

The University of Jordan  
Faculty Of Medicine



# The Ear

**Dr. Ahmed Salman**

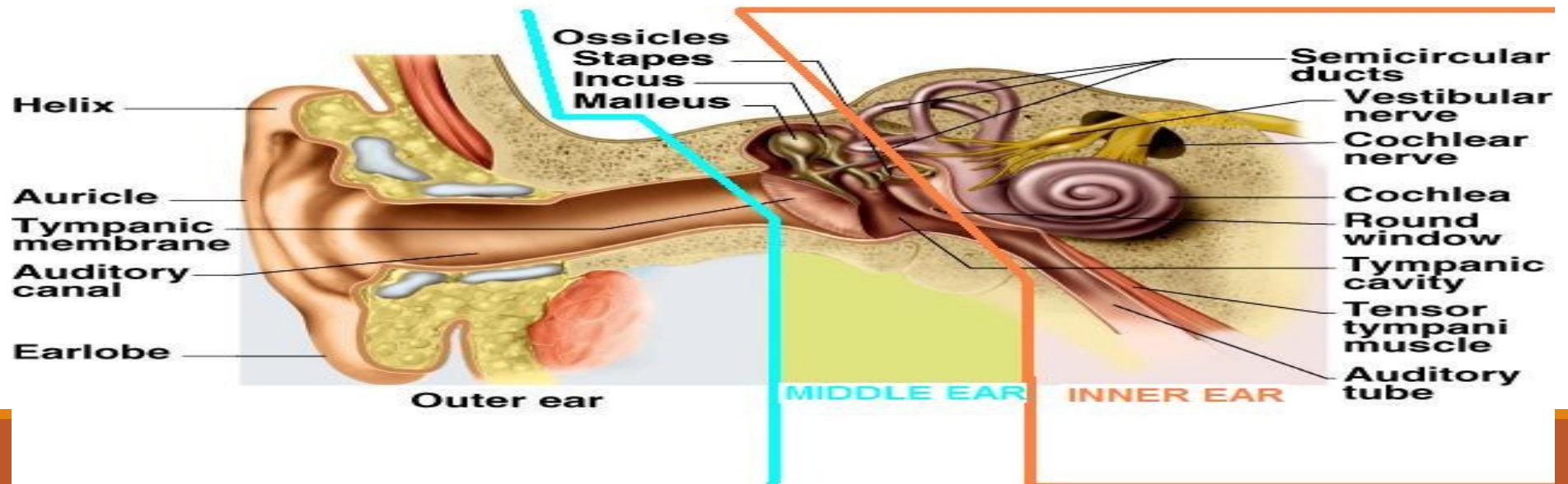
**Associate professor of anatomy & embryology**



# The Ear

The ear is divided into:

- 1) External (Outer) ear:** consists of the auricle of the ear, external auditory meatus & ear drum.
- 2) Middle ear:** a cavity in the petrous part of the temporal bone.
- 3) Internal (Inner) ear:** consists of the cochlea, vestibule & semicircular canals.  
It lies between the middle ear laterally and the internal acoustic meatus medially.



# The External Ear

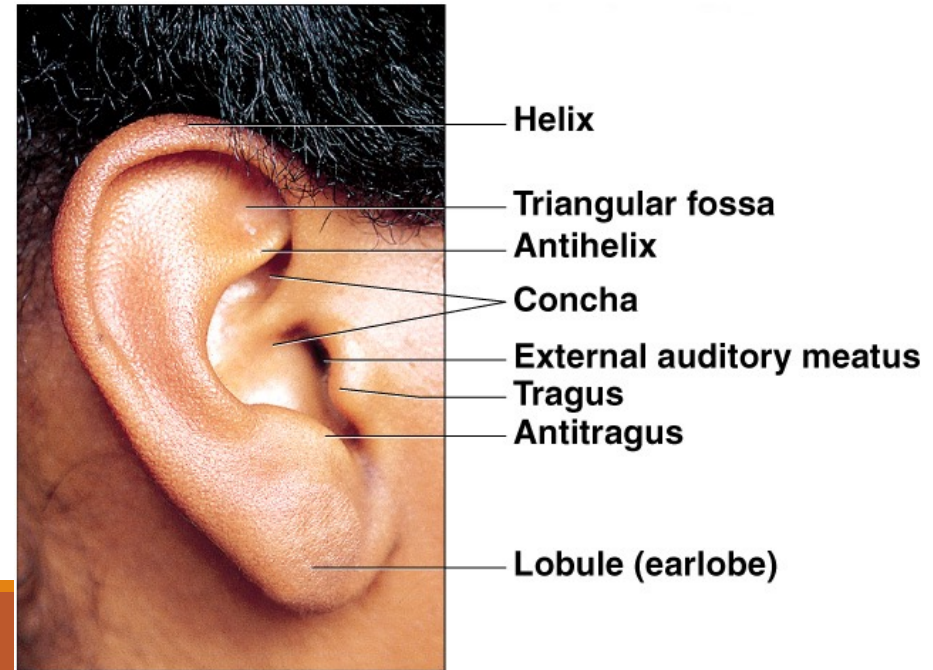
## The auricle (ear pinna):

It consists of cartilage covered with skin except the lobule of the ear which is unsupported by cartilage.

It has the following parts:

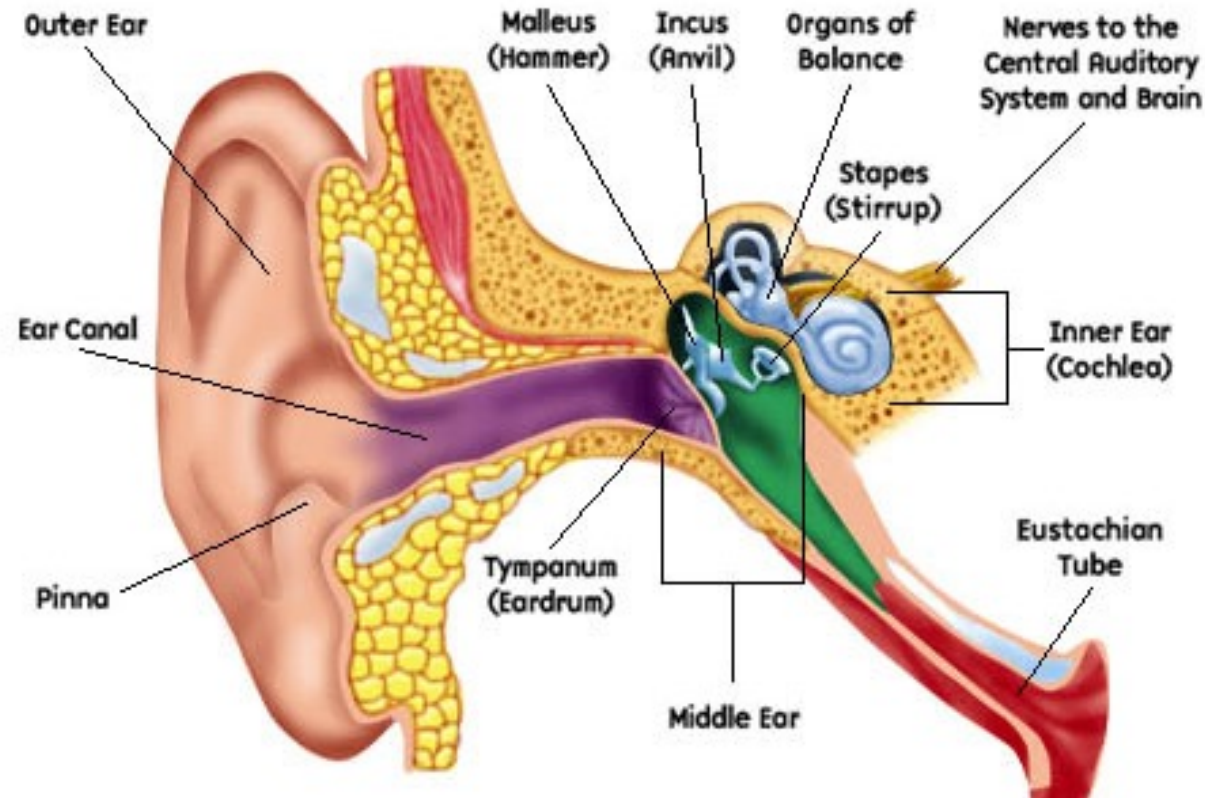
- Helix
- Antihelix.
- Concha of auricle.
- Tragus.
- Antitragus.
- Lobule of the ear

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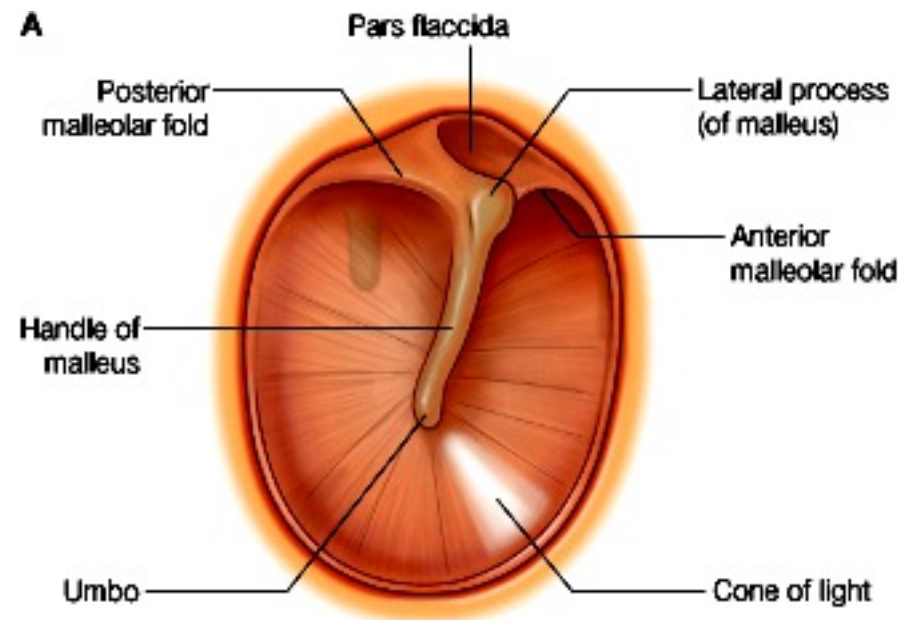
## External acoustic (auditory) meatus:

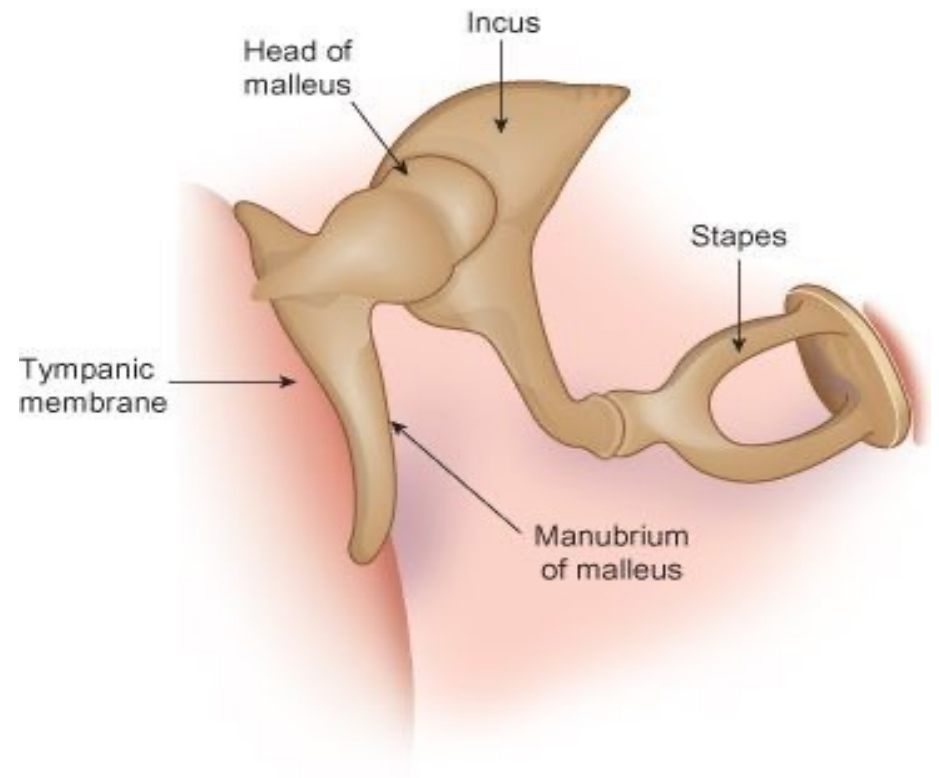
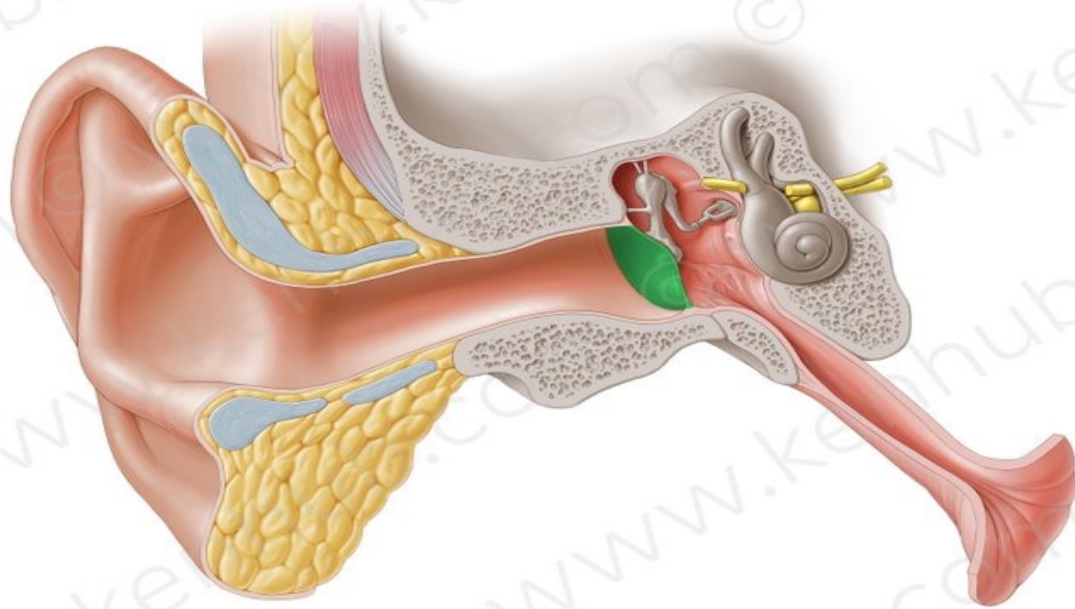
- Its lateral 1/3 consist of cartilage and the medial 2/3 is bony.
- It contains hair and modified sweat glands producing **cerumen** (earwax).



## The ear drum (Tympanic membrane):

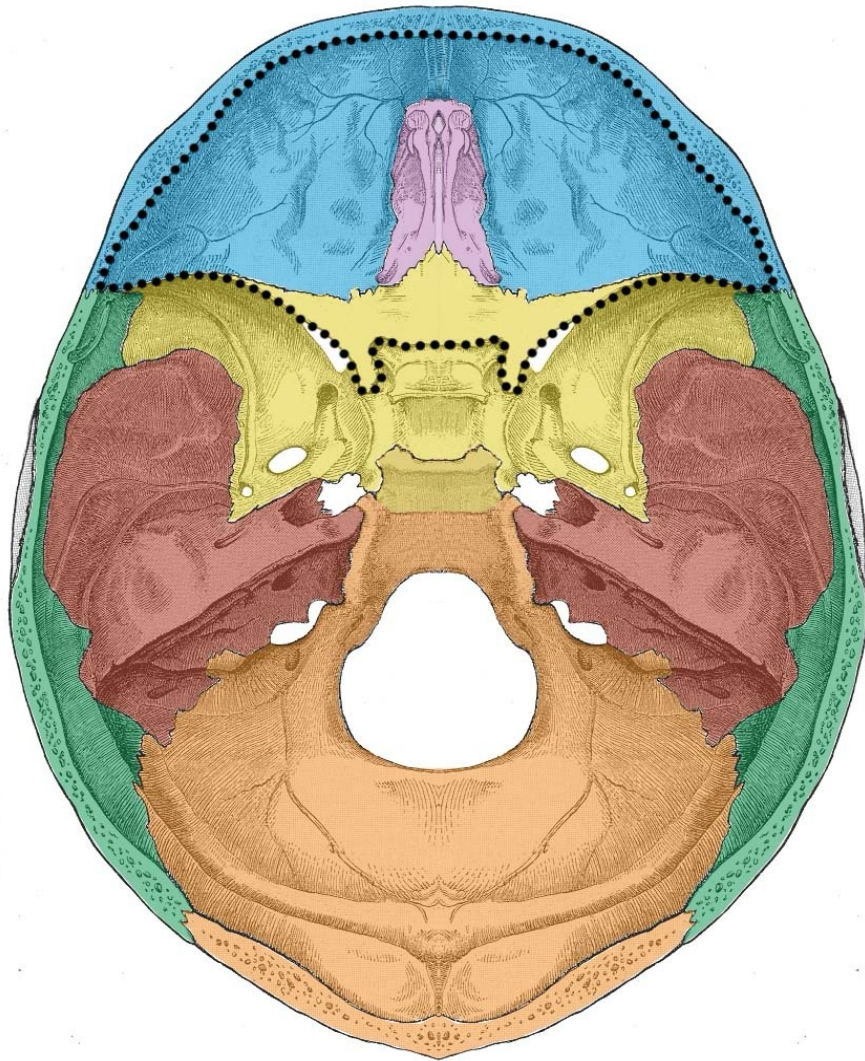
- It separates the external acoustic meatus from the middle ear.
- At its center, a concavity is produced by the attachment on its internal surface to the **handle of malleus**.
- This point of attachment is the **umbo of tympanic membrane**.
- It has upper flaccid part (pars flaccida) & a lower tense part (pars tensa).



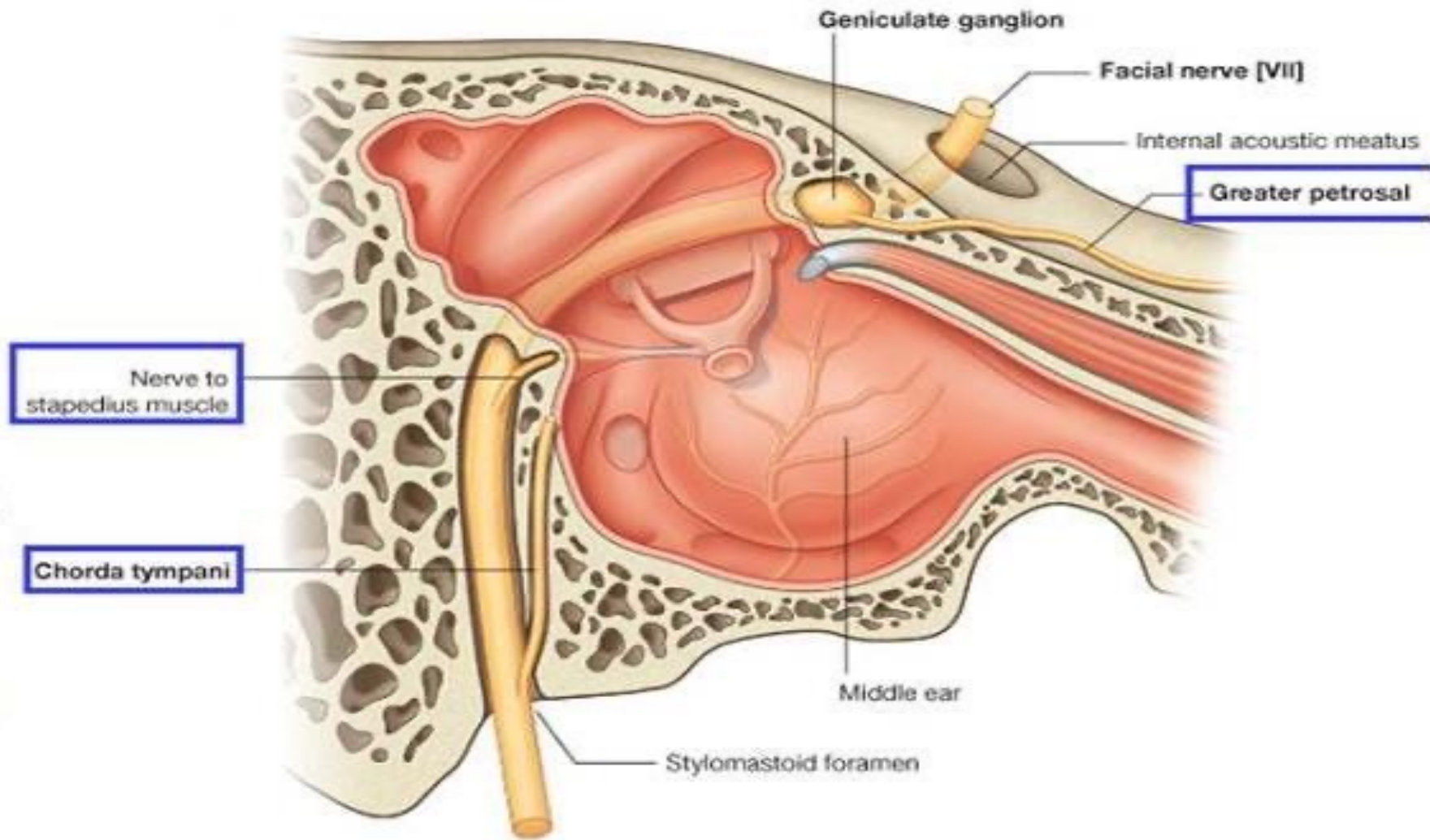


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## Tympanic membrane



- Frontal
- Ethmoid
- Sphenoid
- Temporal
- Parietal
- Occipital





# The Middle Ear Cavity

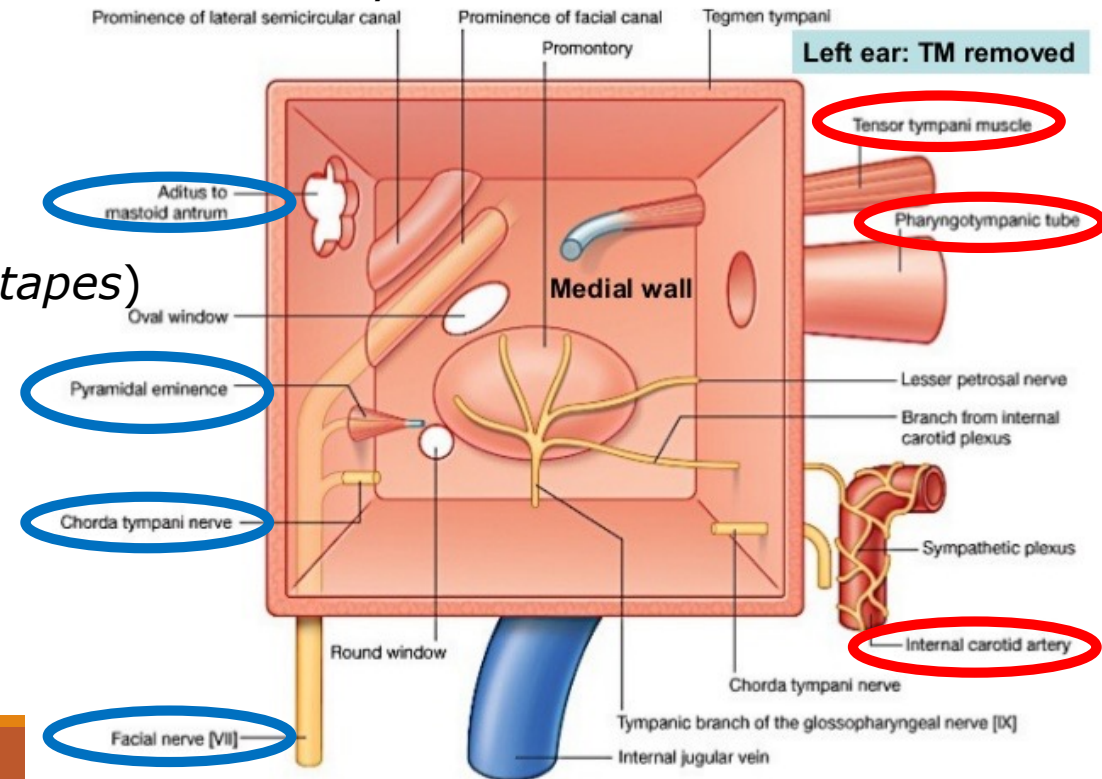
It a biconcave cavity with 6 walls:

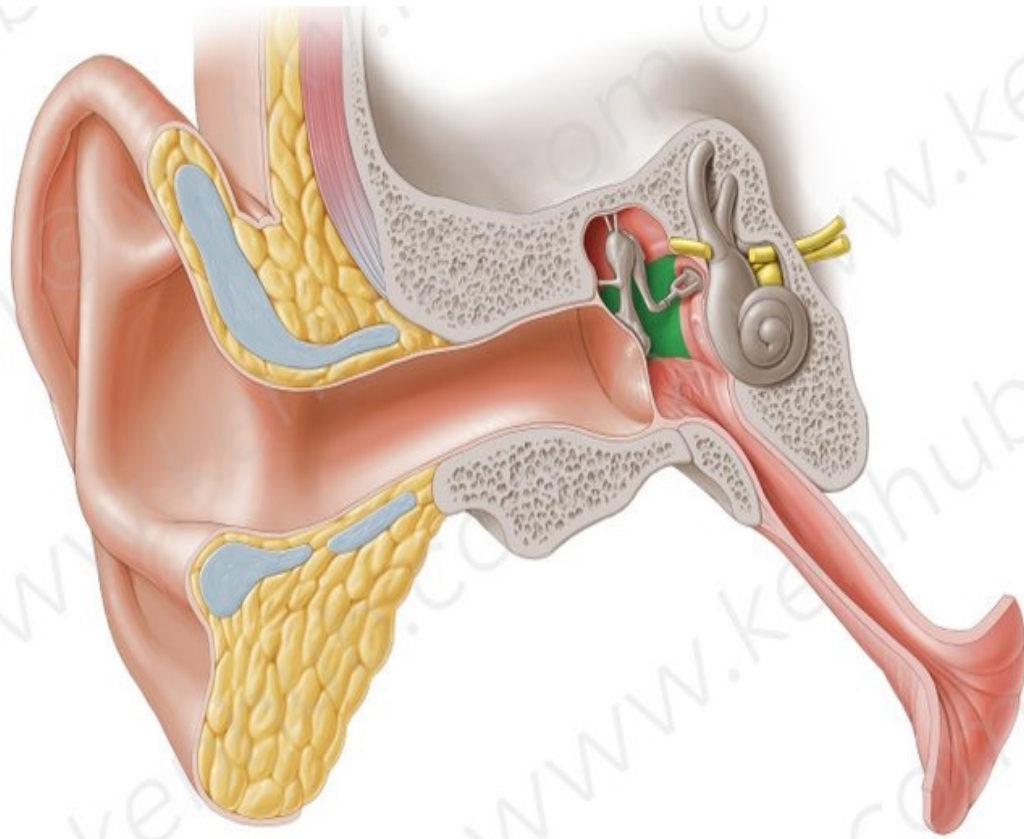
**1) Anterior (carotid) wall:** Shows the following:

- Opening of Eustachian (pharyngotympanic) tube.
- Opening for **tensor tympani** muscle. (*Malleus*)
- Bony plate separating the cavity from internal carotid artery in the carotid canal.

**2) Posterior (mastoid) wall:** Shows the following:

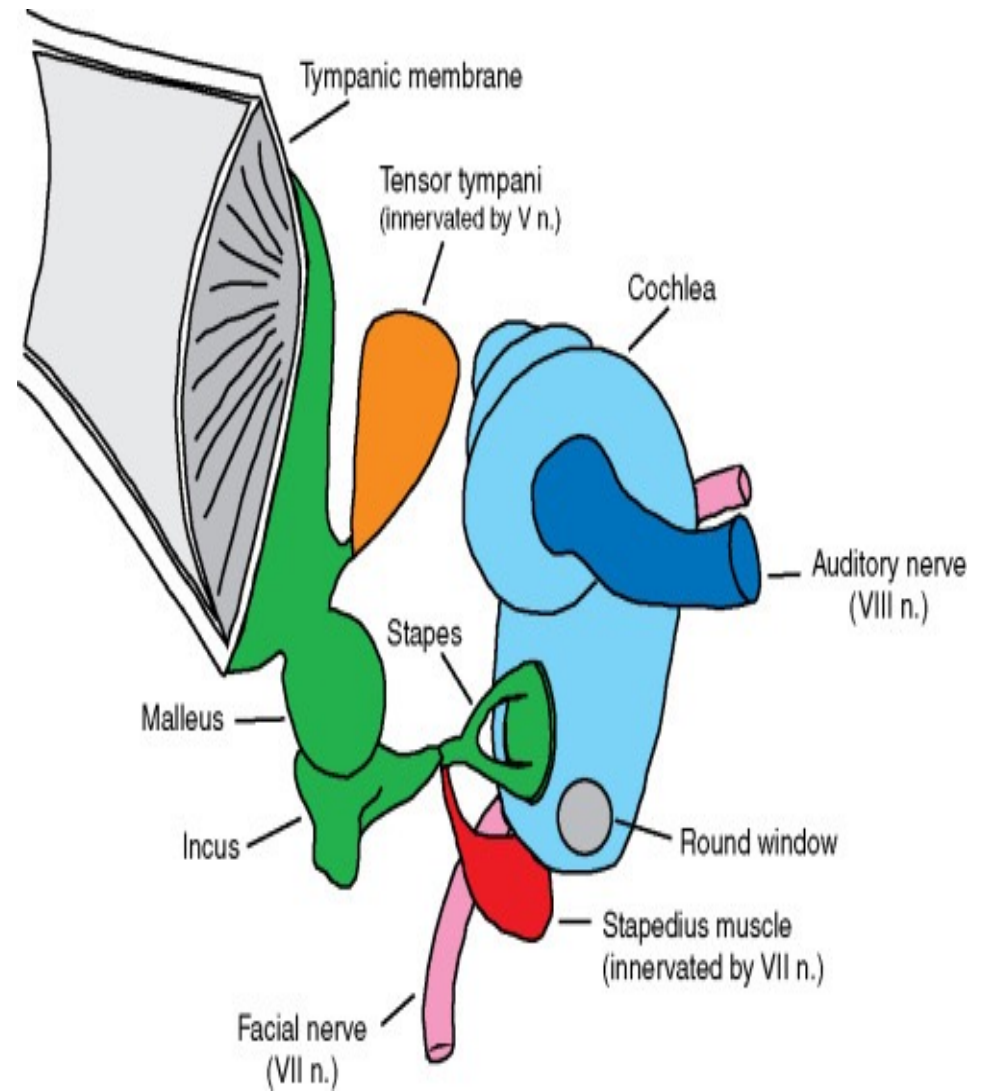
- Opening (aditus) to mastoid antrum.
- Pyramid: transmits **stapedius muscle**. (*Stapes*)
- Vertical part of facial canal.
- Posterior canaliculus for chorda tympani





**Mastoid wall**

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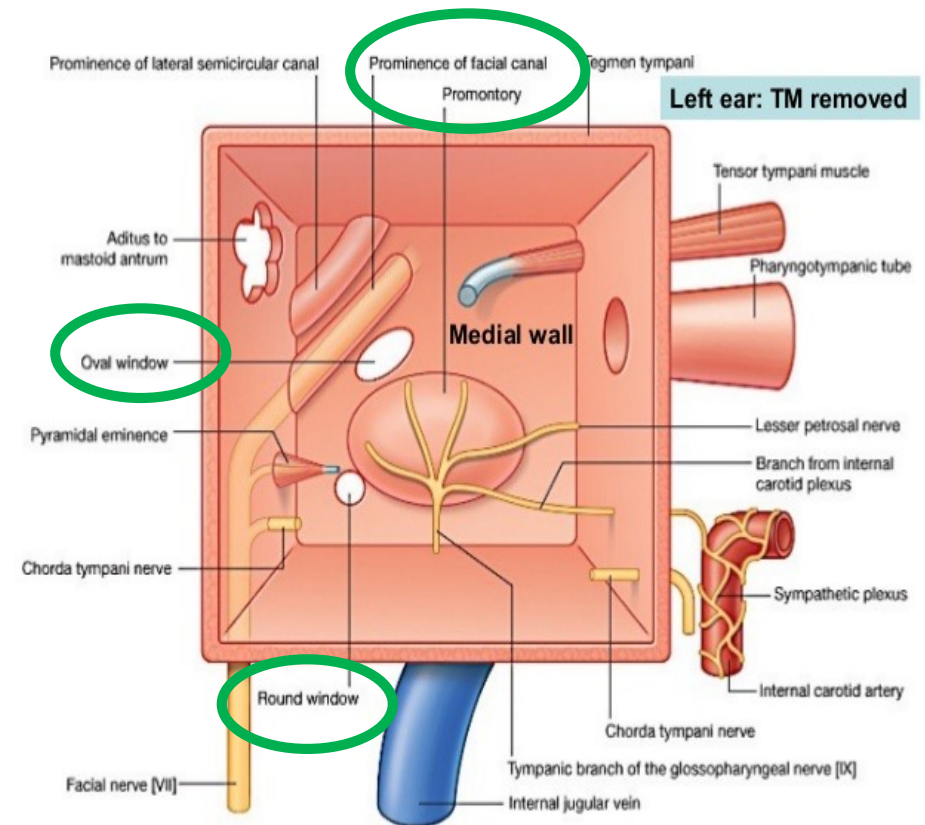
# The Middle Ear Cavity

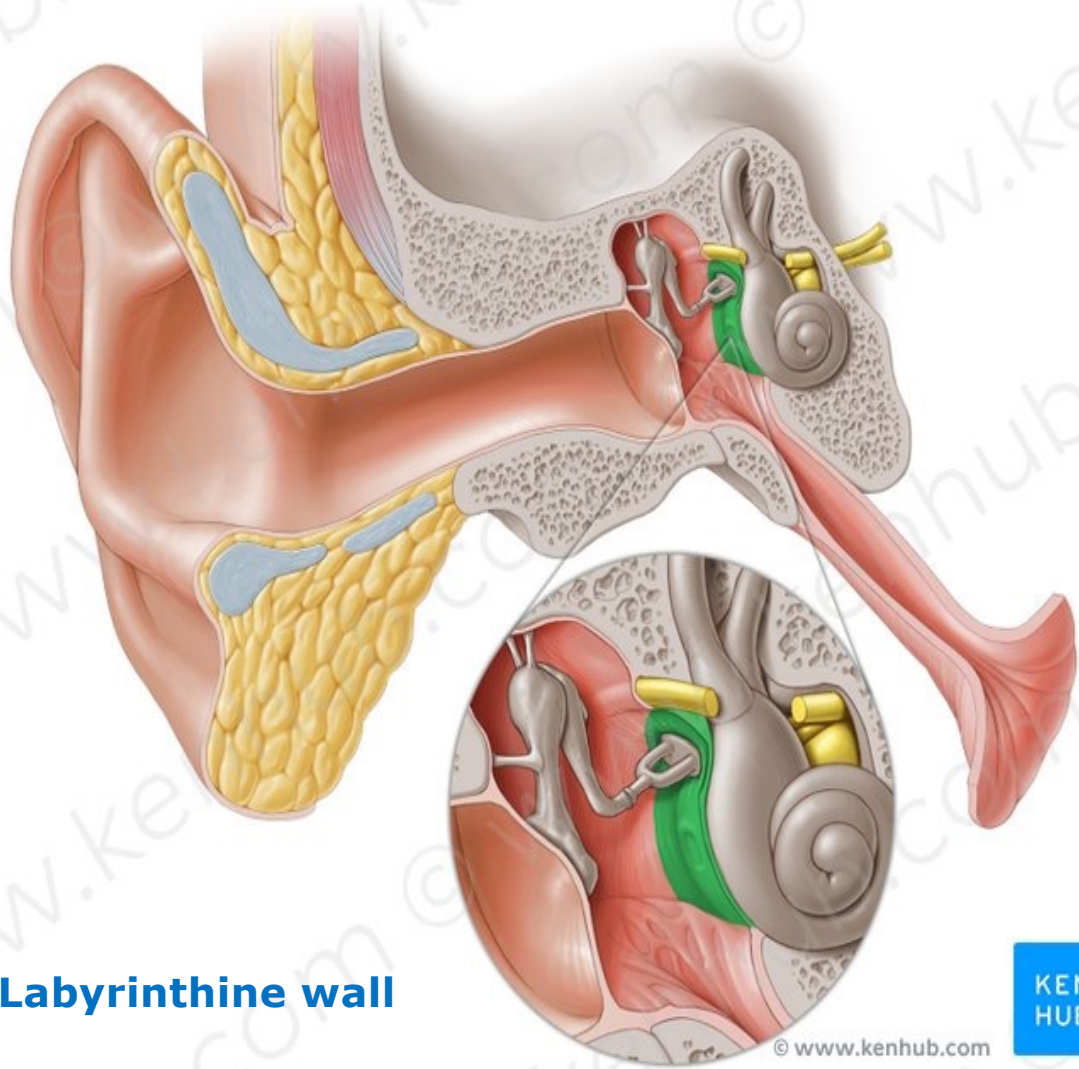
## 3) Lateral (membranous) wall:

- ❖ Its upper part is bony.
- ❖ Its lower part is the ear drum.

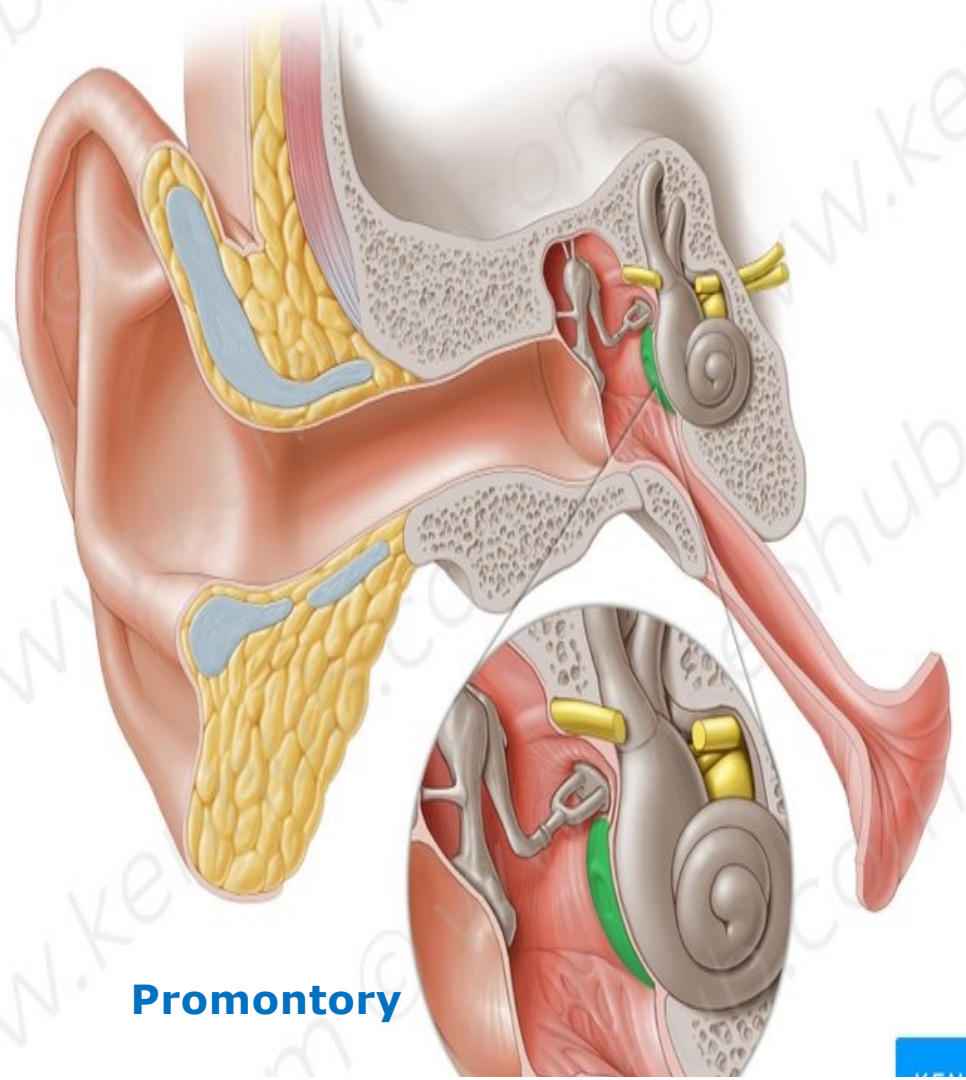
## 4) Medial (labyrinthine) wall: Shows :

- Promontory: the basal turn of cochlea.
- Oval window: Above & behind promontory .  
(Closed by stapes)
- Round window: below & behind promontory.  
(Closed by secondary tympanic membrane )
- Horizontal part of facial canal above and behind & oval window.





**Labyrinthine wall**



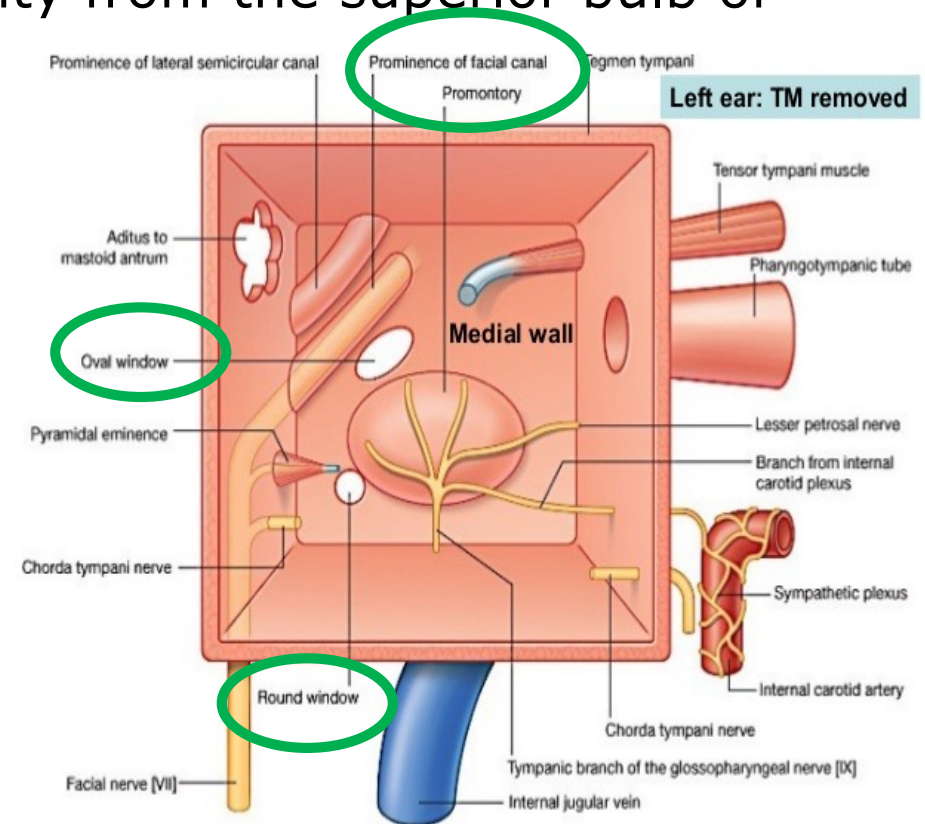
**Promontory**

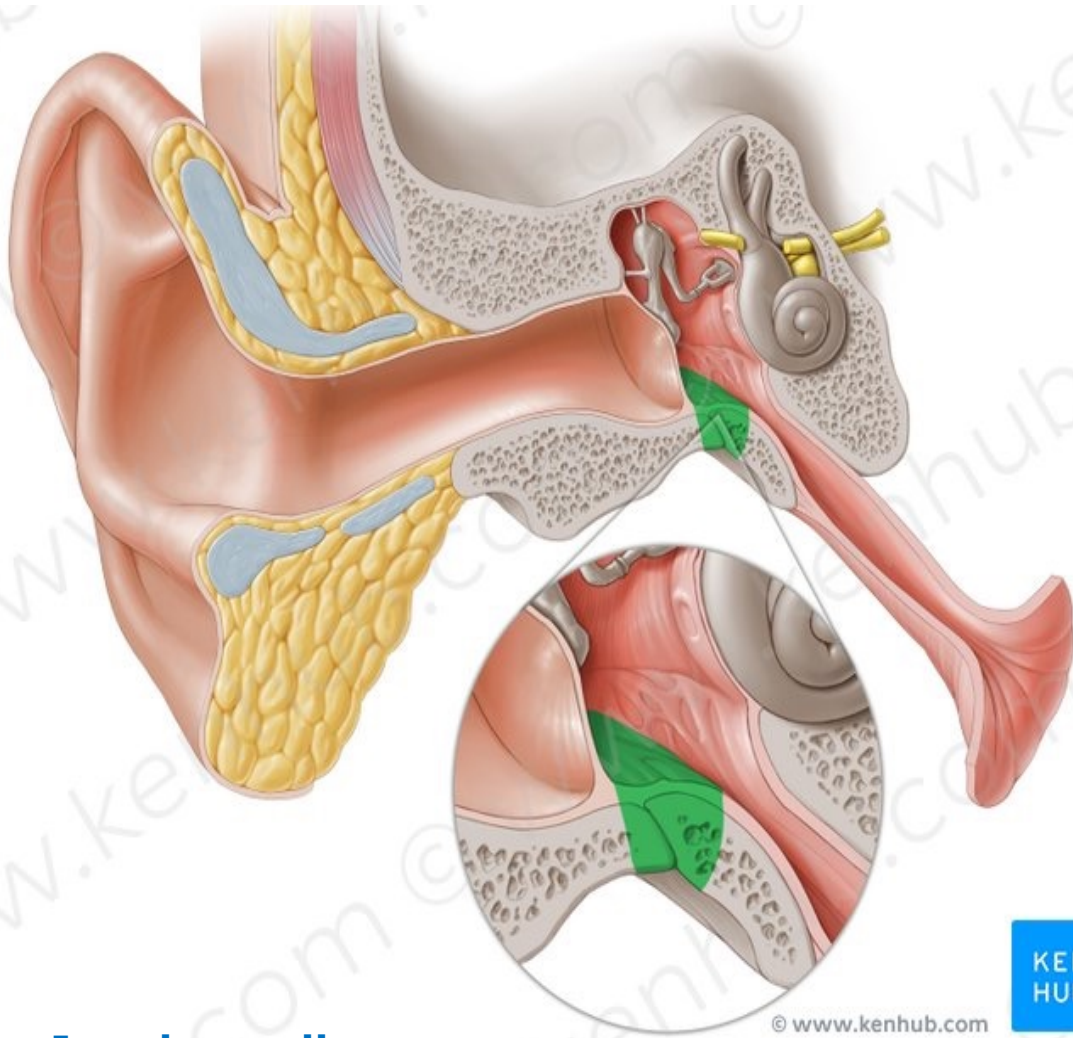


# The Middle Ear Cavity

**5) Roof (tegmental wall):** tegmen tympani which separates it from the temporal lobe of brain.

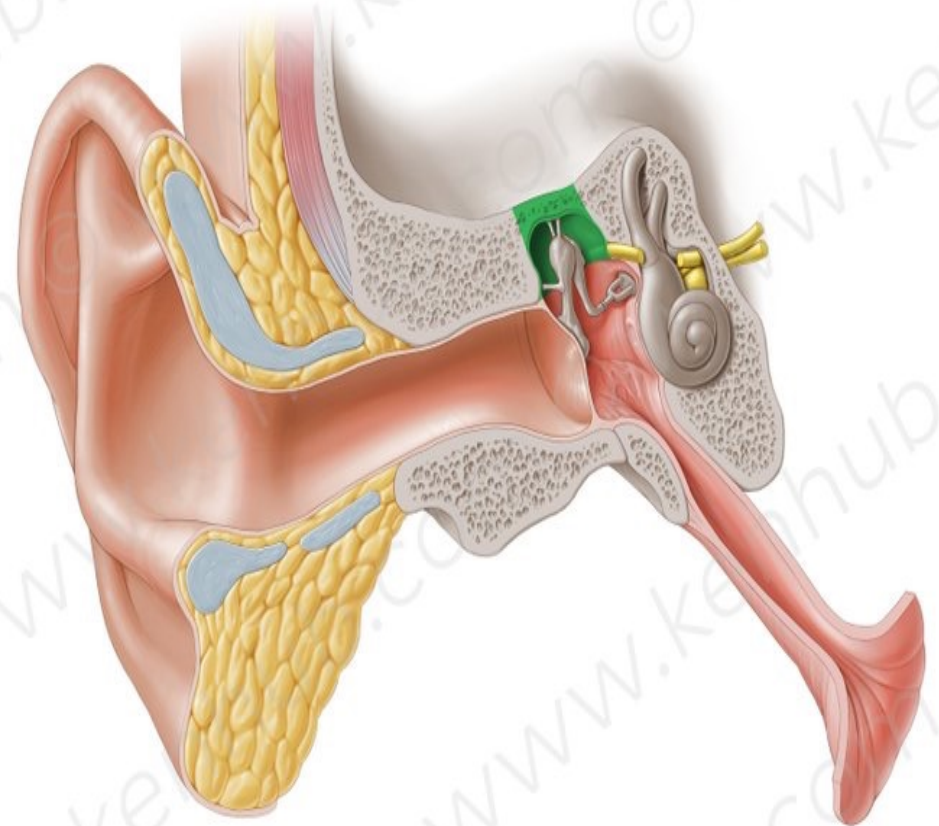
**6) Floor (Jugular wall):** separates the cavity from the superior bulb of internal jugular vein.





**Jugular wall**

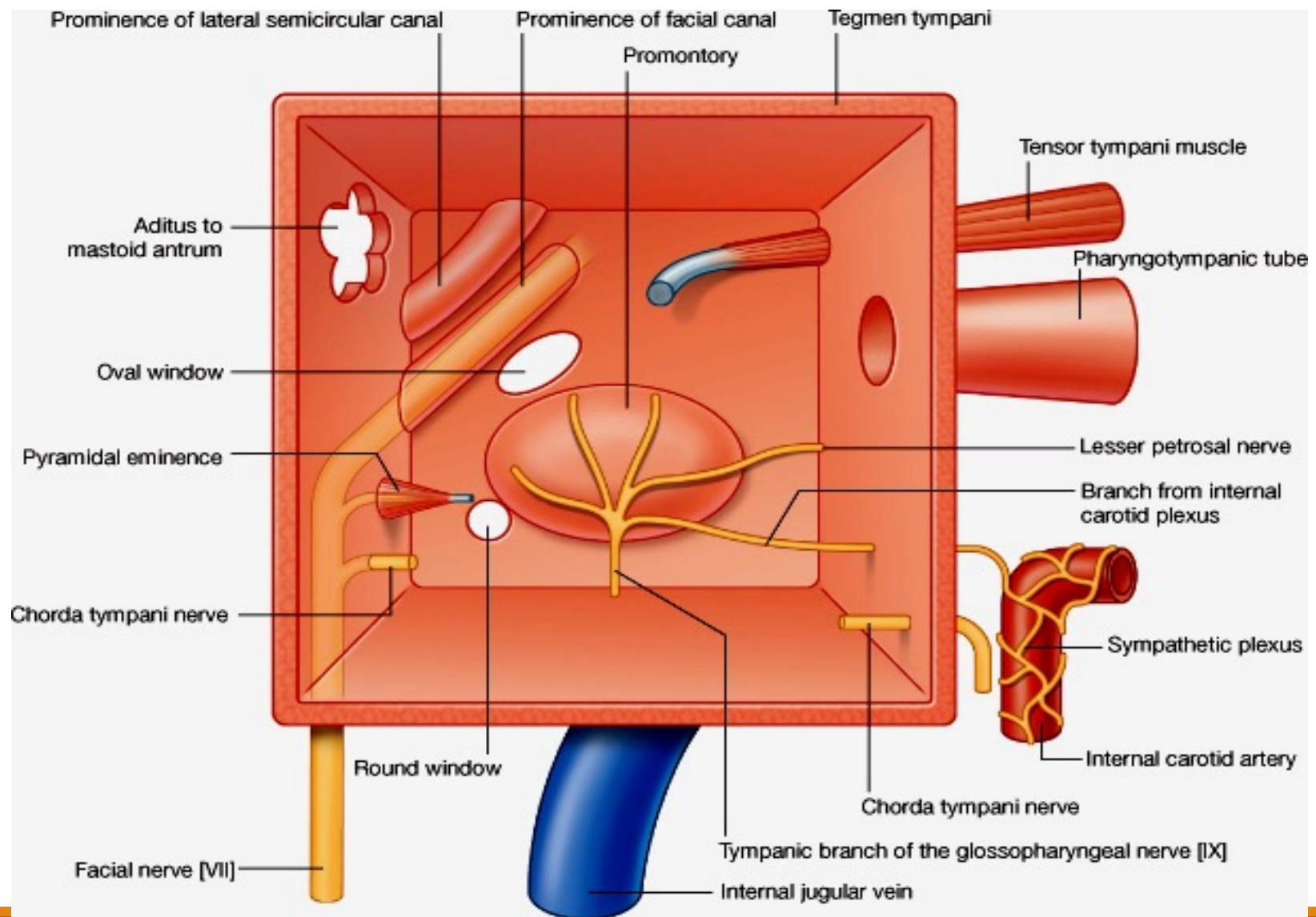
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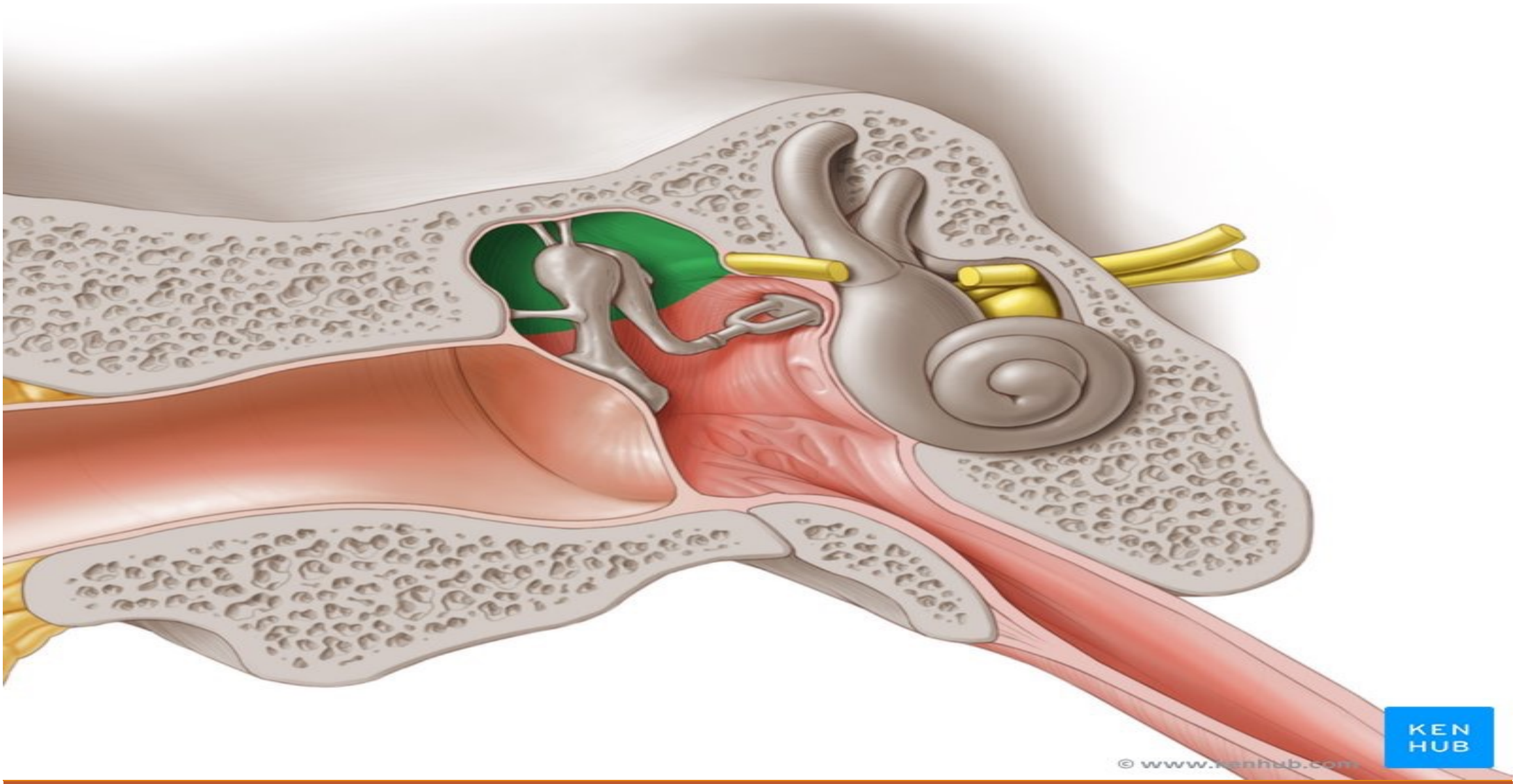


**Tegmental wall**

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## Contents of middle ear:

- 1) Air
- 2) Chorda tympani: branch from facial nerve.
- 3) 3 bony ossicles: **Malleus, incus & stapes.**
- 4) 2 Muscles:

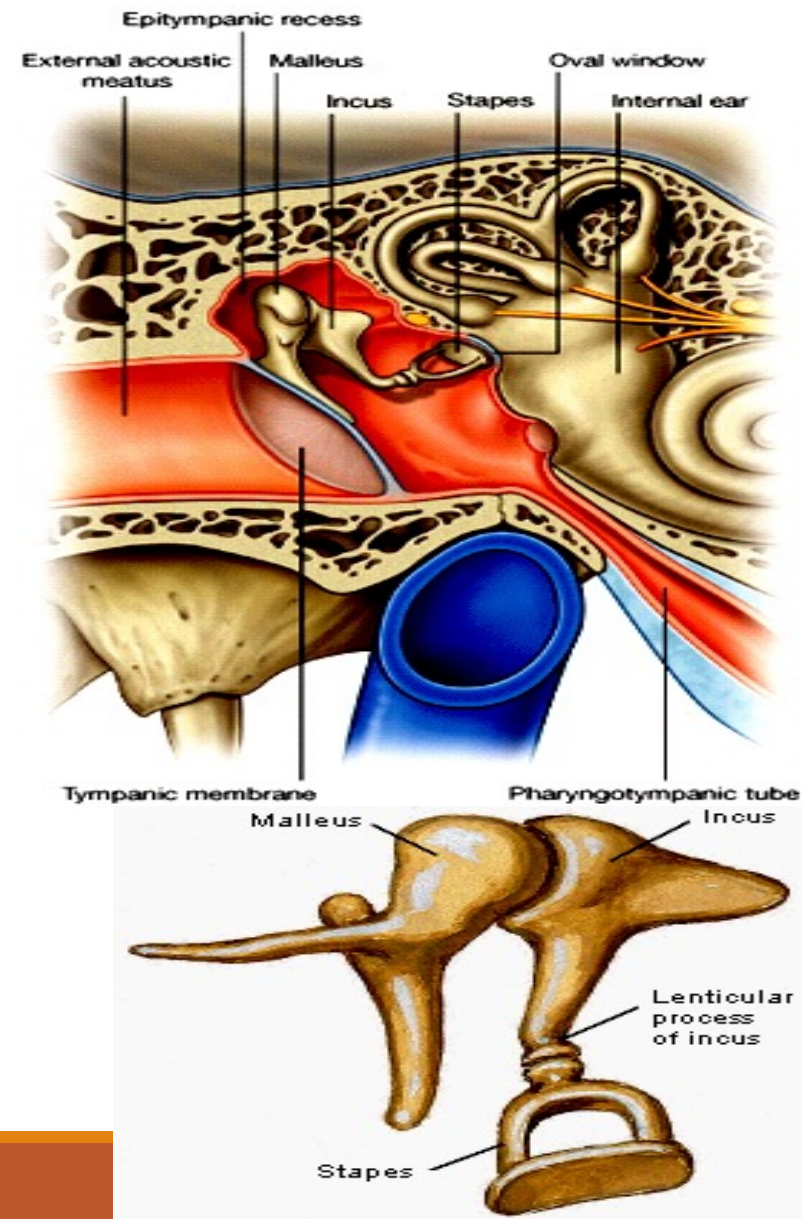
### Tensor tympani :

Its Contraction pulls handle of malleus medially, tensing tympanic membrane to reduce the force of vibrations in response to loud sound. **N.S:** Mandibular nerve trunk

### Stapedius:

Its Contraction, in response to loud sound, pulls the stapes posteriorly and prevents excessive oscillation.

**N.S :** Facial nerve



## Eustachian (Pharyngotympanic tube):

connects the middle ear with the nasopharynx .

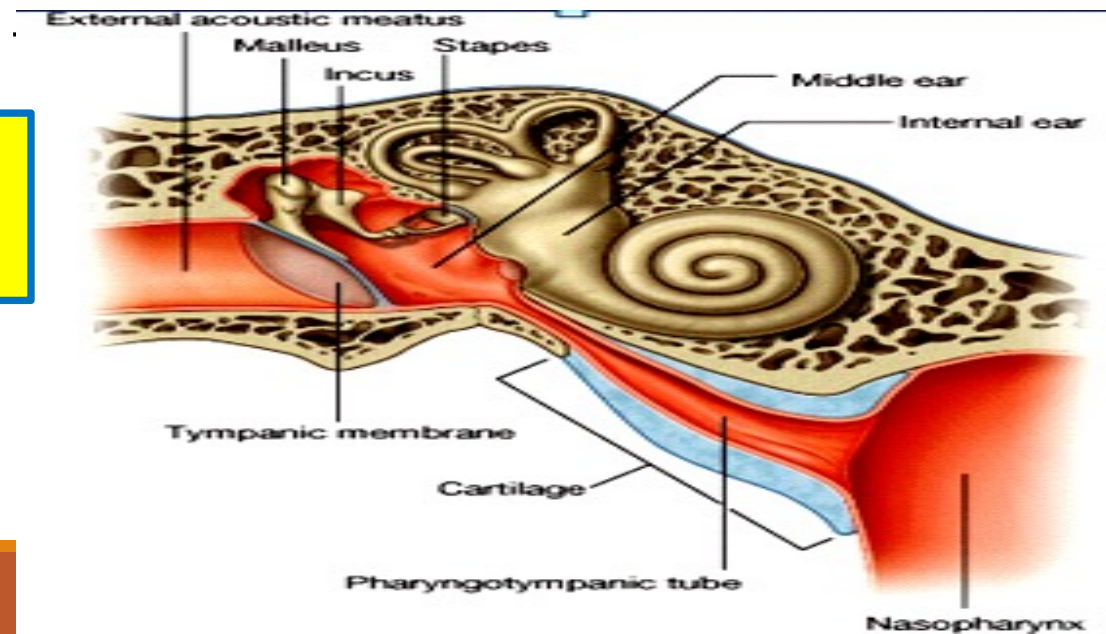
It allows air to enter the middle ear cavity to equalize pressure on both sides of the ear drum.

It consists of:

- **Bony part** the lateral one-third.
- **Cartilaginous part** the remaining

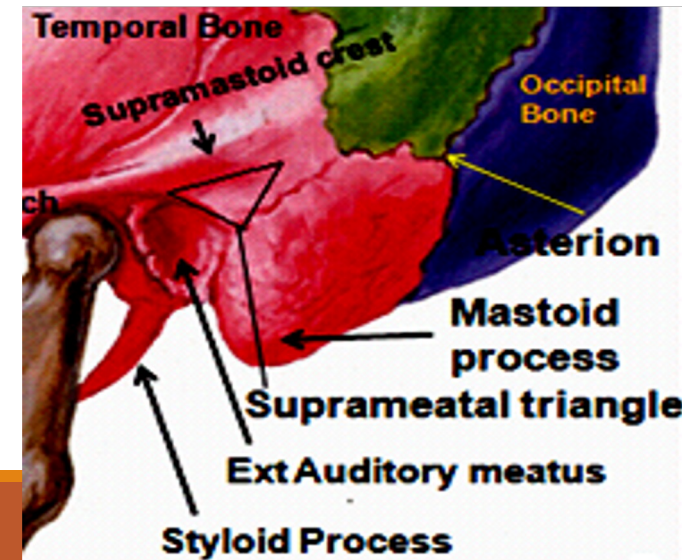
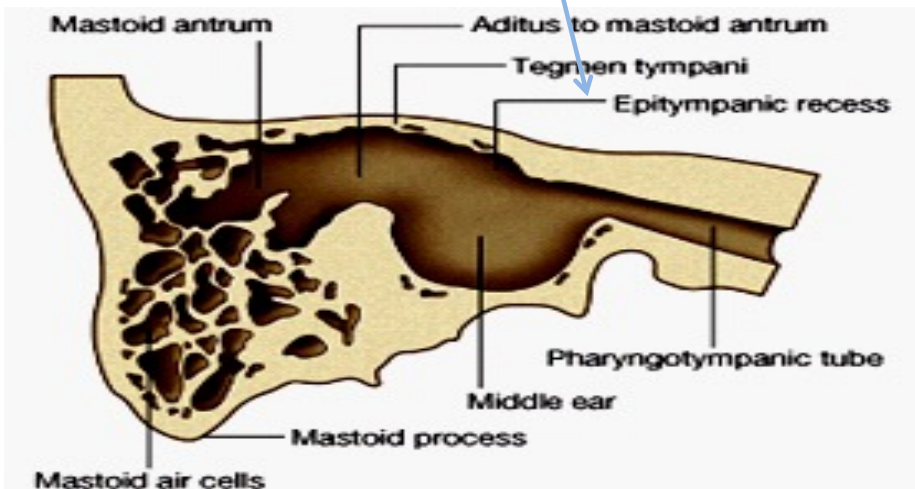
### External acoustic (auditory) meatus:

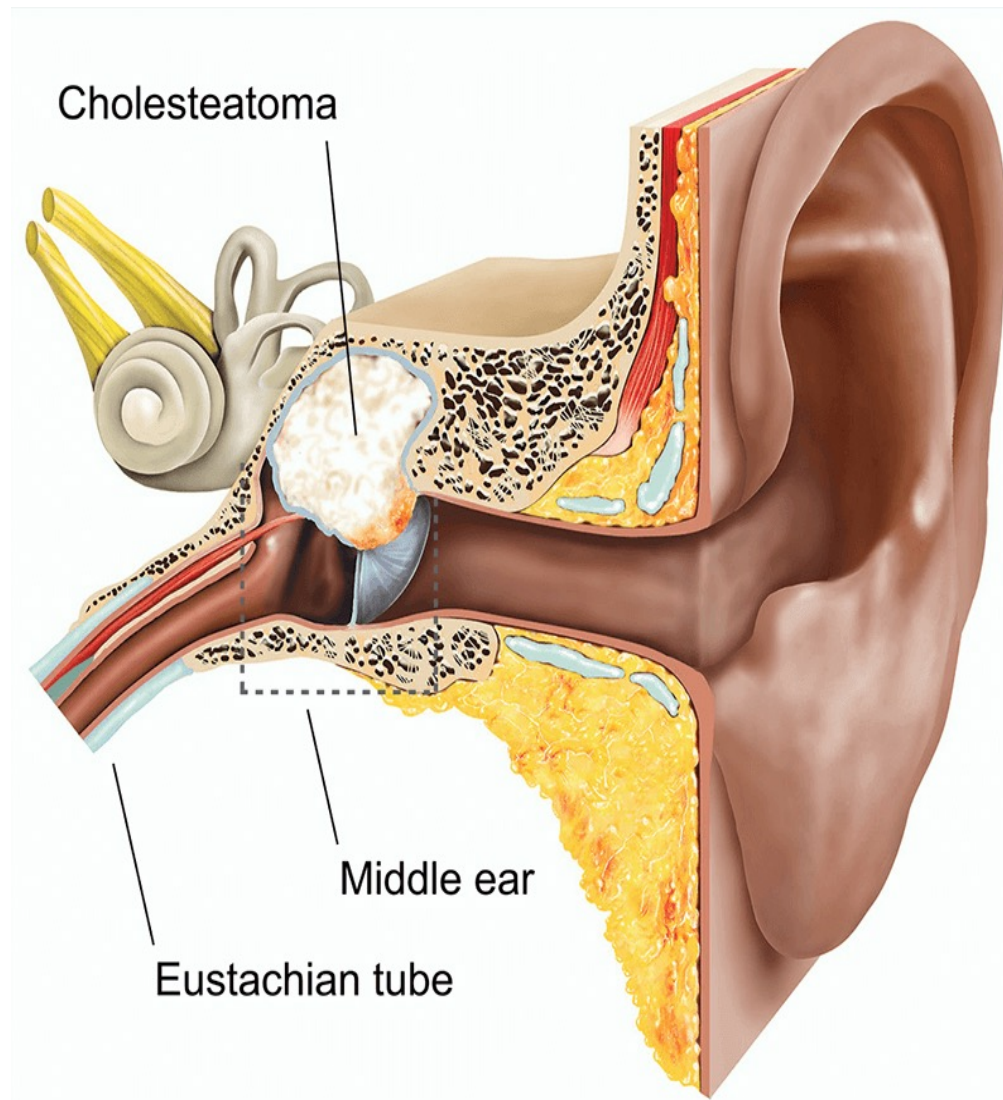
- Its lateral 1/3 consist of cartilage
- and the medial 2/3 is bony.



## Mastoid area:

- The **mastoid antrum** is a small cavity continuous with **mastoid air cells**.
- It lies deep to **suprameatal triangle**.
- The mastoid antrum is separated from the middle cranial fossa above by only the thin tegmen tympani.
- The mucous membrane lining the mastoid air cells is continuous with the mucous membrane throughout the middle ear.
- *Therefore, infections in the middle ear can easily spread into the mastoid area & to the middle cranial fossa.*

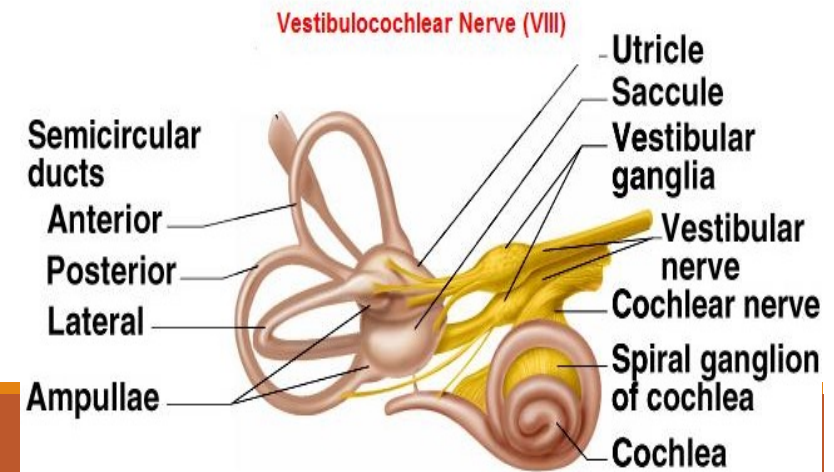
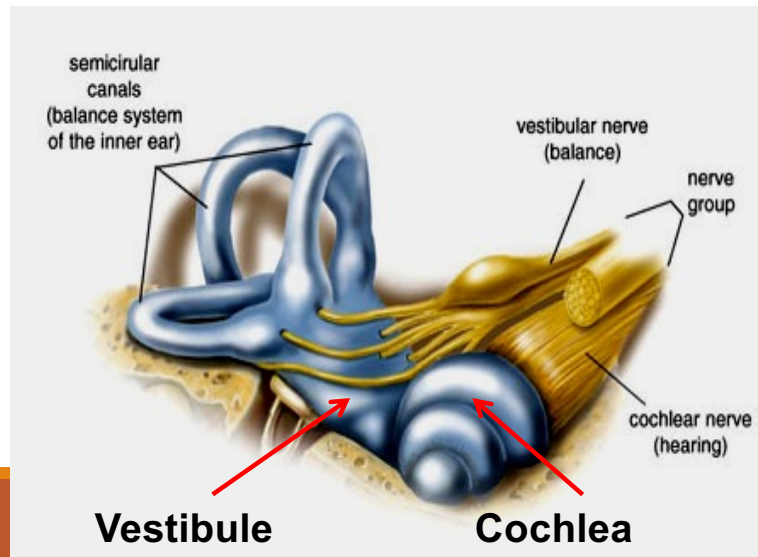
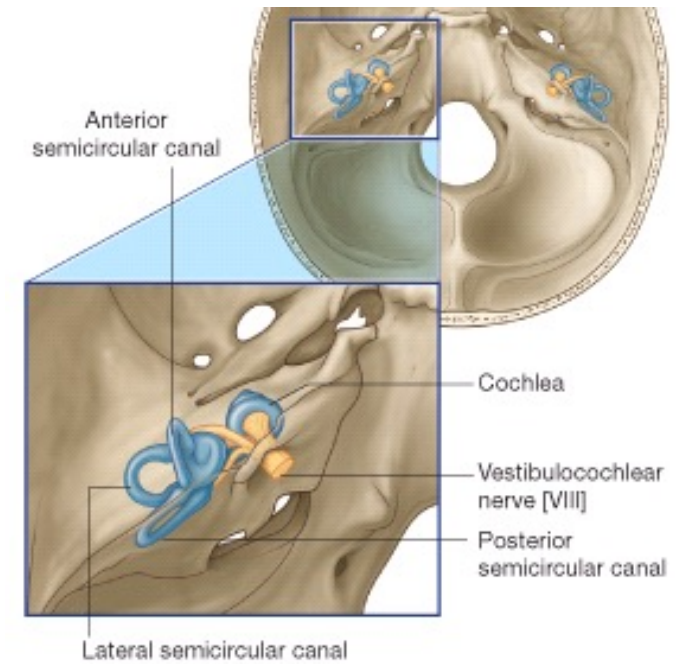


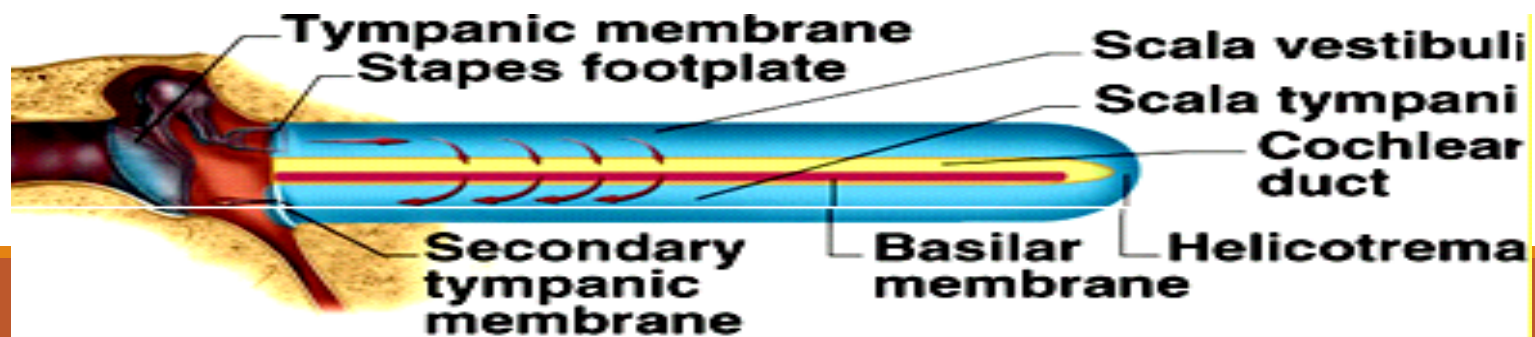
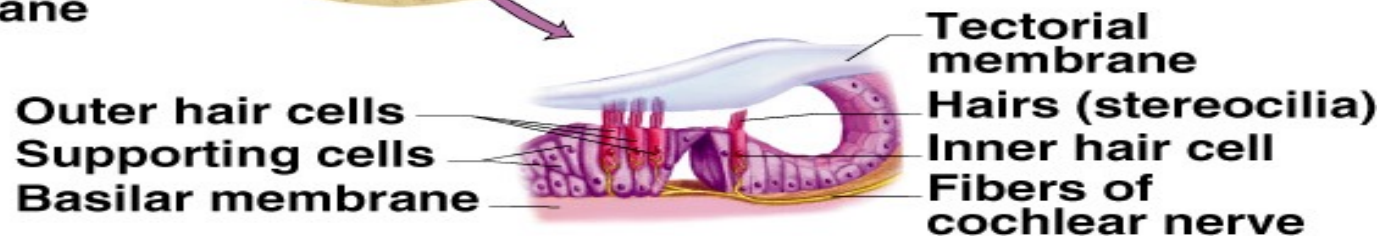
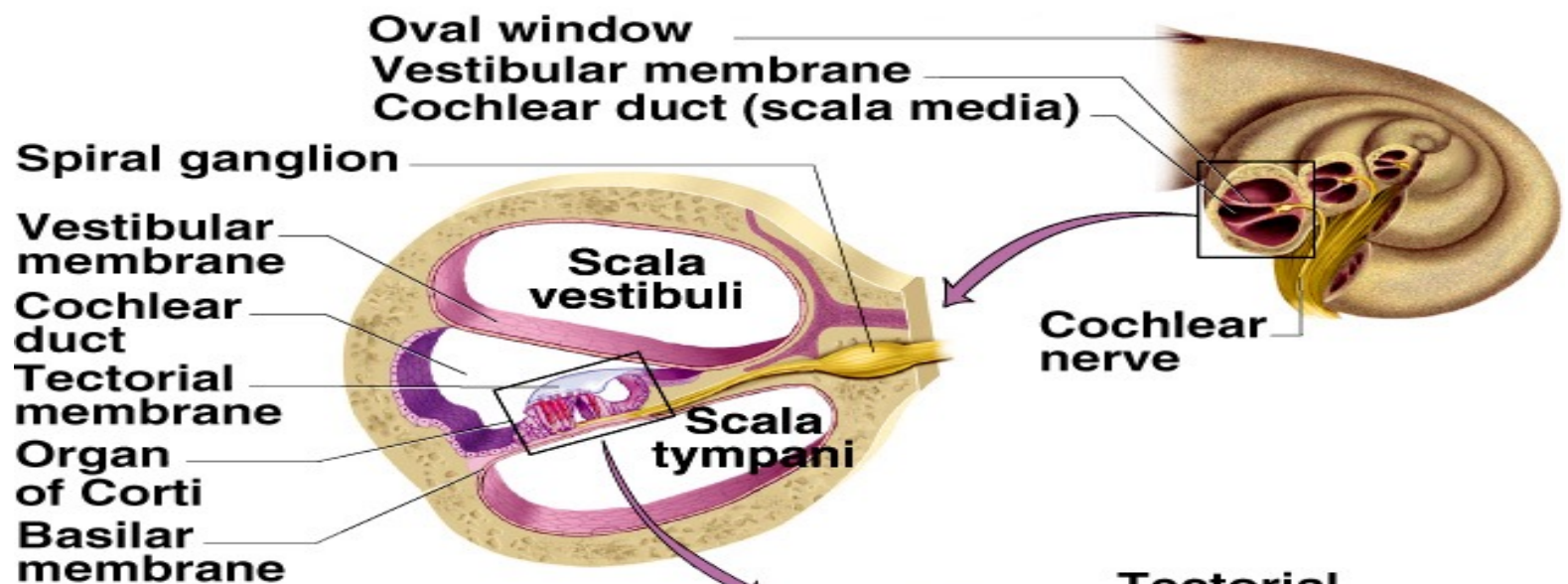


## The Internal Ear

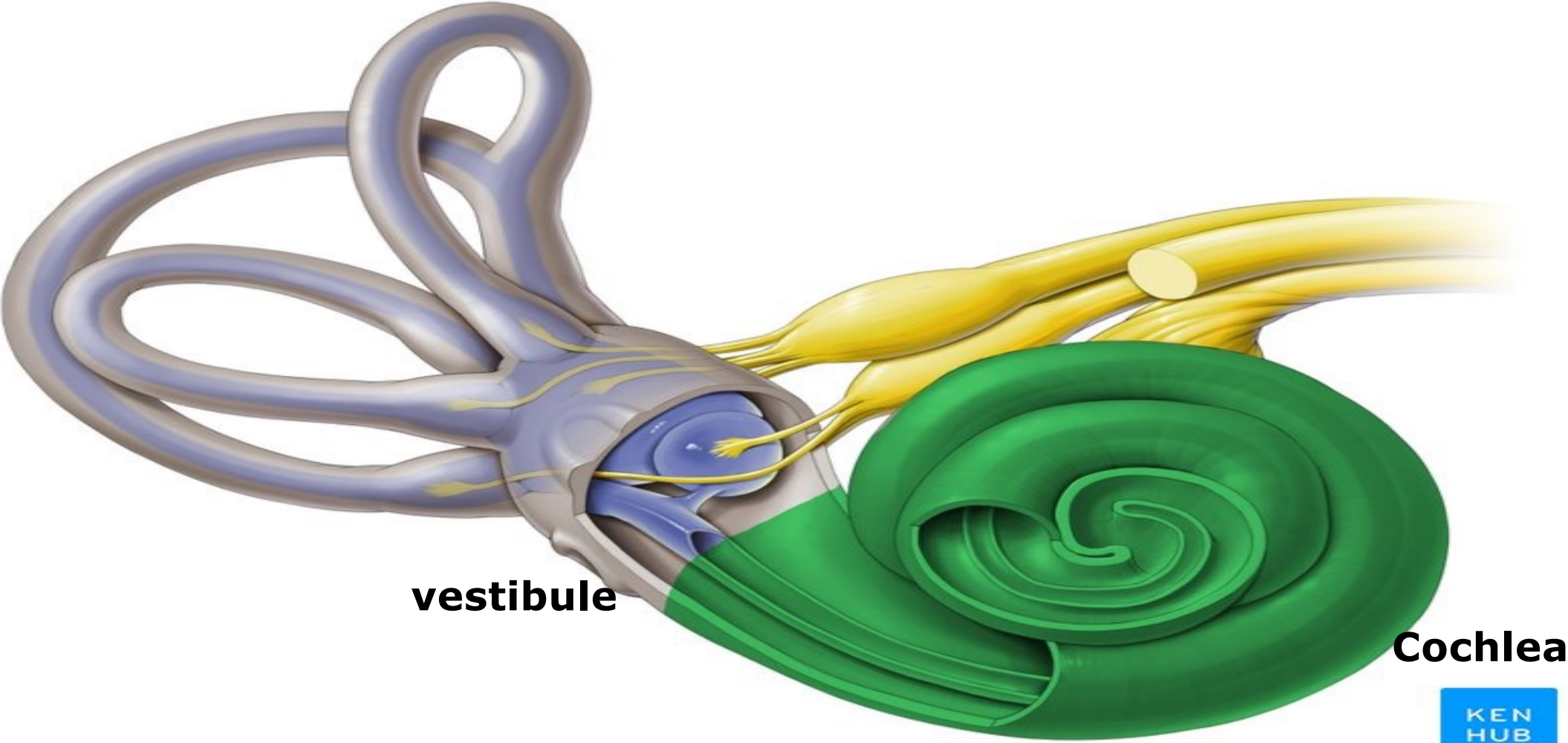
consists of:

- **Bony labyrinth:** consists of the **cochlea** , **vestibule** & three **semicircular canals (anterior, posterior & lateral)**.
- **Membranous labyrinth:** membranous ducts and sacs within the cavities of the bony labyrinth.
- All these structures lie in the petrous part of the temporal bone between the middle ear laterally and the internal acoustic meatus medially





# Semicircular canals

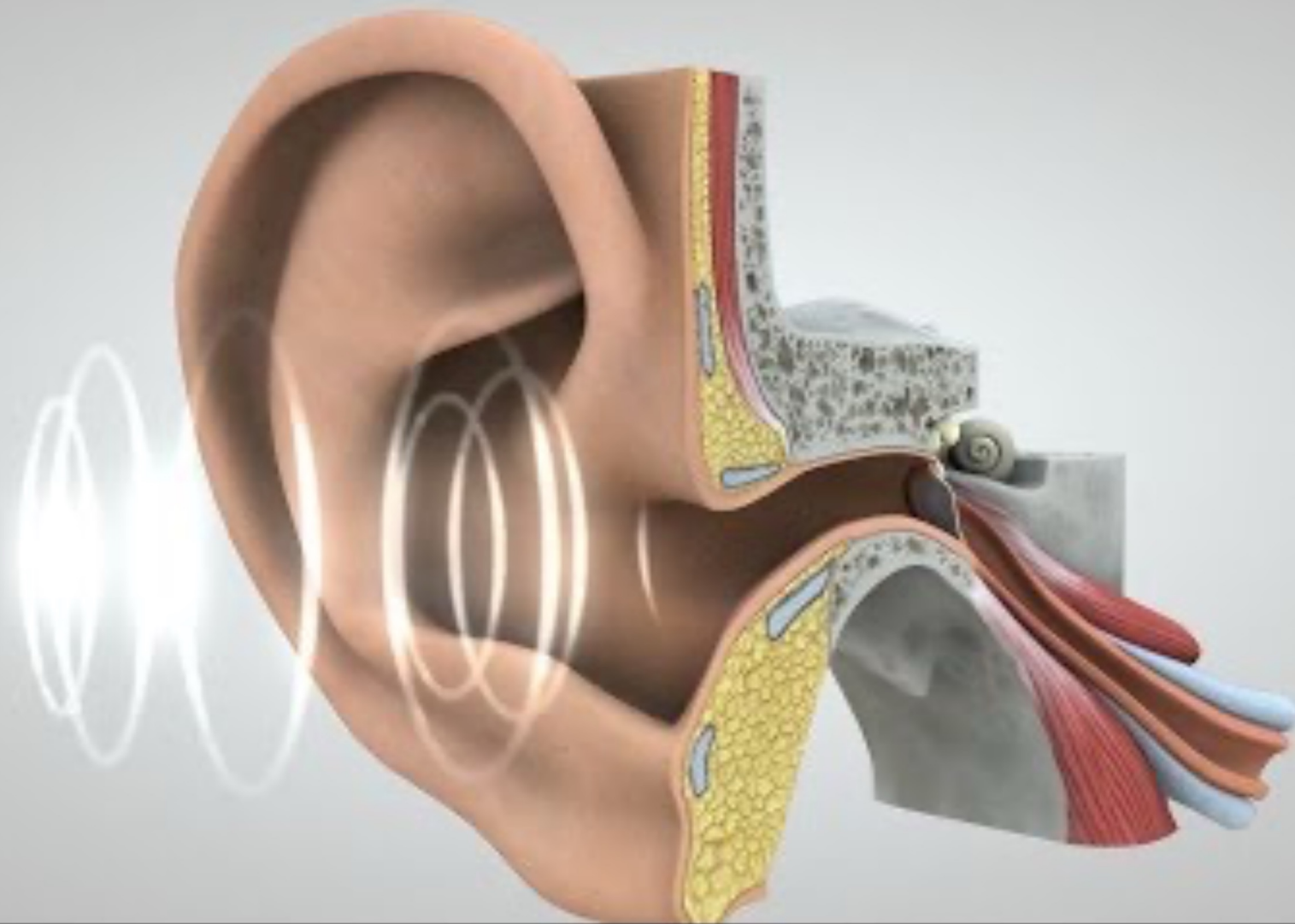


vestibule

Cochlea



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