Auditory

The Anatomy of Hearing

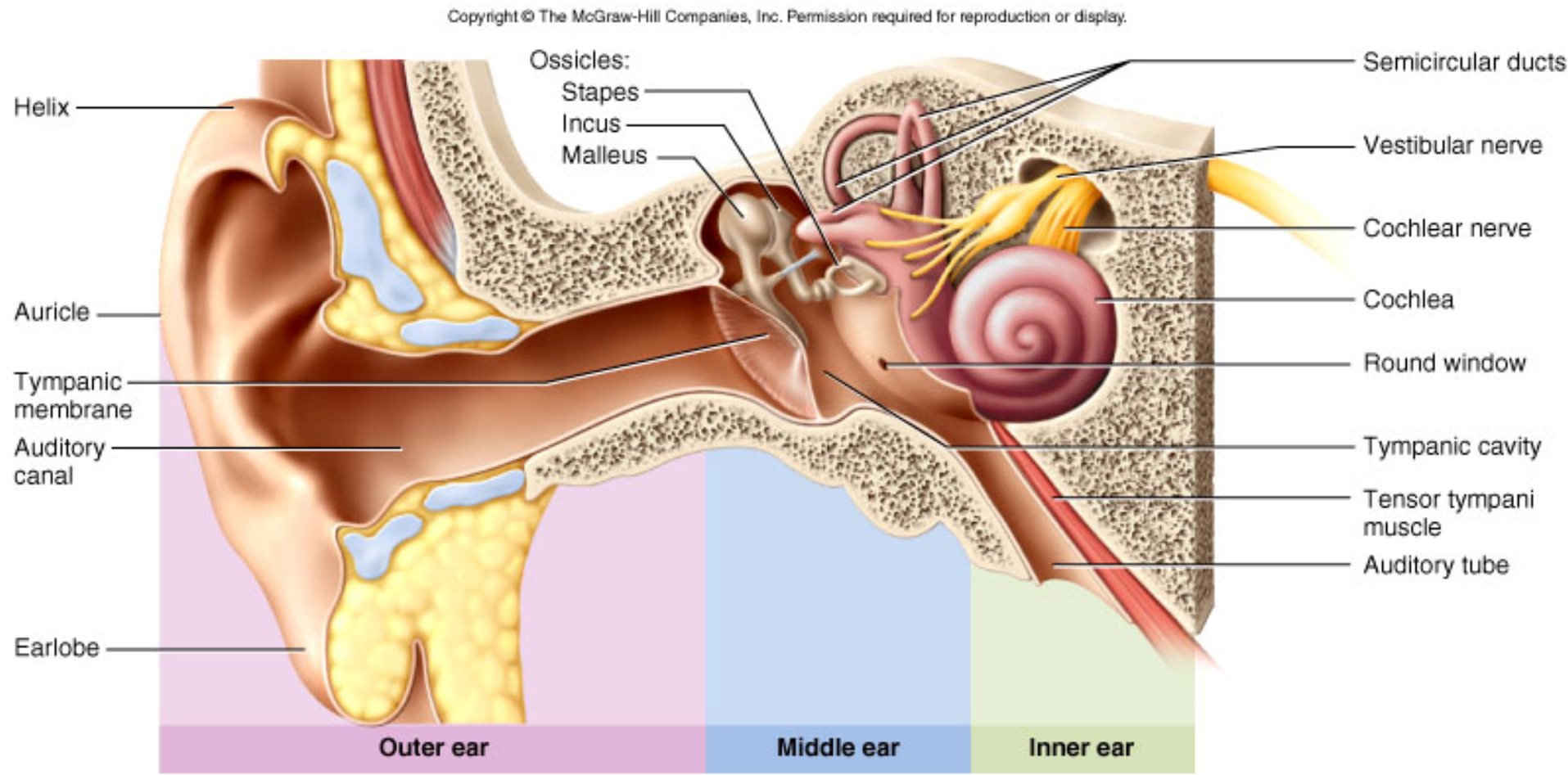
Outer Ear = Auricle or Pinna

Know This

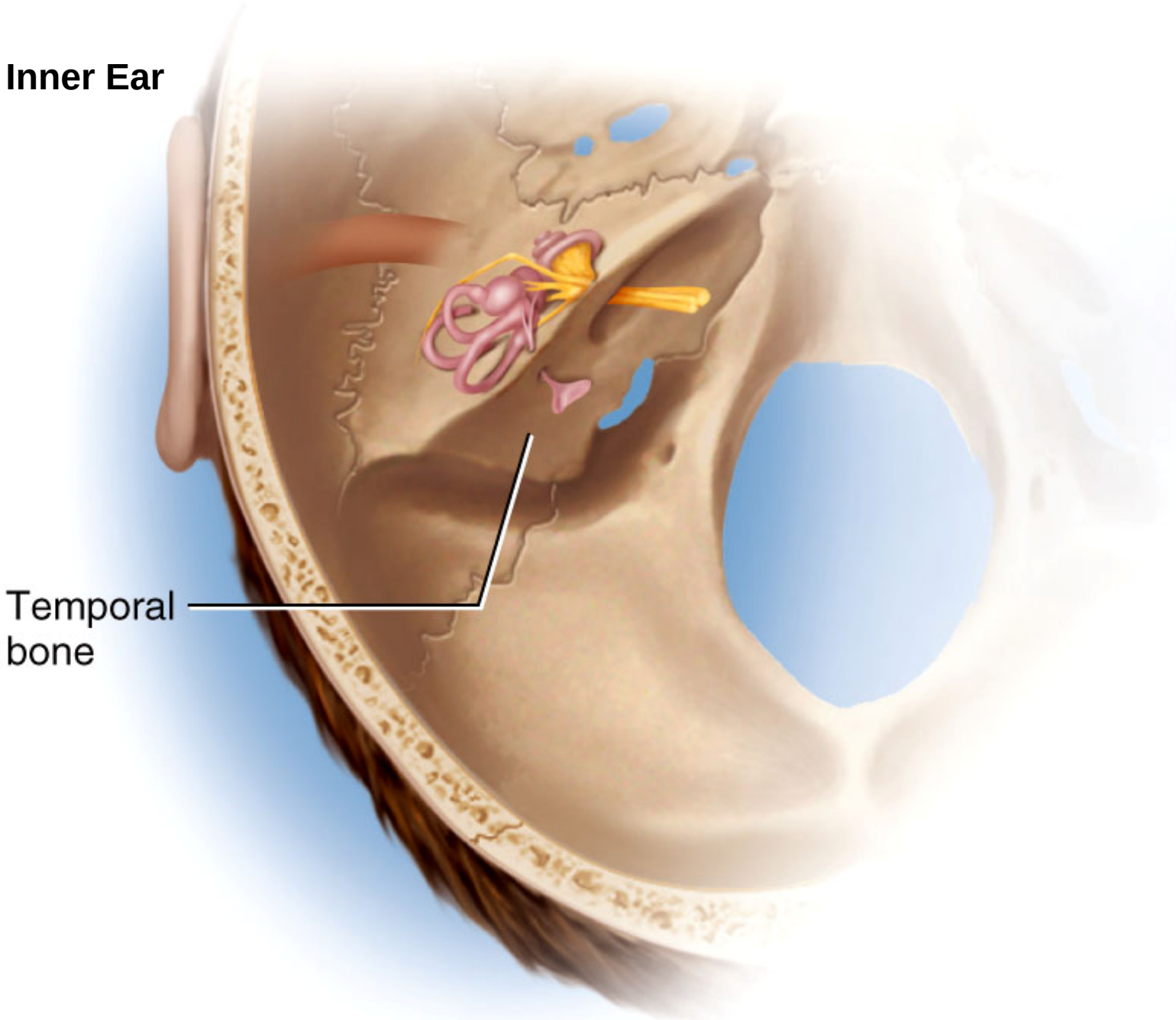
Not required to know these structures

The Nature of Sound

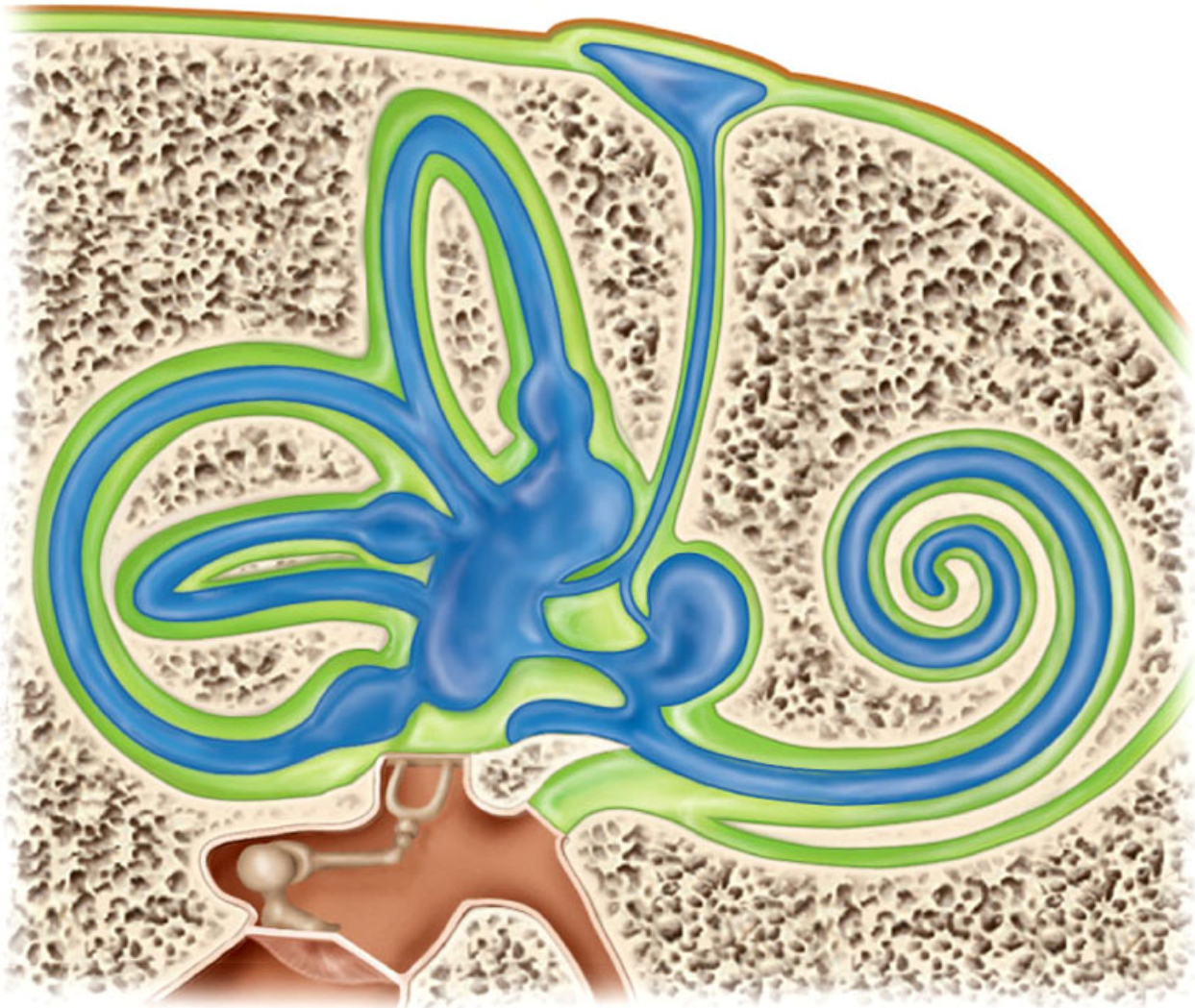
- **Sound - audible vibration of molecules / vibrating object pushes air molecules**



Anatomy of Inner Ear

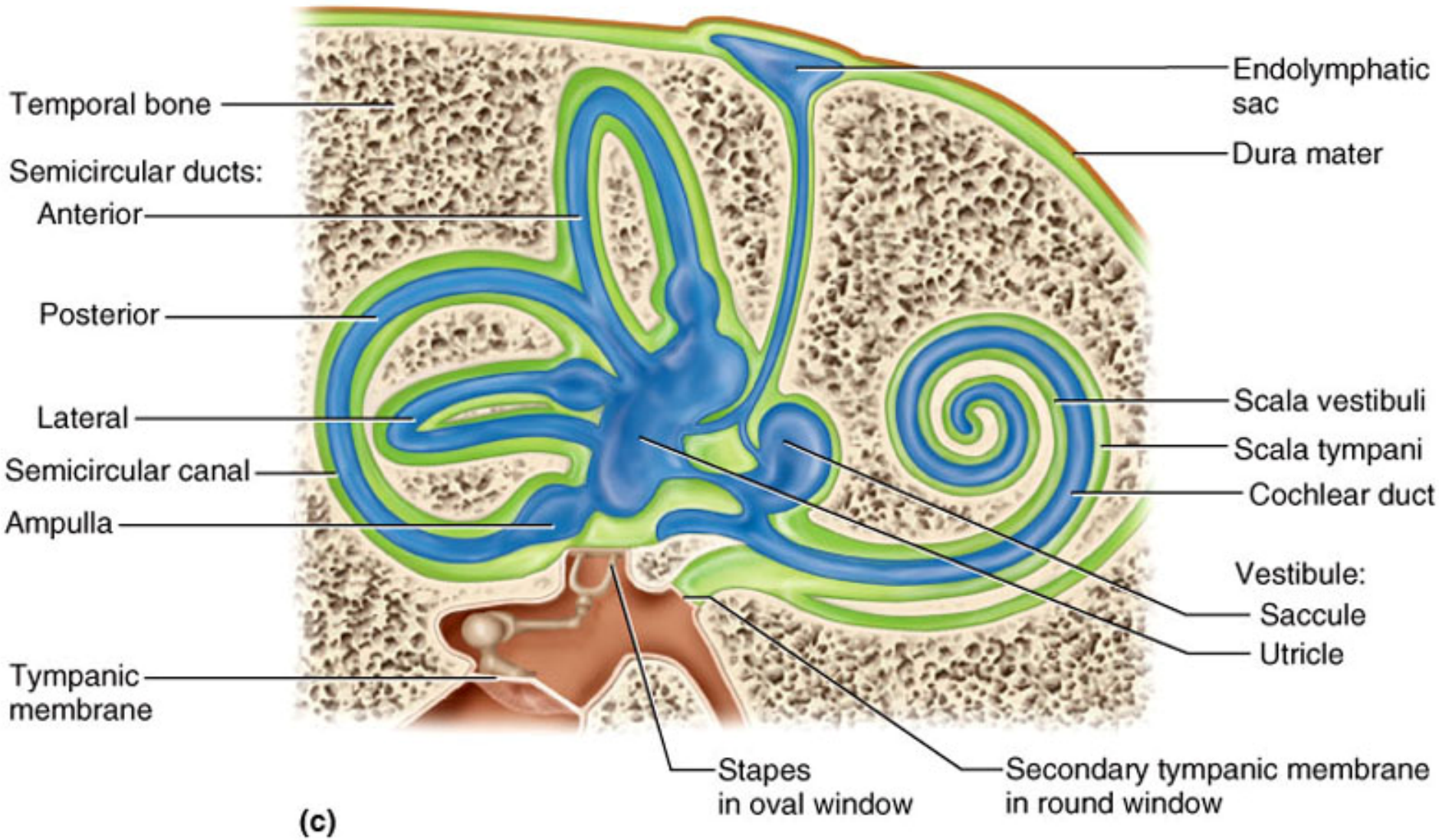


Inner Ear

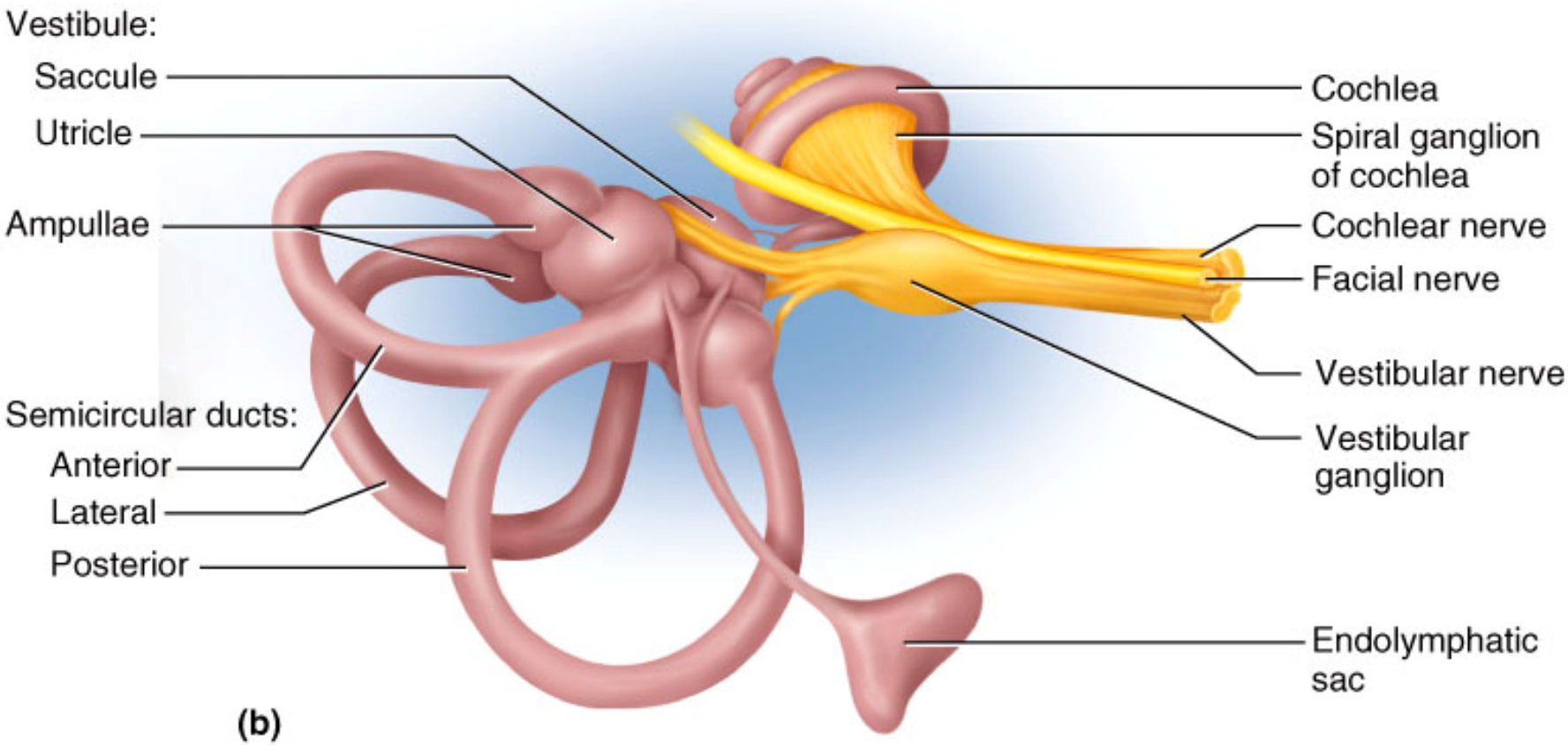


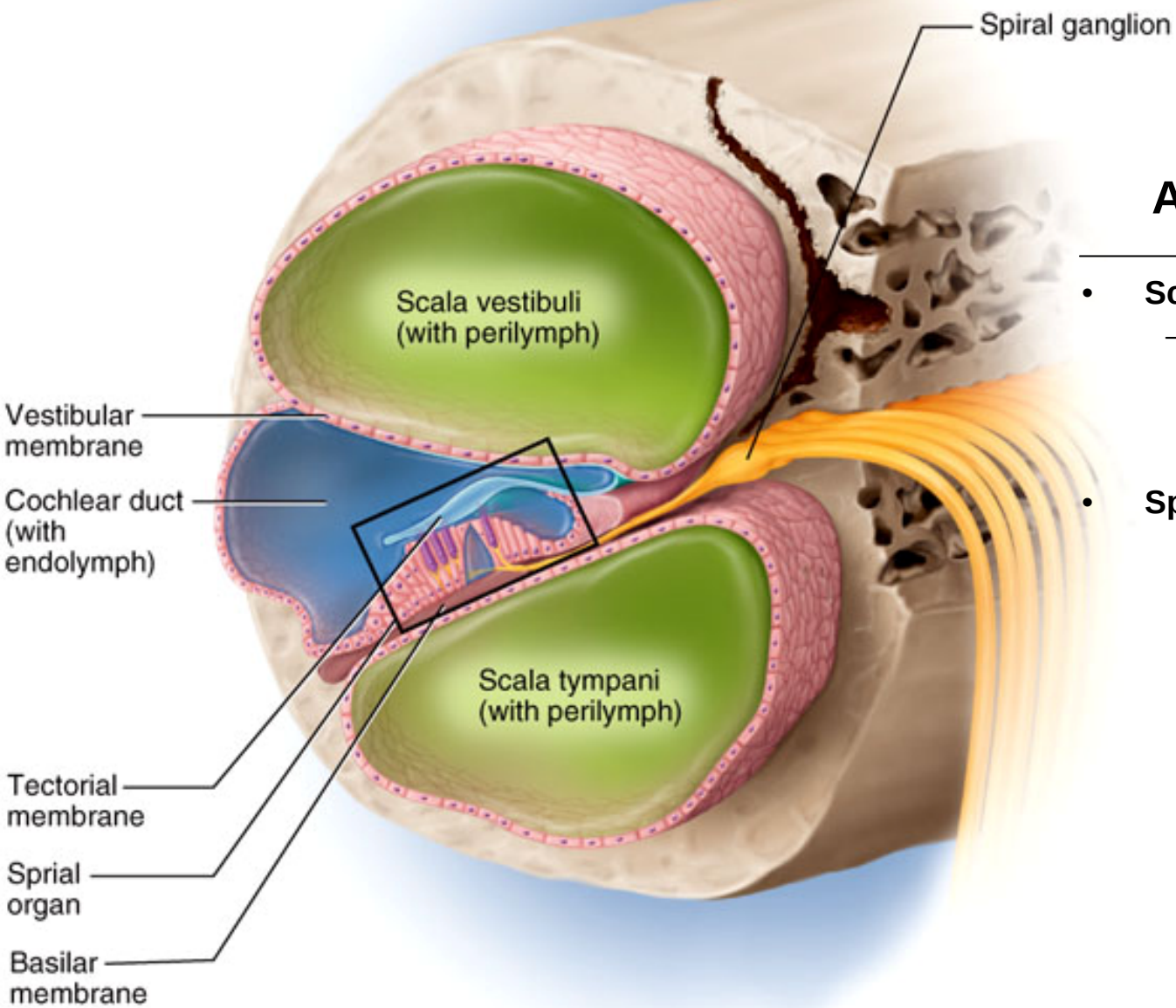
- **Bony labyrinth - passageways in temporal bone**
- **Membranous labyrinth - fleshy tubes lining bony tunnels**
  - **filled with endolymph (similar to intracellular fluid)**
  - **floating in perilymph (similar to cerebrospinal fluid)**

Details of Inner Ear



Details of Inner Ear

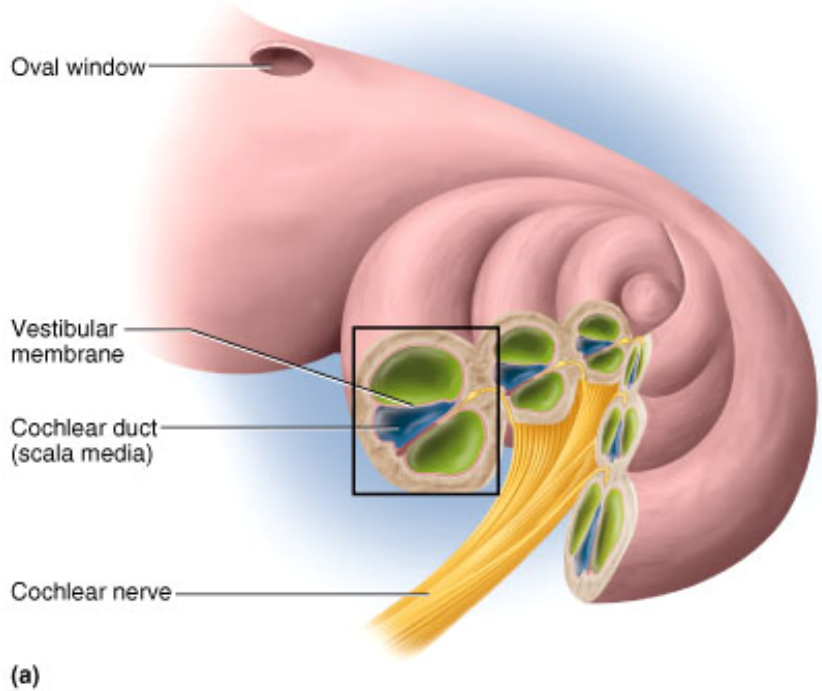




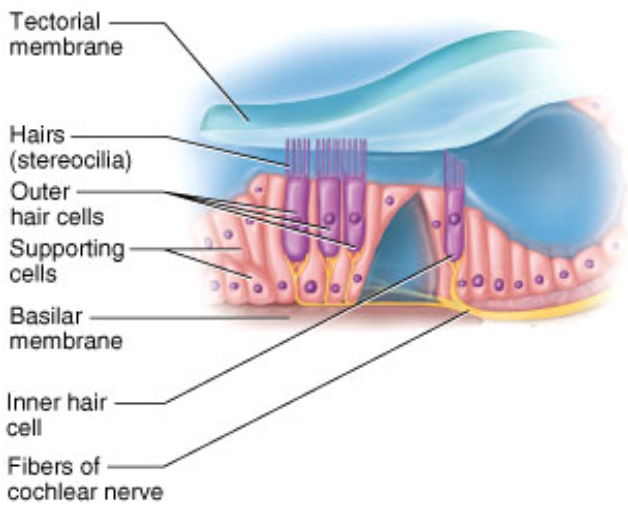
(b)

Anatomy of Cochlea

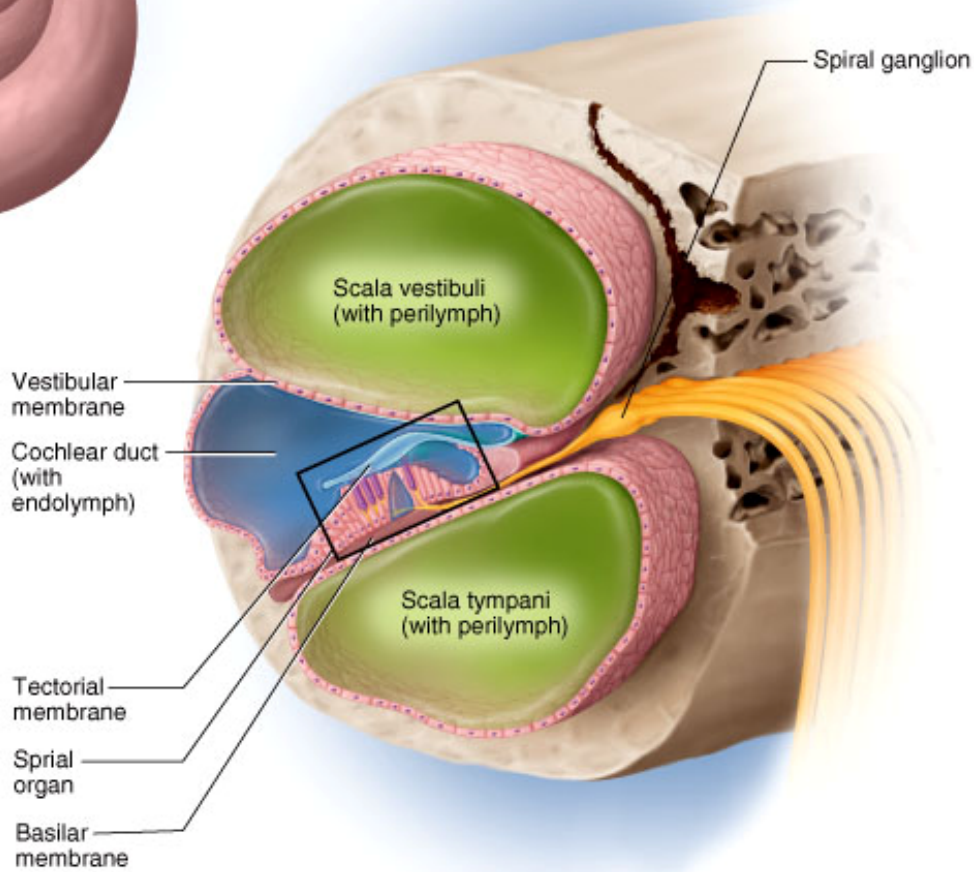
- **Scala media (cochlear duct)**
  - **separated from**
    - **scala vestibuli by vestibular membrane**
    - **scala tympani by basilar membrane**
- **Spiral organ (organ of corti)**



(a)

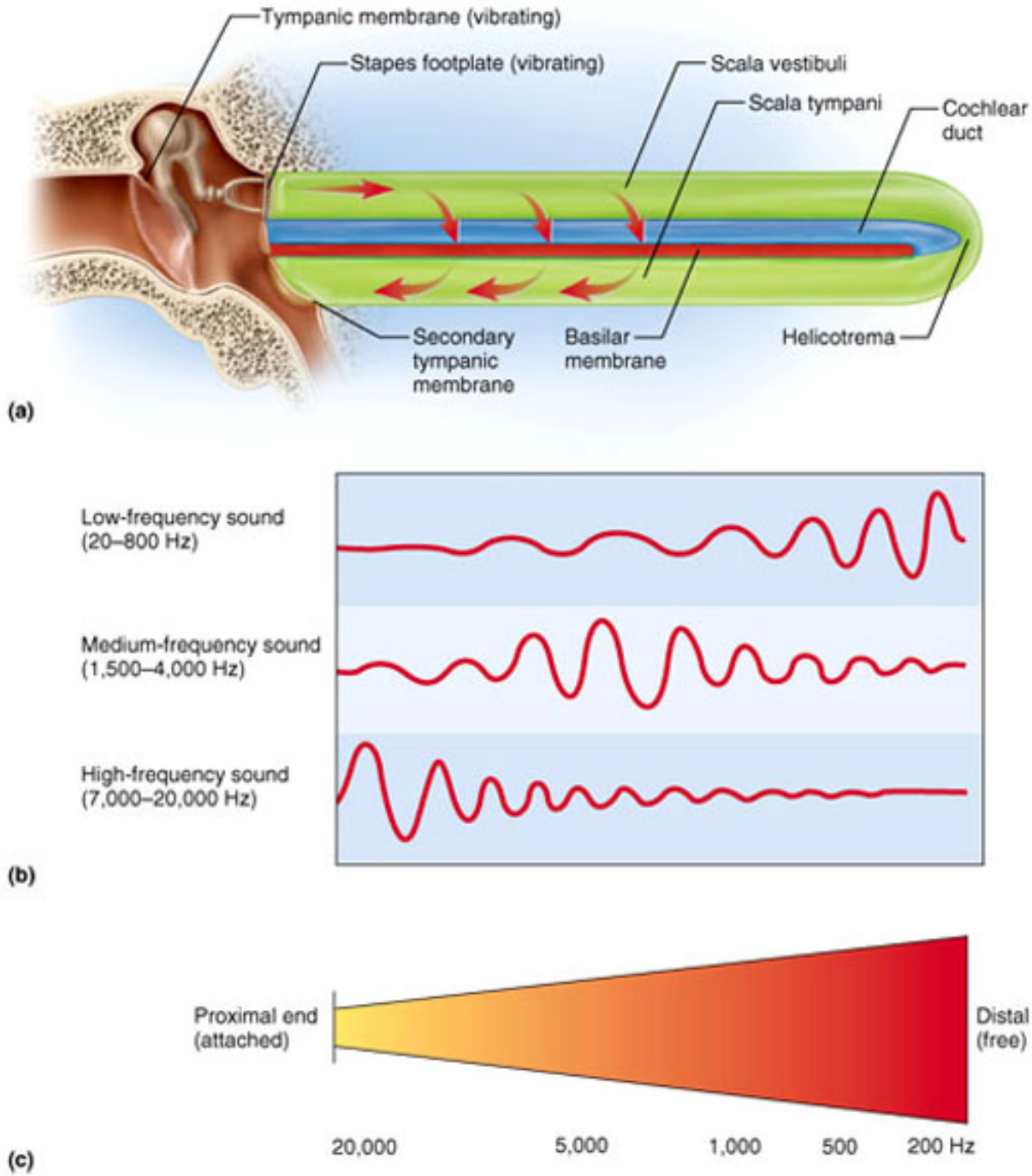


(c)



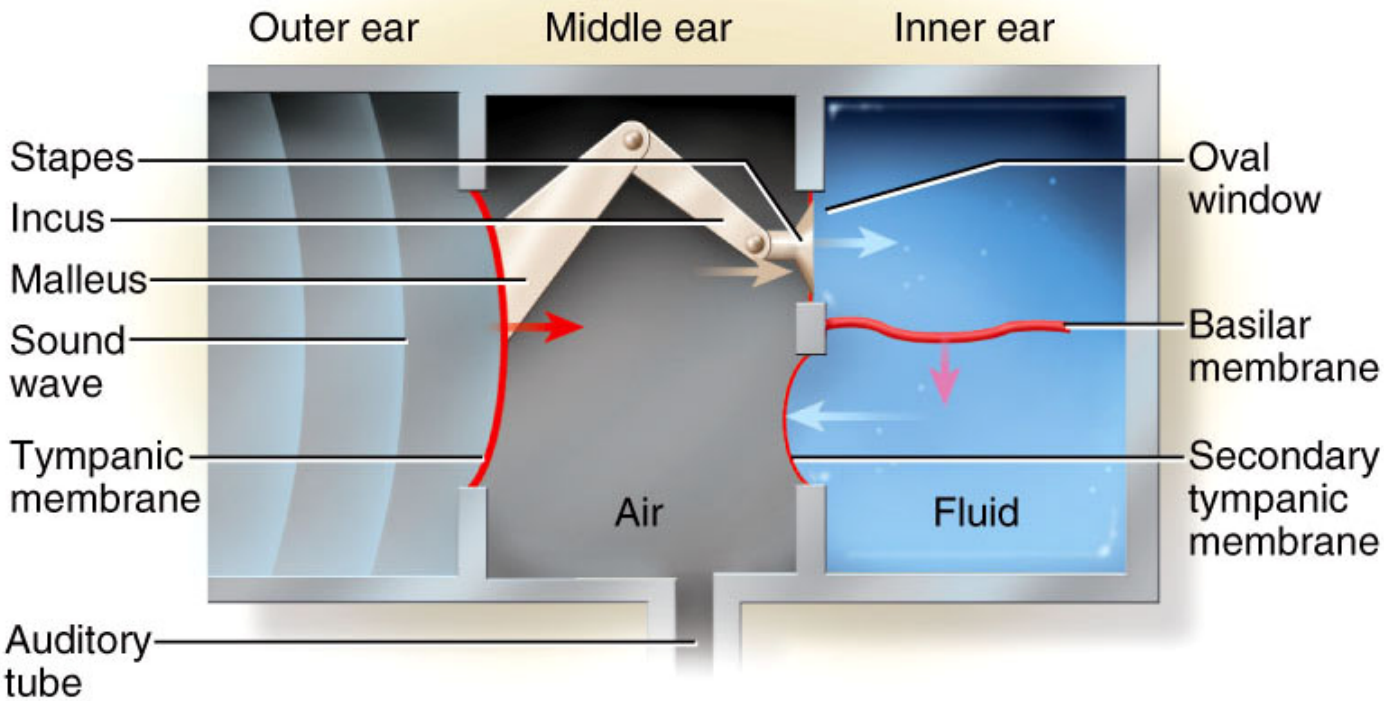
(b)

Basilar Membrane Frequency Response

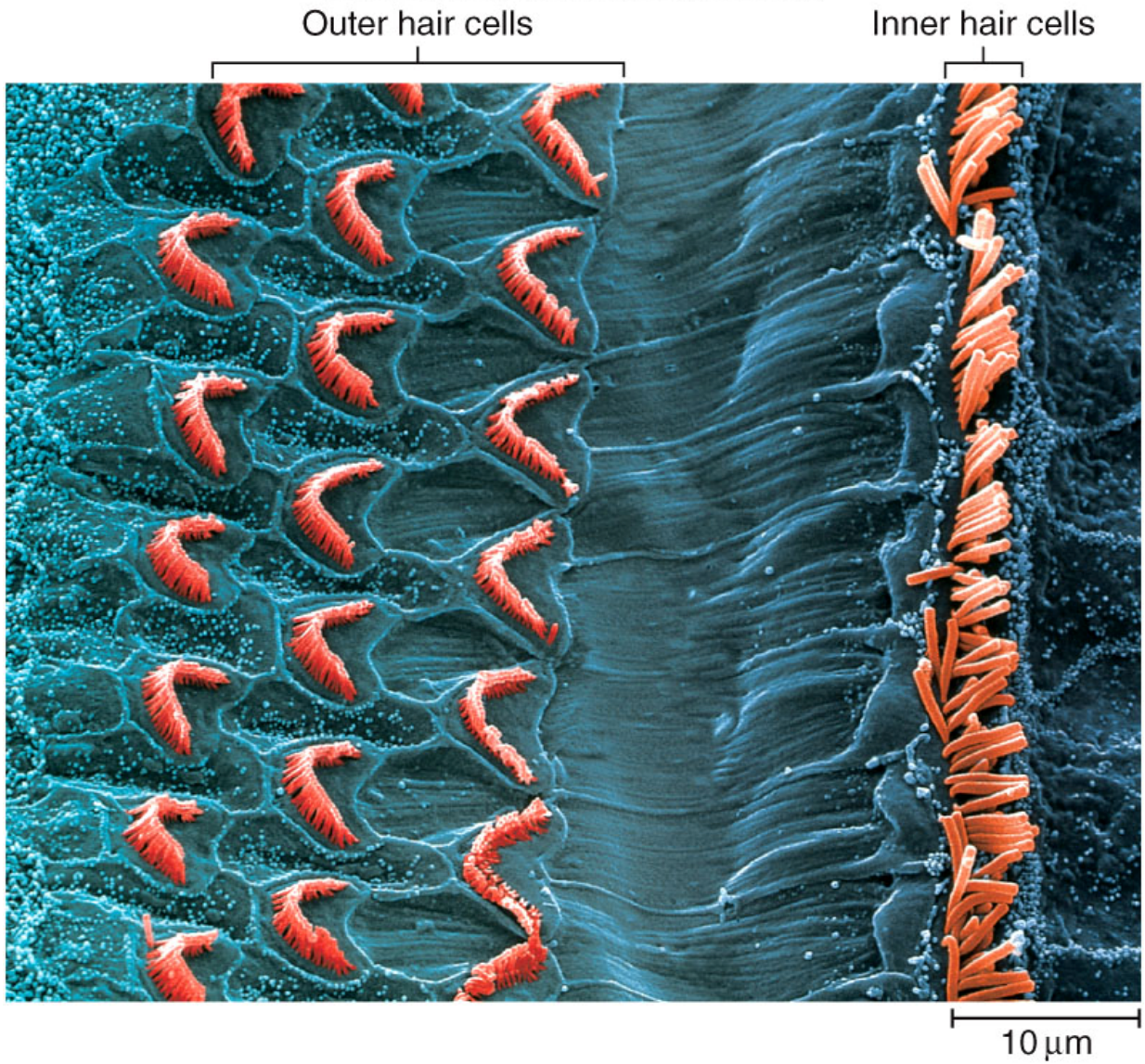


Stimulation of Cochlear Hair Cells

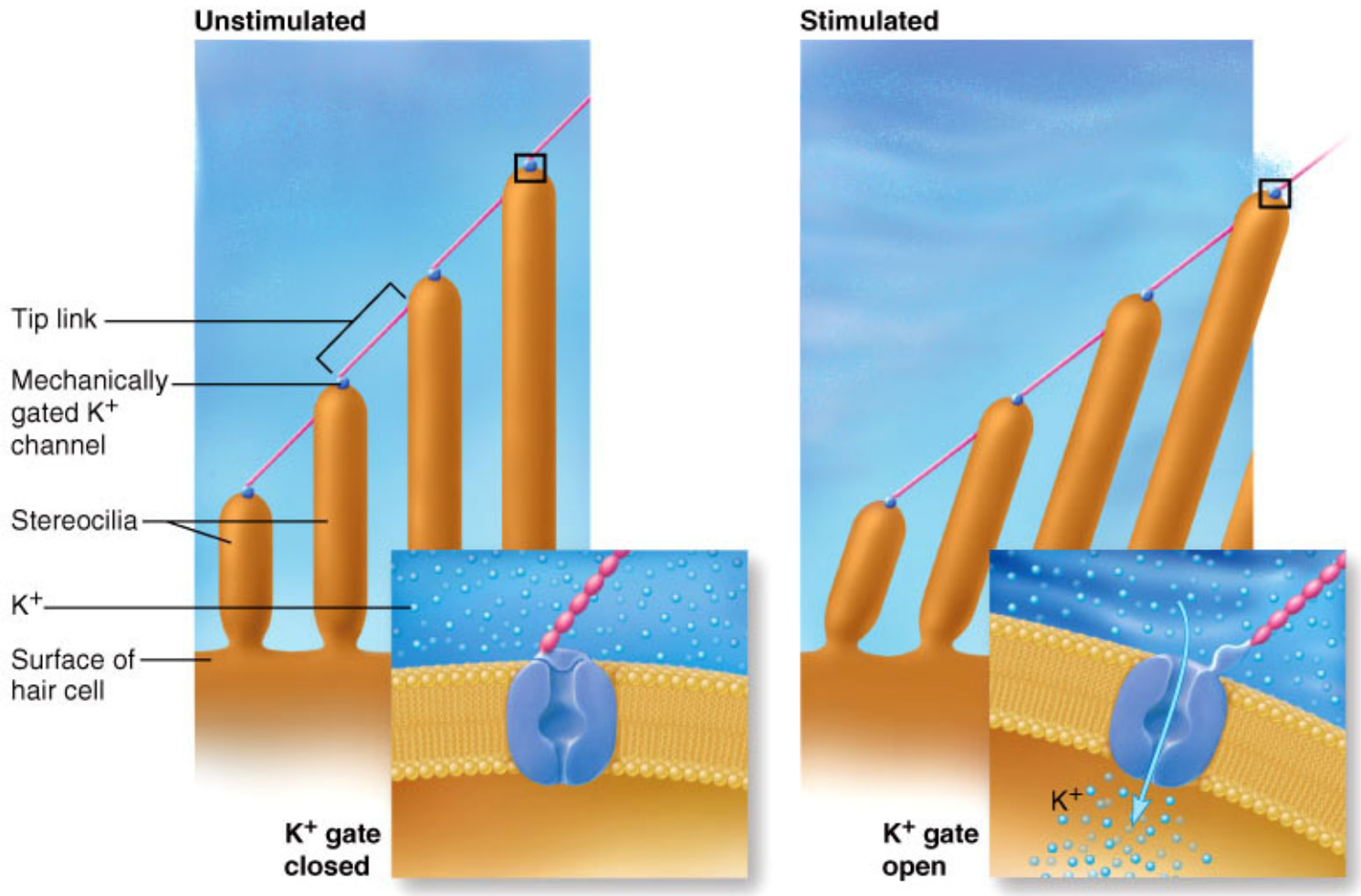
- **Vibration of ossicles causes vibration of basilar membrane under hair cells**
  - **as often as 20,000 times/second**



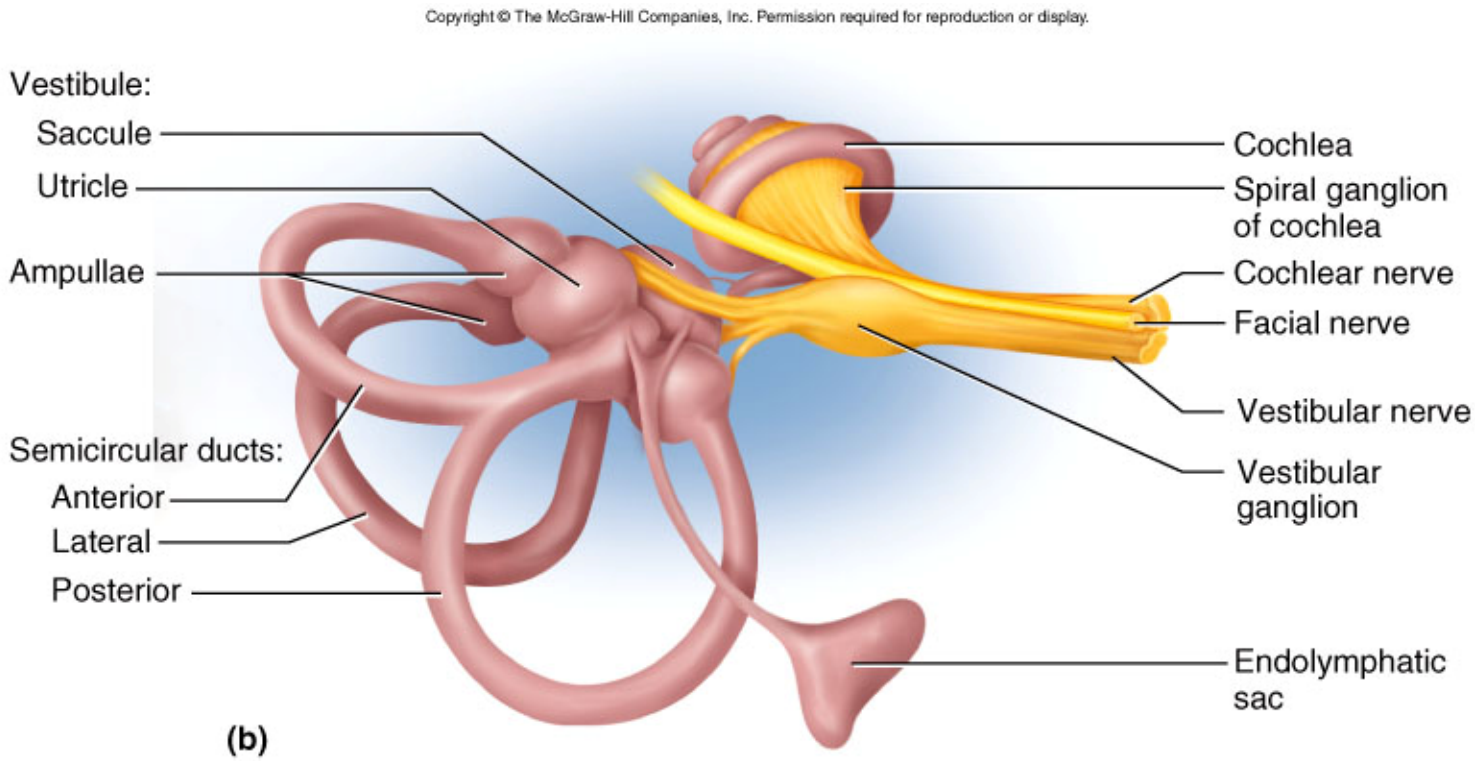
SEM of Cochlear Hair Cells



Potassium Gates

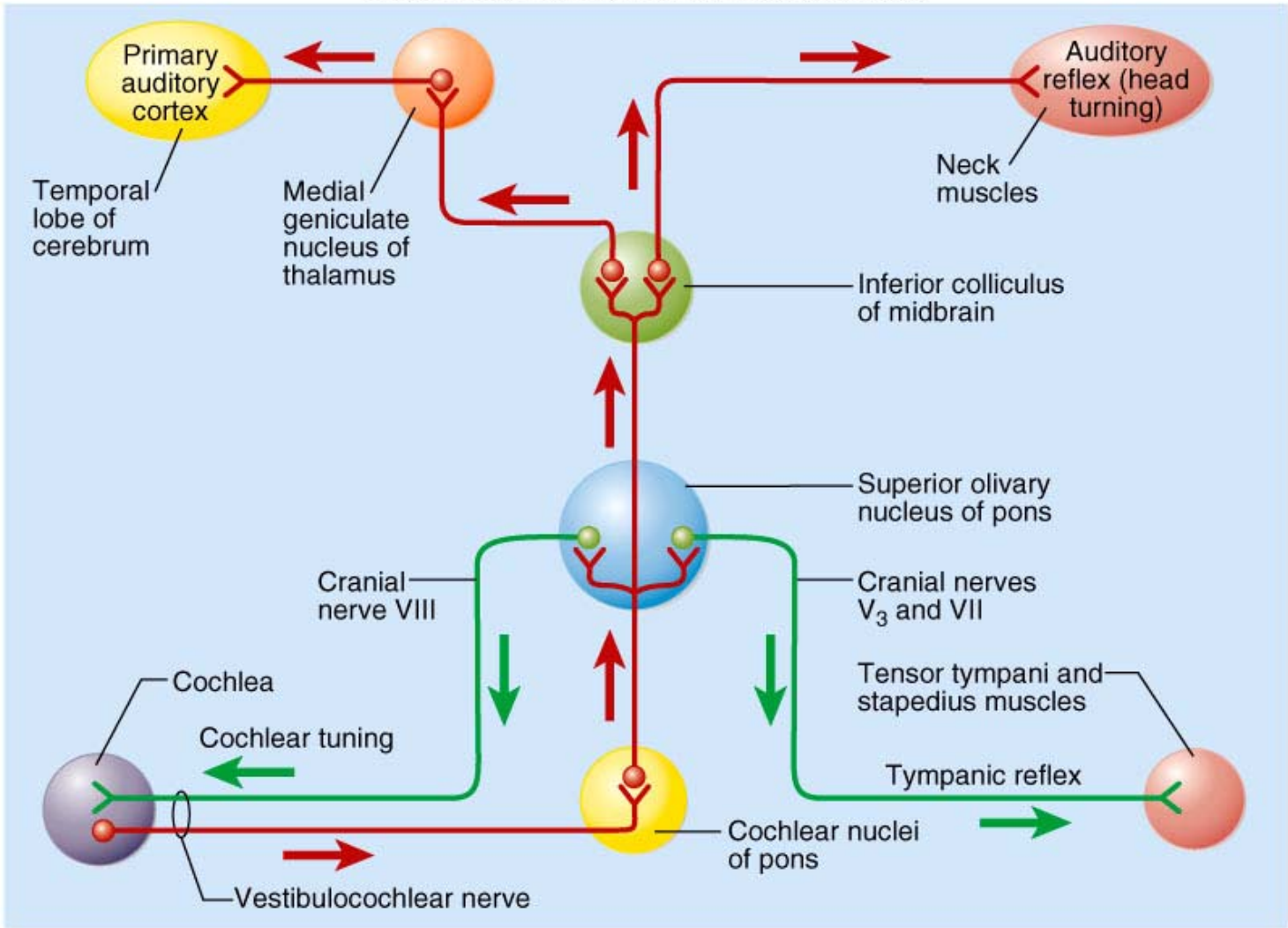


Innervation of Internal Ear



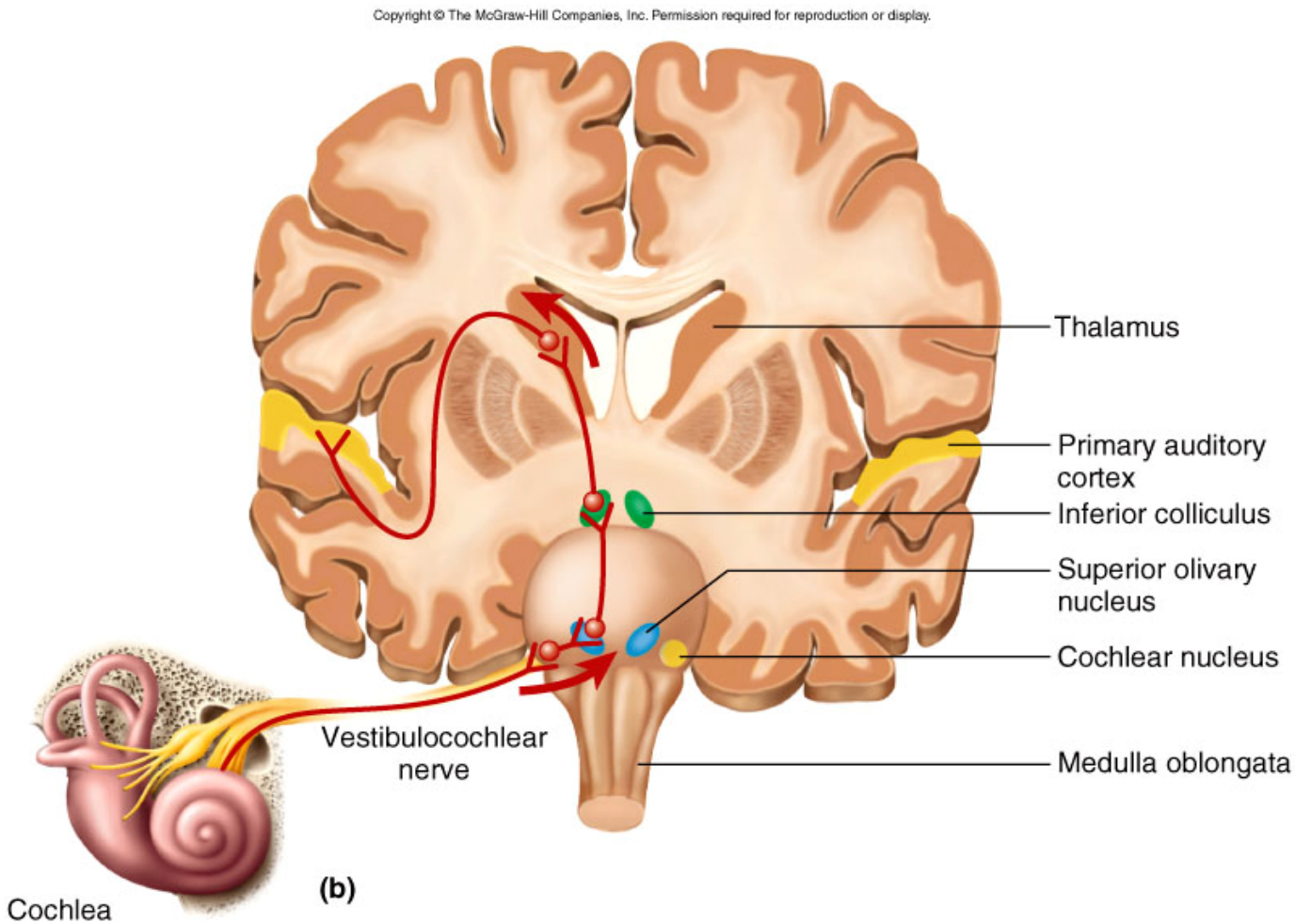
- **Vestibular ganglia - visible in vestibular nerve**
- **Spiral ganglia - buried in modiolus of cochlea**

Auditory Pathway



(a)

Auditory Processing Centers



- **Damage to either auditory cortex does not cause unilateral deafness (extensive decussation)**