INNER EAR SPECIAL SENSES:

HEARING

2/9/82, RVSD 2/13/97, 8 Feb 04, 11 Feb 04, 18 Feb 08, 11 Mar 09, 22 Feb 10, 16 Feb 11, 20 Feb 12

Hearing and balance sensed here.

THREE DIVISIONS OF EAR: (p 575)
External pinna (auricle and lobule) and external auditory meatus
Middle chamber containing three ossicles
Inner transduction occurs in fluid-filled chambers

Embryology: otic placode forms, invaginates into otic pit, then vesicle.
lateral pouch forms from pharynx,
pharyngeal pouch forms eustachian tube
Otic vesicle forms membranous labyrinth,
enervated by C.N VIII, vestibulocochlear nerve

External auditory meatus, 2.5 cm long, down and forward, resonator for 2500 to 5000 cps

EXTERNAL EAR: Auricle, lobule, helix, antihelix, tragus.
(Page 576)
Ceruminous glands make cerumen, antibacterial

MIDDLE EAR: tympanic membrane partitions external from middle ear
(p 575)
oval and round windows oval leads to scala vestibuli of cochlea and round exit via scala tympani
two other openings: to mastoid sinuses and eustachian tube (to nasopharynx)

lined with mucous membrane, continuous with throat, infections can spread esp in young where eustachian tubes open all the time:
mastoiditis is especially dangerous, proximity to brain
otitis media: infections of mucous membrane of middle ear, can impair hearing.
otitis externa: told by tugging on pinna in various directions. if painful, otitis externa.

OSSICLES: malleus, incus to stapes. (page 576)
possess sm muscles (tensor tympani stapedius), react to loud noises, protect inner ear

INNER EAR (within petrous portion of temporal bone): (p 577)
ossaeus labyrinth three areas: vestibule
(In temporal bone) semicircular canals cochlea
membranous labyrinth lines, filled with endolymph.
Perilymph fills outer space
Oval window "opens" (membrane separates) into vestibule, vibrations carried by perilymph which fills the scala vestibuli

COCHLEA: 2 turns around modiolus, bony central core. (P 582)
spiral laminae extend to spirals of cochlea fr modiolus.
two membranes extend across, basilar and vestibular membranes
three tunnels scala vestibuli connects with oval window cochlear duct central chamber, filled with endolymph scala tympani duct terminates at round window

organ of Corti: rests on basilar membrane,
hair cells rest on basilar membrane. (p 583)
Tectorial membrane, hairs touch, trigger impulse

BASILAR MEMBRANE:

near oval window base of cochlea, rigid, small, responds to high pitch vibrations.
near helicotrema, wide, flexible, detects low frequency sound vibrations

Sounds which can be heard by human: 20 to 20,000 hertz, most sensitive to 1000 to 4000

Auditory pathways: (p 587) organ of Corti spiral ganglion cochlear nerve in medulla to inferior colliculus to medial geniculate body of thalamus to temporal lobe near insula (lines lower lateral fissure of cortex