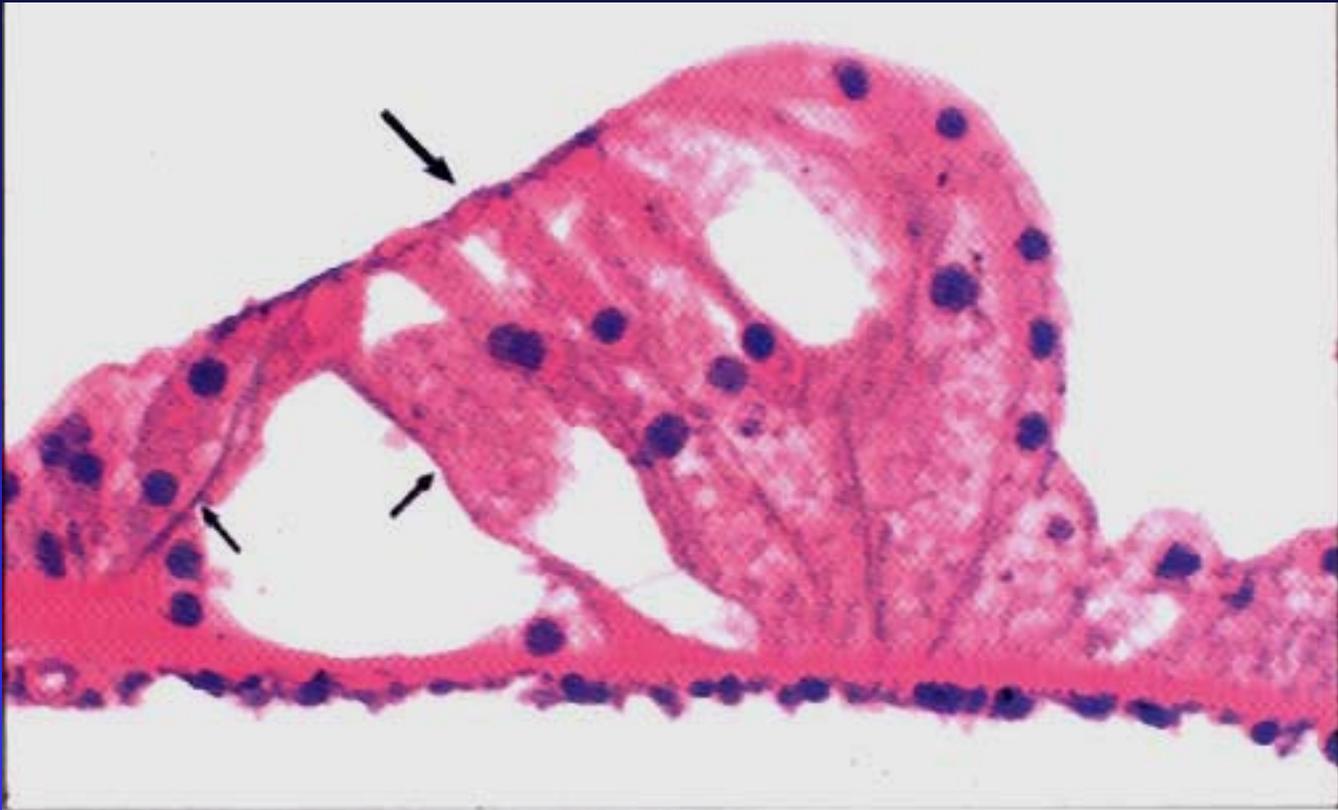
Spiral organ:

so called Corti organ:

- Supporting cells:

 - Pillar cells (internal , external pillar cells): inner tunnel

 - Phalangeal cells (internal, external phalangeal cells)



Spiral organ

- Hair cells

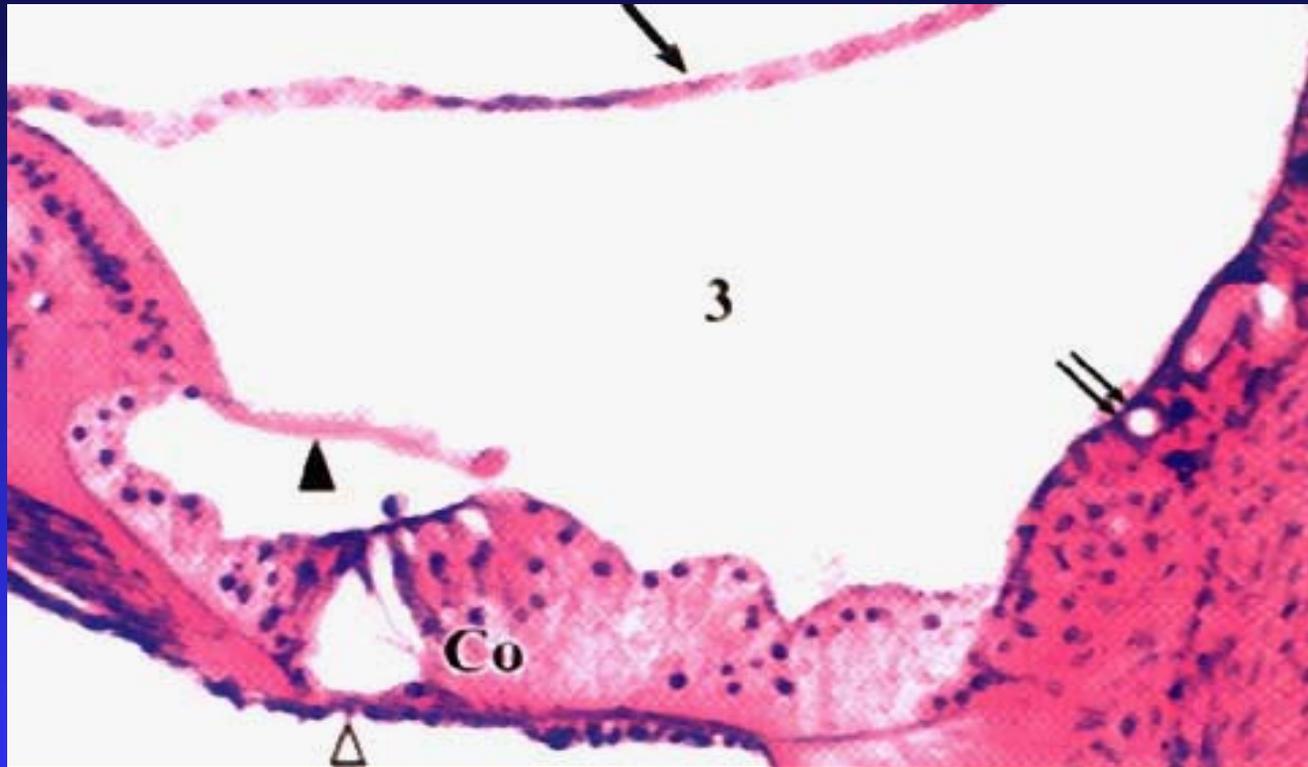
(internal , external hair cells):

tectorial membrane

auditory string

spiral ganglion

- Pathway of sound



Spiral organ