Hearing and The Ear

1. Function of the pinna.
2. Compare location of Swimmer's Ear and Otitis media.
3. Purpose of eustacian tube.
4. What actions help open the tube wider?
5. Purpose of tympanic membrane.
6. Purpose of "tubes in the ear".
7. Cause of pain in otitis media.
8. Reasons children get ear infections/pain more frequently than adults.
9. Compare pressure in middle ear with atmosphere at high altitudes/at low altitudes.
10. Name middle ear bones (English and Latin—in order).
11. Purpose of oval window.
12. Purpose of semicircular canals.
13. Significance of gel crystallizing in the semicircular canals/in the cochlea?
14. The "spins": How does alcohol affect the movement of the gel in the semicircular canals?
15. Which nerve carries information from the inner ear to the brain?
16. What is the purpose of "hair cells" in the cochlea?
17. Which part of the cochlea is usually damaged first by loud noises?
18. After noise damage, what changes about the hair cells?
19. How can an infection in the throat result in an infection in the middle ear?

Answers:

Hearing and The Ear

1. Function of the pinna.
   Funnel in sound waves.
2. Compare location of Swimmer's Ear and Otitis media.
   Swimmer's Ear is usually caused by fungus, and infects the external auditory canal. Otitis media is usually caused by viruses or bacteria and infects the middle ear.
3. Purpose of eustacian tube.
   Equalize pressure between the middle ear and the outside of the body.
4. What actions help open the tube wider?
   Yawning, chewing. For babies, nursing or sucking on a pacifer helps them open their eustacian tubes.
5. Purpose of tympanic membrane.
   Converts sound waves into mechanical movement.
6. Purpose of "tubes in the ear".
   Allows fluid and pressure to release from the middle ear.
7. Cause of pain in otitis media.
   Pressure on the tympanic membrane from fluid or pressure build-up in the middle ear.
8. Reasons children get ear infections/pain more frequently than adults.
   Their eustacian tubes are shorter and narrower, so viral/bacteria infections can get into the middle ear more easily and pressure can be more difficult to release.
   Also, because of their youth, they are still building up immunity to many common respiratory flora (bacteria that are normally in your throat that don't cause disease in adults).
9. Compare pressure in middle ear with atmosphere at high altitudes and with going under water.
   High altitudes: pressure is greater in the middle ear than outside
   Under water: outside pressure is greater than in the middle ear
10. Name middle ear bones (English and Latin—in order).
    Hammer, Anvil and Stirrup; Malleus, Incus and Stapes (pronounced Stay-Peas)
11. Purpose of oval window.
    This thin membrane allows the stirrup to transmit movement to the gel inside the bony labrynth of the the inner ear.
12. Purpose of semicircular canals.
    When your head moves, gel in the semicircular canals moves. This causes hair receptors to fire action potentials down the vestibulocochlear nerve (CN VIII). The brain can then process where your head is and keep you balanced.
13. Significance of gel crystallizing in the semicircular canals/in the cochlea?
    If this happens in the semicircular canals, vertigo could result.
    If this happens in the cochlea, ringing in the ears could result.
14. The "spins": How does alcohol affect the movement of the gel in the semicircular canals?
    It decreases the viscosity, so the gel is "sloshing" around more when you are "sloshed" (drunk). This causes more action potentials to be sent and confuses the brain about your balance. As you sober up, the gel can change viscosity again and actually become a little dehydrated. This can cause dizziness the next day.
15. Which nerve carries information from the inner ear to the brain?
    Cranial Nerve VIII: Vestibulocochlear
16. What is the purpose of "hair cells" in the cochlea?
    The hair cells fire action potentials related to frequency of sound. They are stimulated to fire an action potential when the gel bends them.
17. Which part of the cochlea is usually damaged first by loud noises?
    The outer part of the "snailshell", which generally codes for high frequencies.
18. After noise damage, what changes about the hair cells?
    If the damage is permanent, then the hair cells are bent down permanently. Temporary hearing damage means that the hair cells are able to return to a healthy position.
19. How can an infection in the throat result in an infection in the middle ear?
    Pathogens can travel up the eustacian tube.