

# ANATOMY OF THE EAR

Done by: **Faroq Alabdufattah**  
Revised by: **Dahna Alkahtani**

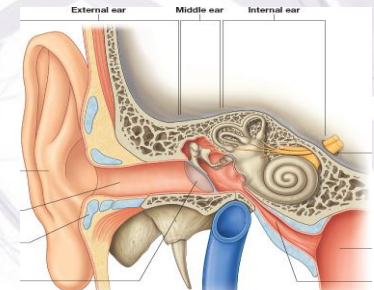
هذا العمل لا يعتبر مصدر رئيسي للمذاكرة وإنما للمرجعة فقط: تنويه

**Anatomy433@gmail.Com**

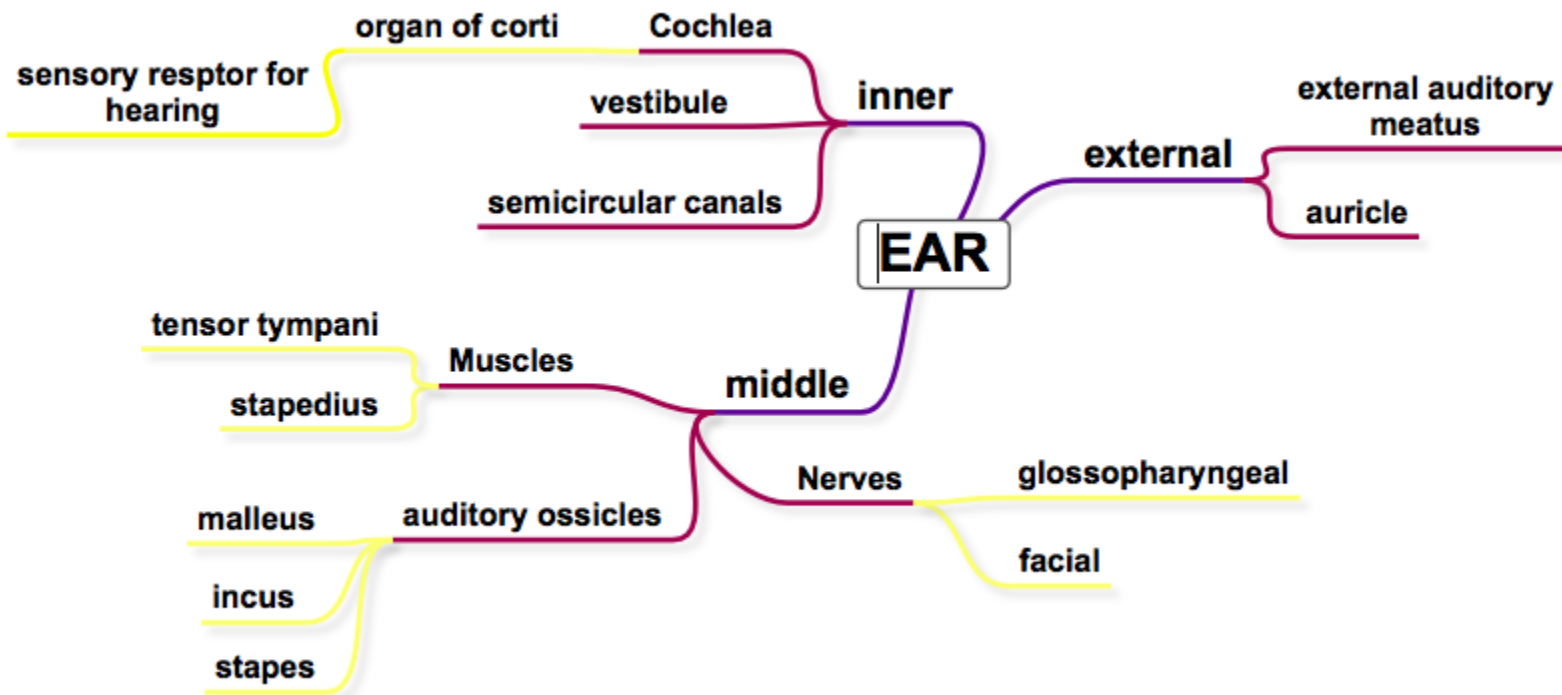


# Objectives

- List the parts of the ear: **External**, Middle (tympanic cavity) and **Internal (labyrinth)**.
- Describe the parts of the external ear: **auricle and external auditory meatus**.
- Identify the boundaries of the middle ear : **roof, floor and four walls (anterior, posterior, medial and lateral)**.
- Define the contents of the tympanic cavity:
  - I. Ear ossicles, : **(malleus, incus and stapes)**
  - II. Muscles, (tensor tympani and stapedius).
  - III. Nerves **(branches of facial and glossopharyngeal)**.
- List the parts of the inner ear, **bony part filled** with perilymph (Cochlea, vestibule and semicircular canals), in which is suspended the membranous part that filled with endolymph).
- List the organs of hearing and equilibrium.







Photos make Anatomy easier! Try to expose your self to as many as you can before and after reading the text.

# EXTERNAL EAR

Auricle

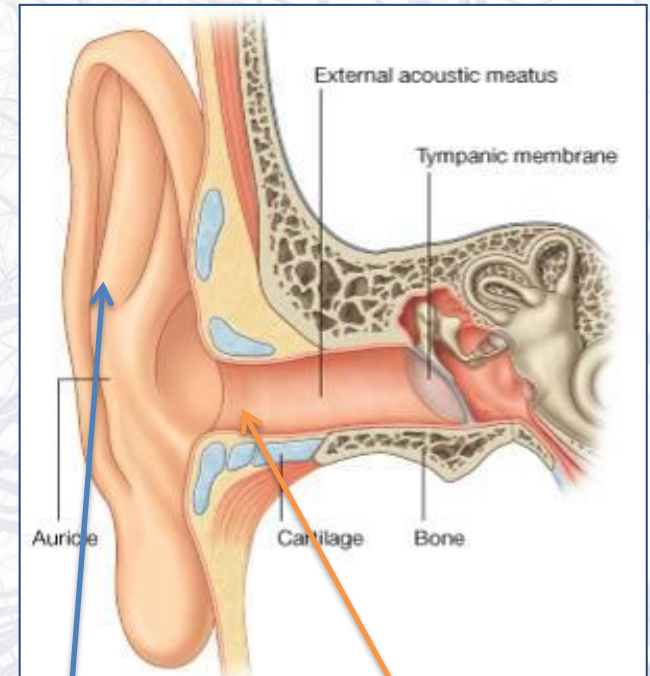
Elastic cartilage

External auditory meatus

Its outer 1/3 part is elastic cartilage

Inner 2/3 part is bone

Its **sensation** is carried by  
1- great auricular N  
2- auriculotemporal N  
3- auricular branch of vagus



Formed of auricle and external auditory meatus.



# MIDDLE EAR OR TYMPANIC CAVITY

Contains the auditory ossicles which transmit vibrations from eardrum to internal ear

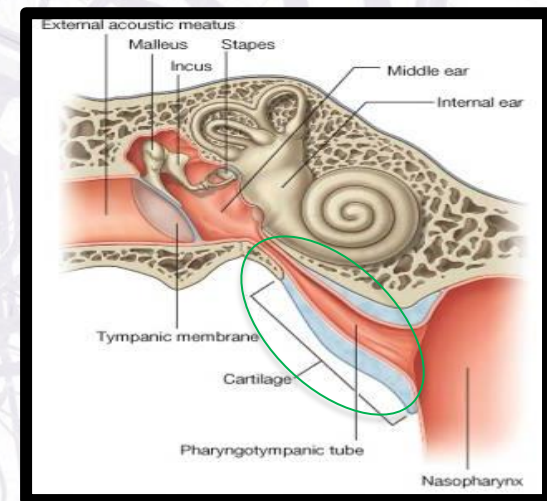
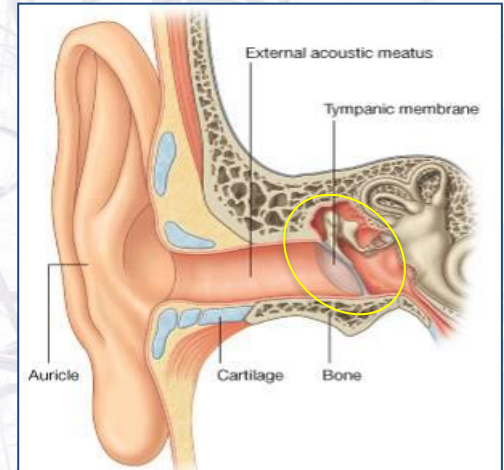


Continues anteriorly to the nasopharynx through the pharyngotympanic tube (auditory tube)



Auditory tube equalizes the pressure between the two sides of the eardrum

The auditory tube: **Posterior 1/3 is bony**  
**Anterior 2/3 cartilaginous**



## WALLS OF MIDDLE EAR

- ✓ **Roof:** by Tegmen tympani bone.
- ✓ **Floor:** by thin plate of bone separating the tympanic cavity and the internal jugular vein.
- ✓ **Anterior:** by thin plate of bone separating the tympanic cavity and the internal carotid artery.
- ✓ **Posterior:** by upper irregular opening (aditus to the mastoid antrum) and by small projection (pyramidal eminence or hollow pyramid) \*it is the origin for stapedius M.
- ✓ **Medial:** oval window, promontory and rounded window.
- ✓ **Lateral:** tympanic membrane

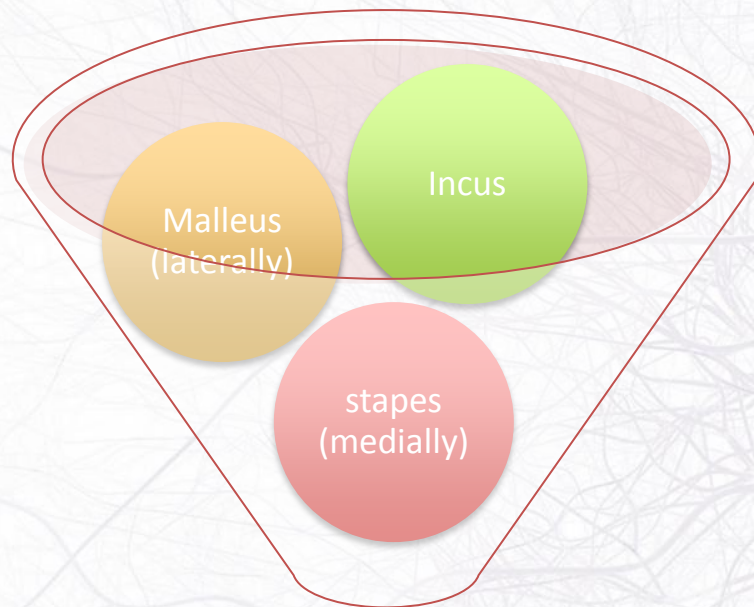
### **Nerve supply to tympanic membrane:**

**Inner surface:** tympanic branch of glossopharyngeal N.

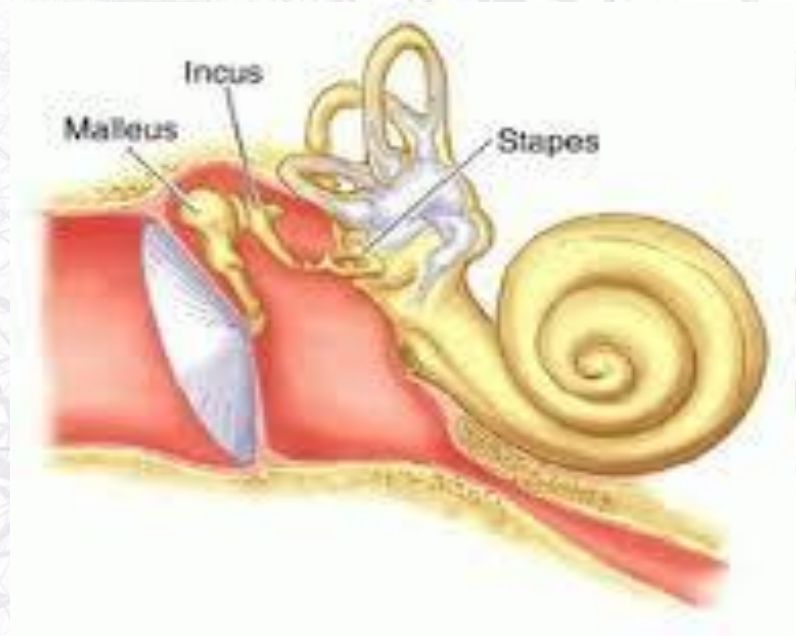
**Outer surface:** auriculotemporal N and auricular branch of vagus N.

*What are the sensory nerves innervating the external ear?*





## **Auditory Ossicles**



*\*Malleus form the UMBO  
What is UMBO ?*

# NERVES OF THE MIDDLE EAR

**Glossopharyngeal N** > give tympanic plexuses > give lesser petrosal > synapses with otic ganglion > to supply parotid gland

**Facial N** > enter through internal auditory meatus > forms geniculate ganglion > pass in the middle ear > leaves through stylomastoid foramen

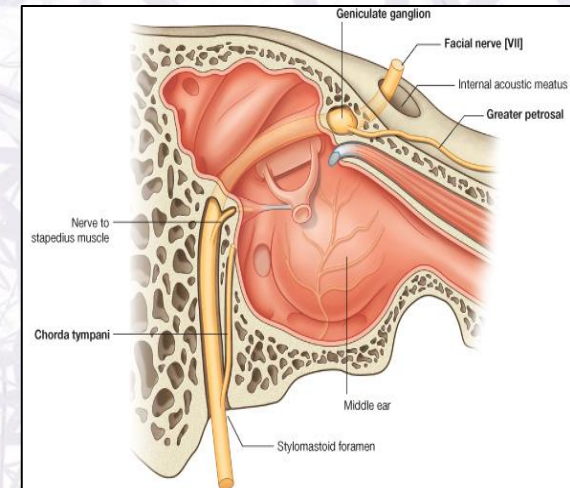
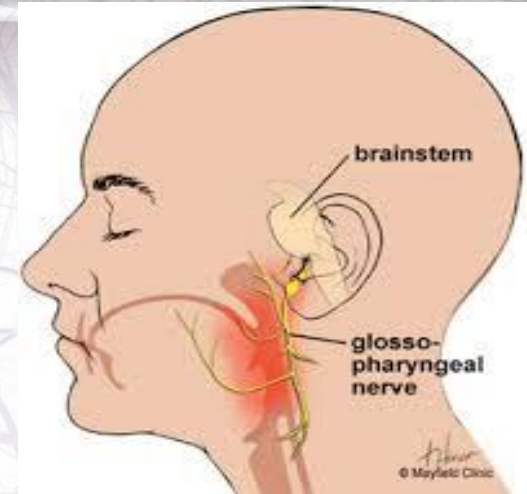
*Its branches are:*

1. Great petrosal
2. Branch to stapedius M.
3. Chorda tympani

**Note:**

**Lesser petrosal: for parotid gland**

**Great petrosal: for lacrimal, nasal and palatin glands**





# INTERNAL EAR OR LABYRINTH

It is a part of the temporal bone, it consists of:

## Bony labyrinth:

Lined by endostum and contains **preilymph** fluid.

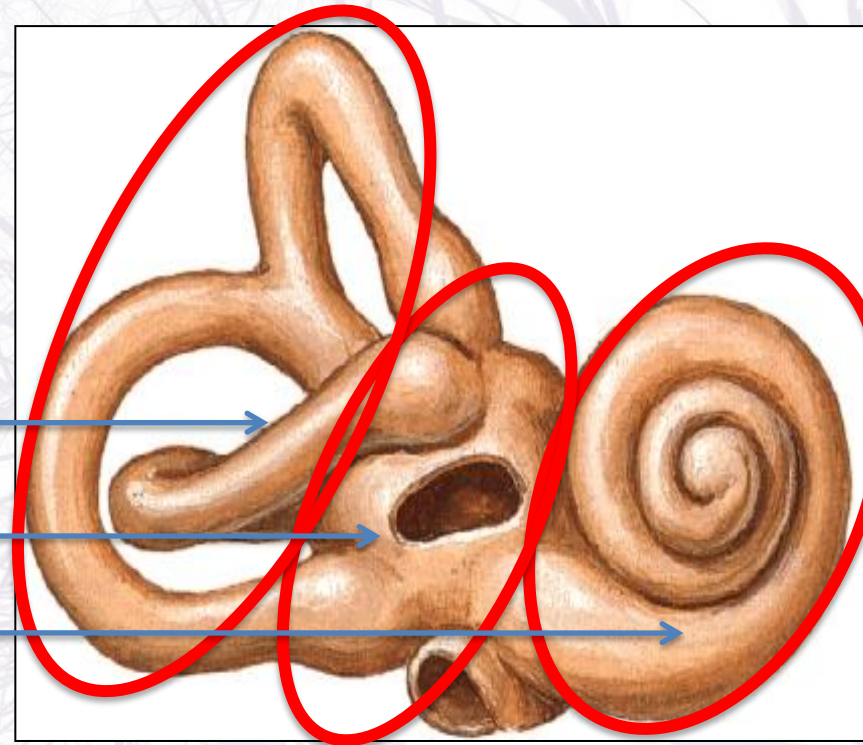
## Membranous labyrinth:

Sacs and ducts within the bony labyrinth and contains **endolymph**.

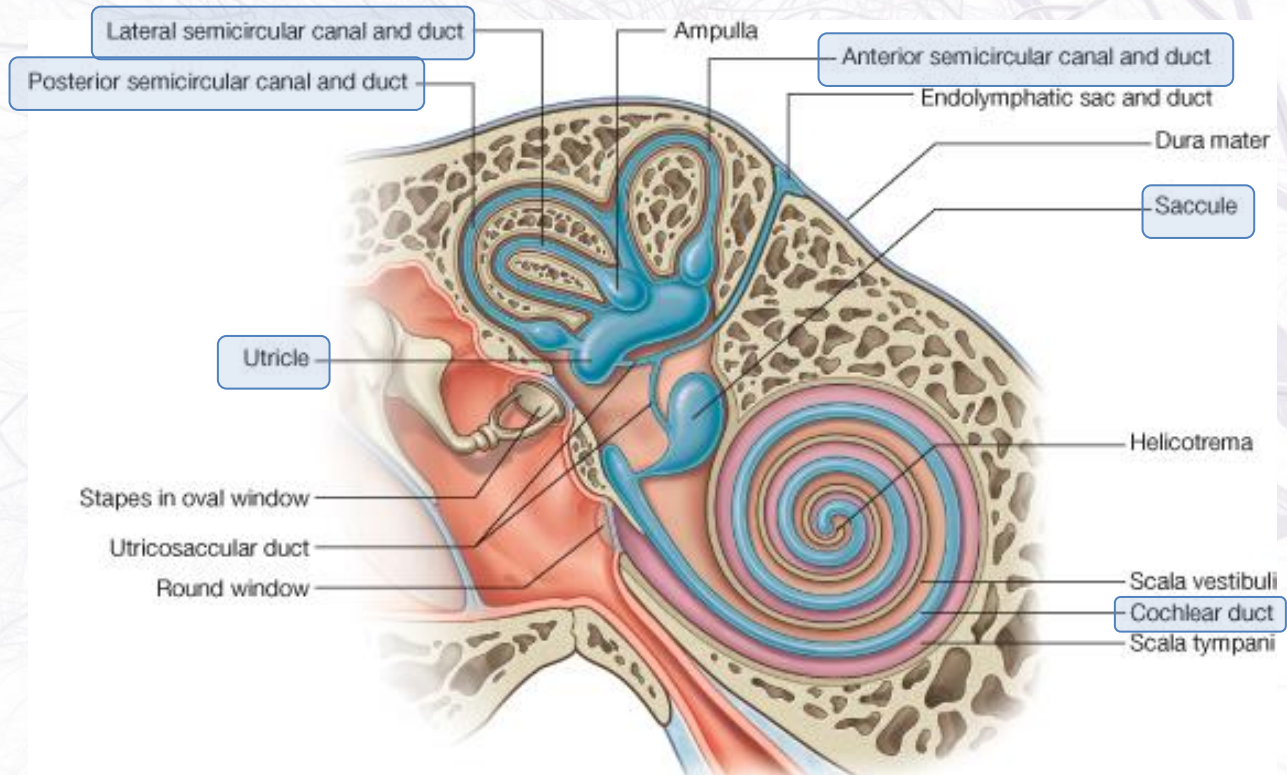
**Semicircular canals** →

**Vestibule** →

**Cochlea** →



## Important figure





## Notes :

- ✓ First turn of the cochlea produces (promontory) of the medial wall of middle ear.
- ✓ Lateral wall of vestibule contains (oval window) of the medial wall of middle ear .  
Which closed by the base of the stapes
- ✓ Secondary tympanic membrane closed the (round window ) of the medial wall of middle ear.
- ✓ Ampulla is that swelling of the ends of each canal.
- ✓ Orifices are 5 gates (openings) between canals and vestibule, one orifice is shared by 2 canals.

## MCQs

1) In the external ear sensation is carried by:

- A. Great auricular n.
- B. Auriculotemporal n.
- C. Auricular branch of vagus.
- D. All of the above.

2) Auditory tube extends from which of the following:

- A. anterior wall downward, forward, and medially to the nasopharynx.
- B. anterior wall downward, forward, and medially larynx.
- C. anterior wall downward, forward, and laterally to the nasopharynx.
- D. anterior wall upward, forward, and medially to the nasopharynx.

3) The roof of the middle ear is formed by:

- A. Auditory tube.
- B. Tegmen tympani.
- C. internal carotid artery.
- D. all of the above.

Ans:

- 1) D
- 2) A
- 3) B



4) Which of the following describes the umbo:

- A. A branch of facial nerve
- B. A small depression in the tympanic membrane produced by the tip of the handle of malleus.
- C. The tense part of the tympanic membrane.
- D. Muscle found in the tympanic cavity.

5) Greater petrosal nerve arises from:

- A. Stylomastoid foramen.
- B. Geniculate ganglion (parasympathetic ganglion of facial nerve)
- C. Tympanic plexus.
- D. Otic ganglion (parasympathetic ganglion of glossopharyngeal nerve).

6) The utricle, saccule and semicircular canals are concerned with:

- A. Pain sensation.
- B. Hearing.
- C. Equilibrium.
- D. Temperature.

Ans:

4) B

5) B

6) C

7) In Semicircular Canals Each canal has a swelling at one end called the :

- A. Utricle.
- B. Ampulla .
- C. Cochlea .
- D. Vestibule.

8) Infection can be transmitted from pharynx to inner ear through

- A. auditory tube
- B. tympanic membrane
- C. oral cavity
- D. Cranial cavity

9) The nerve supply of Stapedius (the smallest voluntary muscle) is:

- A. Auricular branch of vagus
- B. Mandibular nerve.
- C. Facial nerve .
- D. Auriculotemporal nerve

Ans:

- 7) B
- 8) A
- 9) C

**Good luck**