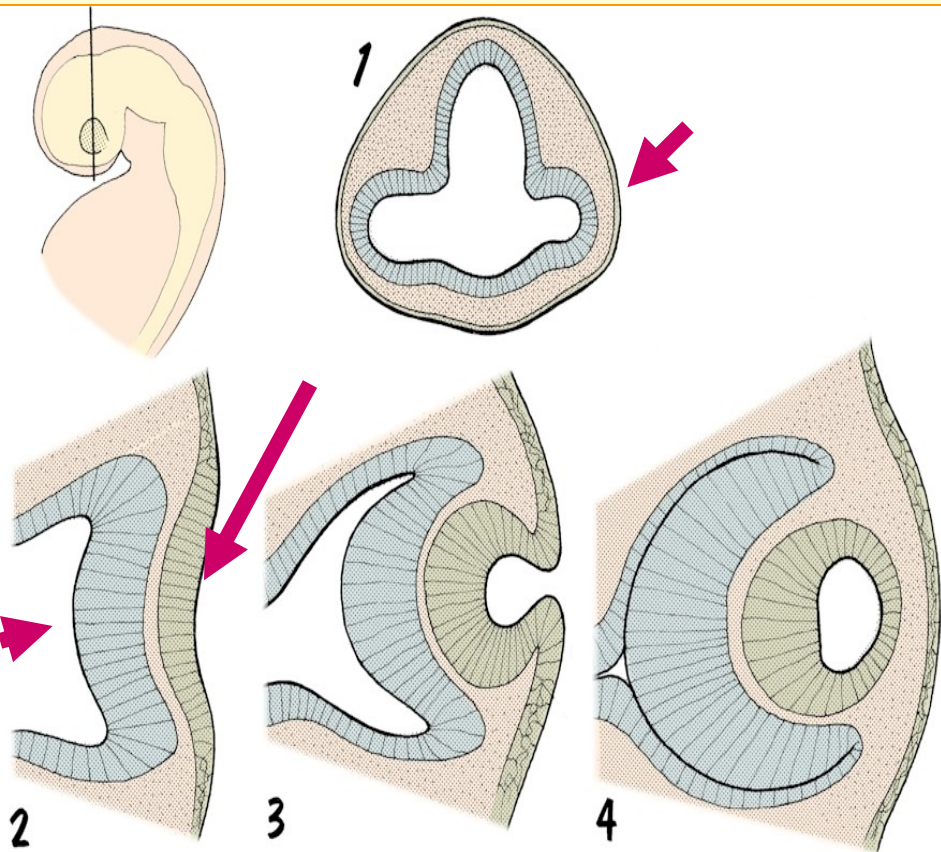
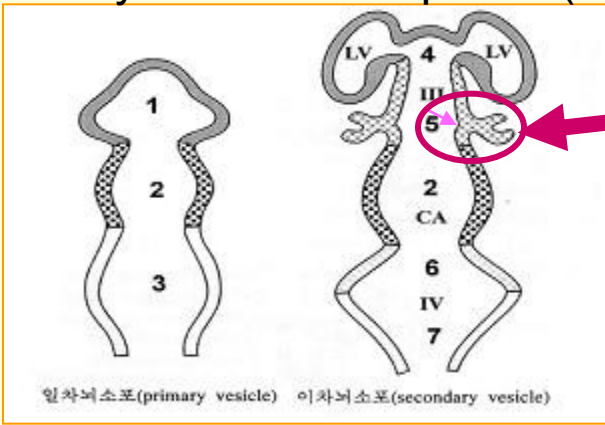


Embryology /organogenesis/

Development and teratology of
sensory organs

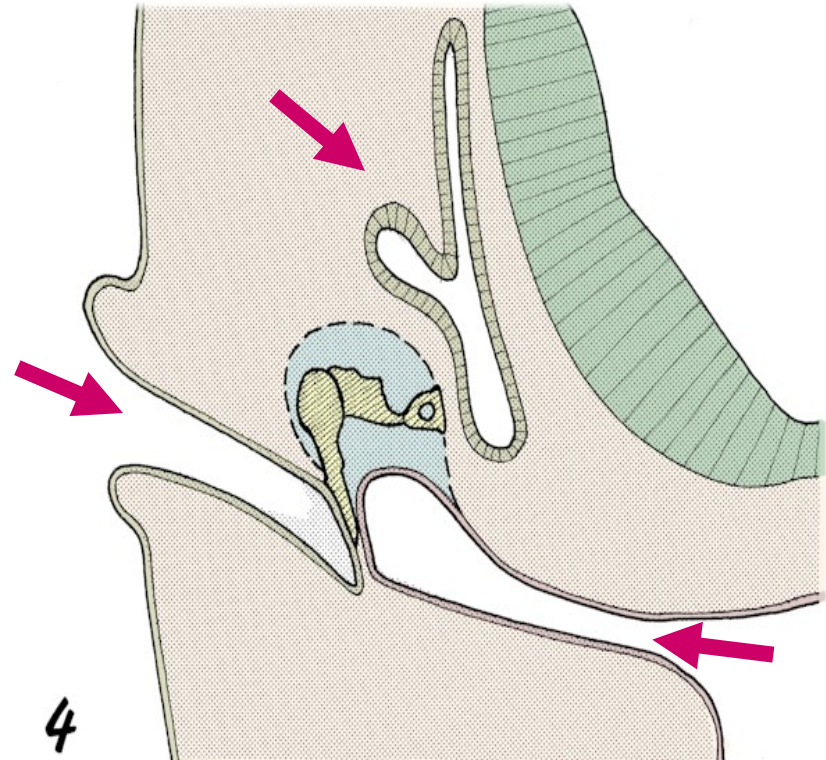
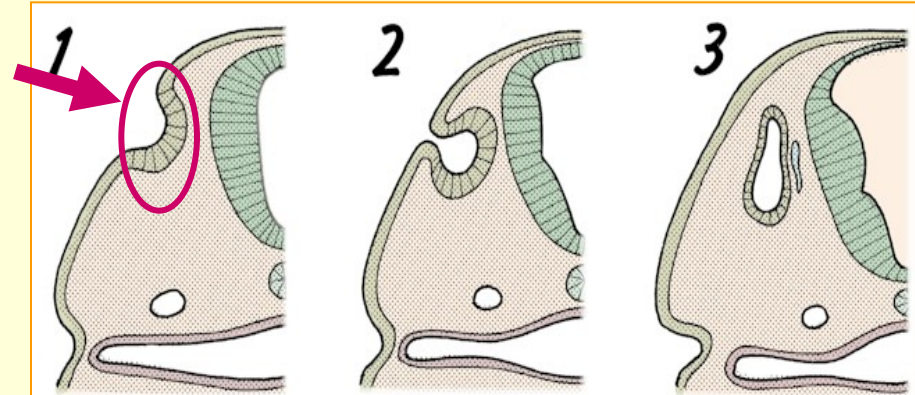
EYE

Day 22: sulcus opticus (neuroectoderm)

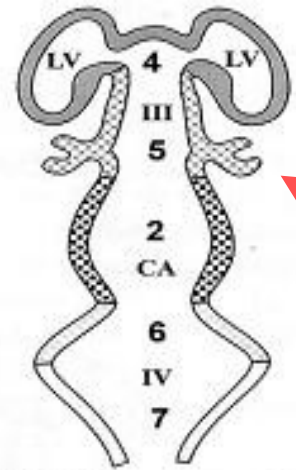
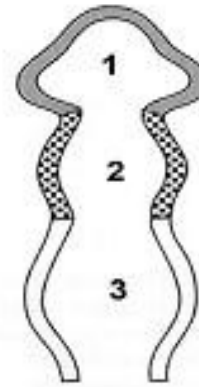


EAR

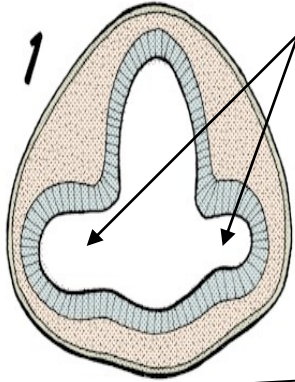
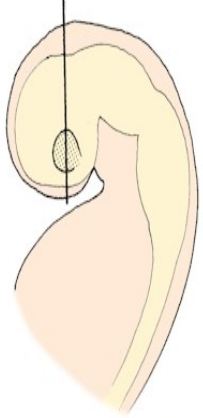
Day 22: otic placode (ectoderm)



EYE



일차뇌소포(primary vesicle) 이차뇌소포(secondary vesicle)

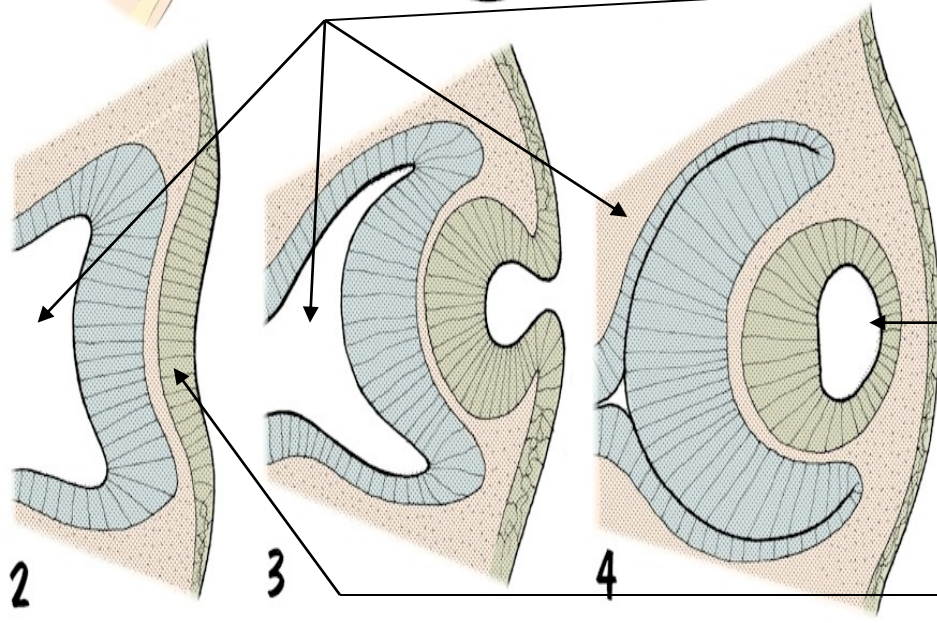


Sulcus opticus (1)

Optic vesicle → cup (2-3)
(week 4)

Lens placode (2)

Lens vesicle (2-3)



DEVELOPMENT of the EYE

NEUROECTODERM:

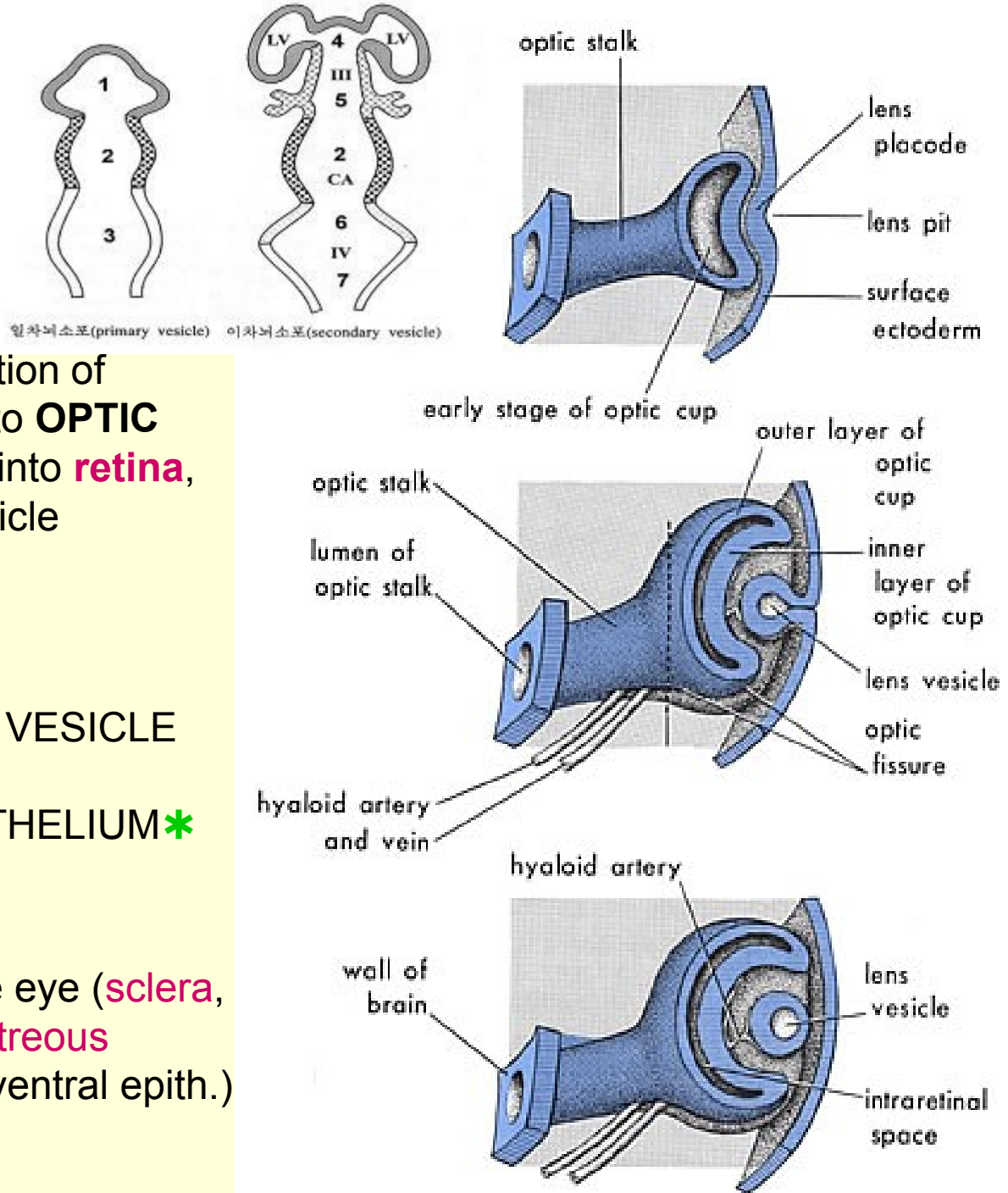
OPTIC GROOVE (evagination of prosencephalon) give rise to **OPTIC VESICLE (CUP)** develops into **retina**, **OPTIC STALK** of optic vesicle give rise to **optic nerve**

ECTODERM:

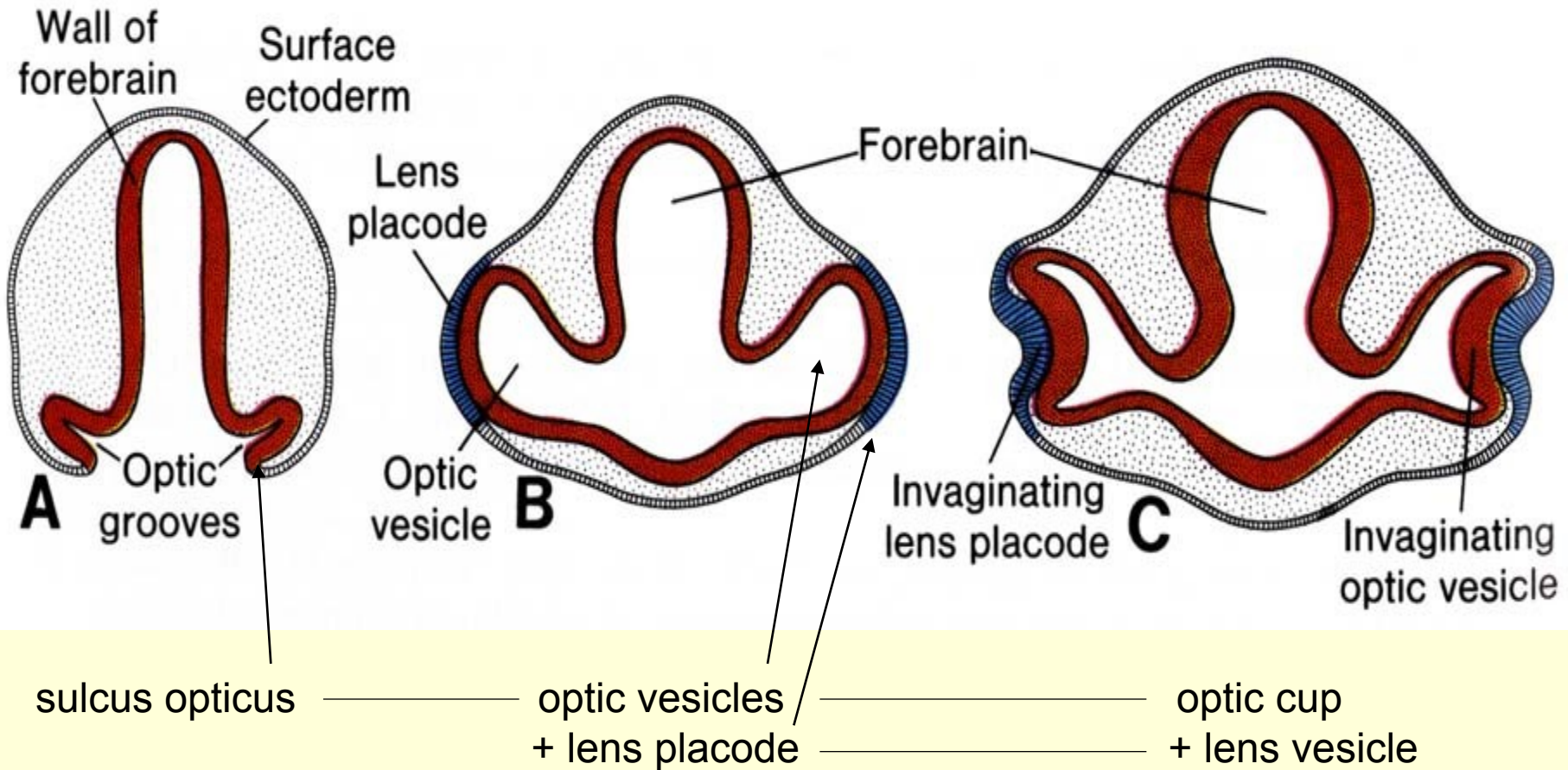
LENS PLACODE ⇒ **LENS VESICLE** and **VENTRAL CORNEAL EPITHELIUM***

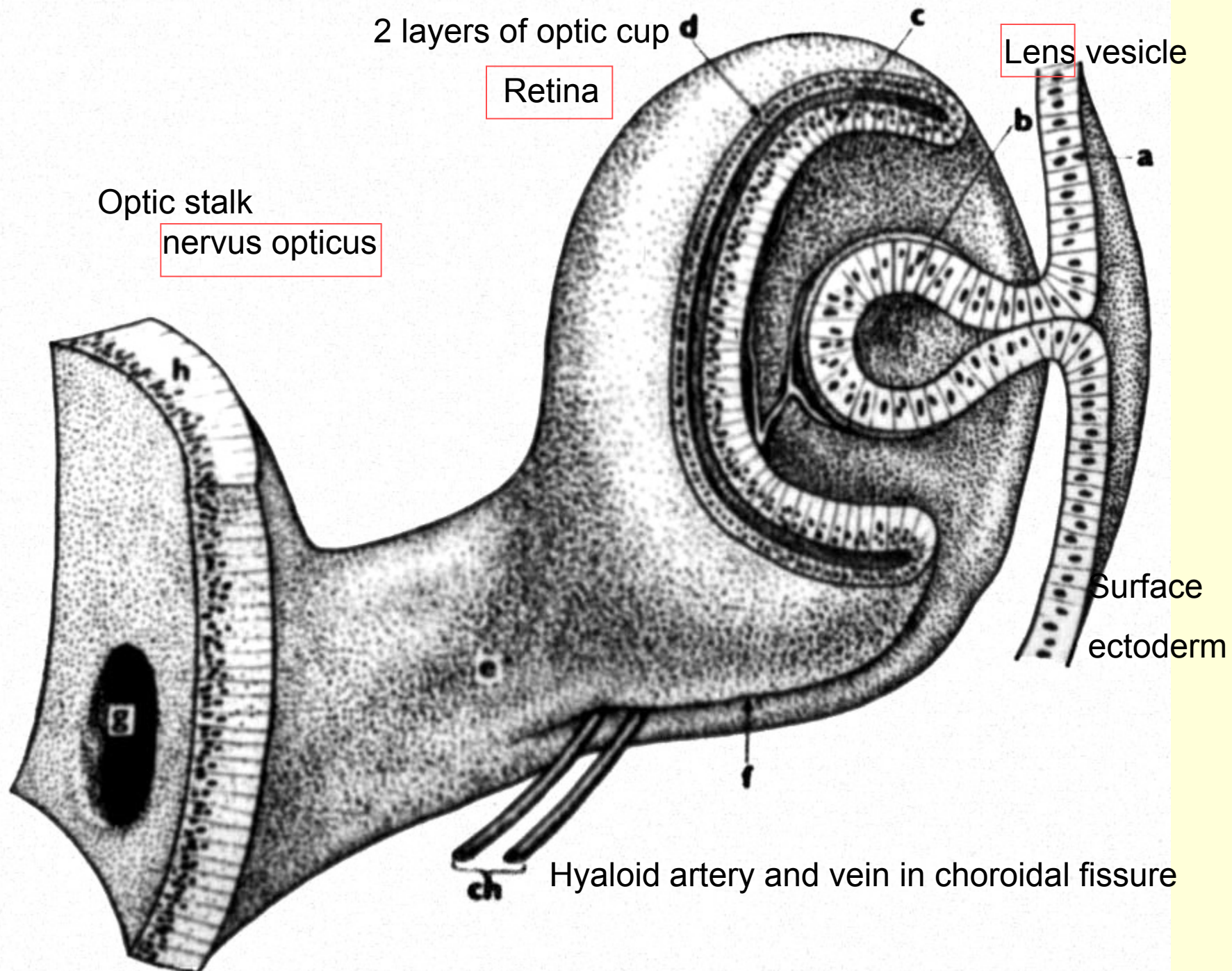
MESENCHYME:

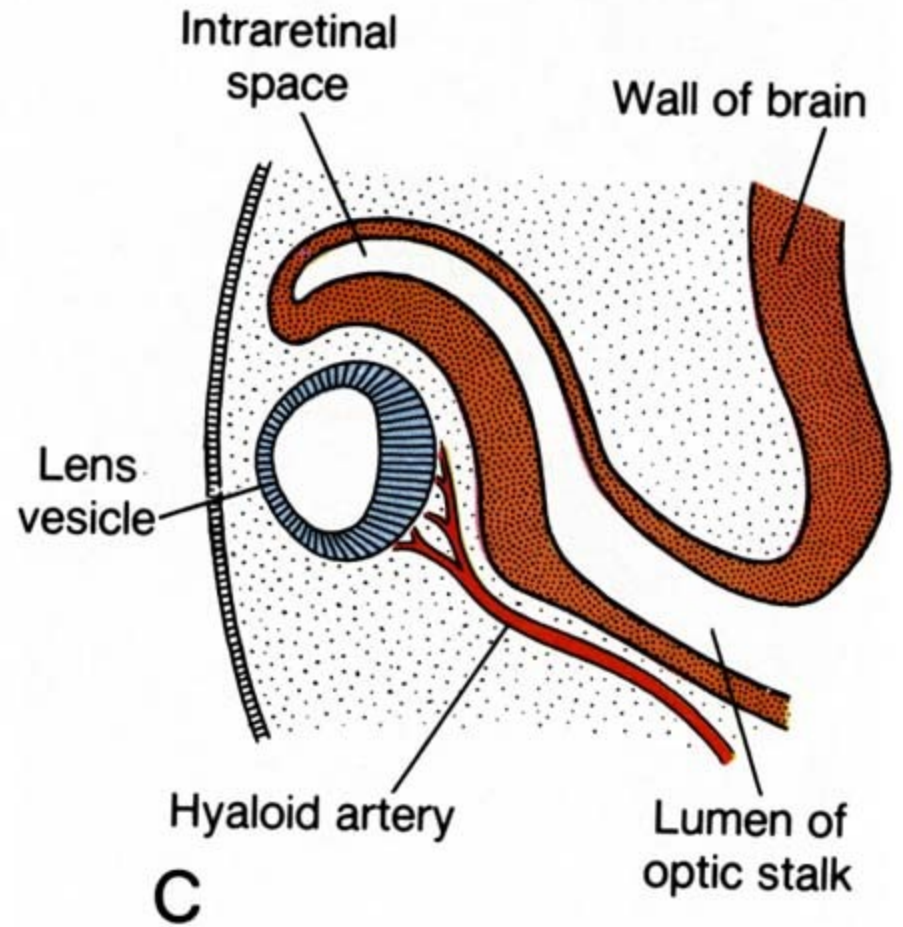
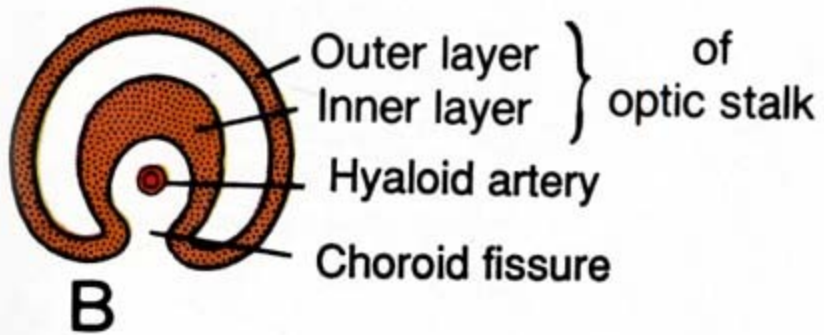
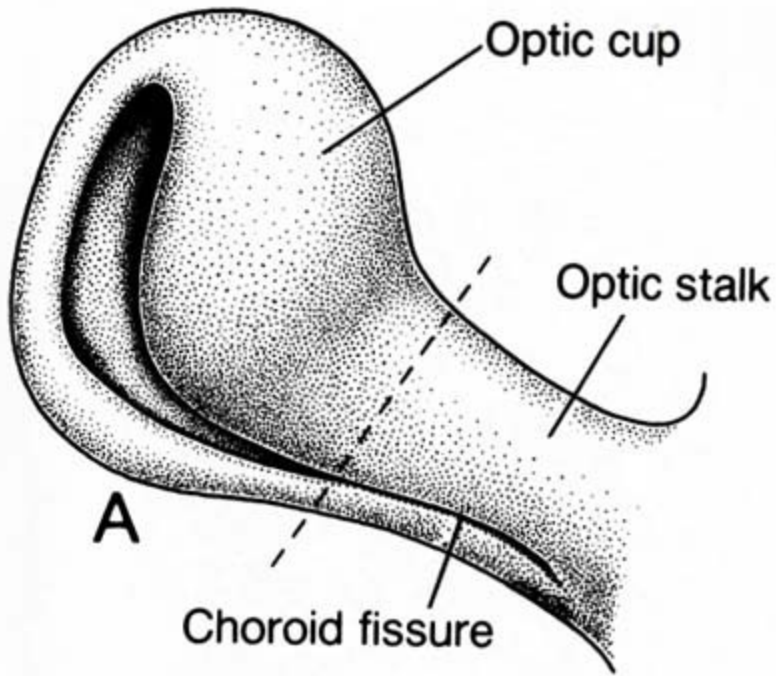
all other components of the eye (**sclera**, **choroid**, **ciliary body**, **iris**, **vitreous body**, **cornea** except its * ventral epith.)

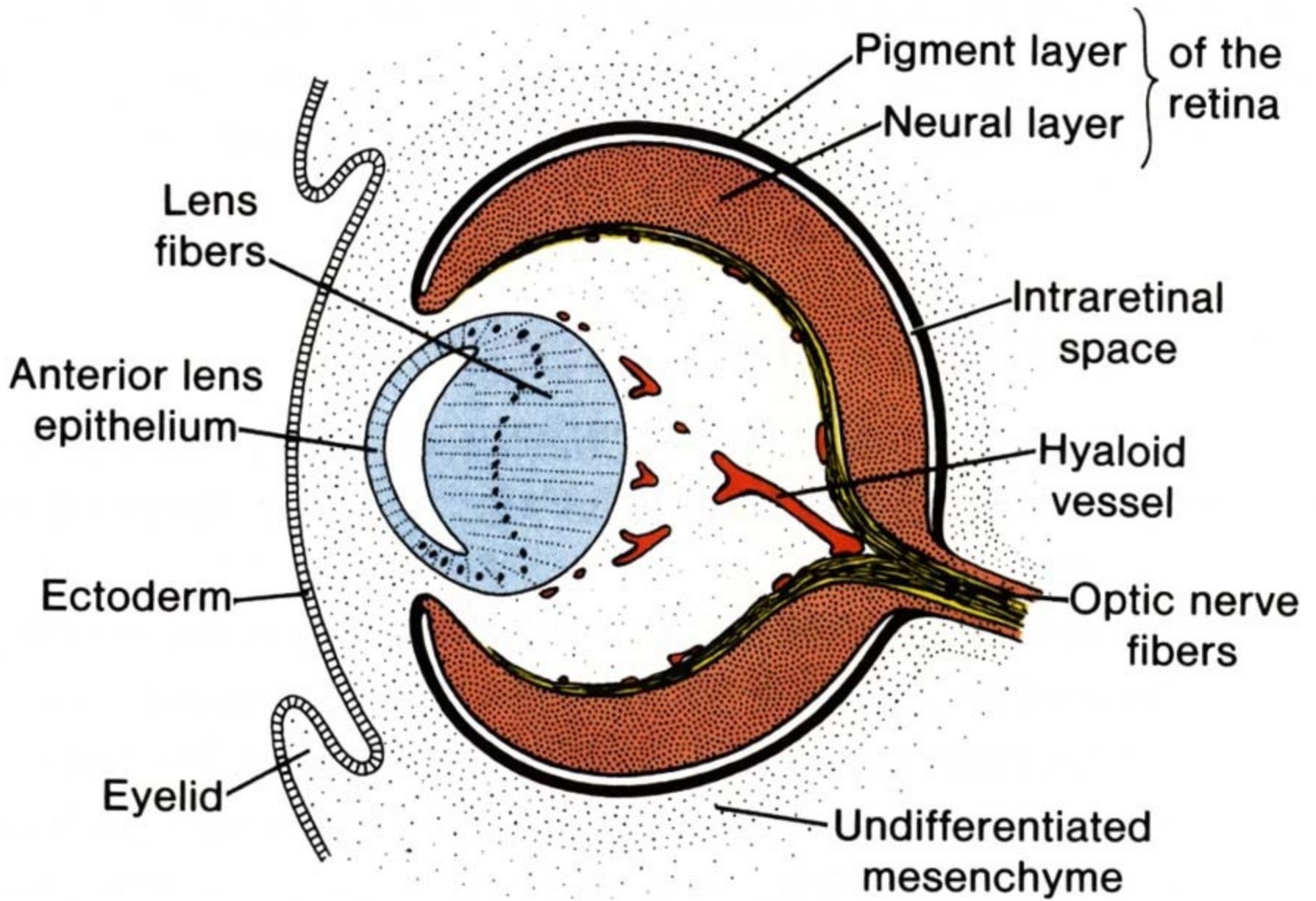


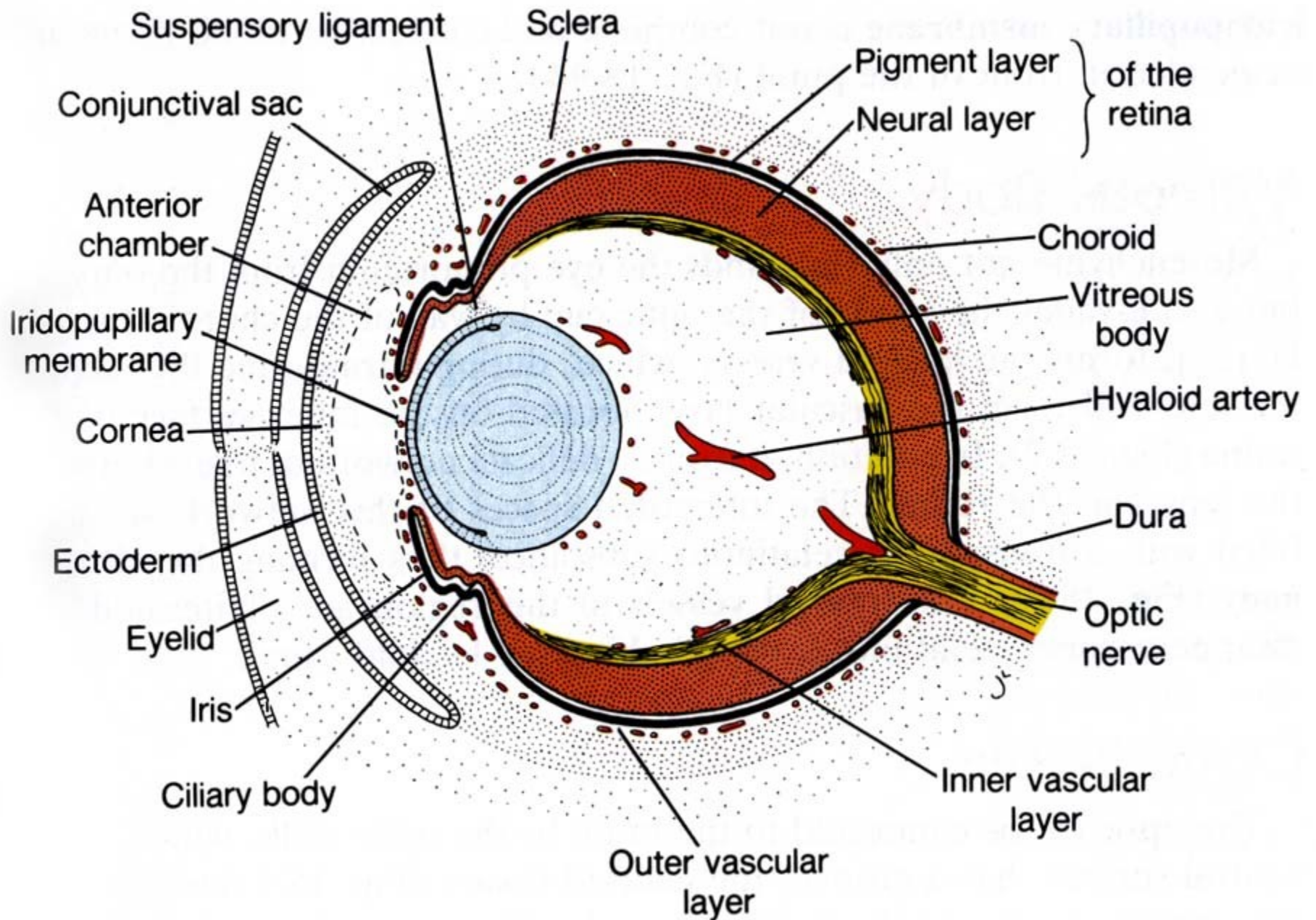
Development of the eye











IN EYEBALL:

Retina – from neuroectoderm of mesencephalon

Lens cristalina – from ectoderm

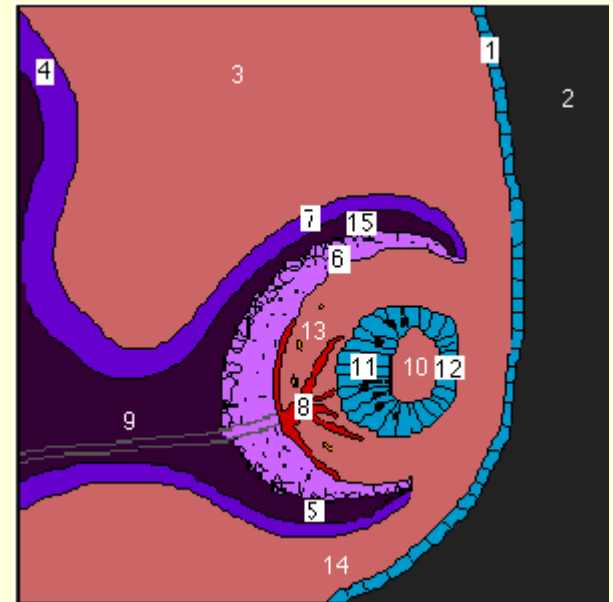
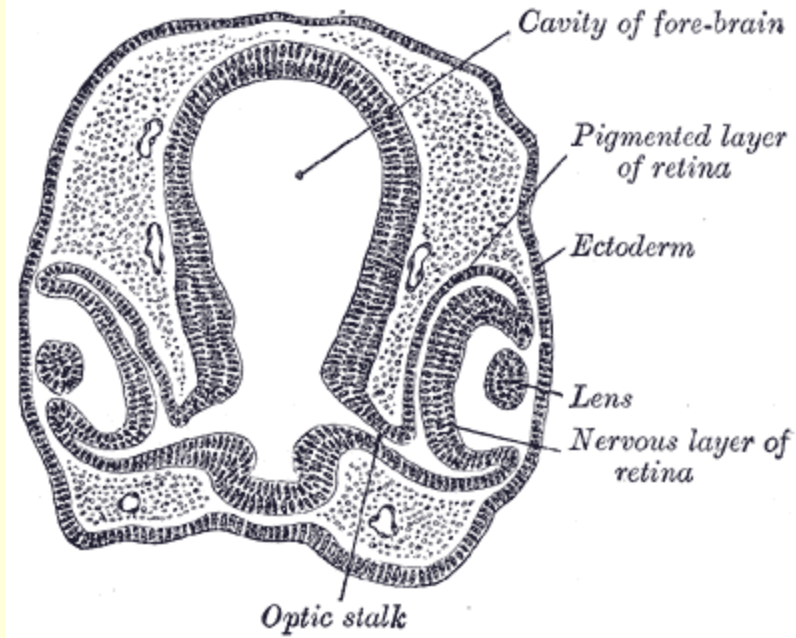
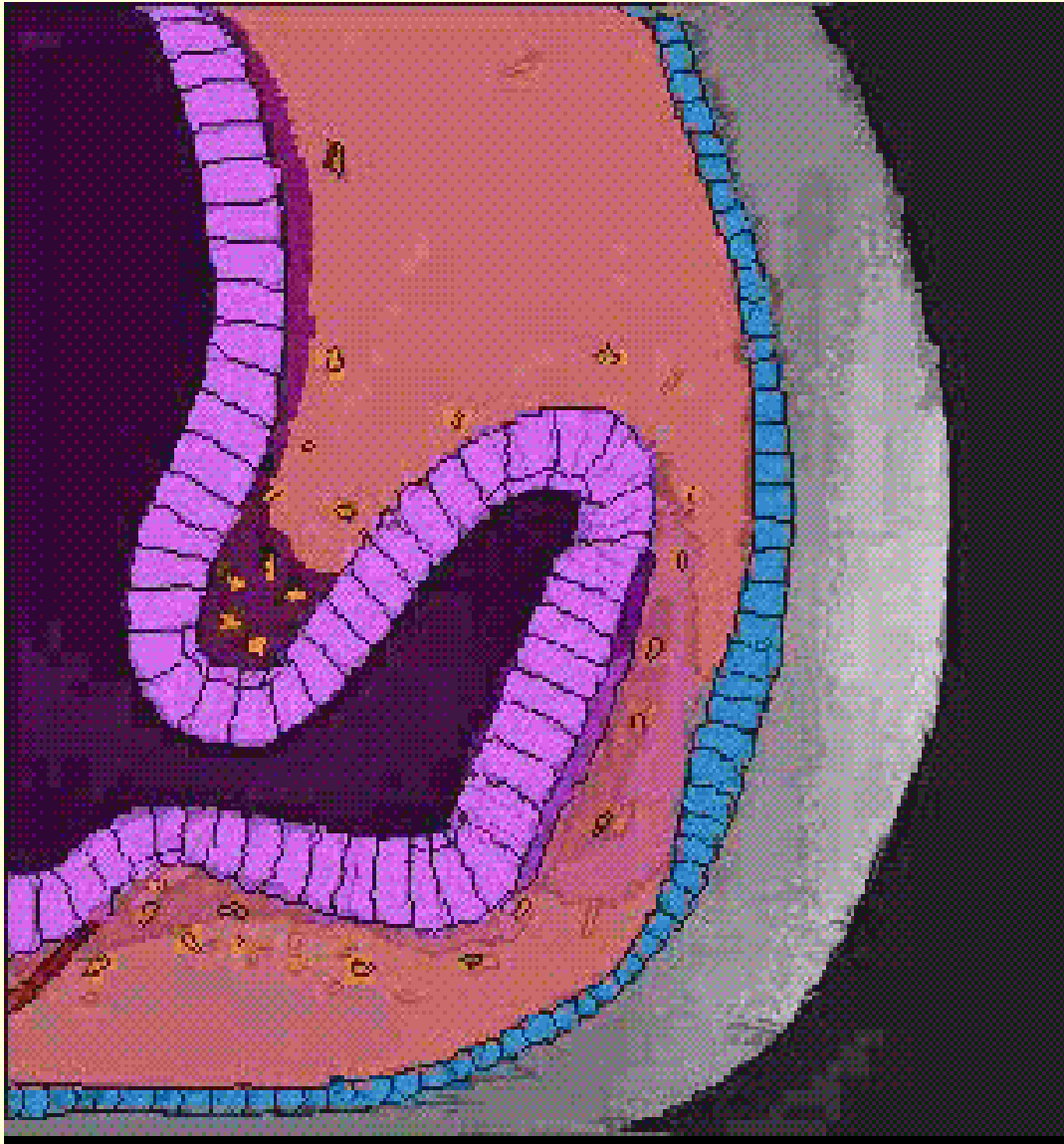
Conjunctival epithelium – from ectoderm

All other – from mesenchym

EYELID

– from ectoderm + mesenchym

Lens growth is induced by optic vesicle



(picture is animated)

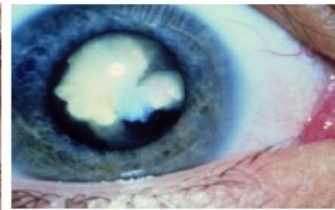
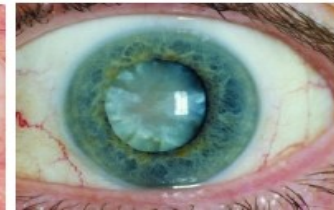
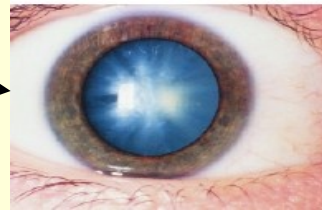
Teratology of the eye



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



no lens



auricle



mesenchyme tubercles (6)

external acoustic meatus



the 1st pharyngeal cleft

tympanic cavity, Eustachian tube

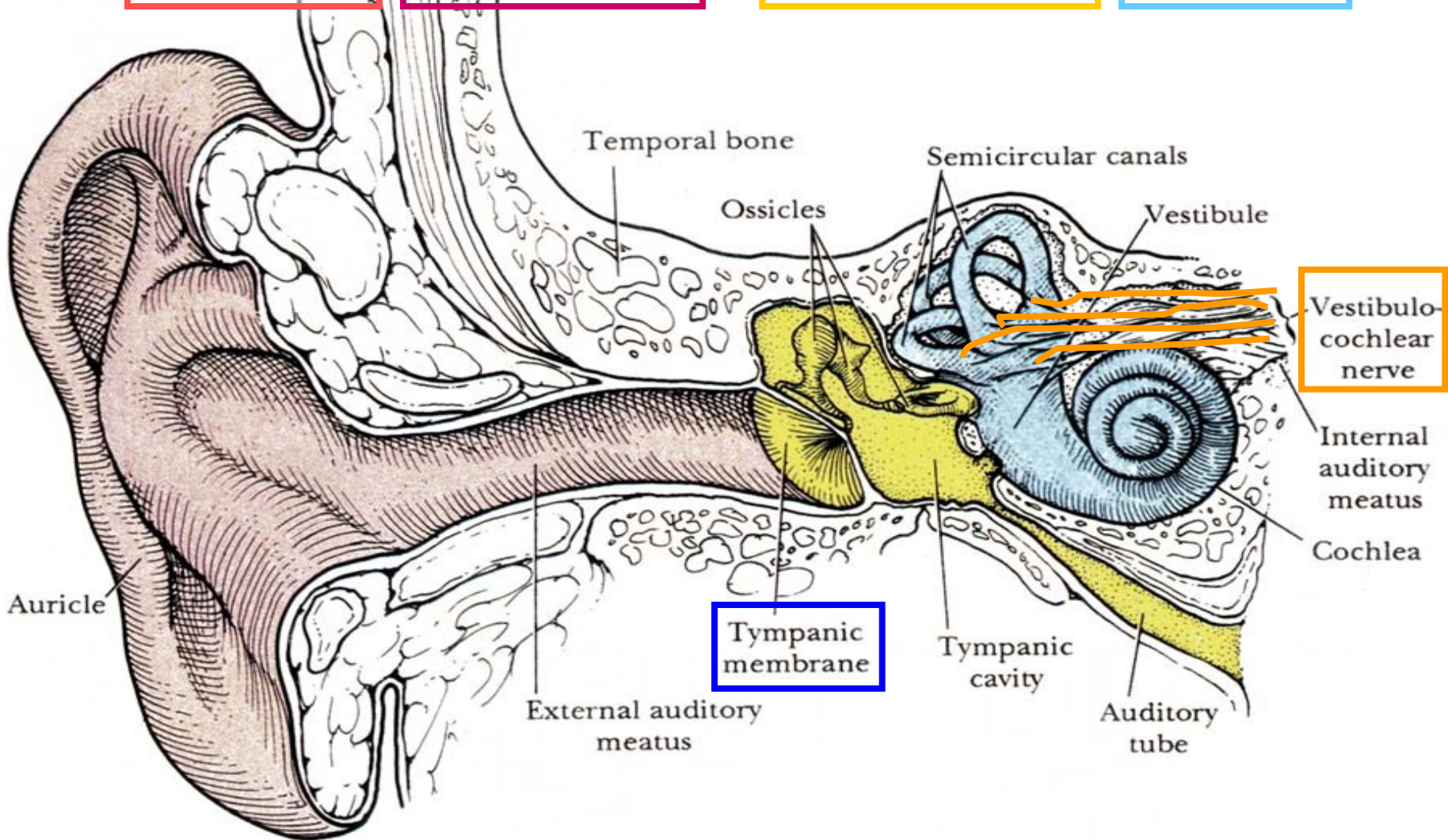


the 1st pharyngeal pouch

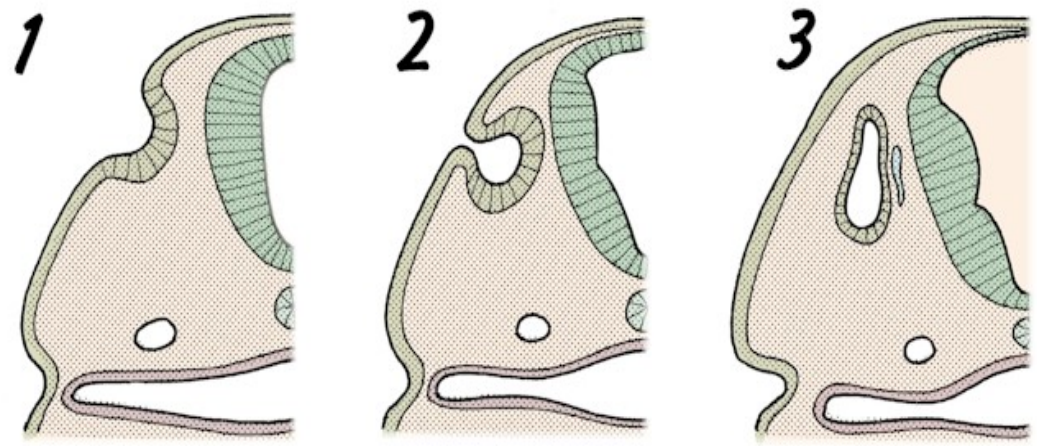
inner ear



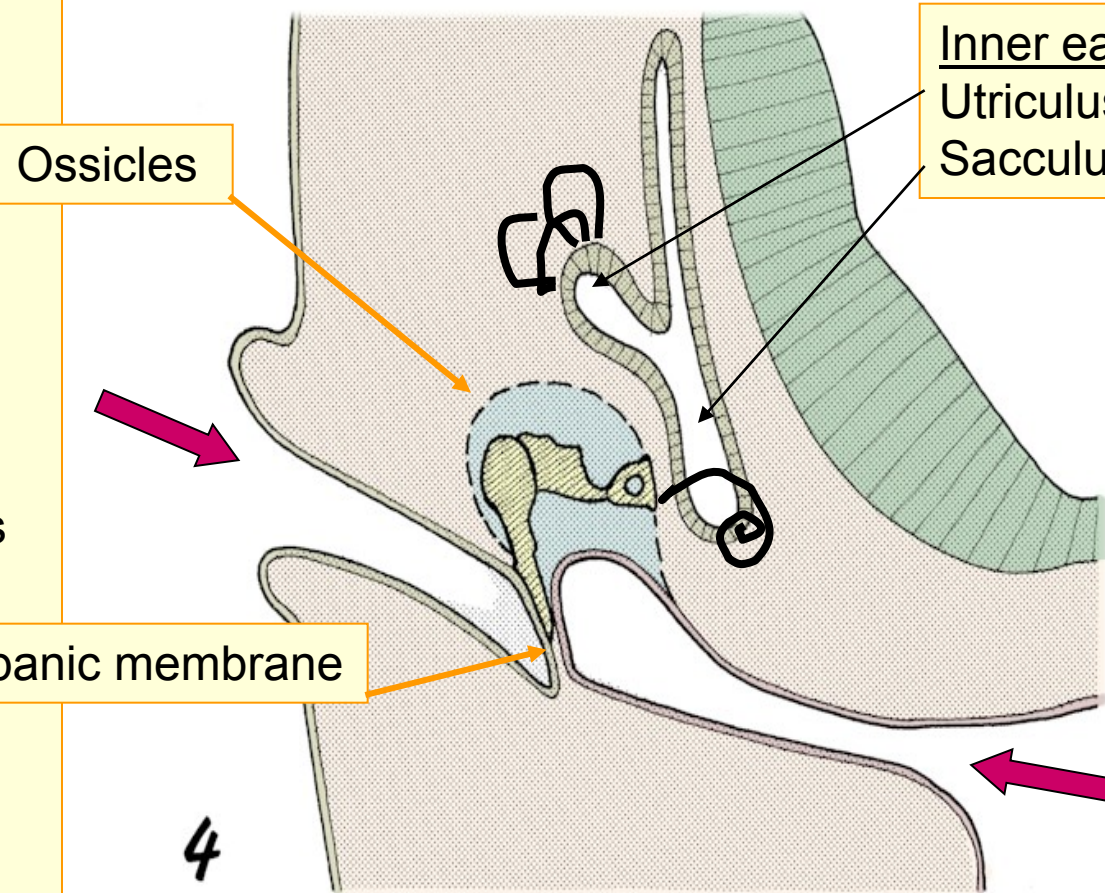
ectodermal otocyst



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

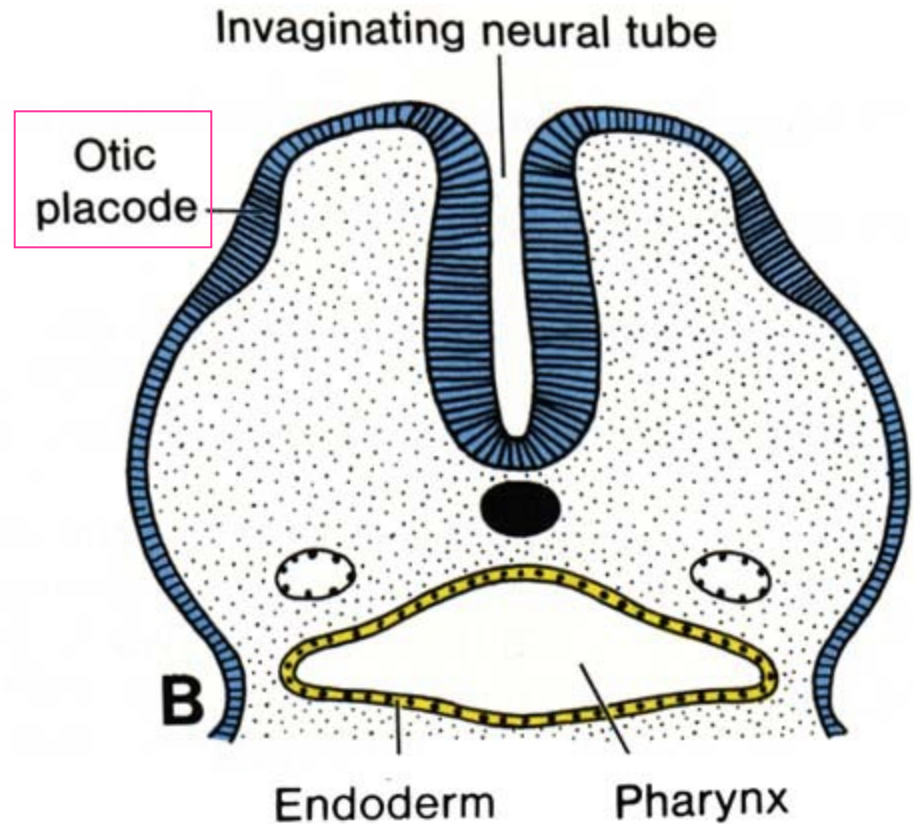
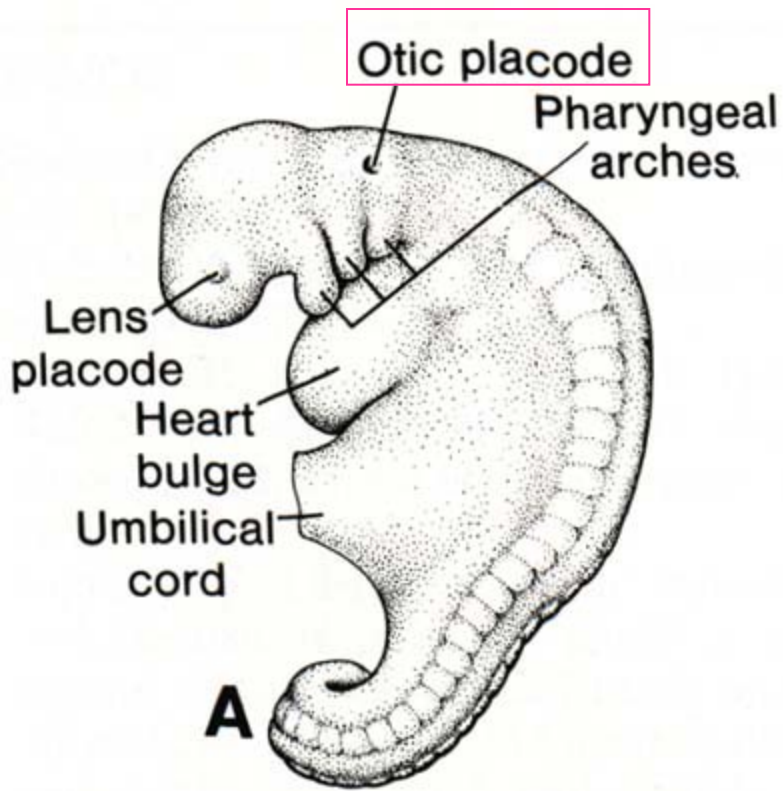


Otic placode – thickening of ectoderm

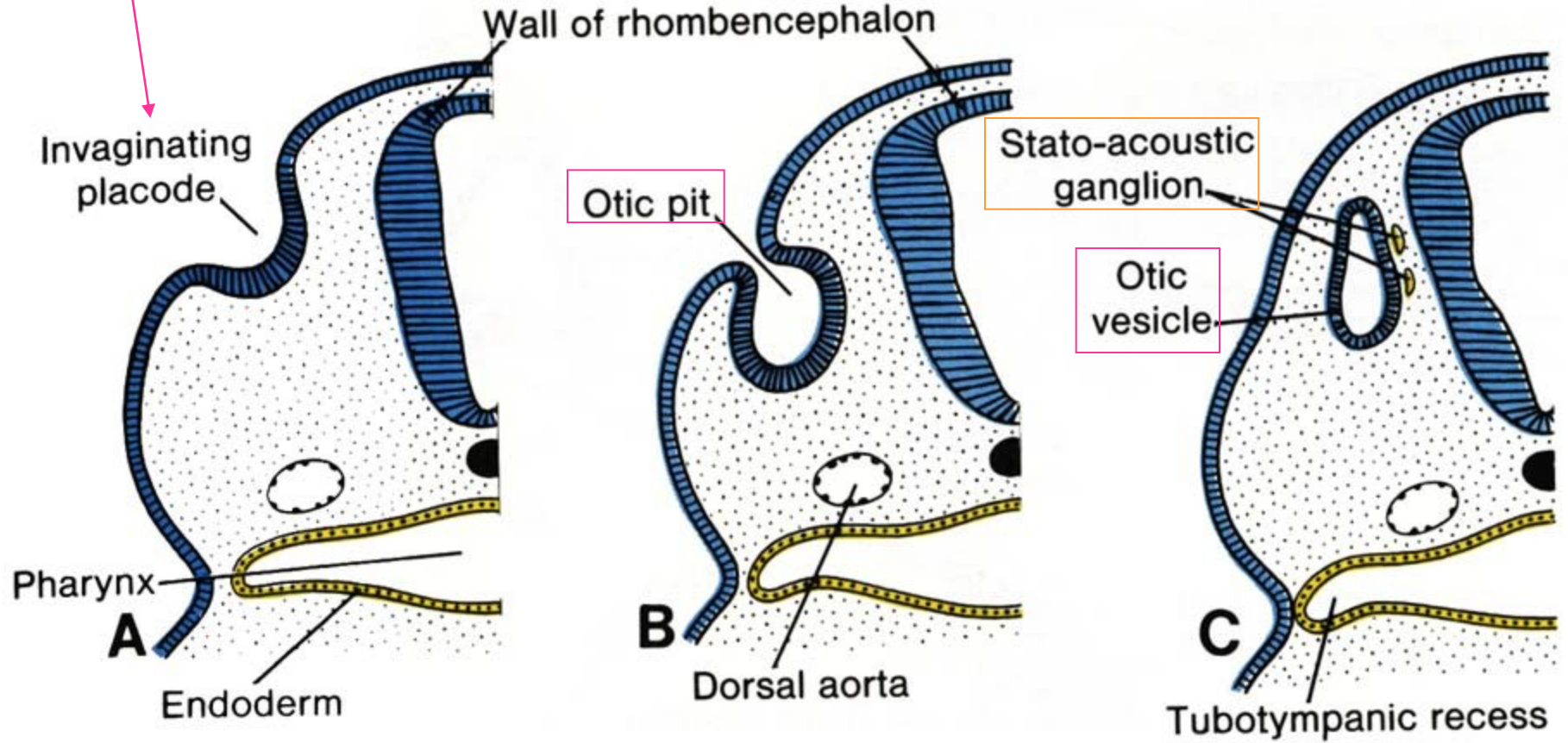
Otic pit

Otic vesicle = otocyst:

epithelium of membranous labyrinth, incl. sensory ep. originate from ectoderm



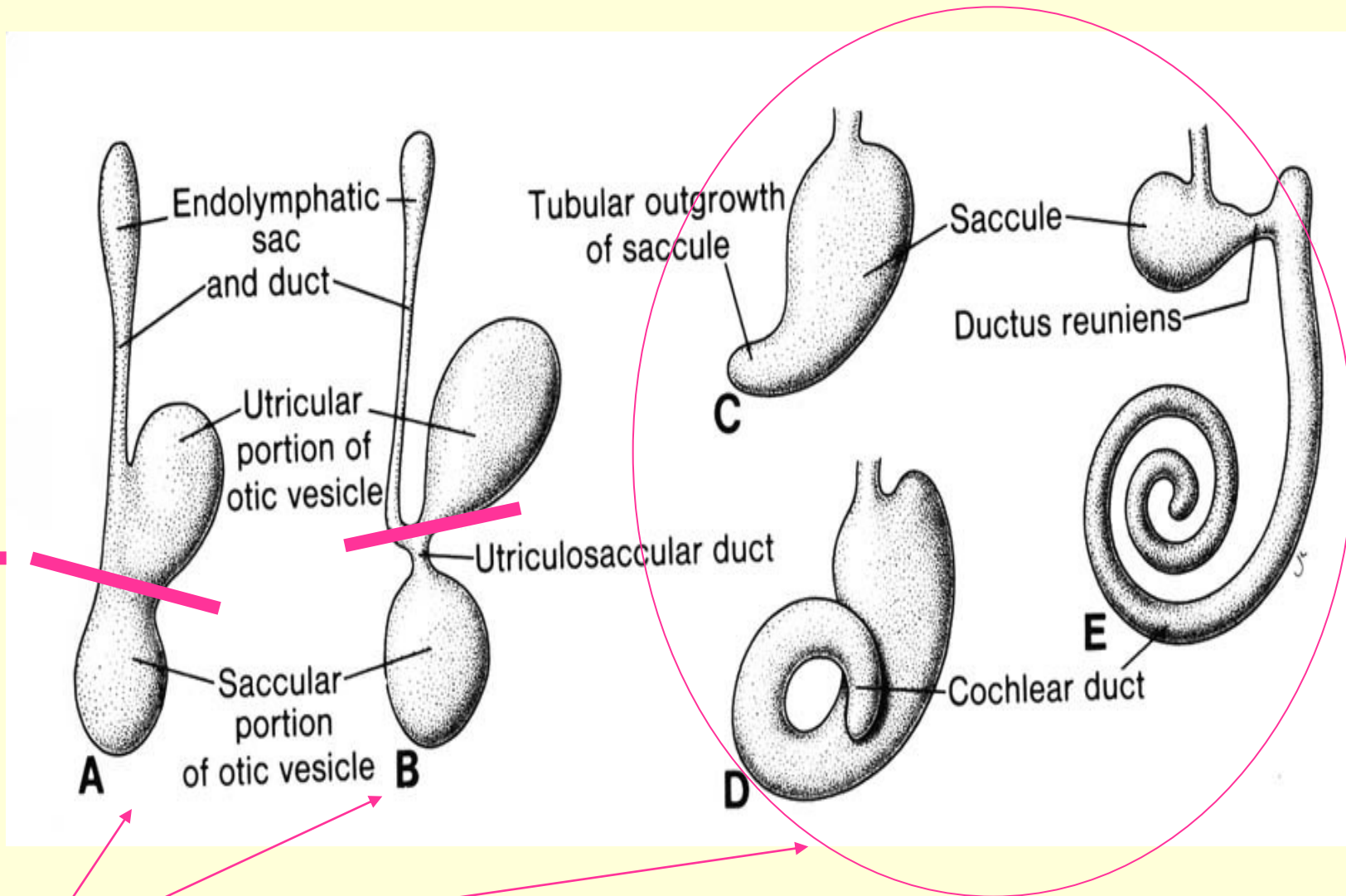
Otic pit \Rightarrow otic vesicle (otocyst)



Differentiation of the otocyst into membranous labyrinth:

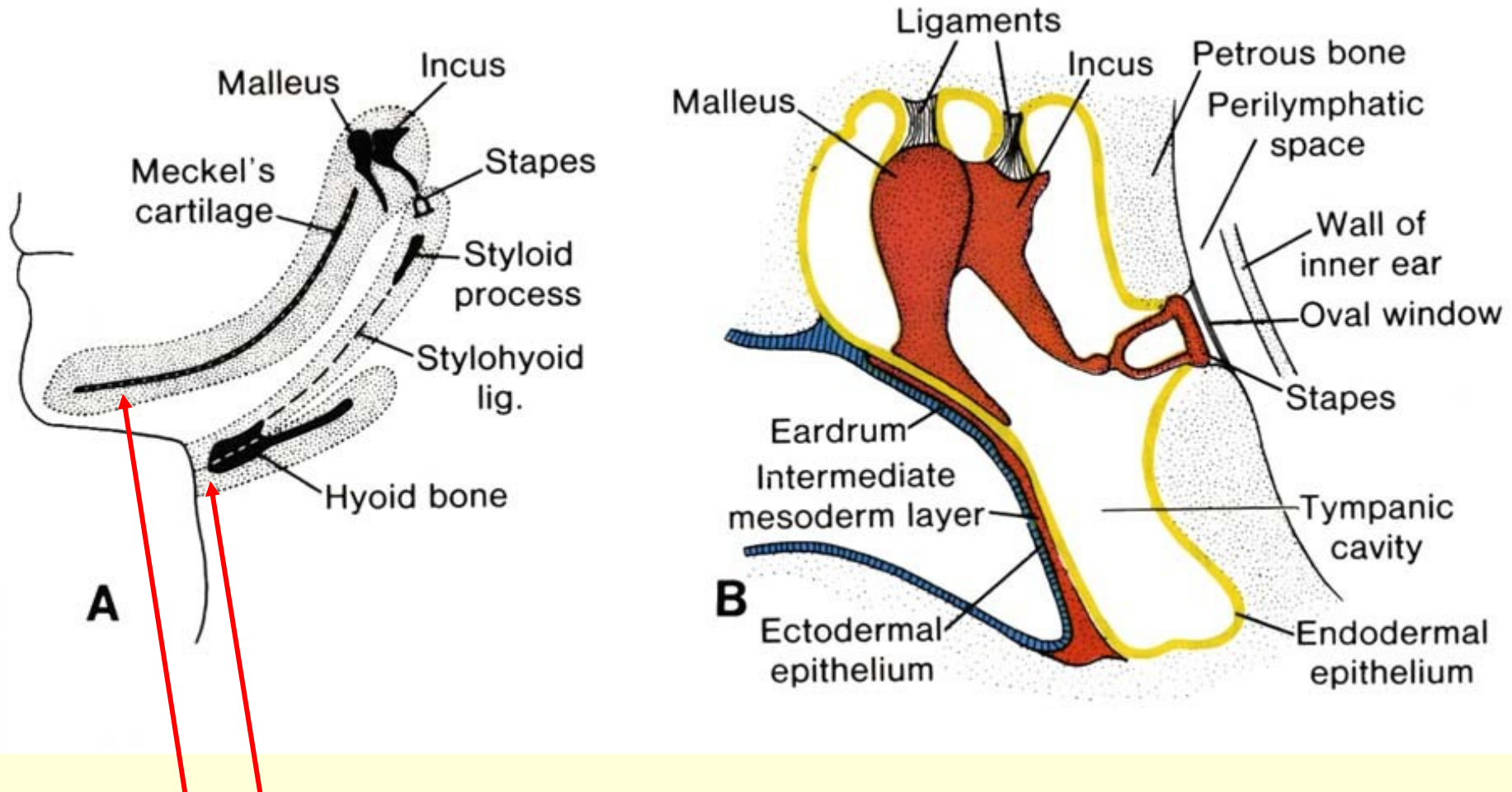
D
O
R
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L
Y

V
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N
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Y



Development of tympanic membrane and cavity

Development of the ear ossicles

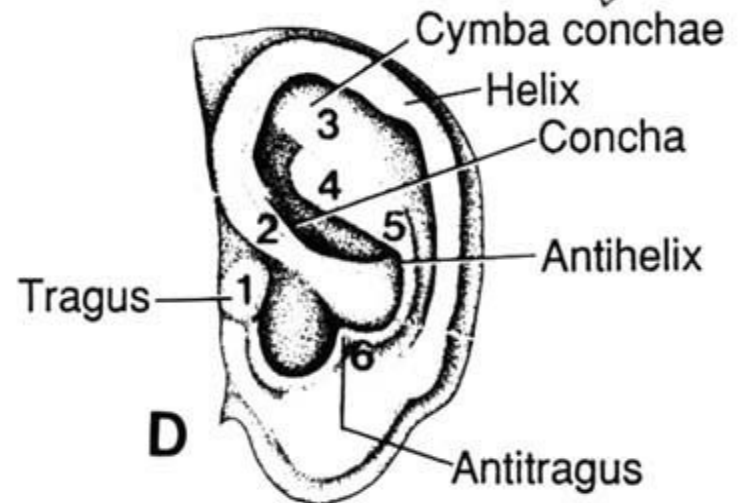
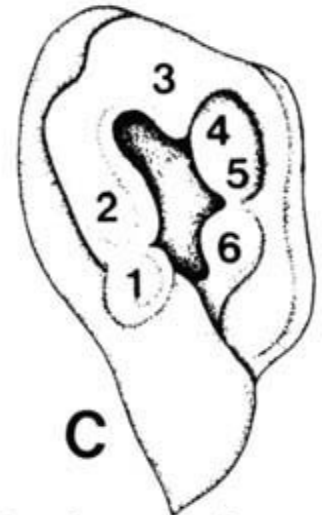
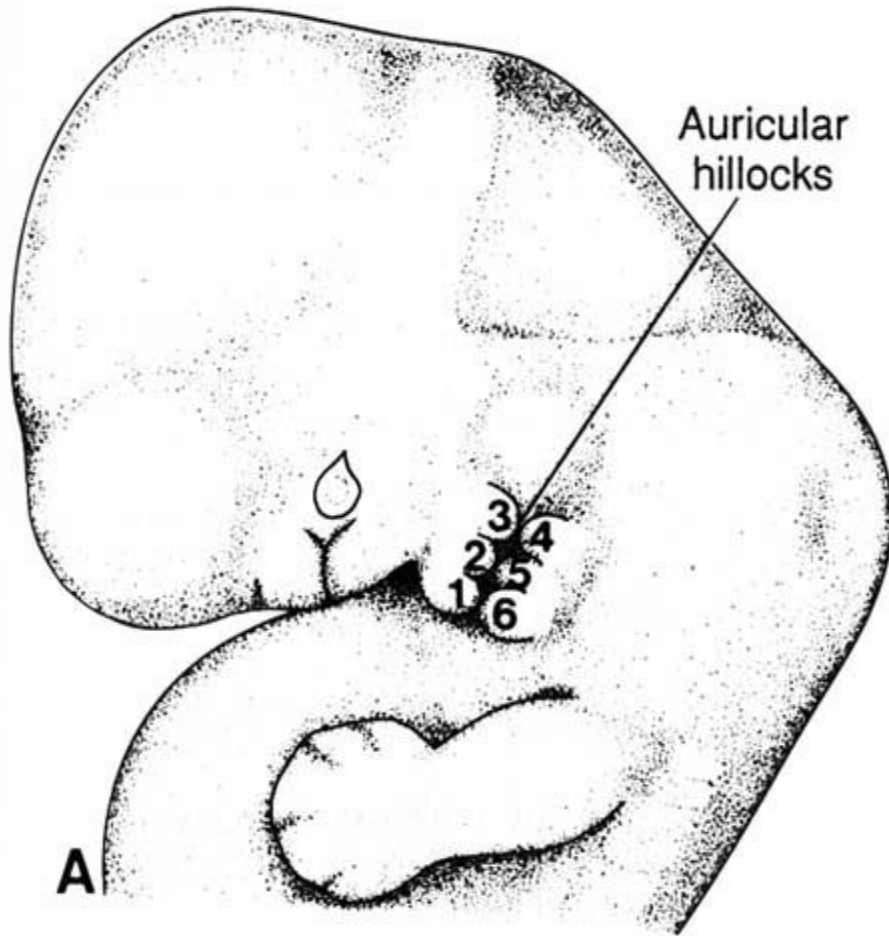


The 1st and 2nd branchial arch: 1 - cartilago Meckeli \Rightarrow malleus, incus
2 - cartilago Reicherti \Rightarrow stapes



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)



Preauricular Sinus



Meatus atresia





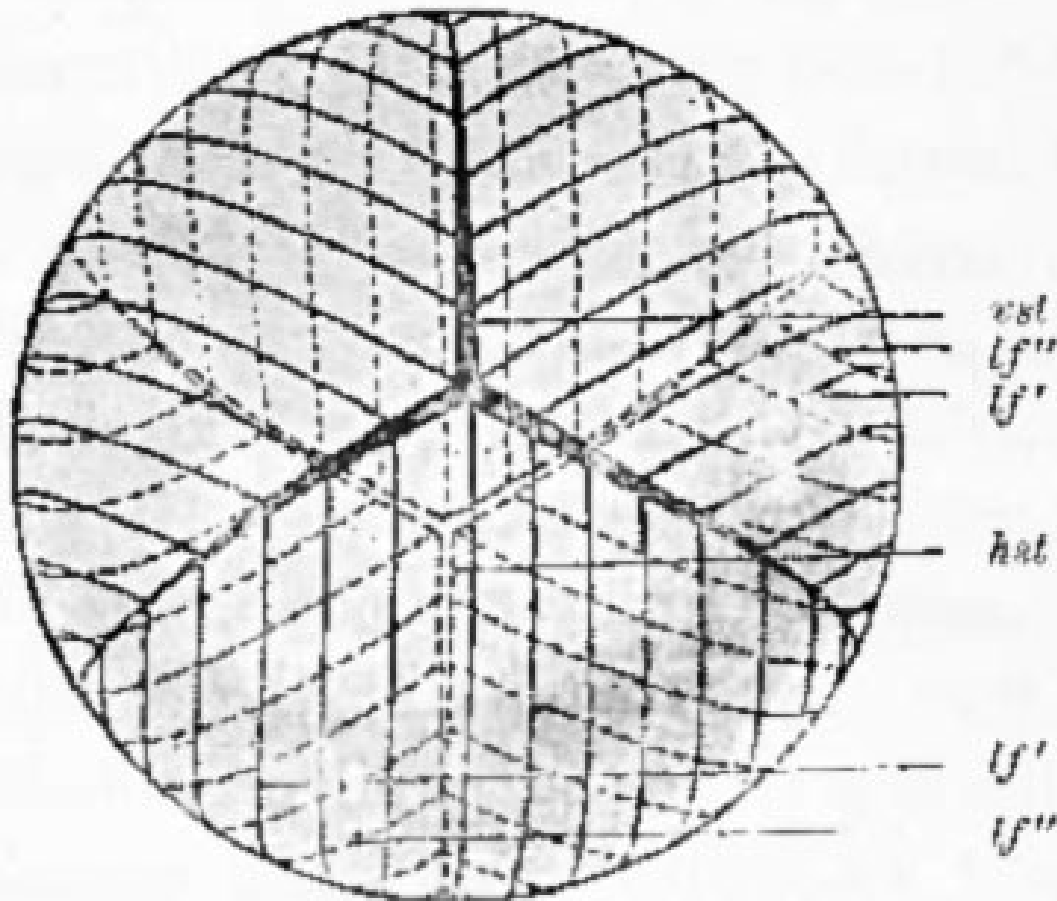
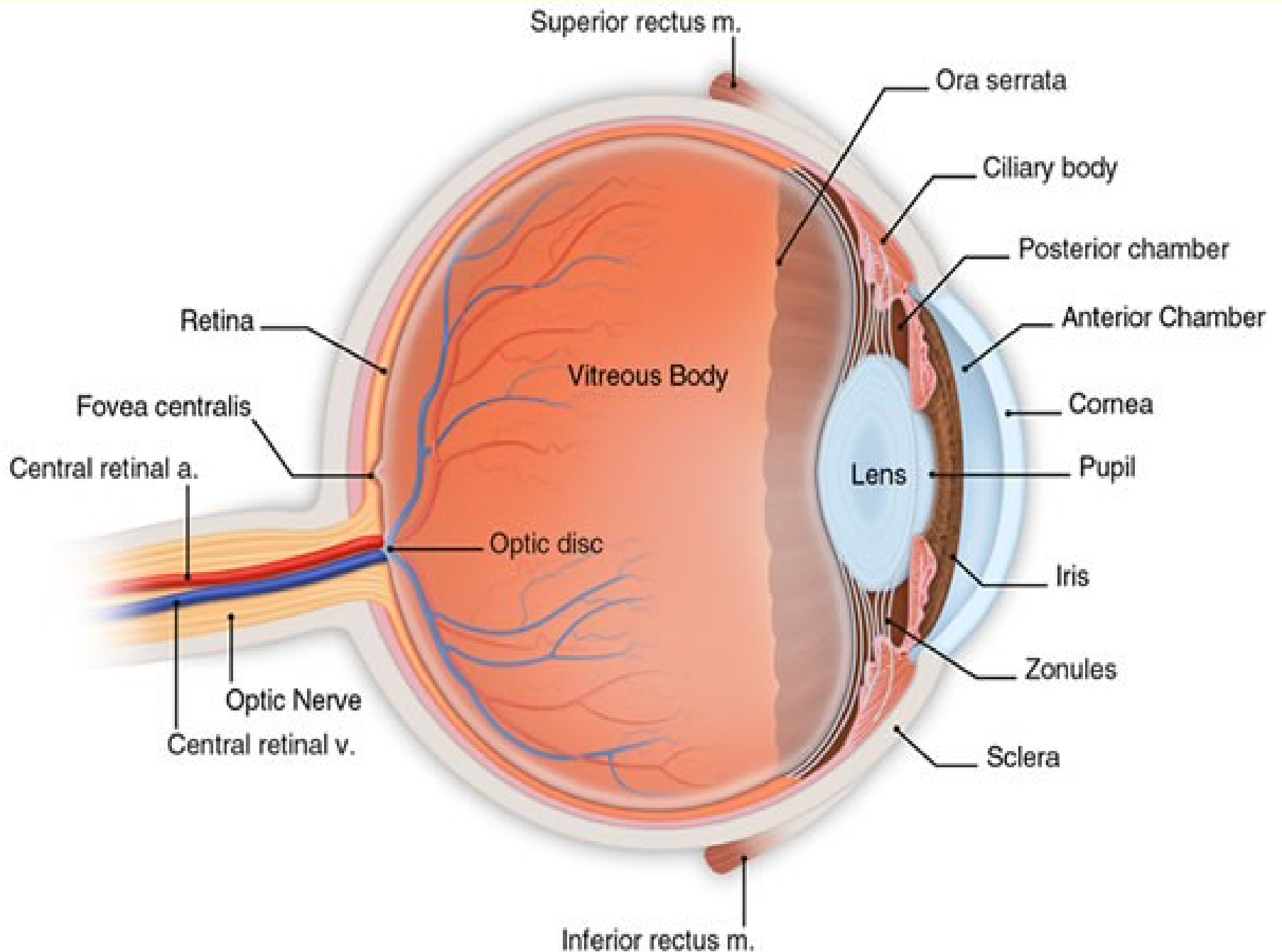
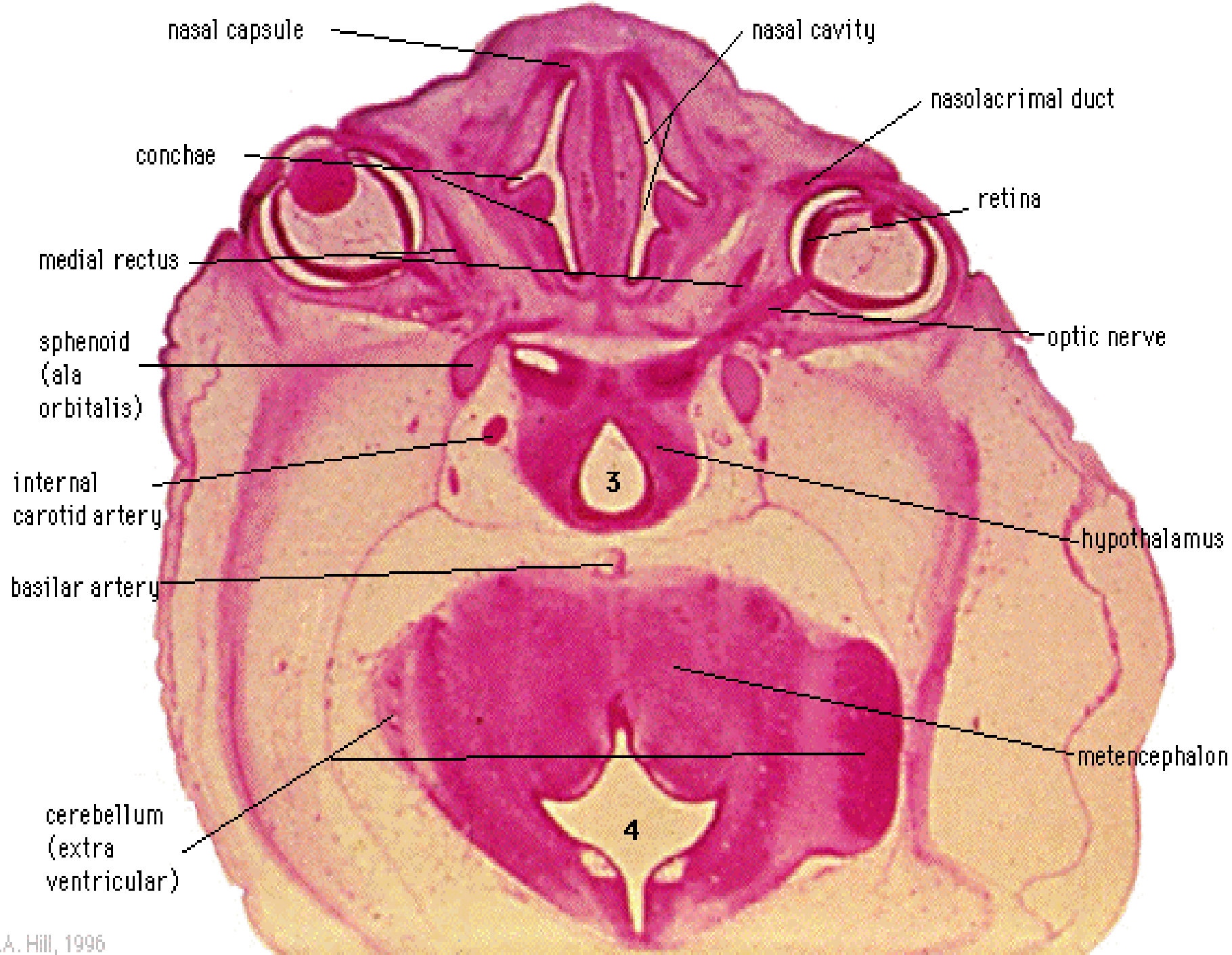


Fig. 268.—Diagram of the arrangement of the lens-fibres.





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

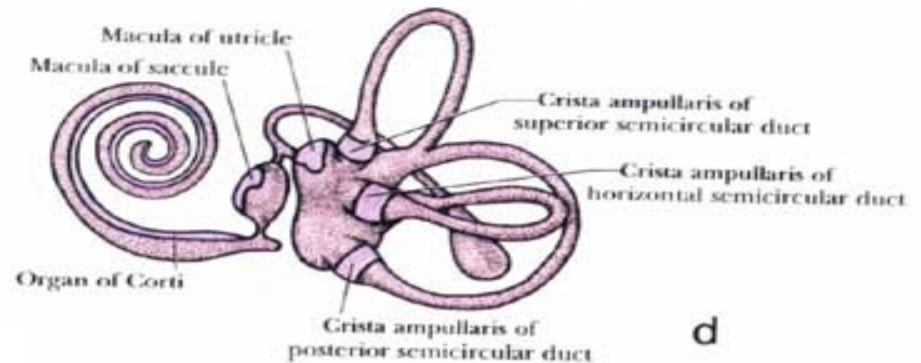
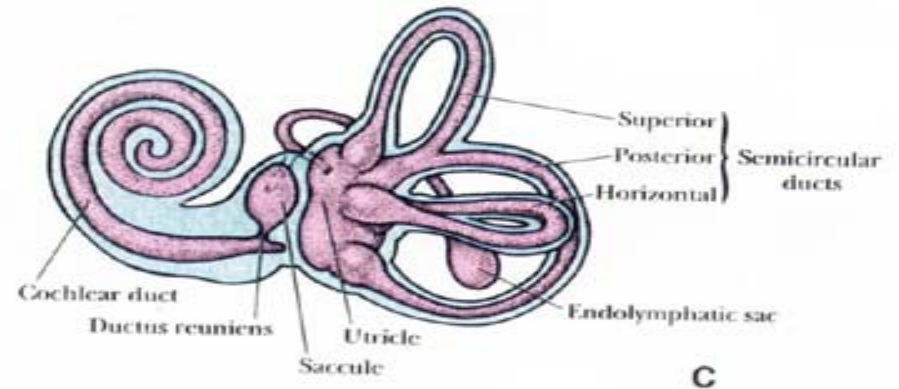
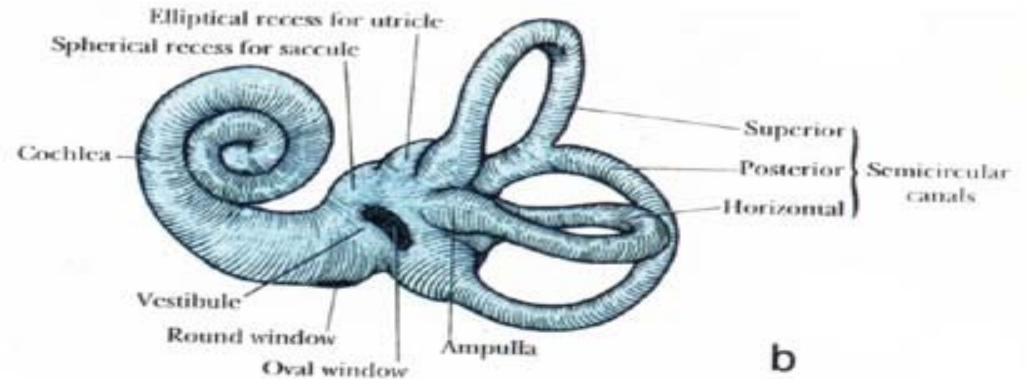
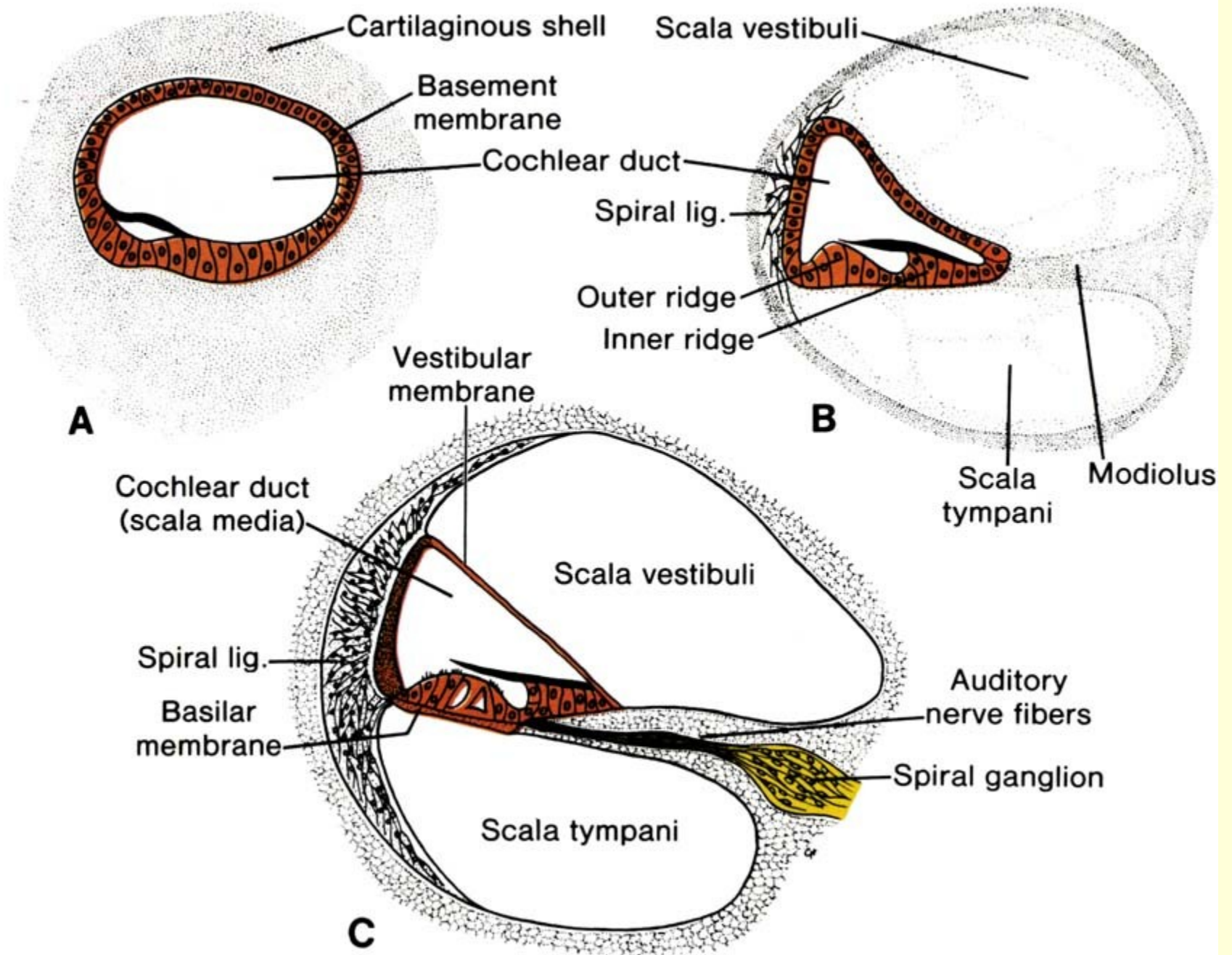
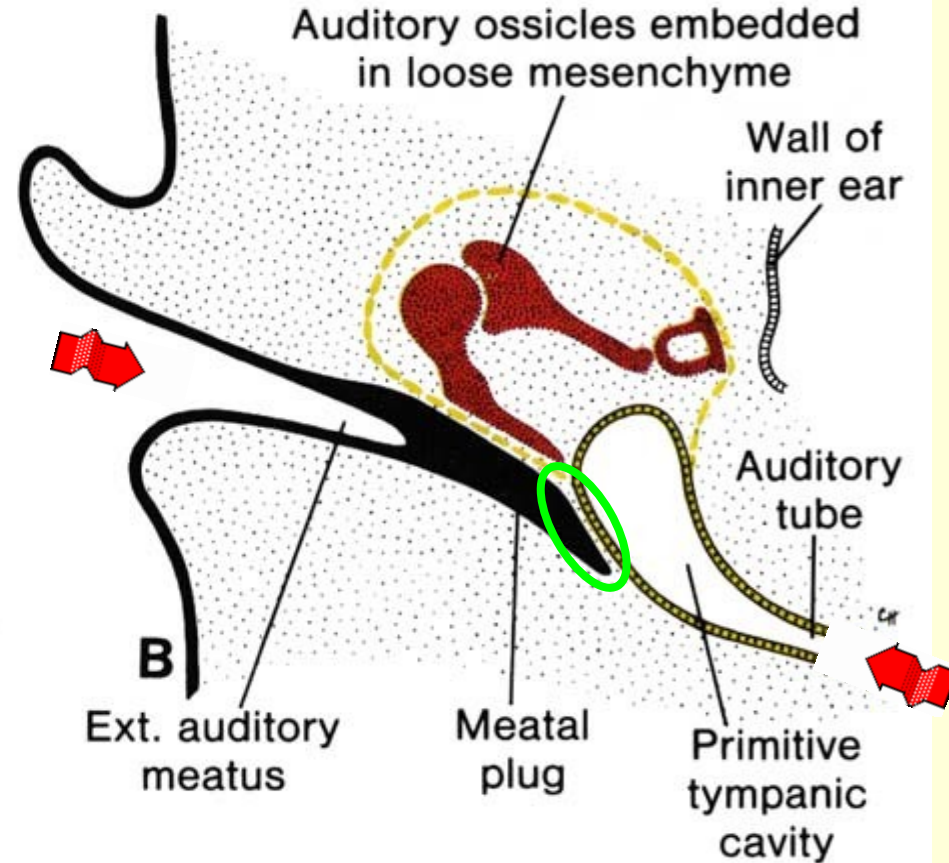
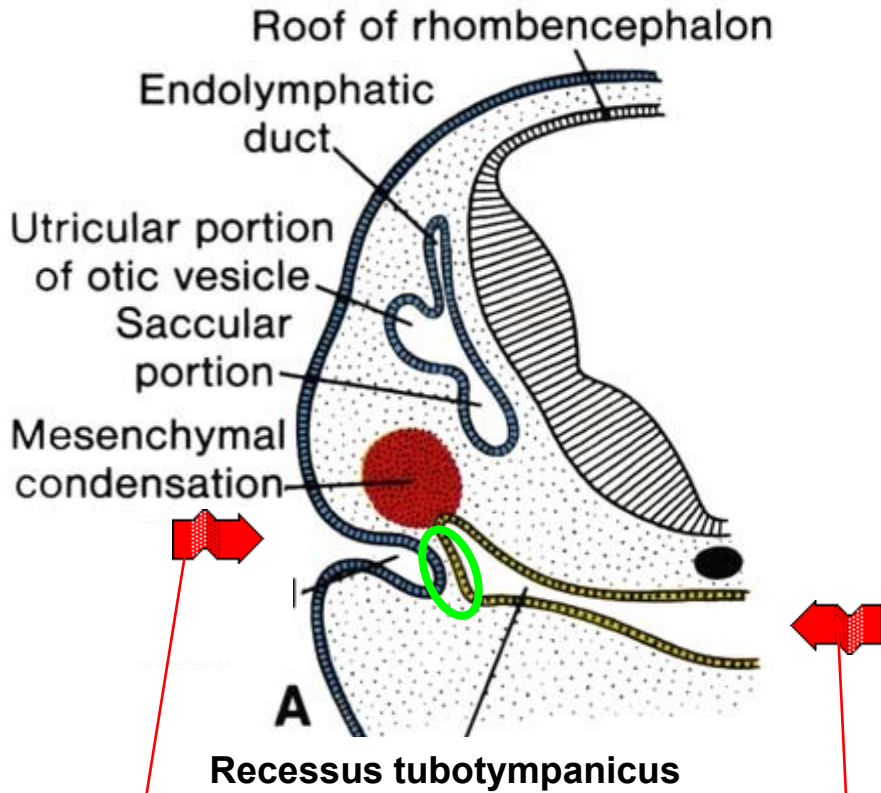


Figure 24.7. b, c, d.



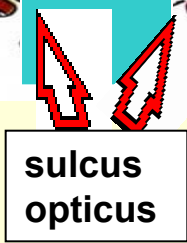
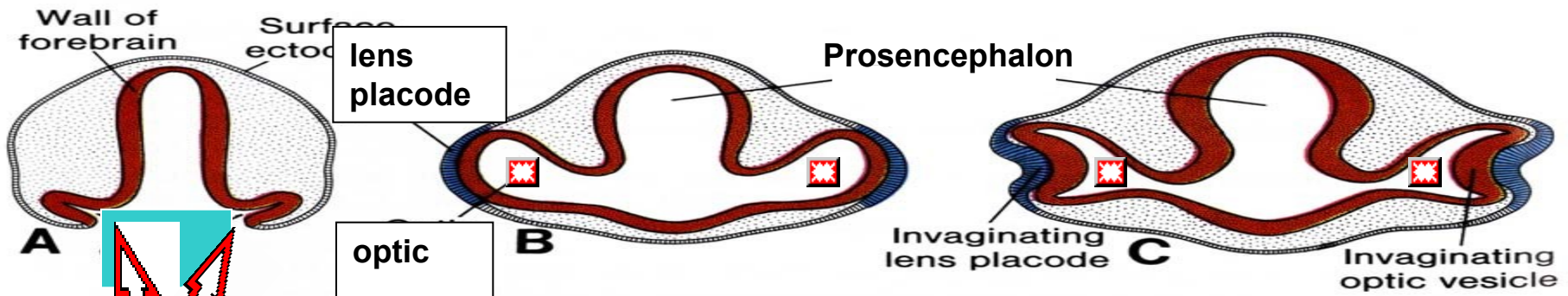
Development of the outer and middle ear



the first ectoderm cleft

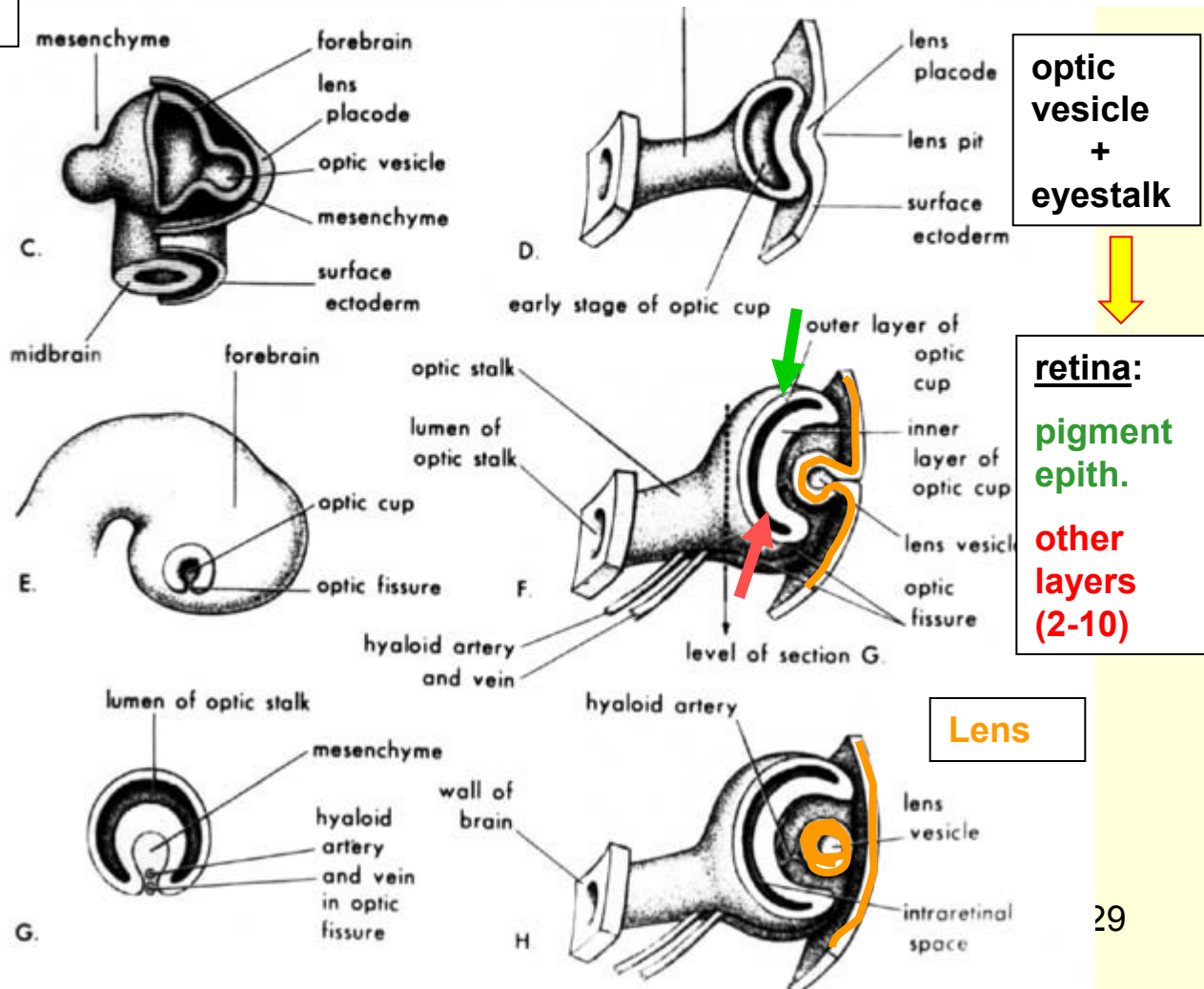
the first endoderm pouch

„ear-drum“



Ectoderm:
lens placode (lens cristalina)

Neuroectoderm:
optic vesicle ⇒ retina



optic vesicle + eyestalk

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

Lens