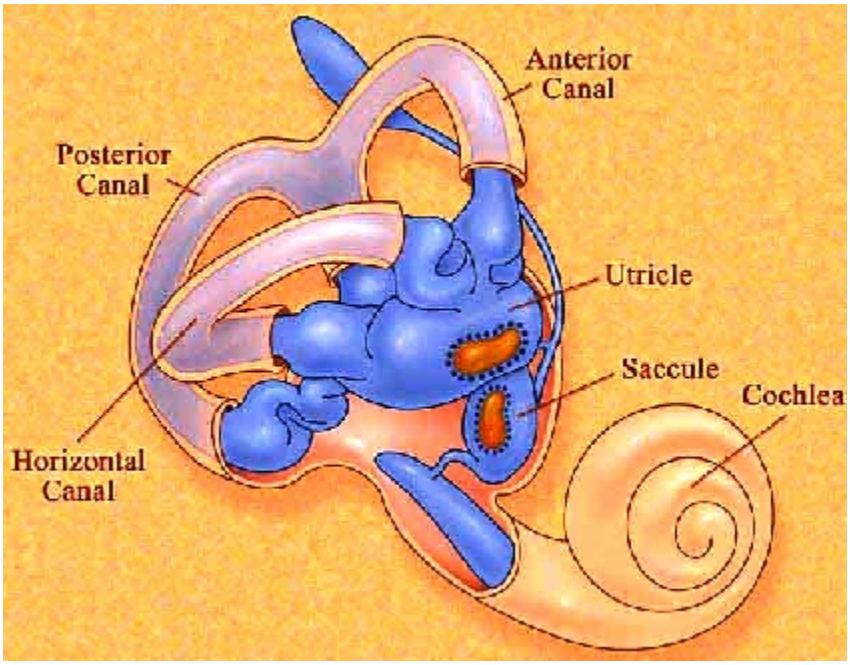
BALANCE ORGANS

2/7/89, rvsd 2/10/94, 2/15/96, 2/13/97, 8 Feb 00, 12 Feb 03, 11 Feb 04, 23Feb09, 16Feb11
Marieb, p 530-533, Martini 5th: 557-574, Martini 6th: 590-594, 8th: 588-592



VESTIBULAR APPARATUS: (p 588)
located in the vestibule portion of inner ear

Detect static vs dynamic equilibrium

LINEAR: (static balance maintained here) (p 591)

maculae (groups of hair cells) in
saccules (little sac), sense vertical
utricles detect **horizontal** linear acceleration utriculus: **small bag**

sensory cilia (**stereocilia**) from **hair cells** project into otolithic membrane with **otoliths**
acceleration flexes hairs, transduction to nervous impulse, carried by vestibular nerve
bent in one direction: **increase** depolarization (many nerve impulses)
other direction: **decrease** depolarization (few nerve impulses)
interpreted as linear acceleration

ROTATIONAL acceleration:
semicircular canals: three canals at right angles, superior & posterior,
anterior: nod yes,
posterior: tilt sideways
lateral: shake no
contain **crista ampularis** (crista) which detect rotational acceleration
stereocilia of hair cells project into gelatinous **cupola** floats in endolymph
rotation causes endolymph to flow past cupola, flexes hair cells, triggers nervous impulse.

Nystagmus is reflex adjustment mediated by **superior colliculi,** aids eyes in tracking when head is turning
also called vestibulo-ocular reflex (VOR) moves eyes in opposite direction of turning head
"Doll's eyes reflex" in unconscious patients, manually turn head side to side. Eyes should go in opposite direcction
absence of doll's eye reflex suggests serious brain injury

motion sickness: **visual** input disagrees with **balance** input,
histamine, acetylcholine and norepinephrine are released in the brain.
warning signs excessive salivation
pallor
rapid deep breathing
sweating

Anti motion sickness drugs: Dramamine (antihistammine)
scopalamine (anticholinergic)