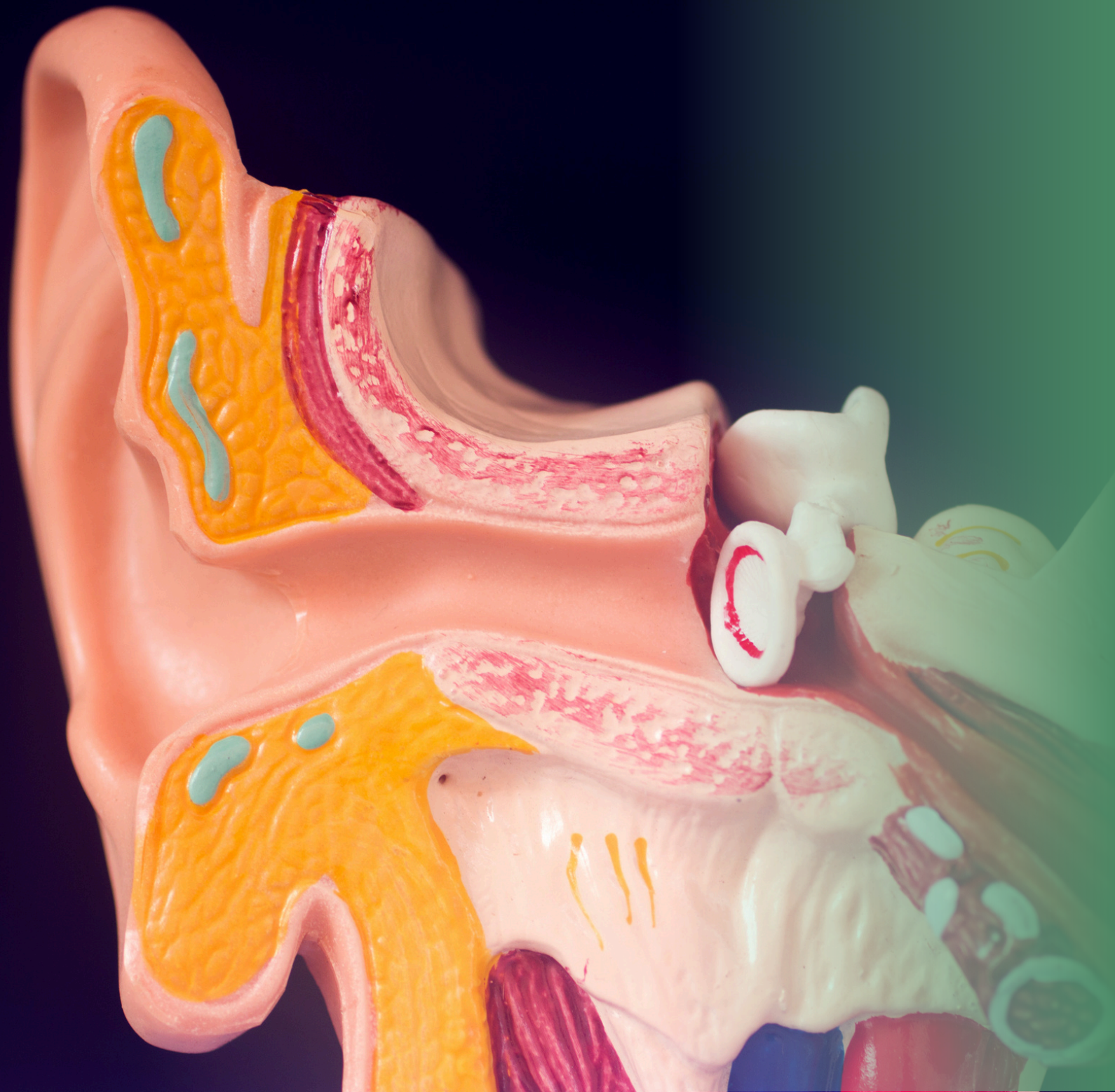
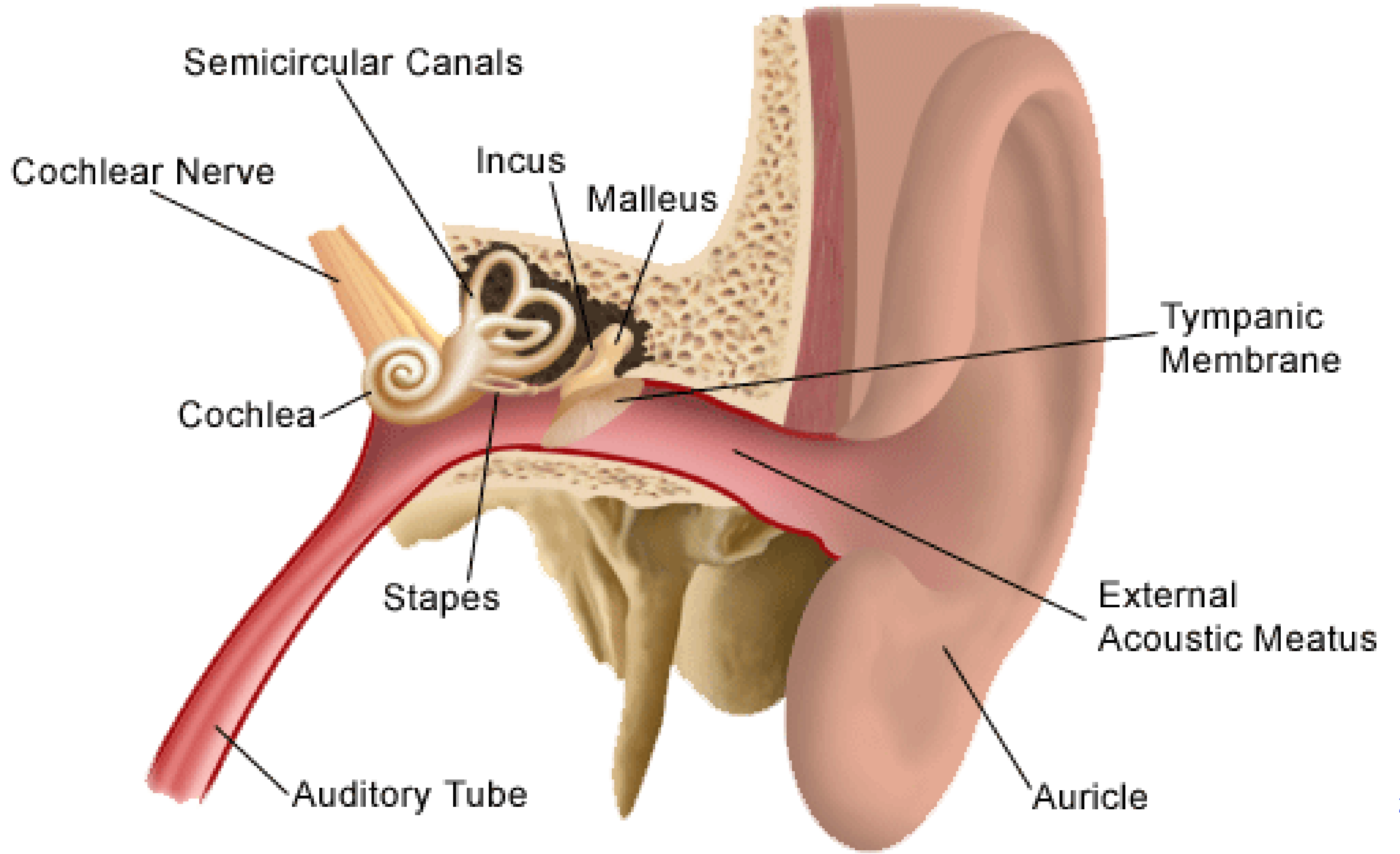


STRUCTURE AND FUNCTION OF EAR

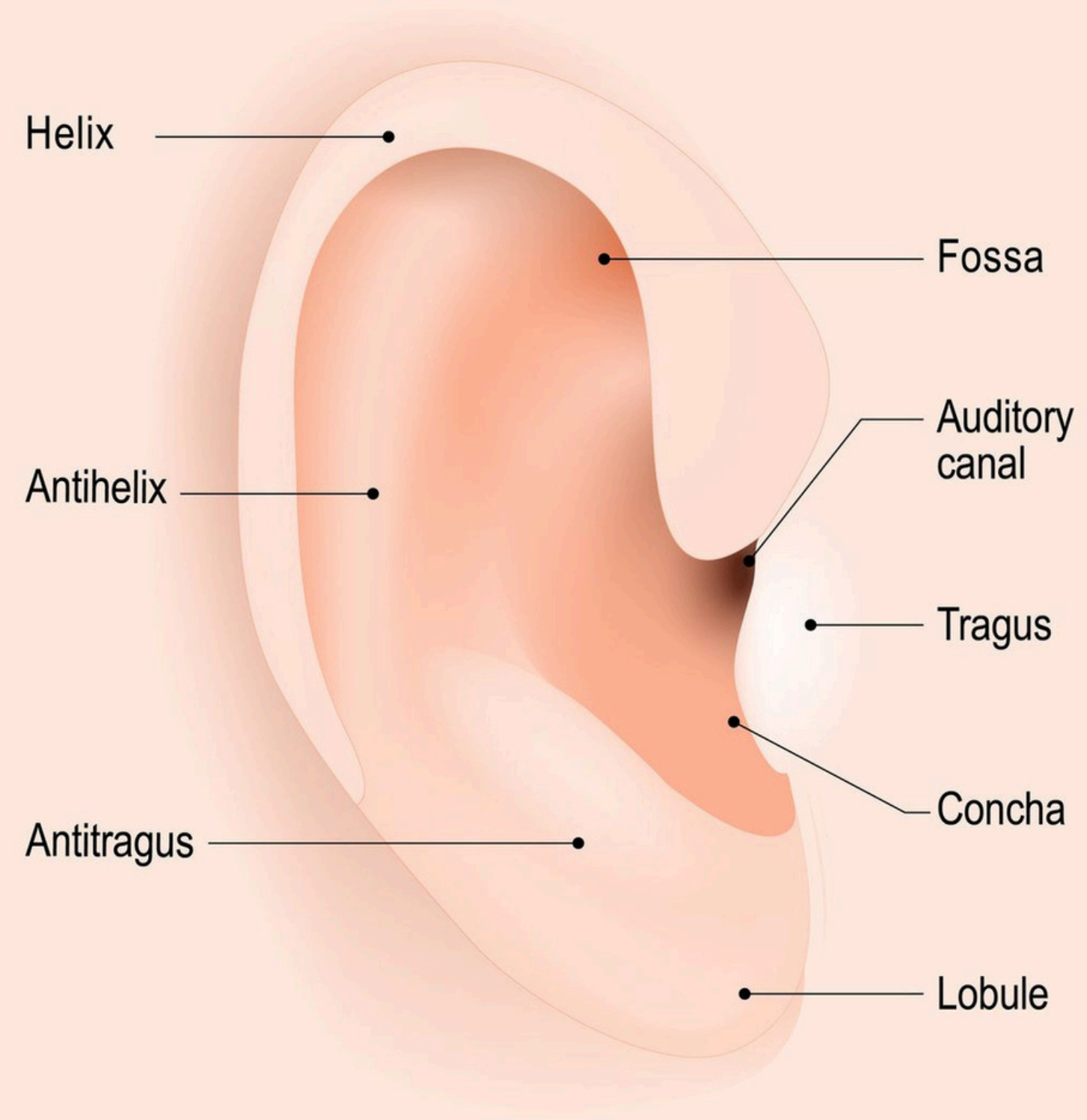




OVERVIEW OF EAR ANATOMY

- 1. Outer Ear: Collects sound waves.**
- 2. Middle Ear: Transfers sound vibrations.**
- 3. Inner Ear: Converts sound to nerve impulses and maintains balance**

AURICLE

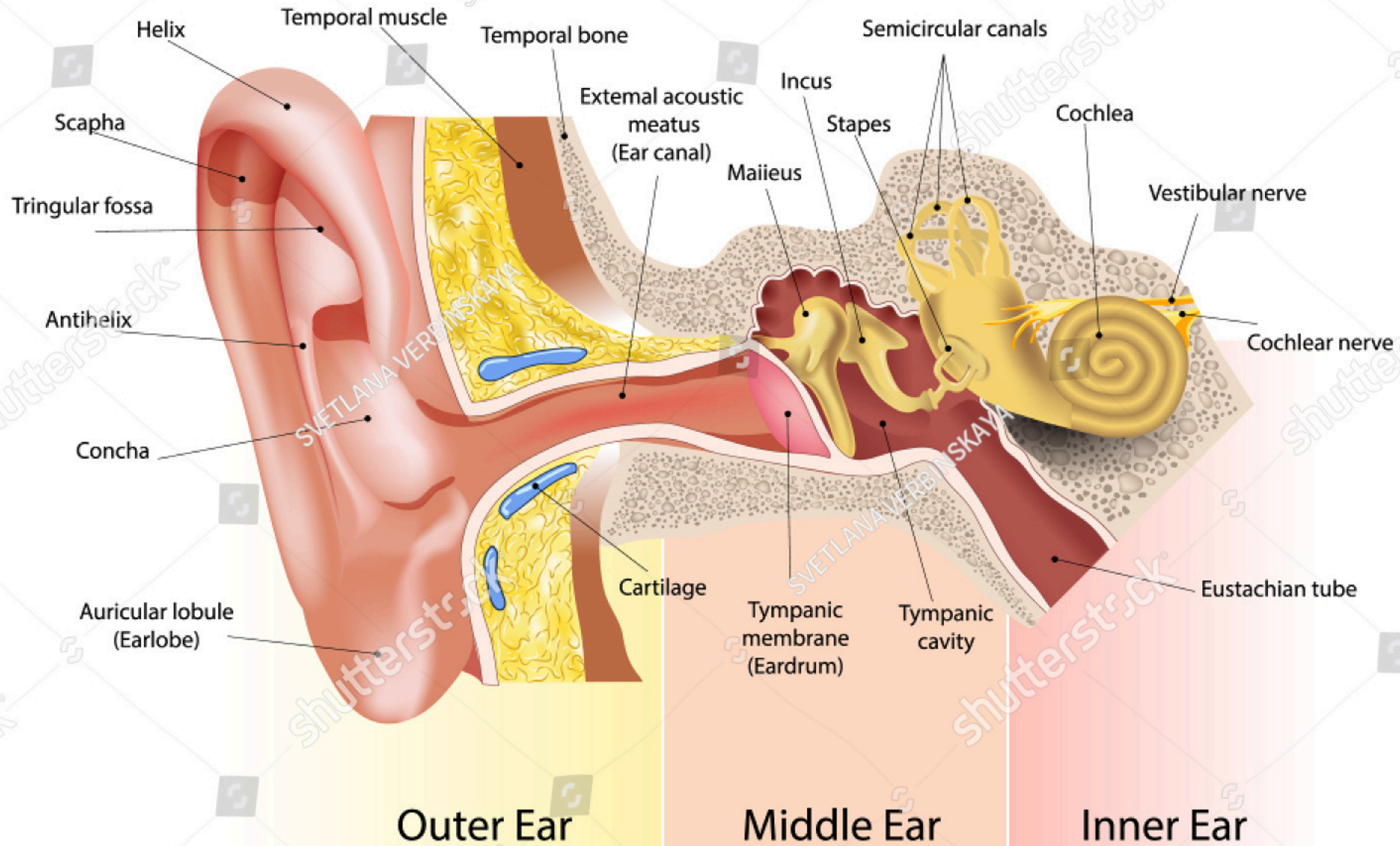


THE OUTER EAR

Structures:

1. **Pinna (Auricle):** The visible part, collects sound.
2. **External Auditory Canal:** Directs sound to the eardrum.
3. **Tympanic Membrane (Eardrum):** Vibrates in response to sound waves.
4. **Function:** Collects and funnels sound into the ear canal.

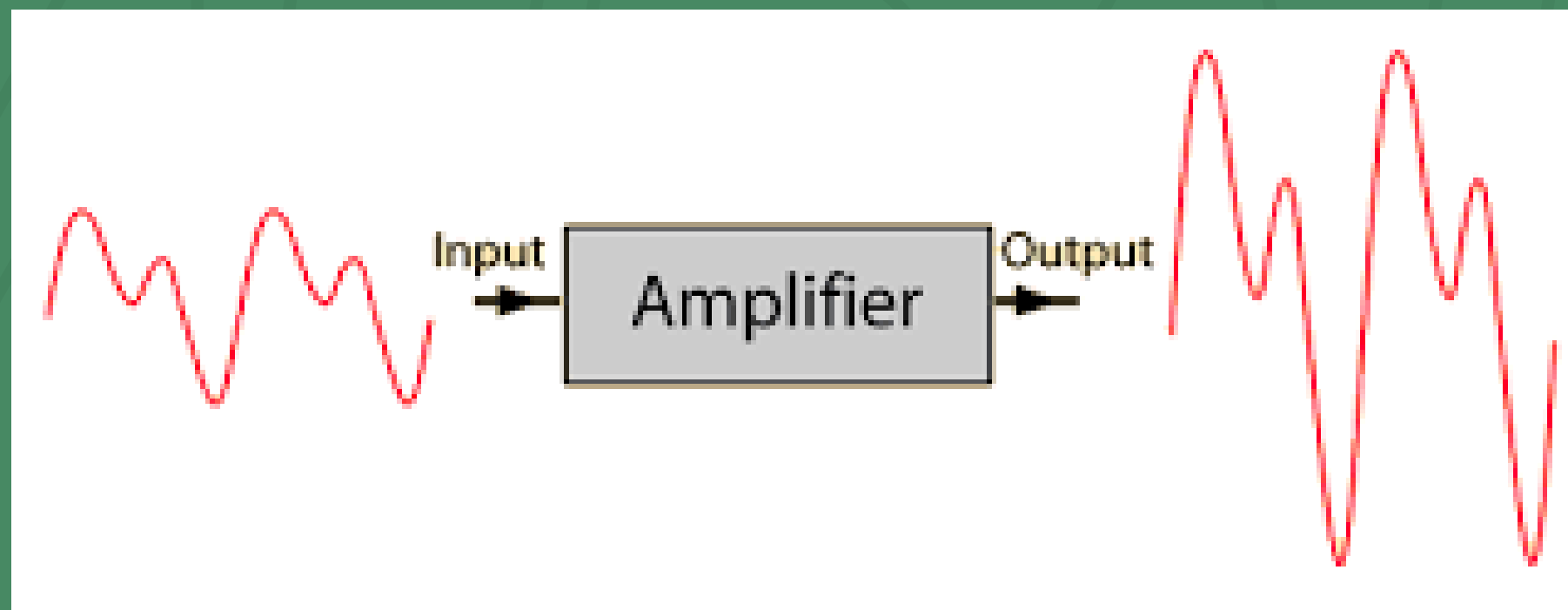
Anatomy of the Ear

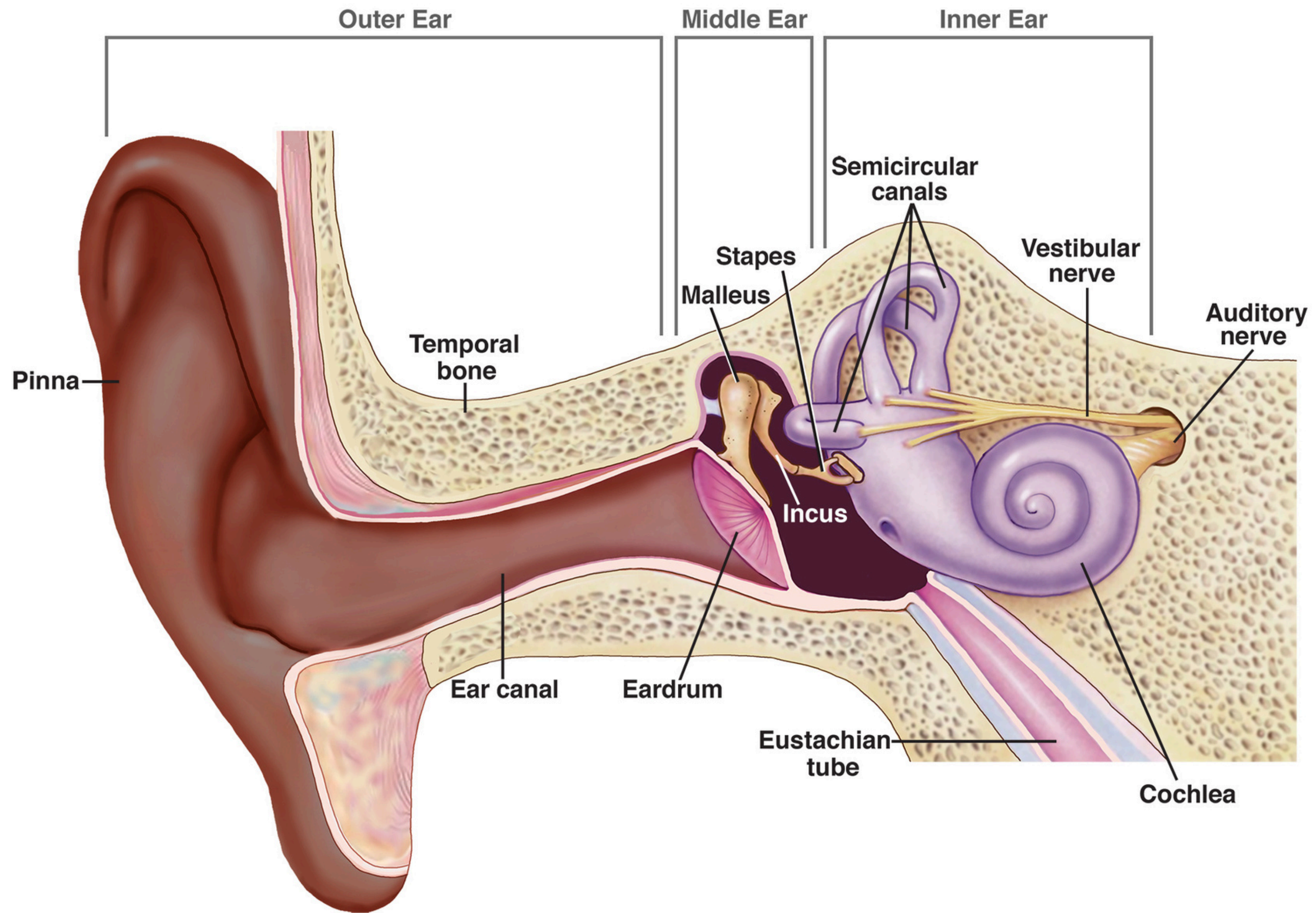


THE MIDDLE EAR

Structures:

1. **Ossicles:** Small bones (Malleus, Incus, Stapes) that amplify sound.
2. **Eustachian Tube:** Balances air pressure.
3. **Function:** Transmits vibrations from the eardrum to the inner ear.





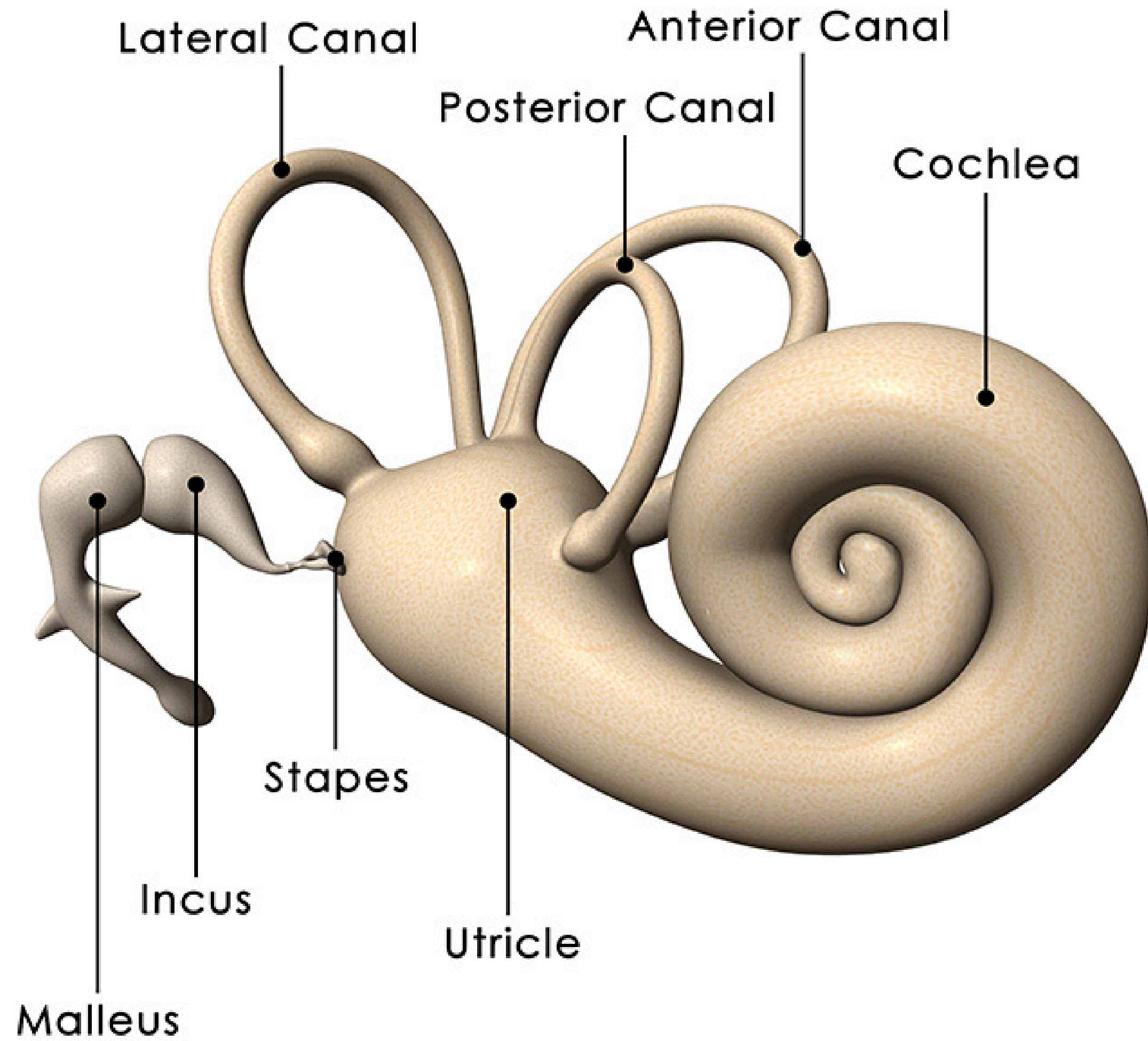
THE INNER EAR

Structures:

- a. **Cochlea:** Spiral-shaped; translates sound into neural signals.
- b. **Vestibule:** Important for balance.
- c. **Semicircular Canals:** Detect head movements.

Function:

Converts mechanical vibrations into electrical impulses; also responsible for equilibrium.



COCHLEA AND HEARING MECHANISM

- **Cochlea Function:**

- Contains hair cells that respond to different frequencies.
- Transmits signals to the auditory nerve, leading to sound perception.

- **Auditory Pathway:**

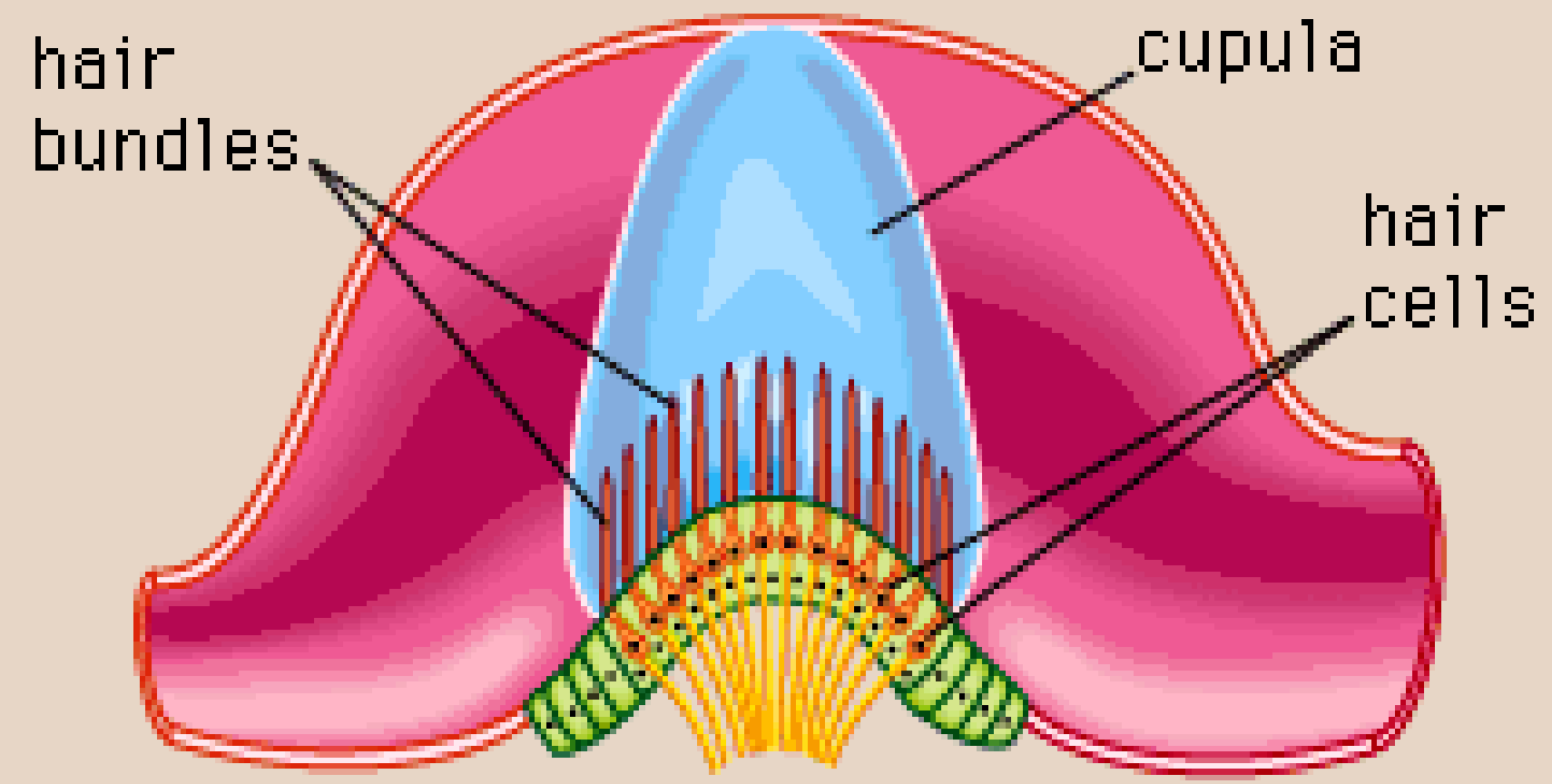
Cochlea → Auditory Nerve → Brain.

VESTIBULAR SYSTEM AND BALANCE

Vestibule and Semicircular Canals:

- **Vestibule: Senses linear movements.**
- **Semicircular Canals: Detect rotational movements.**
- **Balance Mechanism:**
- **Works with visual and proprioceptive systems to maintain balance.**

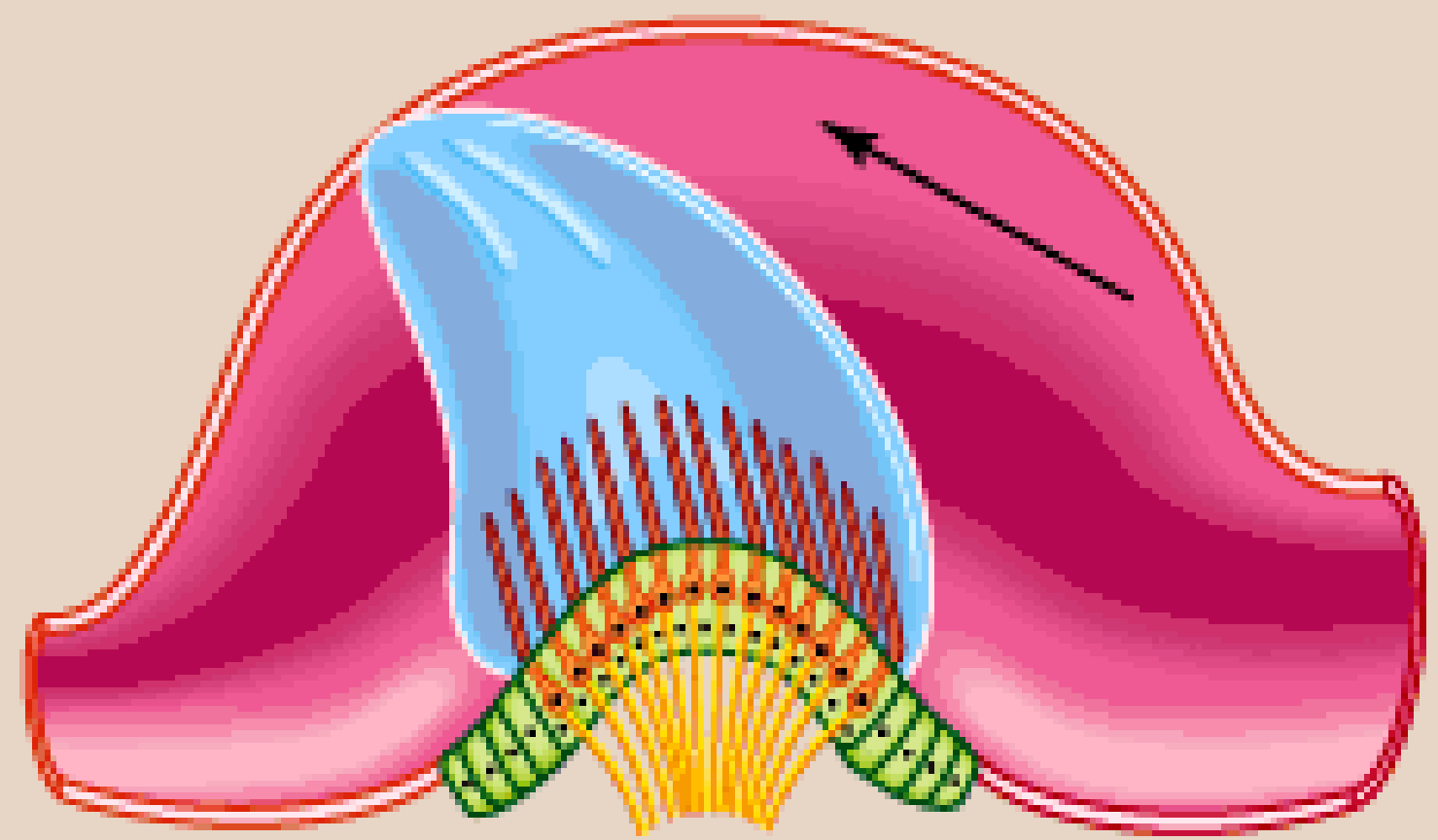
A



stationary section
of the crista
of the horizontal canal



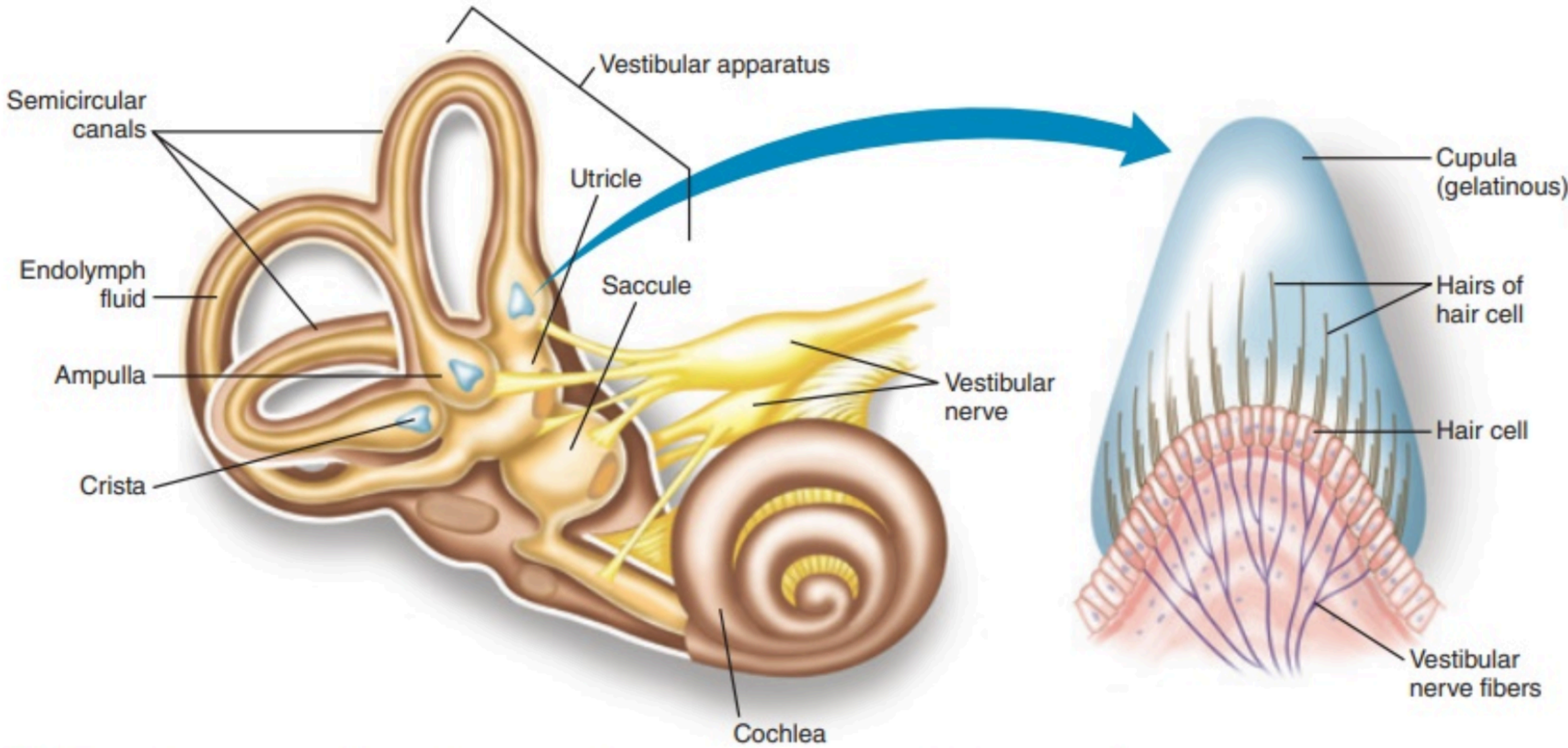
stationary



rotating section
of the crista
of the horizontal canal



rotating



THE HEARING PROCESS (STEP-BY-STEP)

- 1. Sound Collection:** Pinna directs sound into the auditory canal.
- 2. Vibration Transmission:** Sound waves vibrate the tympanic membrane.
- 3. Amplification:** Ossicles amplify vibrations to the inner ear.
- 4. Signal Conversion:** Cochlea hair cells convert vibrations to neural signals.
- 5. Signal Processing:** Auditory nerve transmits signals to the brain for interpretation.

Events Involved in Hearing

1
Sound waves arrive at the tympanic membrane.

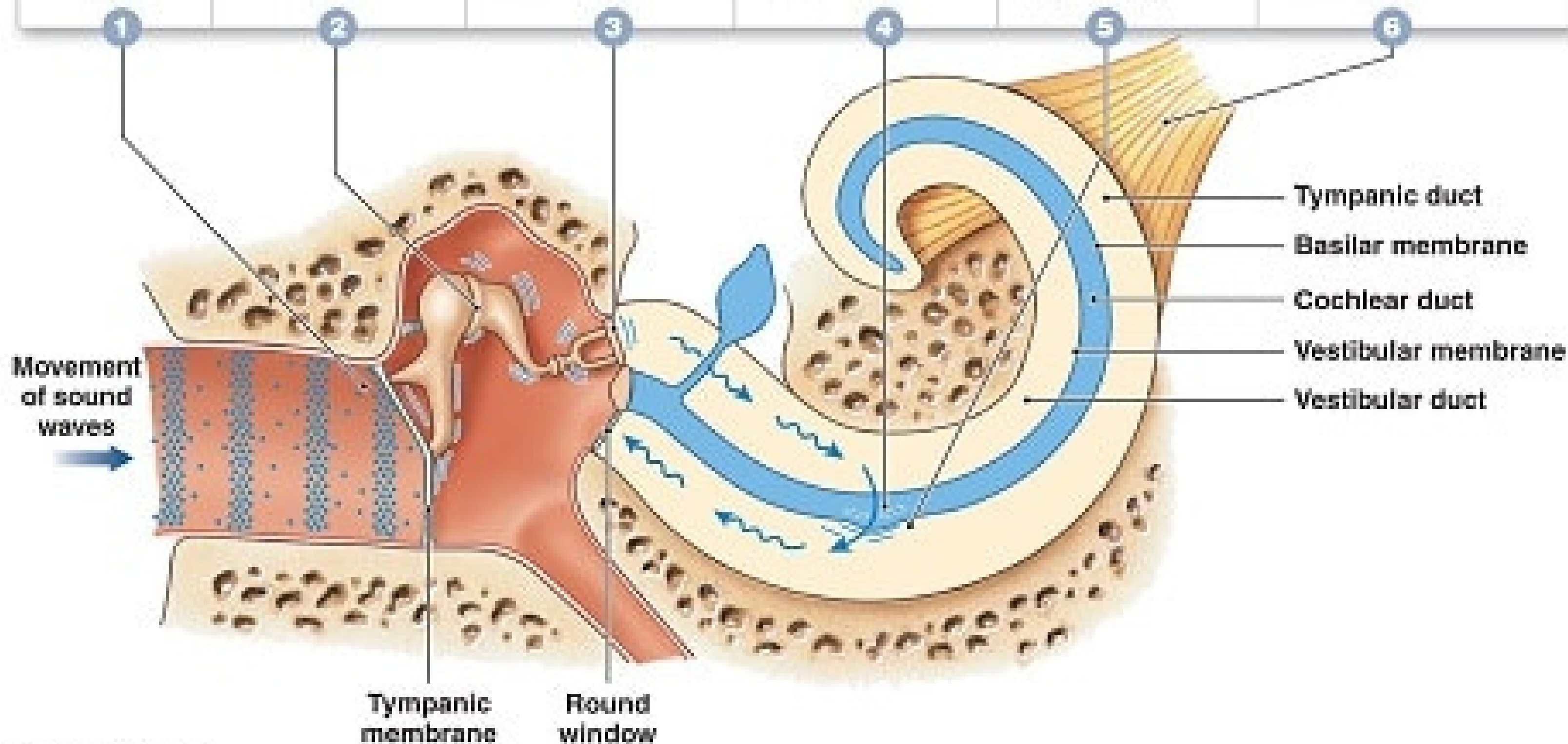
2
Movement of the tympanic membrane causes displacement of the auditory ossicles.

3
Movement of the stapes at the oval window establishes pressure waves in the perilymph of the vestibular duct.

4
The pressure waves distort the basilar membrane on their way to the round window of the tympanic duct.

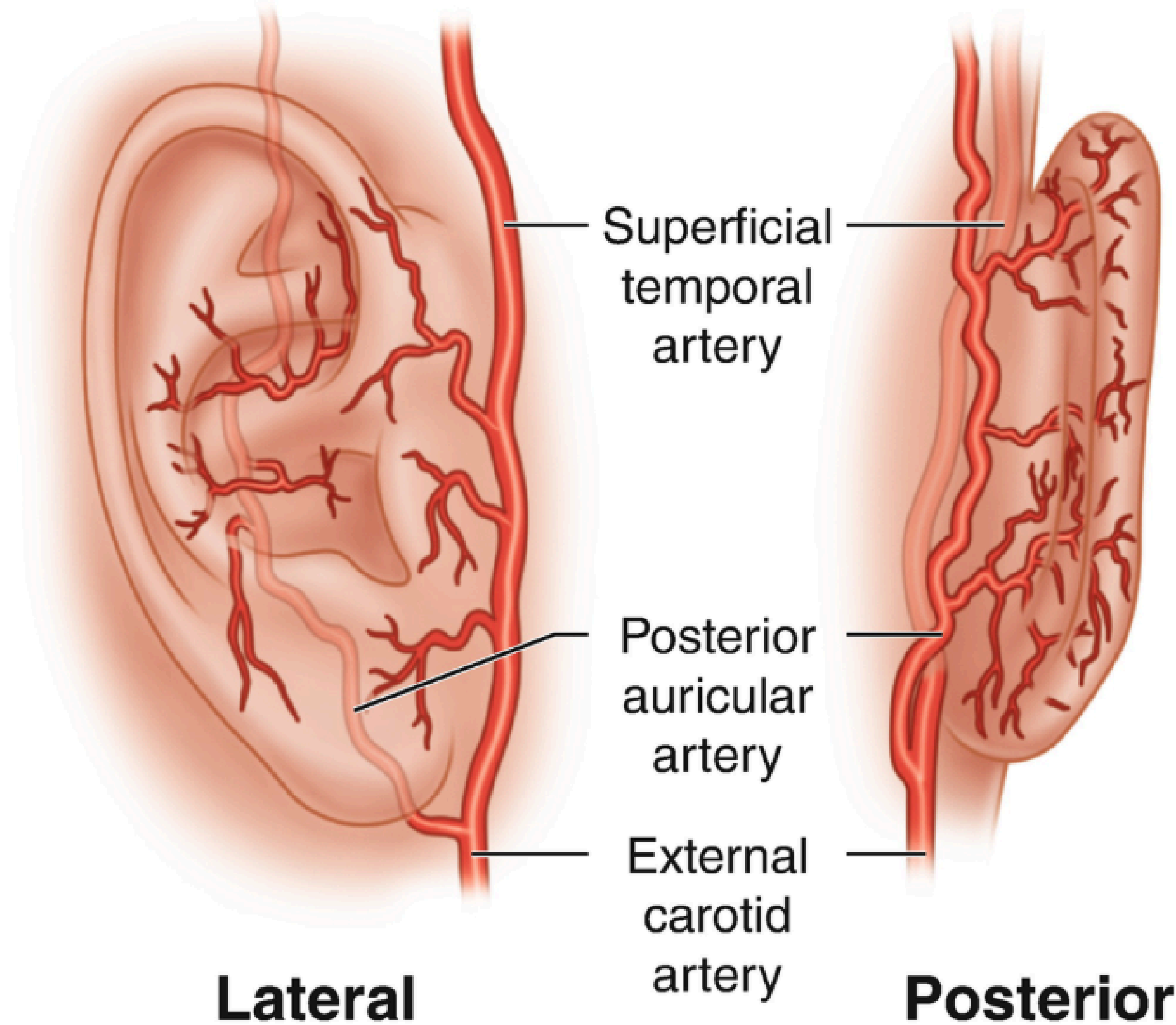
5
Vibration of the basilar membrane causes vibration of hair cells against the tectorial membrane.

6
Information about the region and the intensity of stimulation is relayed to the CNS over the cochlear branch of cranial nerve VIII.



COMMON DISORDERS OF THE EAR

- **Hearing Loss:**
 - **Conductive (outer/middle ear)**
 - **Sensorineural (inner ear/auditory nerve)**
- **Ear Infections: Otitis media, otitis externa.**
- **Balance Disorders: Vertigo, Meniere's disease.**



EAR'S MUSCLES, BLOOD SUPPLY, AND NERVE SUPPLY

- **Muscles:** Tensor tympani and stapedius (middle ear), auricular muscles (outer ear).
- **Blood Supply:** Branches from the external carotid artery for the outer and middle ear; labyrinthine artery for the inner ear.
- **Nerve Supply:** Facial nerve (CN VII), vestibulocochlear nerve (CN VIII), glossopharyngeal nerve (CN IX), along with auricular nerves for the outer ear.

