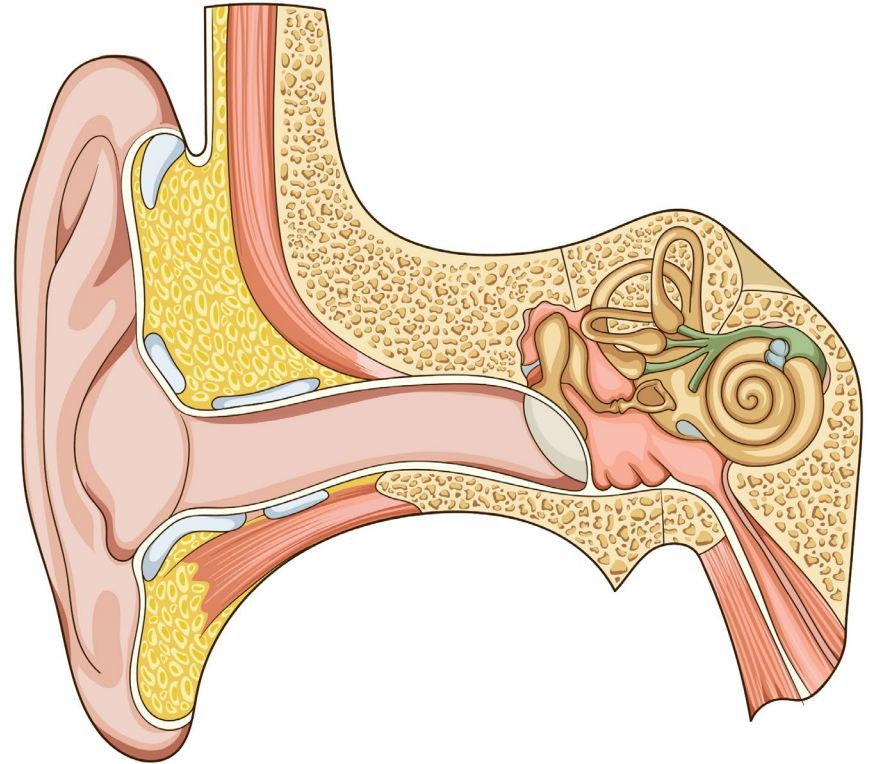


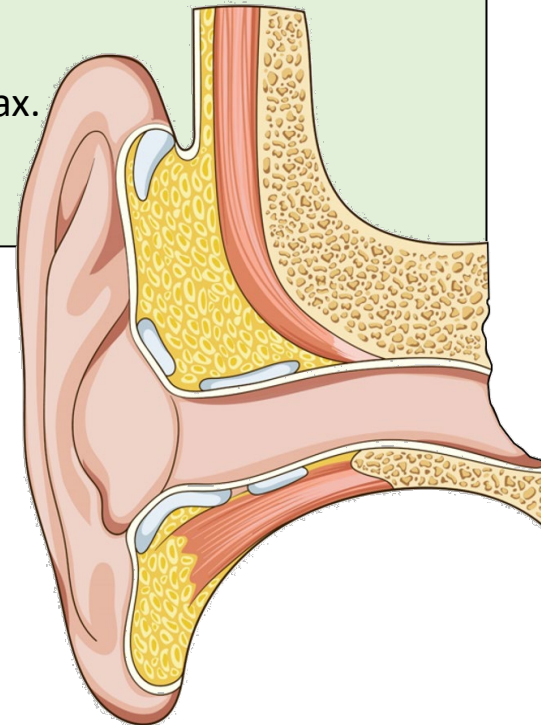
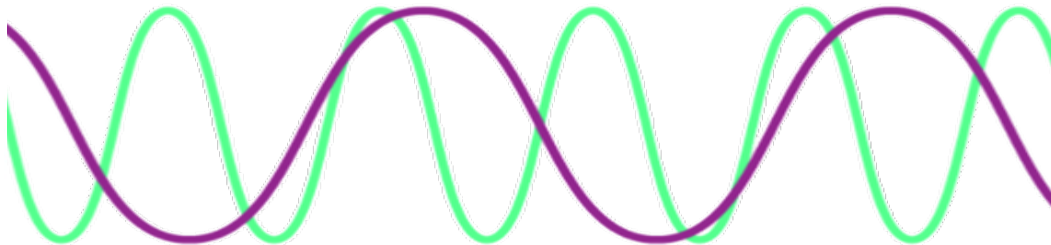
The Structure & Function of the Human Ear



The Human Ear – The Outer Ear

Outer Ear

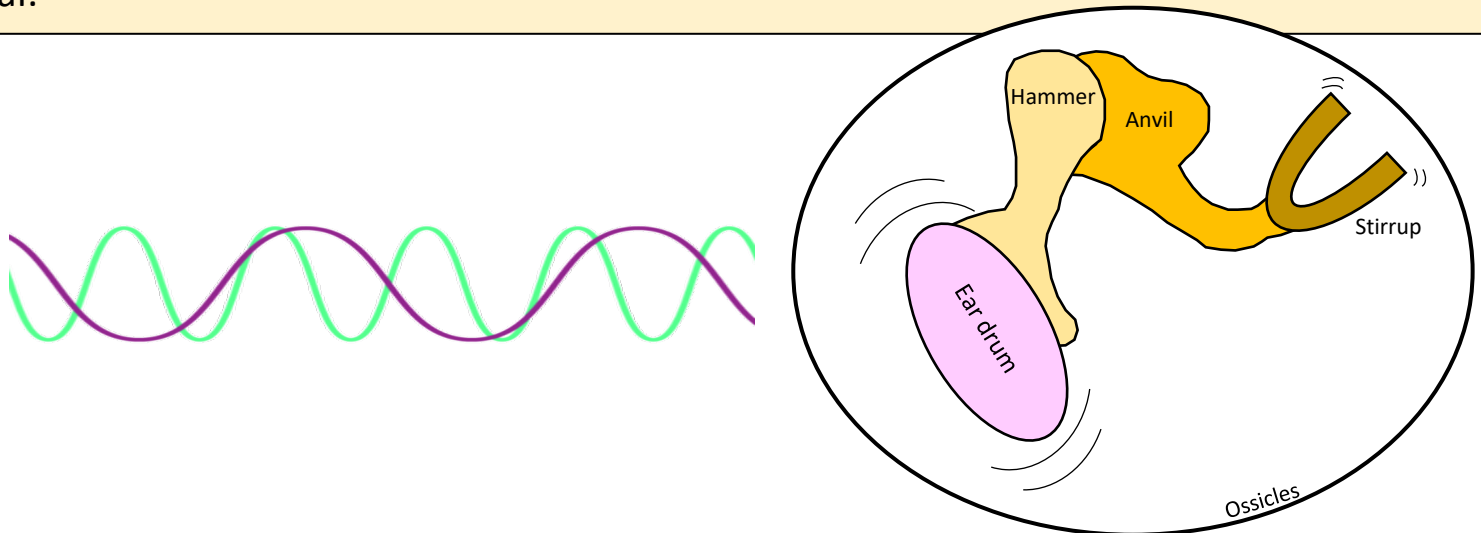
- The visible part of the ear is called the Pinna or the Auricle. The pinna is made of cartilage.
- The outer ear is concerned with the transmission of sound.
- The outer ear consists of the Pinna, the ear canal and the outer layer of the eardrum, also called the Tympanic membrane.
- The ear canal is filled with air and is about 2.5cm long.
- The skin surrounding the ear canal contains glands that secrete ear wax.
- Ear wax is part of the ears protection mechanism.



The Human Ear – The Middle Ear

Middle Ear

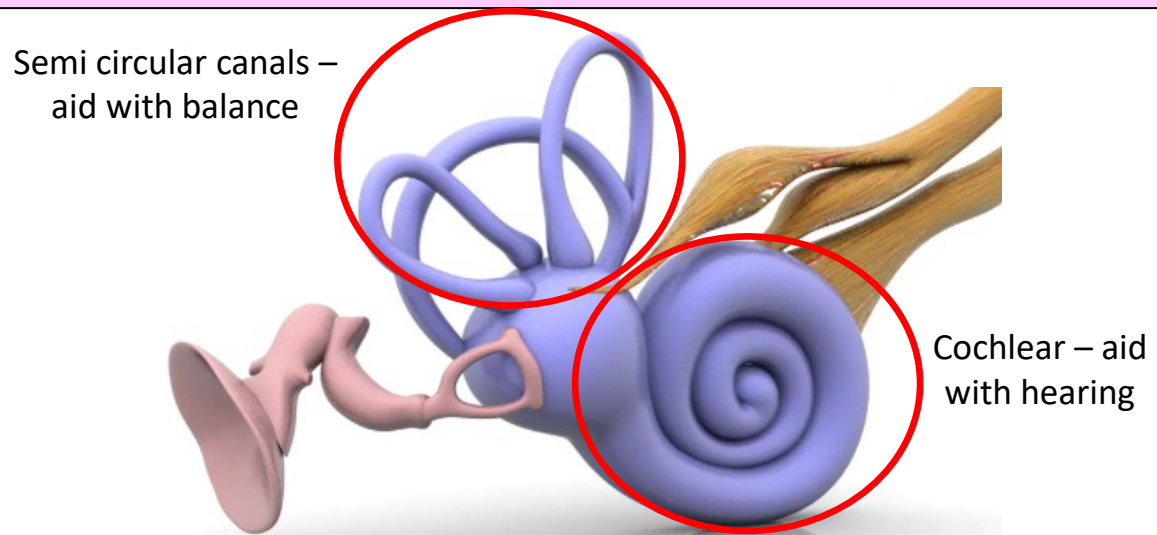
- The middle ear is a small air filled space connecting the outer and inner ear.
- The Primary function of the middle ear is to conduct sound waves through the tympanic membrane to the cochlear via the ear bones.
- The 3 smallest bones in the body are in the middle ear, they are called the hammer (malleus), anvil (incus) and stirrup (stapes).
- These bones are collectively known as the ossicles. Sound waves cause them to vibrate.
- The eustachian tube is also inside the middle ear. The eustachian tube controls the pressure within the ear.

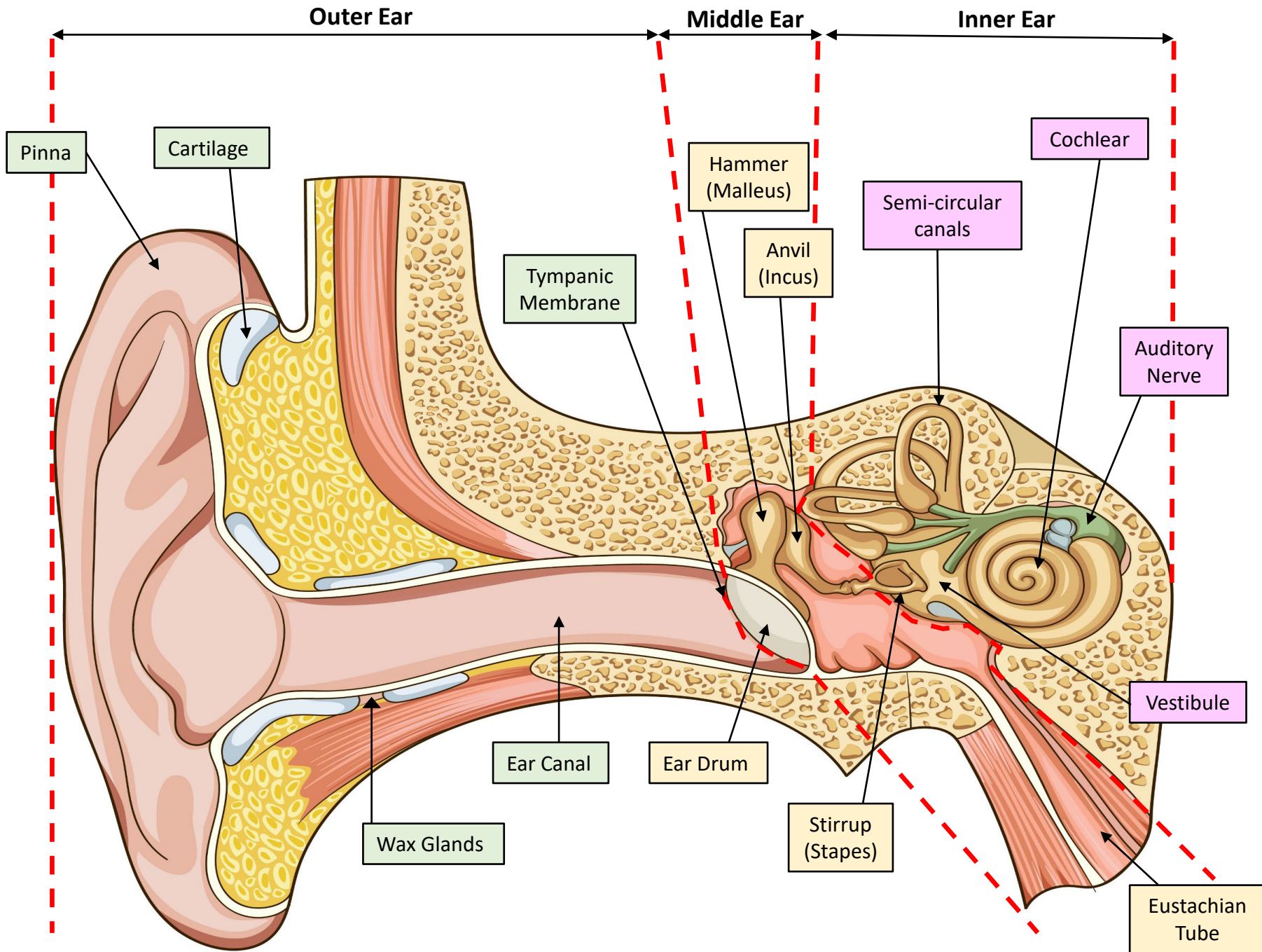


The Human Ear – The Inner Ear

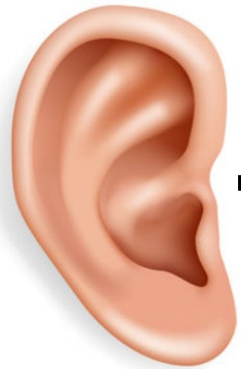
Inner Ear

- The Inner Ear has 2 main functions, to convert sound waves into electrical signals for the brain and to maintain balance by detecting position and motion.
- The inner ear has 3 main parts, the cochlear, the semi-circular canals and the vestibule.
- The cochlear is filled with liquid and acts like a microphone, converting sound waves to nerve impulses that travel to your brain via the auditory nerve.
- The vestibule and semi-circular canals both help you to balance.





How Do We Hear?



Sound waves are funnelled into our ear canal by the pinna.

The sound waves make our ear drum vibrate.

Vibrations of the ear drum cause the 3 small bones in the ear, collectively called the ossicles, to move.

As the last bone in the chain, the stapes, vibrates this causes wave like movements to be generated in the fluid inside the cochlear.

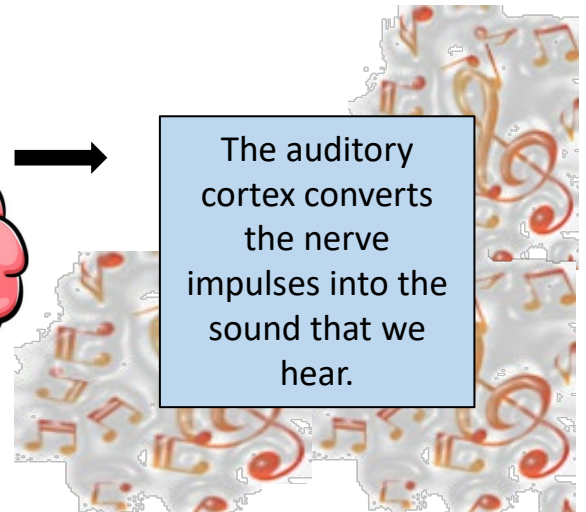
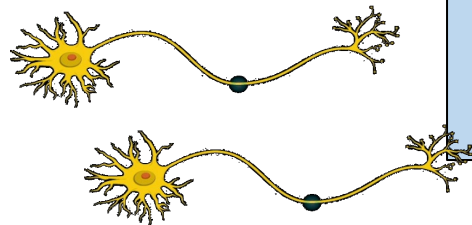
These waves stimulate microscopic hairs inside the cochlear.

The hairs in the cochlear are tuned to respond to differences in sound frequency and pitch.

When stimulated these hair cells generate nerve impulses that are transferred to the auditory nerve.

The nerve impulses travel along the auditory nerve into the hearing centre of the brain, called the auditory cortex.

The auditory cortex converts the nerve impulses into the sound that we hear.

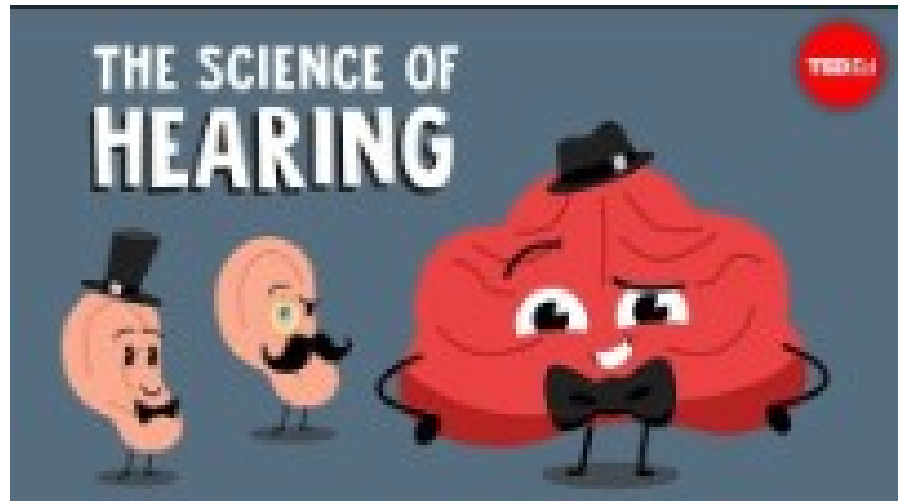


Video Resources

- Cognito video Physics #73 from



- TedED Science of Hearing





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