

Key to the Giant Hands-On Ear

Number 823-33

1. Auricle or Pinna (*external ear*). The auricle helps capture soundwaves and directs them into the external auditory meatus.
2. External auditory meatus (*auditory canal*). It channels soundwaves entering the auricle toward the eardrum.
3. Cartilage of auditory meatus. The cartilage provides flexible support for the fleshy part of the external ear.
4. Temporal bone. The bone which forms part of the side and floor of the skull. The auditory meatus, middle and inner ears are all located within the temporal bone.
5. Eardrum (*Tympanic membrane*). The eardrum is stretched across the inner end of the external auditory meatus. It separates the auditory meatus from the middle ear chamber. Soundwaves entering the external auditory meatus strike the eardrum and set it vibrating.
6. Hammer* (*malleus*). The first in the chain of three tiny bones of the middle ear. The hammer is connected to the inner side of the ear drum.
7. Anvil* (*incus*). The second of the tiny bones of the middle ear. The anvil links the hammer and the stirrup.
8. Stirrup* (*stapes*). The third and smallest of the three middle ear bones — the smallest bone in the human body. The stirrup is connected to the oval window of the labyrinth of the inner ear.

* This chain of three tiny bones, known as the auditory ossicles, located within the middle ear chamber, is set in motion by the vibration of the eardrum. The vibrations are amplified (*increased in strength*) by the bones, and transmitted to the liquid-filled labyrinth of the inner ear.

9. Middle ear chamber (*tympanic cavity*). The hollow air-filled chamber in which the chain of three tiny bones — hammer, anvil, and stirrup — is located.
10. Auditory tube or Eustachian tube. The tube or channel which leads from the middle ear chamber to the throat. It allows air pressure on both sides (*inside and outside*) of the eardrum to be equalized. Generally we are unaware that this air pressure equalization is taking place — the tube opens every time we swallow or yawn. However, it becomes readily apparent when rapid changes in external atmospheric pressure, due to ascent or descent in an airplane or express elevator for example, causes the ears to "pop".

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11. Cartilage of auditory (eustachian) tube. Provides support for the fleshy (*non-bony*) portion of the tube, preventing it from collapsing.
12. Semicircular canals. The three fluid-filled semicircular canals, each oriented in a different plane, at right angles to one another, are an integral part of the inner ear, yet have nothing to do with hearing. They play an essential role in maintaining balance or equilibrium when the body is in motion — walking, running, jumping, somersaulting, etc.

Movements of the head stimulate microscopic hair-like nerve endings in the swollen bases of the canals, sending impulses to the brain. The brain then signals appropriate muscles to maintain balance or orientation during body motion. Amusement park rides often cause such rapid changes in body position that it becomes impossible to maintain equilibrium, and we become dizzy.
13. Vestibule. That portion of the labyrinth of the internal ear closest to the middle ear chamber. The semicircular canals arise from the vestibule. Within the vestibule are two sack-like chambers concerned with maintaining balance and orientation when the body is relatively motionless — sitting, standing, etc.

The sacks are lined with tiny sand-like granules which shift position when the head is tilted in any direction. The shifting granules stimulate hair-like nerve endings, sending impulses to the brain which can then direct a position adjustment if needed.
14. Cochlea. The spiral or snail-like portion of the labyrinth whose fluid-filled passages contain specialized hair-like receptors sensitive to sound vibrations. The receptors at one end of the spiral are stimulated by high-pitched sounds, while those at the other detect low-pitched sounds.
15. Oval window. Located beneath the stirrup, the oval window is the membrane-covered opening into the vestibule through which sound vibrations from the stirrup are transmitted into the fluid-filled labyrinth.
16. Round window. This membrane-covered opening is located in the wall of the cochlea. Pressure waves created when the oval window is pushed by the vibrating stirrup, travel throughout the full length of the spiral, liquid-filled cochlea. Since liquids cannot be compressed, each time the oval window is depressed, the round window bulges outward.
17. Vestibulocochlear nerve. Also called the auditory nerve or acoustic nerve. This important nerve carries balance impulses from the vestibule and sound impulses from the cochlea to the brain.
18. Internal carotid artery. The main artery supplying blood to the brain.