THE EAR pp. 942-960

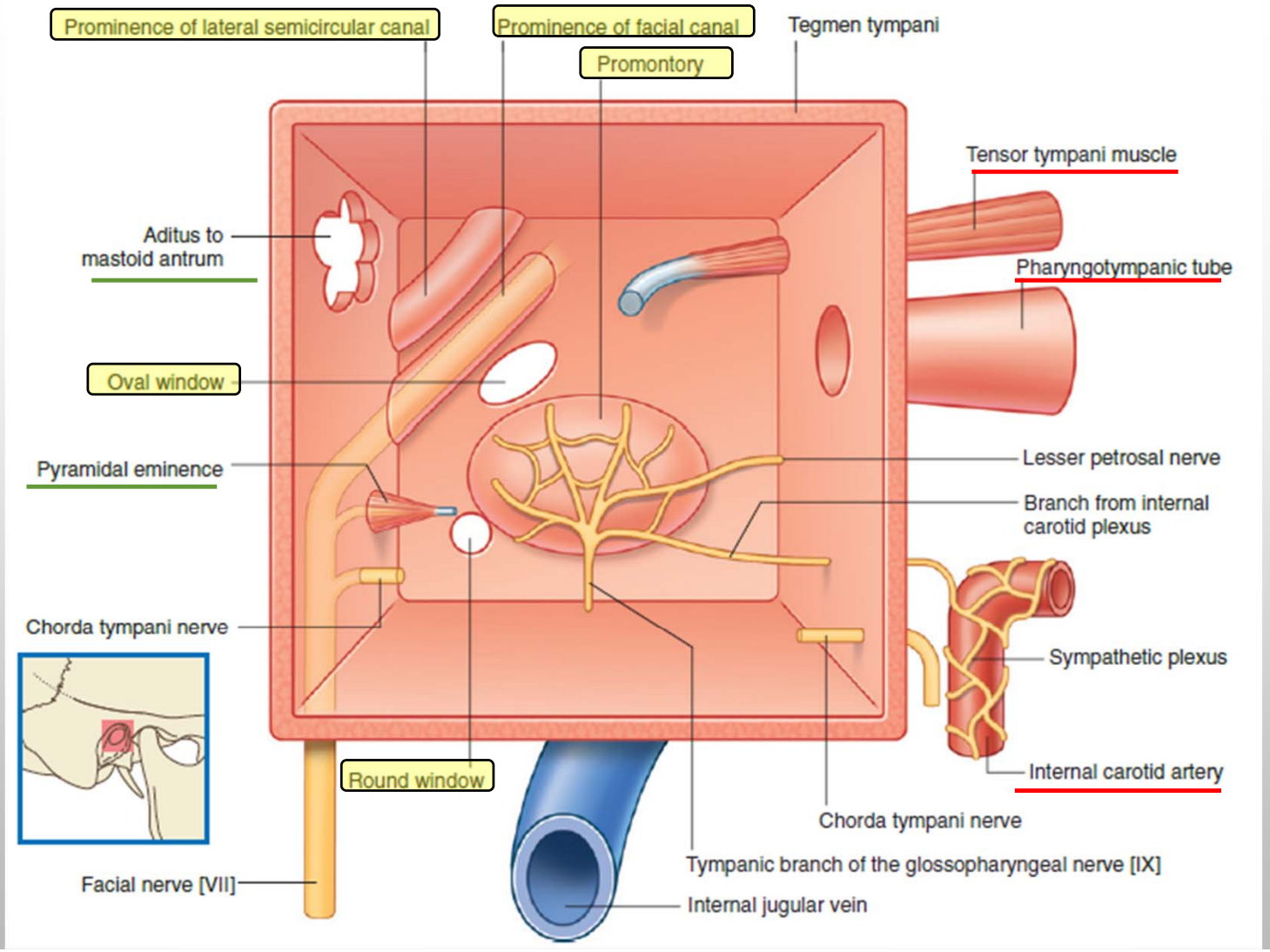
Objectives:

- Review the boundaries, contents & connections of the middle ear
- Study the anatomical features of the vestibulocochlear organ (labyrinth)
- Understand the mechanism of sound conduction & balance control
- Study the facial nerve in the temporal bone

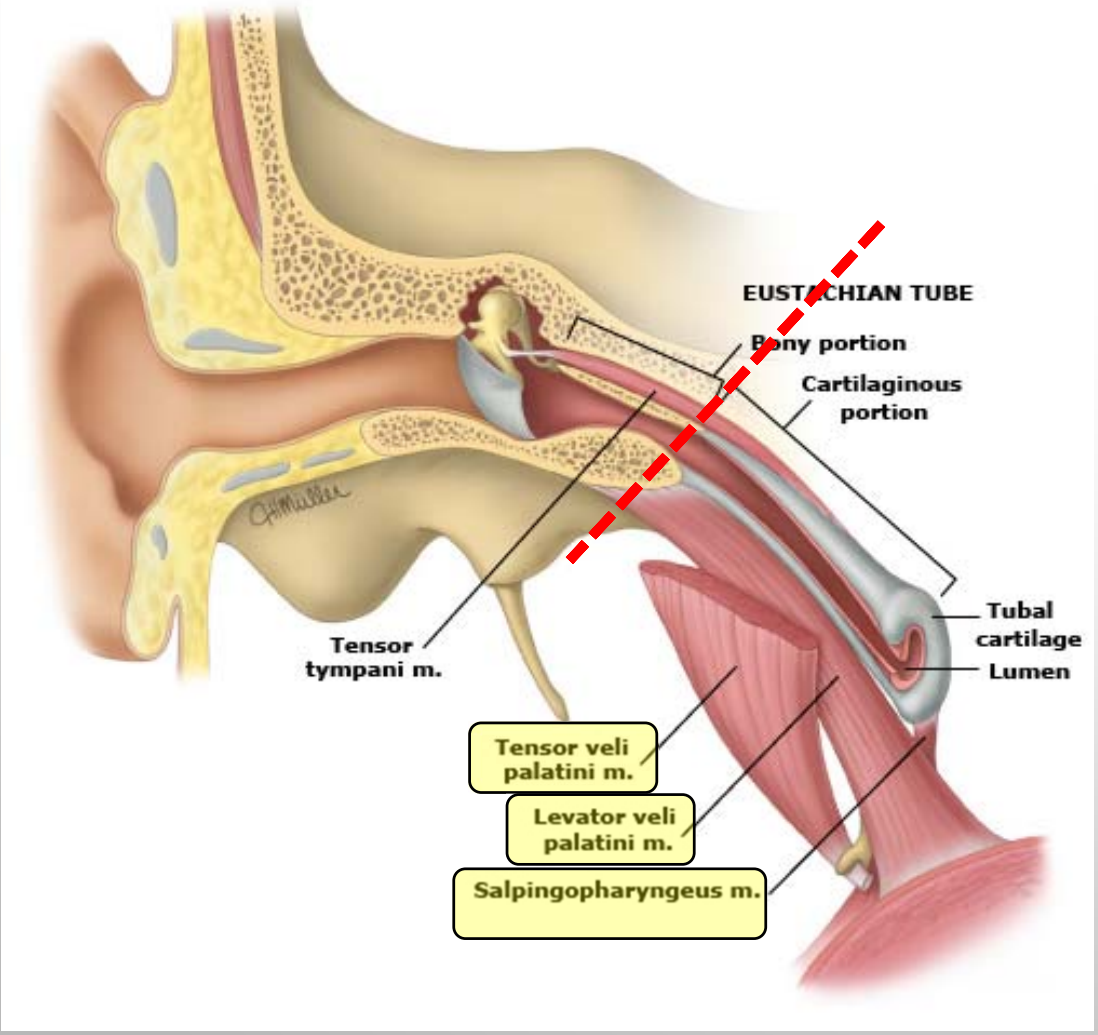
MIDDLE EAR: LATERAL VIEW

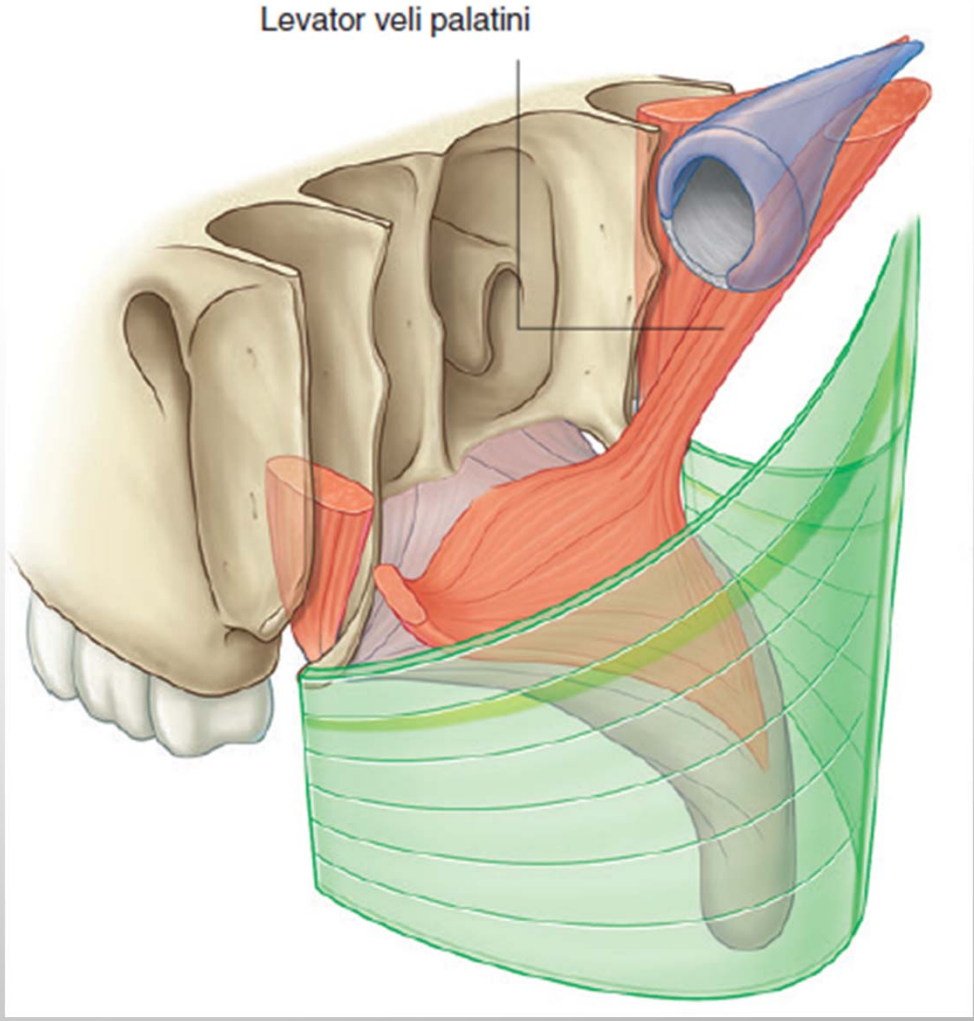
POST.

ANT.

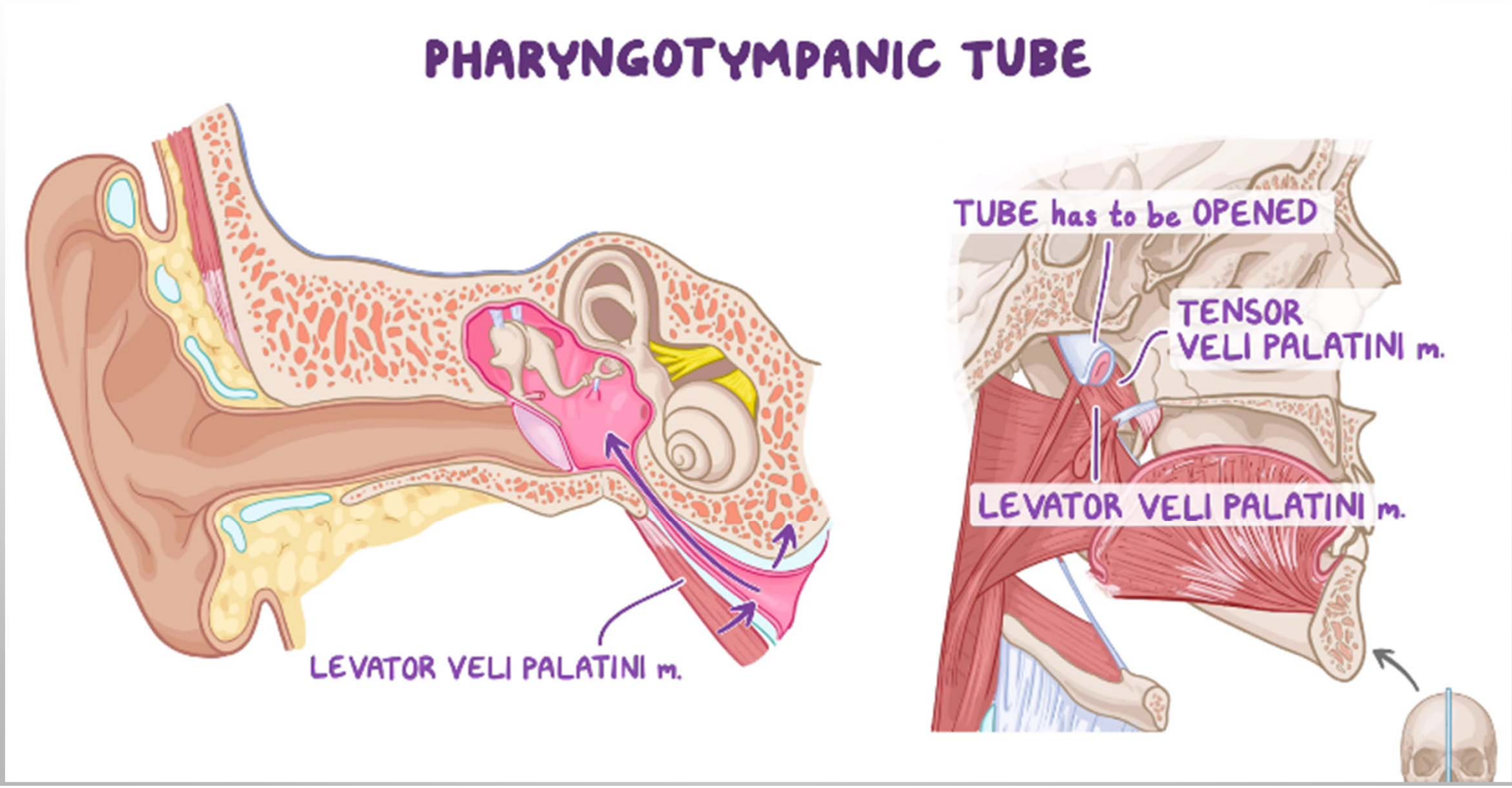


PHARYNGOTYMPANIC TUBE





PHARYNGOTYMPANIC TUBE: OPENING MUSCLES



MIDDLE EAR: ARTERIAL SUPPLY

Large arteries

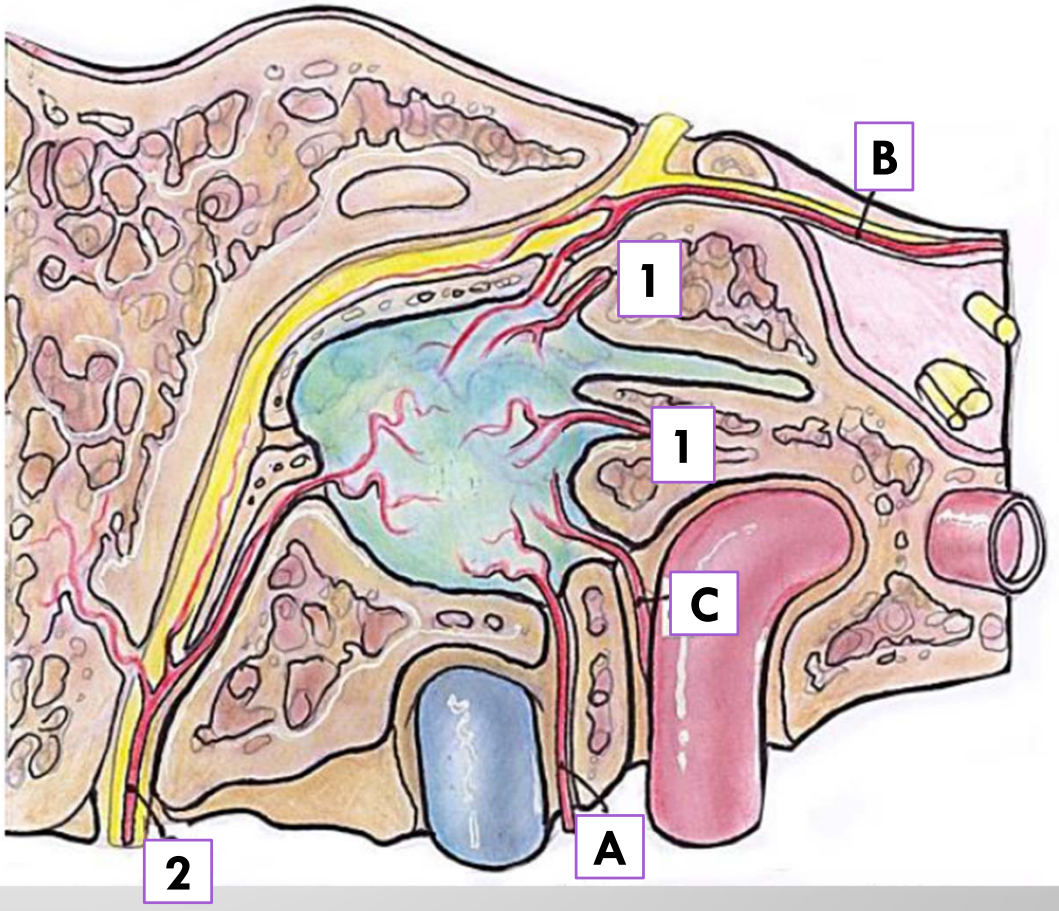
1. Anterior tympanic (from maxillary)
2. Stylomastoid (from occipital or post. auricular)

Small arteries

A. Inferior tympanic (from ascending pharyngeal & middle meningeal)

B. Superior tympanic (from a. of pterygoid canal)

C. Caroticotympanic (from ICA)



MIDDLE EAR: VENOUS DRAINAGE

1. Pterygoid venous plexus

2. Superior petrosal sinus

MIDDLE EAR: INNERVATION

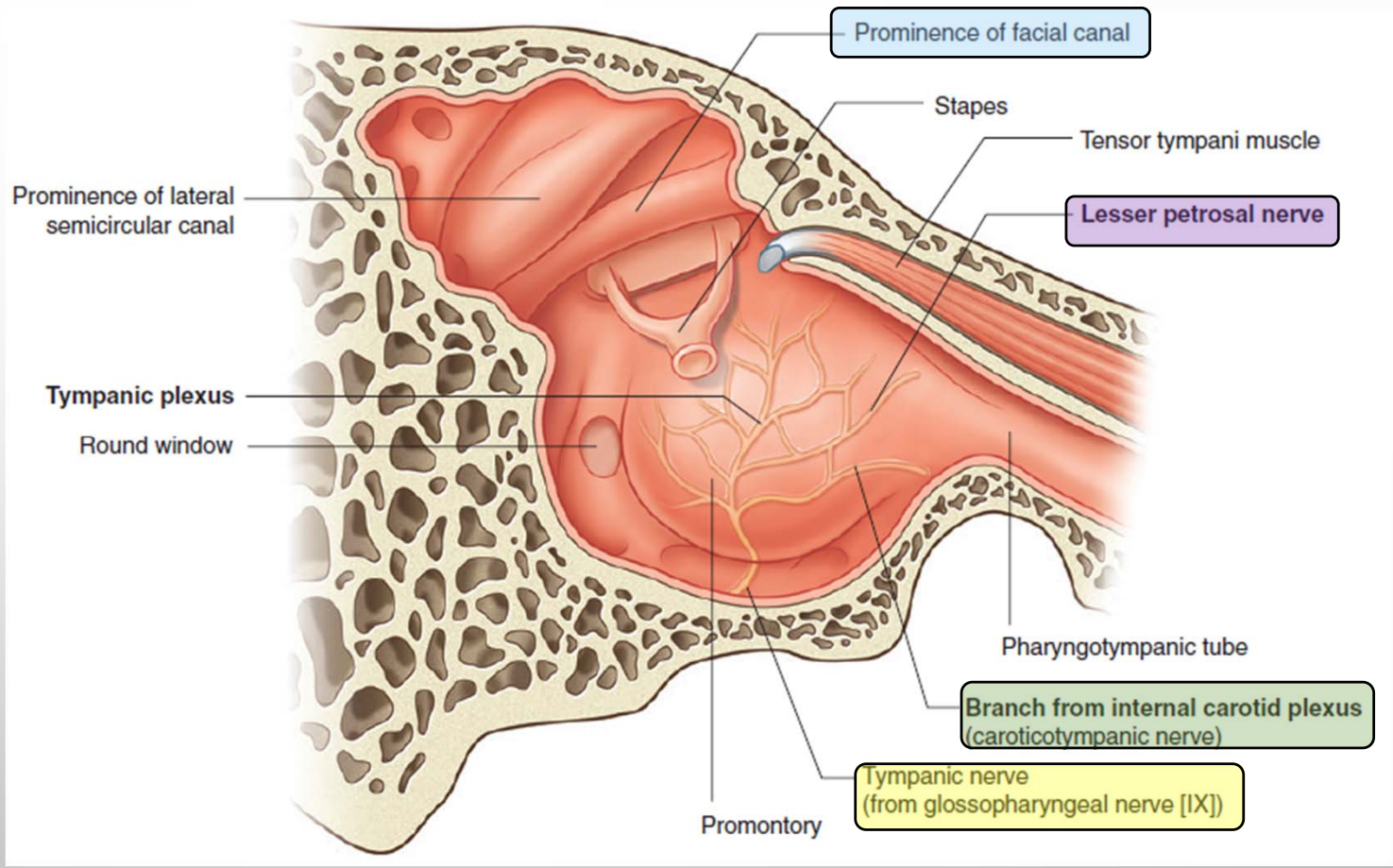
Tympanic plexus

- Afferent:

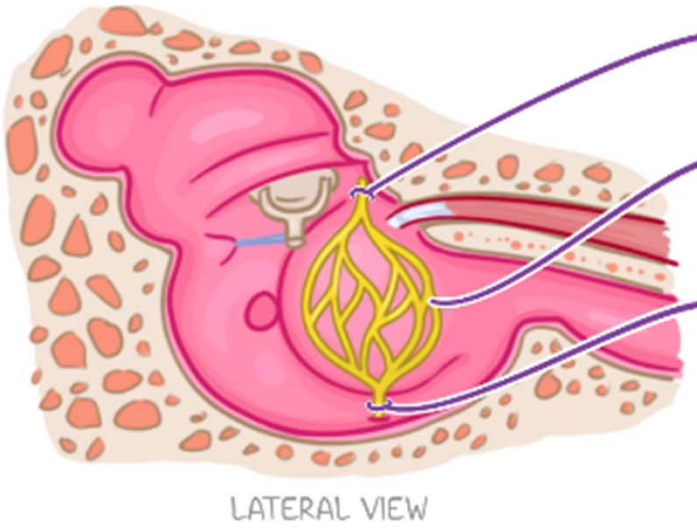
1. Tympanic n. (from CN IX): Sensory
2. Carticotympanic n. (from internal carotid plexus) : Sympathetic
3. Communicating n. from CN VII: Parasympathetic

- Efferent:

Lesser petrosal n. (parasympathetic to otic ganglion)



MIDDLE EAR: OTHER NERVES



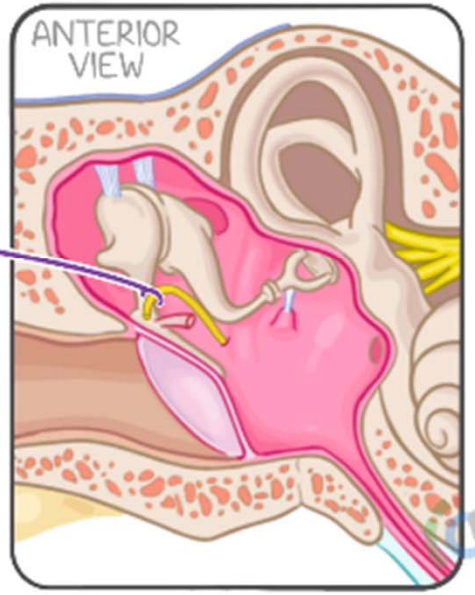
LATERAL VIEW

LESSER PETROSAL n.
- PARASYMPATHETIC INNERVATION to PAROTID GLAND

TYMPANIC PLEXUS
- INNERVATES MUCOUS MEMBRANE of MIDDLE EAR & PHARYNGOTYMPANIC TUBE

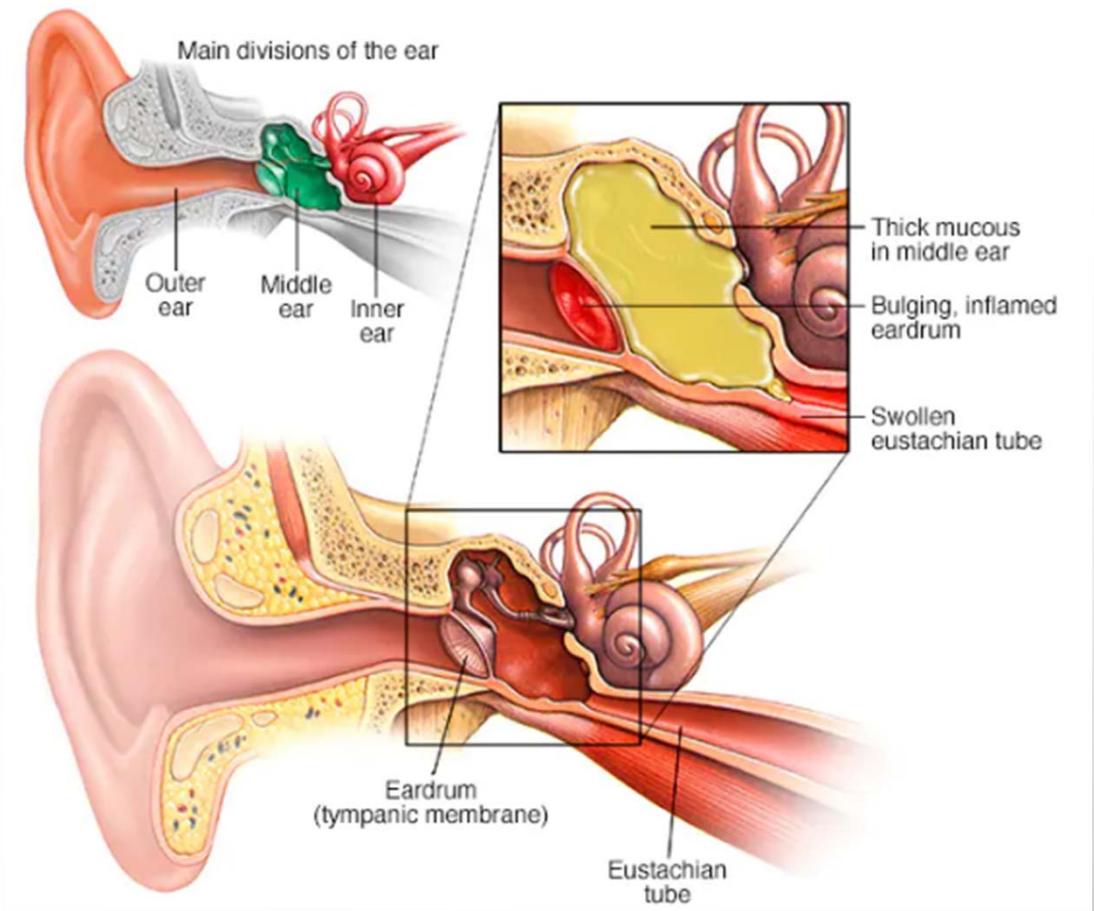
TYMPANIC n.
- branch of GLOSSOPHARYNGEAL n. (CN IX)

CHORDA TYMPANI n.
- branch of FACIAL n. (CN VII)
- EXITS through ANTERIOR WALL to INFRATEMPORAL FOSSA

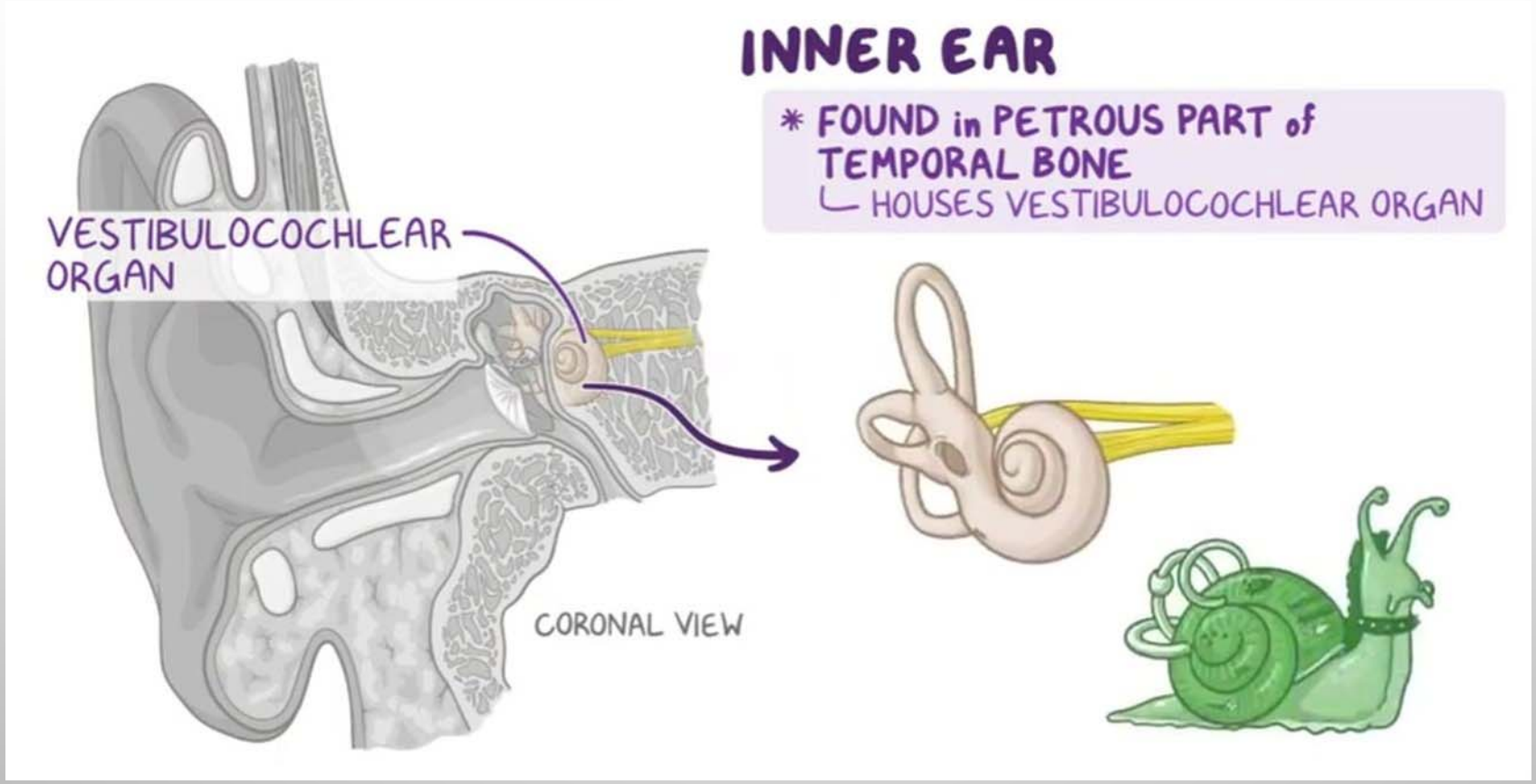


+Nerves to stapedius & tensor tympani

OTITIS MEDIA



INNER EAR: LOCATION

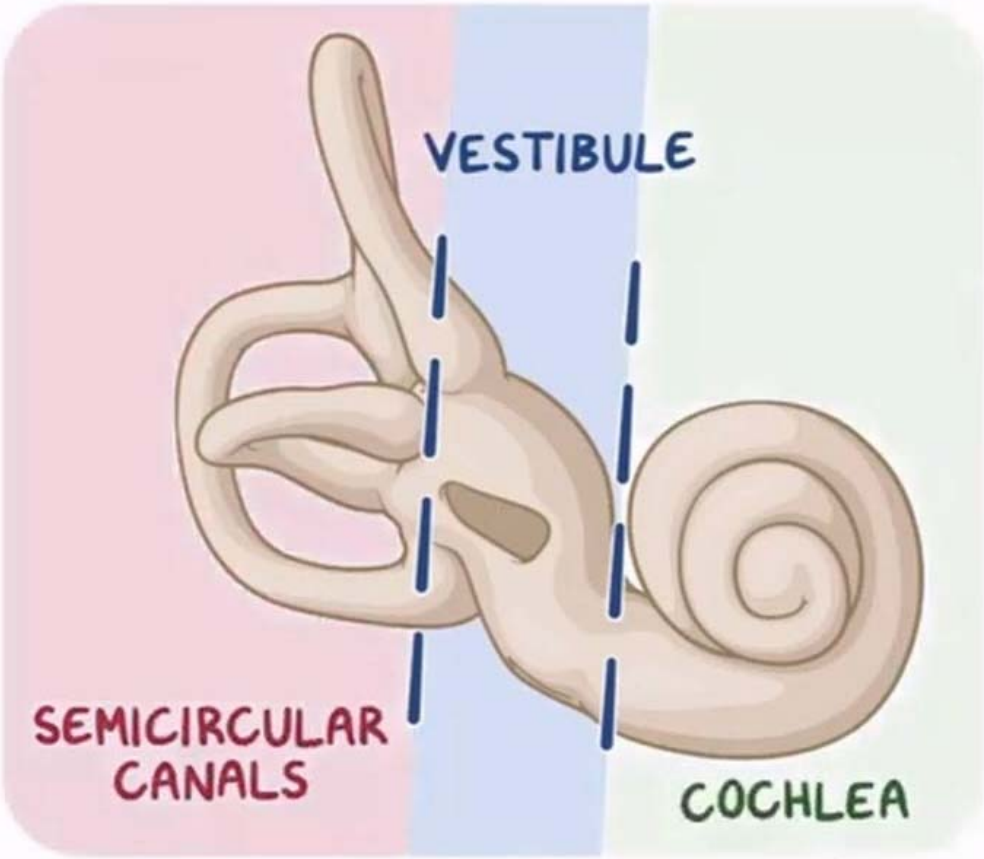


INNER EAR: PARTS OF BONY LABYRINTH

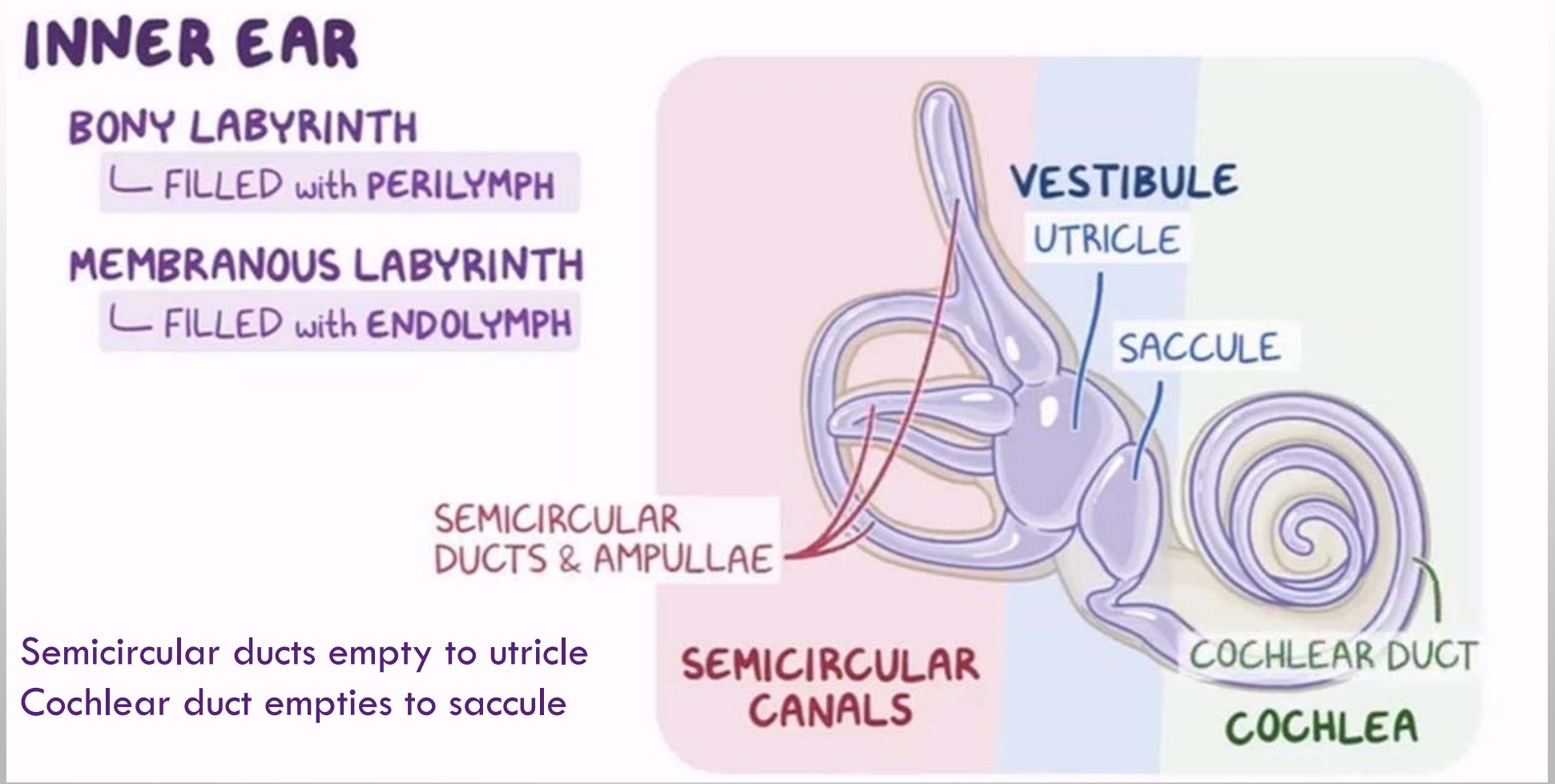
INNER EAR

BONY LABYRINTH

└ FILLED with PERILYMPH



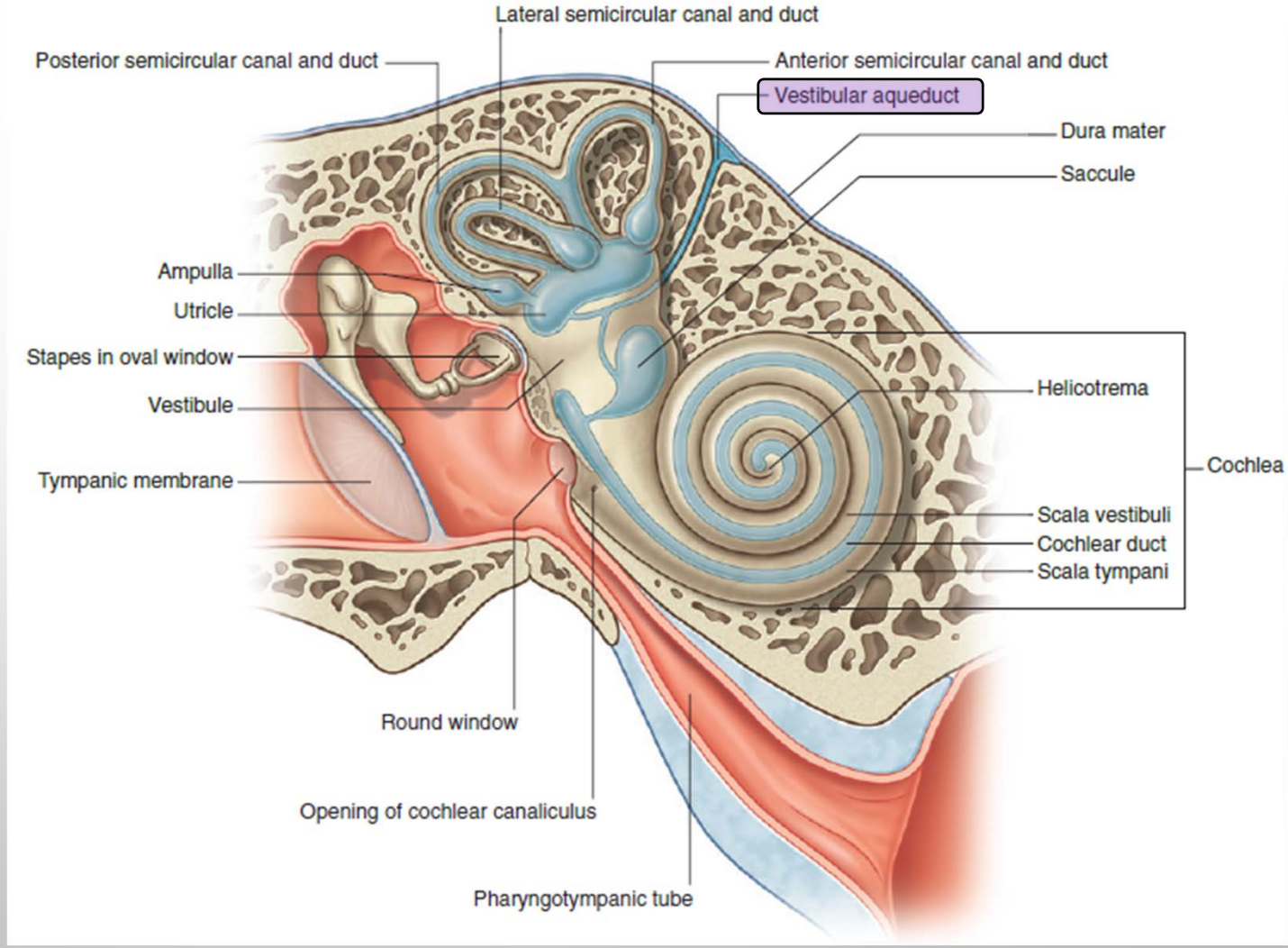
INNER EAR: PARTS OF MEMBRANOUS LABYRINTH



Semicircular ducts empty to utricle
Cochlear duct empties to saccule

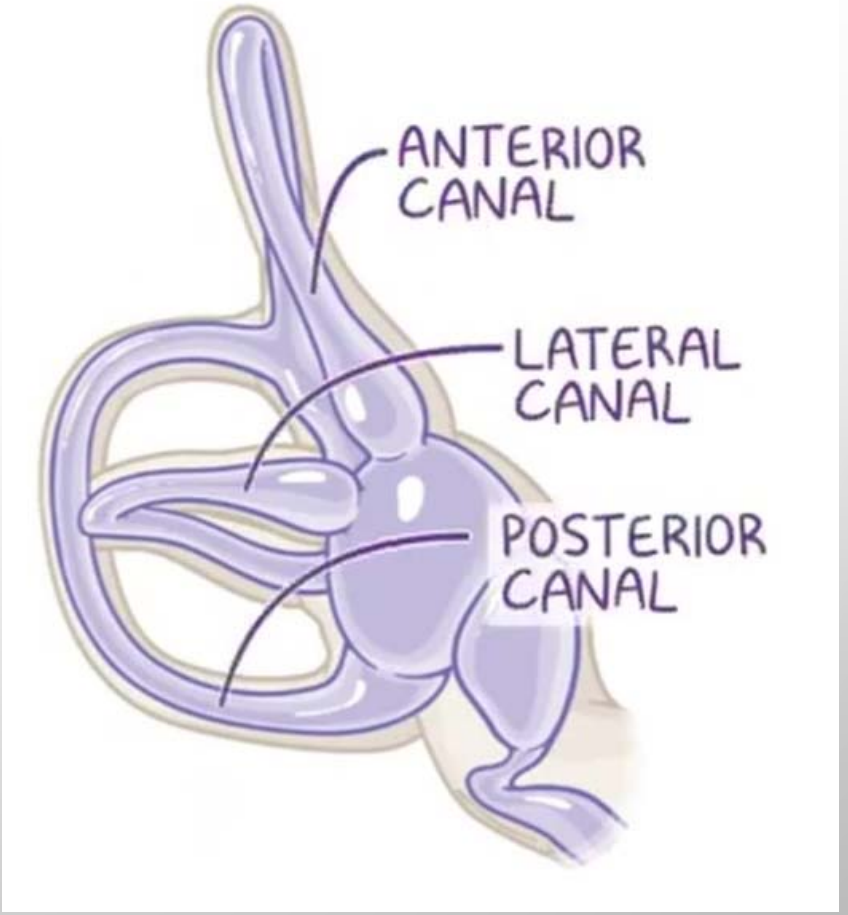
THE VESTIBULOCOCHLEAR ORGAN

- Cochlear duct is the organ of hearing
- Saccule, utricle & semicircular ducts for balance
- Endolymph & perilymph come from CSF & cochlear blood flow
- Endolymph circulates via vestibular aqueduct



THE SEMICIRCULAR CANALS/DUCTS

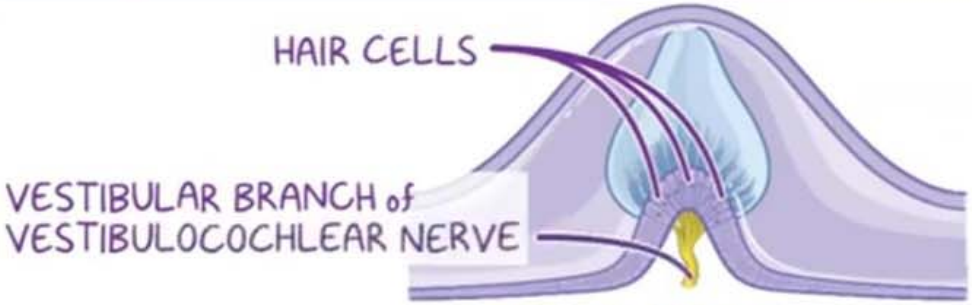
- Anterior (lies superior)→ Sagittal plane
- Posterior (lies inferior)→ Coronal plane
- Lateral (lies inferior) → Horizontal plane



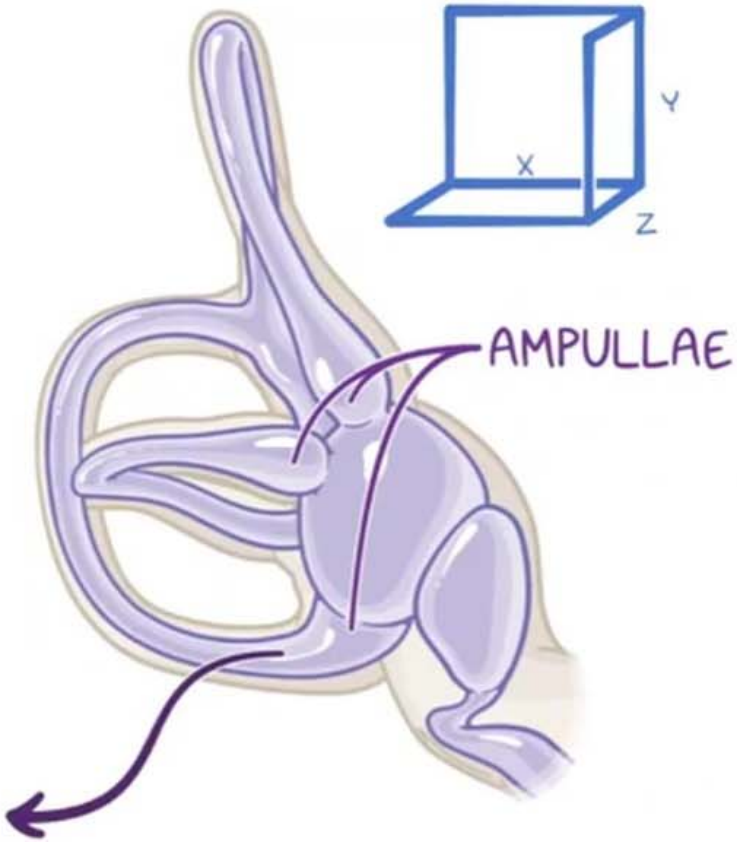
THE SEMICIRCULAR CANALS

SEMICIRCULAR CANALS, UTRICLE, & SACCULE

* THREE SEMICIRCULAR CANALS
  - ORIENTED in 3 DIFFERENT PLANES
  - DILATED END ⟶ AMPULLA
    ↳ SENSORY EPITHELIUM CALLED **AMPULLARY CRESTS**
    ↳ PICKS UP INFO about ROTATIONAL MOVEMENTS of the HEAD
    ↳ INNERVATED by **VESTIBULAR BRANCH of VESTIBULOCOCHLEAR NERVE**
    (C

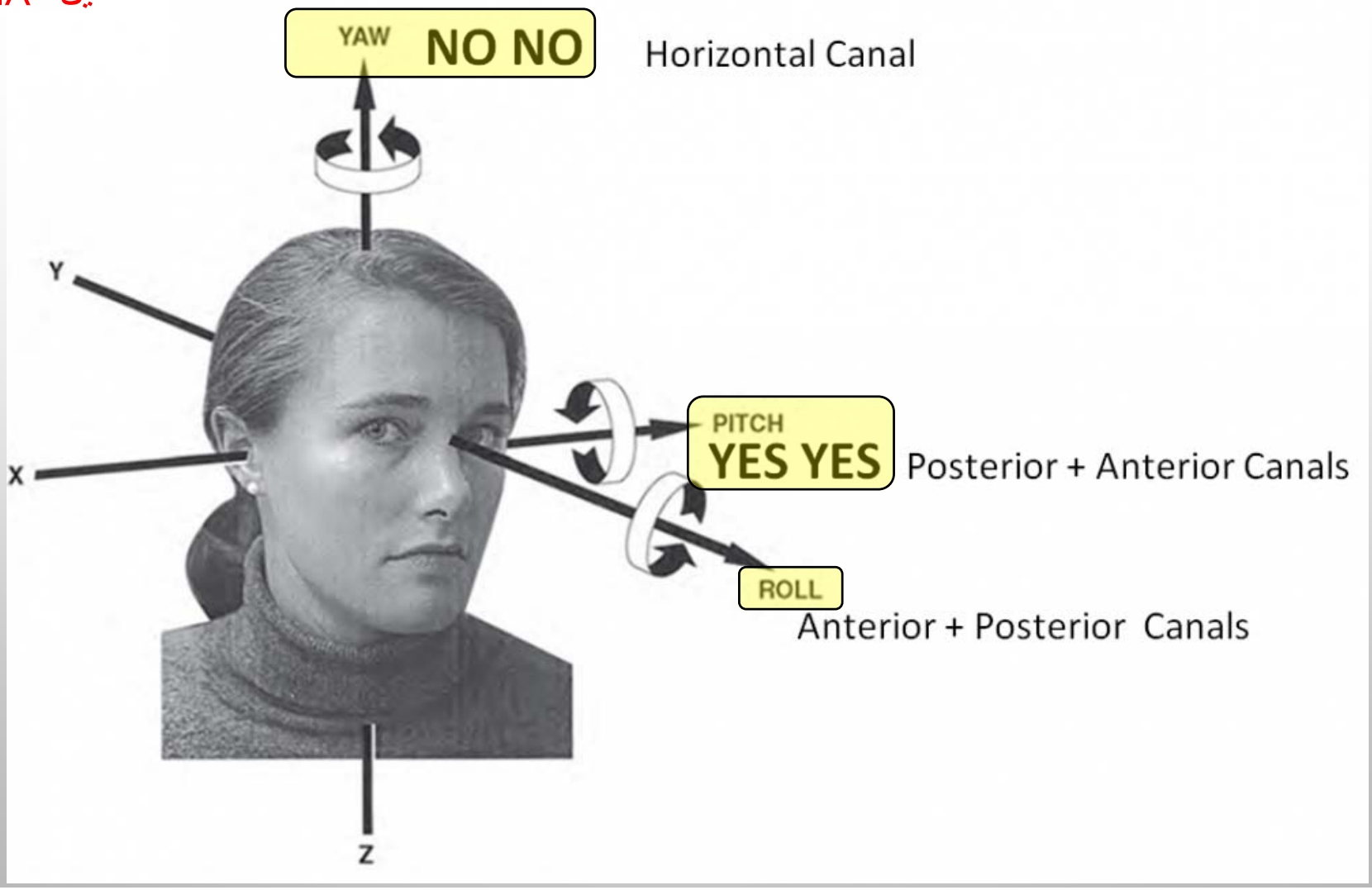


AMPULLARY CREST



INERTIA=التعطيل

THE SEMICIRCULAR CANALS

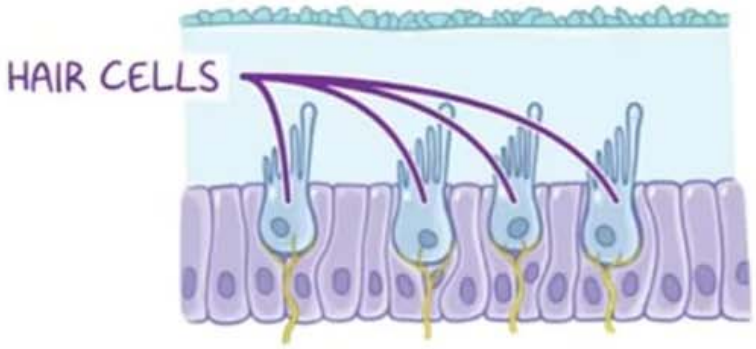


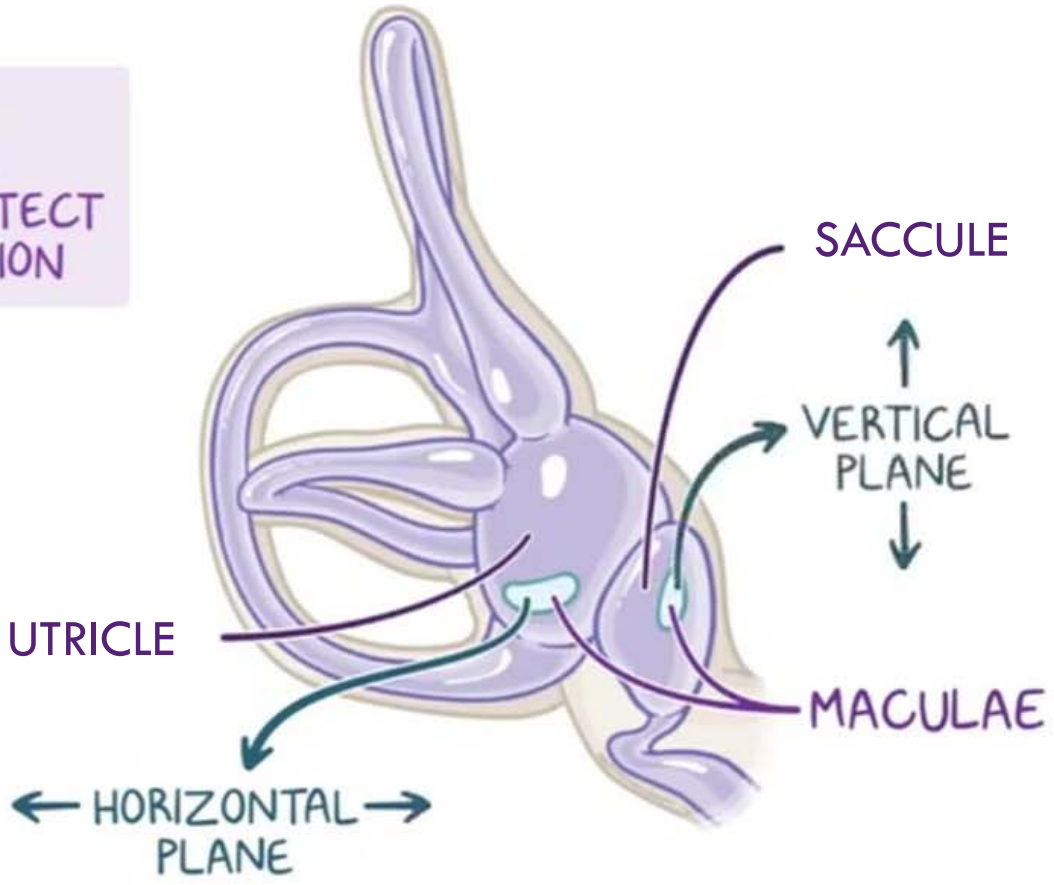
THE UTRICLE & SACCULE

INERTIA=التعطيل

UTRICLE, & SACCULE

* MACULAE
  - AREAS of SENSORY EPITHELIUM
  - CONTAINS HAIR CELLS that DETECT INFO about LINEAR ACCELERATION

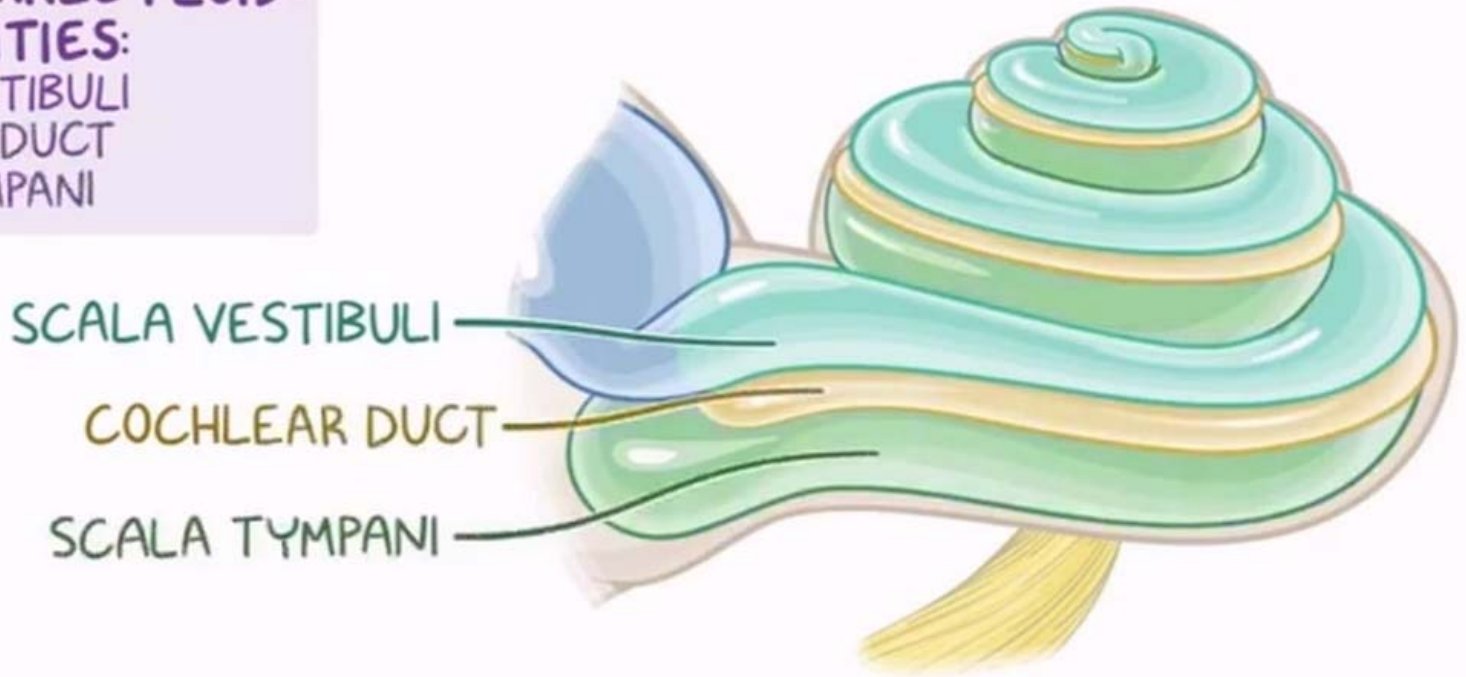




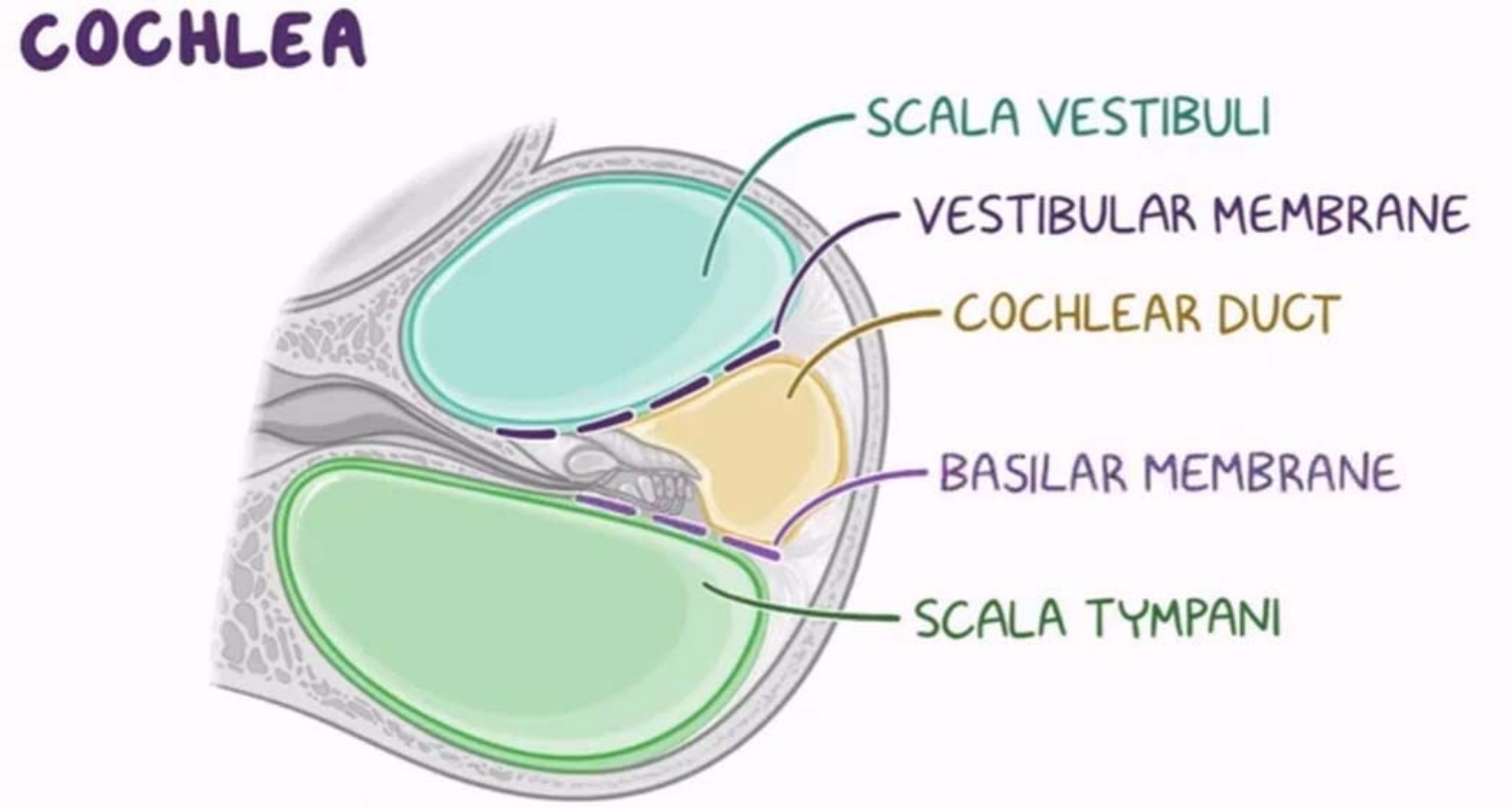
THE COCHLEA/COCHLEAR DUCT

COCHLEA

* CONTAINS THREE FLUID-FILLED CAVITIES:
  - ~ SCALA VESTIBULI
  - ~ COCHLEAR DUCT
  - ~ SCALA TYMPANI

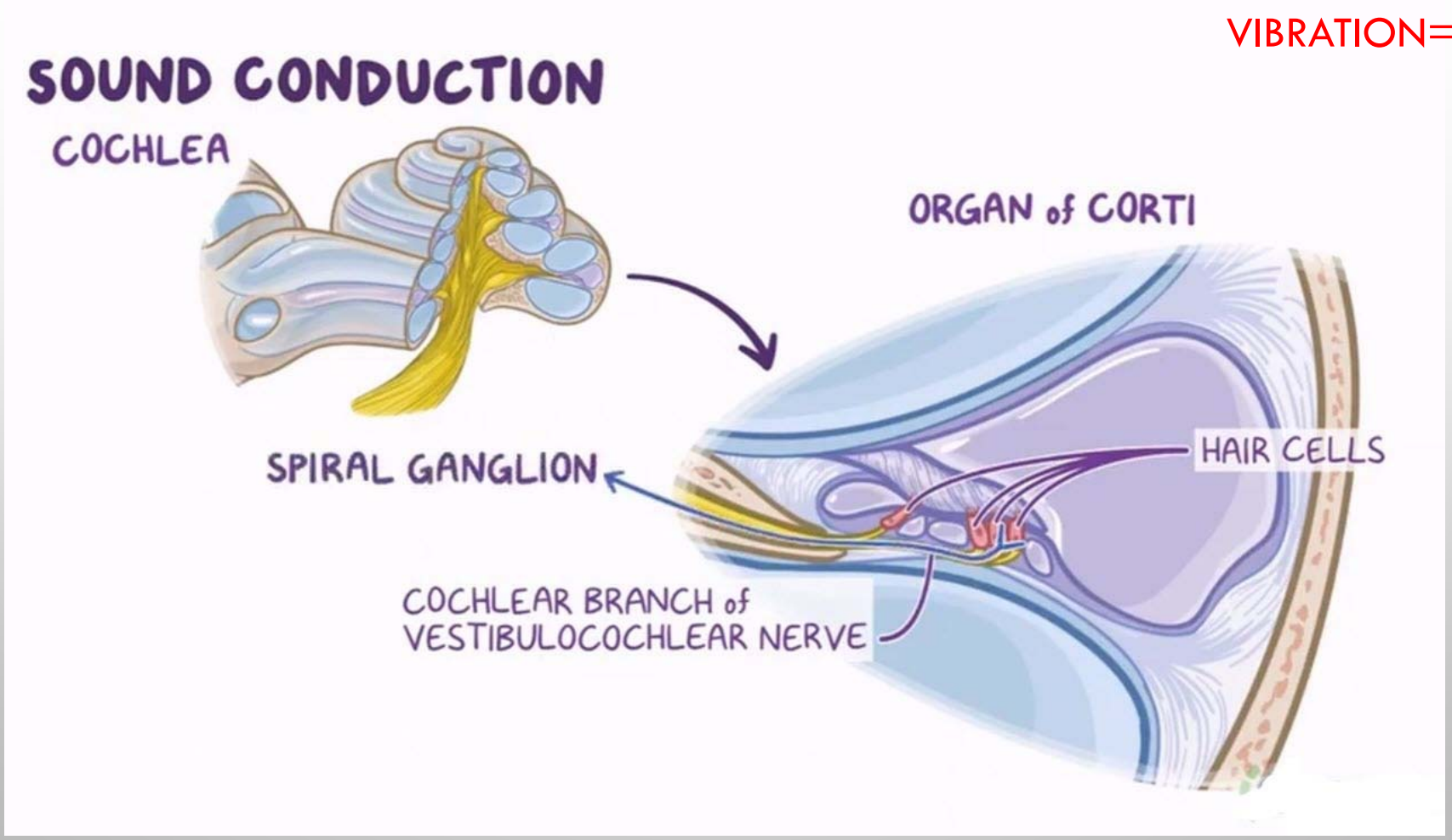


THE COCHLEAR DUCT

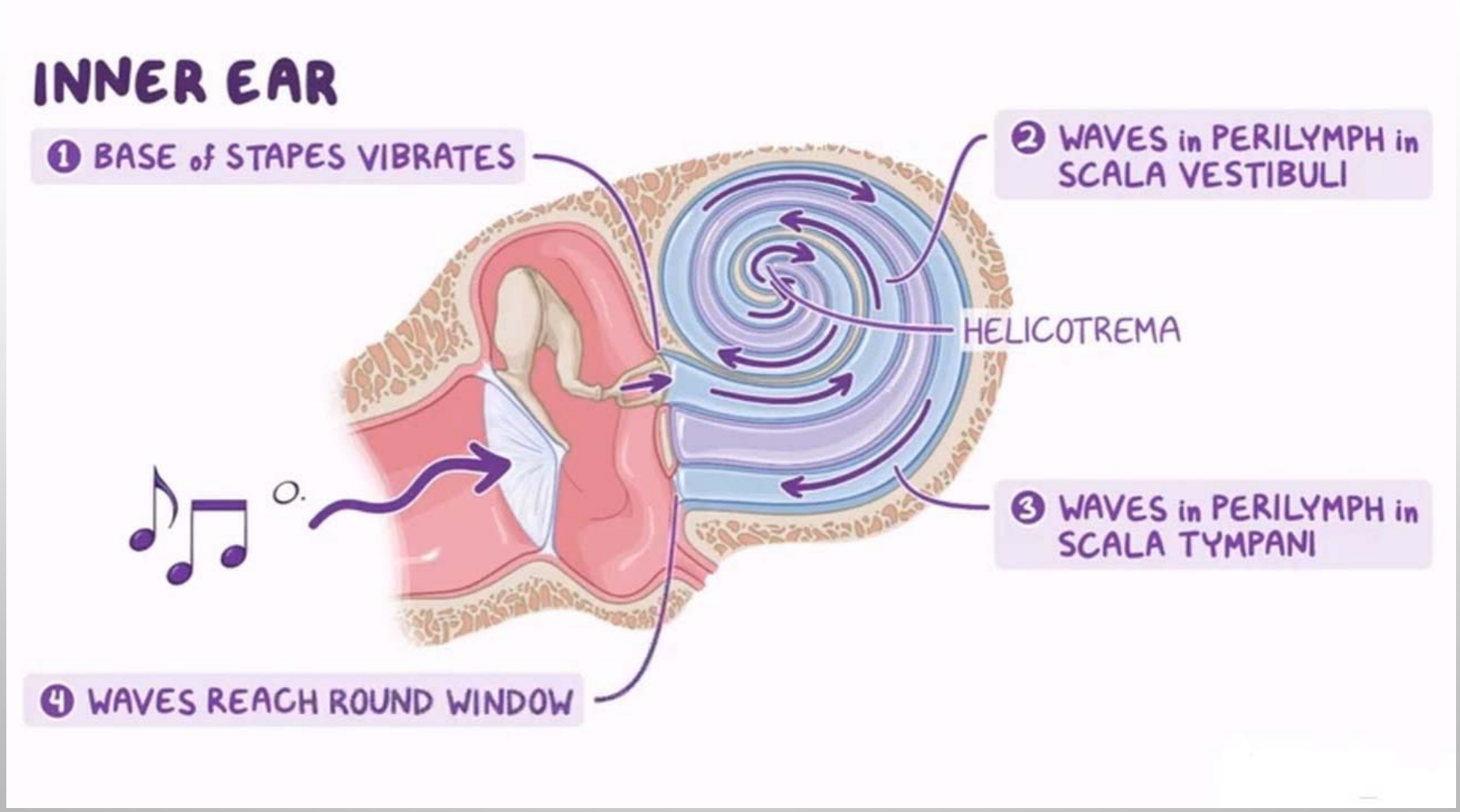


THE COCHLEA/COCHLEAR DUCT

VIBRATION=الذبذبة



SOUND CONDUCTION & HEARING



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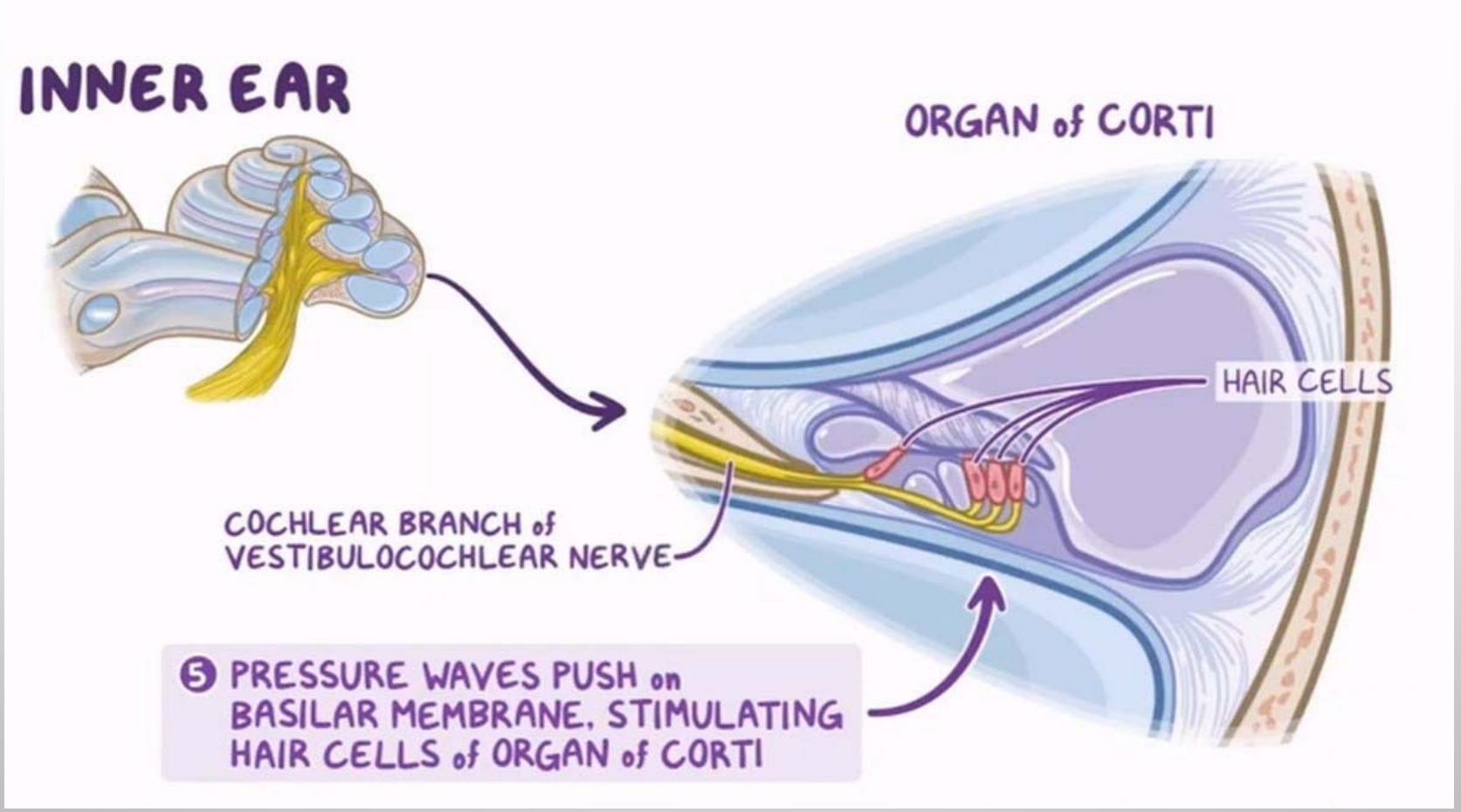
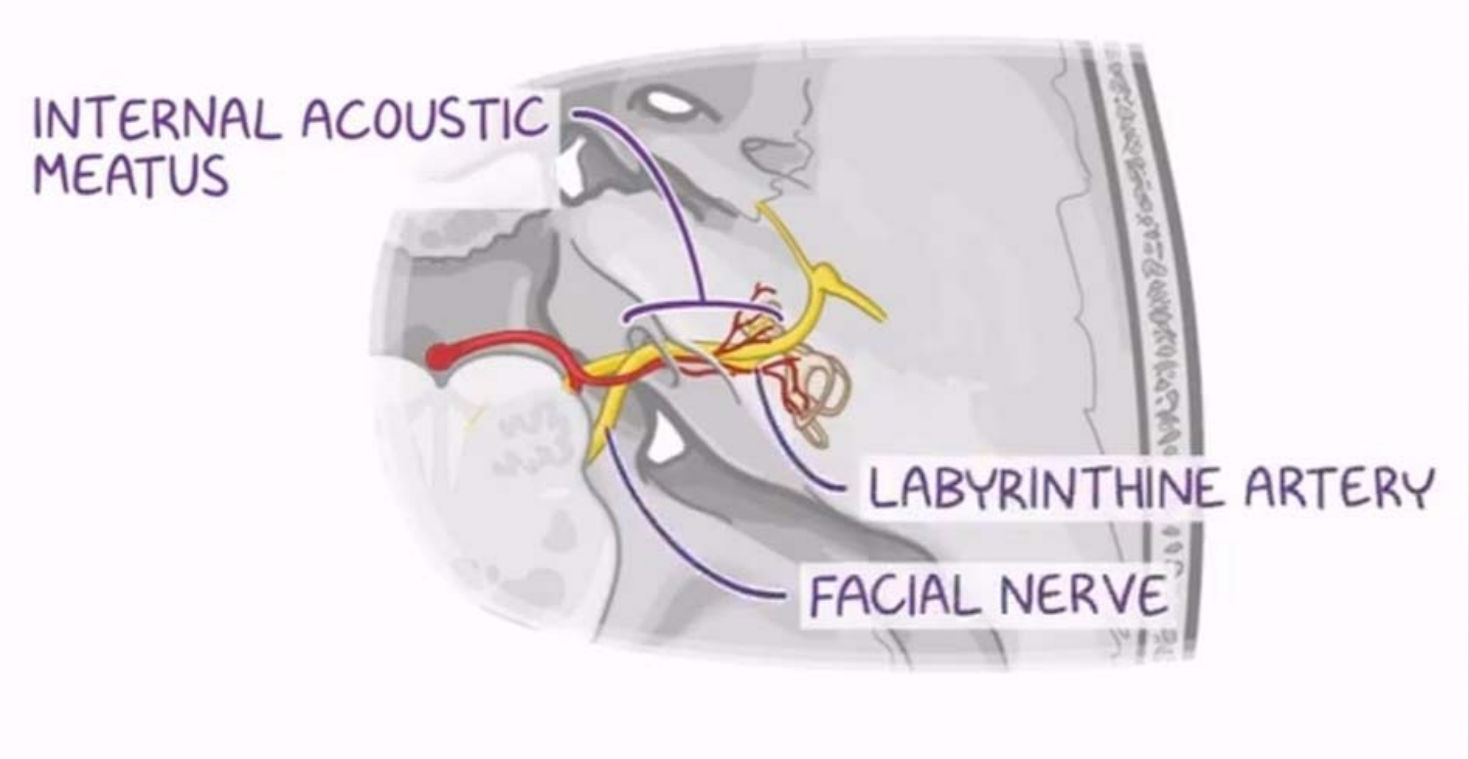
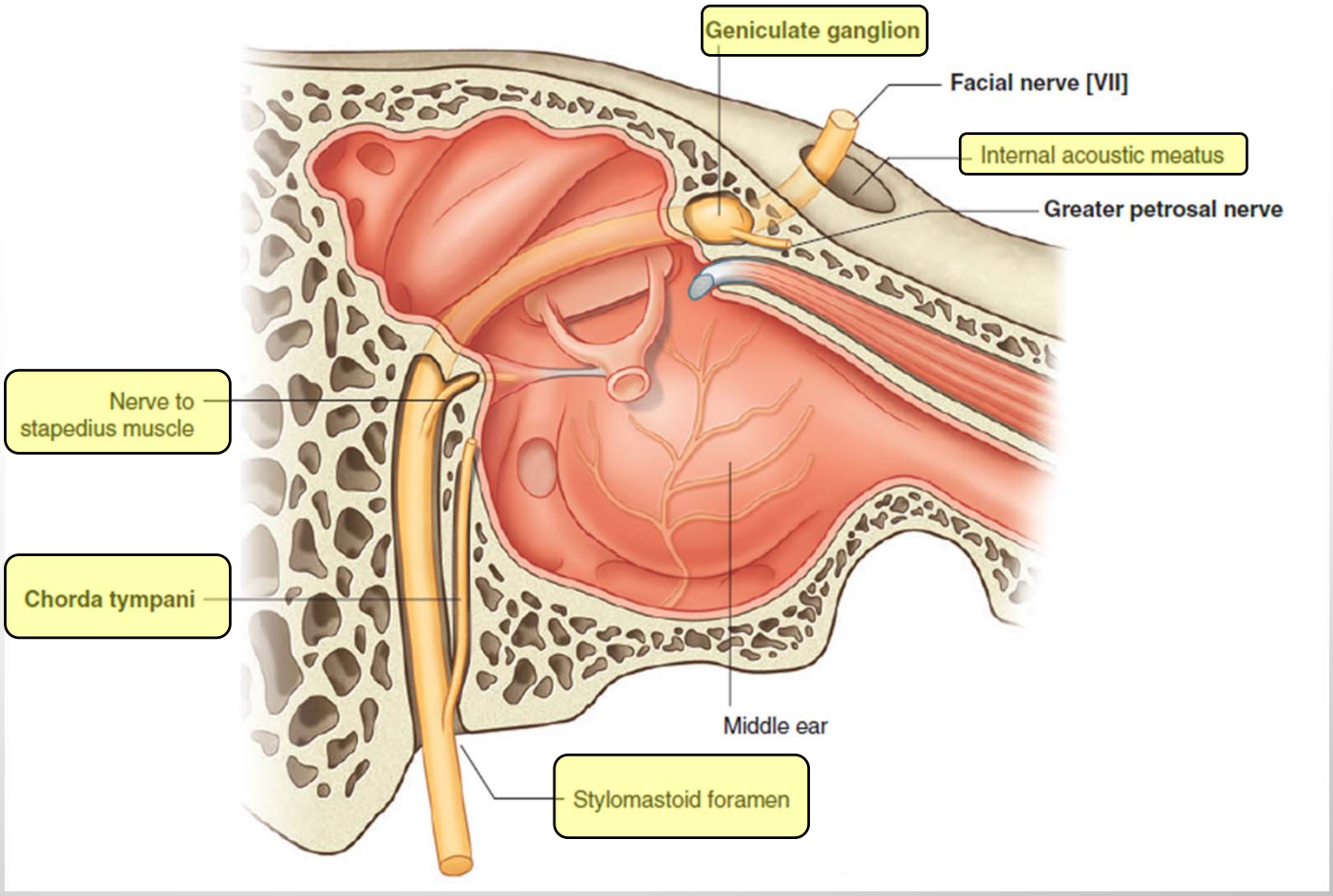


INNER EAR: NEUROVASCULAR SUPPLY



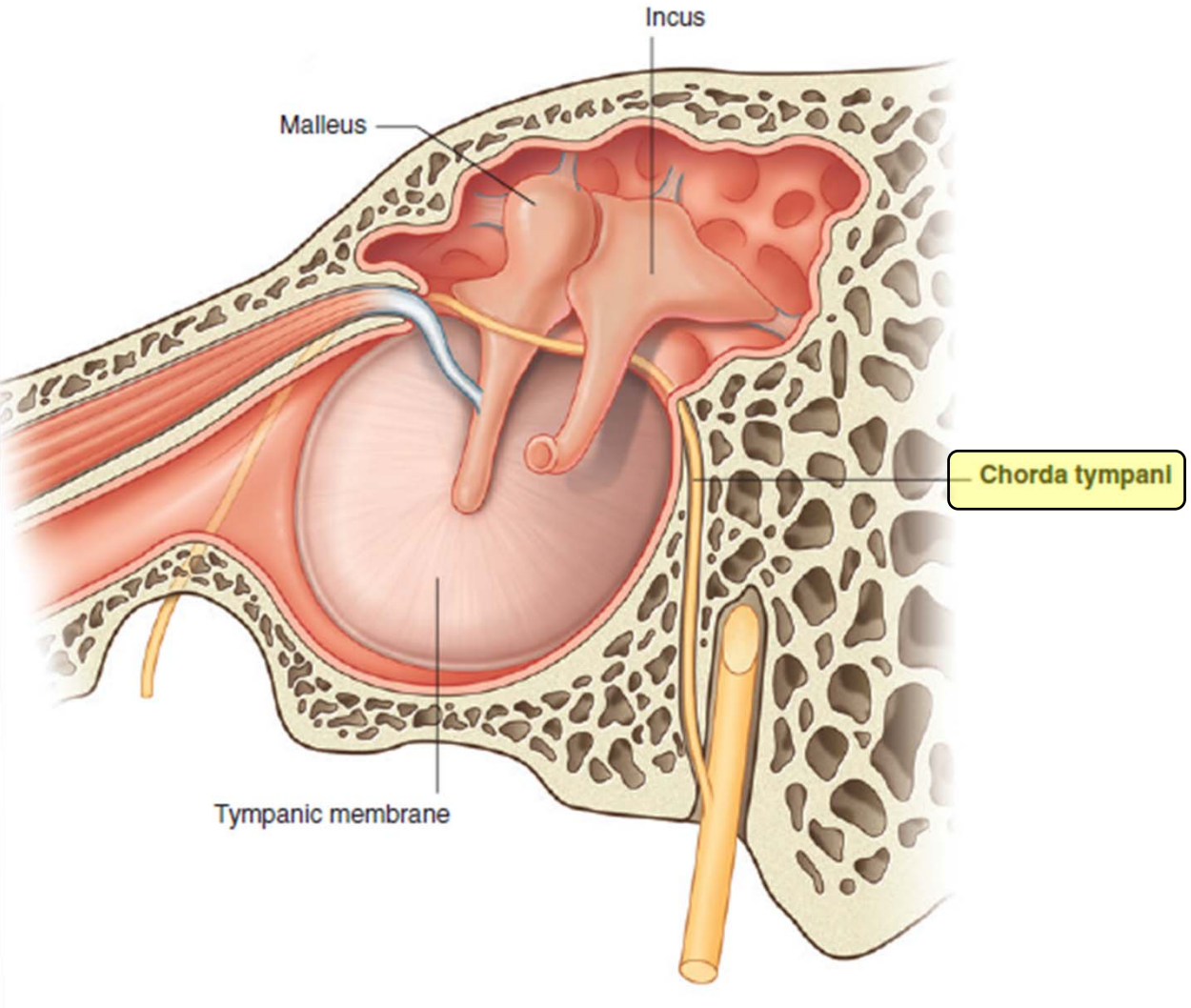
- Bony labyrinth supplied by: anterior tympanic branch (maxillary a.)+ stylomastoid branch (posterior auricular a.)+petrosal branch (middle meningeal a.)
- Membranous labyrinth: labyrinthine artery (anteroinferior cerebellar a. or basilar a.)
- CN VIII (CN VII)

FACIAL NERVE IN THE TEMPORAL BONE



1. Greater petrosal n. (pregang. parasymp.)→ opening of its own→ pterygopalatine ganglion
2. Nerve to stapedius (motor).
3. Chorda tympani (taste ant 2/3 of tongue)→ tympanic membrane→ petrotympanic fissure→ lingual nerve

CHORDA TYMPANI



TINNITUS

Tinnitus is often associated with:

- age-related hearing loss
- inner ear damage caused by repeated exposure to loud noises
- an earwax build-up
- a middle ear infection
- Ménière's disease – a condition that also causes hearing loss and vertigo (a spinning sensation)
- otosclerosis – an inherited condition where an abnormal bone growth in the middle ear causes hearing loss