

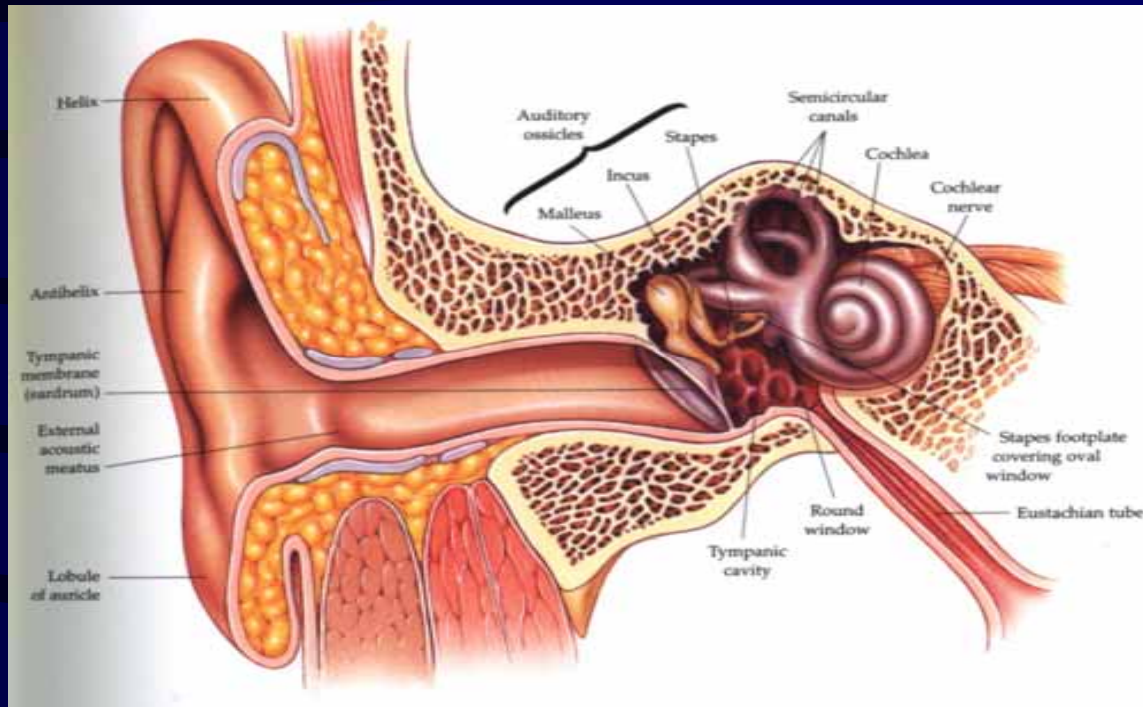
THE EAR: PRACTICAL ANATOMY & PHYSIOLOGY:

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US/TBH

Some questions you should be able to answer by the end of this lecture:

- Where (anatomically) may/may you not wear an earring?
- Why should you throw your earbuds away?
- What makes it possible to hear whispered “sweet nothings”?
- Why should airlines give you gum to chew on descent?
- Why does syringing an old lady’s ear with cold tapwater make her dizzy?
- How does the ear differentiate between low & high-pitched sounds?
- Why do your ears ring after a rave party?

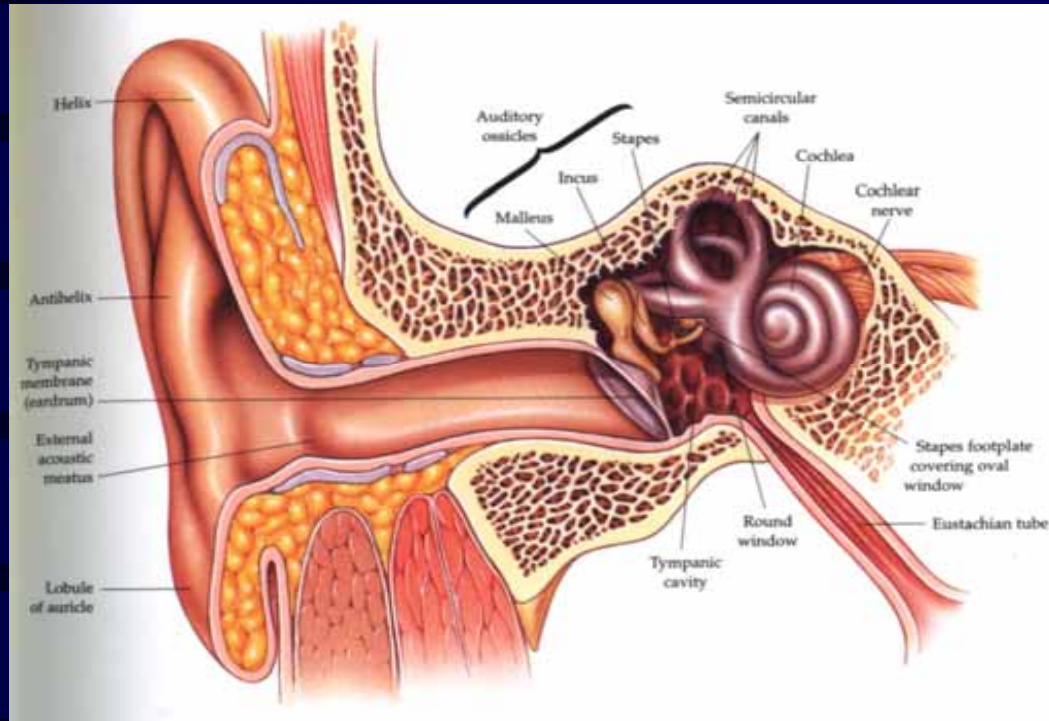
Ear: The 3 Parts:



External Ear:

- Pinna
- External Auditory Meatus
- Drum (Tympanic Membrane)

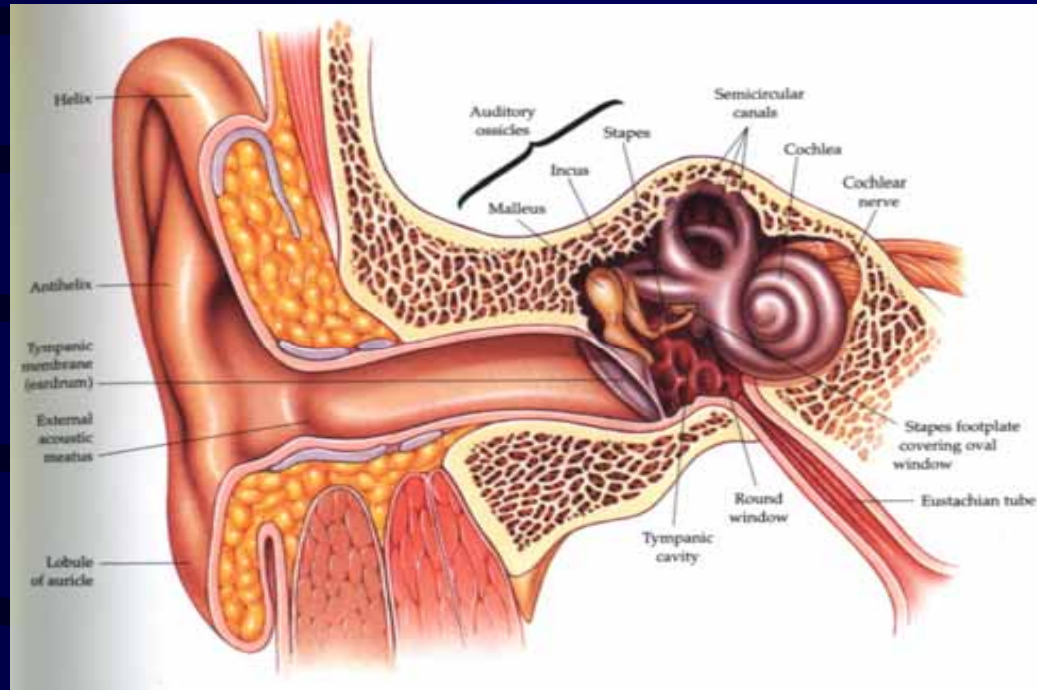
Ear: The 3 Parts:



Middle Ear Cleft:

- Middle Ear itself
- Eustachian Tube
- Mastoid Air Cell System

Ear: The 3 Parts:

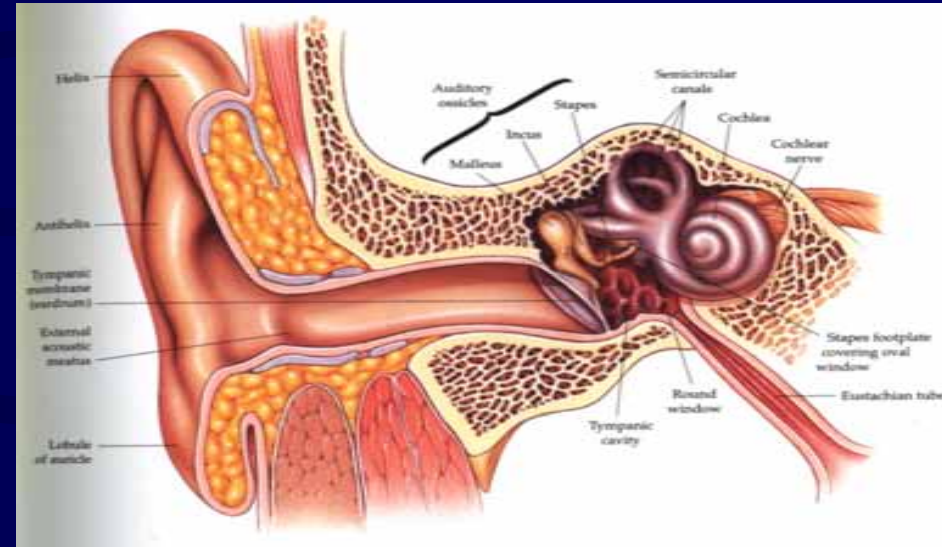


Inner Ear: “The Labyrinth”

- Cochlea
- Vestibule: Utricle
Saccule
Semicircular Canals
- Vestibulocochlear Nerve --> CNS

External Ear:

- Pinna
- External Auditory Meatus
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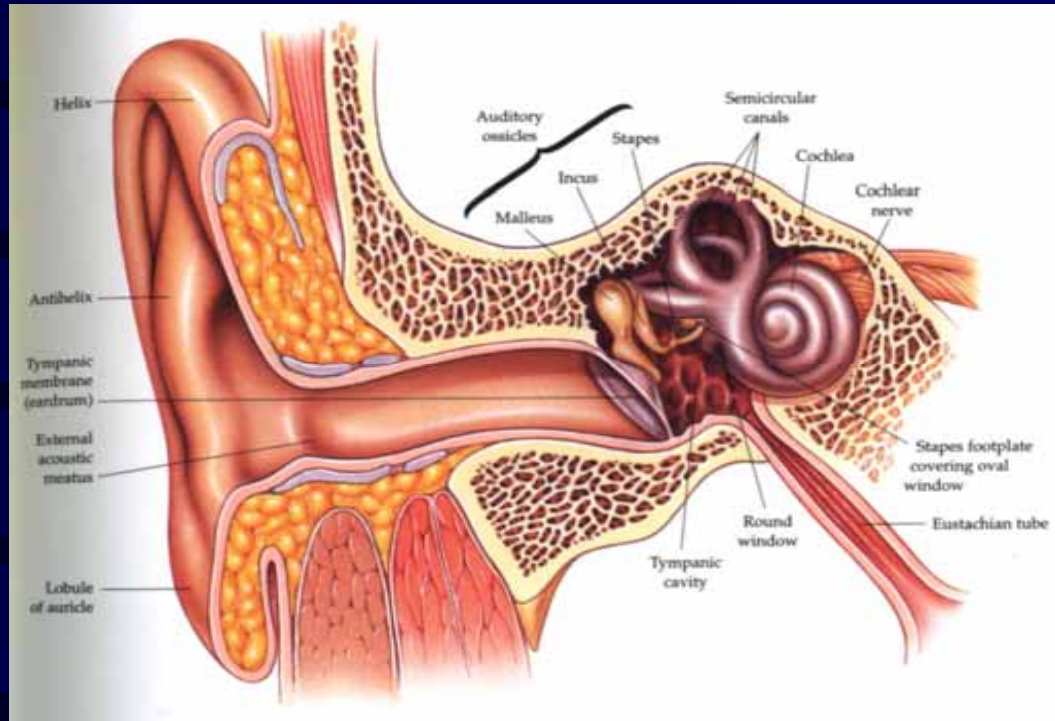
Tissues:

- Skin incl
 - Wax
 - Hairs
- Cartilage
 - Perichondrium
- Bone
- Eardrum

Function:

- Desquamation, migration
- Protection, migration
- protection, expulsion
- Seals off Middle Ear

Middle Ear Cleft:

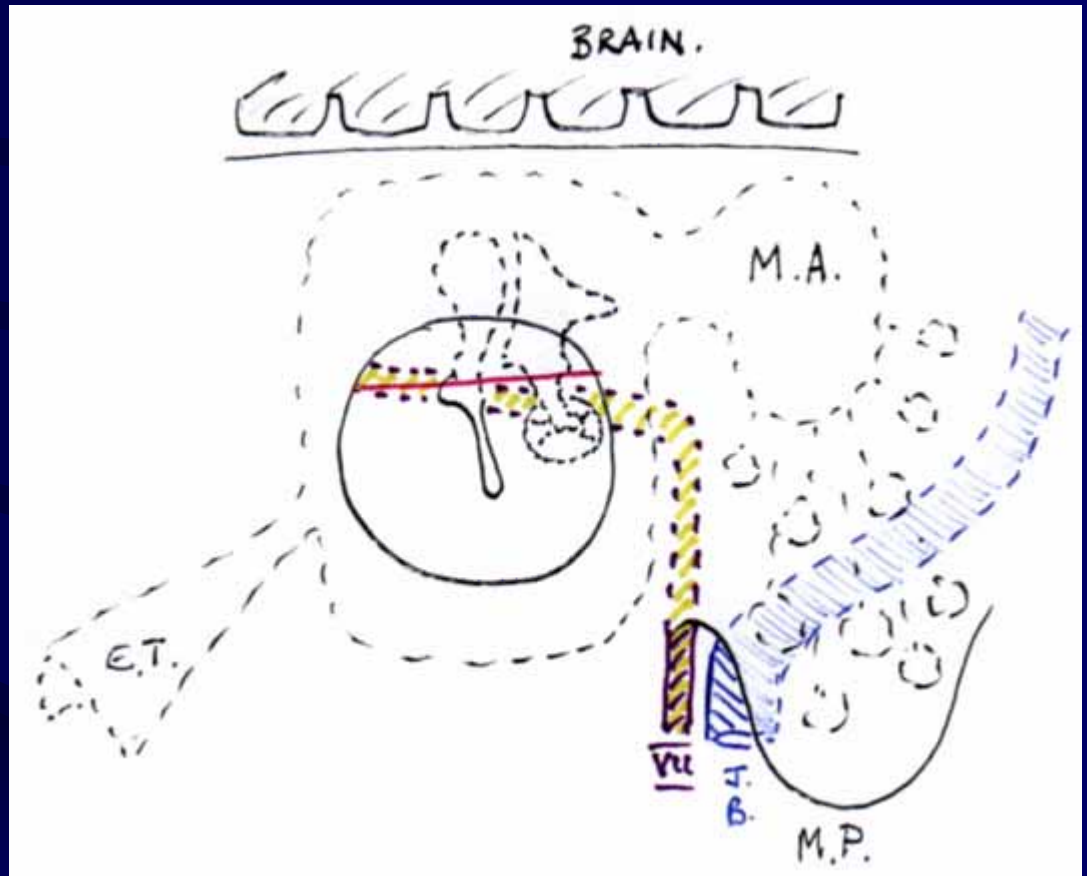


Middle Ear itself

- Eustachian Tube
- Mastoid Air Cell System

Middle ear Cleft: parts:

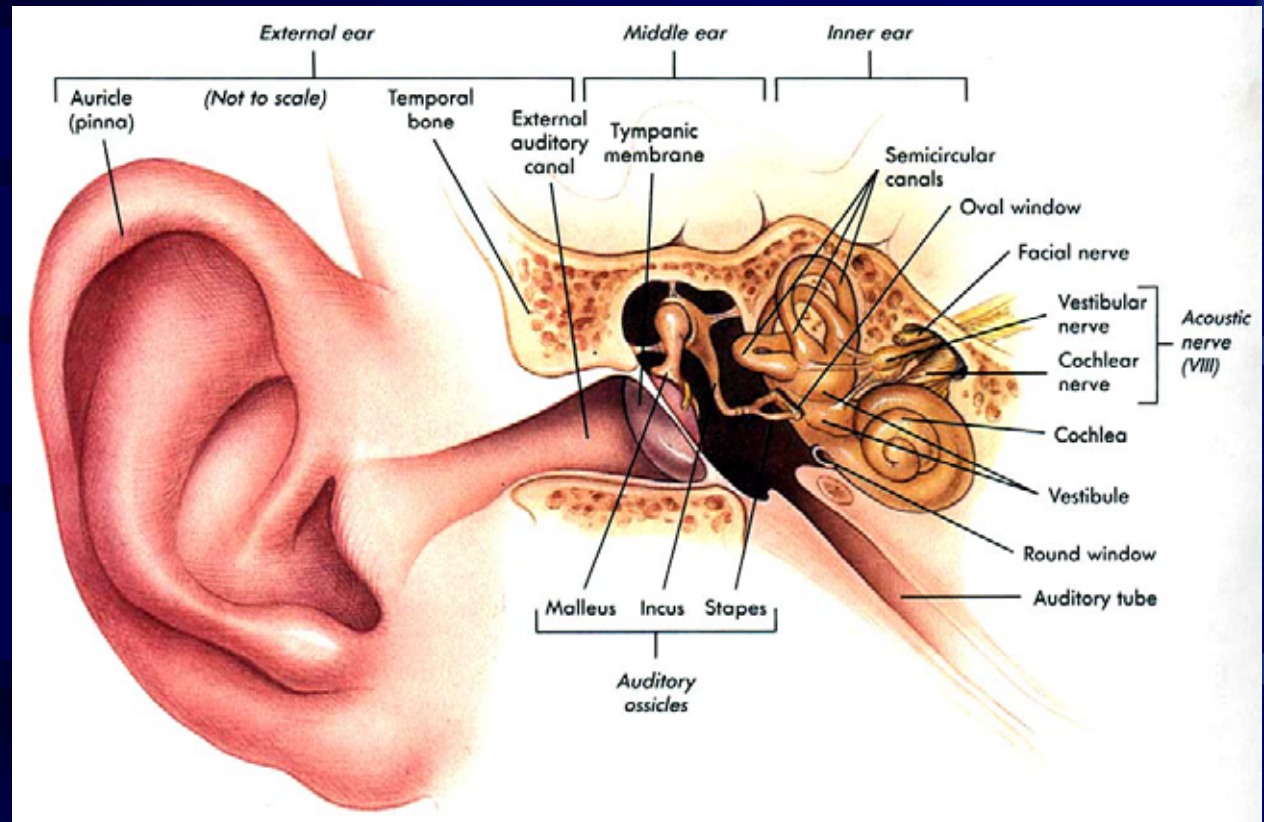
- Middle ear per se:
 - Mesotympanum
 - Epitympanum (“attic”)
 - Hypotympanum
- Eustachian Tube
- Mastoid:
 - “Antrum”
 - Aditus
 - Air cells



Left M.E.Cleft

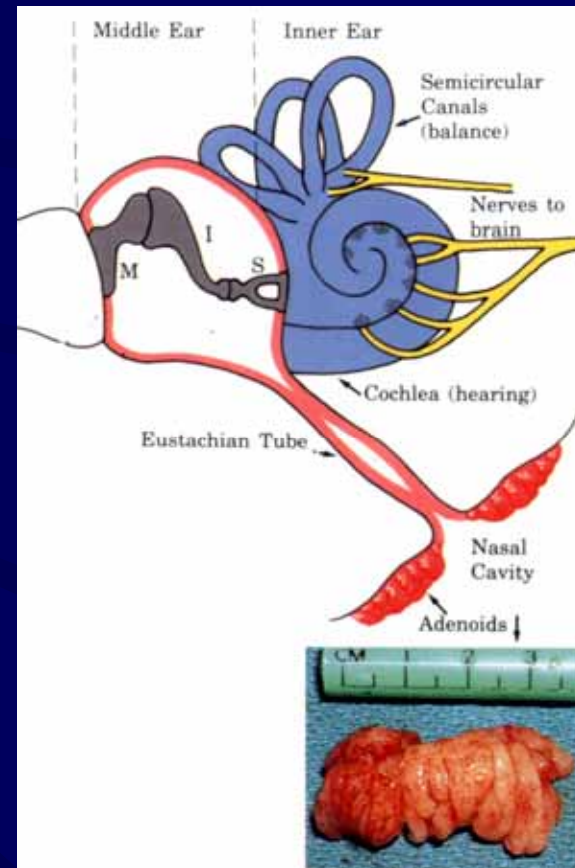
Middle ear anatomy: contents:

- Eardrum
- Ossicles:
 - malleus
 - incus
 - stapes
- Oval Window
- Round Window
- Facial Nerve



Middle ear Physiology:

- Aeration:
 - Eustachian tube
 - Mastoid air cell “reservoir”
- Mucosa
- Sound amplification
 - TM
 - Ossicles



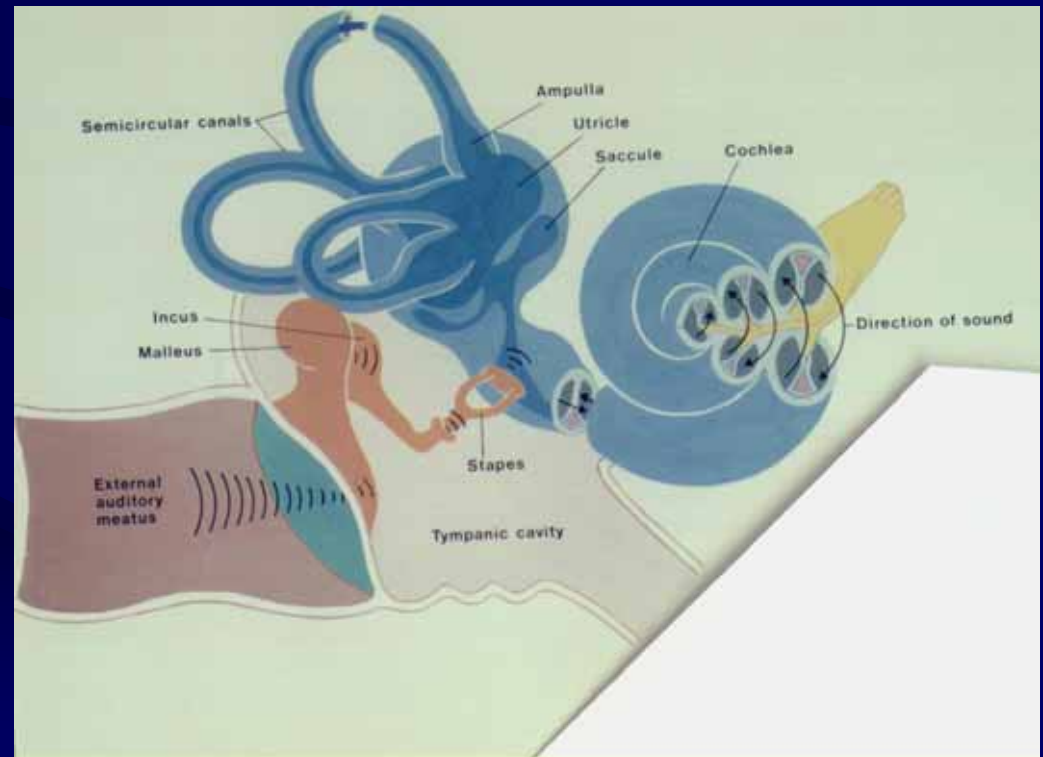
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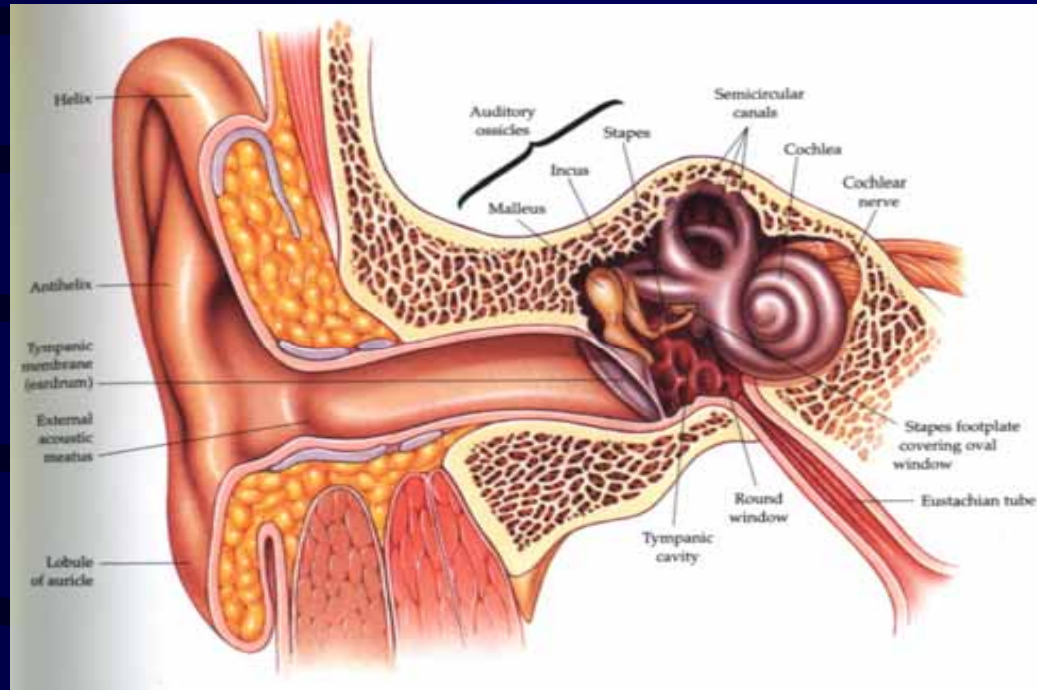


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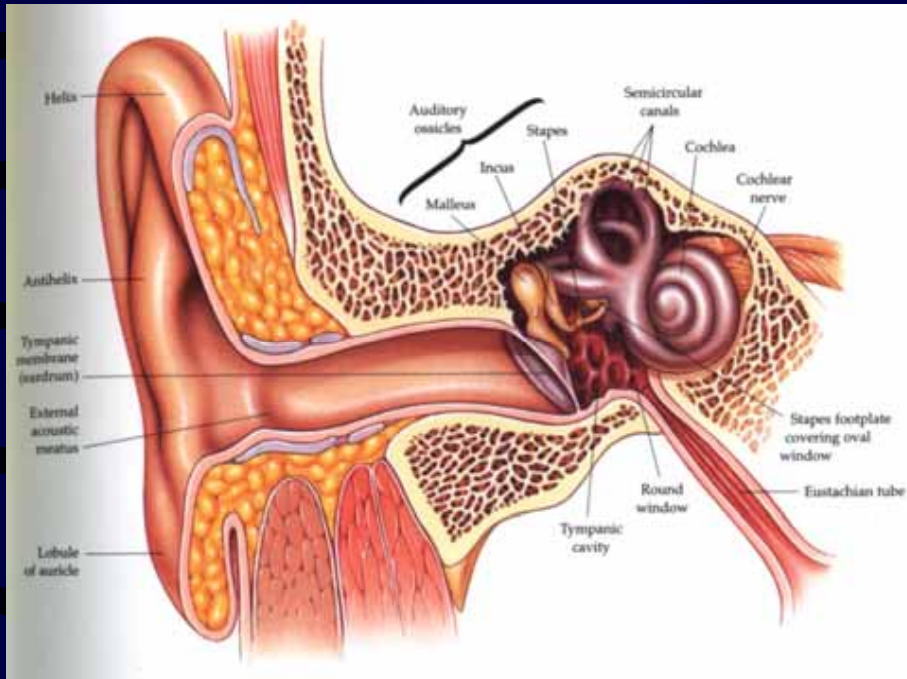
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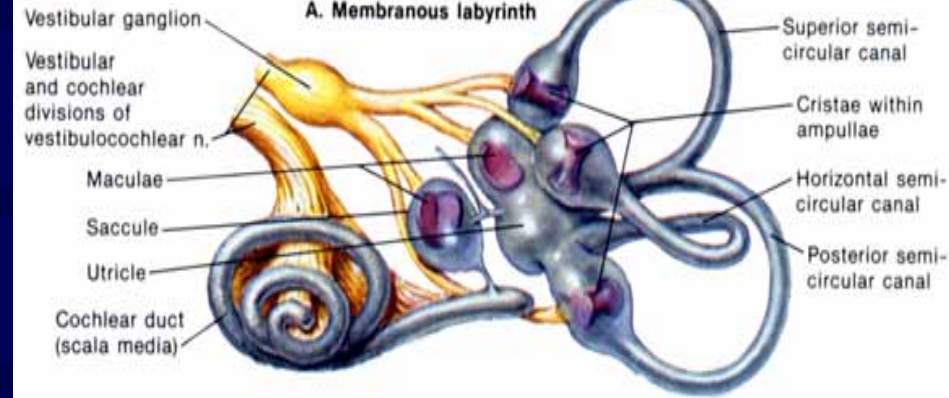
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THE INNER EAR:



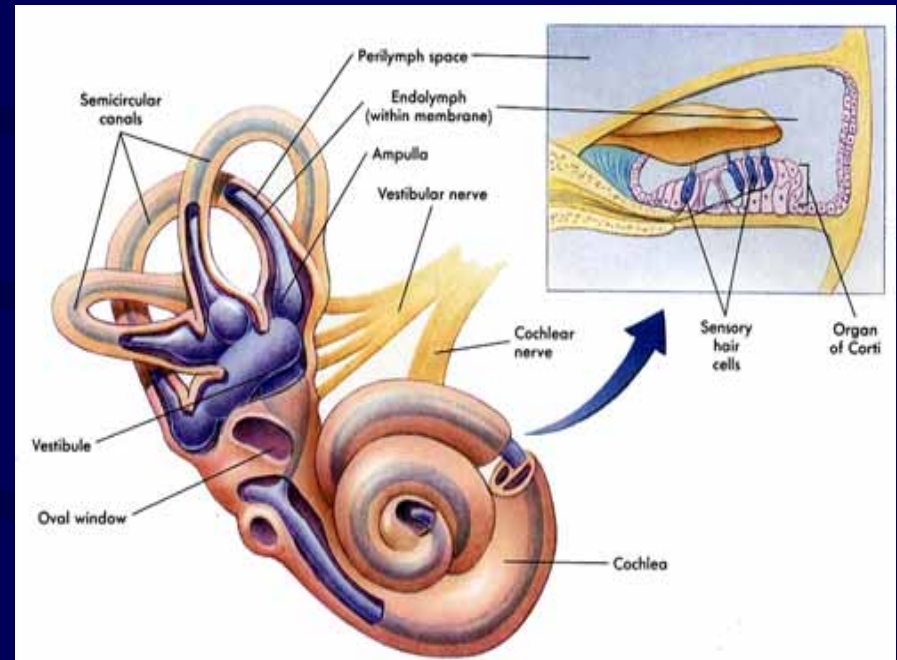
Vestibular Receptors



- Cochlea
- Vestibule: Utricle
Saccule
Semicircular Canals
- Vestibulocochlear Nerve --> CNS

The Inner Ear: Cochlea:

- Twisted tube:
 - Basal turn to apex
- 3 Compartments:
 - Scala tympani
 - Scala media
 - Scala vestibuli
- Basilar membrane & hair cells



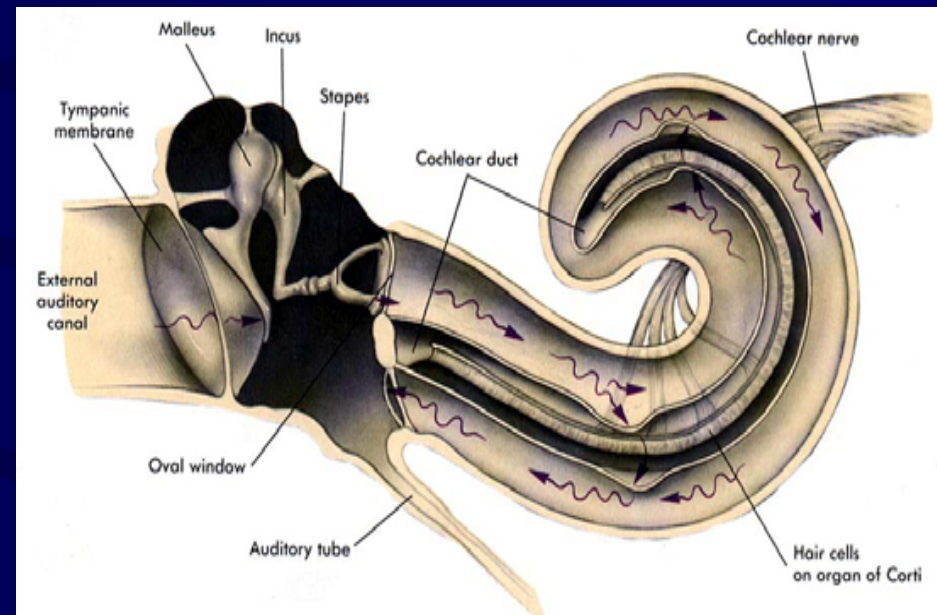
The Inner Ear: Cochlea: Function:

HEARING:

Sound wave travels up
Basilar Membrane

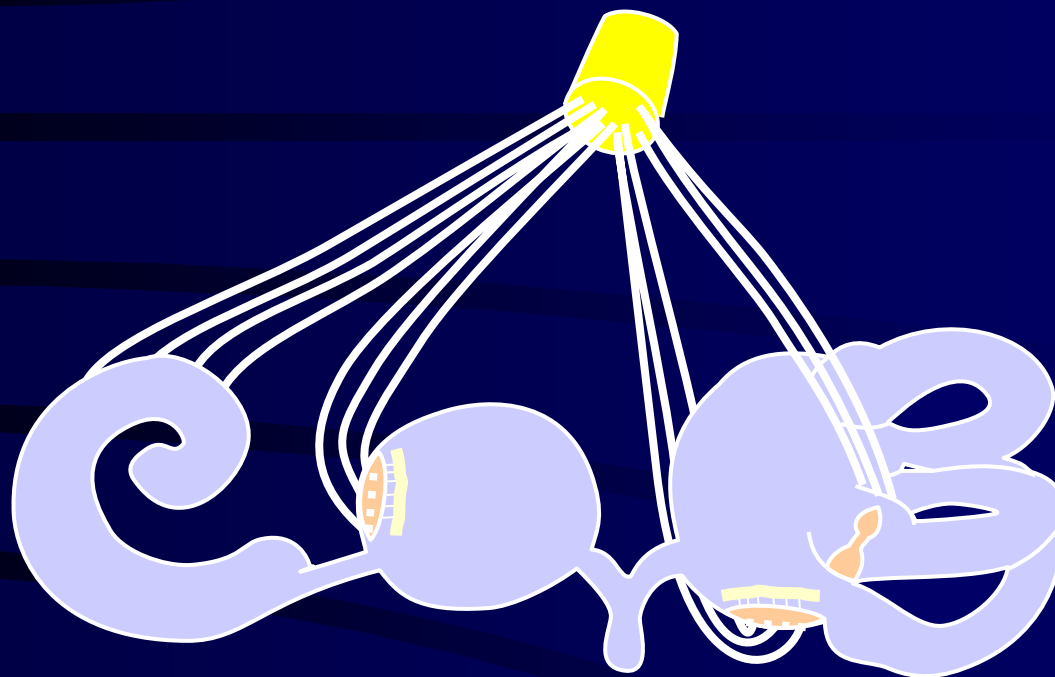
Pitch (frequency)
determines place of max.
displacement

Hair cells of Organ of Corti
on Basilar Membrane
transform movement into
electrical impulses =>
Cochlear Nerve=>
Cerebral Cortex



INNER EAR: PHYSIOLOGY:

Vestibulocochlear nerve (VCN)

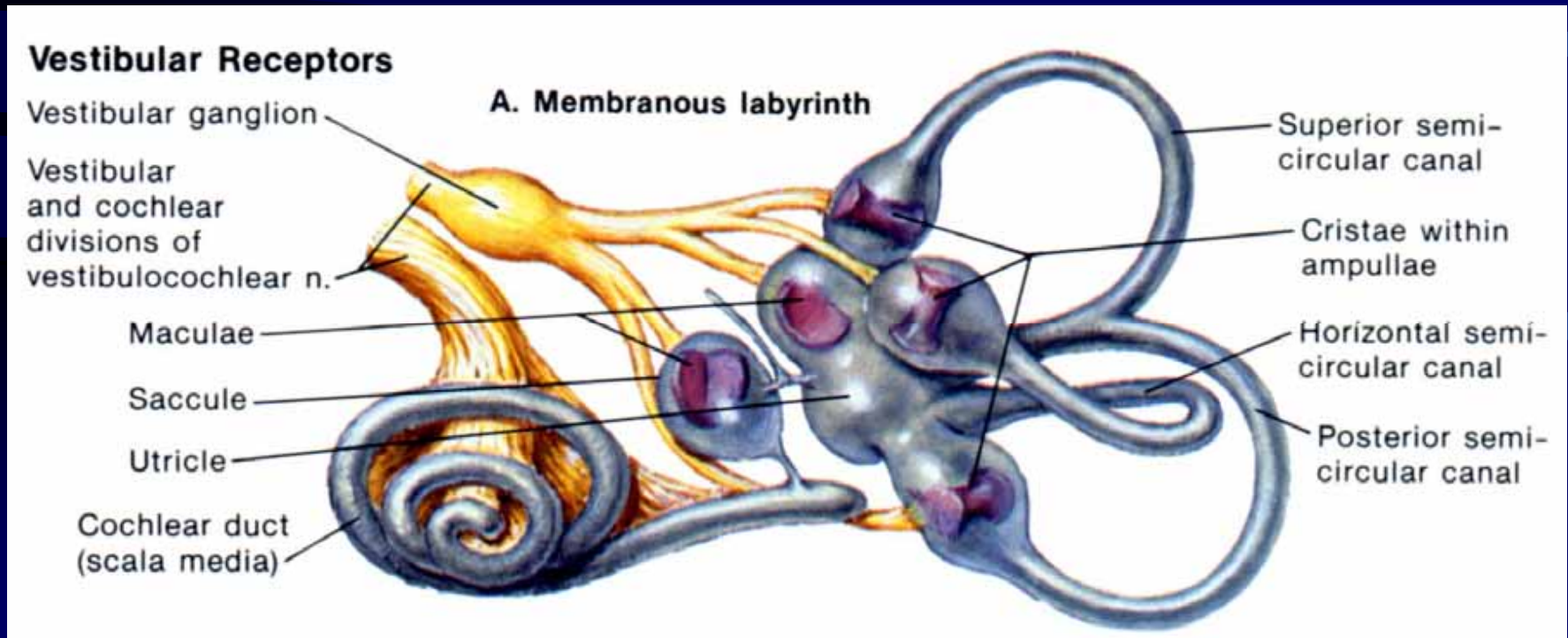


Cochlea	Vestibular labyrinth	
Hearing	Saccule + Utricle +	Semicircular canals
	Static position + linear acceleration	Angular acceleration
	Maculae: Hair cells + statoconial membrane	Ampullary crista: Hair cells + cupulae

EQUILIBRIUM:

ANATOMY & PHYSIOLOGY OF VESTIBULAR APPARATUS

- Bony Labyrinth contains membranous
- (Outer) Perilymph ~ Extracellular Fluid
- (Inner) Endolymph ~ Intracellular Fluid ($\uparrow K, \downarrow Na$)

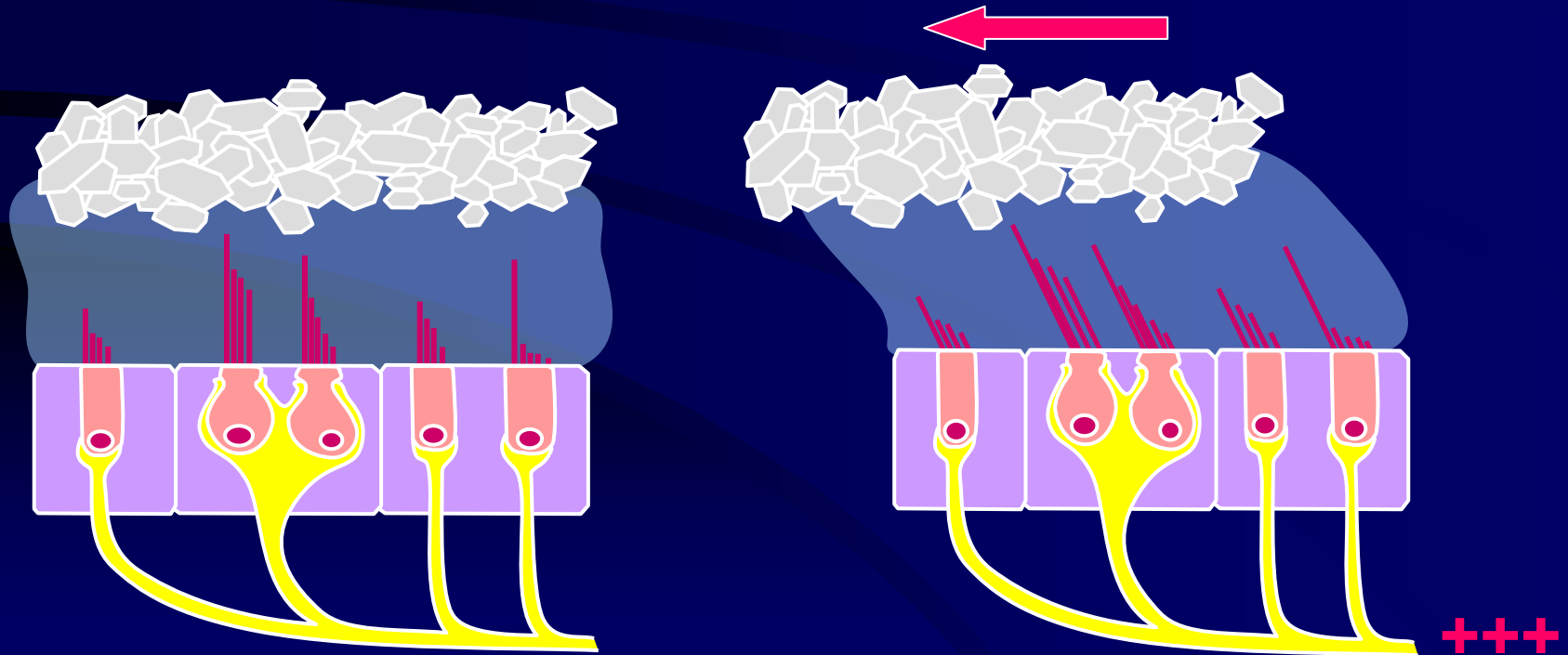


EQUILIBRIUM:

ANATOMY & PHYSIOLOGY OF VESTIBULAR APPARATUS

MACULA (of utricle & saccule)

- Hair cells
- Stataconial membrane (CaCo3 crystals in mucopolysaccharide bed)
- Static position & linear acceleration

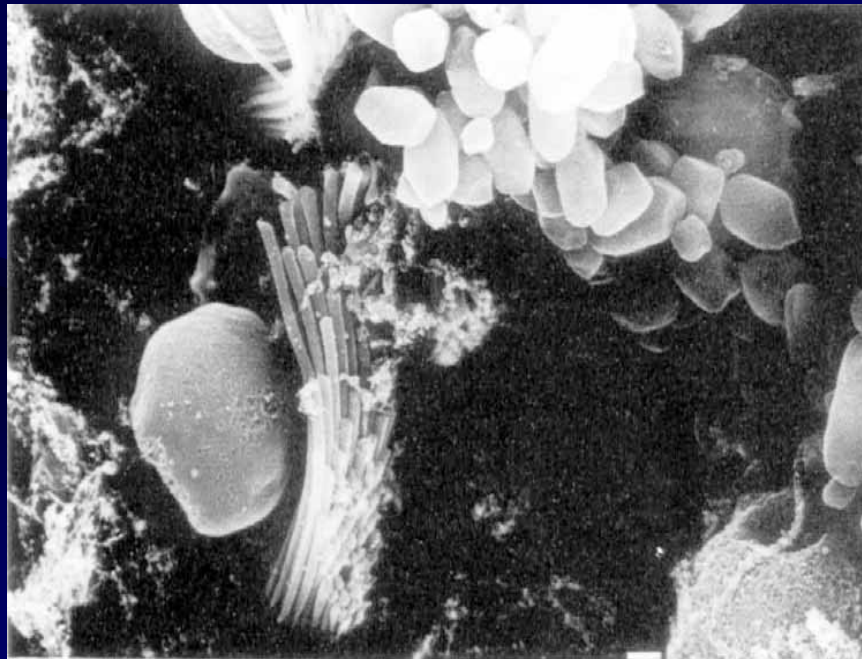


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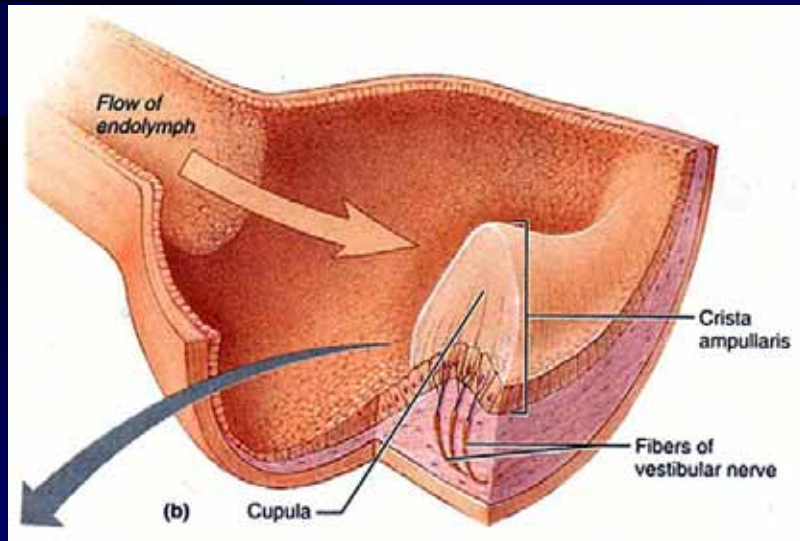


EQUILIBRIUM:

ANATOMY & PHYSIOLOGY OF VESTIBULAR APPARATUS

AMPULLARY CRISTA:

- Dilated ampulla at end of semicircular canal
- Hair cells
- Cupula
- Angular acceleration



EQUILIBRIUM:

ANATOMY & PHYSIOLOGY OF VESTIBULAR APPARATUS

SEMICIRCULAR CANALS:

- Orientated in 3 different spacial planes
- at +/- right angles
- able to track exact direction of acceleration

