



Hearing

Sarah Mae Sincero 6.6K reads

One of the five traditional senses, hearing is the ability to determine sound. This happens through the ear, a sensory organ that is able to detect vibrations and changes in pressure over time relative to sound stimuli. The human auditory system transforms vibrations into nerve impulses via transduction so that perception of sound in the brain may occur.

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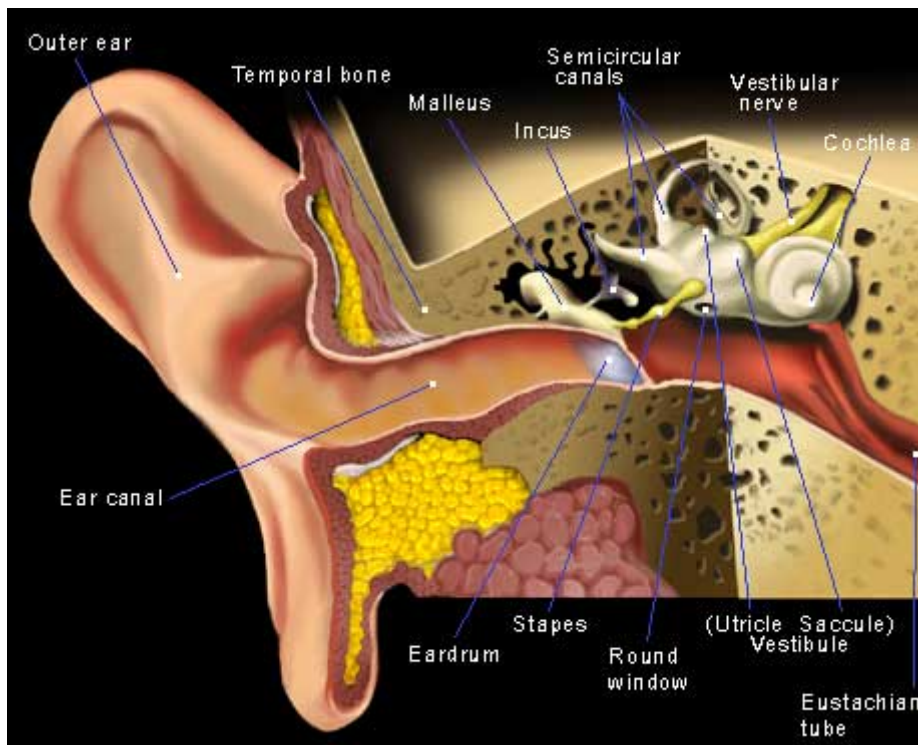
Mechanism

The ear is divided into three major sections: the outer, middle, and inner ear. The outer ear includes the pinna, auditory canal, and eardrum. When sound waves strike the eardrum, this structure vibrates, causing the sound waves to have distinct amplitudes. Thus, differentiation of sound starts at the eardrum. The middle ear is comprised of an air-filled chamber containing the human bodies' smallest bones – the ossicles. Through these tiny structures, sound waves are transmitted and amplified from the outer ear to the inner ear.

The inner ear includes a spiral-shaped structure called cochlea. The cochlea is responsible for transducing the sound waves into nerve impulses. The basilar membrane of the cochlea has hair cells which are specialized auditory receptors. Sound waves cause these hair cells to move, causing the changes in sound frequency of waves that enter the inner ear. The vibrations are then transformed into firings of spatial-temporal form in the auditory nerve. These firings travel to the brainstem via the auditory nerve. Learn more about the auditory system [here](#).

Because hearing involves the auditory system being sensitive to molecular movement in the

outside world of the organism, this sense is classified as mechanosensation, just like touch.



Ear Anatomy. Photo by jacquichris [1]

Eustachian Tube

A 1 ½ inch long air-filled tube, the Eustachian tube is a structure that acts as a connector between the middle ear and the nasopharyngeal region. The Eustachian tube [2] opens for less than a second whenever a person yawns or swallows for two important biological functions: (1) to equalize the changes in the pressure in the ear, particularly when there are altitude changes, and (2) to refill the air that the middle ear's mucous membrane has absorbed.

Hearing Tests

Physical examination usually involves simple hearing tests such as the watch tick test and the whisper test. An audiometer is a device used to measure hearing. Procedures such as electrocochleography (EchoG), otoacoustic emissions (OAE), and auditory brainstem-evoked potentials (ABR) are electrophysiological hearing tests that present more accurate results than the audiometer.

Disorders

Hearing loss is a sensory disorder that is classified into degrees: mild, moderate, and severe hearing loss. Patients suffering from mild hearing loss have a hard time hearing during conversations. They have difficulties hearing when they are in a noisy environment. People with moderate hearing loss usually have a hearing aid to keep up with conversations. Patients afflicted with severe hearing loss use more powerful hearing aids. A greater degree is profound hearing loss, wherein patients depend on sign language and lip-reading during conversations.

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Links

[1] <http://www.flickr.com/people/jackiechris/>

[2] <http://www.earallergy.com/ears-allergy/why-allergy-and-ear-disease/role-of-the-eustachian-tube/>