

# Physiology of Hearing

1. Which of the following is the middle ear ossicle that is attached to the tympanic membrane?

- A) Columella
- B) Incus
- C) Malleus
- D) Modiolus
- E) Stapes

Answer: C

2. Which compartment of the cochlea contains the organ of Corti?

- A) Ampulla
- B) Saccule
- C) Scala media
- D) Scala tympani
- E) Scala vestibuli

Answer: C

Questions 3 and 4

A 20-year-old soldier sustains a noise-induced hearing loss over a period of 6 months from multiple exposures to loud sounds. Use this information to answer Questions 3 and 4.

3. Loss of which structure is most likely to contribute to the hearing deficit?

- A) Cochlea
- B) Inner hair cells
- C) Organ of Corti
- D) Scala media
- E) Scala vestibuli

Answer: B

4. An increase in which of the following is the most likely cause of this hearing loss?

- A) Connexin 26
- B) Endolymph
- C) Perilymph
- D) Reactive oxygen species

Answer: D



5. The stereocilia of hair cells are embedded in which membrane?

- A) Basilar
- B) Reissner's
- C) Tectorial
- D) Tympanic
- E) Vestibular

Answer: C

6. In the central auditory pathway, which option represents the correct sequence of structures in the pathway?

- A) Cochlear nuclei–superior olive–inferior colliculus via the lateral lemniscus–medial geniculate–auditory cortex
- B) Cochlear nuclei–inferior olive–inferior colliculus via the medial lemniscus–medial geniculate–auditory cortex
- C) Cochlear nuclei–superior olive–superior colliculus via the lateral lemniscus–lateral geniculate–auditory cortex
- D) Cochlear nuclei–inferior olive–inferior colliculus via the lateral lemniscus–lateral geniculate–auditory cortex
- E) Cochlear nuclei–trapezoid body–dorsal acoustic stria–inferior colliculus via the lateral lemniscus–medial geniculate–auditory cortex

Answer: A

7. Which molecules move from the endolymph into the stereocilia and depolarize the hair cell?

- A) Calcium ions
- B) Chloride ions
- C) Hydrogen ions
- D) Potassium ions
- E) Sodium ions

Answer: D



8. Which statement regarding the transmission of auditory information from the ear to the cerebral cortex is correct?

- A) Inferior colliculus neurons synapse in the cochlear nuclei of the brain stem
- B) Neurons with cell bodies in the spiral ganglion of Corti synapse in the inferior colliculus
- C) The majority of neurons from the cochlear nuclei synapse in the contralateral superior olivary nucleus
- D) There is no crossing over of information between the right and left auditory pathways in the brain stem
- E) Trapezoid neurons synapse in the cochlear nuclei of the brain stem

Answer: C

9. Which event prompts the auditory system to interpret a sound as loud?

- A) A decreased number of inner hair cells become stimulated
- B) A decreased number of outer hair cells become stimulated
- C) Hair cells excite nerve endings at a diminished rate
- D) The amplitude of vibration of the basilar membrane decreases
- E) The amplitude of vibration of the basilar membrane increases

Answer: E

10. The function of the round window can best be described by which statement?

- A) It provides the connection point for the stapes
- B) It serves to damp out low frequency sounds such as your own voice
- C) It transmits the frequency information into the cochlea from the tympanic membrane
- D) It serves as the pressure relief valve for the cochlea
- E) It transmits amplitude information into the cochlea from the tympanic membrane

Answer: D

11. Auditory information is relayed through which thalamic nucleus?

- A) Dorsomedial
- B) Lateral geniculate
- C) Medial geniculate
- D) Ventral posterolateral
- E) Ventral posteromedial

Answer: C

12. The primary auditory cortex lies primarily in which lobe of the cerebral cortex?

- A) Frontal
- B) Limbic
- C) Occipital
- D) Parietal
- E) Temporal

Answer: E