

EAR And 8th CRANIAL NERVE

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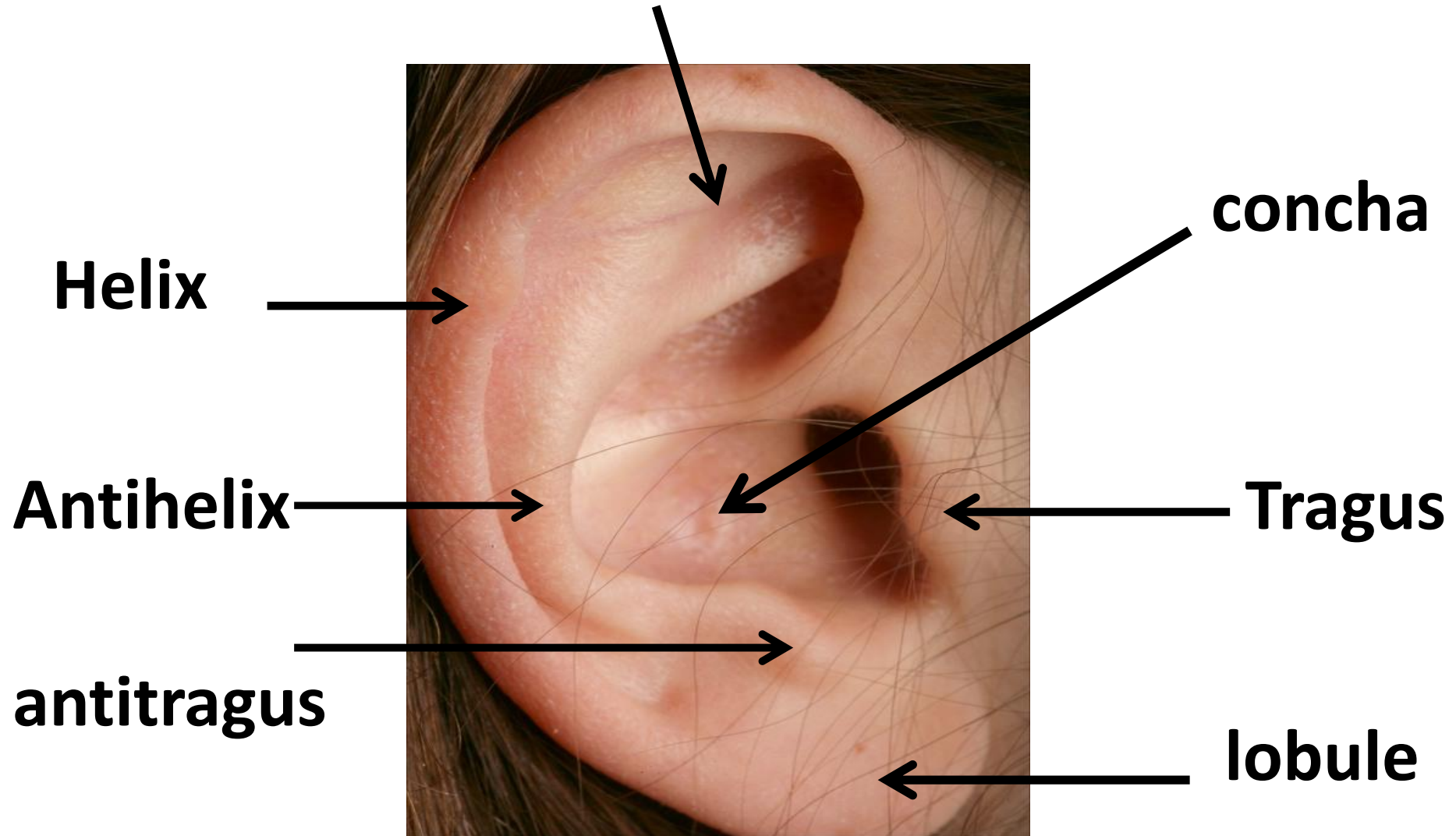
Session ILOs

- 1. Recognize the anatomy of external ear**
- 2. Anatomy of the middle ear**
- 3. Anatomy of the inner ear**
- 4. Describe the origin of vestibulochochlear nerve (VIII cranial nerve)**
- 5. outline the pathway of (VIII cranial nerve)**

Auricle

It is a thin plate of elastic cartilage covered by skin

Triangular fossa



External Auditory Meatus

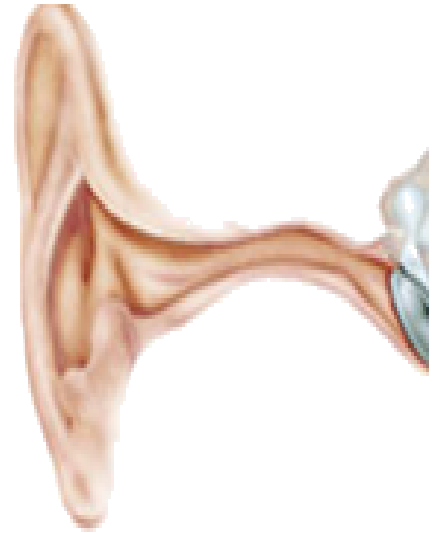
Extends from the auricle to the tympanic membrane

- Size and shape it is about one inch (2.5 cm).

Protects the eardrum:

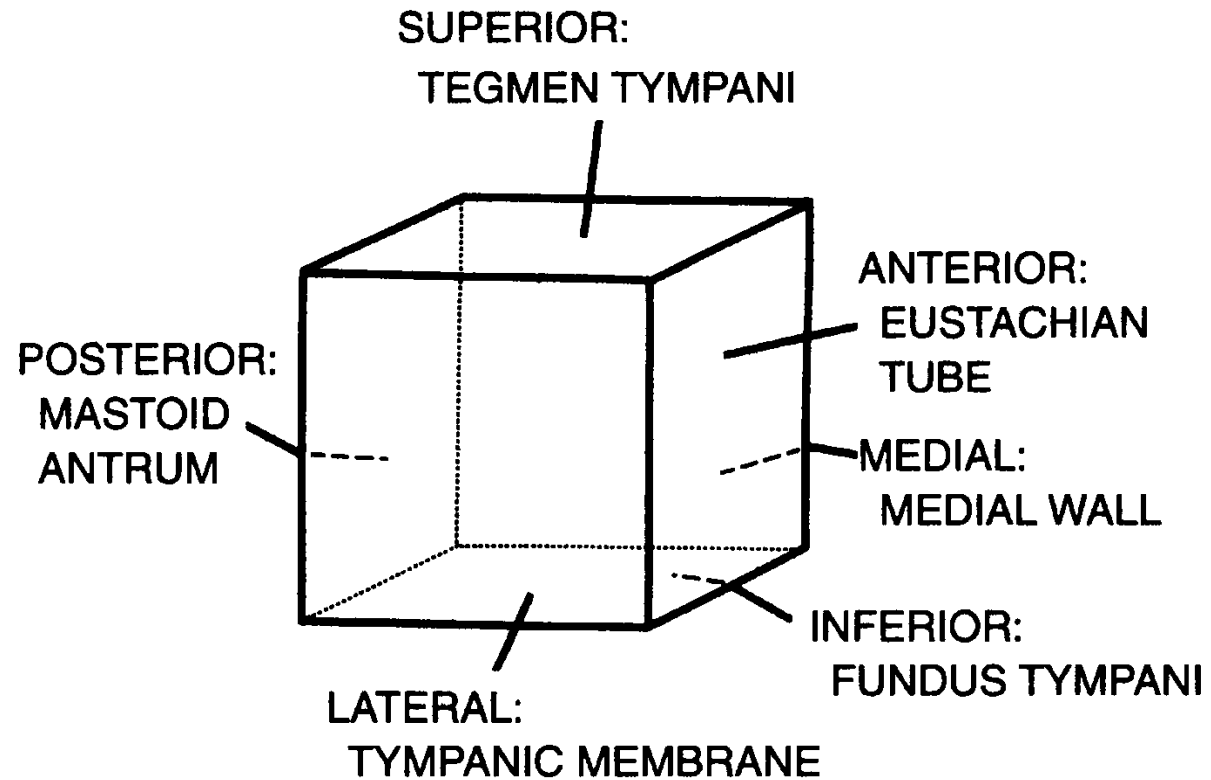
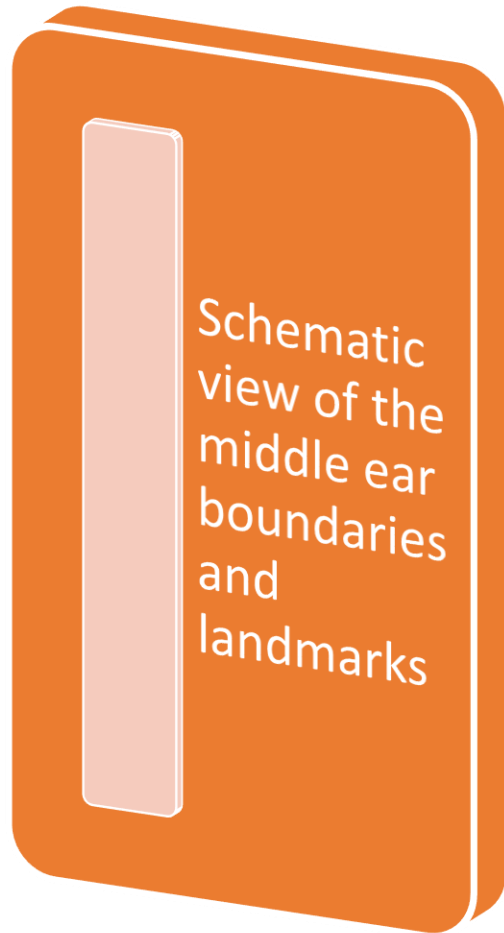
As it is lined by skin , Its outer third provided by hairs and sebaceous and ceruminous glands which produce wax.

Its outer third is elastic cartilage , and the inner two thirds are bony formed by tympanic plate.

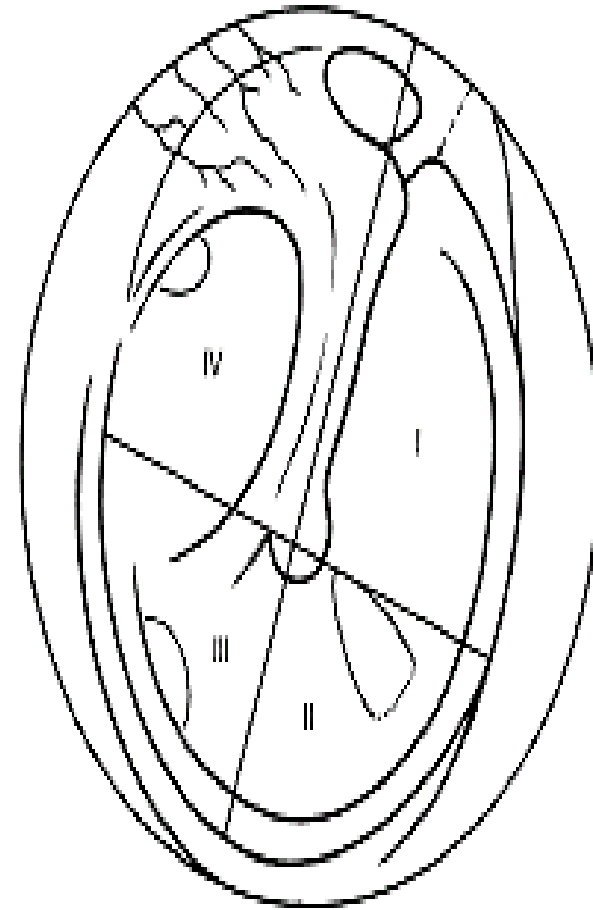
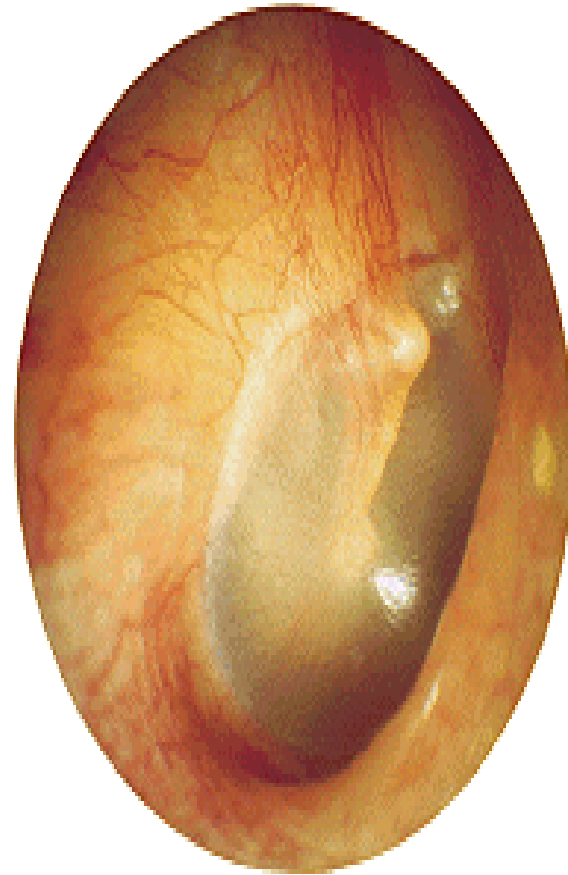


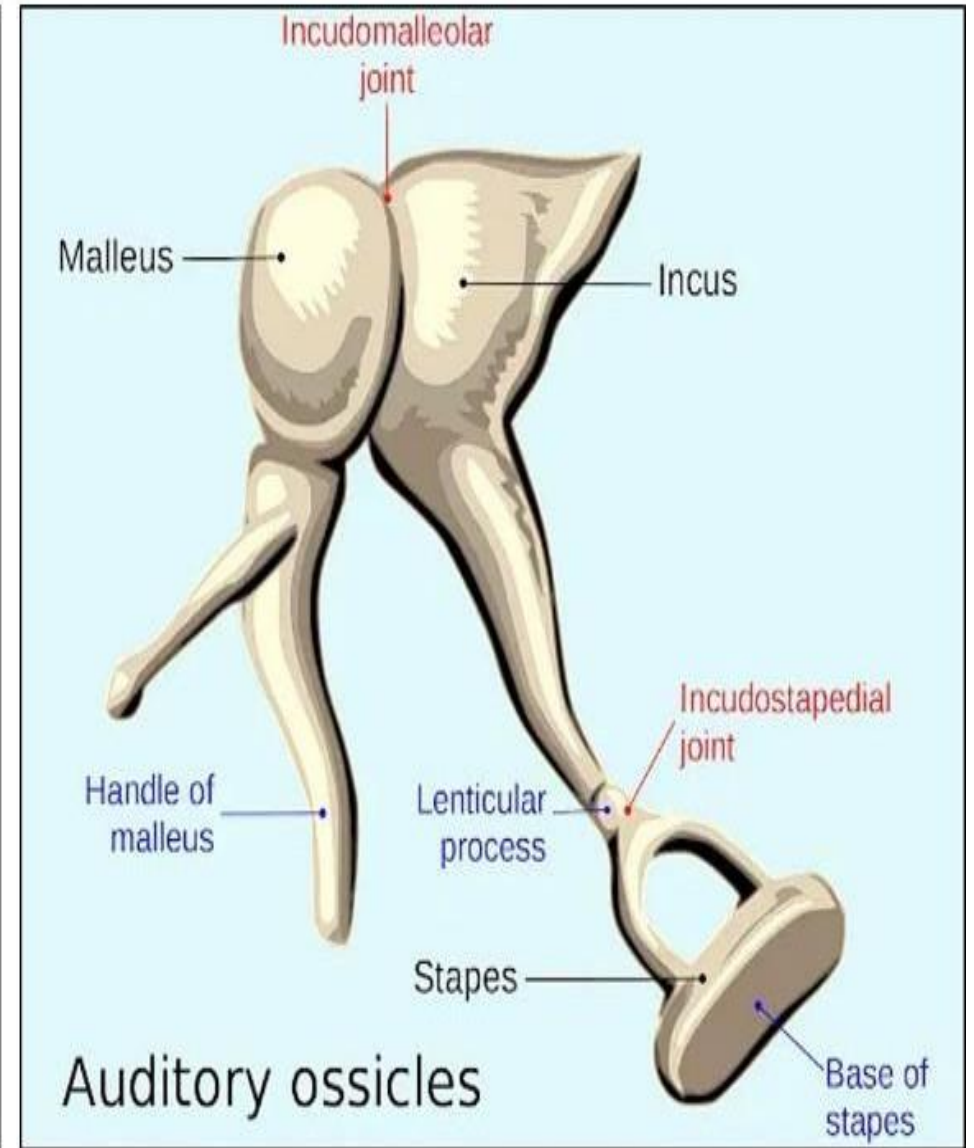
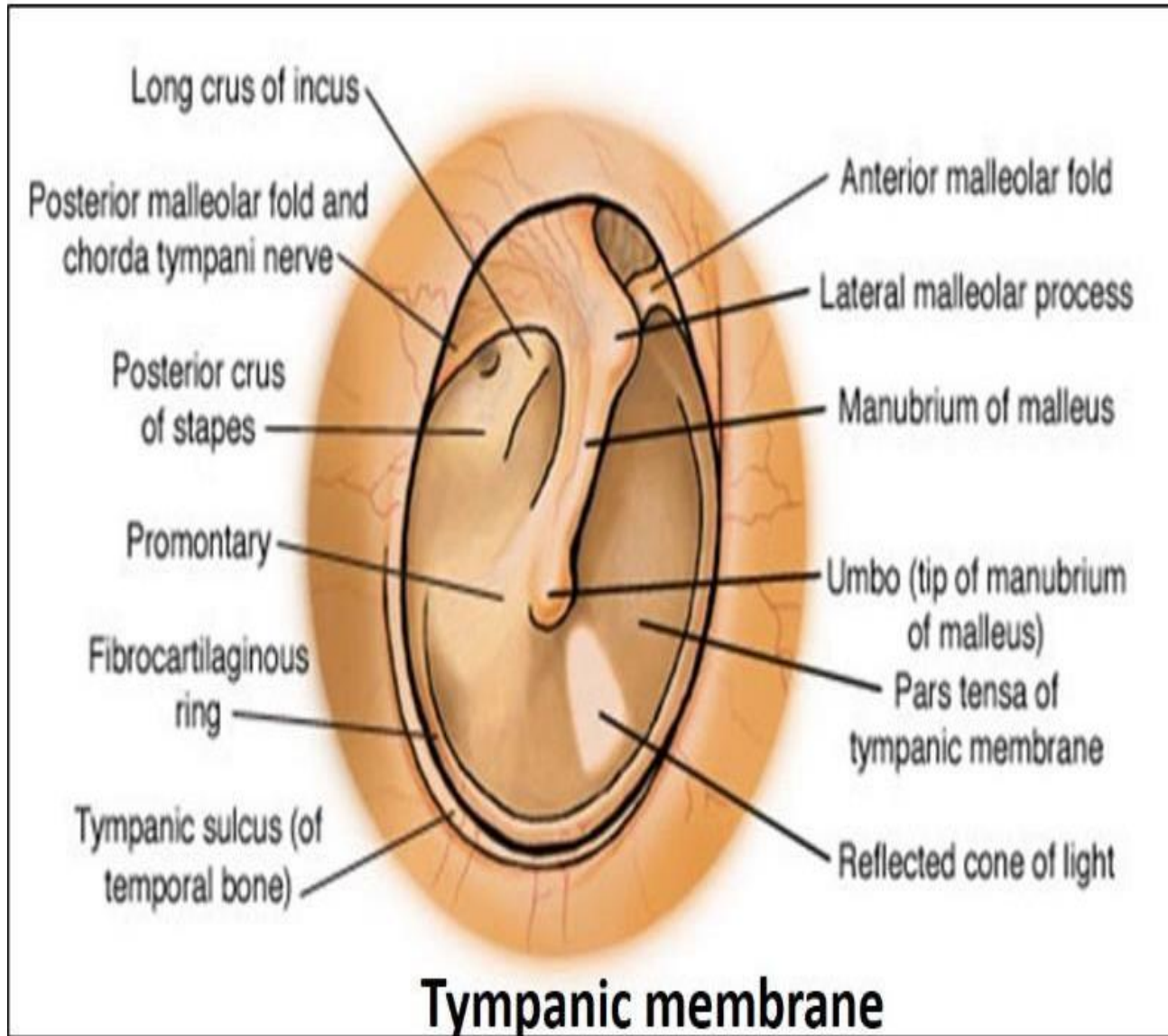
Anatomy of the middle ear

THE MIDDLE EAR



Lateral wall (the tympanic membrane)





Tympanic Membrane

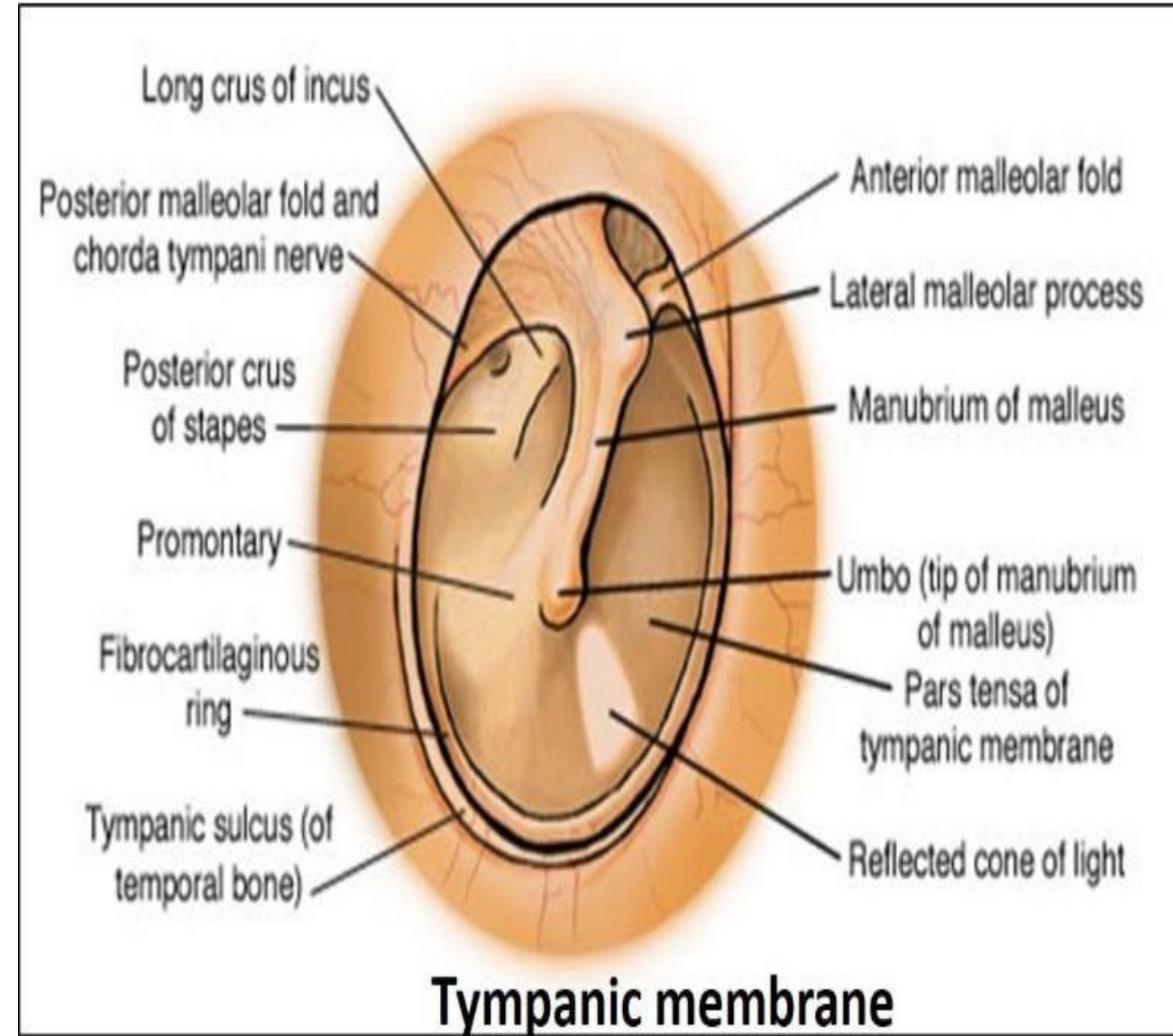
Separates outer ear from middle ear

Barrier from foreign objects

Cone-shaped in appearance

Vibrates in response to sound waves.

The membrane movement is incredibly small



Tympanic membrane

Consists of two parts:

1-Pars flaccida – upper, thin

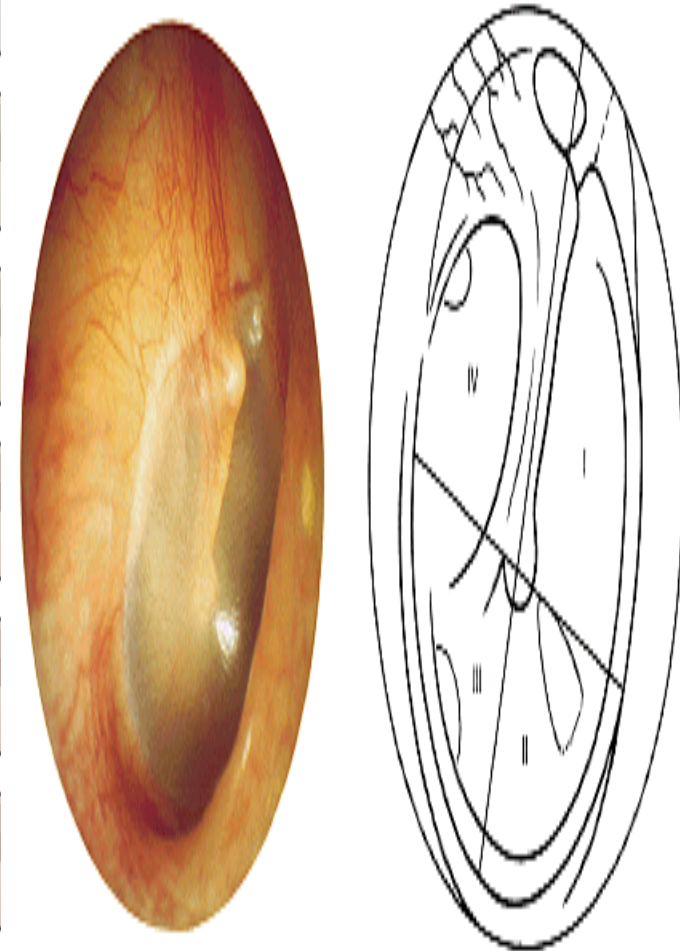
2-Pars tensa – lower, tense

which consists of Three layers:

1. Outer, cutaneous – continuation of the canal skin. No hairs and glands.

2. Middle, fibrous – elastic fibers.

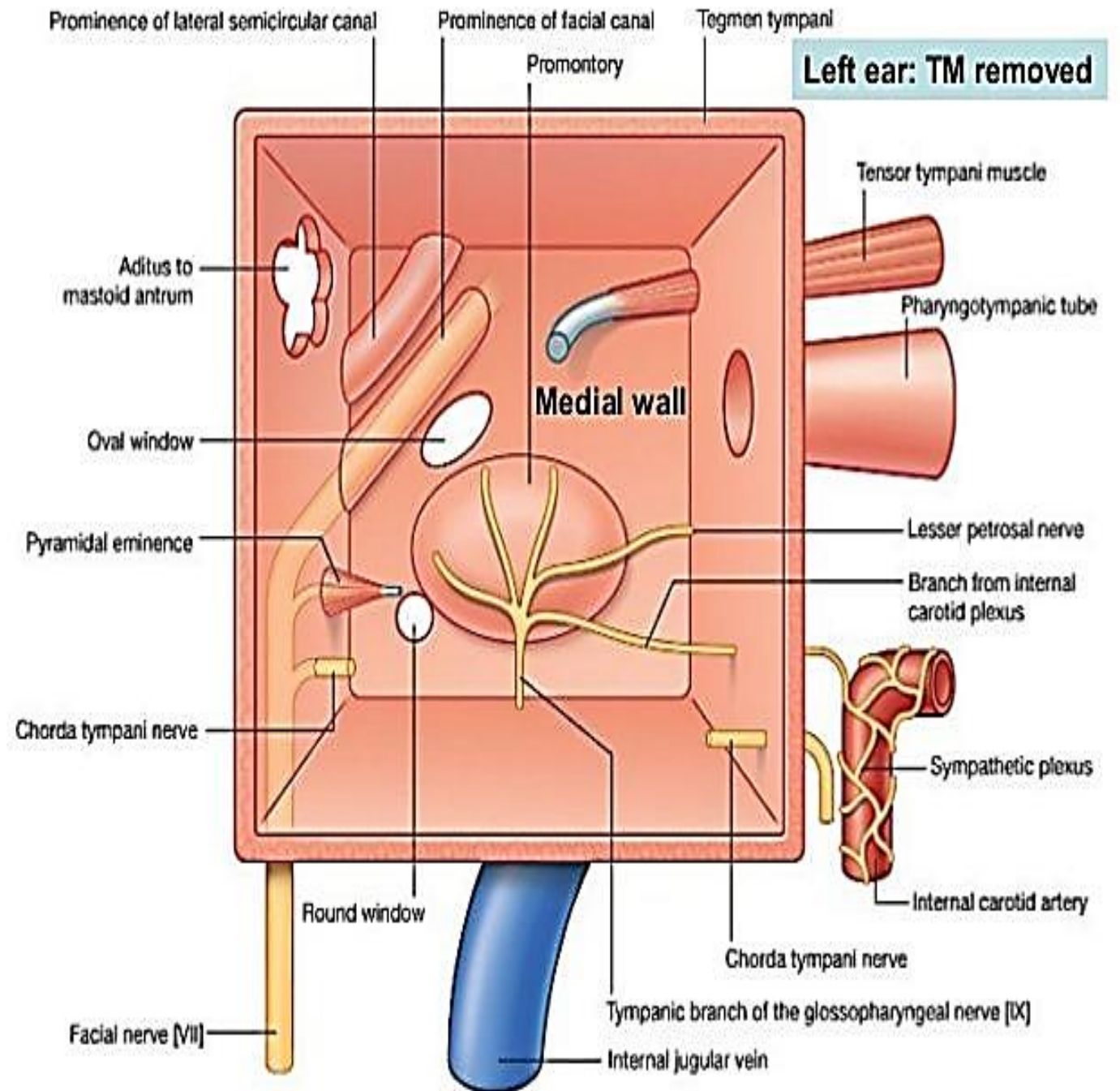
3. Inner, mucous – tympanic cavity lining



Medial wall

On this wall we find:

- 1- fenestra vestibuli oval in shape, closed by foot piece of stapes
- 2- fenestra cochleae rounded closed by secondary tympanic membrane.
- 3- promontory caused by first turn of cochlea
- 4- prominence of facial nerve canal



Superior wall (roof) :

formed by thin plate of bone tegmen tympani (part of petrous part of temporal bone) separates it from the meninges and temporal lobe of brain

Inferior wall (floor):

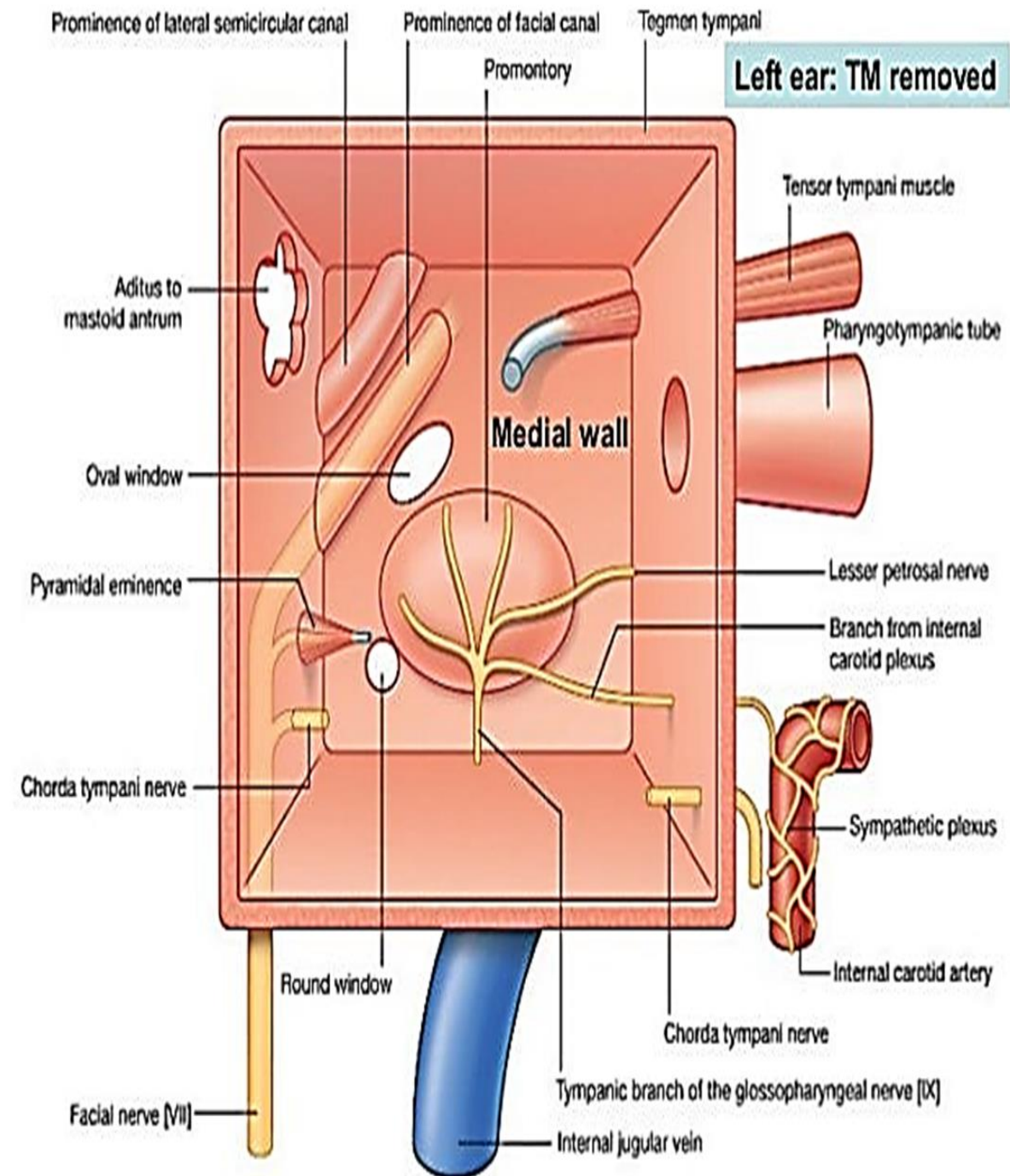
Thin plate of bone (may be partially fibrous tissue) separates it from superior bulb of internal jugular vein.

Anterior wall:

below: Thin plate of bone Separates tympanic cavity from internal carotid artery.

Above: two canals

- upper smaller – canal of tensor tympani
- Lower larger opening of Eustachian tube.

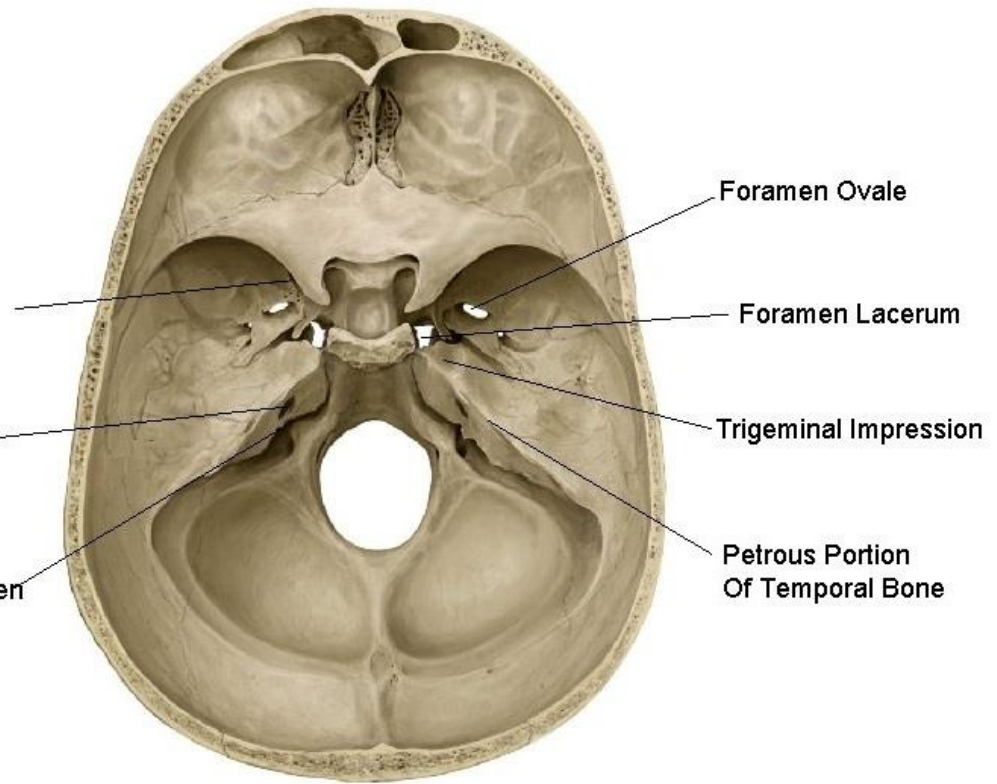




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Acoustic
Meatus

ular Foramen



Foramen Ovale

Foramen Lacerum

Trigeminal Impression

Petrous Portion
Of Temporal Bone



Auditory (Eustachian) tube

-Connects tympanic cavity with pharynx

-it has two openings

-consists of two parts:

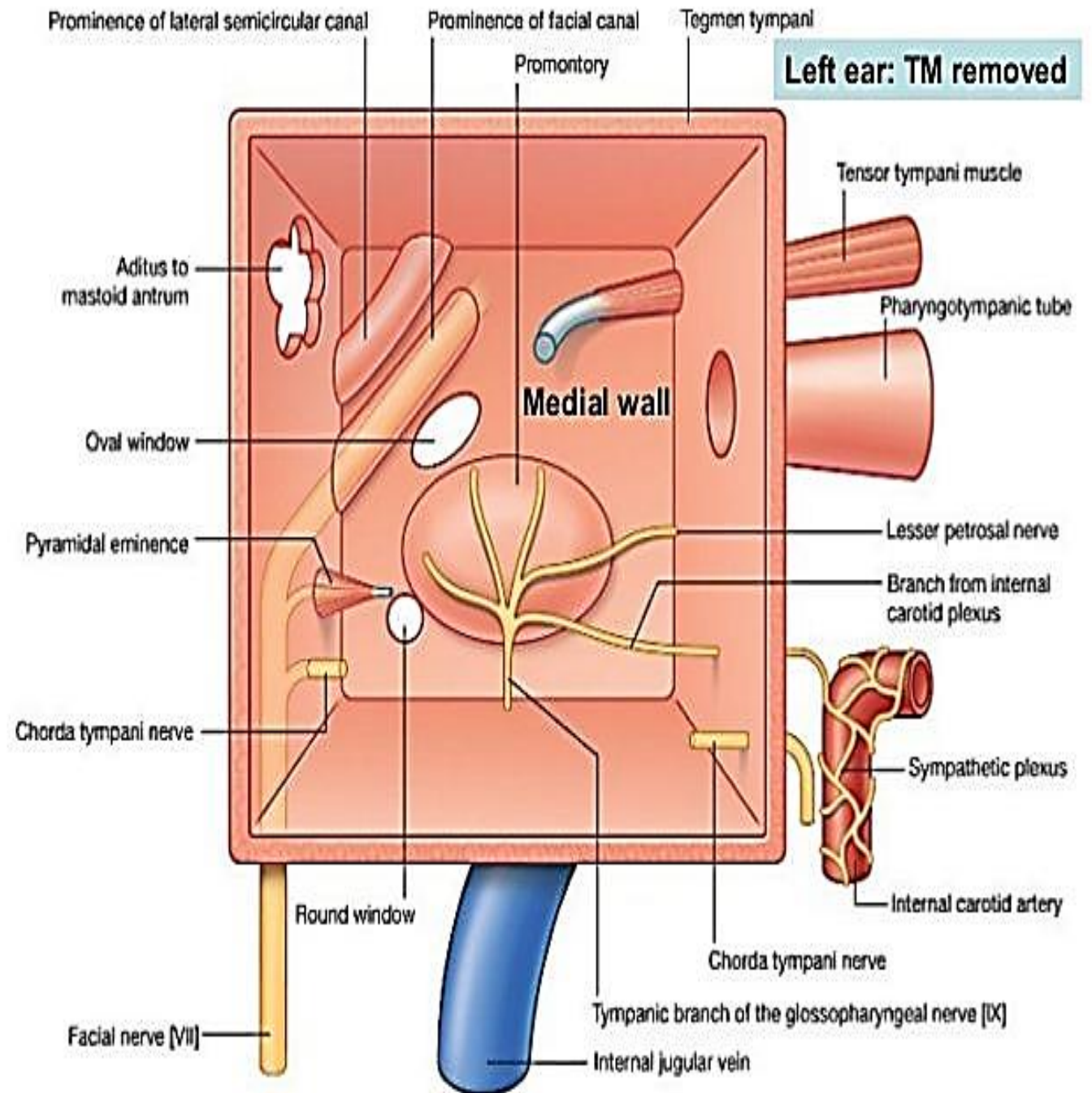
- bony**
- cartilagenous**

-Function:

- Equalizes pressure on both sides of tympanic membrane for optimal hearing.**

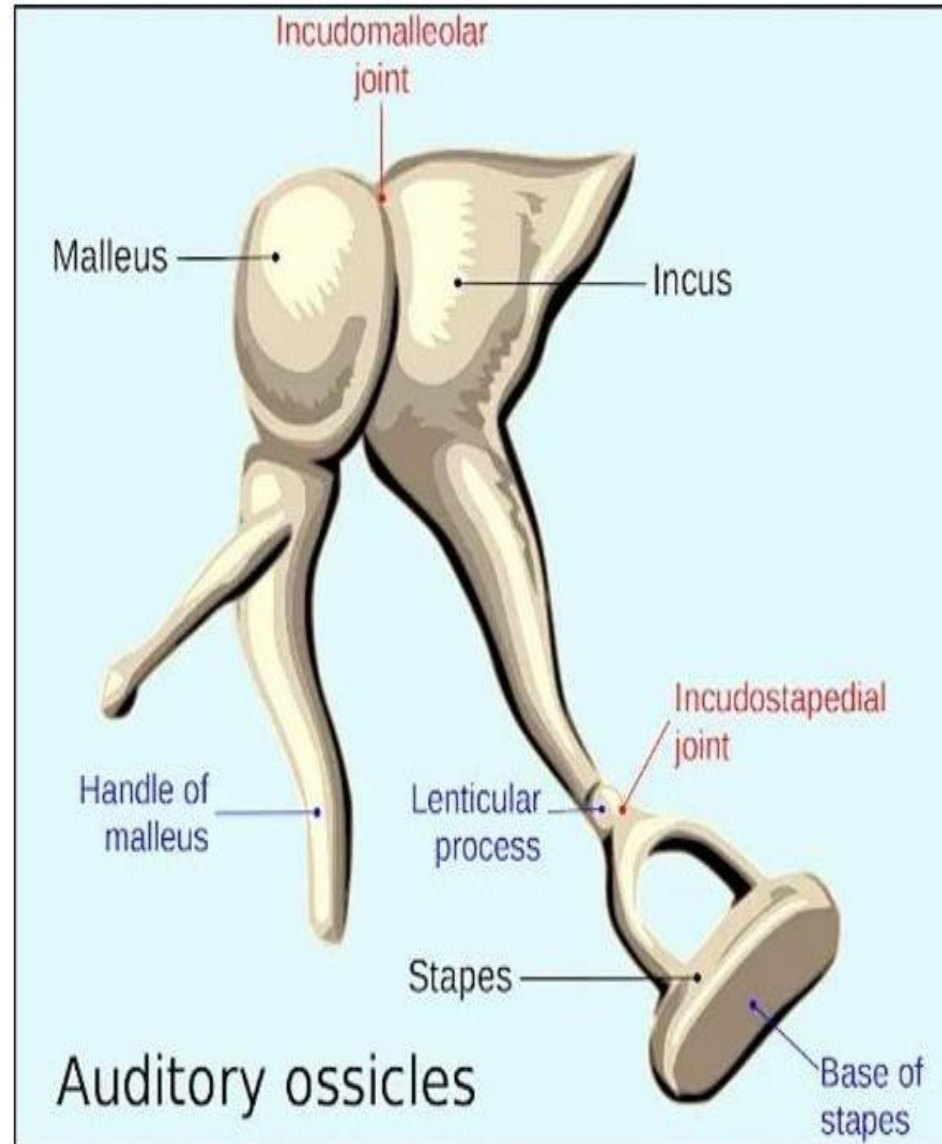
Posterior wall

- **Aditus of the mastoid antrum:**
- **Pyramid :** from its apex emerge the tendon of stapedius muscle.



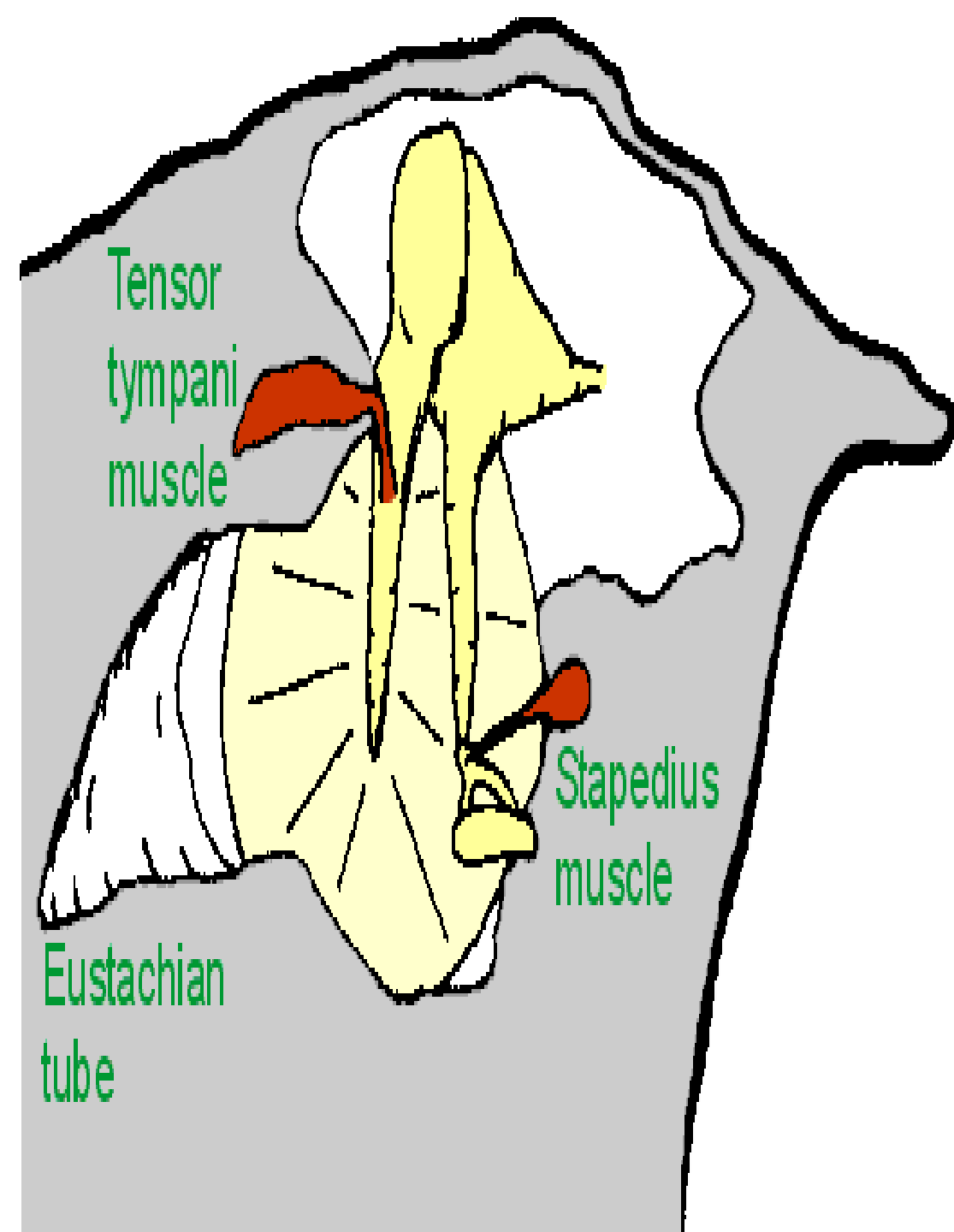
Auditory Ossicles

- Malleus (hammer)
- Incus (anvil)
- Stapes (stirrup) smallest bone of the body



Middle Ear Muscles

- **Tensor tympani**
 - Attached to malleus
 - Innervated by V, trigeminal nerve
- **Stapedius**
 - Attached to stapes
 - Innervated by VII, facial nerve
- **Middle Ear Muscle Function:**
 - Help maintain ossicles in proper position
 - Protect inner ear from excessive sound levels.
 - This protective reflex termed "acoustic reflex"



3. Anatomy of inner ear

Auditory

Vestibular

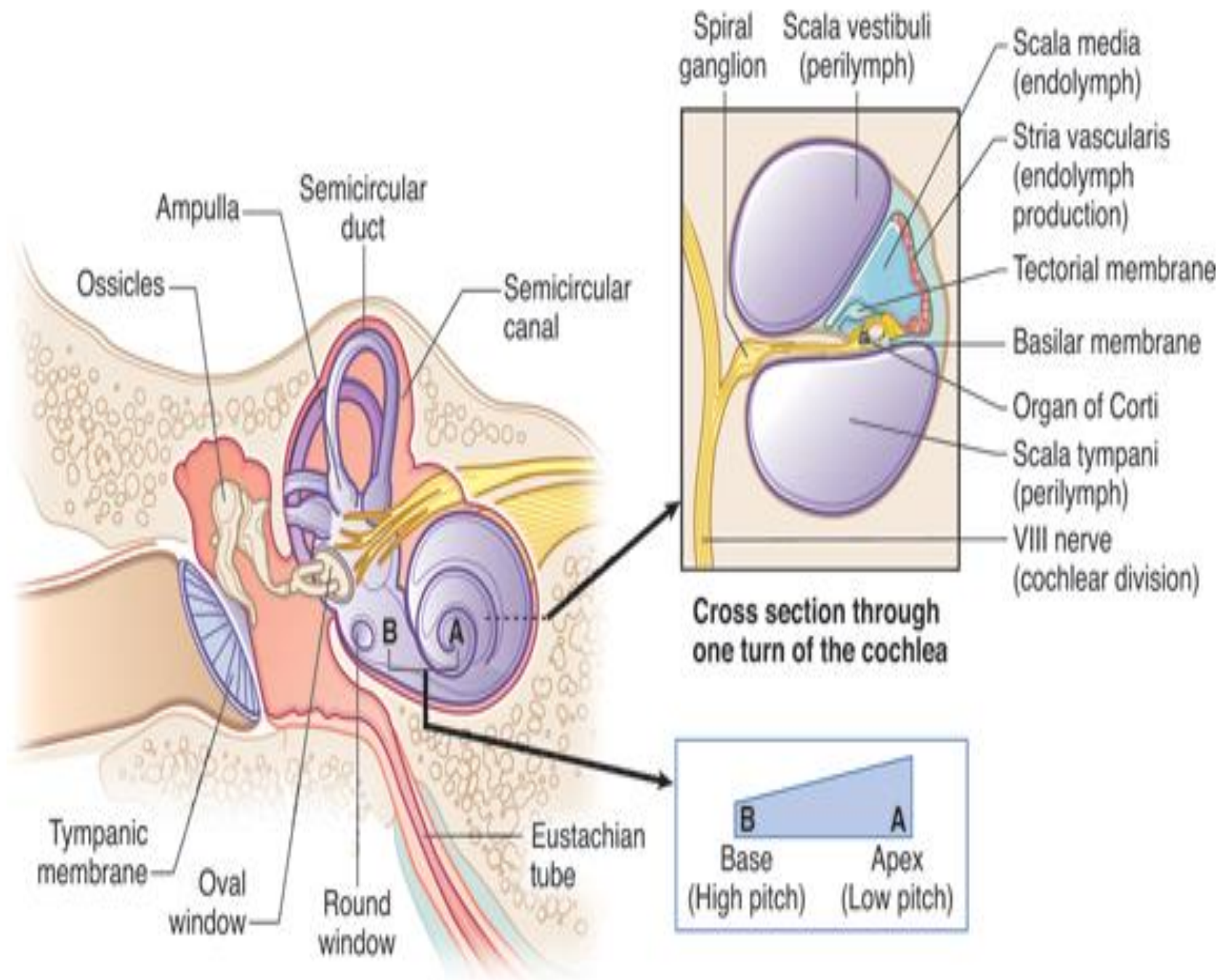
Cochlea and semicircular canals



Cochlea

- The cochlea resembles a snail shell and spirals for about 2 1/2 turns around a bony column
- Within the cochlea are three canals:
 - Scala Vestibuli
 - Scala Tympani
 - Scala Media





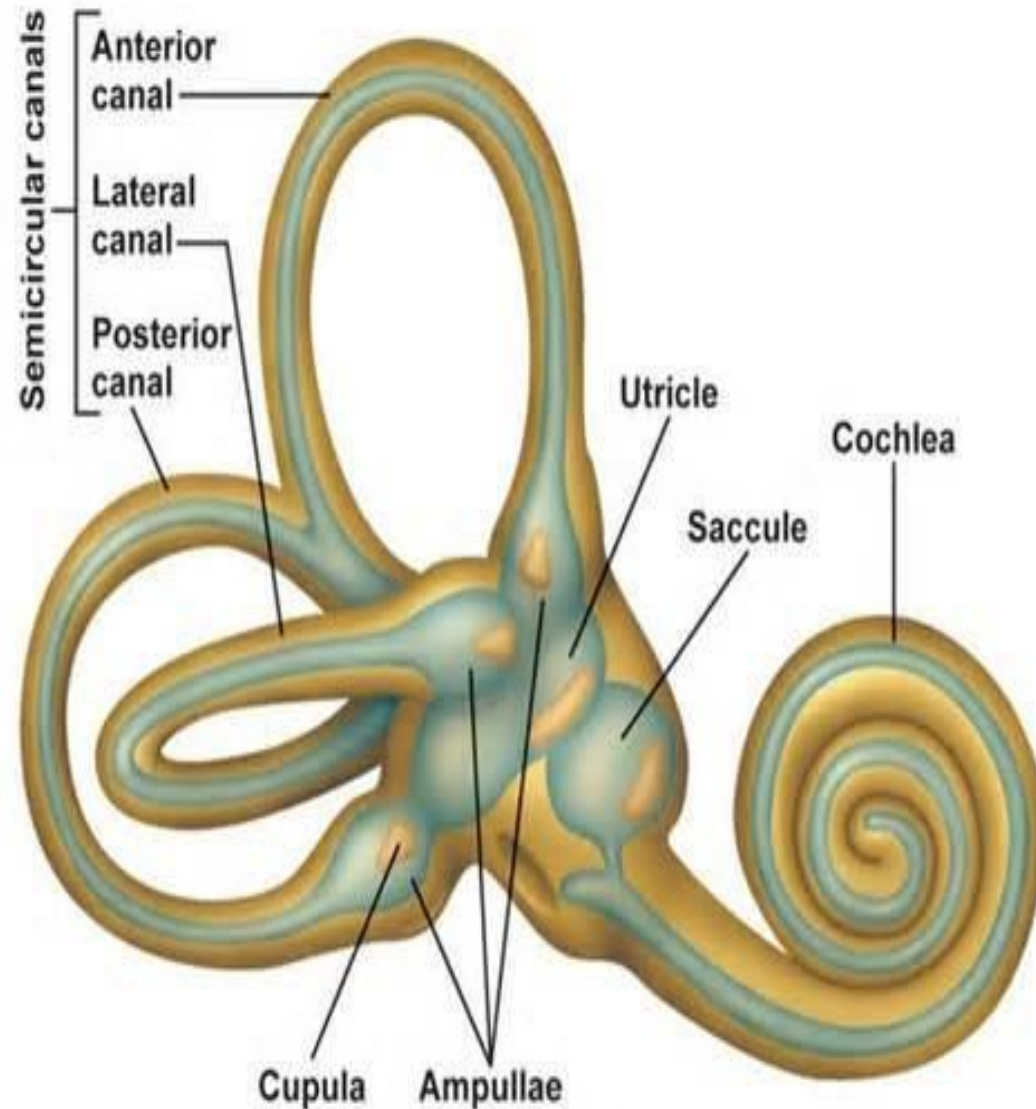
Vestibular labyrinth

Composed of :

- Two bags – saccule and utricle**
- Three semicircular canals**
- One endolymphatic duct**

Semicircular canals

**Are three
anterior
posterior
and lateral**



Function of Inner Ear

- Convert mechanical sound waves to neural impulses that can be recognized by the brain
- for:
 - Hearing
 - Balance

The origin and pathway of vestibulochochlear nerve (VIII cranial nerve)

the cochlear Pathway

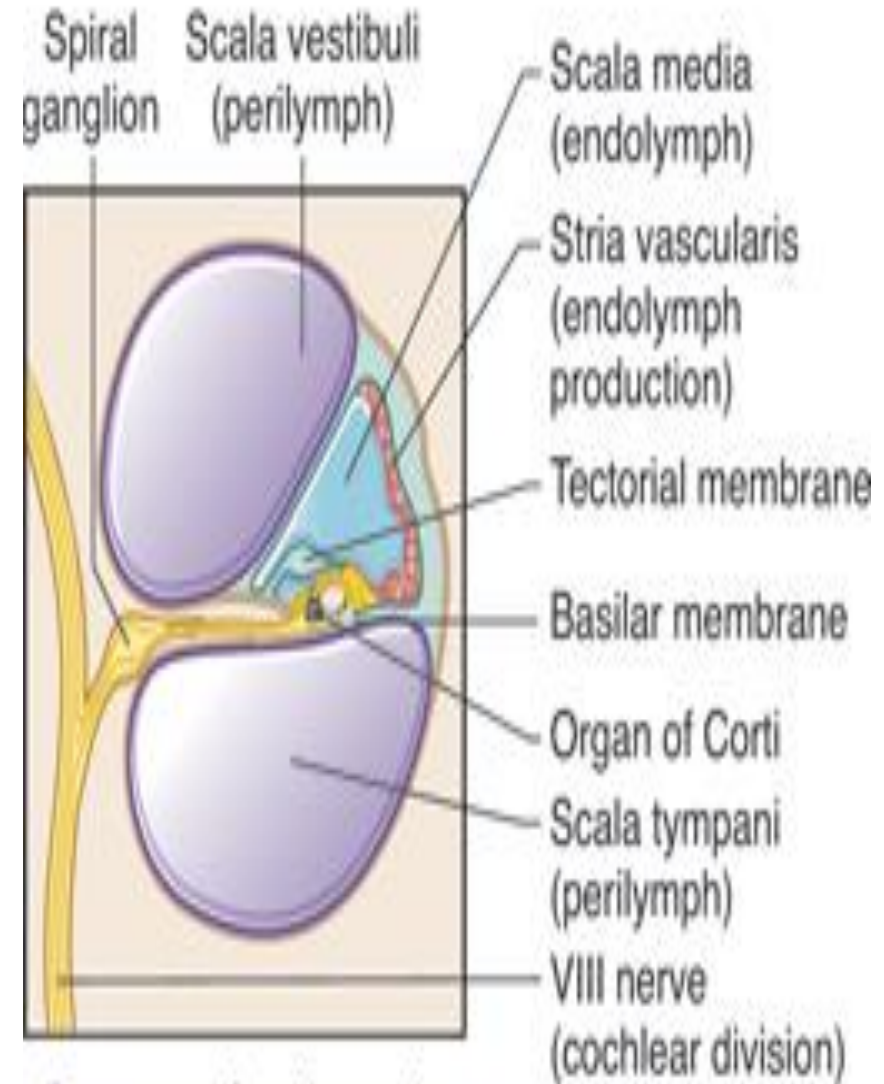
origin:

the central processes of spiral ganglion in the Inner ear.

Its peripheral processes arising from neuroepithelium in the organ of corti.

second order neuron:

1- dorsal and ventral cochlear nuclei.



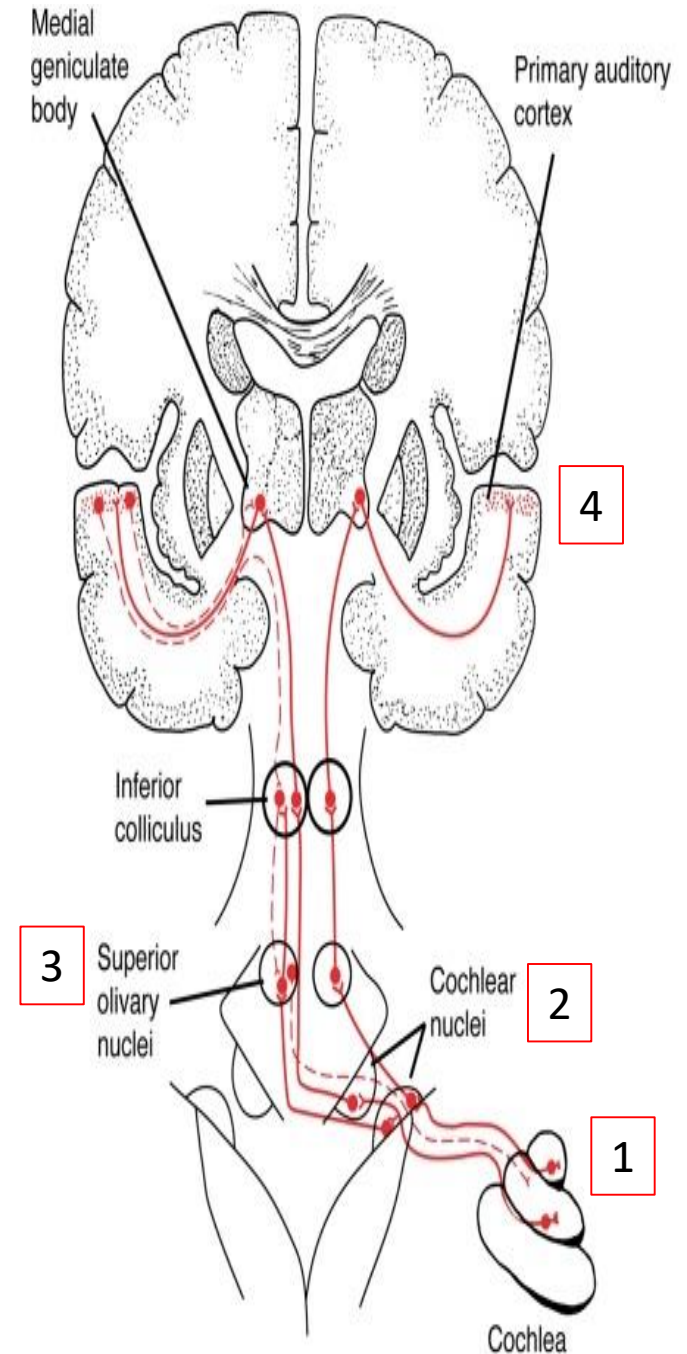
Cross section through one turn of the cochlea

The auditory pathway

Third neuron:
superior olivary and trapezoid body of both sides

fourth neuron:
cell of origin in medial geniculate body.

Axons pass in sublentiform part of internal capsule
then auditory radiation
finally to primary auditory centre in superior temporal gyrus area 41,42



the vestibular pathway

origin:

from central processes of vestibular ganglion in the Internal auditory meatus.

The peripheral processes arising from neuroepithelium in the 3 semicircular canals

second order neuron:

1- vestibular nuclei in the pons then to cerebellum and spinal cord.

2-some vestibular fiber go to cerebellum directly.

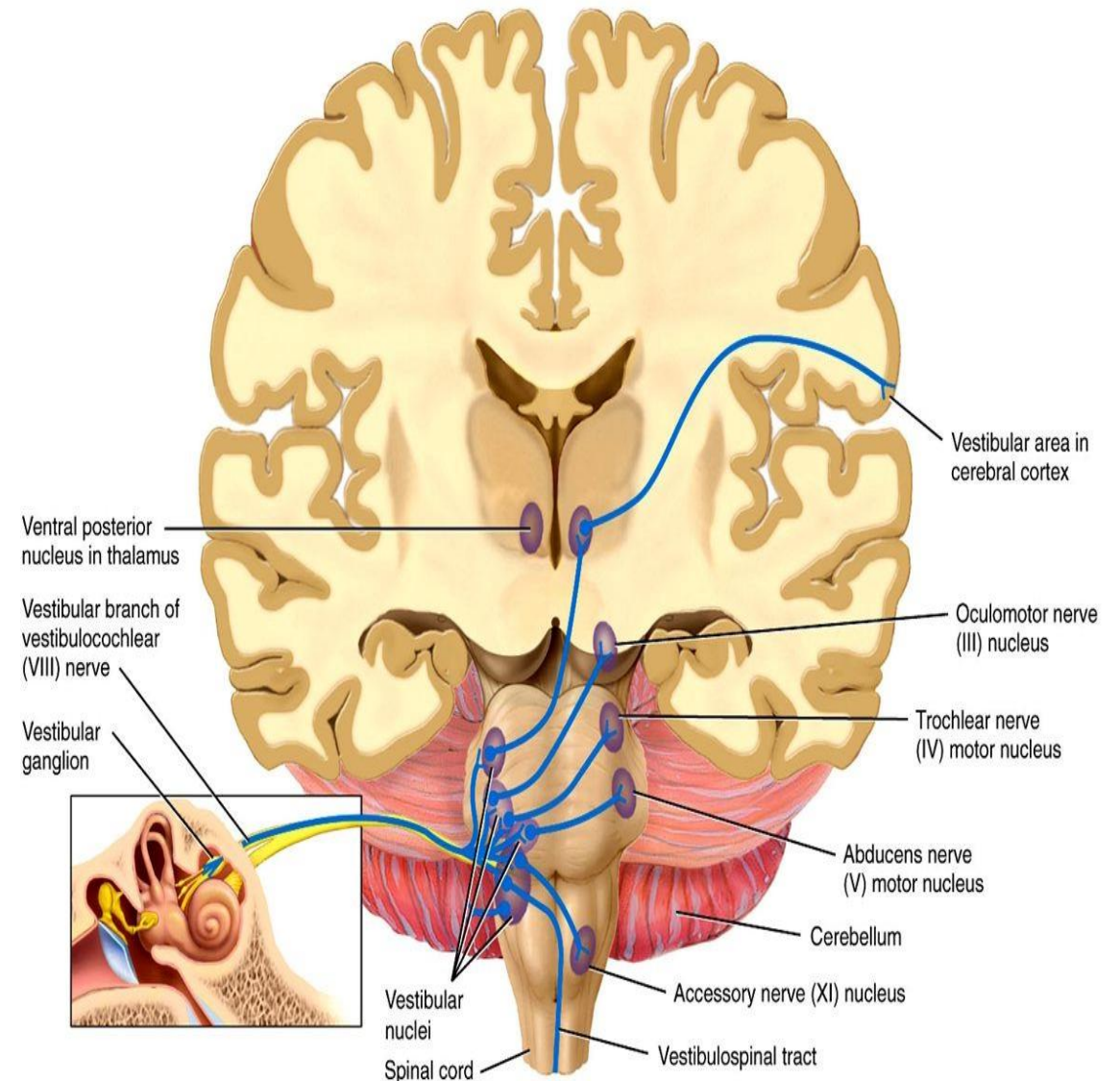
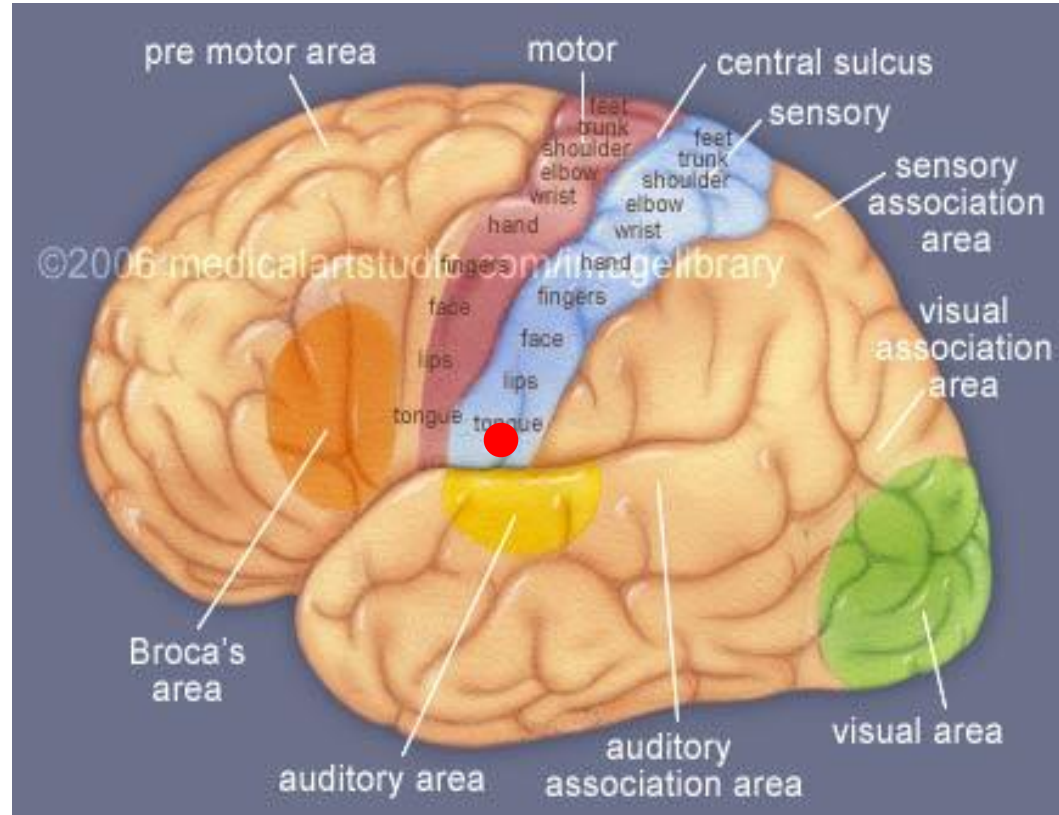


Figure 17.26 Tortora - PAP 12/e
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Vestibular Cortex

- Located in the lower part of postcentral gyrus (head area).
- Responsible for conscious awareness of vestibular sensation.



Thank
you

