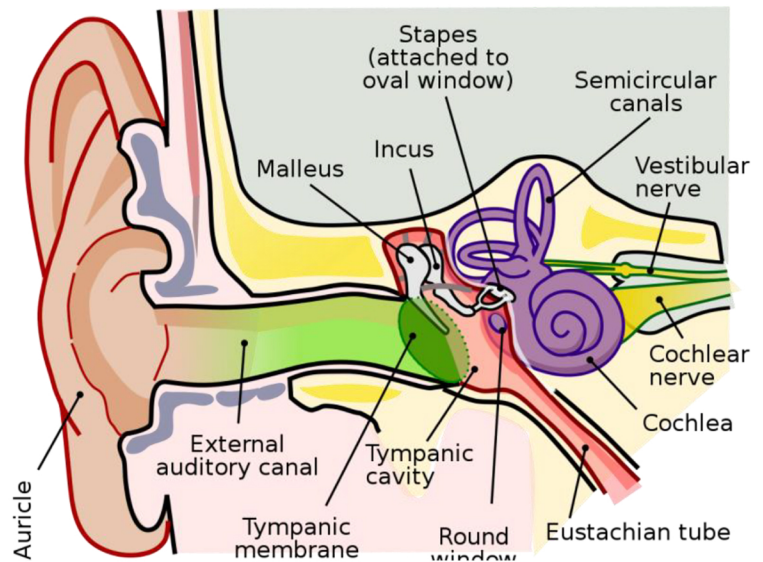


Ear Anatomy & Sound



The ear can be divided into three compartments, each with specific structures meant to transmit sound waves from the environment, to hair cells of the cochlea, and finally to the brain.

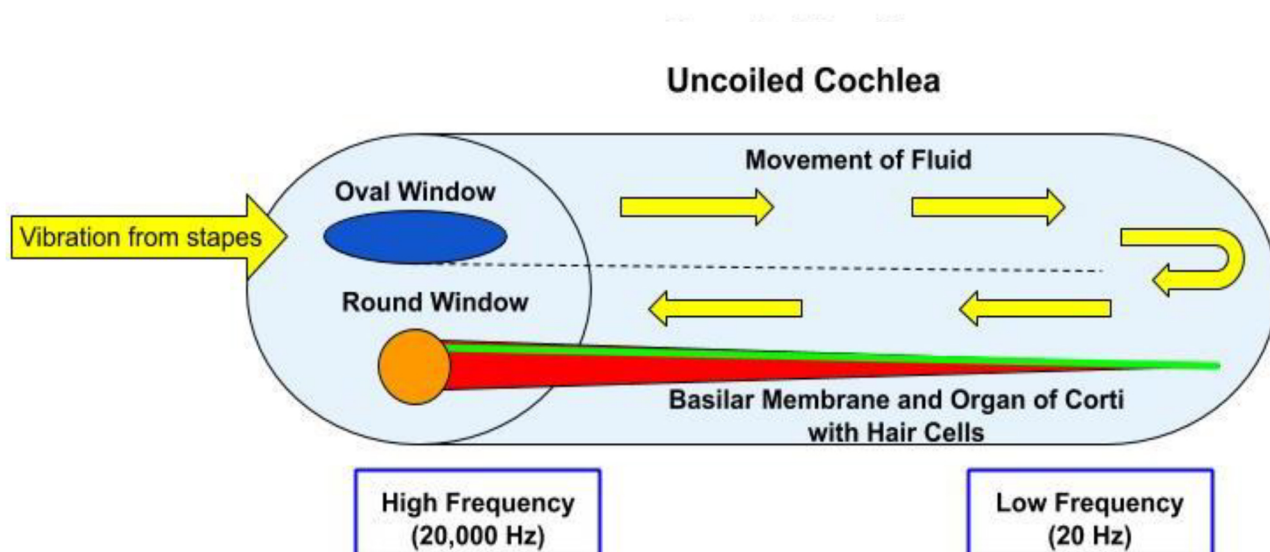


Lars Chittka; Axel Brockmann / CC BY (<https://creativecommons.org/licenses/by/2.5>)

	Filled with	Component	Function
External Ear	Air	Auricle	Capture soundwaves from the environment
		External auditory meatus	Transmits soundwaves
Boundary		Tympanic membrane	Vibrate ossicles
Middle Ear	Air	Ossicles: Malleus, Incus, Stapes	Vibrate to transmit and amplify sound waves
		Eustachian Tube	Connects with pharynx to equalize pressure with the environment
Boundary		Oval window	Transmit oscillations to fluid of the inner ear
Inner Ear	Fluid	Semicircular Canal	Detect angular acceleration
		Vestibule	Detects linear motion
		Cochlea	Converts movement of fluid to a neural signal

After passing through the external, middle, and inner ear, oscillations caused by soundwaves finally reach the spiral-shaped **cochlea** of the inner ear.

Pressure moves the fluid within the cochlea, bending cilia on the hair cells. These cells convert mechanical energy from the fluid waves to electrical signals, which are finally sent to the brain as sound.



Structures of the Cochlea:

Oval Window	Transmits vibrations from the middle ear to fluid of the cochlea
Basilar Membrane	Positions hair cells within fluid to sense variable sound frequencies <ul style="list-style-type: none"> Low frequency sound is picked up near the apex High frequency sound picked up near the round window
Organ of Corti	Lies on top of the basilar membrane and contains hair cells
Hair Cells	Detect fluid movement in the ear and send electrical signals to the brain
Round Window	Relieves pressure caused by fluid movement in the cochlea

Key Concept:

Mechanotransduction: the transformation of mechanical force to electrical signal.
Ex. Hair cells in the cochlea convert pressure waves to a signal interpreted as sound in the brain