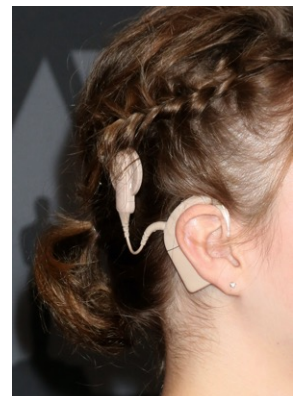
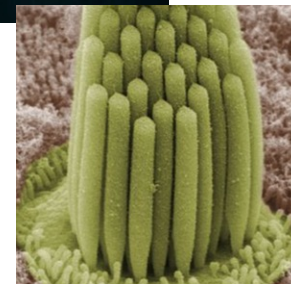
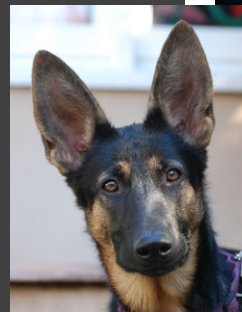
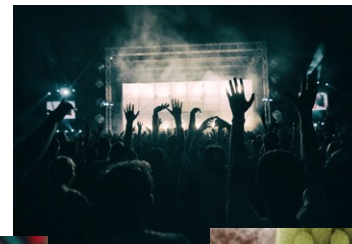
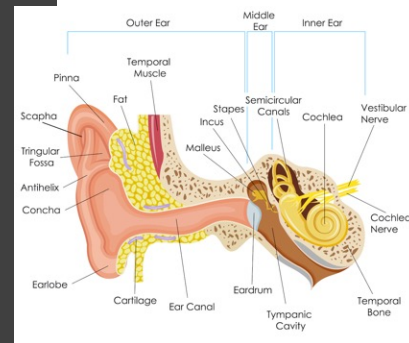


Hearing and the Human Ear

- Hearing Frequencies
- Hearing Loss and Earbuds
- What Causes Hearing Loss?
- Hearing Stats
- Hearing Loss Prevention
- Sound Intensity
- Anatomy of Hearing
- Vertigo
- Hearing Aids



Preview File

Please enjoy this preview of your Student Version of the presentation. Please note within this sample file:

- Some slides appear blank because they have been removed
- Student versions have portions of the text removed which is given in the teacher version and appear as _____ which the students are to fill in
- Other slides may have on them, this represents writing that has been removed on this sample

The paid full version of your resource includes both Google Slides and PowerPoint and is Google Classroom Ready



Hearing Test

- Humans can generally hear from 20Hz to 20kHz. See where you fall
- As we age, we lose the ability to hear high frequencies. Click the image to the right to see if you can hear the higher frequencies
- How old are your ears?



Hearing Frequencies

- Many animals can hear frequencies outside of what a human can
- _____
- This allows us to utilize “dog whistles” which send out a signal between 23kHz and 54kHz
- This noise is detectable by dogs but not humans



Dog whistles have frequencies between 23 – 54 kHz

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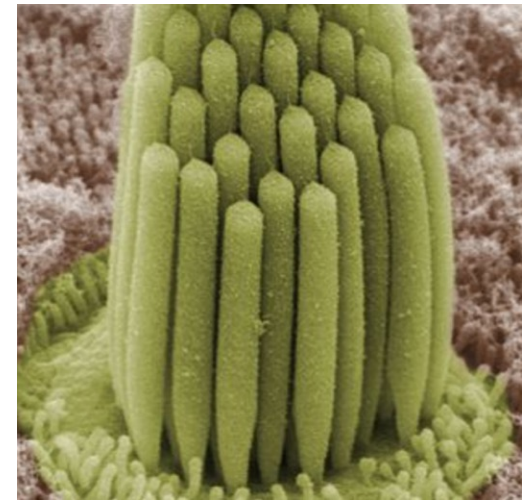
Hearing Loss and Earbuds

- There are many ways to lose your hearing such as disease, trauma, wax buildup, nerve damage, aging, etc. but the most common cause of _____
- Earbuds are especially bad since it sends the sounds directly into the ear



What Causes Hearing Loss?

- _____
- Loud noises can damage these hair cells preventing sound signals from being transmitted to the brain
- Loud noises (typically over 85 db which is about 50%-75% maximum volume on most phones) can permanently damage these hairs

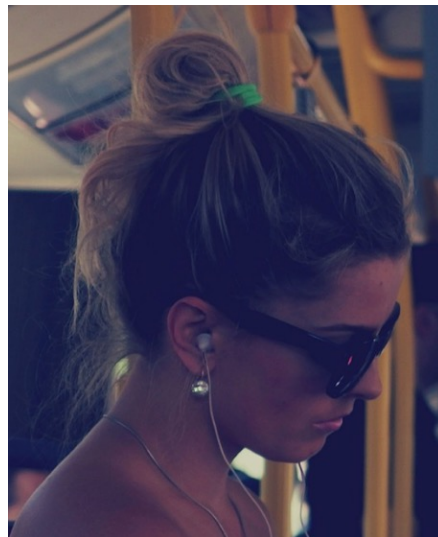


High-resolution miniscule hair-like protrusion in the inner ear. They are found on the surface of sensory cells found deep within the cochlear of the inner ear.

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Teen Hearing Stats

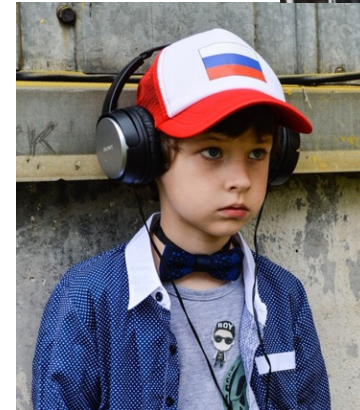
- _____
- 9/10 engage in activities which put them at risk of hearing loss. These activities include listening to music above 85 decibel (db)



Prevention

- _____

- Turn down the volume and take a break
- See a doctor if you experience any ringing in your ears
- Stay away from speakers at concerts
- Wear ear protection if you are constantly exposed to a loud environment (i.e. at work, etc.)



Sound Intensity and Hearing

- _____
- We typically use the decibel (db) to measure the intensity level of sound
- 0 db is the threshold of hearing while 130 db is painful for humans to hear
- Since the db scale is logarithmic, 130 db is 10^{13} times more intense than 0 db

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Sound Wave Intensity

- _____
- Sound waves spread out as they leave the source therefore, intensity decreases as distance increases

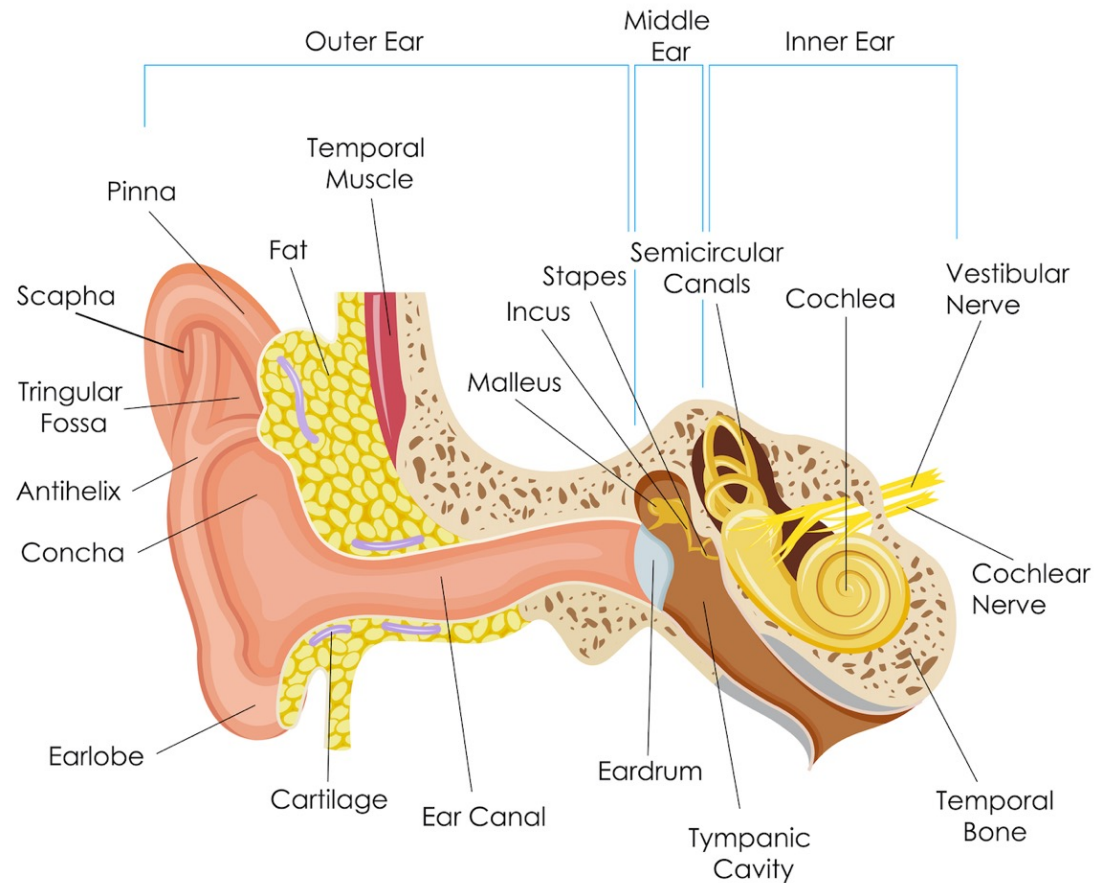
The Human Ear – The Anatomy of Hearing

The human ear consists of three basic parts:

1. The Outer Ear

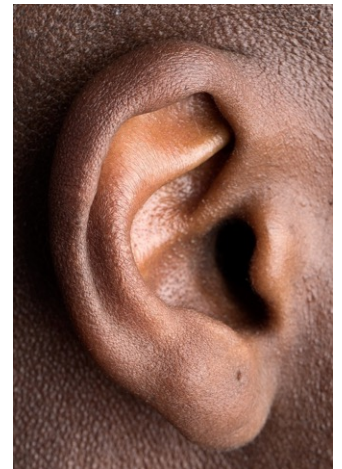
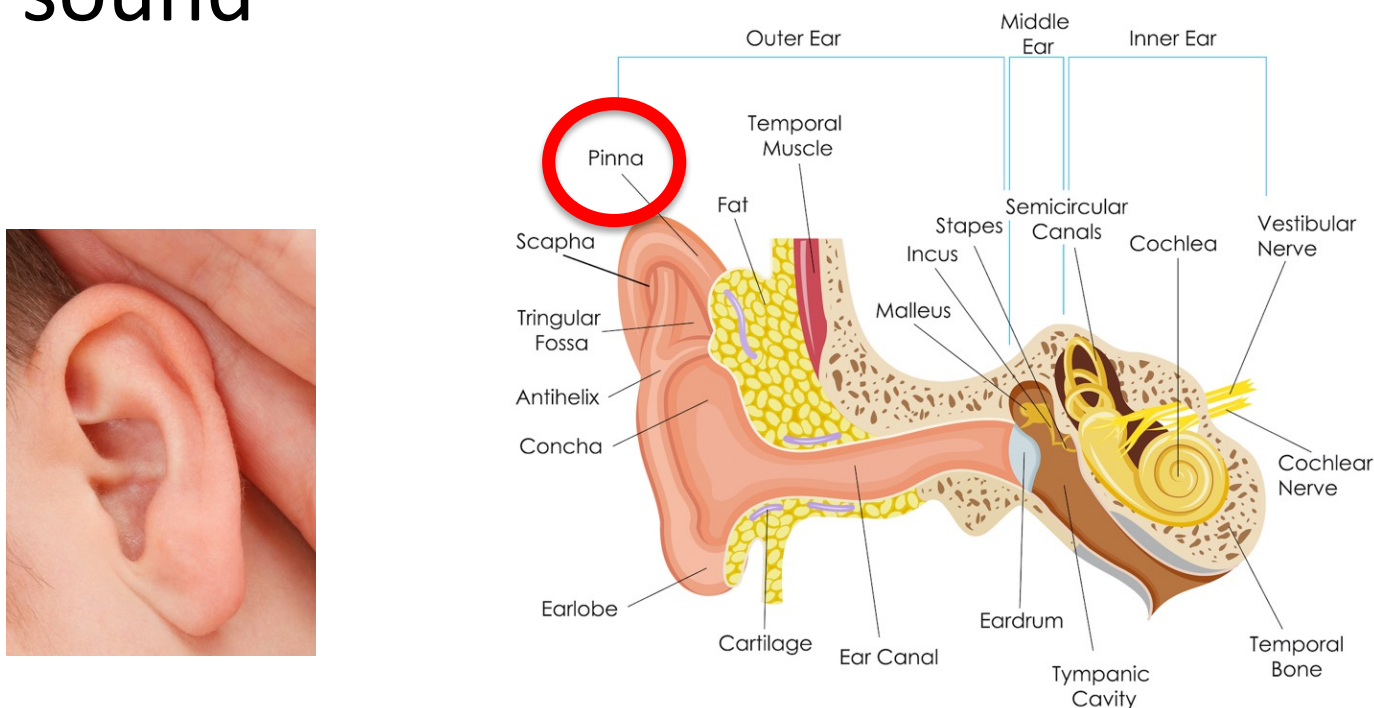
2. The Middle Ear

3. The Inner Ear



The Outer Ear

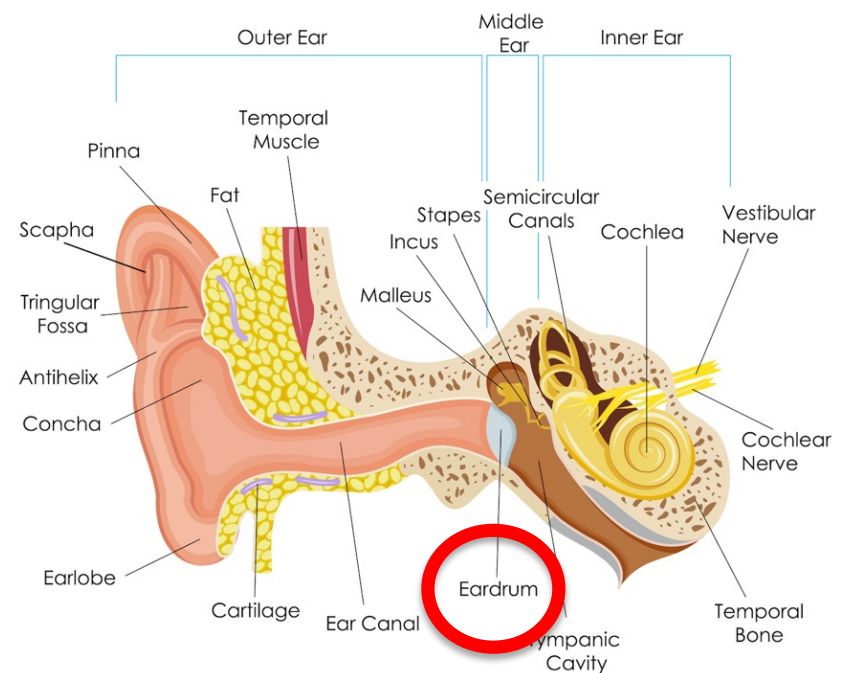
- _____
- Is shaped to collect sounds
- Notice how cupping your ear exaggerates its natural shape and increases its ability to gather sound



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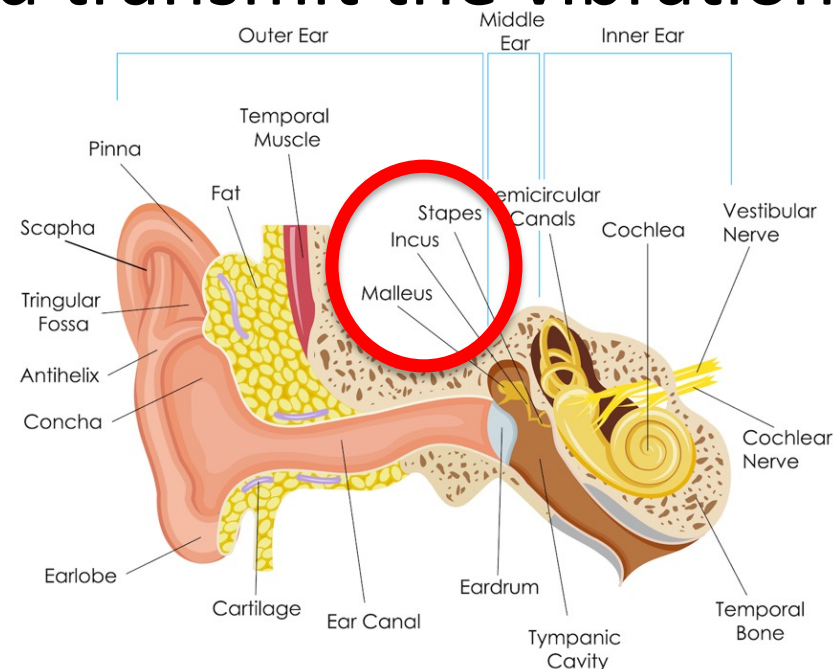
The Middle Ear

- _____
- The eardrum is a tightly stretched, tough membrane less than 0.1 mm thick
- The compression and rarefaction of sound
- The frequency of the sound waves which enter the ear are mirrored by the vibration of the eardrum



The Middle Ear Continued

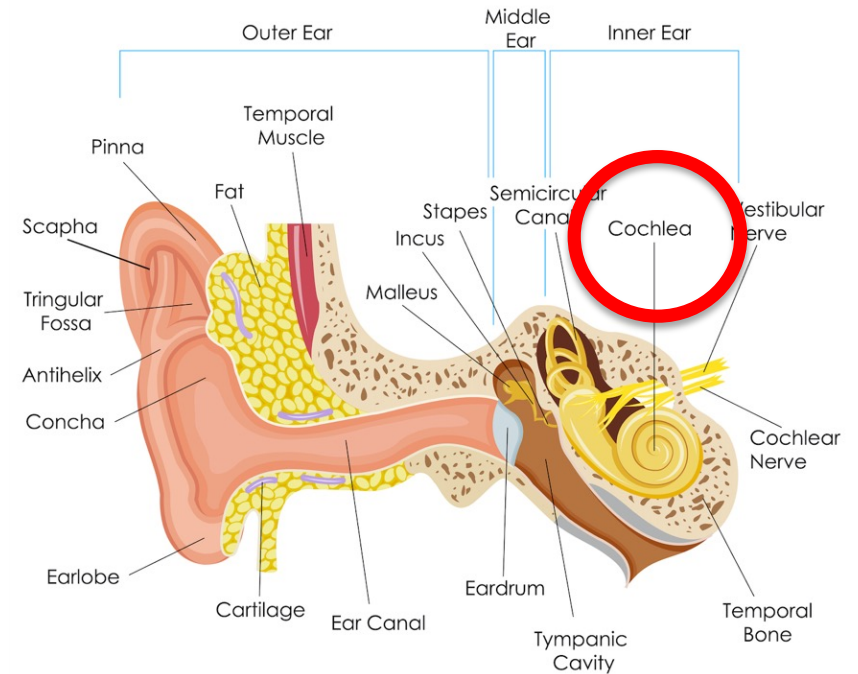
- There are three connected bones (the ossicles) which attach to the eardrum
- _____
- These bones magnify and transmit the vibrations to the inner ear



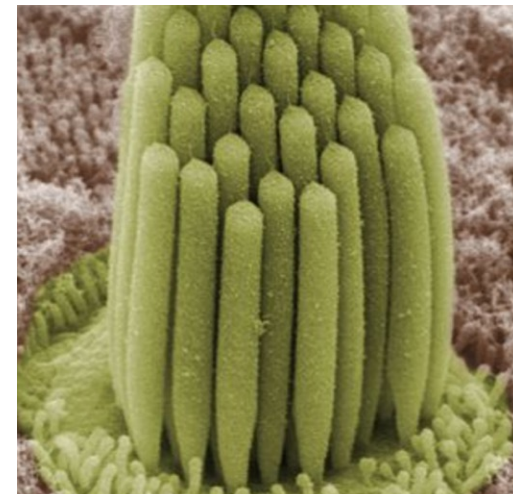
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The Inner Ear

- The cochlea's interior is coated



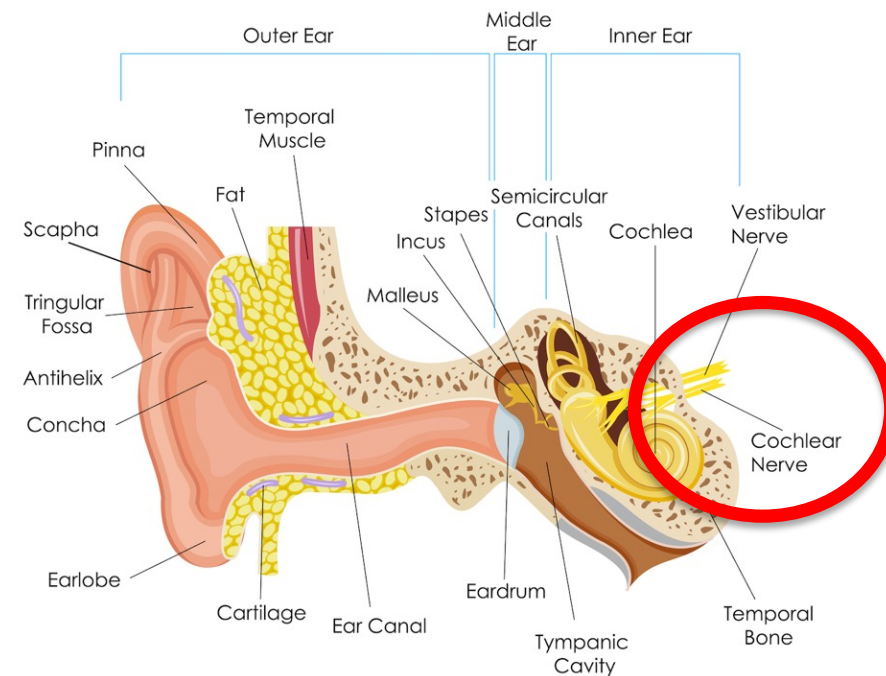
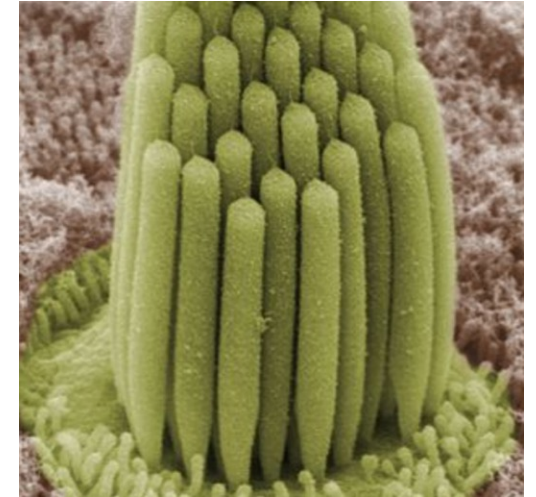
- As the fluid inside the cochlea moves in accordance to the



The Inner Ear

-

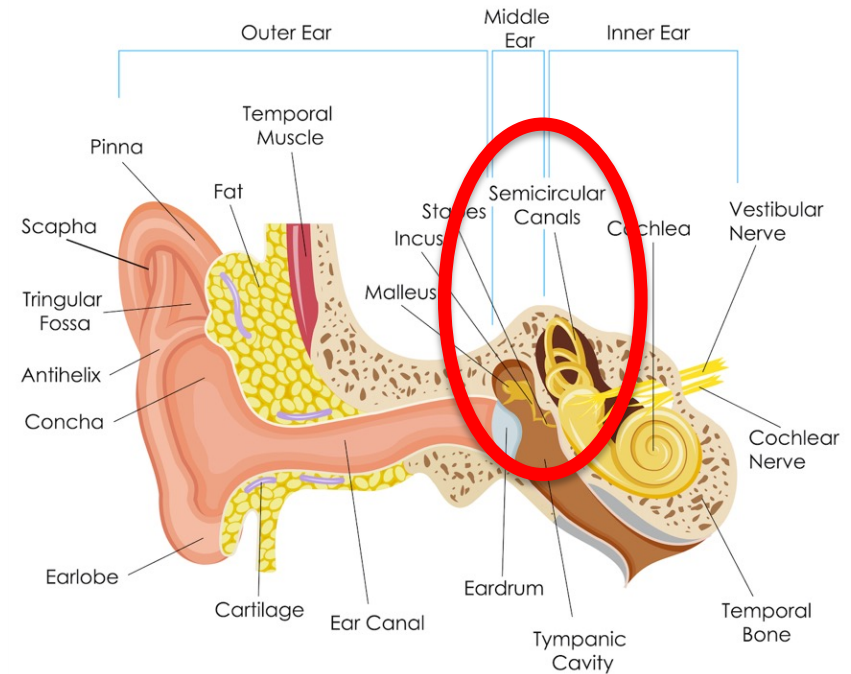
- The brain interprets these signals as sound



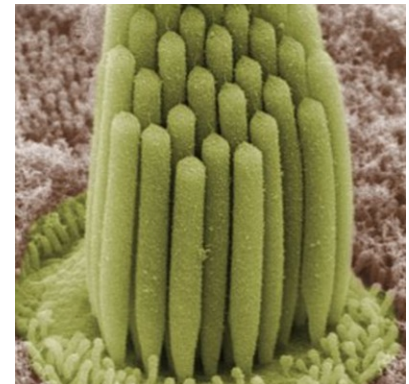
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Semicircular Canals

- As the fluid inside the canals shifts, a different set of hairs in the canals move



- ---
- The brain uses this information to maintain the body's balance



Vertigo

- If something happens to the balance in your semicircular canals, you can experience vertigo
- _____
- It leads to feelings of nausea, headache, etc.
- Can be caused by a virus or buildup of fluids or calcium in the inner ear
- Can last from minutes to weeks at a time



Loss of Hearing – Anatomically Speaking

- _____
- The microscopic hairs can be permanently damaged if exposed to intensities of 90 db or more for a prolonged period
- Damage to the auditory nerve will cause deafness

Hearing Aids

- Is an electronic device which allows a deaf person to hear sounds
- Basic
- Other devices can bypass the outer ear and cause direct vibrations on the bones of the middle ear
- In more extreme cases, the outer and middle ear can be bypassed completely, and _____



Basic Hearing Aids



Cochlear Implant

