



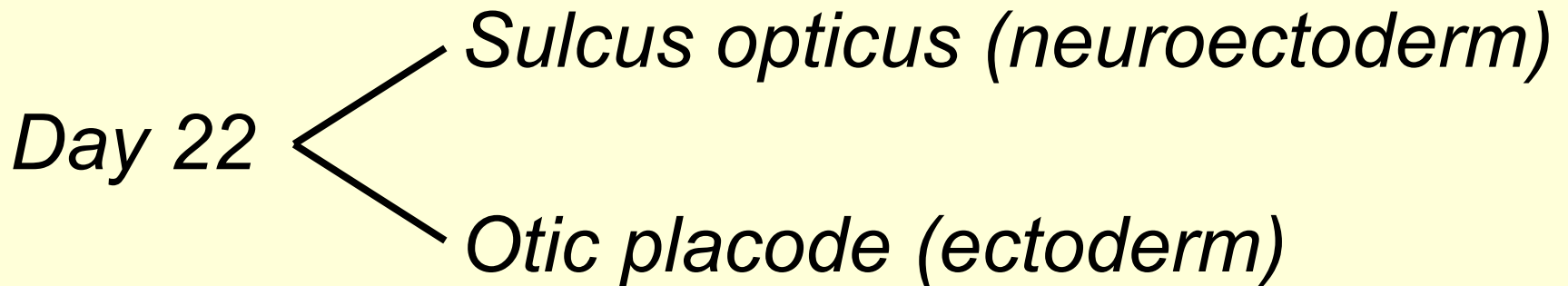
Embryology /organogenesis/

Development and teratology of sensory organs.

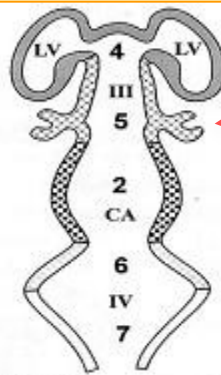
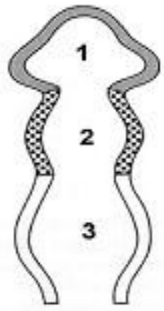
Repetition: sensory organs.

- 29. An overview of development of the eye.
 - 30. An overview of development of the external, middle and inner ear.
-

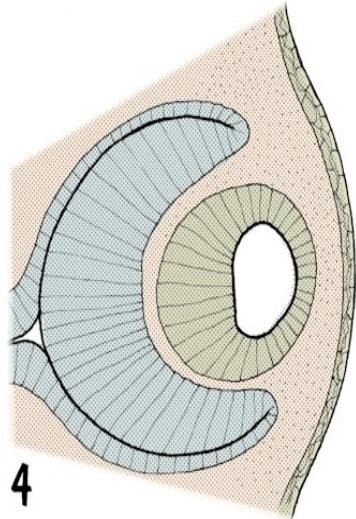
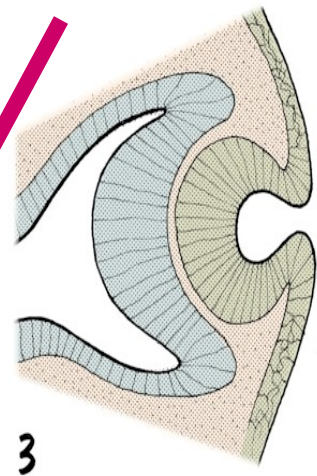
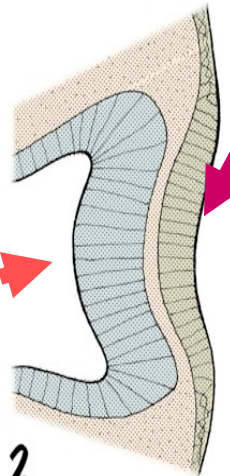
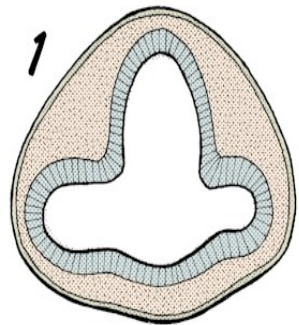
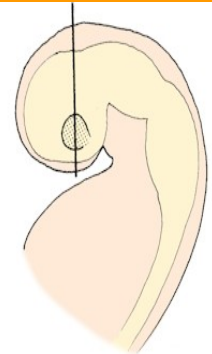
Eye and ear start to develop at:



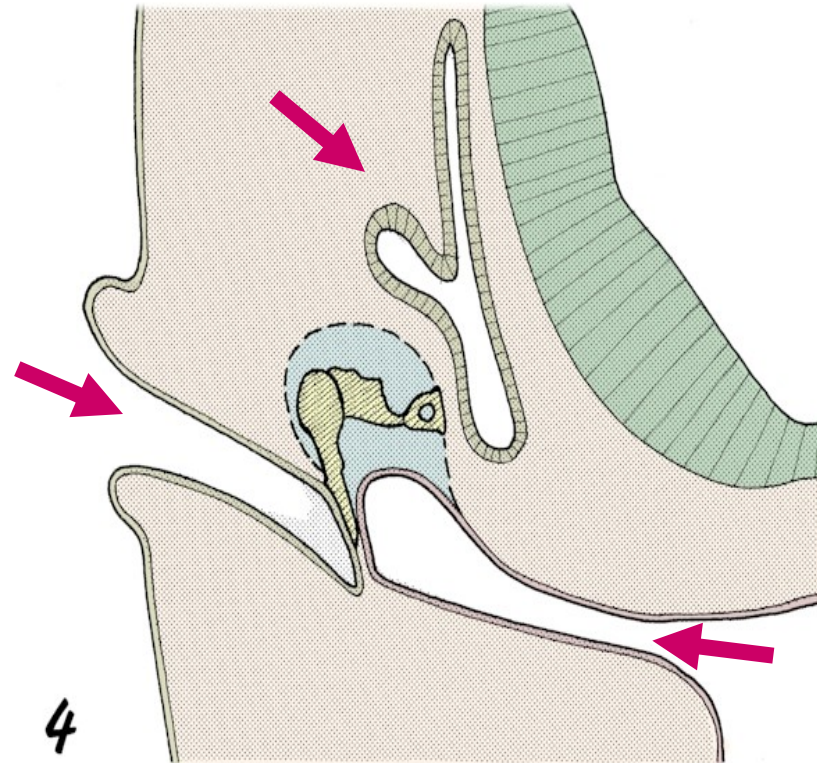
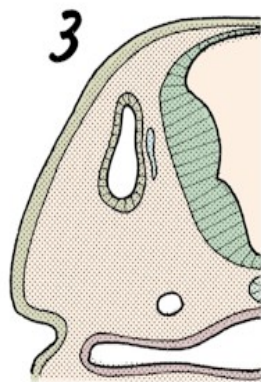
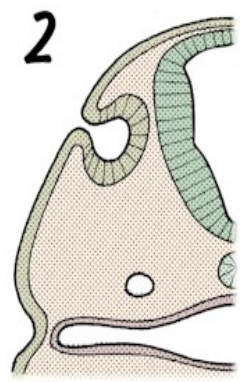
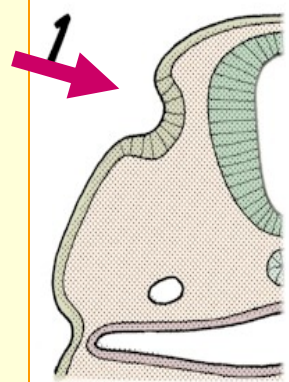
EYE

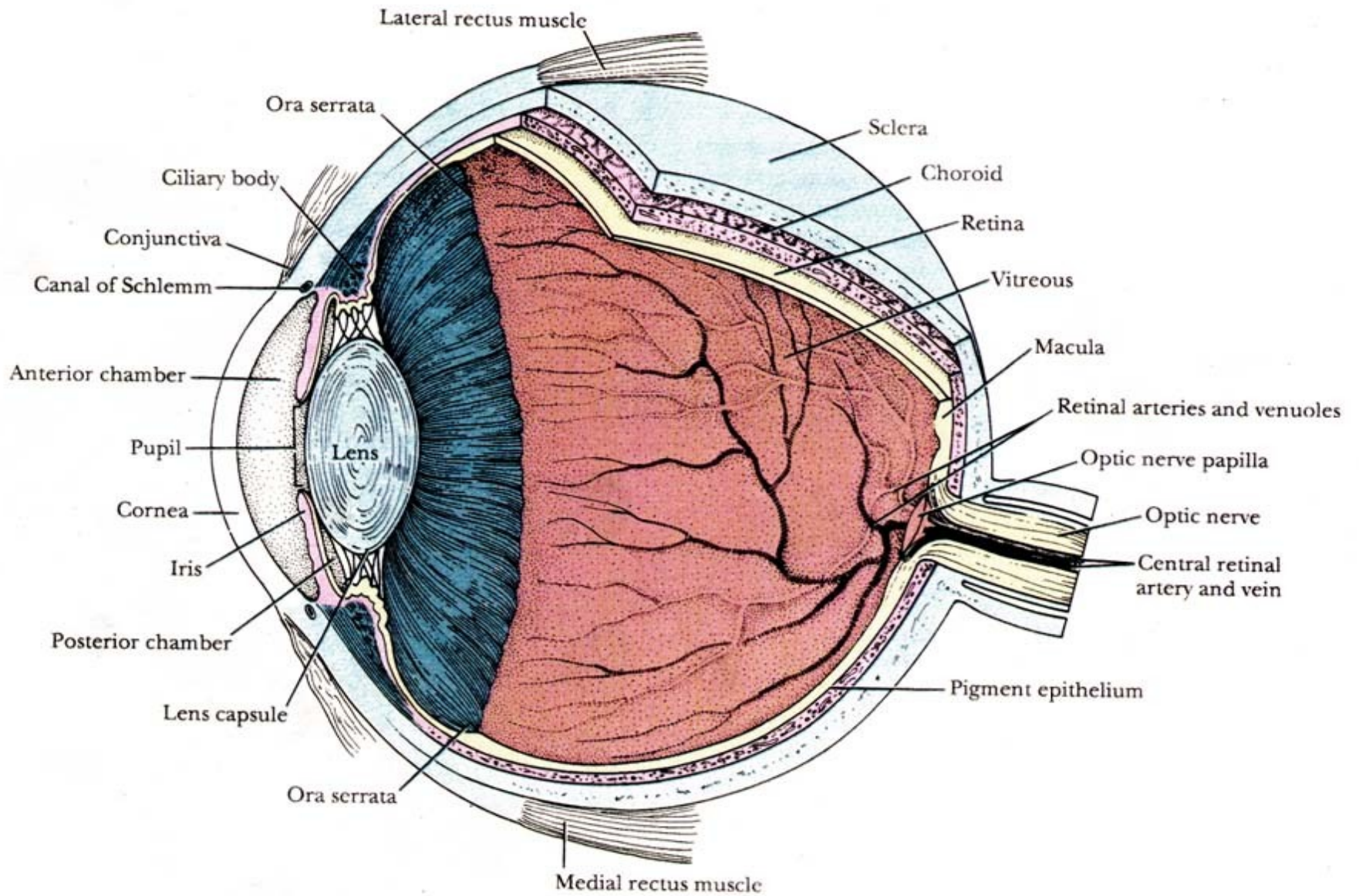


일차배소포(primary vesicle) 이차배소포(secondary vesicle)

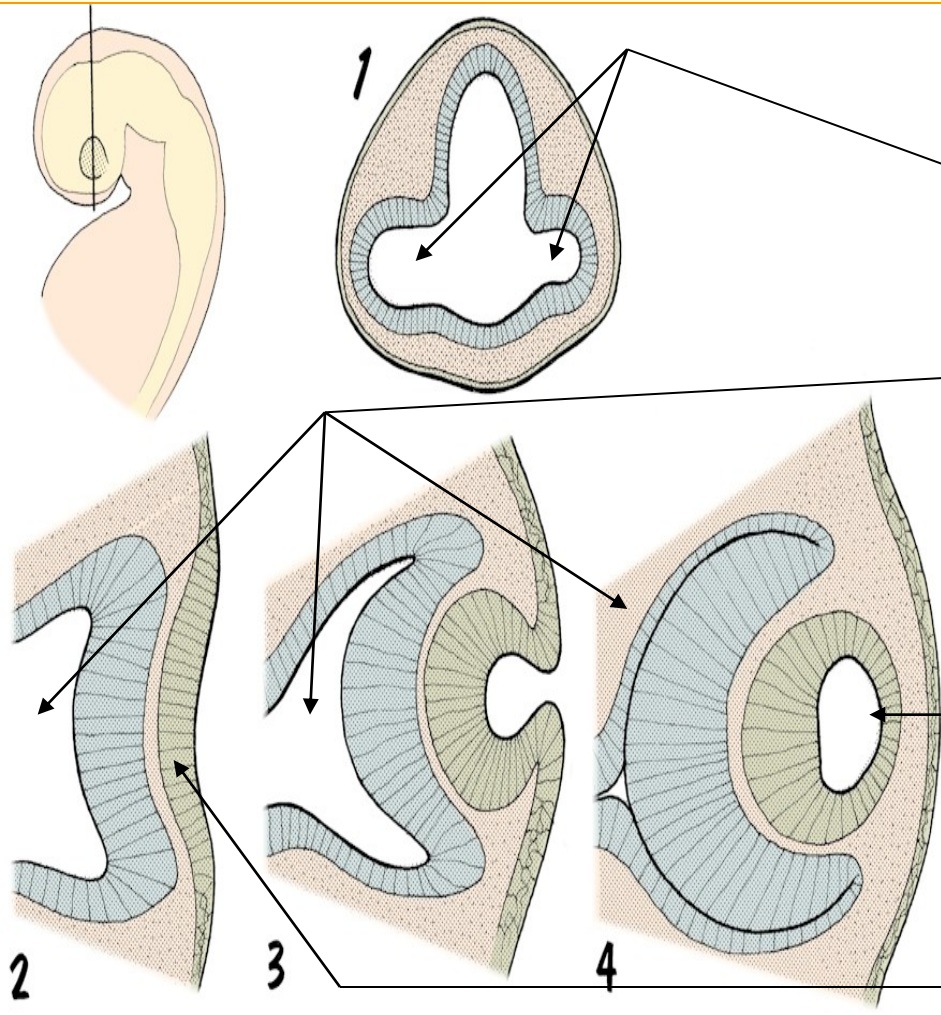
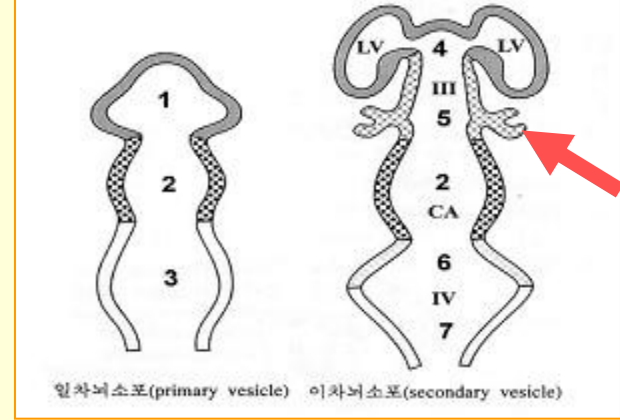


EAR





EYE



Sulcus opticus (1)

Optic vesicle – cup (2-3)
(week 4)

Lens placode (2)

Lens vesicle (2-3)

DEVELOPMENT of the EYE

NEUROECTODERM:

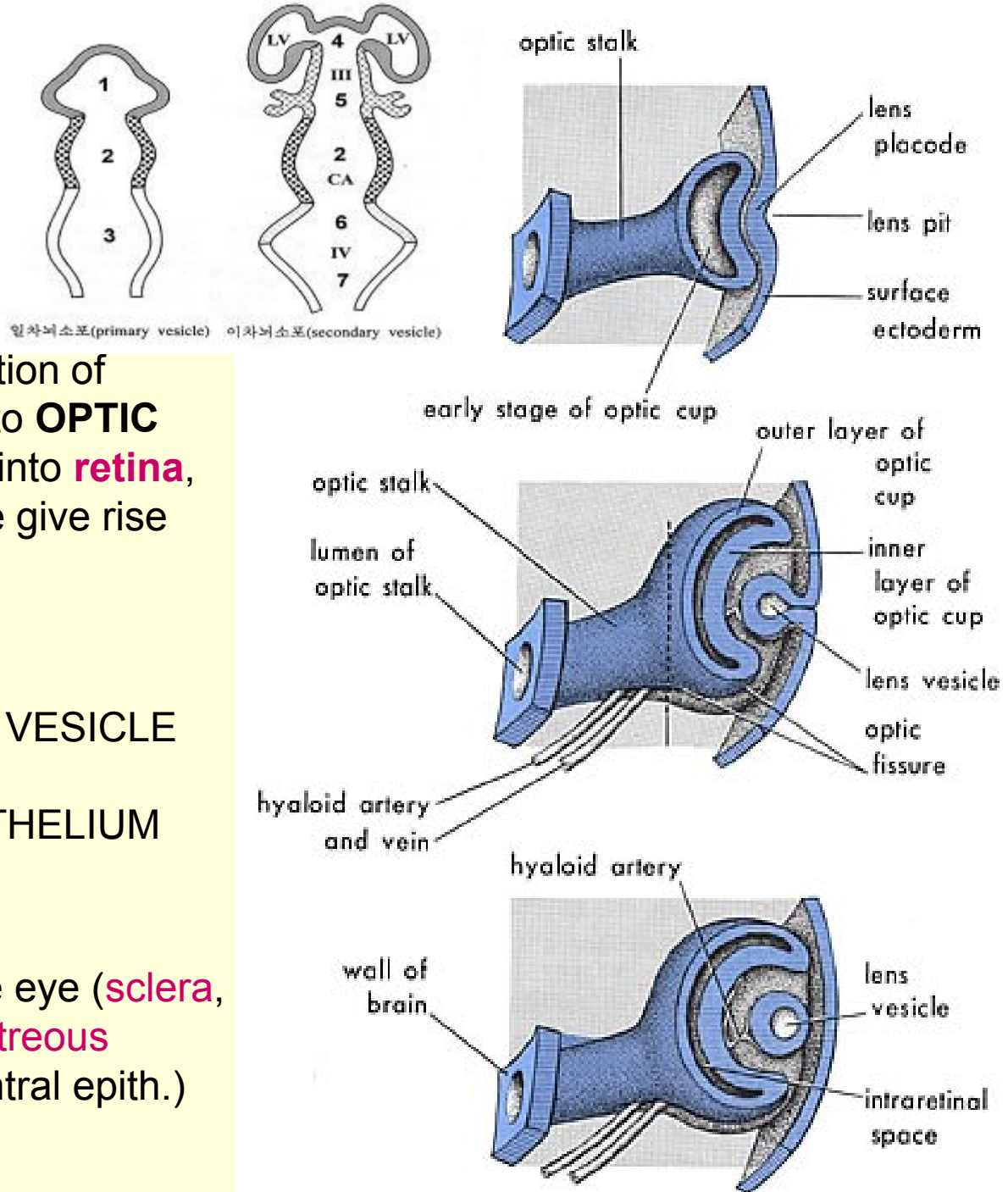
OPTIC GROOVE (evagination of prosencephalon) give rise to **OPTIC VESICLE (CUP)** develops into **retina**, **EYESTALK** of optic vesicle give rise to **optic nerve**

ECTODERM:

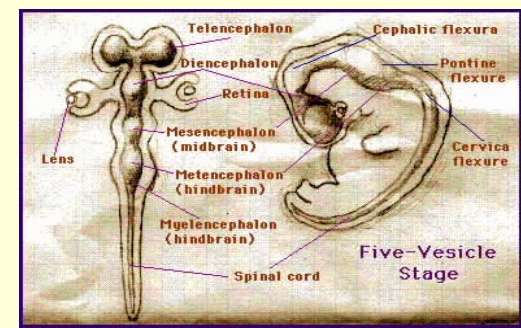
LENS PLACODE ⇒ **LENS VESICLE** and **VENTRAL CORNEAL EPITHELIUM**

MESENCHYME:

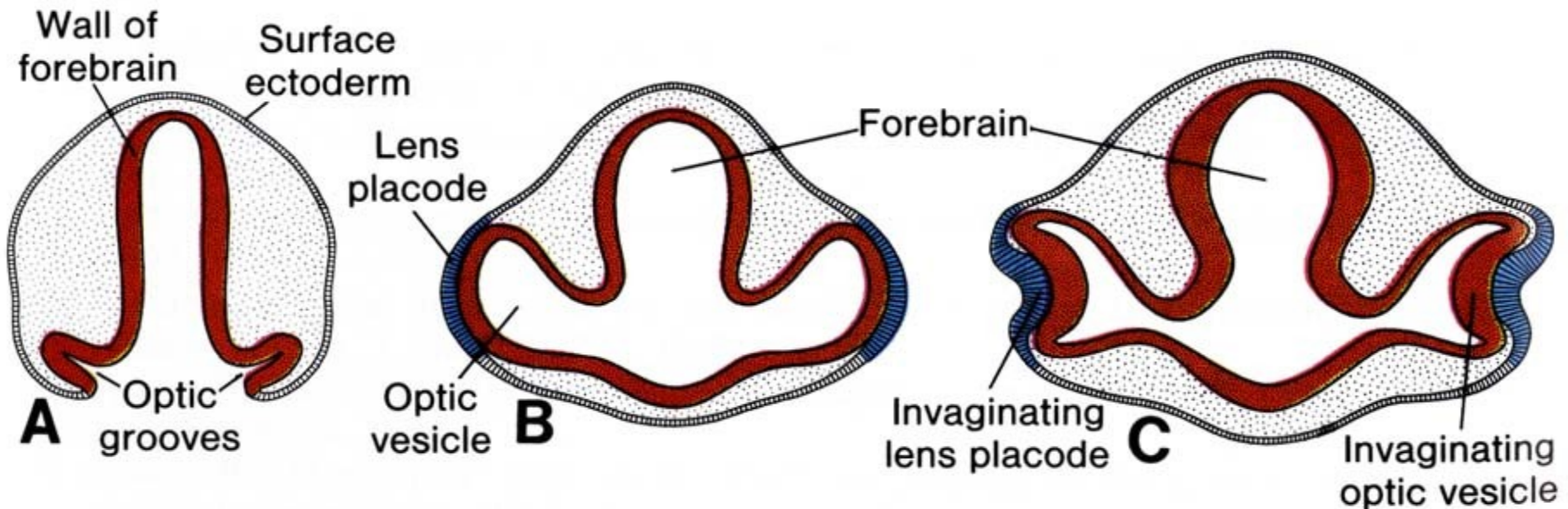
all other components of the eye (**sclera**, **choroid**, **ciliary body**, **iris**, **vitreous body**, **cornea** except its ventral epith.)

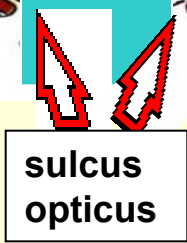
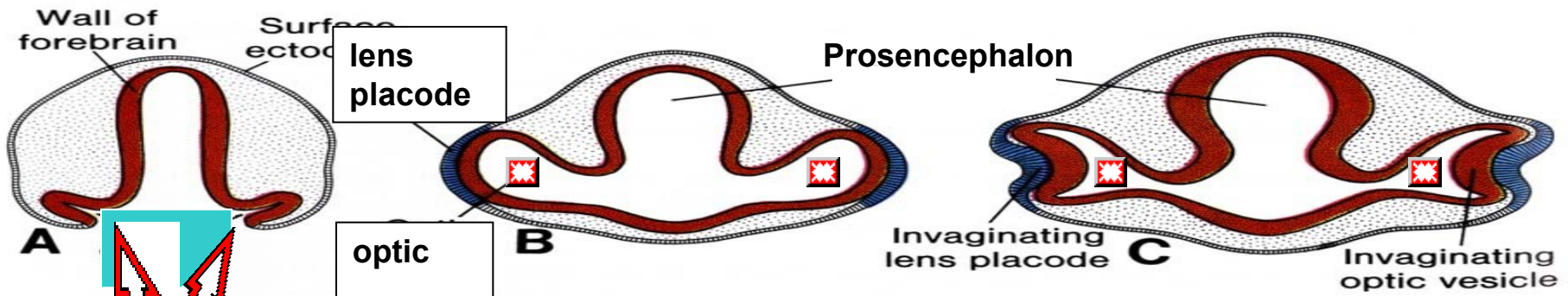


Development of the eye



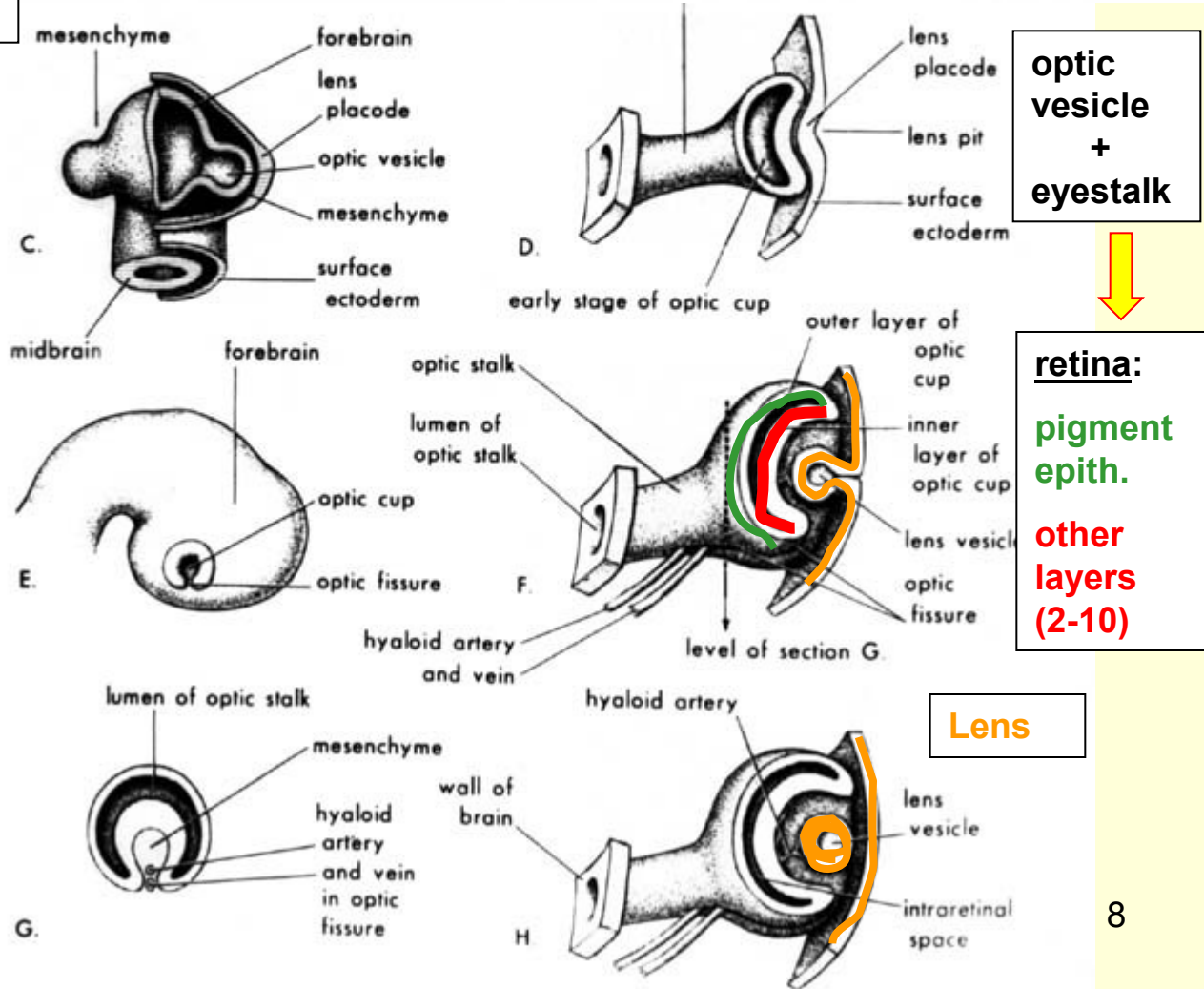
- Sulcus opticus (day 22)
- Optic vesicle





Ectoderm:
lens placode (lens cristalina)

Neuroectoderm:
optic vesicle ⇒ retina

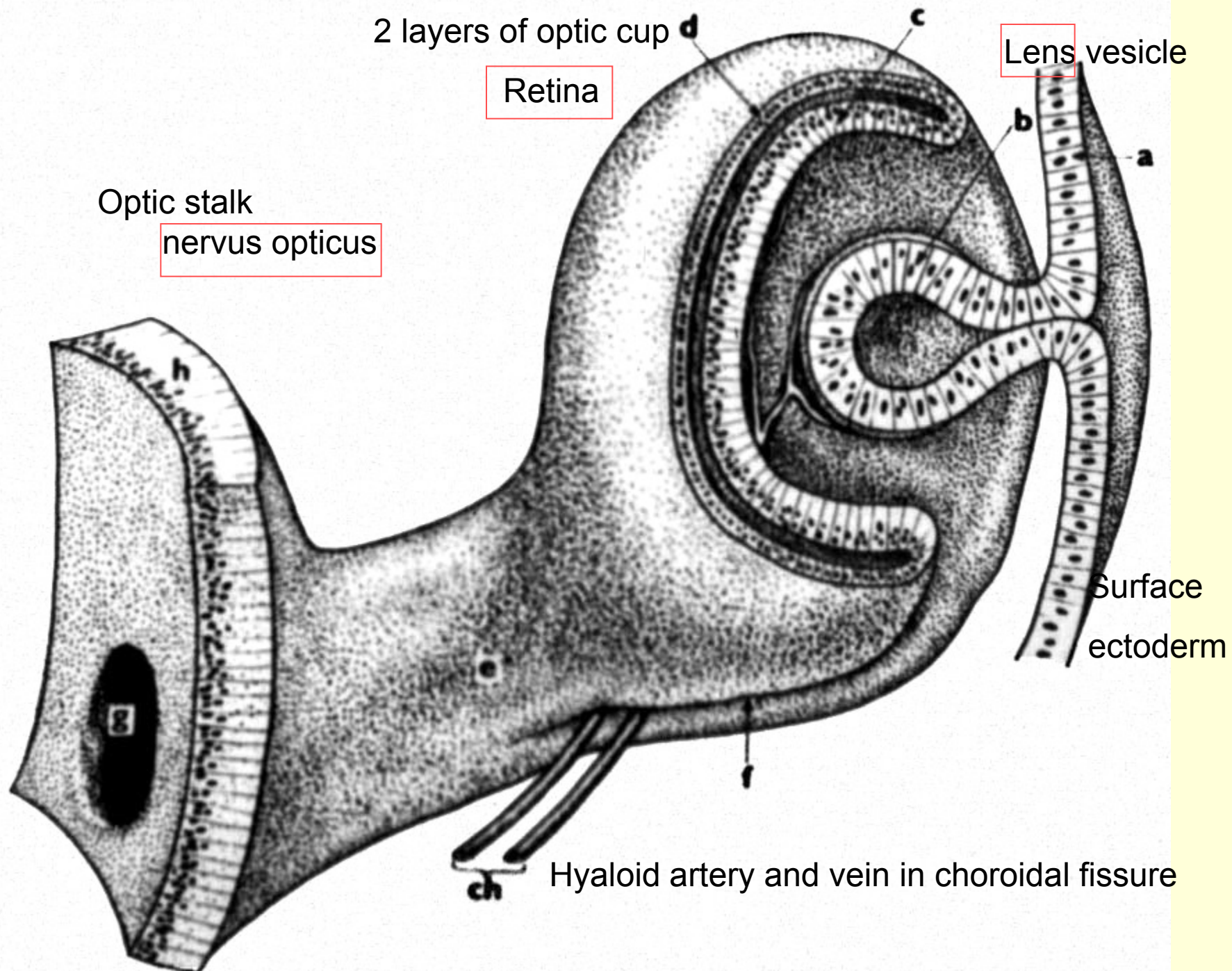


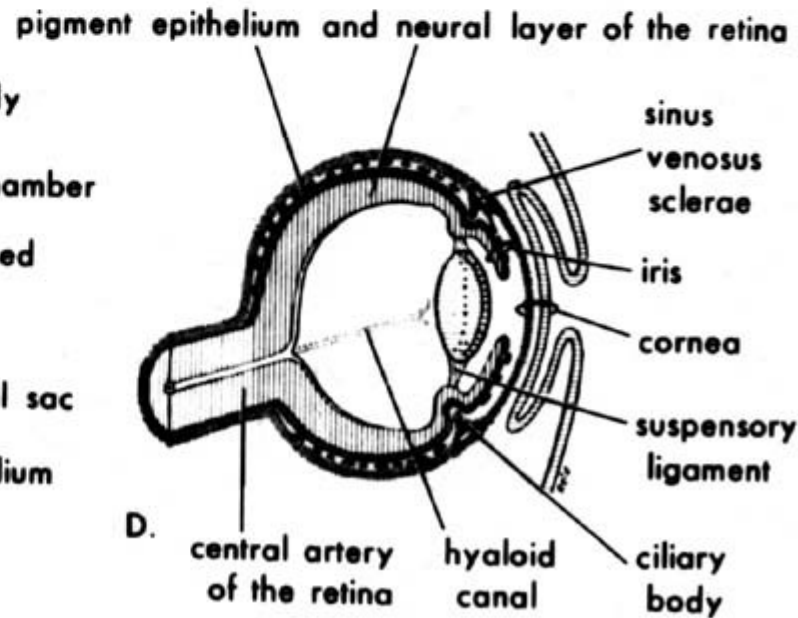
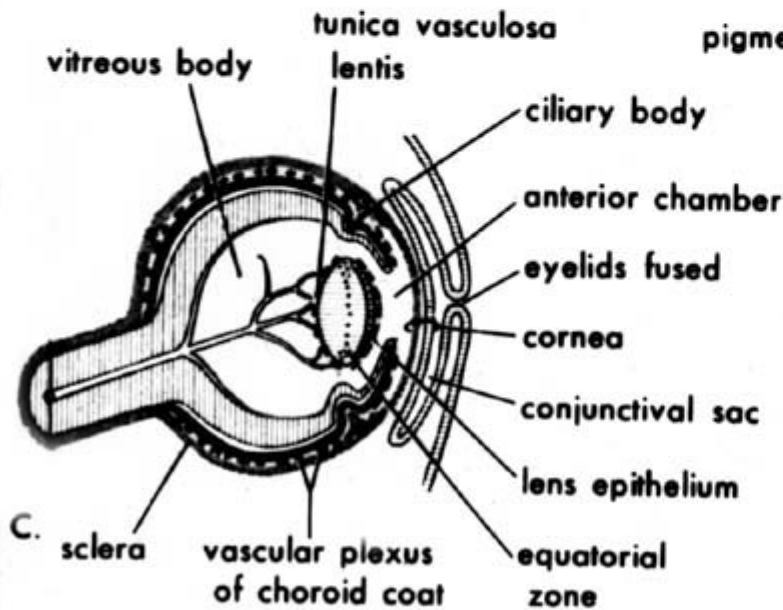
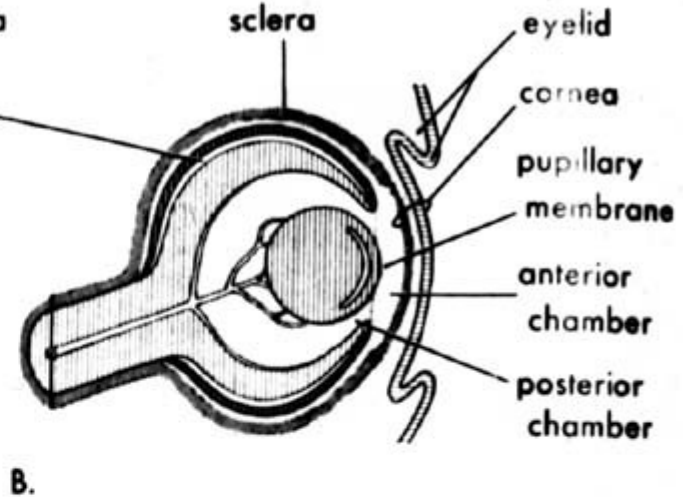
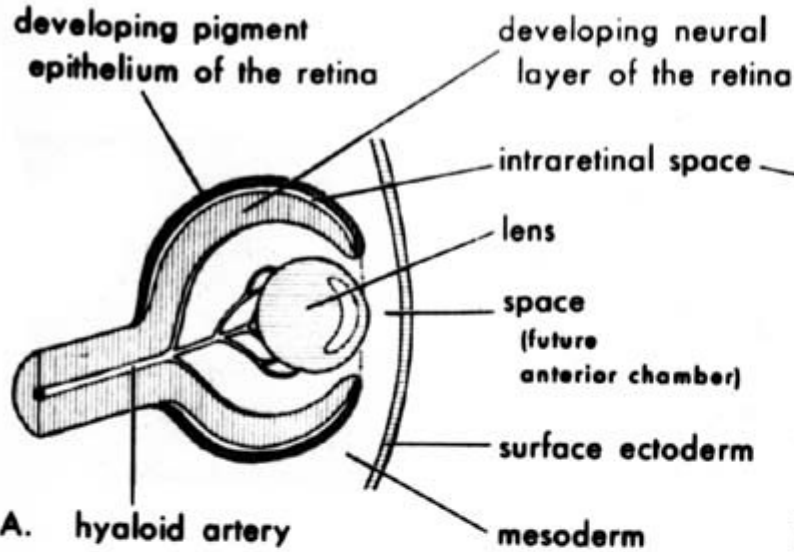
optic vesicle + eyestalk

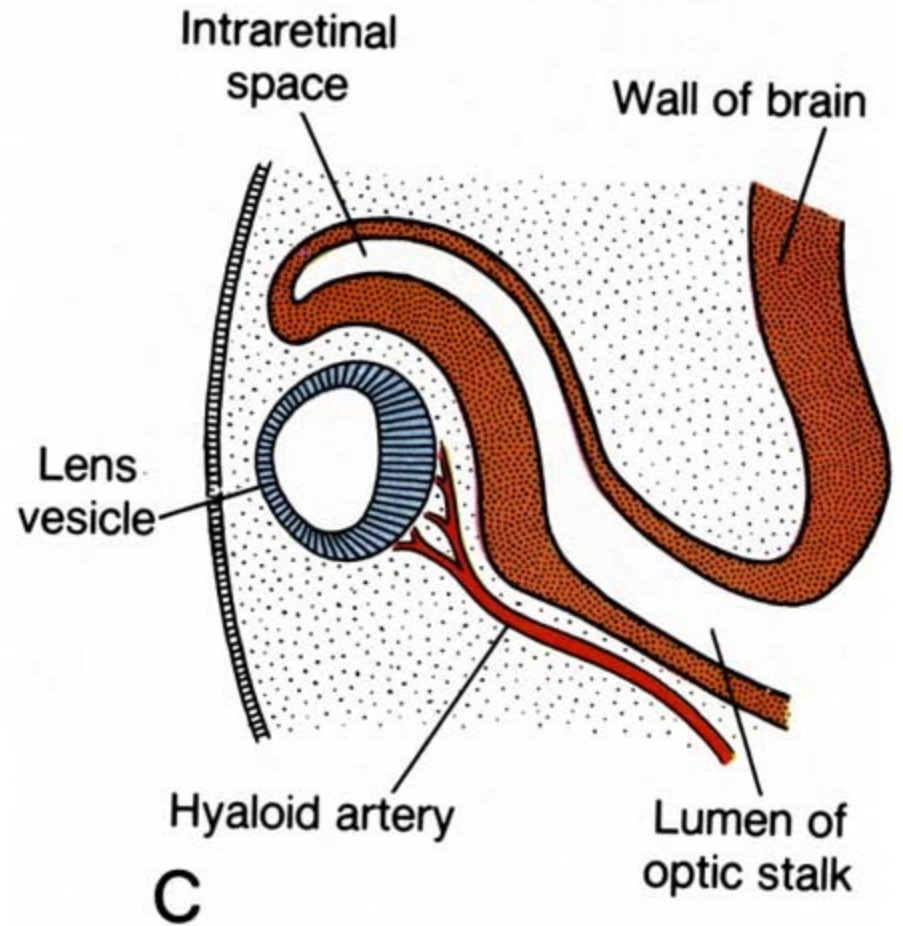
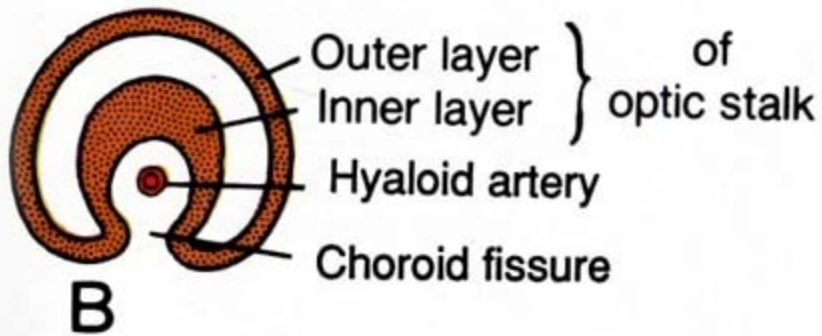
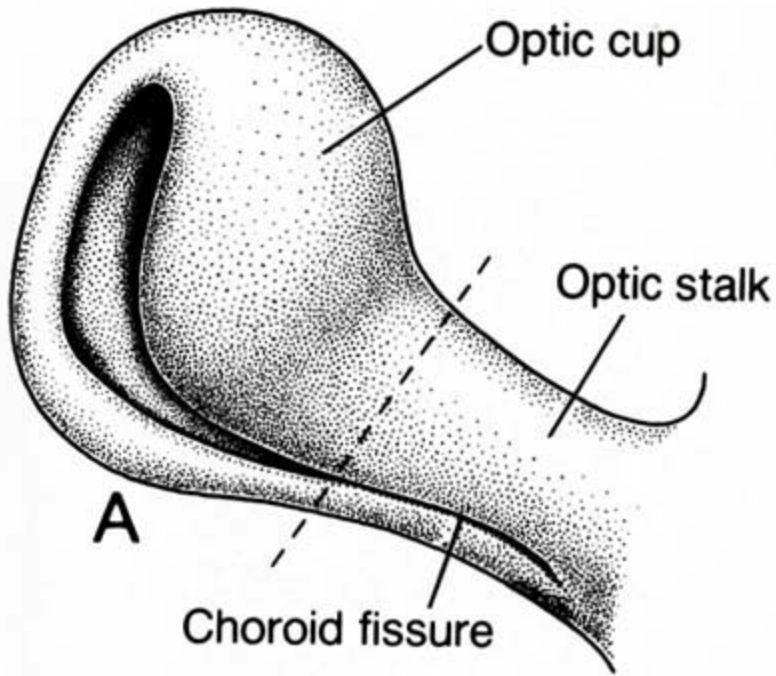


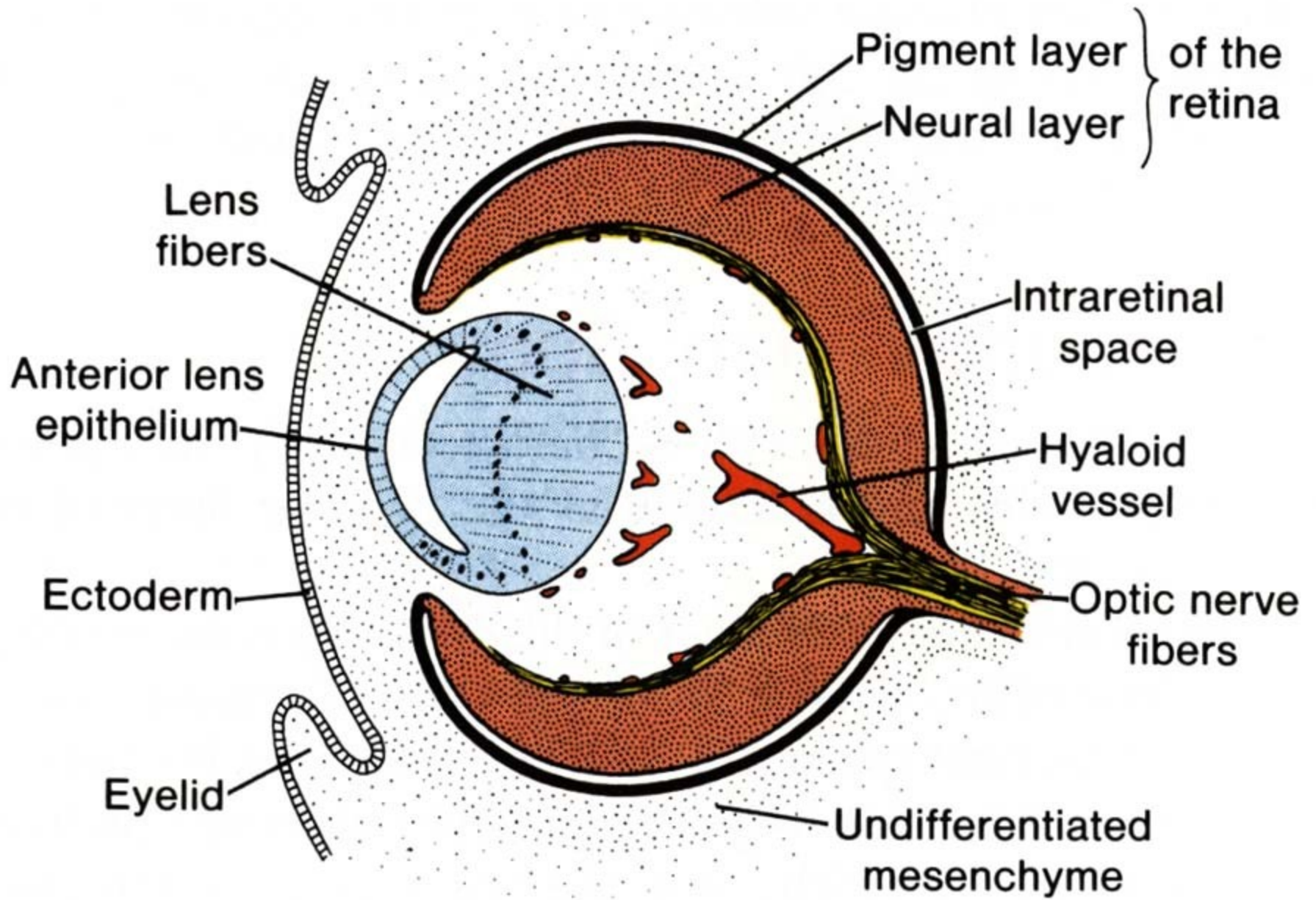
retina:
pigment epith.
other layers (2-10)

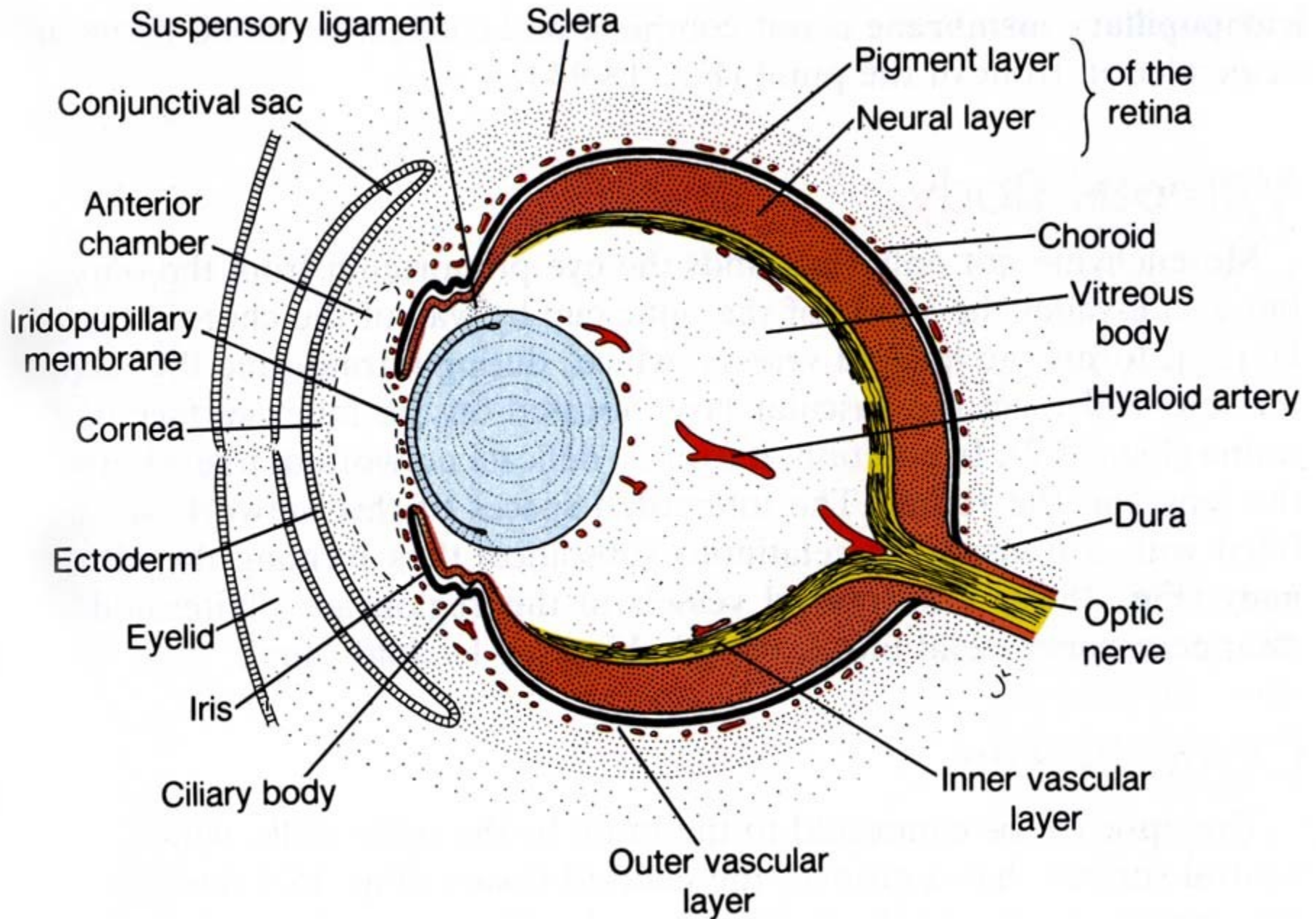
Lens

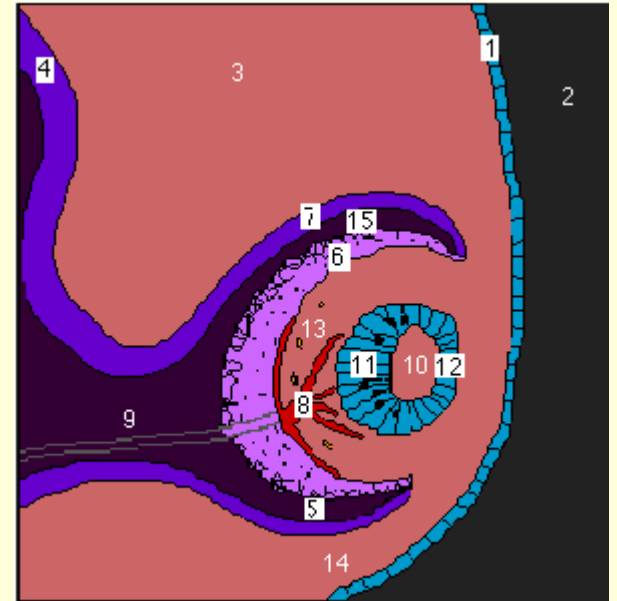
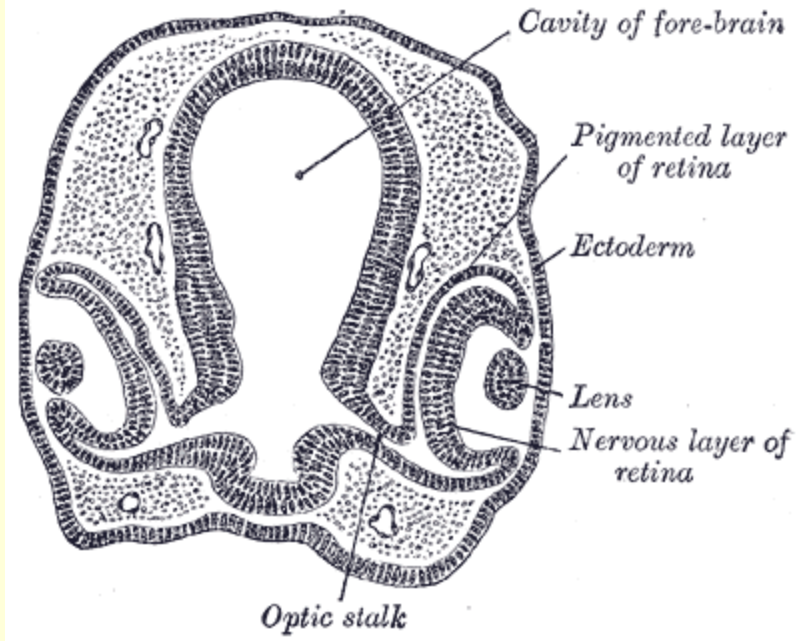
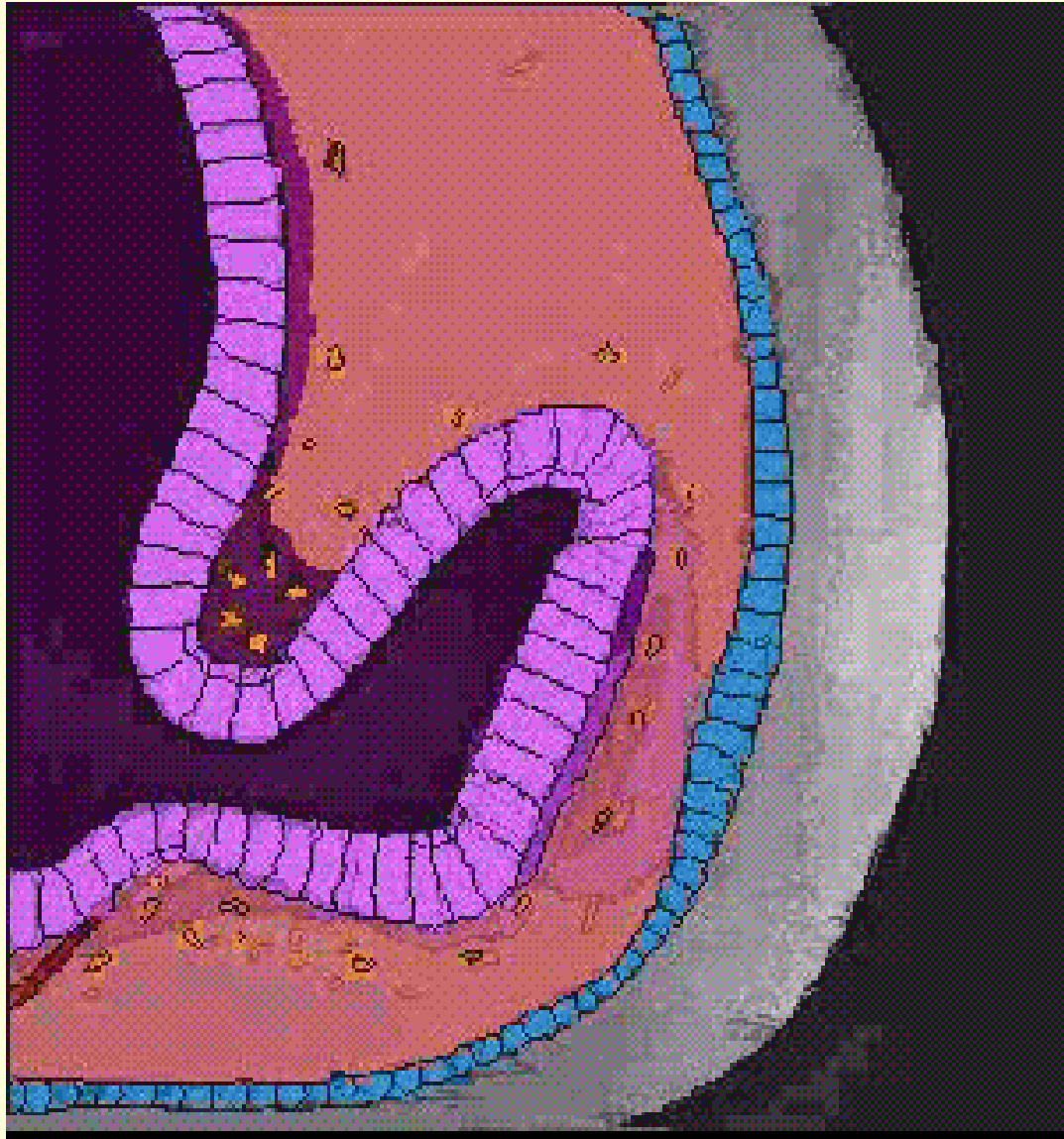






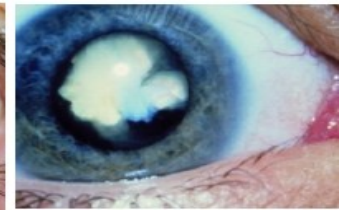
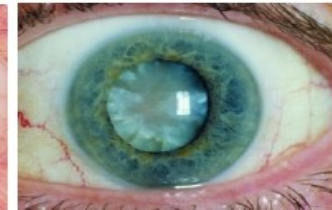
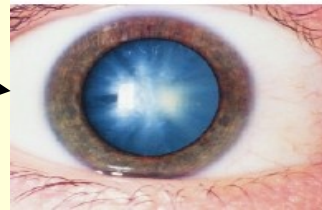






Teratology of the eye

- Anophthalmia
- Microphthalmia
- Aphakia
- Coloboma
(iris, eyelid)
- Congenital cataracta
or glaucom
- Congenital
ptosis of
eyelid



auricle



mesenchyme
tubercles (6)

external
acoustic meatus



the 1st
pharyngeal cleft

tympanic cavity,
Eustachian tube

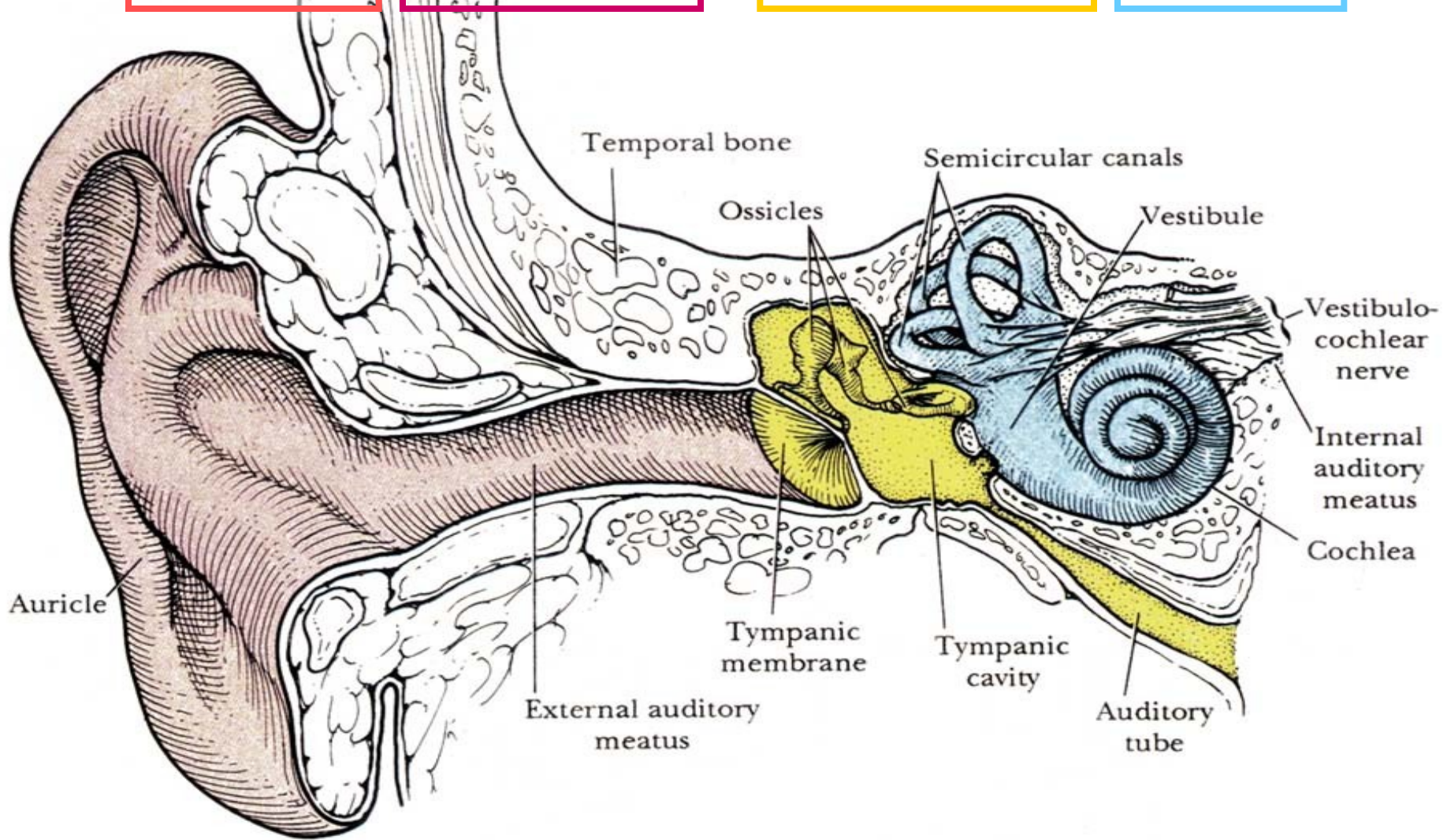


the 1st
pharyngeal pouch

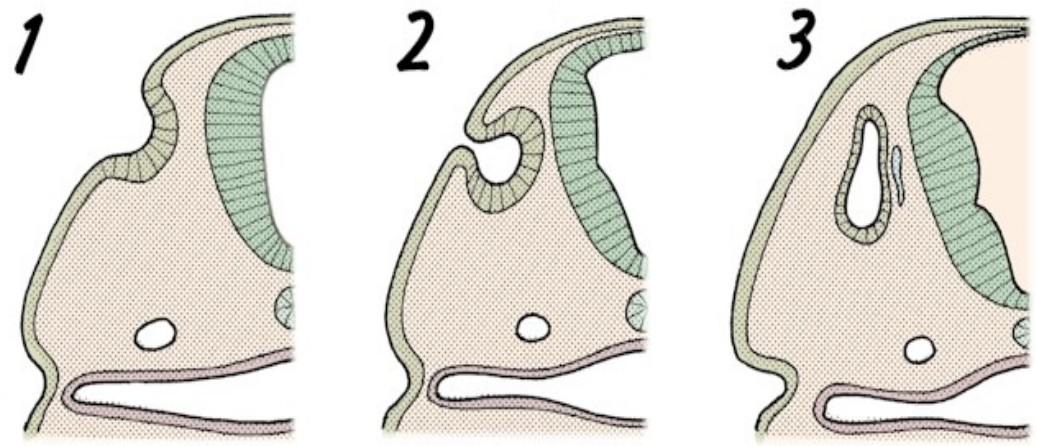
inner ear



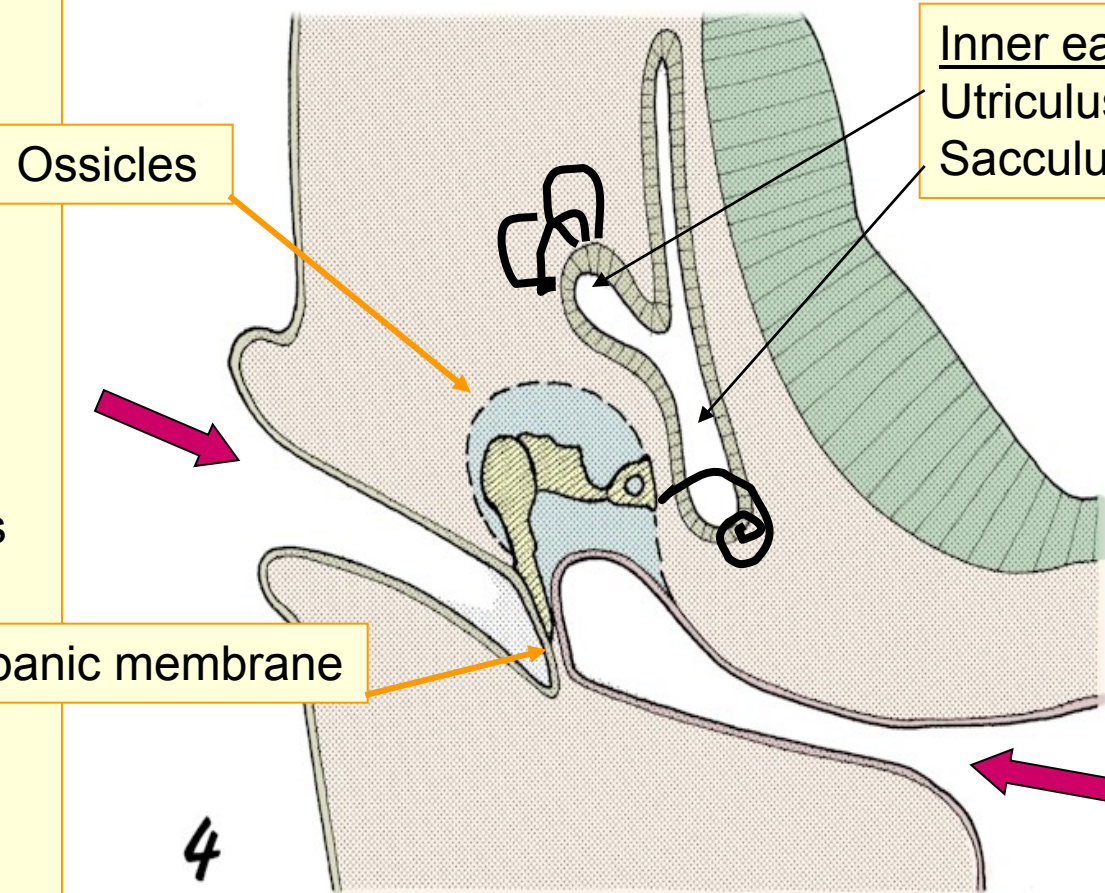
ectodermal
otocyst



EAR



ECTODERM:
Otic placode (1)
(day 22)
Otic pit (2)
Otocyst (3-4)



**The 1st
ectodermal
cleft:**
Meatus acusticus

**The 1st
Endodermal
pouch:**
Auditory tube +
Tympanic cavity

Development of the inner ear

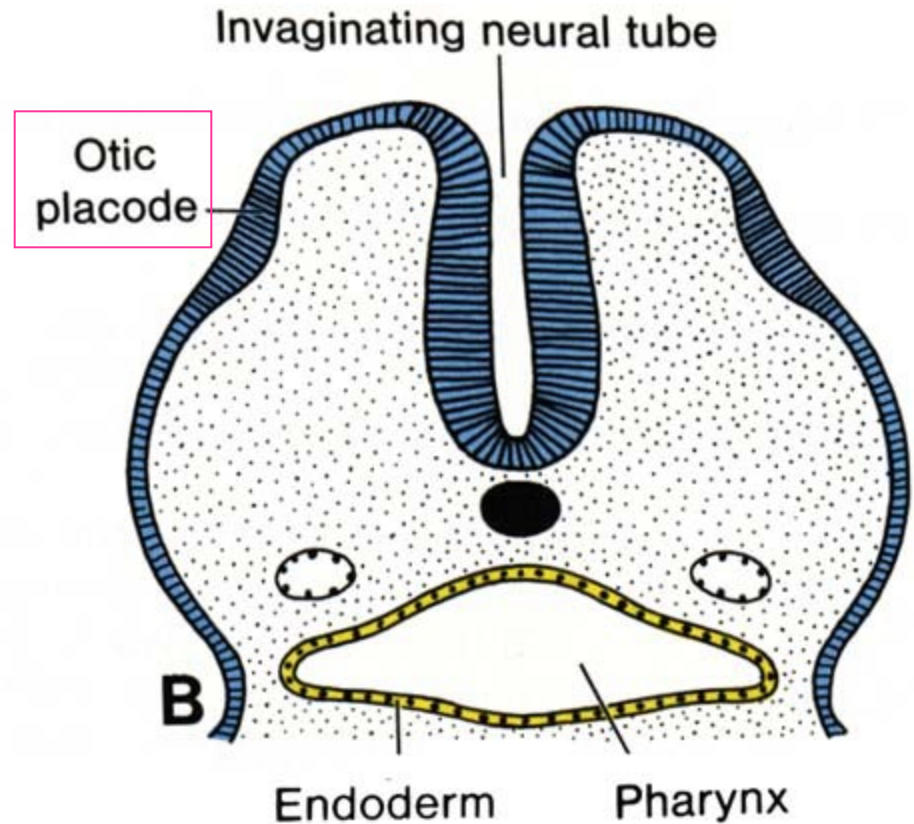
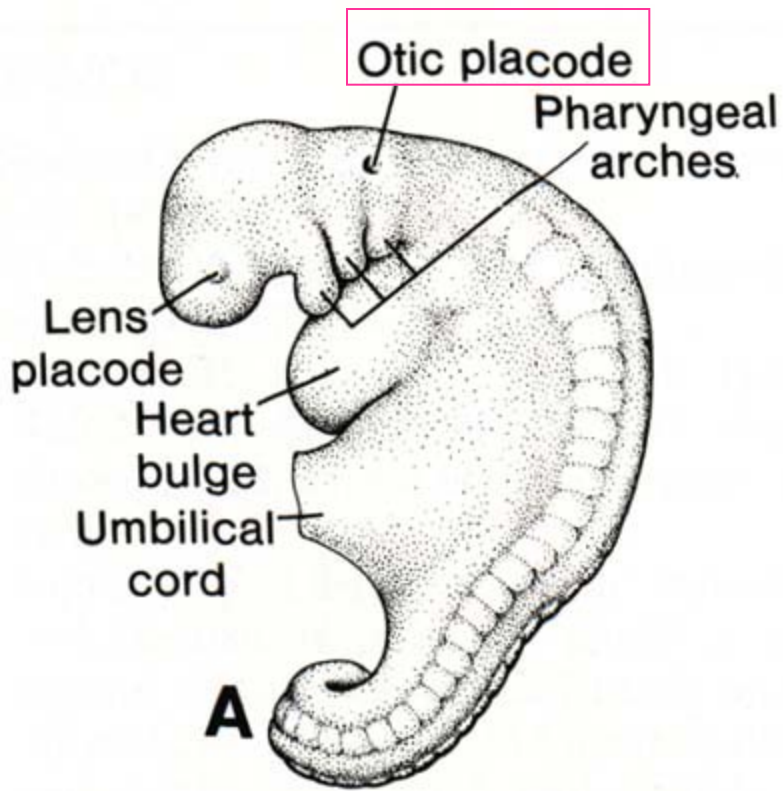


Otic placode – thickening of ectoderm

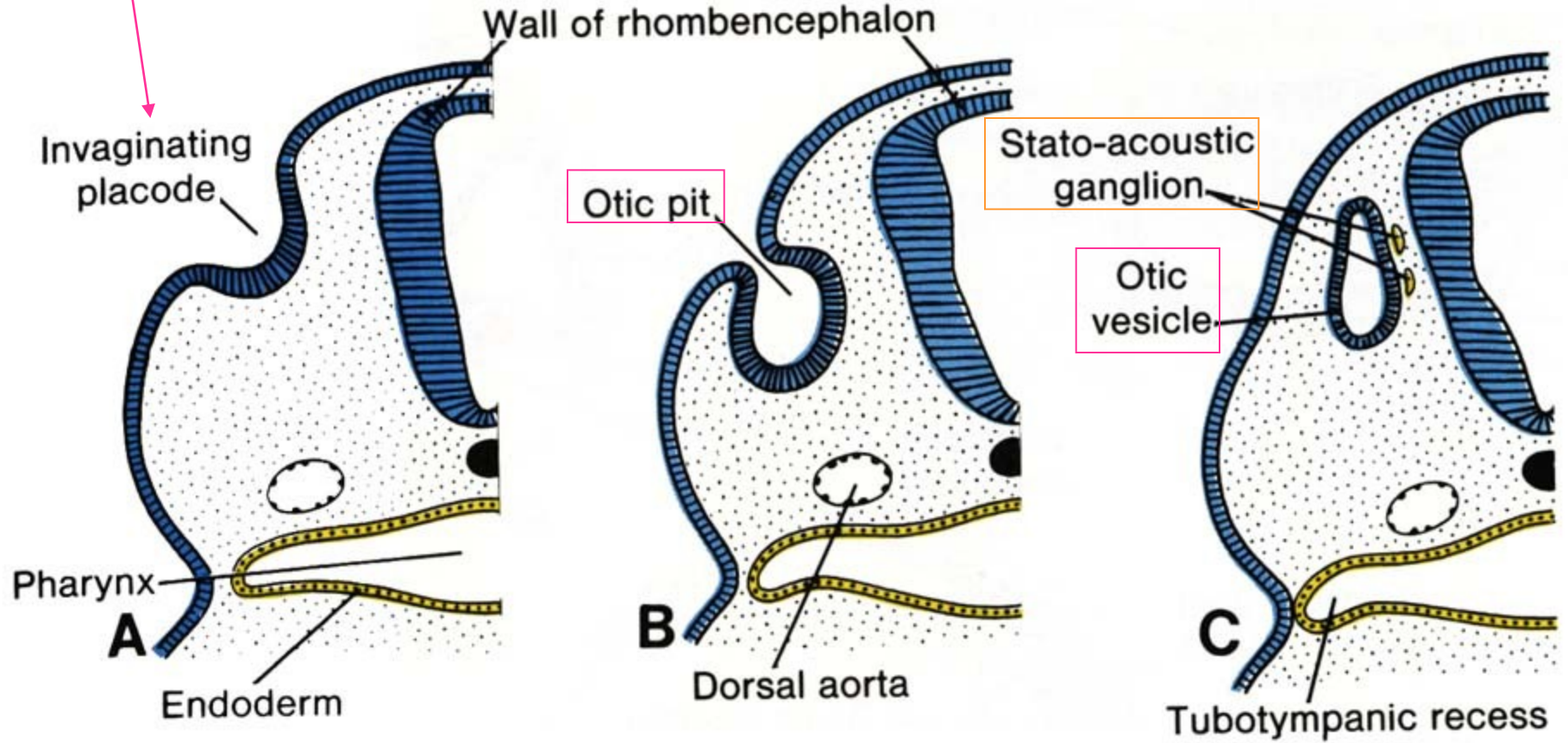
Otic pit

Otic vesicle = otocyst:

epithelium of membranous labyrinth, incl. sense  *originate from ectoderm*



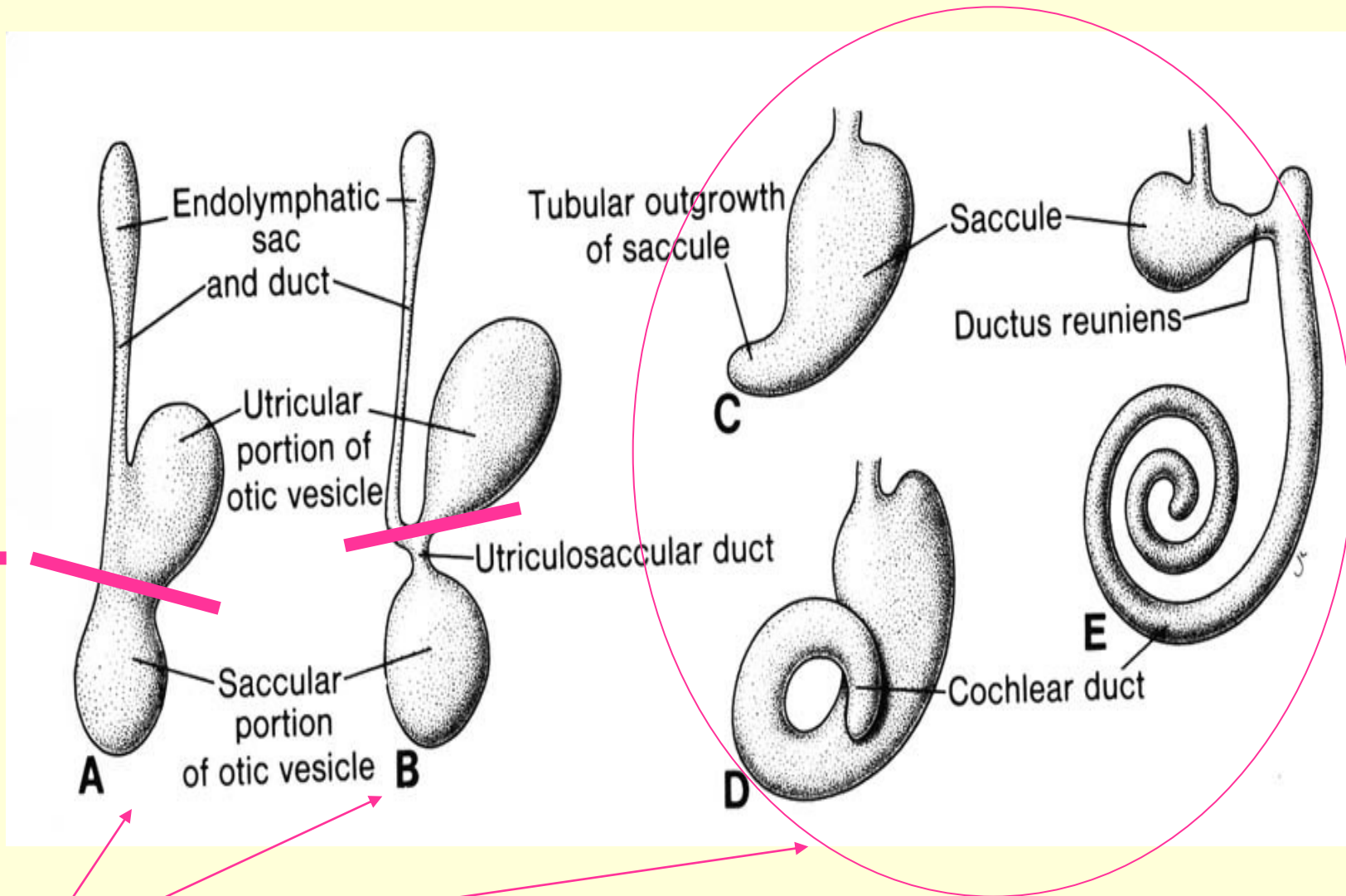
Otic pit \Rightarrow otic vesicle (otocyst)



Differentiation of the otocyst into membranous labyrinth:

D
O
R
S
A
L
L
Y

V
E
N
T
R
A
L
L
Y



Bony labyrinth

from mesenchyme

Cochlea

Vestibulum

Canales semicirculares

Membranous labyrinth

from ectoderm – epithelium
from mesenchyme – rest
(membrana basilaris, perilymphatic spaces and their epithelium)

Ductus cochlearis

Sacculus

Utriculus

Ductus semicirculares

Ductus et saccus

endolymphaticus

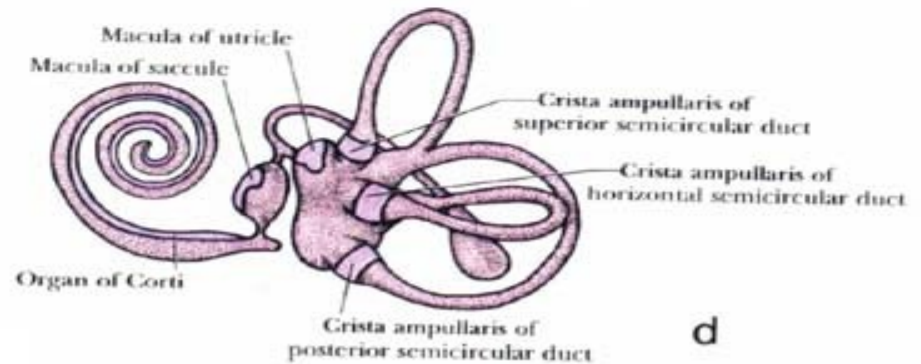
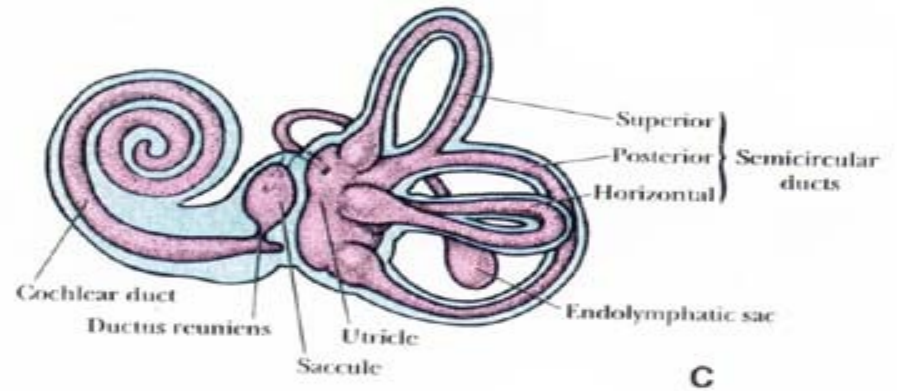
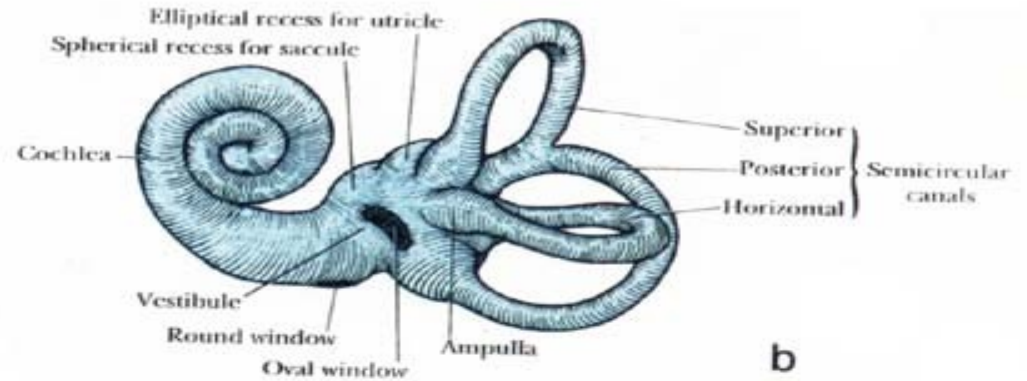
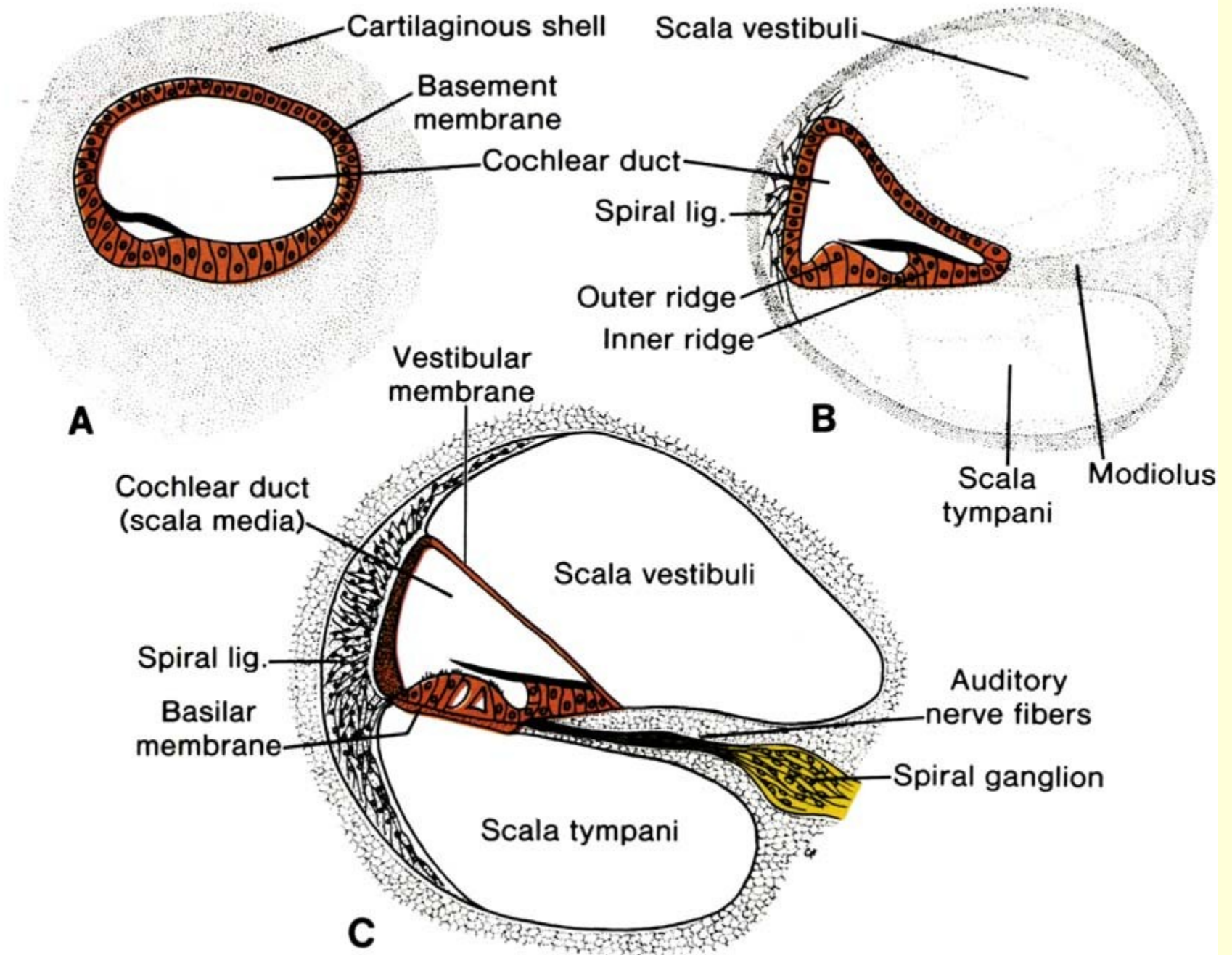
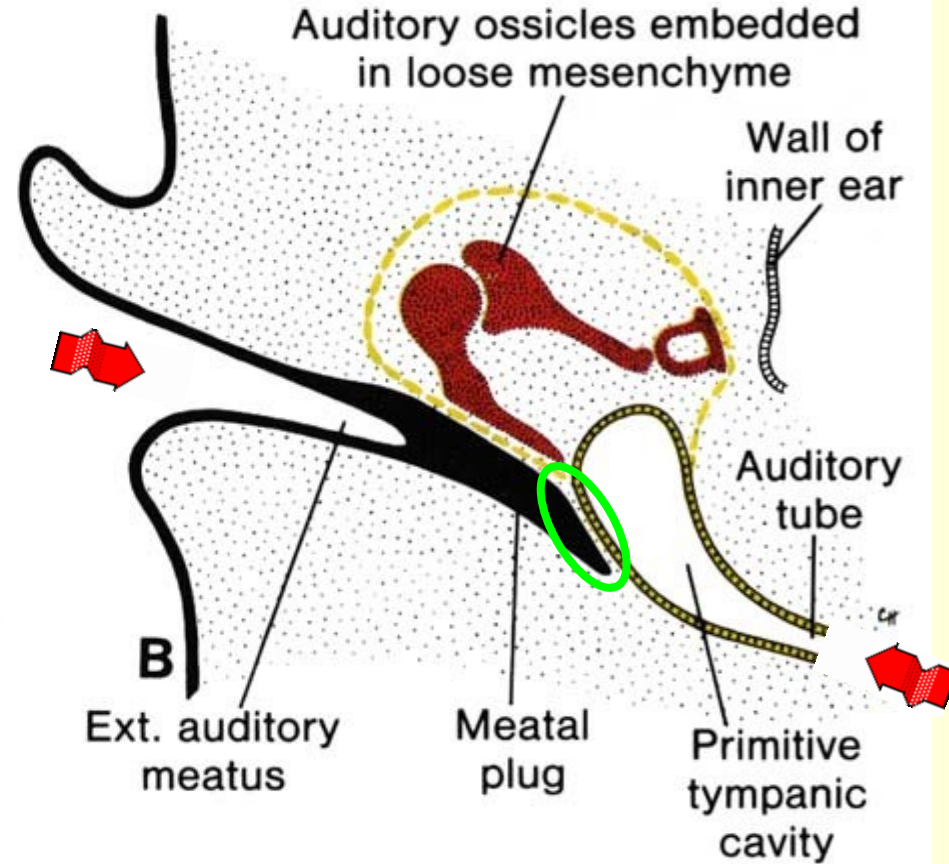
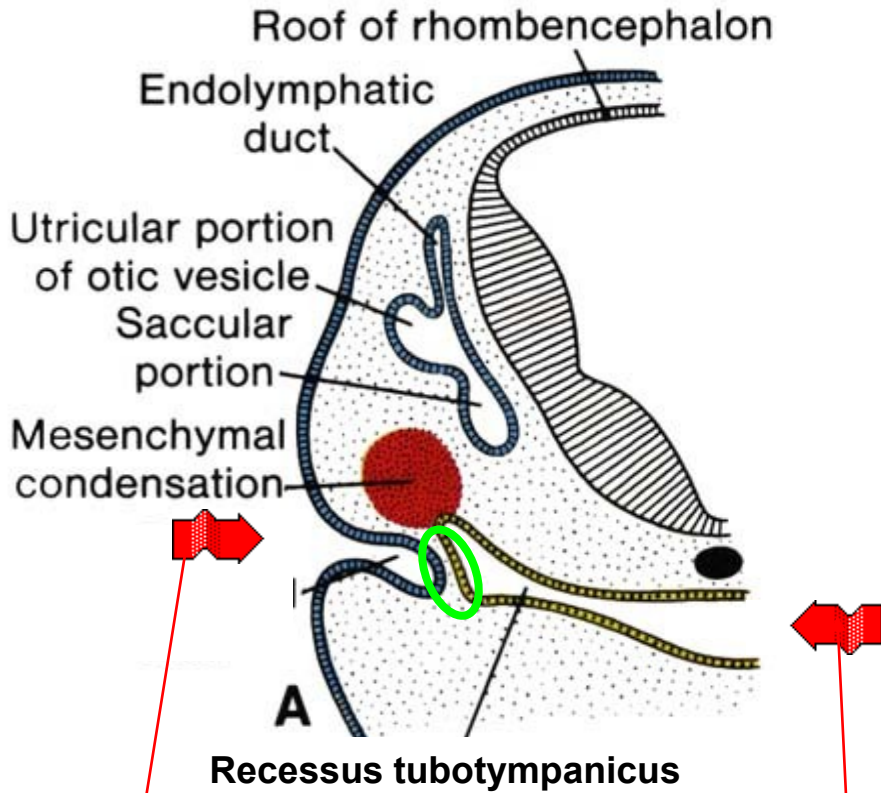


Figure 24.7. b, c, d.



Development of the outer and middle ear



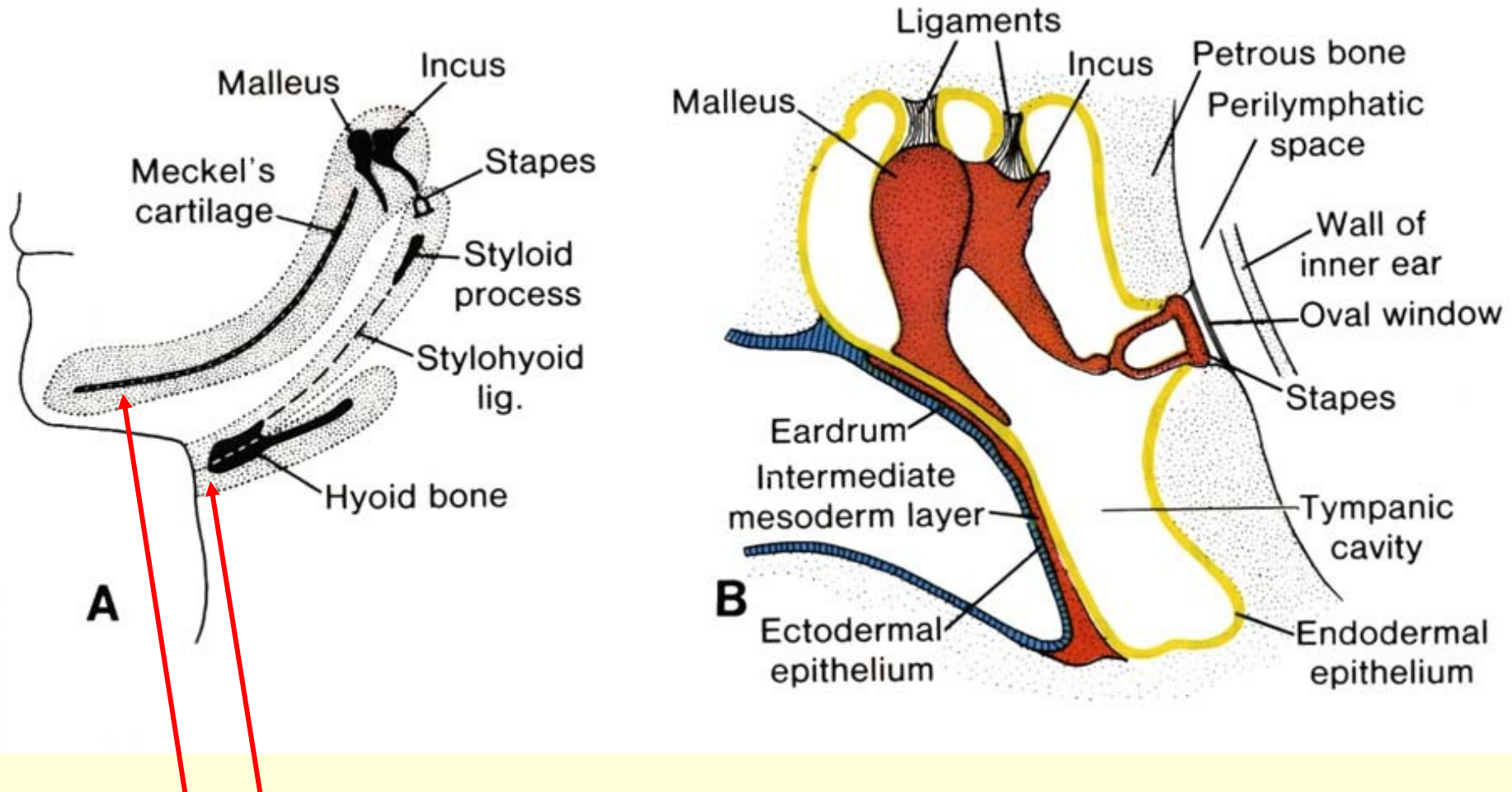
the first ectoderm cleft

the first endoderm pouch

„ear-drum“

Development of tympanic membrane and cavity

Development of the ear ossicles

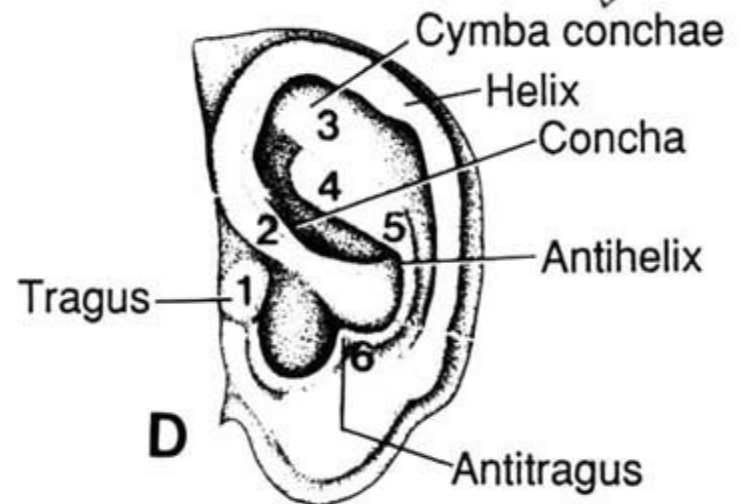
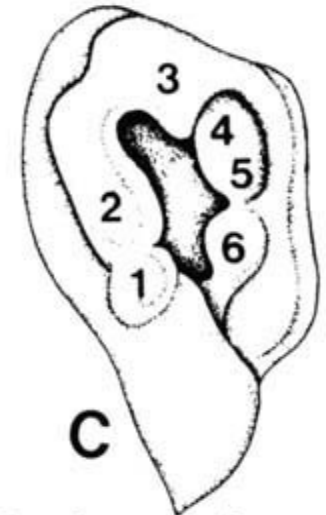
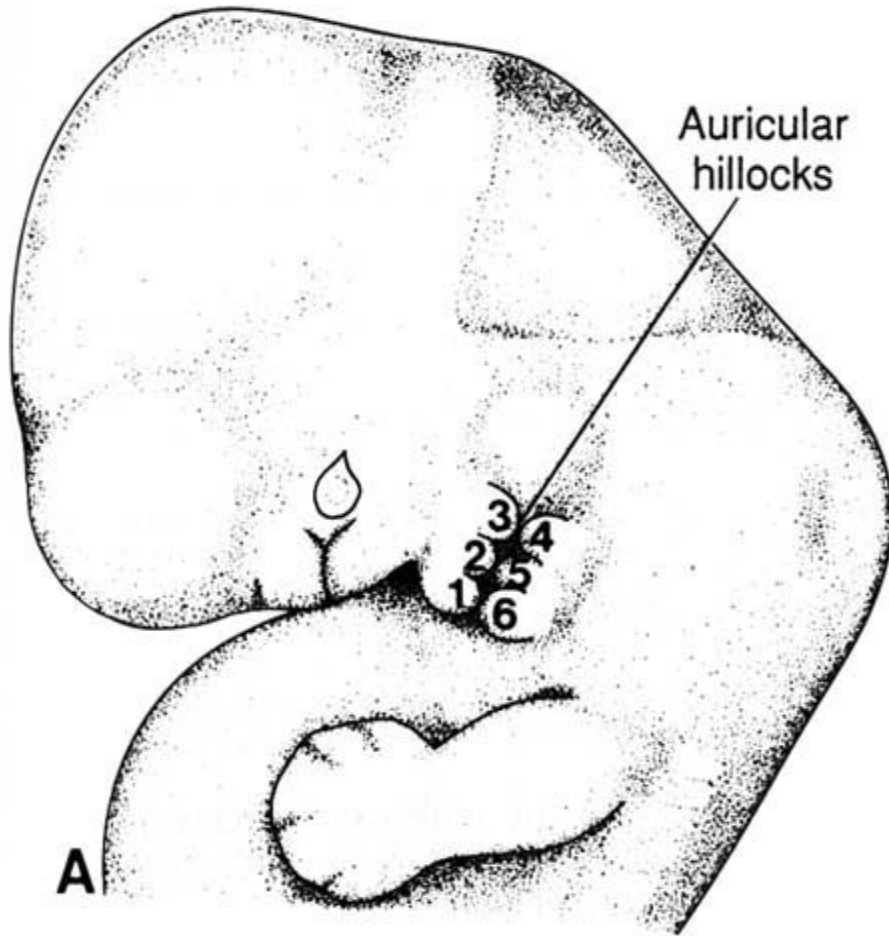


The 1st and 2nd branchial arch: 1 - cartilago Meckeli \Rightarrow malleus, incus
2 - cartilago Reicherti \Rightarrow stapes



Development of the outer ear

from mesenchyme of the 1st and 2nd arch, covered with ectoderm
⇒ 6 tubercles (3 ventral + 3 dorsal)



Teratology: congenital malformations of the ear

- Anomalies of:

- Outer ear:

anotia, macrotia, microtia,
preauricular protuberances
and sinuses, meatus
atresia

- Middle ear: congenital
fixation of stapes

- Inner ear: aplasia –
hypoplasia of labyrinth
(rubeola in mother), salicyl
preparates using during the
1st trimester)

Hypacusia or deafness:

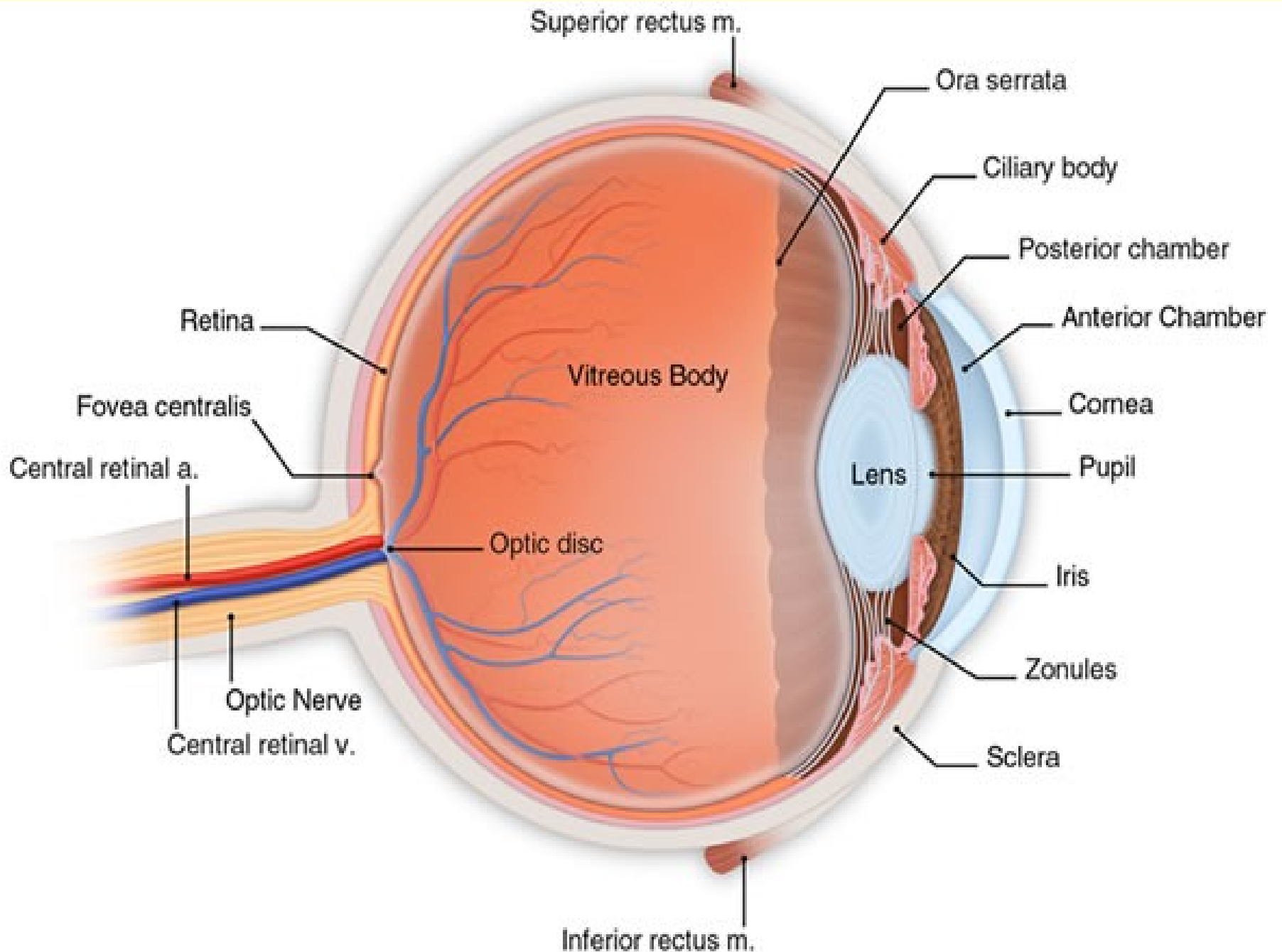
conductive

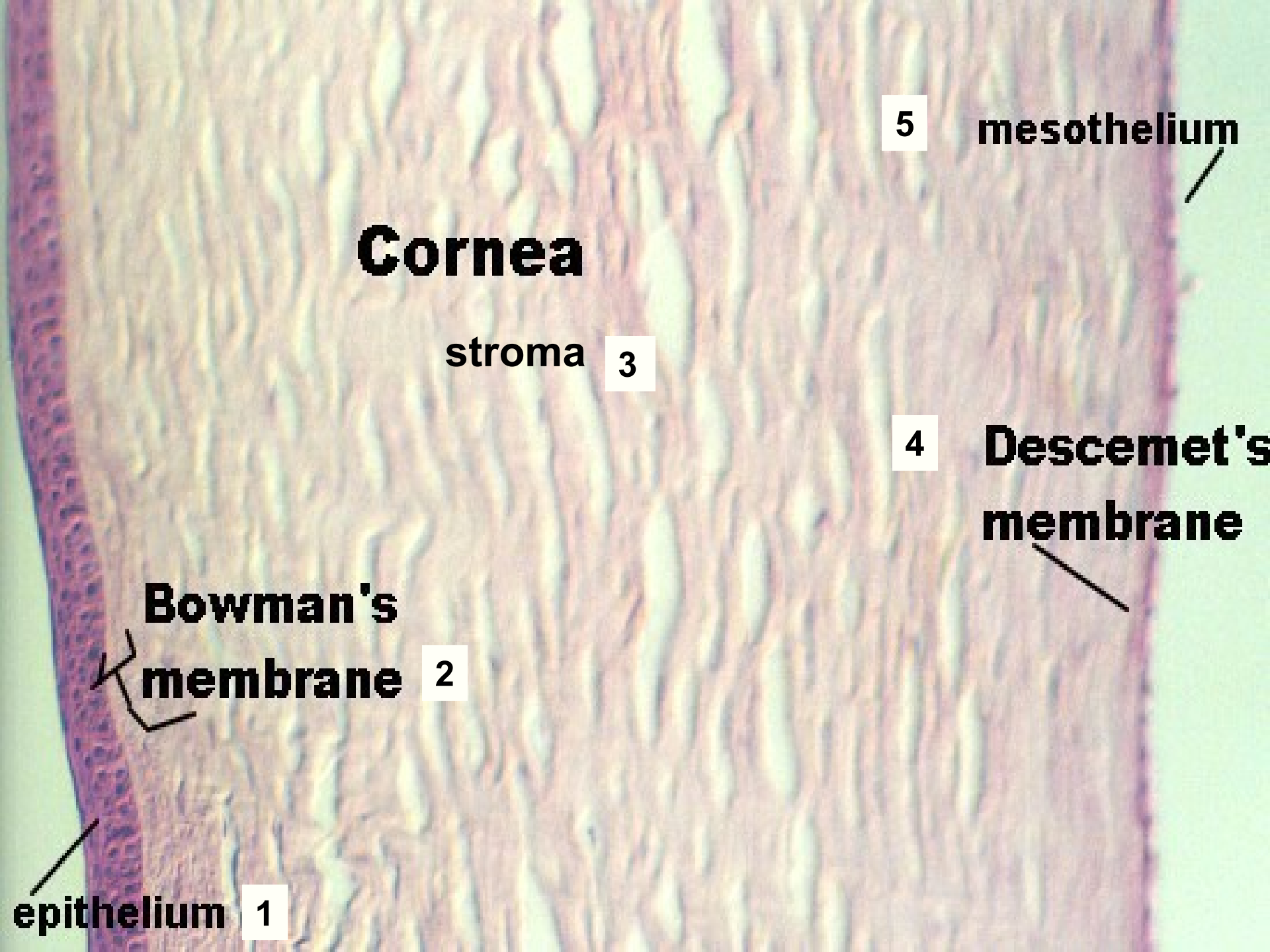
sensorineural (perceptive)



Repetition: sensory organs

- An overview of structural units of the retina.
 - Microscopic structure of the retina, synapses between neurons.
 - Microscopic structure of the sclera and cornea.
 - Choroid, corpus ciliare, iris.
 - Dioptric media of the eye (cornea, aqueous humor, lens and vitreous body).
 - Accessory apparatus of the eye (palpebra, lacrimal apparatus, conjunctiva, extraocular muscles).
-
- Microscopic structure of outer and middle ear.
 - Microscopic structure of inner ear – the organ of balance.
 - Microscopic structure of inner ear – the organ of hearing (ductus cochlearis, organ of Corti).





Cornea

stroma

5

mesothelium

3

4

Descemet's
membrane

Bowman's
membrane

2

epithelium

1

