

The Ear

The eye has photoreceptors to translate light to nerve impulse. The ear has mechanoreceptors that translate movement of air into nerve impulses. The brain then interprets these impulses as sounds.

There are three separate sections to the ear:

1. The **outer ear** - consists of the **pinna** and the **auditory canal**. The auditory canal has hairs and wax-producing glands that protect the ear.
2. The **middle ear**- contains the eardrum - called the **tympanic membrane**, as well as the three smallest bones in the body, the **ossicles**. They are called the **malleus**, **incus**, and **stapes** . There are two small openings called the **round window** and the **oval window**. In this section you will also find the **eustachian tube** which connects the ear to the nose and throat.
3. The **inner ear**- has three sections : cochlea (hearing)
vestibule
semicircular canals (the last two are involved with
balance and equilibrium)
The inner ear is filled with fluid, the other two are filled with air.

How You Hear

- sound waves (vibrating air molecules) enter the auditory canal
- the waves cause the tympanic membrane to vibrate
- vibrations travel to the malleus, then incus, then the stapes
- from the stapes the vibration passes to the oval window and out into the fluid of the cochlea
- the cochlea has several canals that interconnect
- pressure waves move from the vestibular canal to the tympanic canal, making the basilar membrane
- hair cells between the basilar membrane and the tectorial membrane then bend, causing a nerve impulse to travel along to the **cochlear nerve**(**auditory nerve**)
- the brain hears

Disorders of the Auditory System

Deafness - there are two types of deafness:

1. Nerve deafness - caused by damage to the hairs of the spiral canal. Is irreversible and often comes with age, illness or constant exposure to loud noises
2. Conduction deafness - caused by damage to the outer or middle ear, is more easily treated because hearing aids could help.

Chronic Ear Infections

If the angle of the eustachian tube connection to the middle ear is shallow, fluid can build up. This causes infections, especially in children.

Tympanostomy tube surgery or eustachian tube implants can often help.

Cochlear Implant Surgery

These procedures have proved successful for many who have nerve deafness, but there are some ethical considerations. People who have had the surgery are often shunned by the deaf community, of which they are no longer a part, but not truly accepted by the hearing community, who still views them as hearing impaired.

