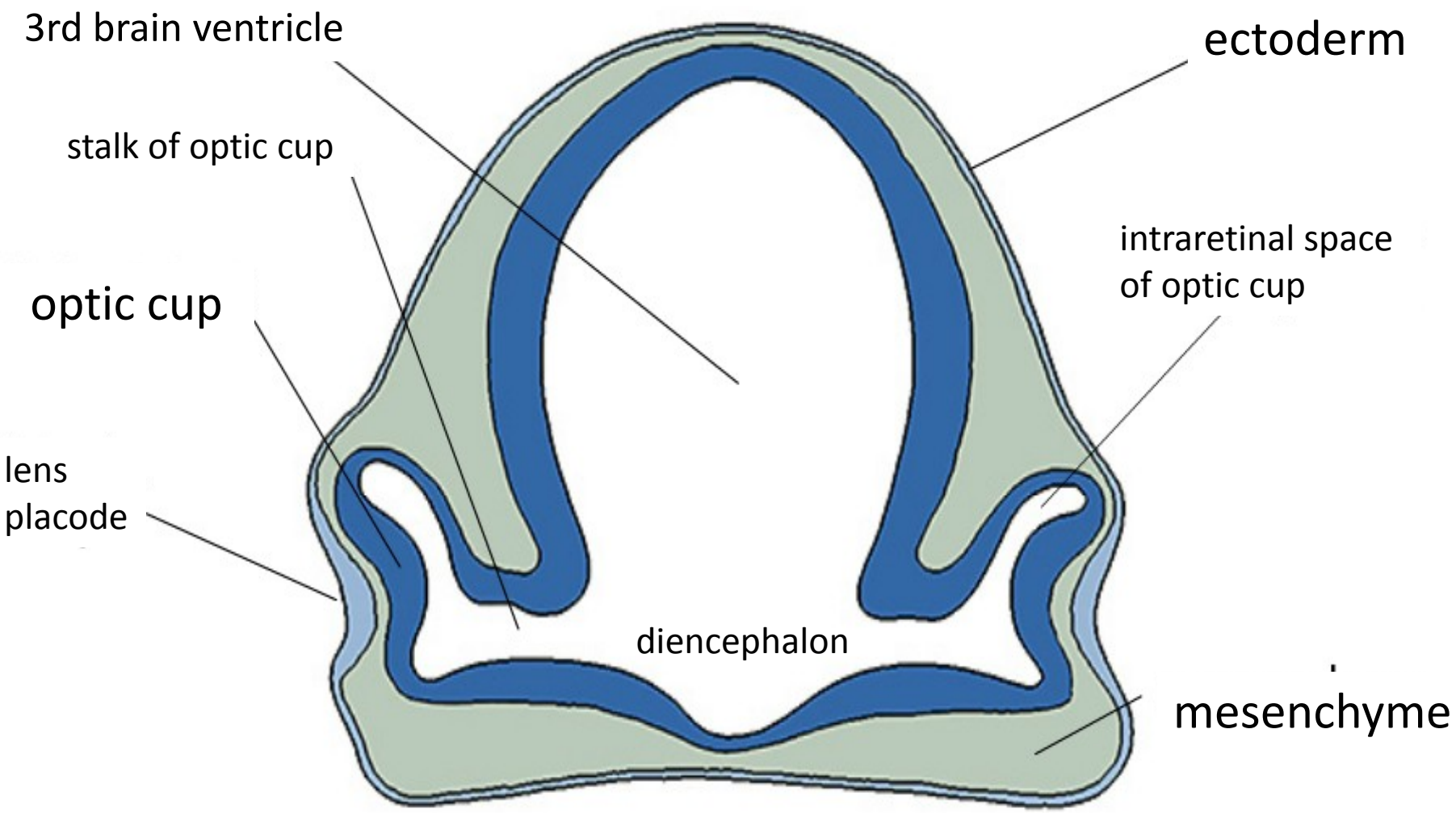
Development and teratology of sensory organs

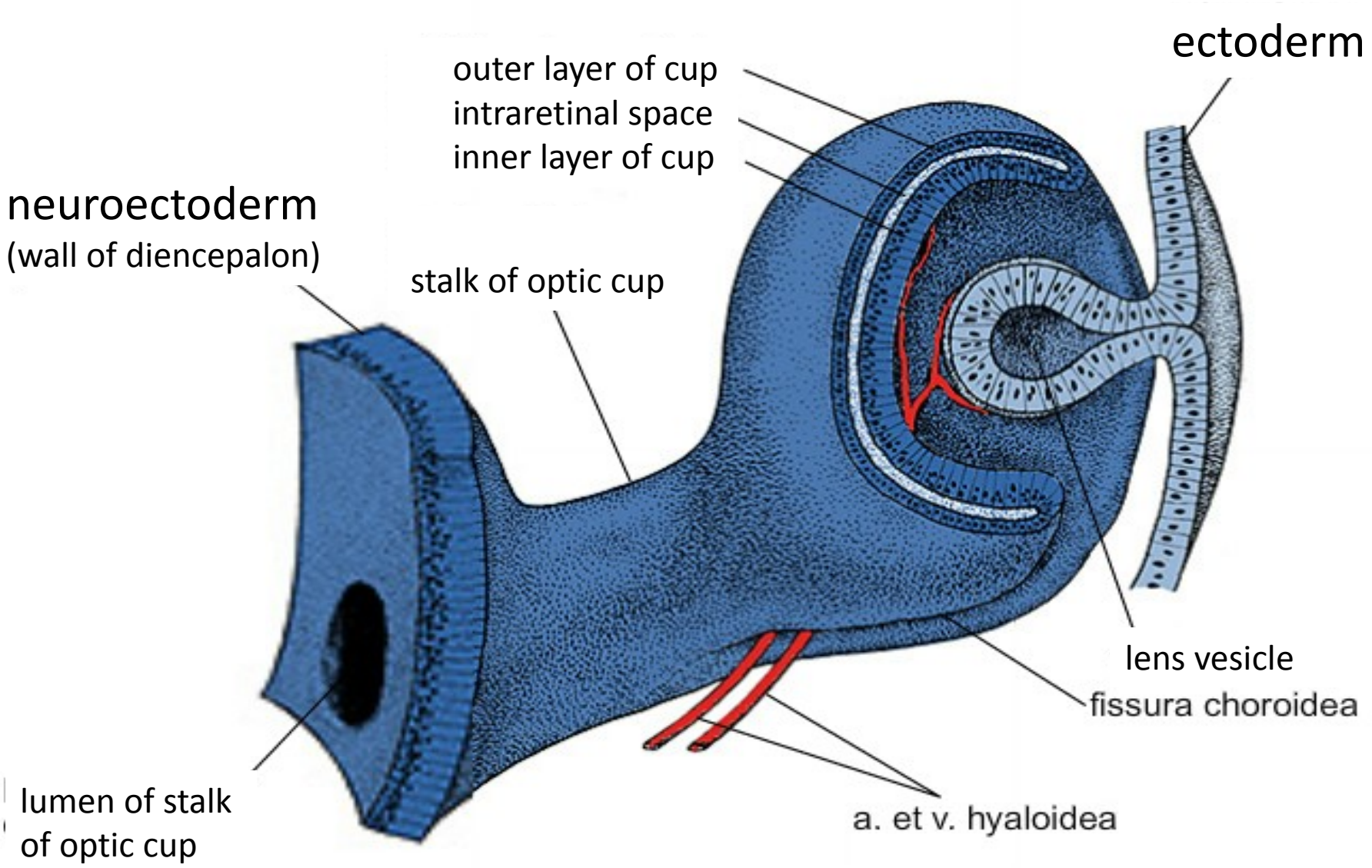
Anna Mac Gillavry Danylevska

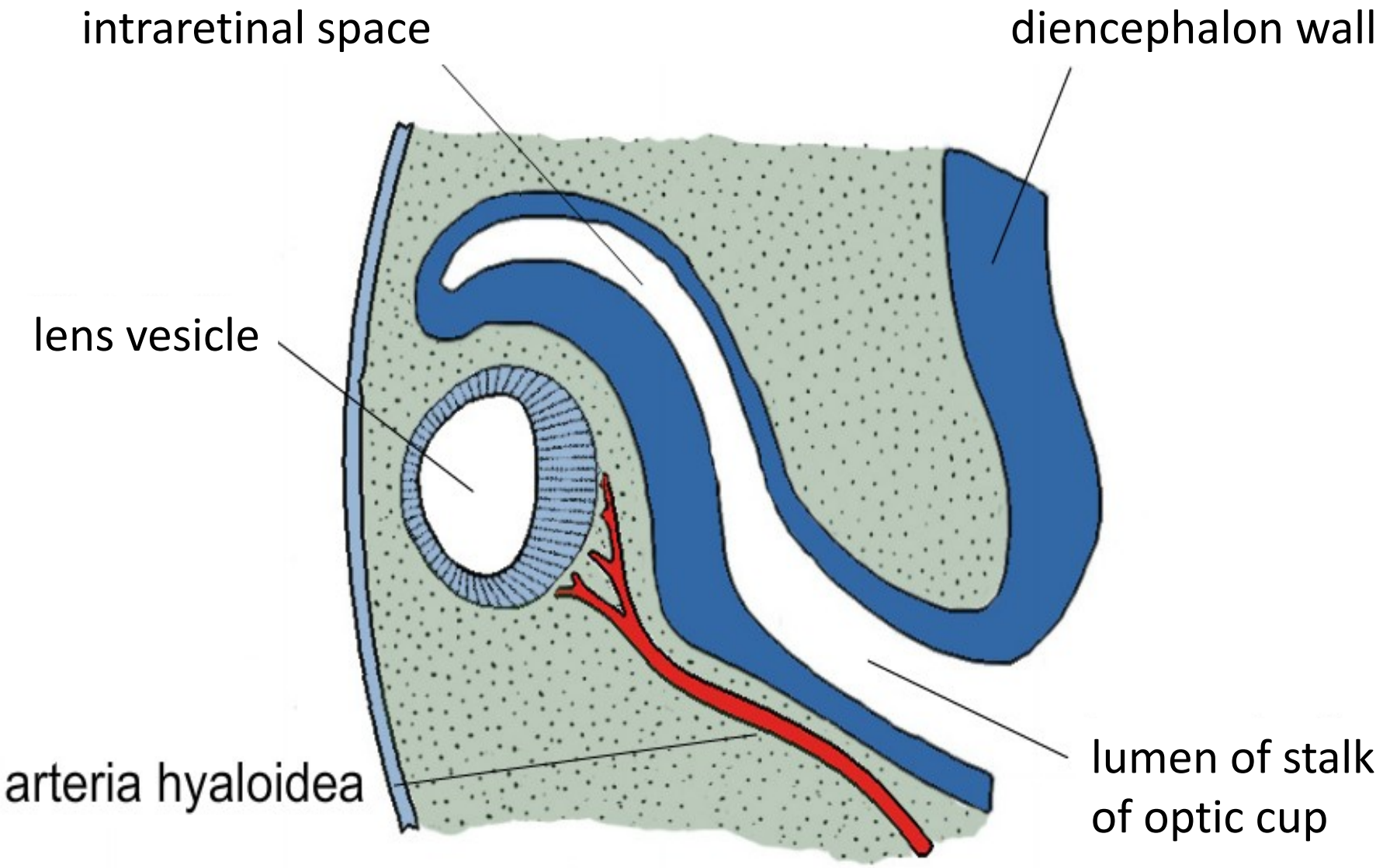
9.5.2022

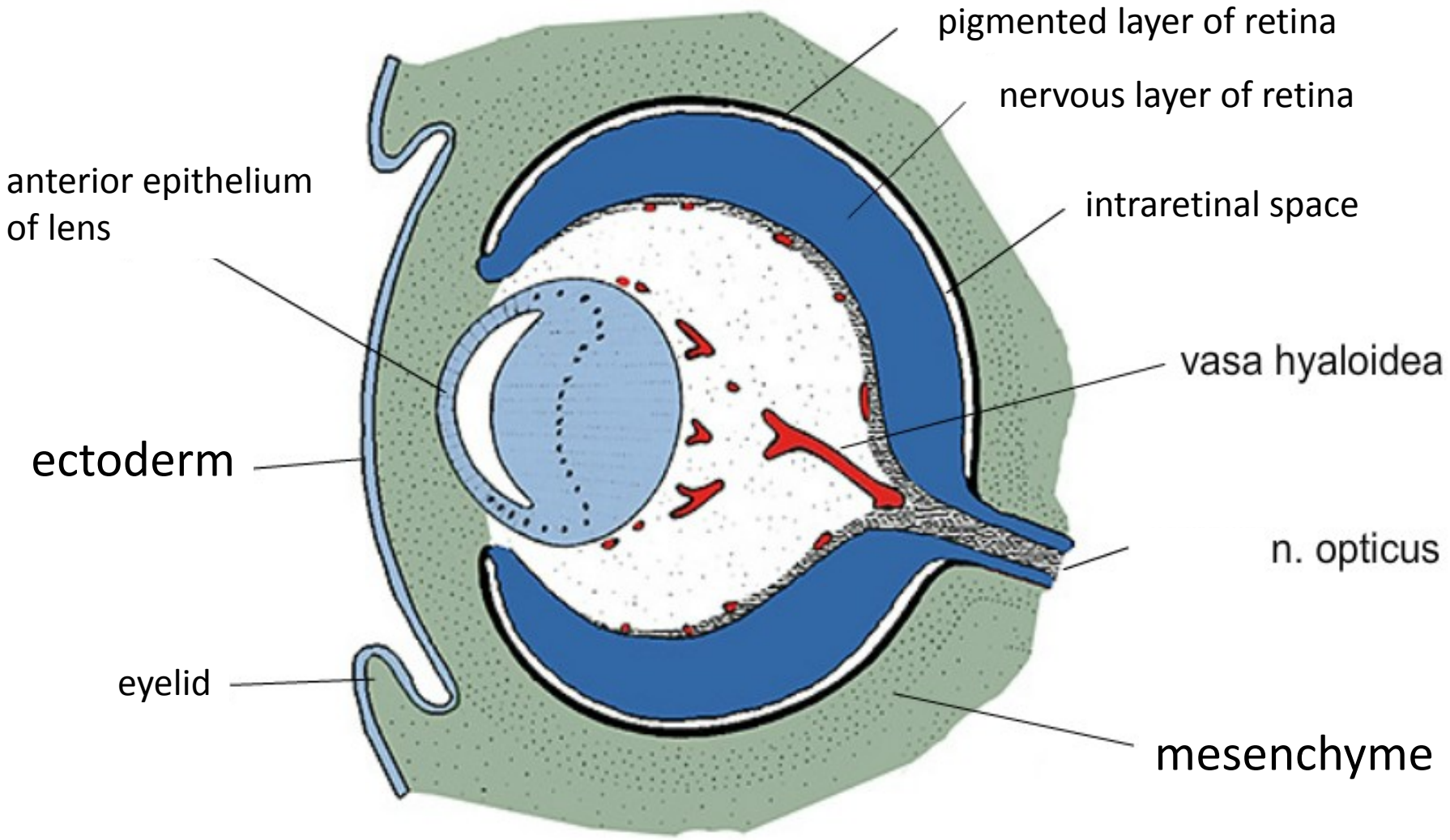
Development of the eye

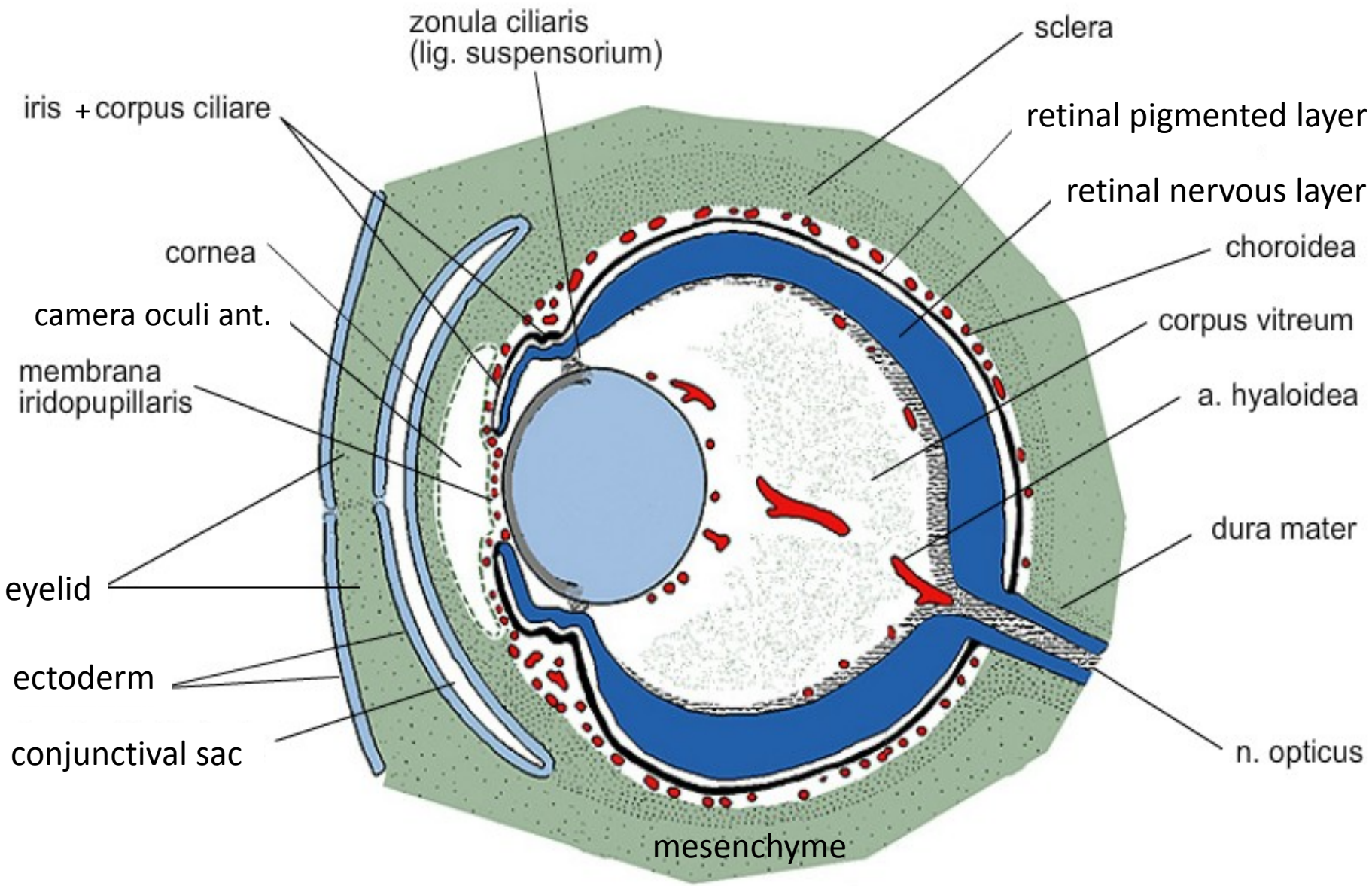


Development of optic cup and lens




intraretinal space
diencephalon wall
lens vesicle
arteria hyaloidea
lumen of stalk
of optic cup


pigmented layer of retina
nervous layer of retina
anterior epithelium of lens
intraretinal space
vasa hyaloidea
ectoderm
n. opticus
eyelid
mesenchyme

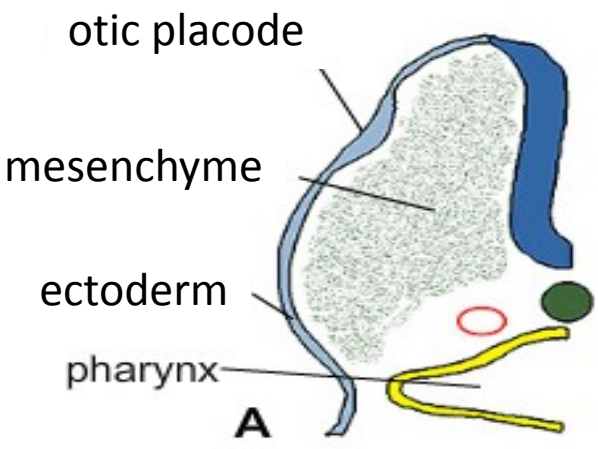

zonula ciliaris
(lig. suspensorium)
sclera
iris + corpus ciliare
retinal pigmented layer
retinal nervous layer
cornea
choroidea
camera oculi ant.
corpus vitreum
membrana
iridopupillaris
a. hyaloidea
dura mater
eyelid
ectoderm
conjunctival sac
n. opticus
mesenchyme

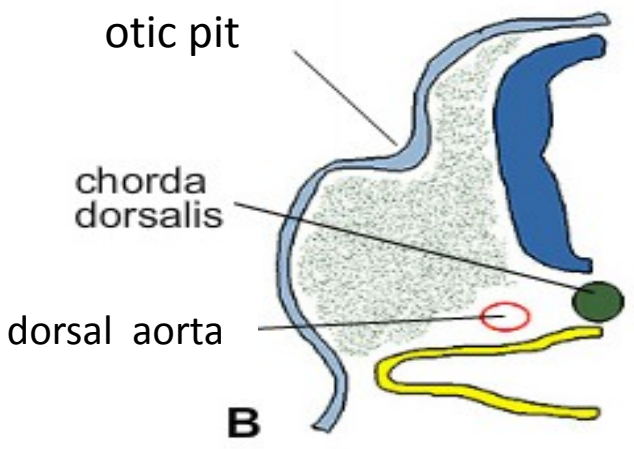
Eye abnormalities

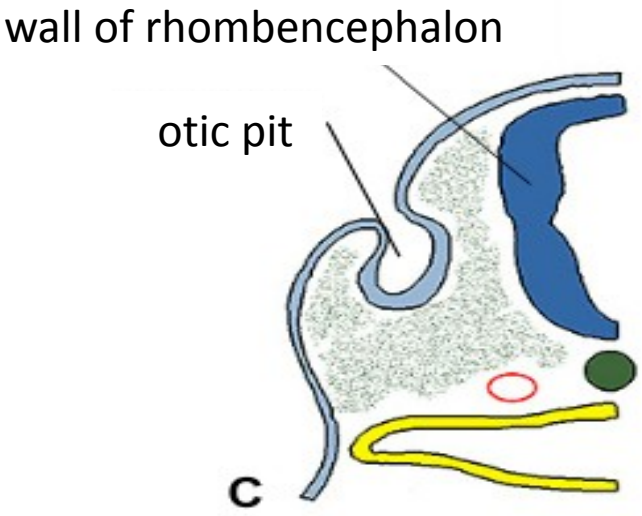
- Coloboma – in most cases coloboma iridis, frequently associated with other eye abnormalities; optic nerve coloboma is linked to PAX2 gene mutations – renal coloboma syndrome – autosomal dominant
- Iridopupillary membrane
- Sclerocornea
- Peters anomaly
- Congenital cataracts – rubella virus!
- Persistent hyaloid artery (in 3 % of full term infants) – amblyopia, vitreous haemorrhage, retinal detachment

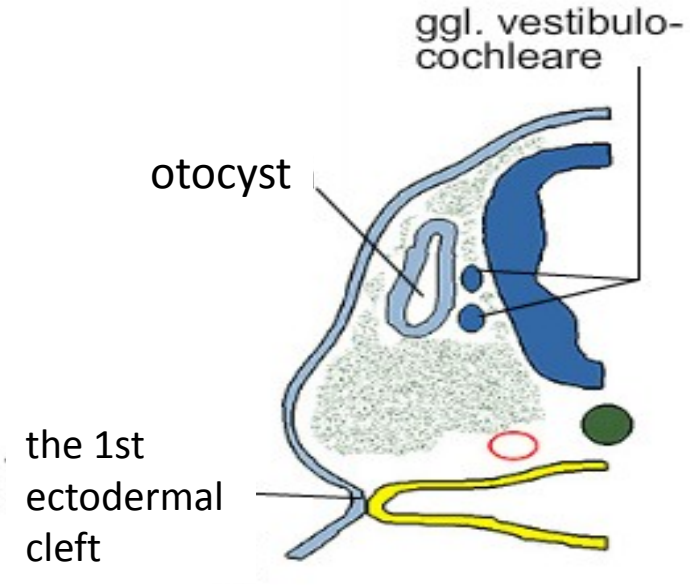
- Microphtalmia – 1,5-1,9 in 10000, cytomegalovirus, toxoplasmosis
- Anophtalmia – 0,18-0,4 in 10000
- Congenital aphakia/aniridia – mutation in PAX6 results in aniridia; WAGR syndrome – microdeletion in chromosome 11 (PAX6 and WT1)
- Cyclopia and synophtalmia (loss of midline tissue - holoprosencephaly) – alcohol, maternal diabetes, mutations in SHH and abnormalities in cholesterol metabolism

Development of the inner ear

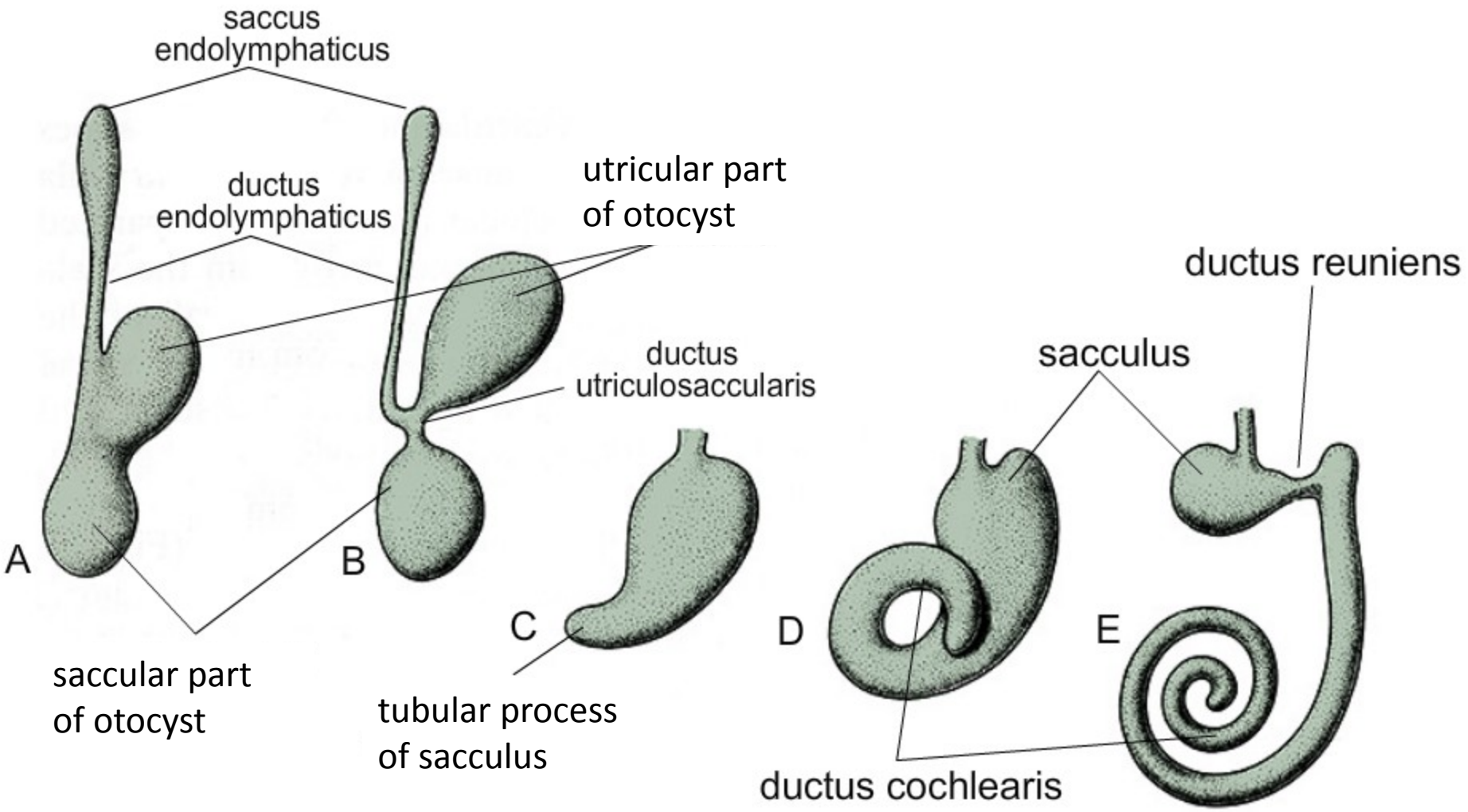






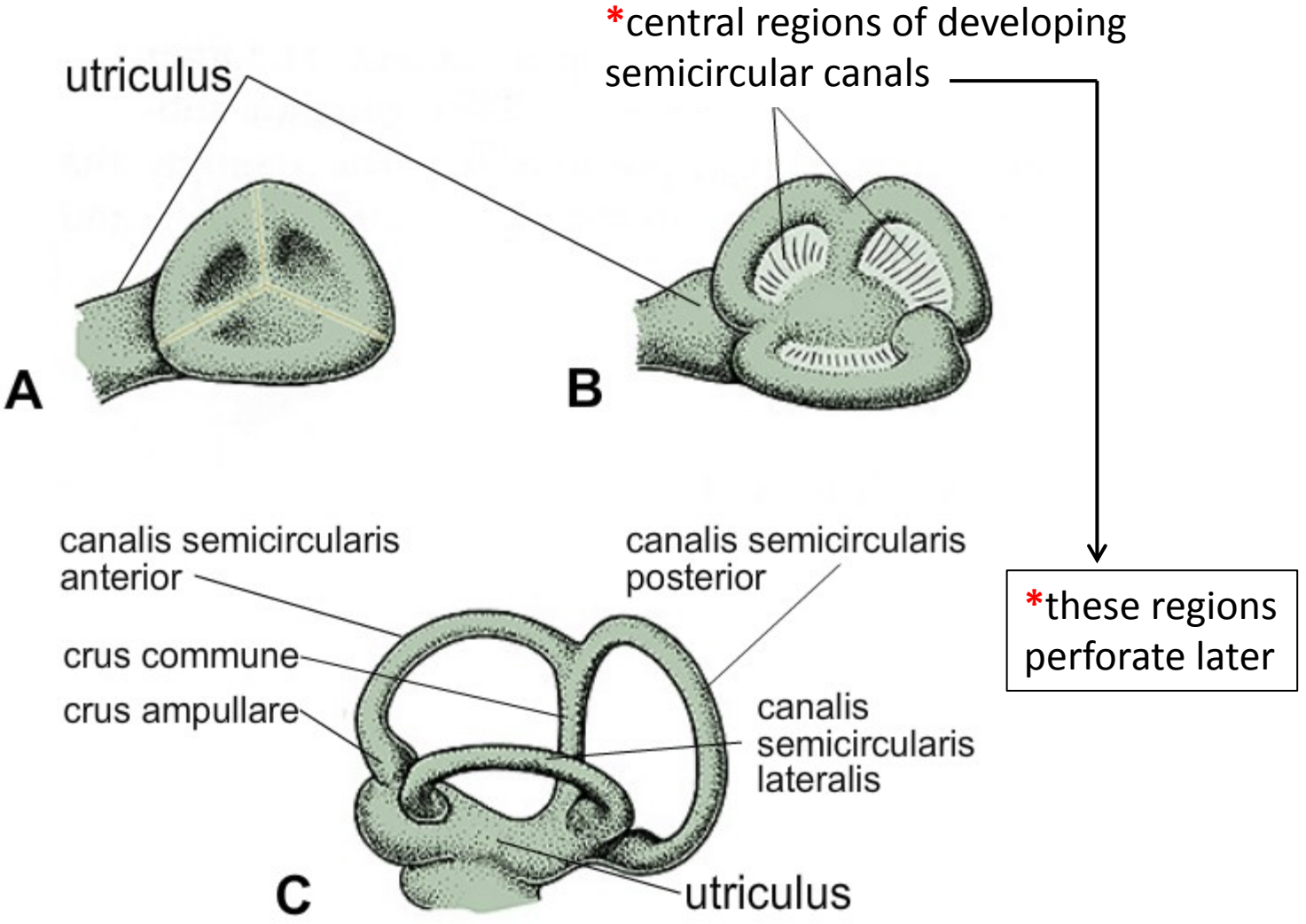


Development of membranous labyrinth



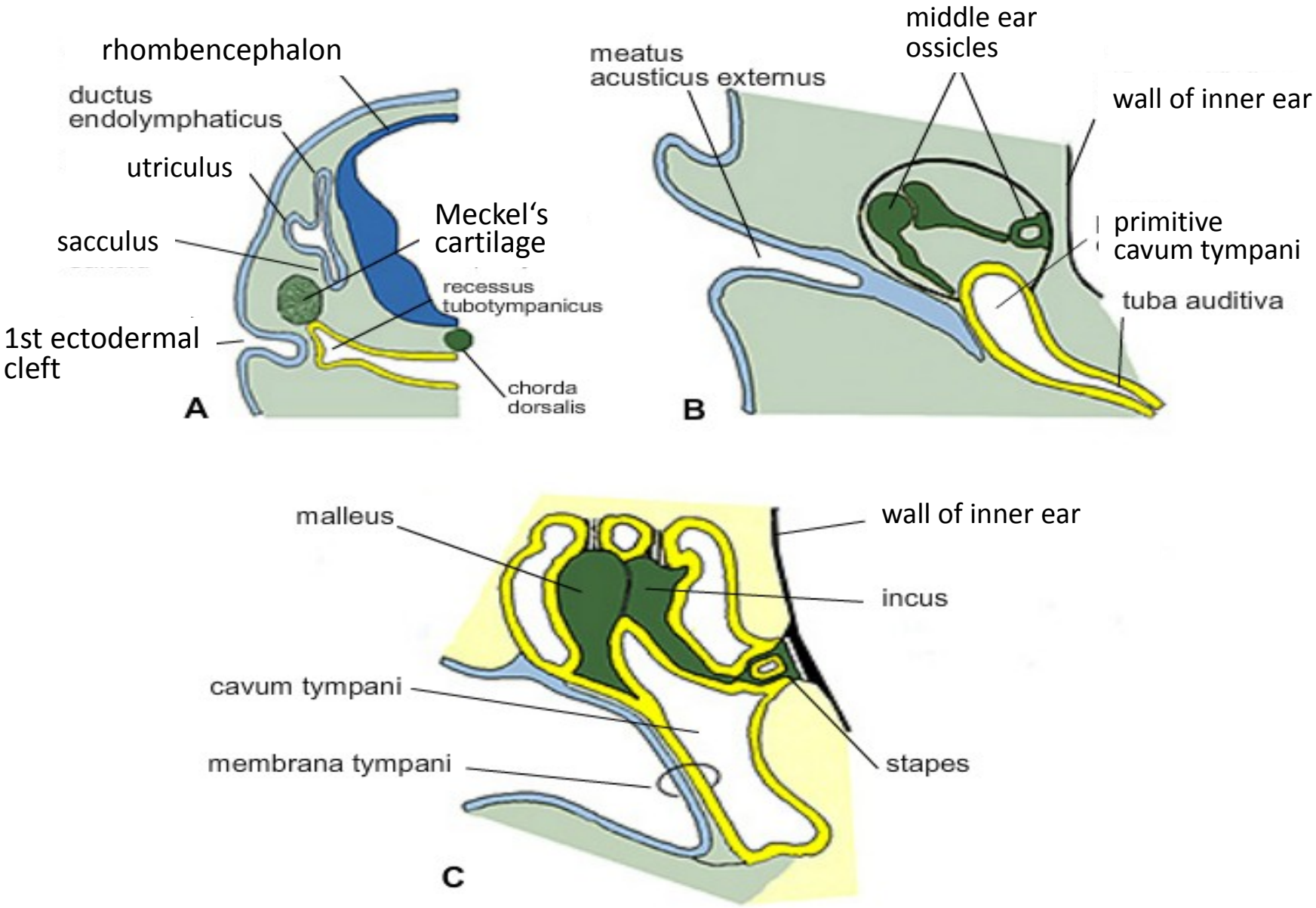
T. W. Sadler, Langman's medical embryology

Development of semicircular canals

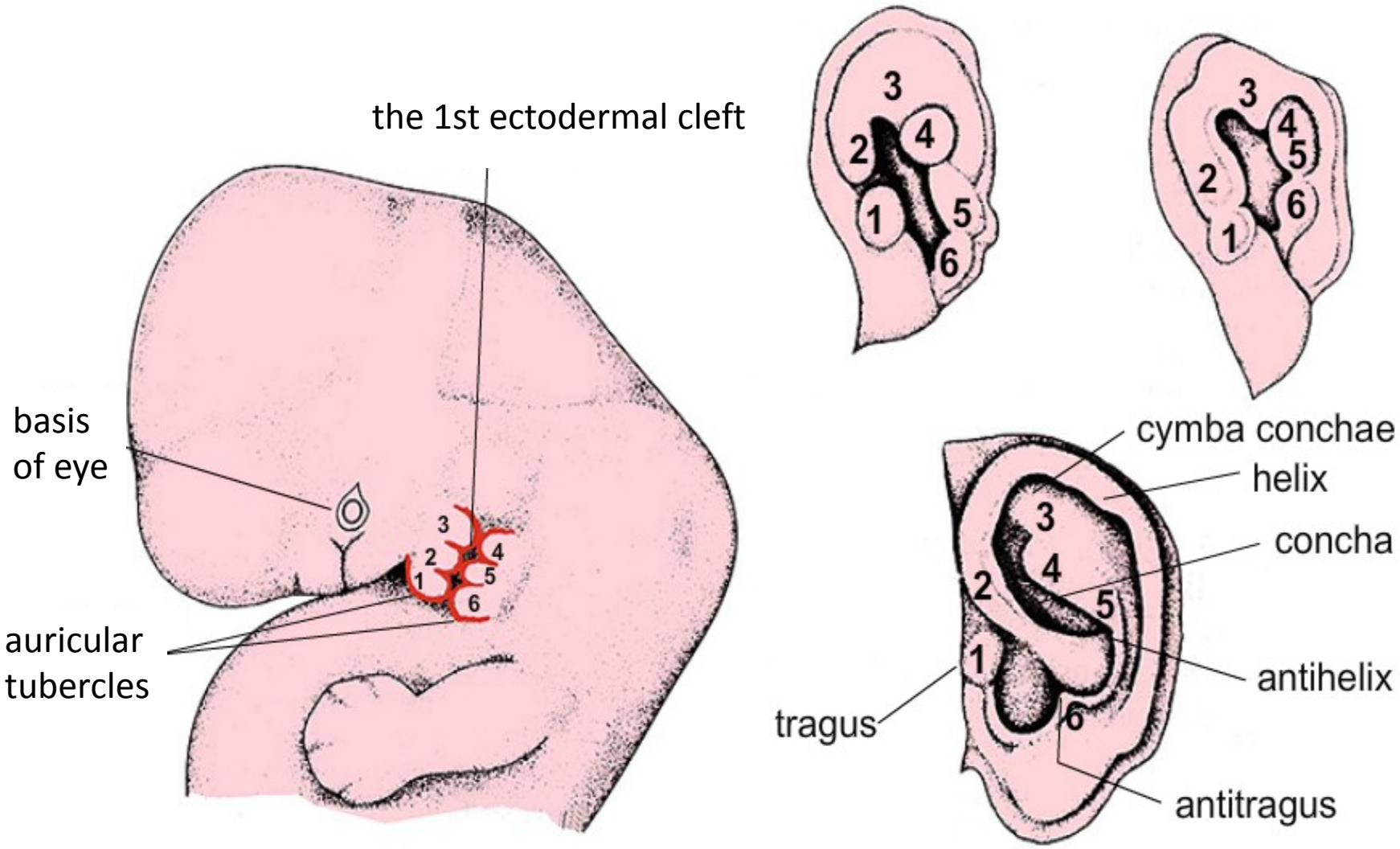


T. W. Sadler, Langman's medical embryology

Development of middle ear

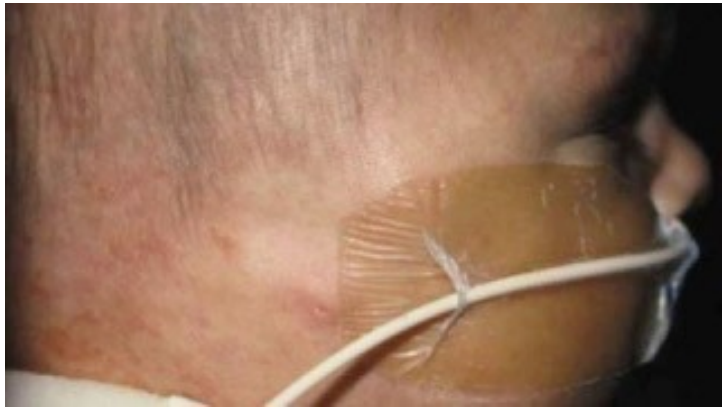


Development of external ear



T. W. Sadler, Langman's medical embryology

External ear defects



Anotia | Children's Hospital of Philadelphia (chop.edu)

- Anotia
- Microtia

- (1 in 6000-12000) usually one ear is affected, the external accustic meatus is absent or narrowed – conductive hearing loss

- Preauricular appendages and pits

All of the most common chromosomal syndromes and most of the less common have ear anomalies in their characteristics!!! (Langman's medical embryology, T. W. Sadler, 12th edition, p. 328)

Congenital hearing loss (sensory)

- Genetic factors
- Rubella virus, cytomegalovirus
- Isotretinoin!