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Human Ear: Cochlea (Auditory Organ) , the Reissner's Membrane

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Cochlea (Auditory Organ)

The coiled portion of the membranous labyrinth which looks like a snail.

This is made up of three canals:

- Upper vestibular canal or scala vestibule.
- Middle cochlear duct or scala media.
- The lower tympanic canal or scala tympani.

The Reissner's Membrane

- It separates scala media and scala vestibule.
- Also known as the vestibular membrane or the vestibular wall.
- It creates a compartment in the cochlea filled with endolymph together with the basilar membrane.

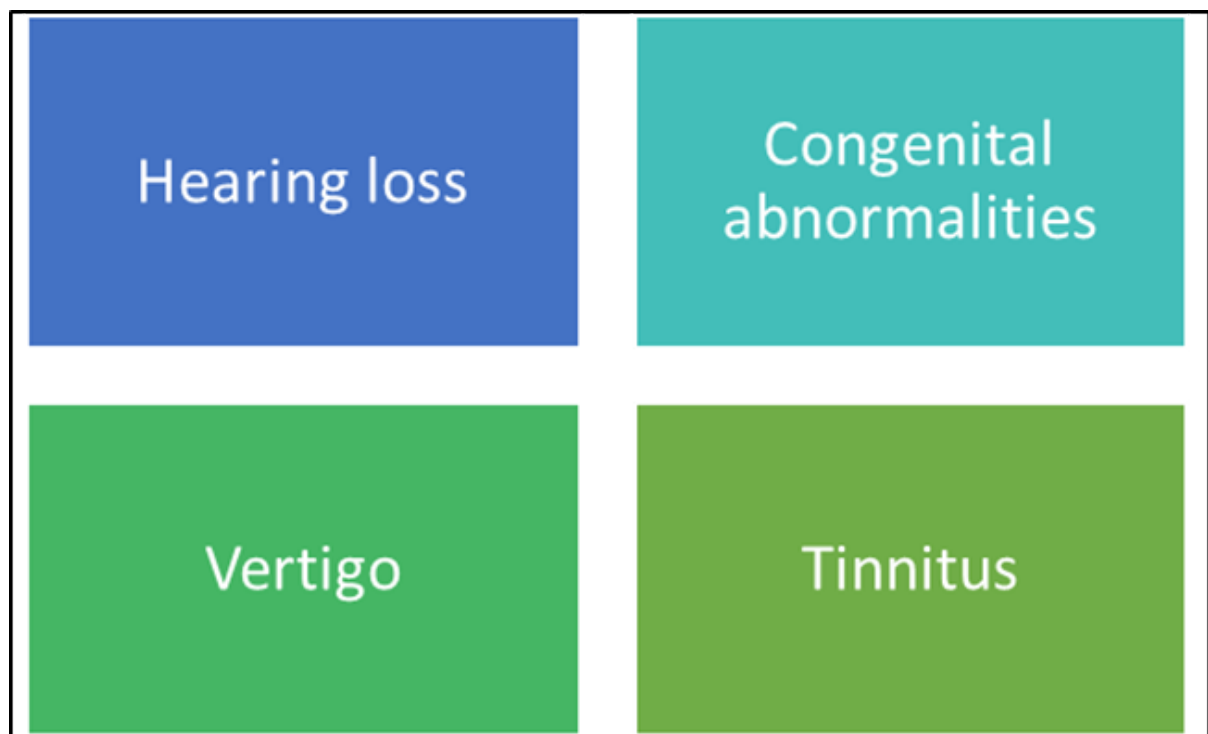
Stereocilia

- It projects from the hair cells and extend till the cochlear duct.
- The tectorial membrane is the other membrane present above hair cells.
- The pressure waves are detected using the hair cells present in the cochlea.

Vestibular Apparatus (Equilibrium Organ)

- It is present above the cochlea and it helps in maintaining the equilibrium.
- It is present in the membranous labyrinth.
- Saccule and utricle are the two sacs like chambers along with three circular canals.
 - Saccule and utricle have macula, a projecting ridge.
- Otoliths are calcium ear stones.
- Crista ampullaris contain hair cells present in each of the ampulla responsible for sensing angular rotation.

Clinical Significance



Vertigo

- It refers to the inappropriate perception of motion due to dysfunction of the vestibular system.
- Benign paroxysmal positional vertigo is one common type of vertigo.
 - An otolith is displaced from the ventricles to the semicircular canal.
- Result in the perception of vertigo:
 - Ménière's disease
 - labyrinthitis
 - Strokes
 - Other infective and congenital diseases

Tinnitus

- When there is no external sound, tinnitus is the hearing sound.
- It may also sound like a clicking, hiss or roaring though often described as the ringing.
- Unclear voices or music are heard rarely.
- The sound may be soft or loud, low pitched or high pitched.
- The sound causes depression, anxiety, or concentration difficulties in some people.
- It is not a disease but a symptom that can be caused by noise-induced hearing loss.
 - Some other causes are ear infections, disease of the heart or blood vessels, Ménière's disease, brain tumors, emotional stress, etc.

FAQs

Q 1. Is Tinnitus a disease or just a symptom?

Answer: Tinnitus is not a disease and just a symptom may be caused due to a few reasons such as ear infections, disease of the heart or blood vessels, Ménière's disease, brain tumors, emotional stress, etc.

Q 2. What is The Reissner's membrane?

Answer:

- The Reissner's membrane separates scala media and scala vestibule.
- Also known as the vestibular membrane or the vestibular wall.
- It creates a compartment in the cochlea filled with endolymph together with the basilar membrane.

Q 3. What are the three main classification of Physiology of ear?

Answer:

- The three main classification of Physiology of ear are:
- The organ of Corti (Cochlea)
 - Performs the hearing function.
- Maculae (Saccule and Utricle)
 - This is responsible for static equilibrium.
- Cristae (semicircular canals)
 - This is responsible for dynamic equilibrium.

Q 4. What is Cochlea (Auditory Organ?)

Answer:

- The coiled portion of the membranous labyrinth which looks like a snail.
- This is made up of three canals:

- Upper vestibular canal or scala vestibule.
- Middle cochlear duct or scala media.
- The lower tympanic canal or scala tympani.