

In the name of GOD

General anatomy

For paramedicine student

By

Dr. Saeednia

Auditory System

- External Ear
- Middle Ear
- Internal Ear

External Ear

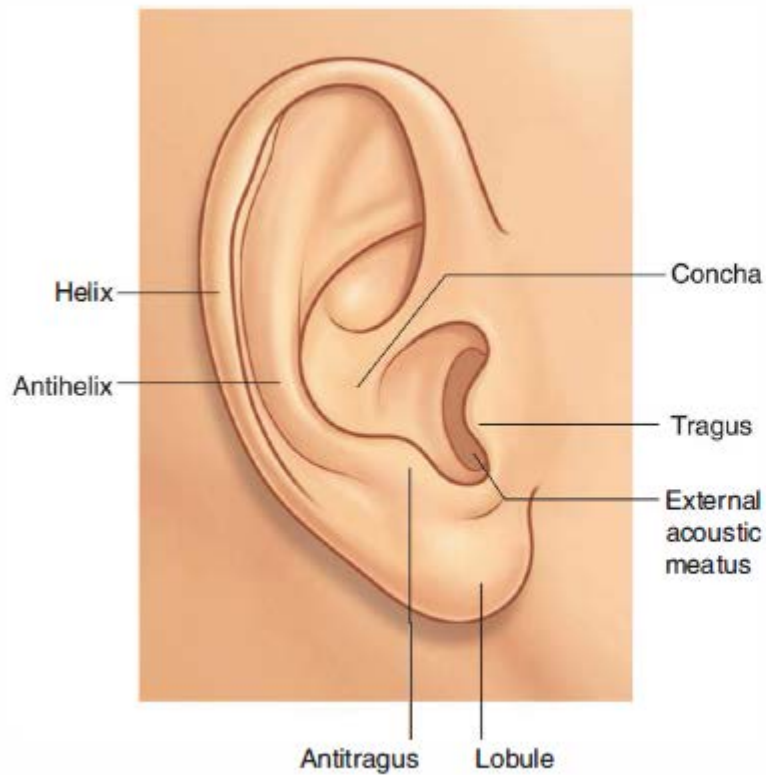


Fig. 8.110 Auricle.

Auricle ***External acoustic meatus***

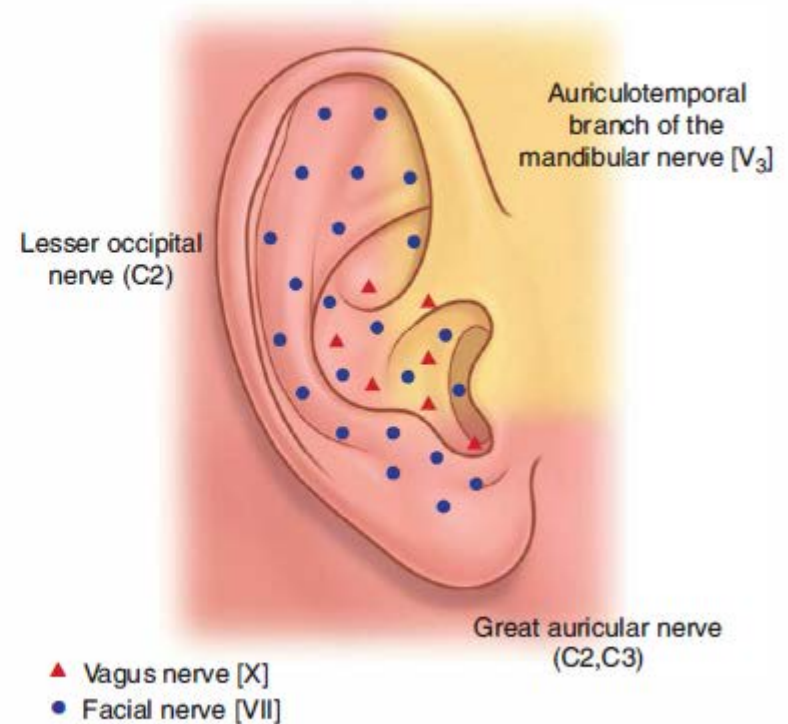


Fig. 8.111 Sensory innervation of the auricle.

External acoustic meatus

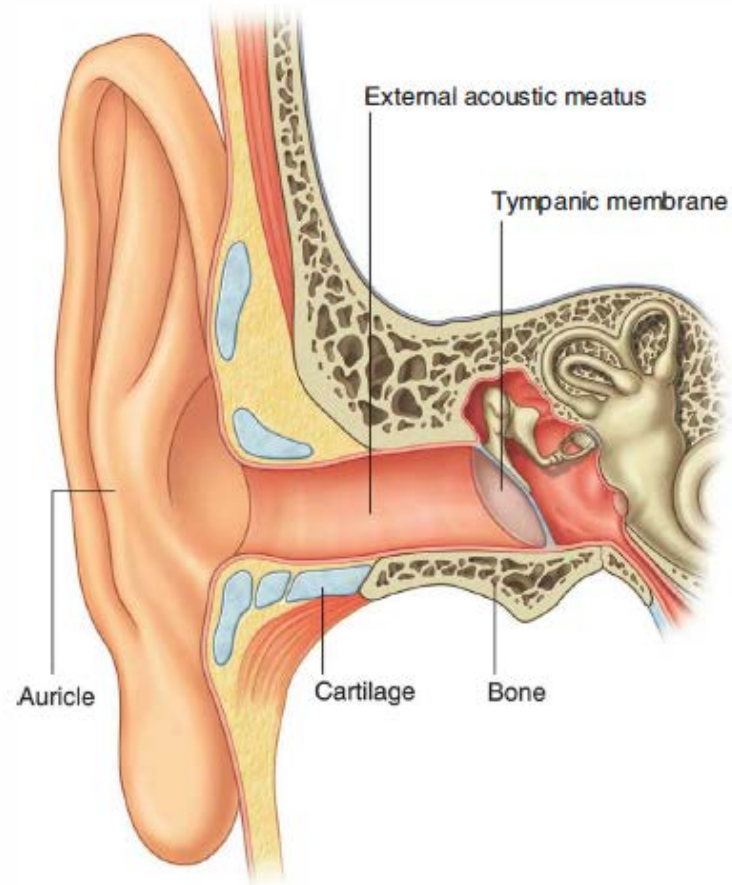
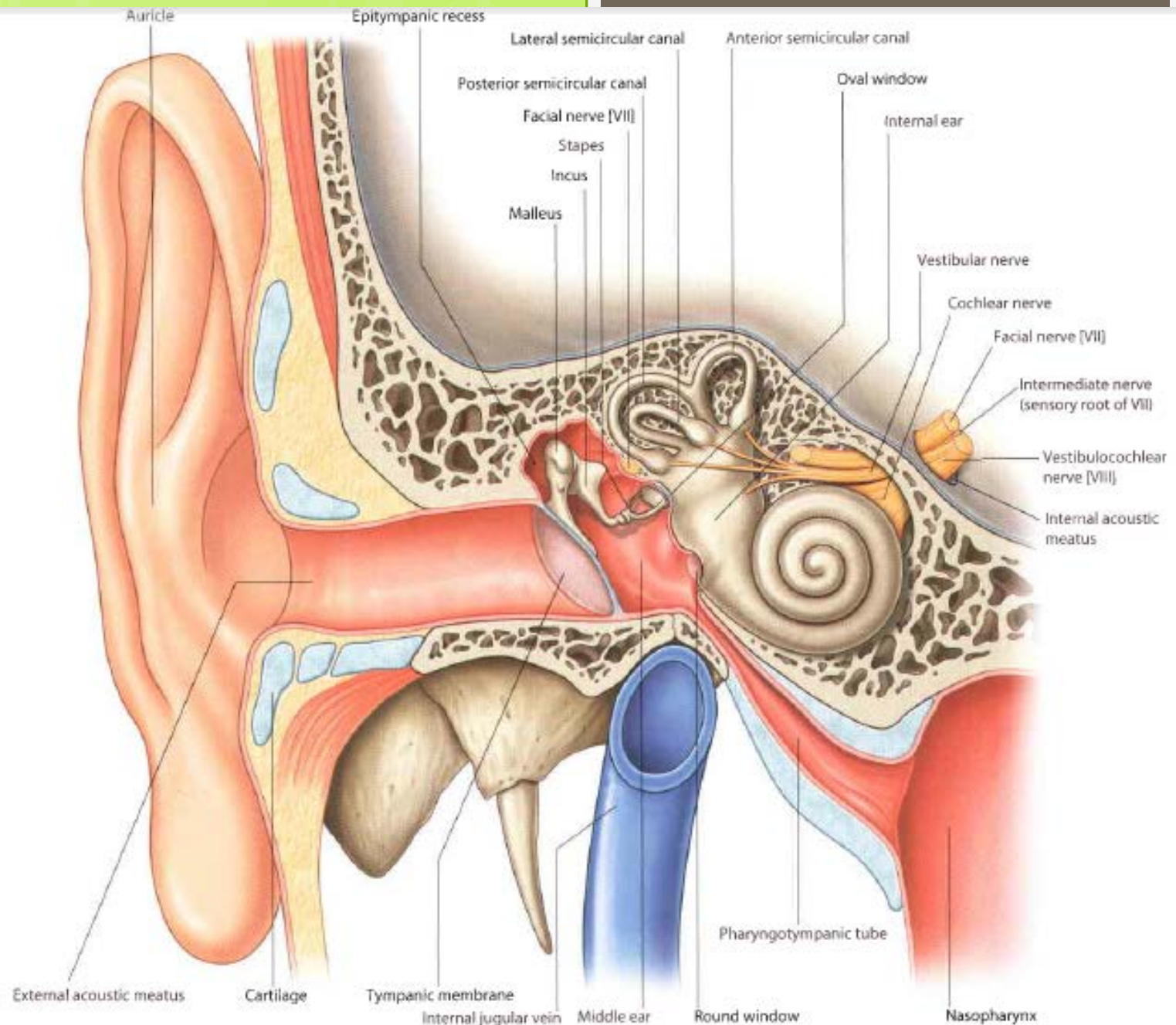


Fig. 8.112 External acoustic meatus.



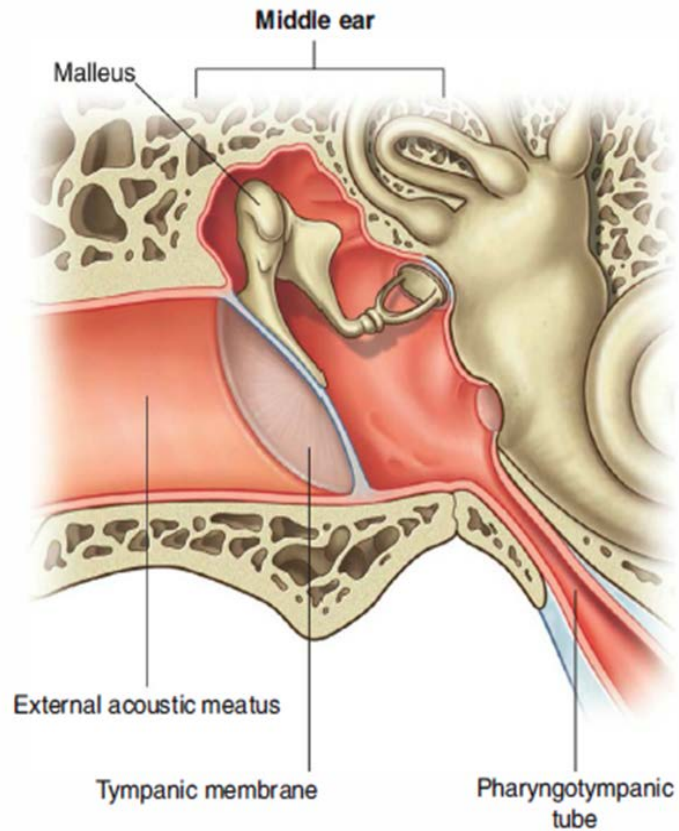


Fig. 8.1B Middle ear.

Middle Ear

Tympanic cavity

Supra tympanic cavity

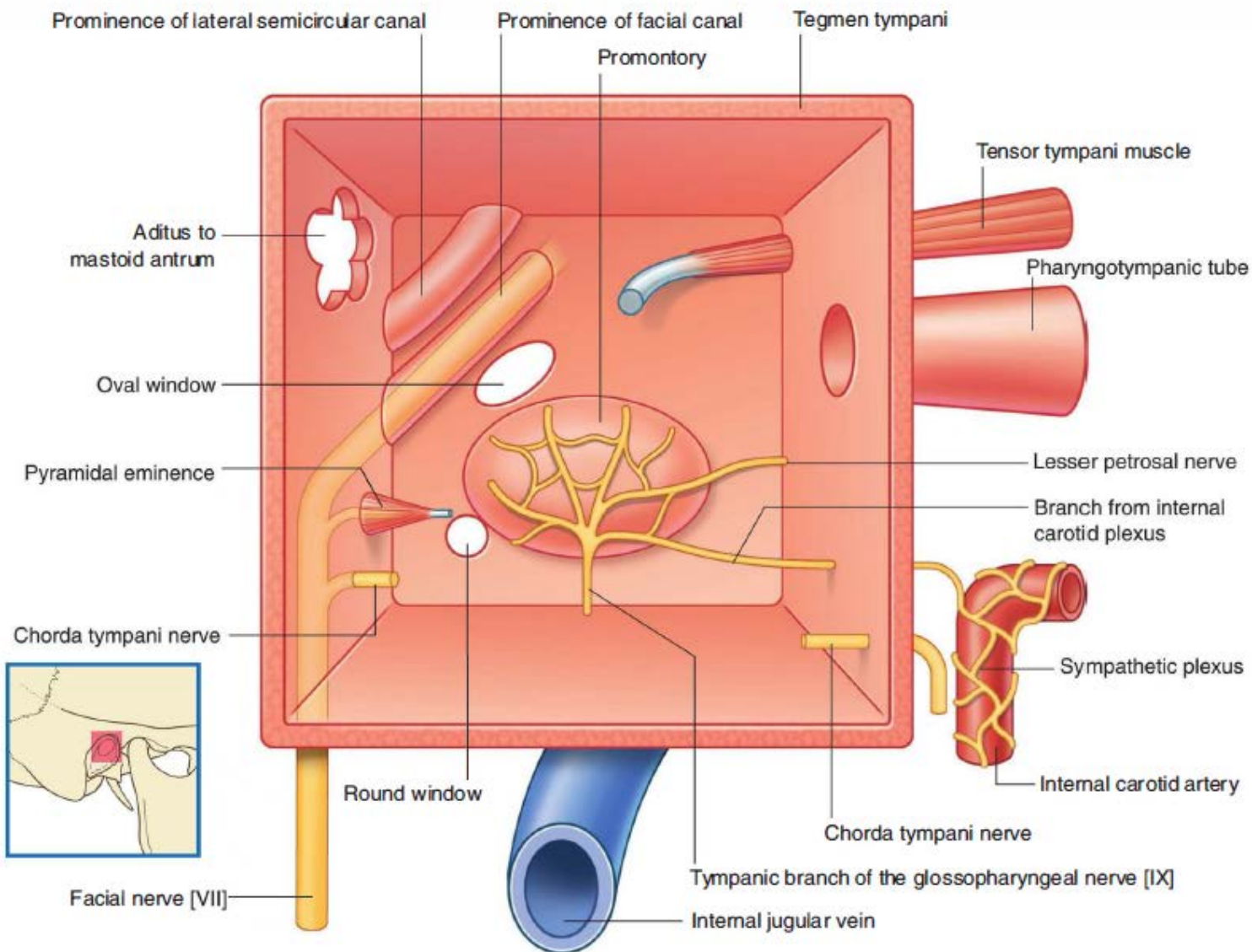


Fig. 8.116 Boundaries of the right middle ear.

Middle ear boundaries :

Roof : tegmen tympani

Floor : bony plate that separate tympanic cavity from int. jugular vein

Lat. : tympanic membrane

Med. : promontory / fenestra cochlea (round window) / fenestra vestibuli (oval window)

Post. : auitus to mastoid antrum

Ant. : pharyngotympanic tube / int. carotid artery

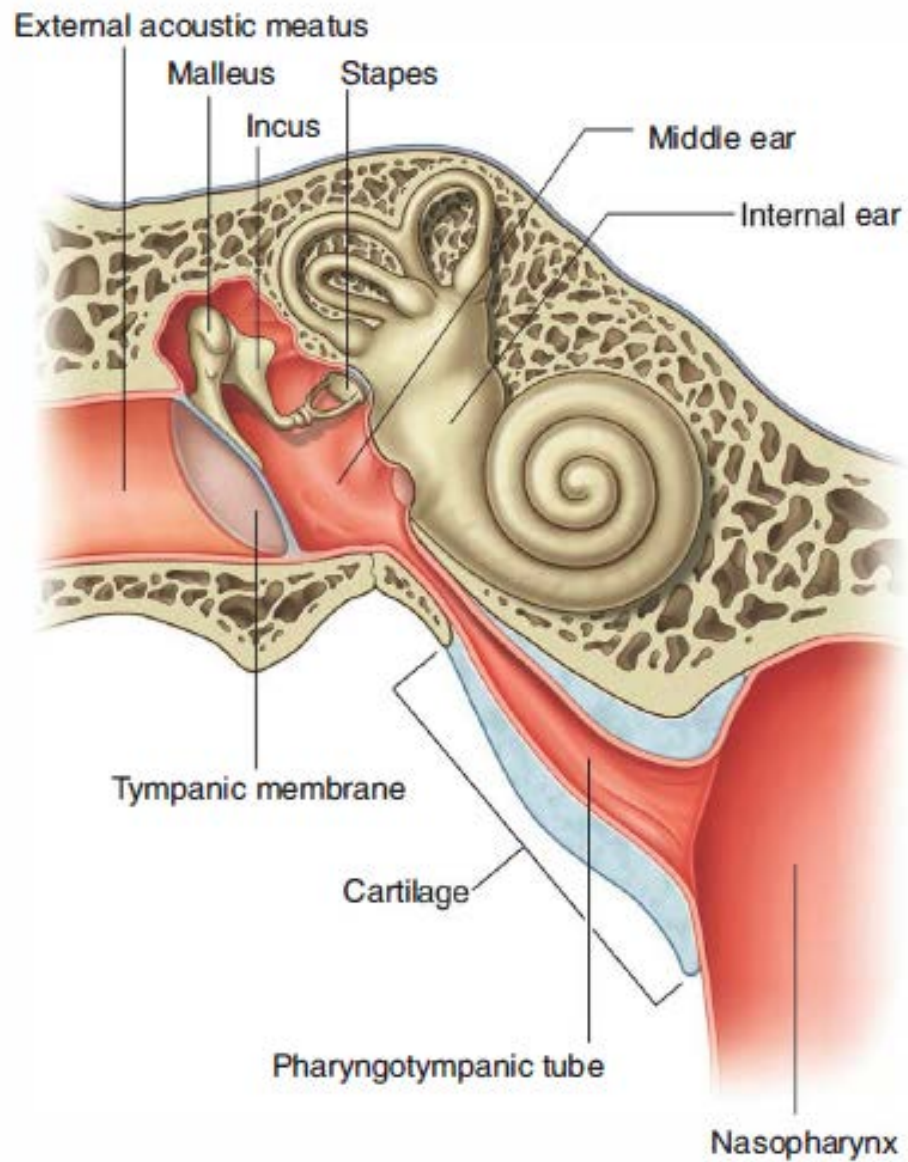


Fig. 8.118 Pharyngotympanic tube.

Tympanic Membrane

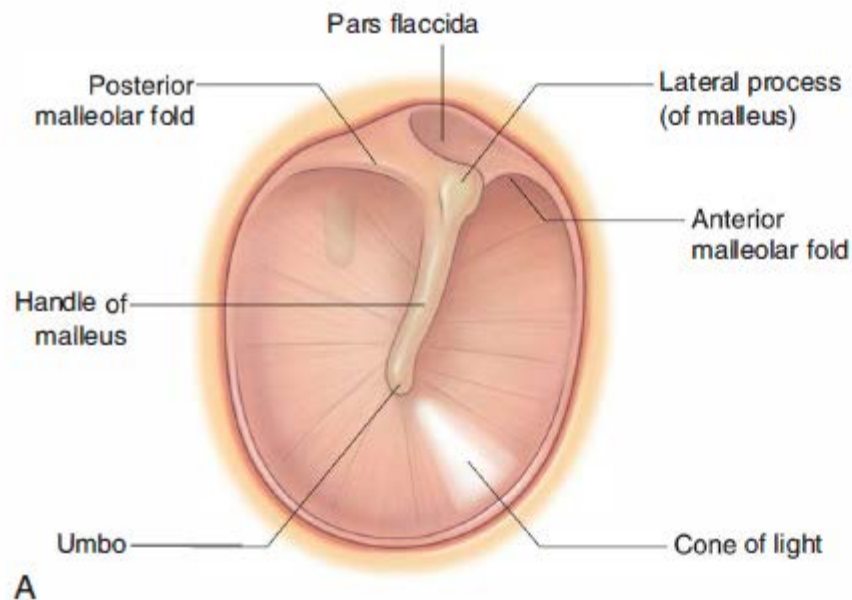


Fig. 8.114 Tympanic membrane (right ear). **A.** Diagram. **B.** Otoscopic view.

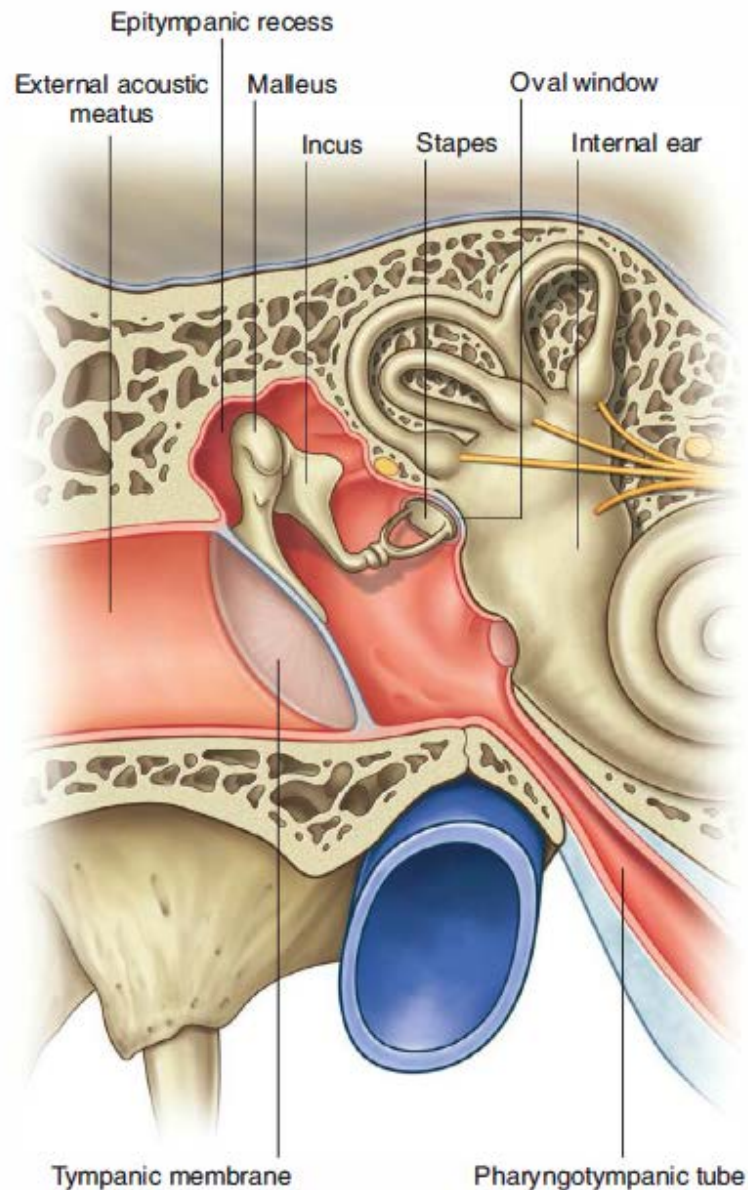


Fig. 8.115 Parts of the middle ear.

Auditory Ossicles

Malleus

Incus

stapes

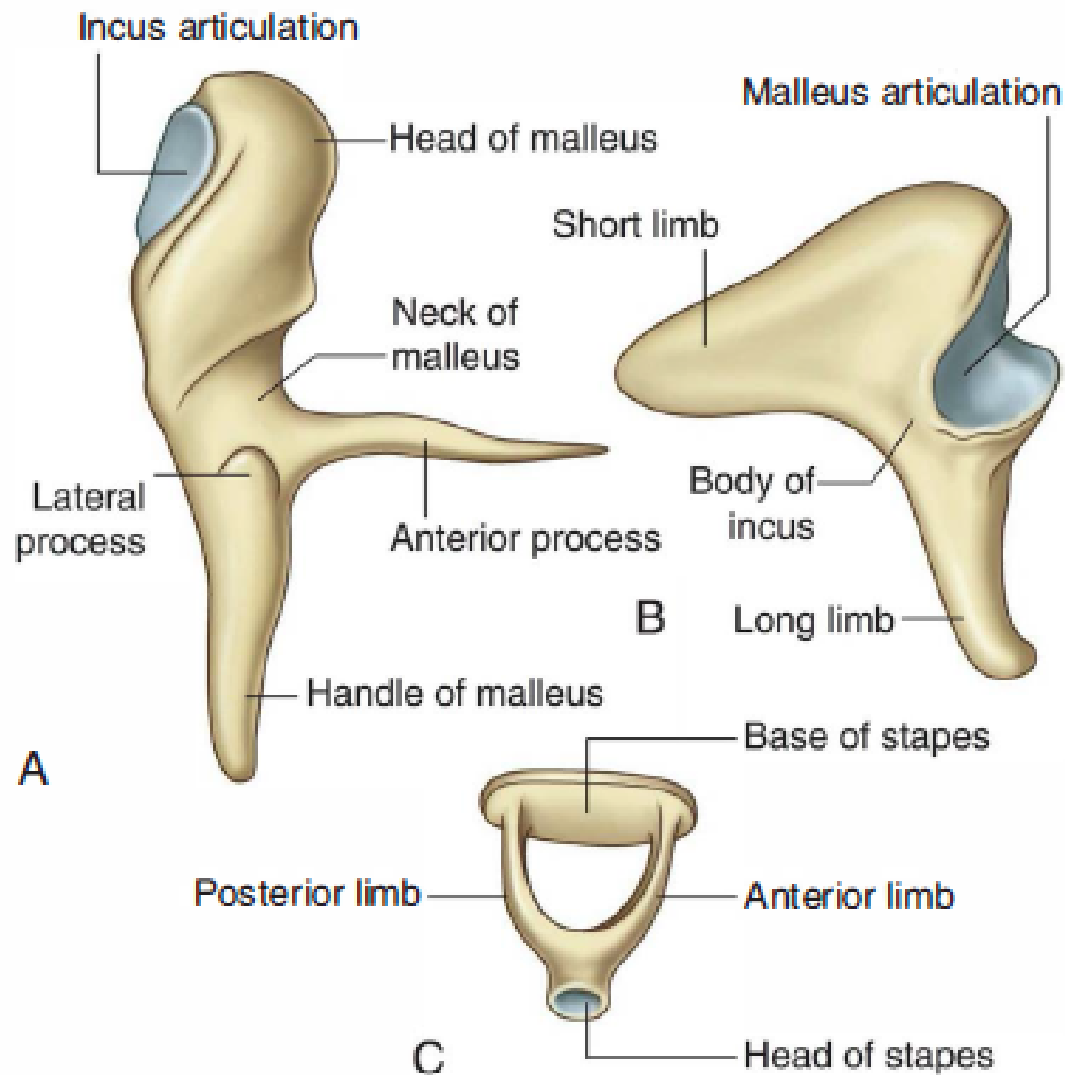
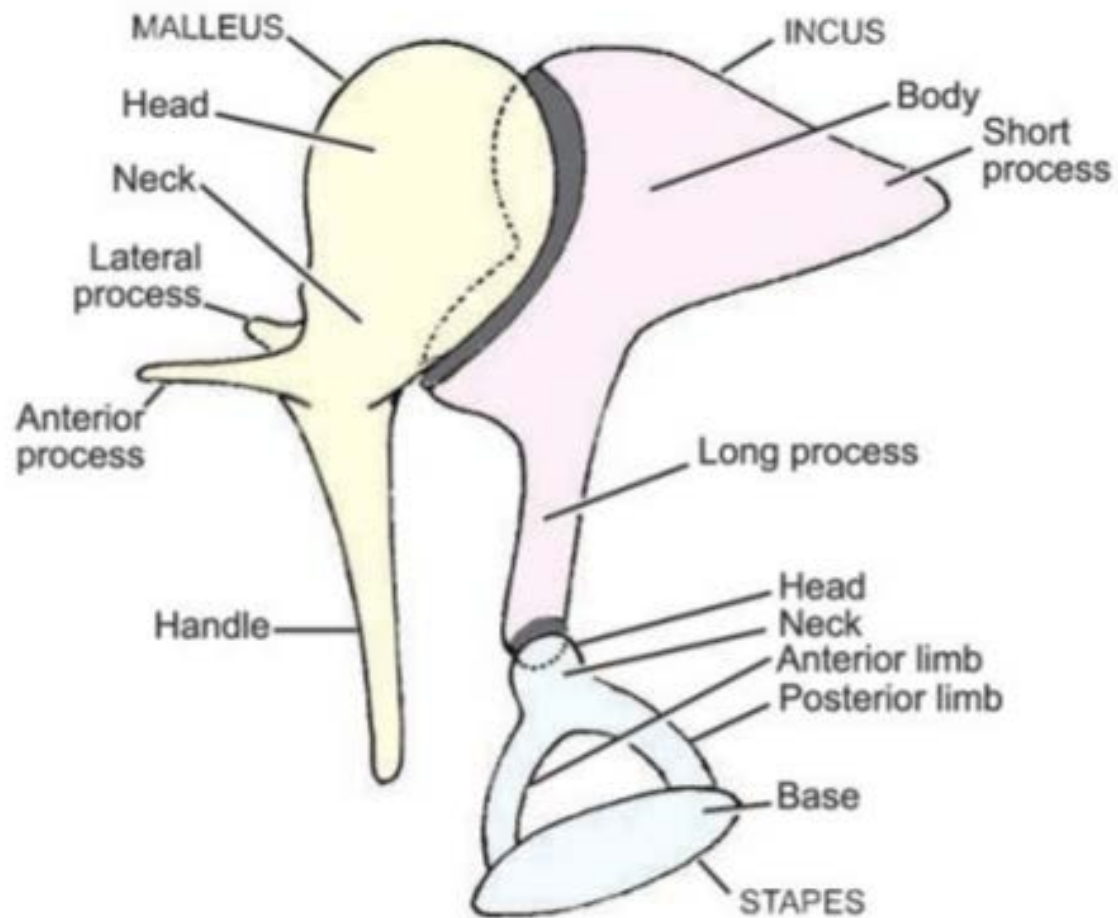


Fig. 8.119 Auditory ossicles. **A.** Malleus. **B.** Incus. **C.** Stapes.



44.22: Ossicles of the ear as seen from the medial side

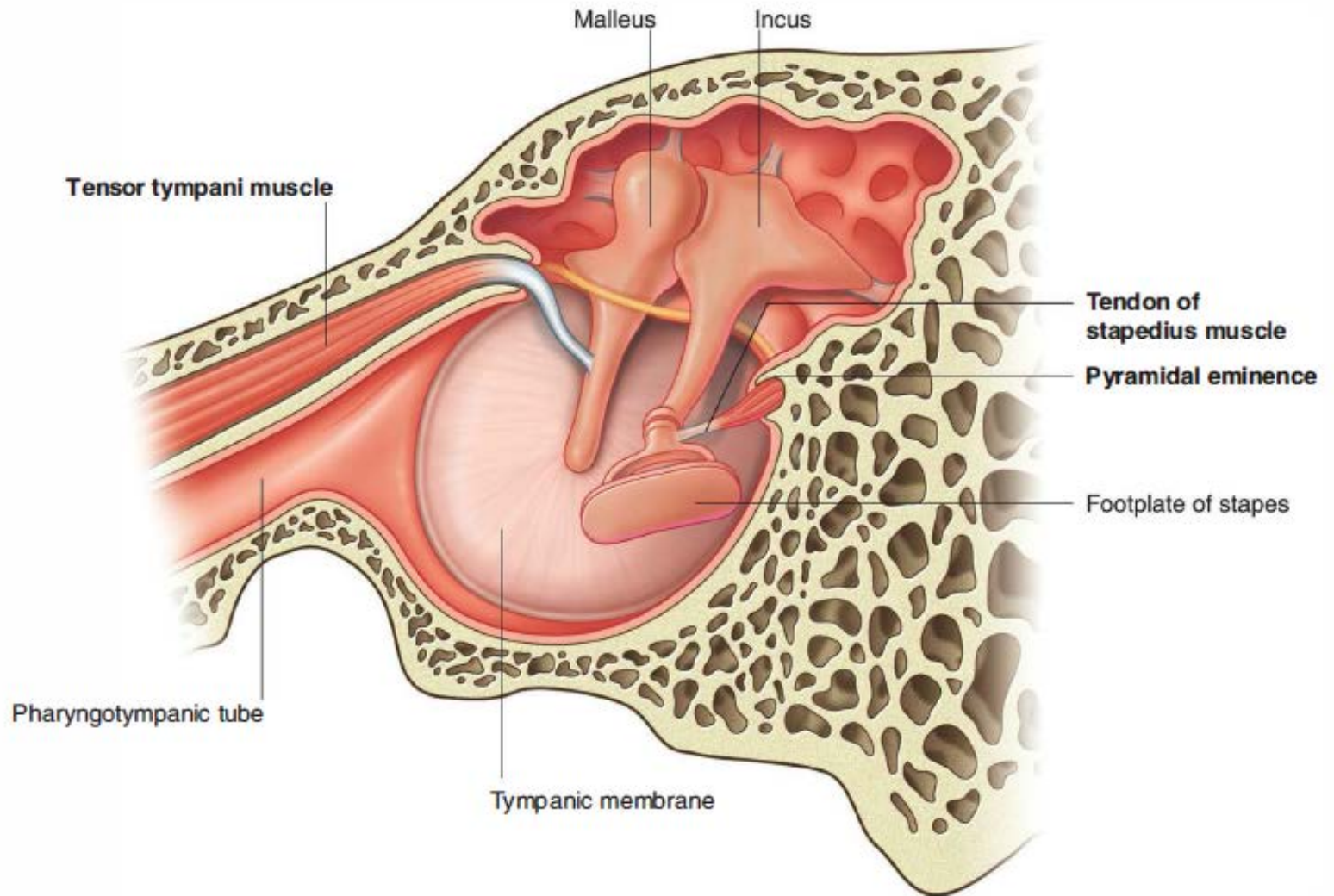


Fig. 8.120 Muscles associated with the auditory ossicles (right ear).

Inner Ear

The internal ear consists of :

a series of **bony cavities** (the **bony labyrinth**)
membranous ducts and sacs (the membranous labyrinth) within these cavities .

All these structures are in the **petrous part of the temporal bone** between the middle ear laterally and the internal acoustic meatus medially

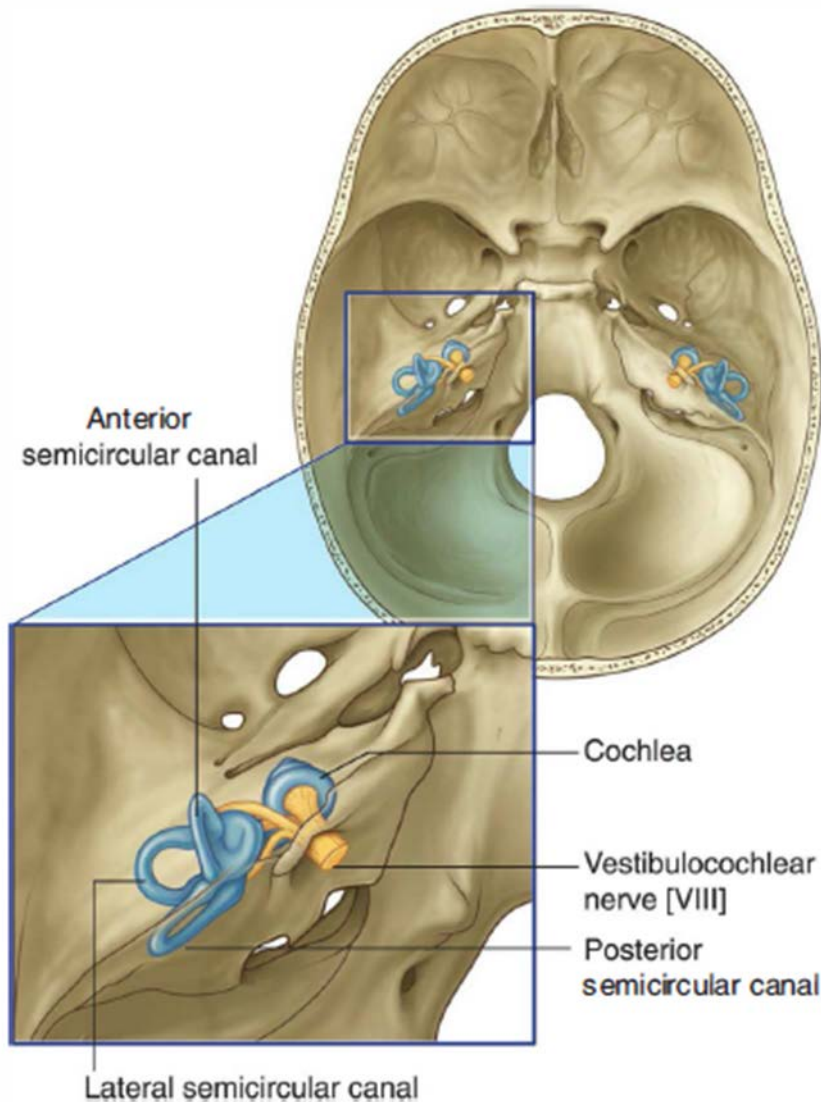


Fig. 8.123 Location of the internal ear in temporal bone.

Inner Ear

bony labyrinth :

**Vestibule / three
semicircular canals / the cochlea / contain
a clear fluid (the perilymph)**

membranous labyrinth :

**semicircular ducts / the cochlear
duct / two sacs (the utricle and the
sacculle) /are filled with endolymph**

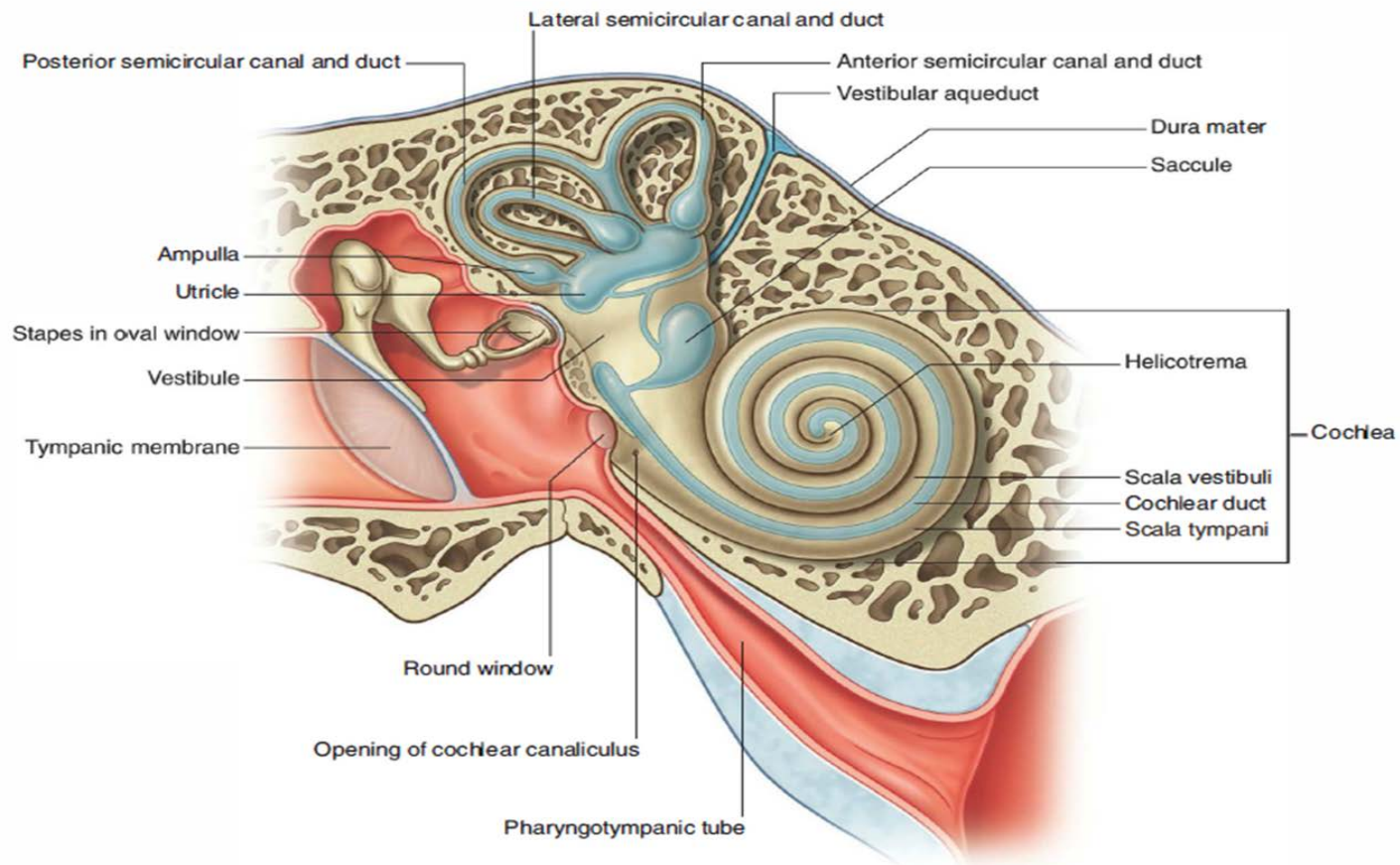


Fig. 8.125 Bony labyrinth.

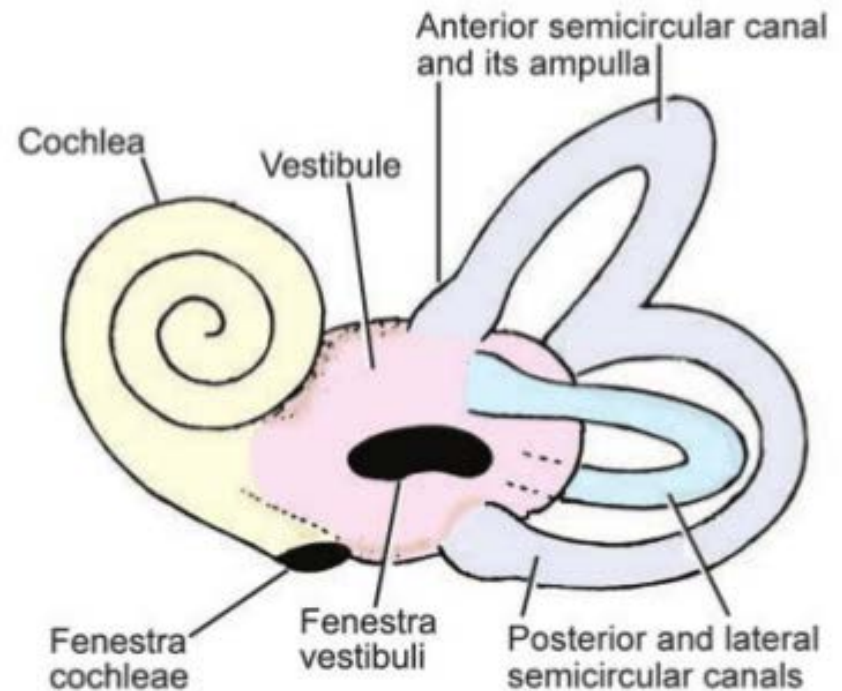
bony labyrinth :

Three Semicircular Canals:

- Is Located superior and posterior of vestibule
- Have 3 ducts : ant. / post. / lat.
- Open in vestibule

Vestibule:

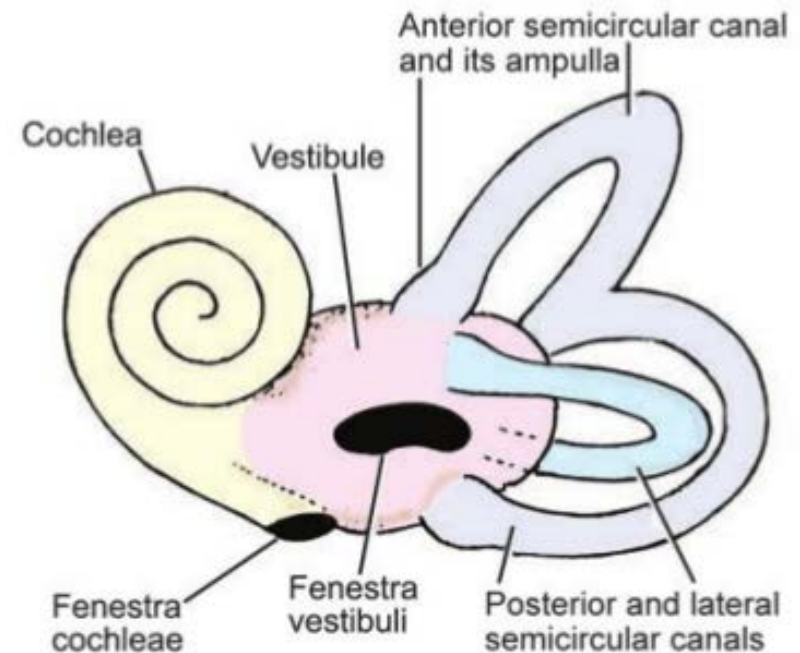
- Central part of bony labyrinth
- Is located between semicircular canals and the cochlea
- Utricle and saccule occupy vestibule



44.34: Bony labyrinth seen from the lateral side

The Cochlea:

- twists on itself two and one-half times around a central column of bone (the modiolus)
- the cochlear duct creates two canals {the scala vestibuli and the scala tympani)
- The scala vestibuli is continuous with the vestibule
- The scala tympani is separated from the middle ear by the secondary tympanic membrane covering the round window



44.34: Bony labyrinth seen from the lateral side

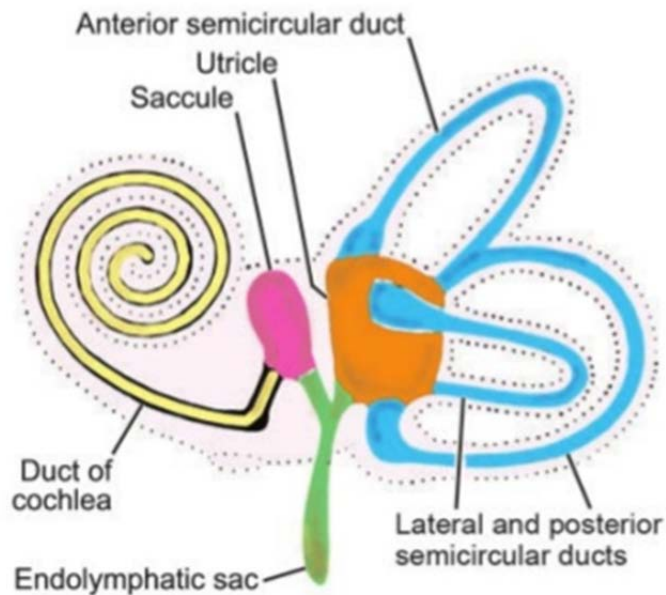
membranous labyrinth :

semicircular ducts

the utricle

the saccule

the cochlear duct



44.35: Scheme to show the parts of the membranous labyrinth. Note the ampullated ends of the semicircular ducts

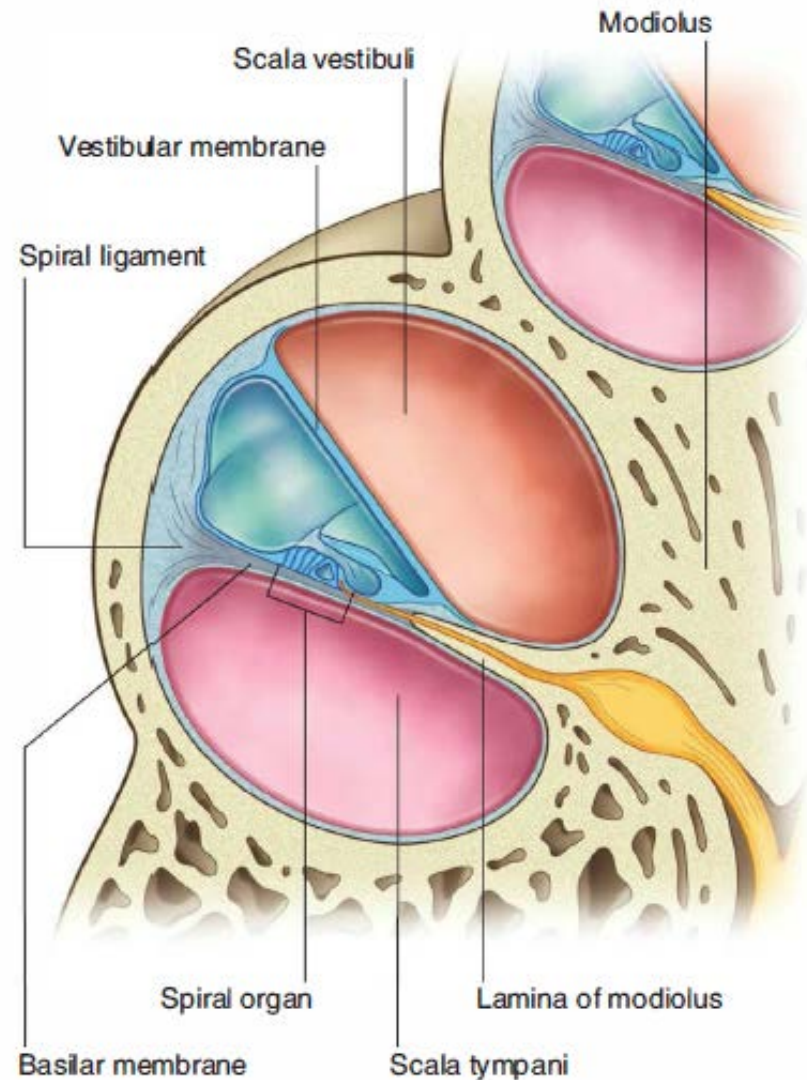


Fig.8.128 Membranous labyrinth, cross section.

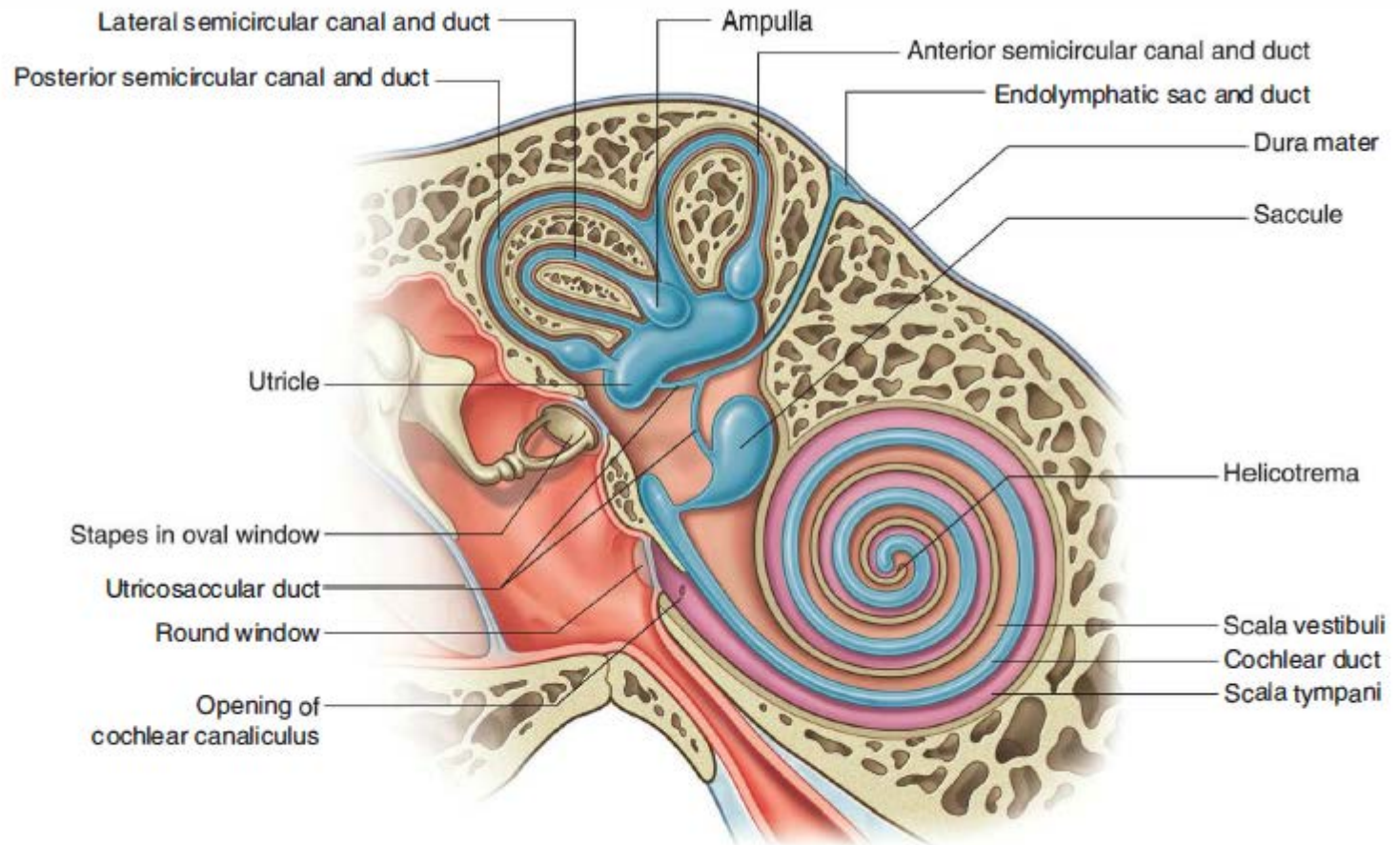
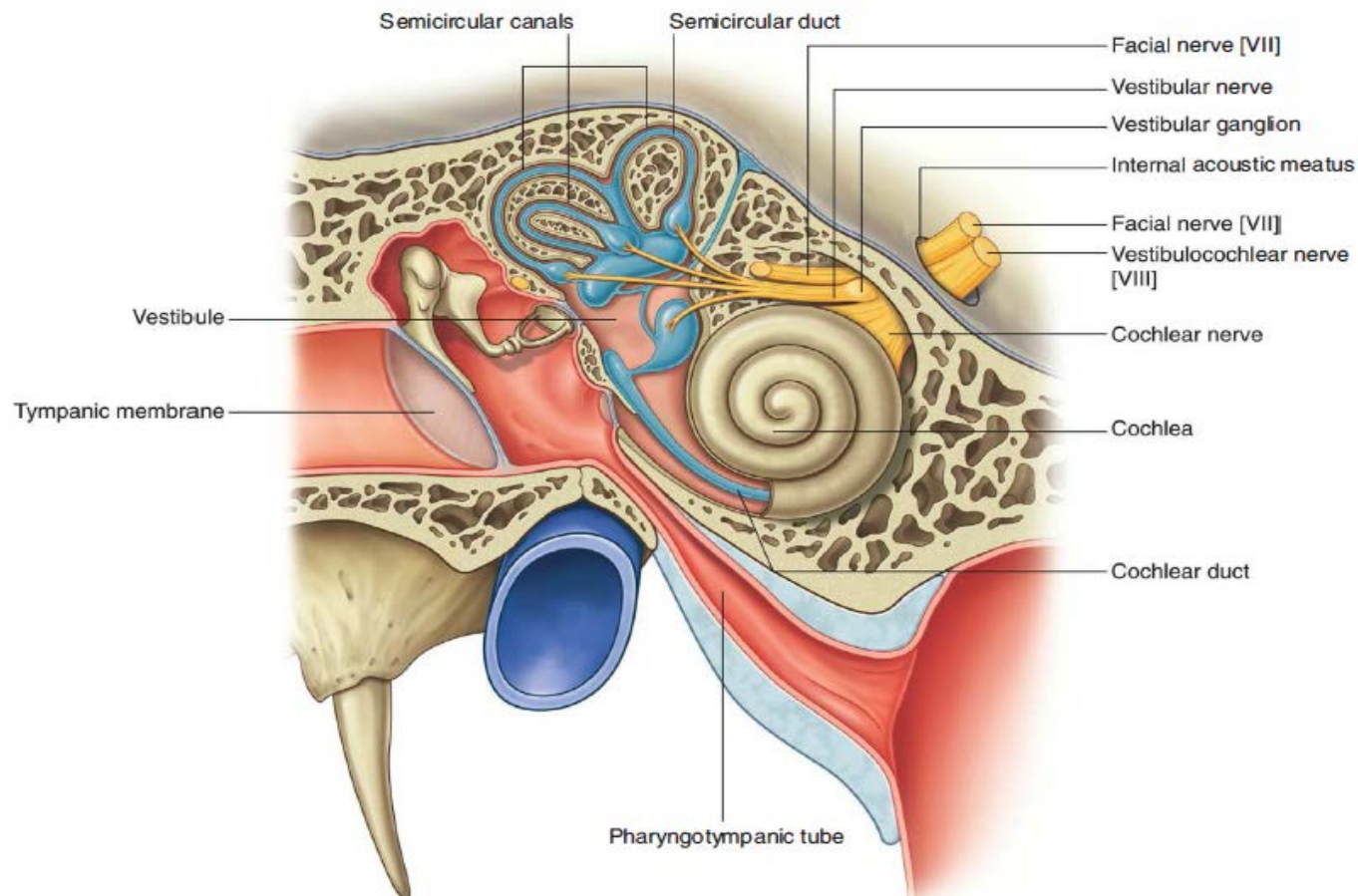


Fig. 8.127 Membranous labyrinth.

The cochlear duct is the organ of *hearing*

The semicircular ducts, utricle, and saccule are the organs of *balance*



Sensory receptors in membranous labyrinth:

In the utricle and saccule the **balance** organ is the macula of the utricle and the macula of the saccule.

in the **ampulla** of each of the three semicircular ducts the **balance** organ is the crista.

The spiral organ is the organ of **hearing**, rests on the **basilar membrane**, and projects into the enclosed, endolymph-filled **cochlear duct**

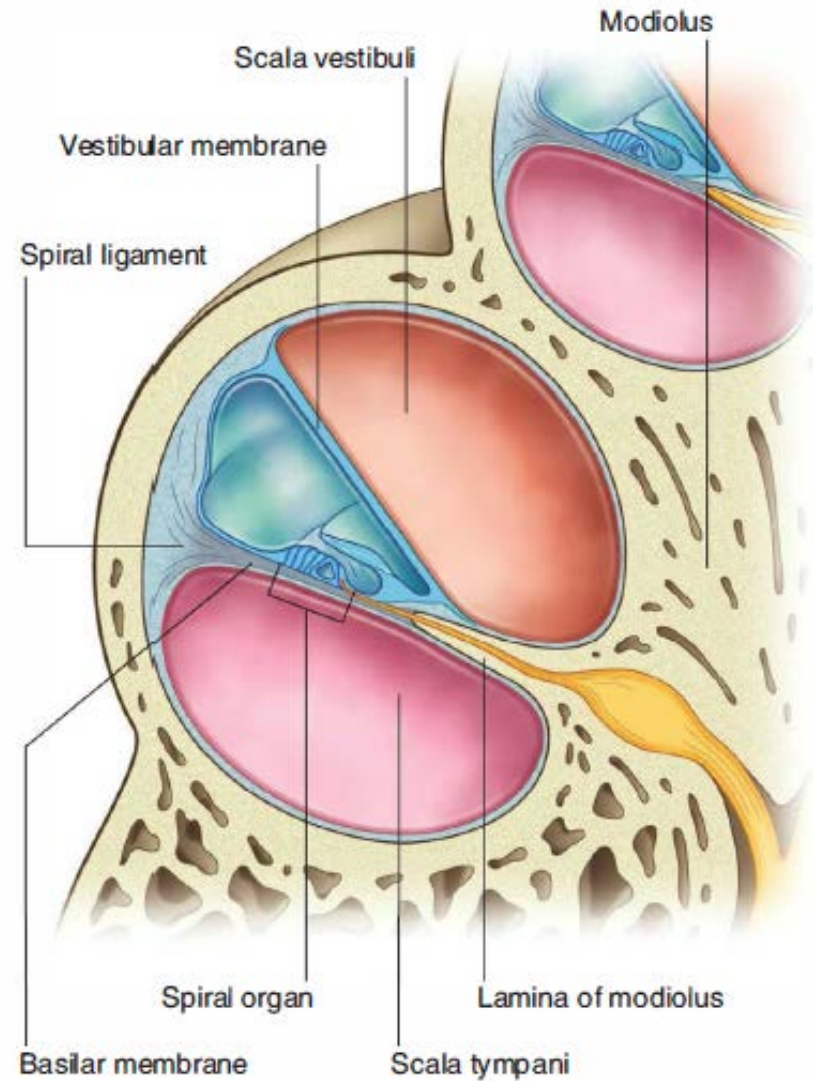
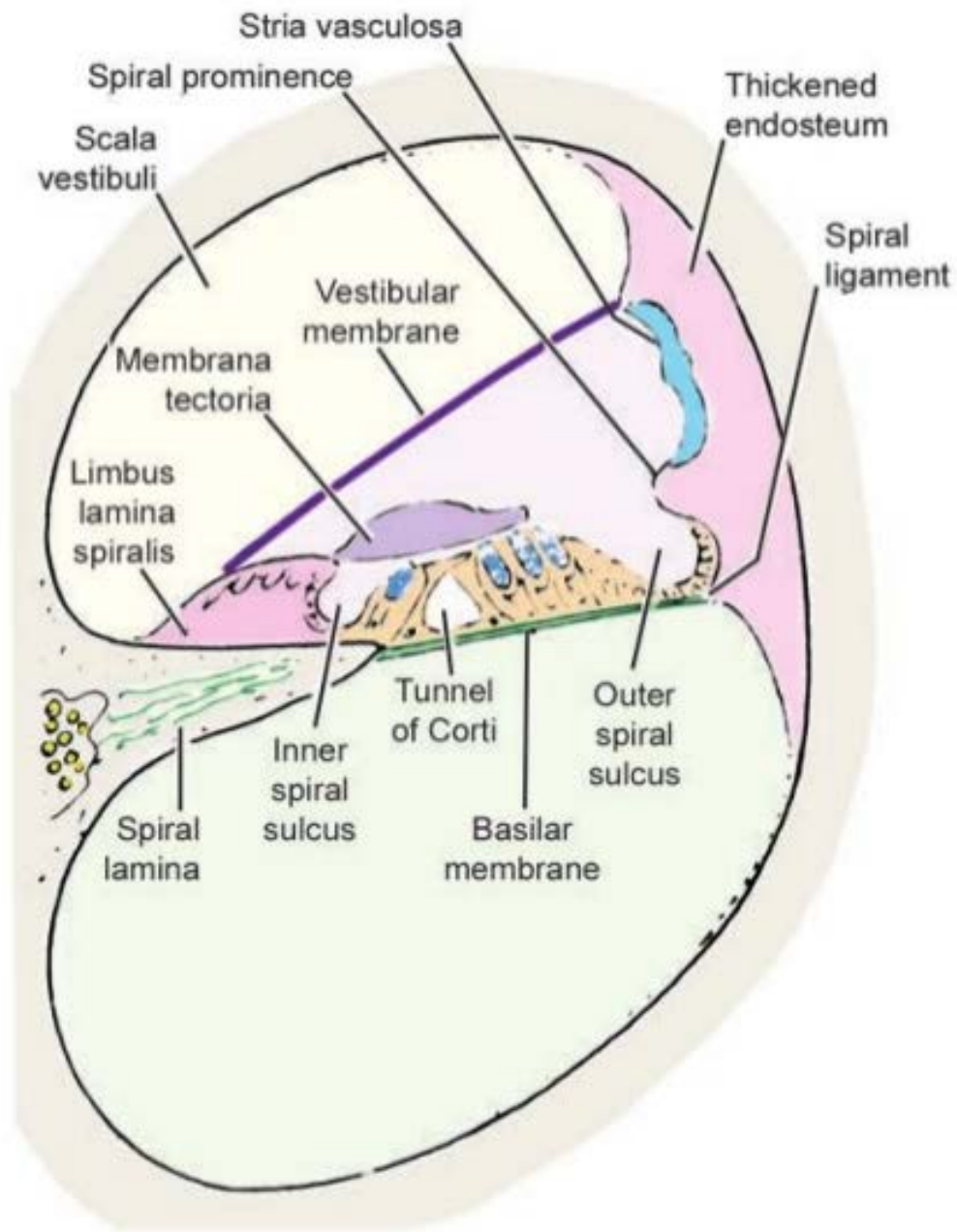


Fig. 8.128 Membranous labyrinth, cross section.

Cochleovestibular Nerve :

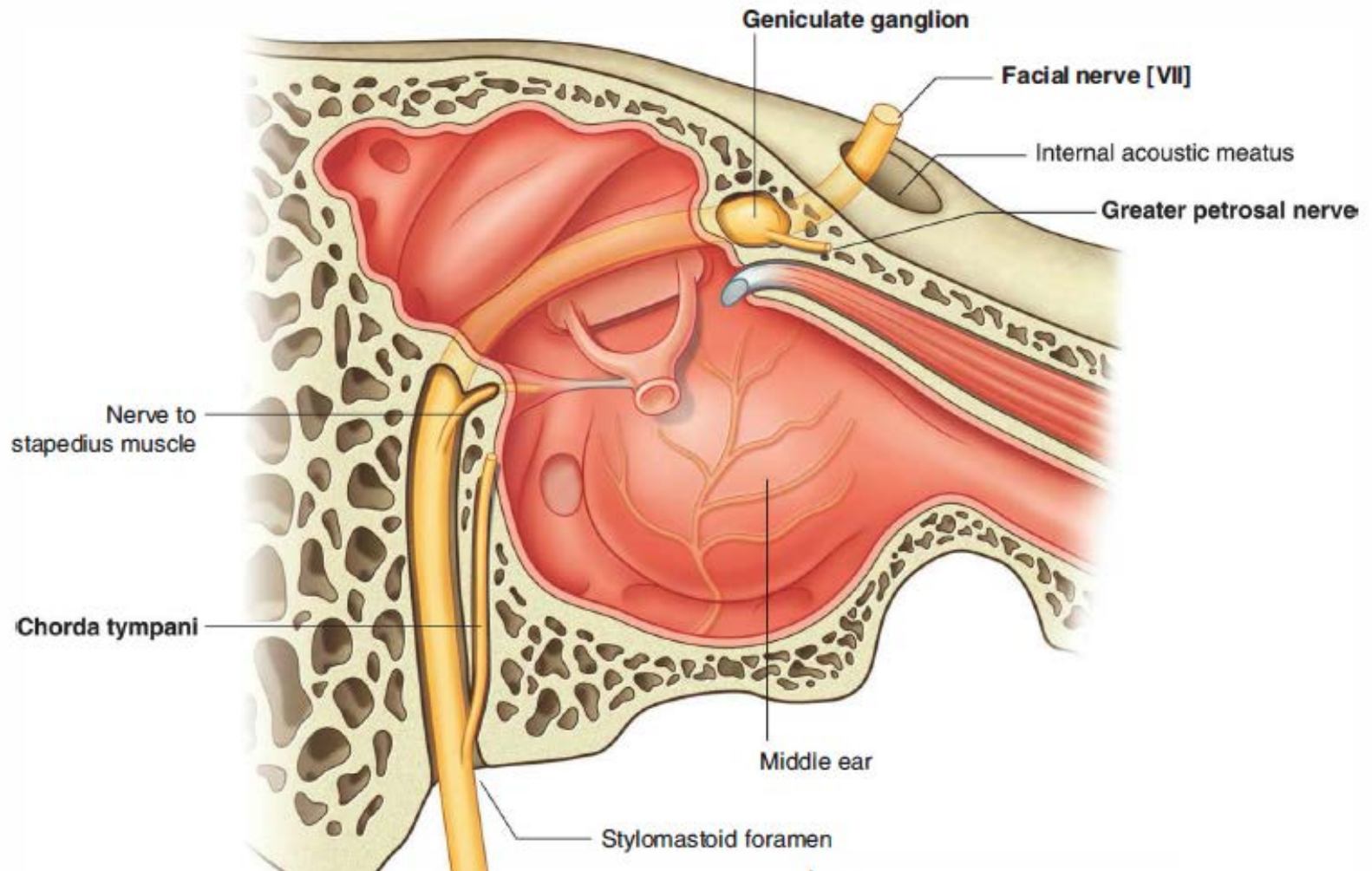
Spiral organ of corti → Spiral ganglion → cochlear nerve

Macula of utricle and saccule and crista in the ampulla of semicircular duct → Spiral ganglion → vestibular nerve



44.38: Transverse section through one turn of the cochlea

Facial Nerve



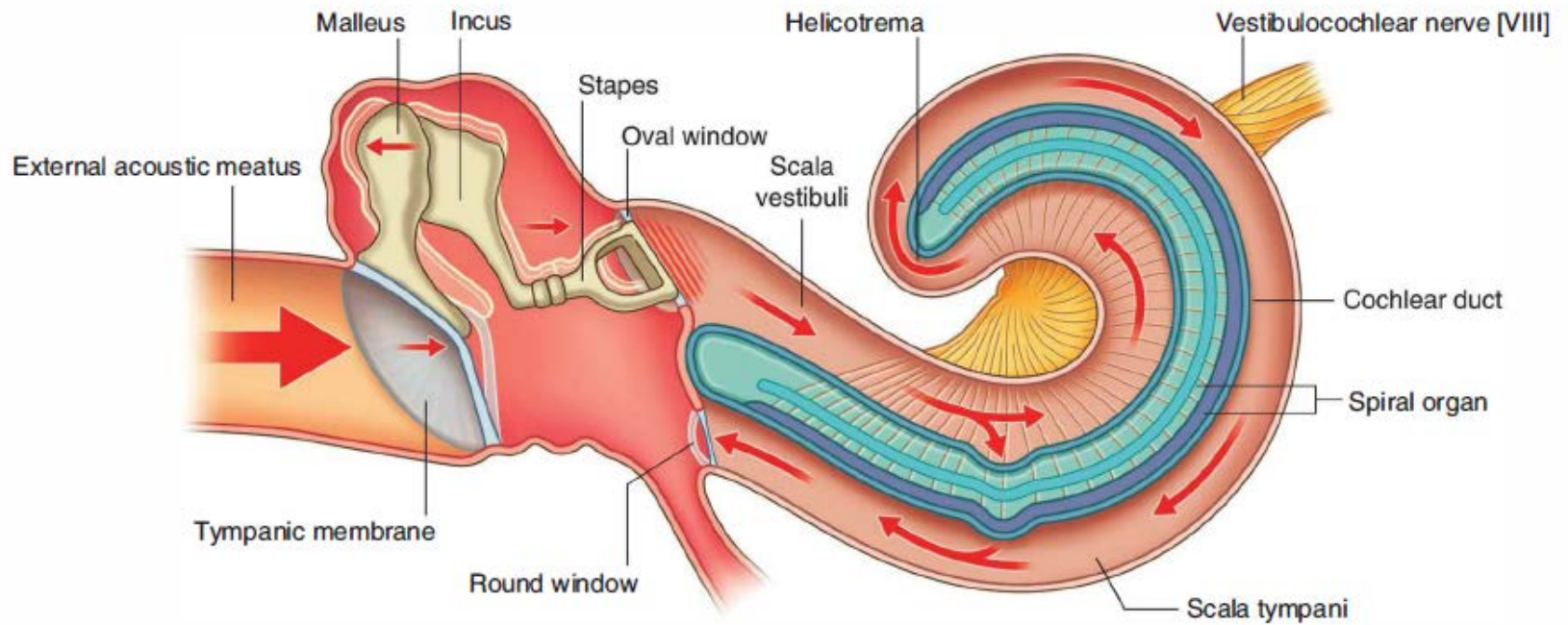


Fig. 8.130 Transmission of sound.