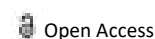




## COMMENTARY



# Structure of the Human Ear and its Variants

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## Description

The ear is an organ that provides hearing and, in mammals, body balance through the vestibular system. In mammals, the ear is usually described as having three parts: The outer ear, the middle ear, and the inner ear. The outer ear consists of the ear and the ear canal. Since the outer ear is the only visible part of the ear in most animals, the word “ear” often refers to the outer part only. The middle ear includes the tympanic cavity and three ossicles. The inner ear is located in a bony labyrinth and contains structures that are key to several senses: the semicircular canals, which allow balance and tracking of the eyes during movement; the uterus and sac, which allow balance in a stationary state; and the cochlea, which enables hearing. The ears of vertebrates are located somewhat symmetrically on both sides of the head, which helps localize sound.

## Structure

The human ear consists of three parts, the outer ear, the middle ear, and the inner ear. The auditory canal of the outer ear is separated from the air-filled tympanic cavity of the middle ear by the tympanic membrane. The middle ear contains three small ossicles involved in sound transmission and is connected to the throat in the nasopharynx through the pharyngeal opening of the Eustachian tube. The inner ear contains the otolith organs of the uterus and sac and the semicircular canals, which belong to the vestibular system, as well as the cochlea of the auditory apparatus.

**External ear :** The external ear is the outer part of the ear that includes the fleshy visible pinna (also called pinna), the ear canal, and the outer layer of the eardrum (also called the eardrum).

The auricle consists of a curved outer edge called the helix and an inner curved edge called the antihelix and

opens into the ear canal. The cupid protrudes and partially obscures the ear canal, as does the reversed cupid. The hollow area in front of the ear canal is called the concha. The ear canal extends about 1 inch (2.5 cm). The first part of the canal is surrounded by cartilage, and the second part near the eardrum is surrounded by bone. This bony part is known as the ossicle and is formed by the tympanic part of the temporal bone. The skin around the ear canal contains ceruminous and sebaceous glands that produce protective earwax. The auditory canal ends on the outer surface of the eardrum.

**Middle ear :** The middle ear is located between the outer and inner ear. It consists of an air-filled cavity called the tympanic cavity and includes three ossicles and the ligaments that hold them together; auditory tube; and round and oval windows. The ossicles are three small bones that work together to receive, amplify, and transmit sound from the eardrum to the inner ear. The bones are the mallet (hammer), the anvil (anvil) and the stirrup (stirrup). The stapes is the smallest bone in the body. The middle ear also connects to the upper part of the throat in the nasopharynx through the pharyngeal opening of the Eustachian tube.

**Inner ear :** The inner ear is located in the temporal bone in a complex cavity called the bony labyrinth. The central area, known as the vestibule, contains two small fluid-filled depressions, the utricle and the sac. They connect with the semicircular canals and the cochlea. There are three semicircular canals, located at right angles to each other, which are responsible for dynamic balance. The cochlea is a spiral, shell-shaped organ responsible for hearing. Together, these structures form the membrane labyrinth.

The bony labyrinth refers to the bony compartment

containing the membranous labyrinth contained within the temporal bone. The inner ear structurally begins with the oval window, which receives vibrations from the tip of the middle ear. The vibrations are transmitted to the inner ear in a fluid called endolymph that fills the membranous labyrinth. The endolymph is located

in two vestibules, the utricle and the sac, and eventually passes into the cochlea, a spiral-like structure. The cochlea consists of three fluid-filled spaces: the vestibular duct, the cochlea, and the tympanic duct. Hair cells responsible for converting mechanical changes into electrical stimuli are present in the organ of Corti in the cochlea.