

Anatomy and Physiology of the Ear: The Mechanics of Hearing

Note: Refer to the color diagram of the ear on page 92 (Appendix B) of this resource guide.

1. The **pinna** is the only part of your ear located on the outside of your head. It is what we commonly refer to as the ear. It is made of skin and cartilage. The pinna helps direct sounds into the ear. It also helps your brain to figure out where the sound is coming from.
2. The **auditory canal** (commonly called the ear canal) is a short tube. An adult's ear canal is only about one inch long and directs sound to the eardrum. This is also the part of our ear where **earwax** is found. Earwax is actually a good thing to have; the wax traps dirt before it reaches the eardrum, keeps skin moist and protected, and also repels bugs with its scent!
3. The **eardrum**, or **tympanic membrane**, is a thin membrane that vibrates in response to sound. The tympanic membrane vibrates at the same frequency (rate of vibration) as the incoming sound, and in turn, causes a small bone in the ear to vibrate at that same frequency.
4. The **ossicles** are three bones found in the ears of all mammals. (The root word 'os' refers to bones.) These bones are the smallest bones in a person's body, and they act like a system of levers.
The **malleus**, or hammer, is the bone attached to the eardrum. When the eardrum begins to vibrate as a result of sound, it pushes on the malleus, which then begins to vibrate.
The **incus**, or anvil, lies between the other two ossicles. When the malleus vibrates against it, the incus also begins to vibrate.
The **stapes**, or stirrup, is the third ear bone. When the incus vibrates against it, the plate at the end of the stapes vibrates. The stapes is connected to a window in the cochlea.
5. The **cochlea** is the snail-shaped structure in the inner ear. The cochlea is filled with fluid, and lined with about 18,000 microscopic **hair cells**. They are called hair cells because they are topped by hair-like structures called stereocilia. All 18,000 hair cells could stand on the head of a pin. As vibrations from the stapes enter the cochlea, the fluid is set into motion, causing the stereocilia on the hair cells to move. The hair cells in turn stimulate the auditory nerve.
6. The **auditory nerve** (not shown in the diagram) acts like a telephone line to the brain. The electrical signals generated by the hair cells are sent to the brain via the auditory nerve. The hearing centers in the brain interpret the signals as sounds we can recognize.