**Table 1** Wave Guides, Resonators and Triggers of Human Auditory System

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Ear/Nerves**  **/Brain** | **Wave Guide1 /Resonator2/Trigger3** | **Coupling of Energy and Information** | **Media** | **Most vibration direction** |
| Outer Ear | Ear canal1,2 | Ear drum (tympanic membrane) to middle ear. | Air, N2,O2, .... | Longitudinal |
| Middle Ear | Auditory ossicles1 | Ear drum (tympanic membrane) to outer ear,  oval and round membrane window to inner ear. | Solid, bone. | Longitudinal |
| Inner Ear  (Cochlea) | Scala vestibuli1 | Oval membrane window to middle ear; transparent window to scala tympani; membrane to scala media. | Liquid (plasma), perilymph. | Longitudinal and transverse |
| Inner Ear  (Cochlea) | Scala tympani1 | transparent window to scala vestibuli; round membrane window to middle ear; membrane and cells to scala media. | Liquid (plasma), perilymph. | Longitudinal and transverse |
| Inner Ear  (Cochlea) | Scala media1 | Membrane to scala vestibuli; membrane and cells to scala tympani. | Liquid (plasma), endolymph. | Longitudinal and transverse |
| Inner Ear  (Cochlea) | Basilar membrane1,2, hair and supporting cells2; a temporal frequency is encoded at a spatial angle. | Hair probing to tectorial membrane and scala media; synapses to spiral ganglion; membrane to scala tympani. | Liquid (plasma); solid, membrane. | Longitudinal and transverse |
| Inner Ear  (Cochlea) | Tectorial membrane1,3 and hairs3 | Membrane to scala media; hair probing to hair cells. | Solid, hair, membrane. | Transverse and Longitudinal |
| Inner Ear  (Cochlea) | Spiral ganglion1 | Synapses to hair cells (receptors or sensors). | Liquid (plasma). | Transverse |
| Auditory Cortex | Neurons2; a cochlear angle is decoded at a cortical location. | Synapses to auditory radiations | Liquid (plasma). | Transverse |