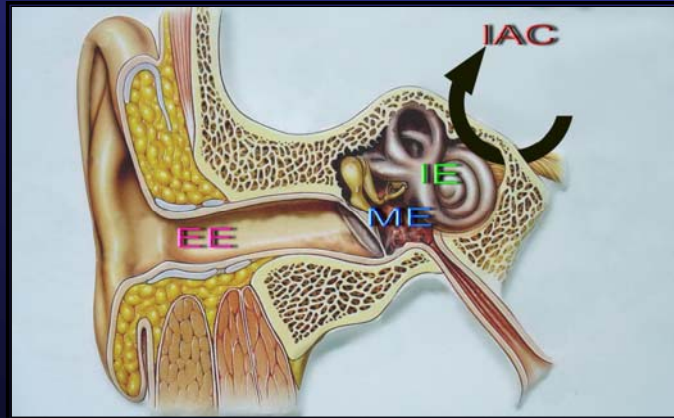


# Anatomy & Physiology of Ear

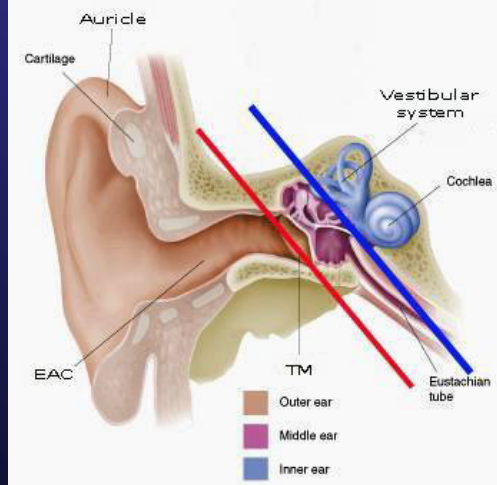


Fatthi Abdel Baki MD

2010

ANATOMY

## Parts of the Ear



External Ear

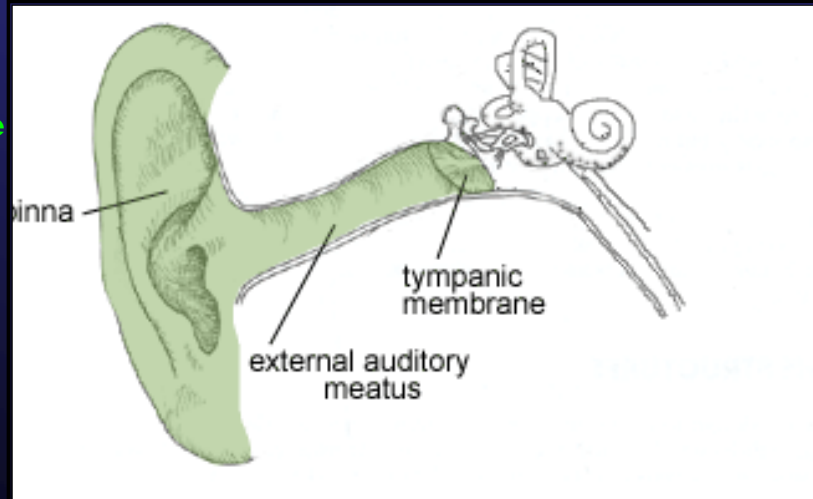
Inner Ear

Middle Ear Cleft

## External Ear

ANATOMY

**Auricle**  
(Pinna)



**External auditory canal**

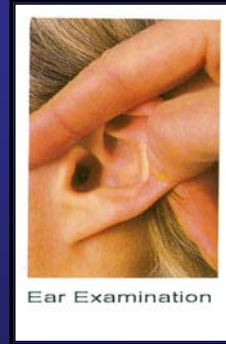
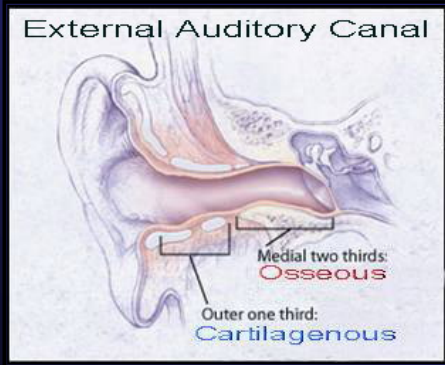
## Auricle

ANATOMY



## External Auditory Canal

### Cartilaginous part

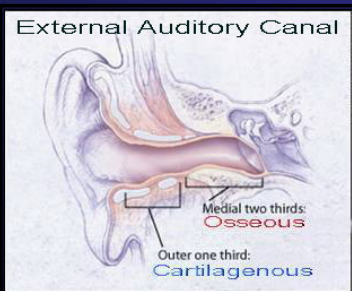


Outer 1/3: Cartilage  
Inner 2/3: Bone

Examination Adult:  
up and back

## External Auditory Canal

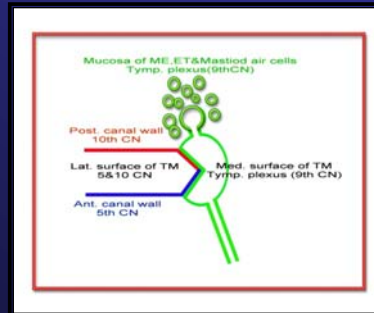
### Cartilaginous part



Outer 1/3: Hair follicles = furunculosis  
Inner 2/3: No hair follicles

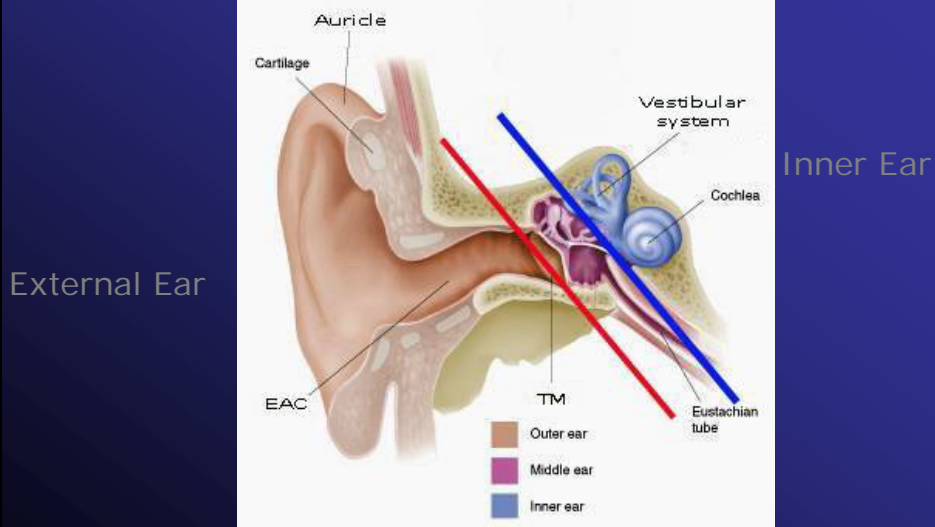
# Referred Otalgia

- V: Trigeminal
- IX: Glossopharyngeal
- X: Vagus
- C2 & C3



## Parts of the Ear

ANATOMY



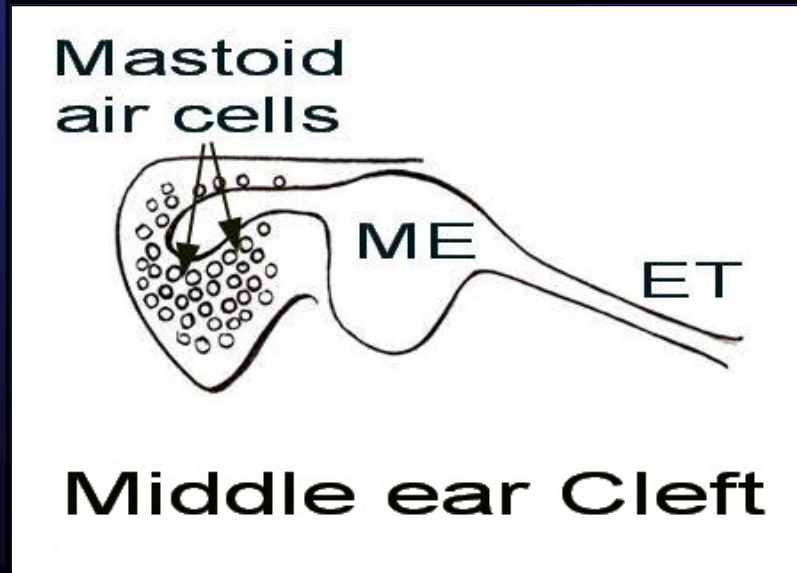
External Ear

Inner Ear

Middle Ear Cleft

## Middle Ear Cleft

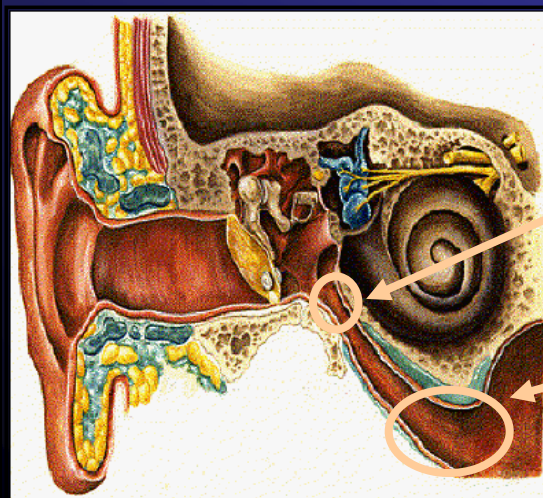
ANATOMY



## Eustachian Tube

ANATOMY

From Middle ear To Nasopharynx



Bony opening:  
• Patent

Cartilaginous opening:  
• Potentially closed  
• Opens on yawning & swallowing

## Eustachian Tube

### Children



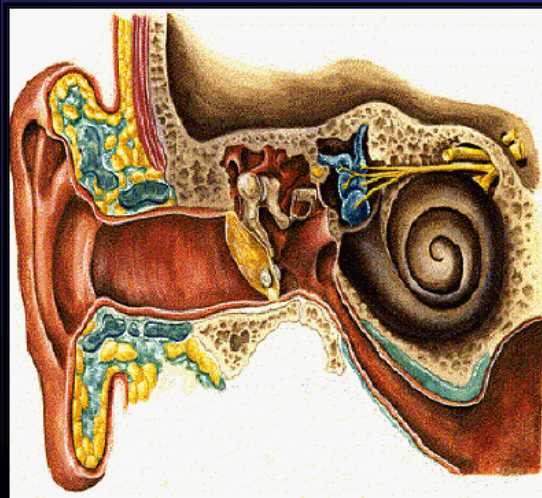
### Children ET:

- Shorter
- Wider
- More horizontal

Infection is commoner in infants

## Eustachian Tube

### Physiology

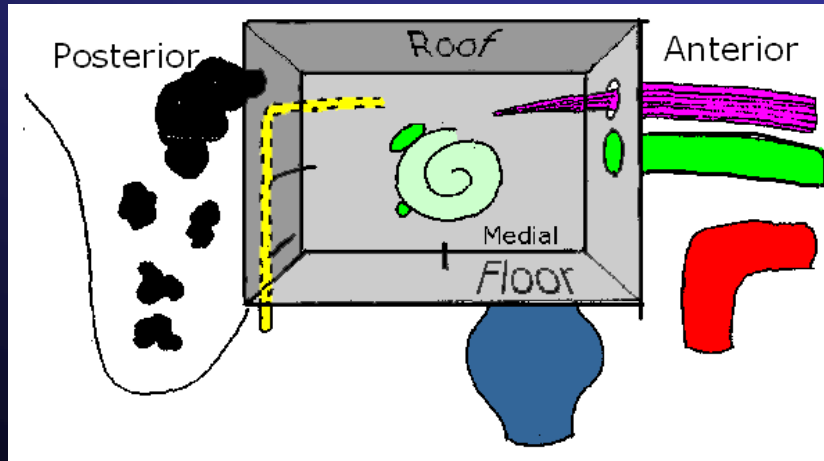


Equalize Pressure  
Middle & External Ear



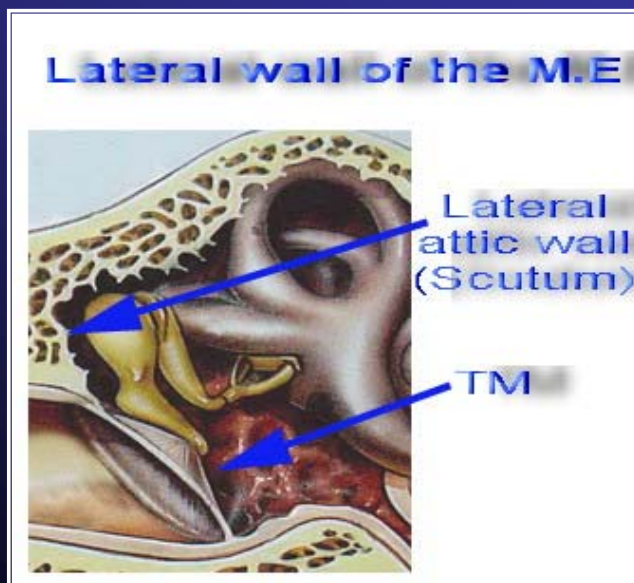
## Middle Ear Cavity Walls (6)

ANATOMY



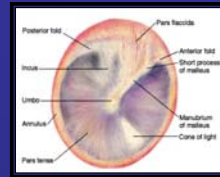
## Middle Ear Cavity Lateral wall

ANATOMY



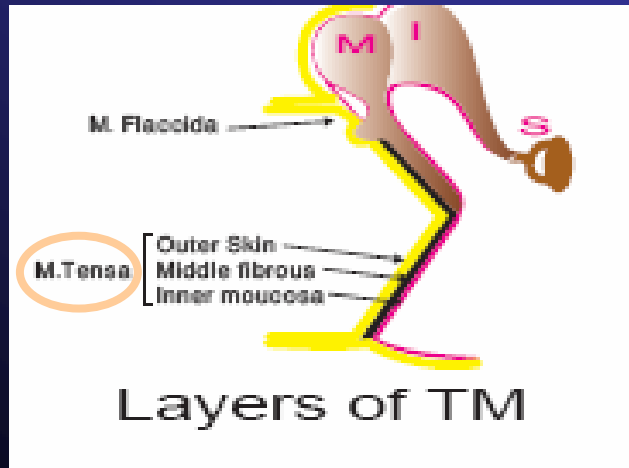
## Middle Ear Cavity

### Lateral wall (Tympanic membrane)



Pars Flaccida

Pars Tensa



- Skin
- MM

- Skin
- Fibrous
- MM

## Middle Ear Cavity

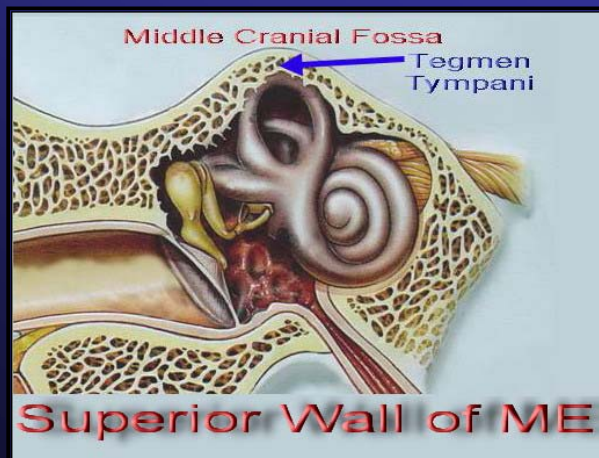
### Superior wall

ANATOMY

MCF (Temporal lobe)

Tegmen Tympani

Middle Ear

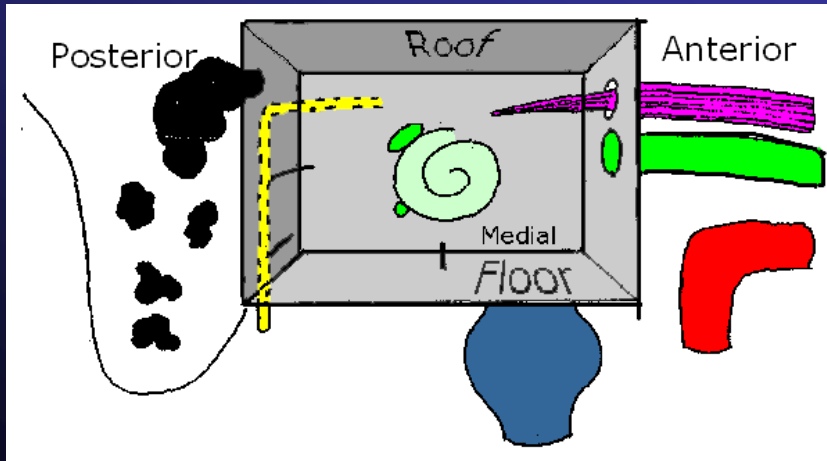




# Middle Ear Cavity

## Medial Wall

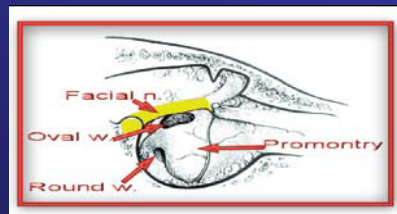
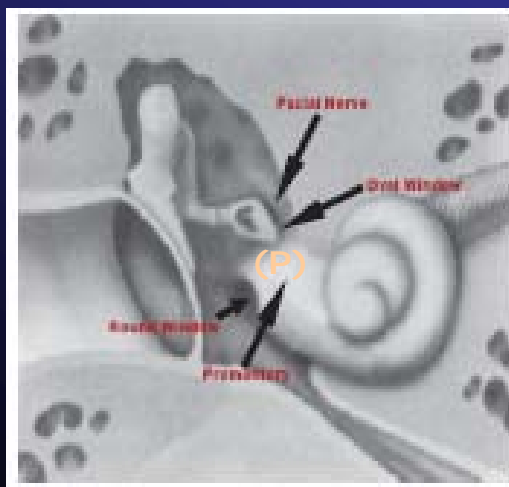
ANATOMY



# Middle Ear Cavity

## Medial wall

ANATOMY

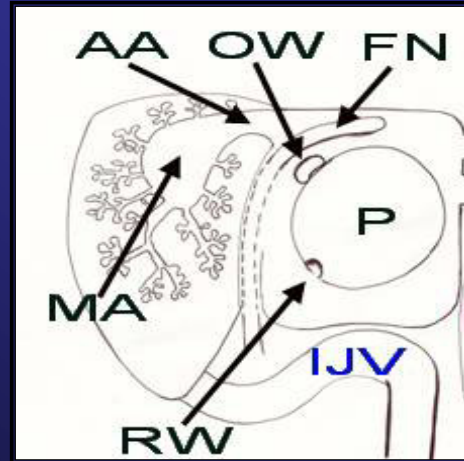
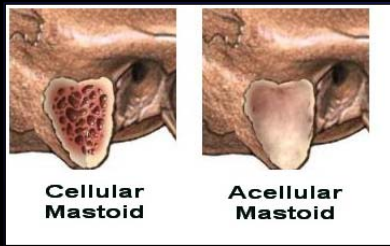


## Middle Ear Cavity

### Posterior wall

#### Mastoid air cells:

- Cellular
- Sclerotic

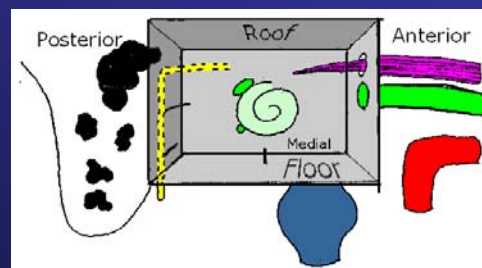


## Middle Ear Cavity

### Posterior wall

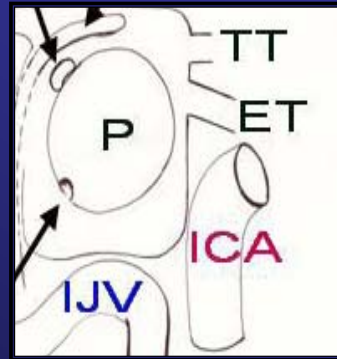
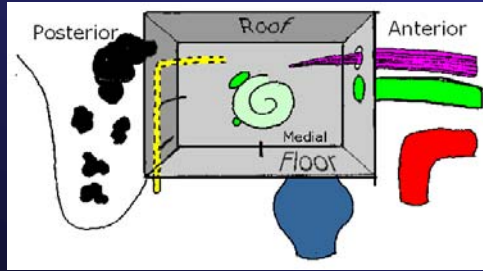
#### Vertical part of facial nerve:

- Third part or mastoid part
- Bony canal
- Exit from stylomastoid foramen



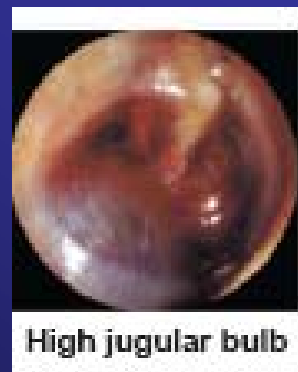
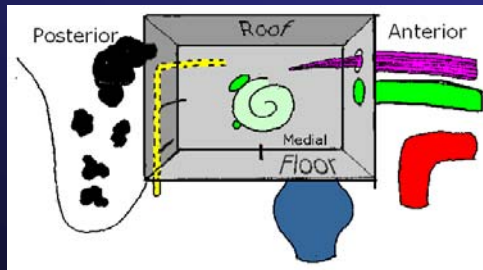
# Middle Ear Cavity

## Anterior wall



# Middle Ear Cavity

## Inferior wall



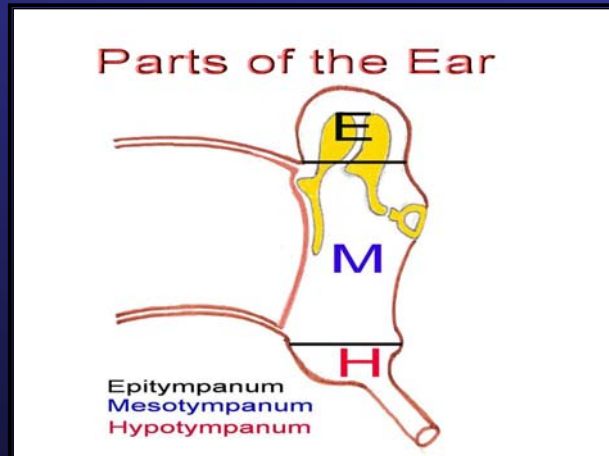
Bony plate (thin) separating ME from IJV

## Middle Ear Cavity Parts

Epitympanum (Attic):  
Above TM

Mesotympanum:  
Opposite TM

Hypotympanum:  
Below TM



## Middle Ear Cavity Contents

Ossicles: 3

Muscles: 2

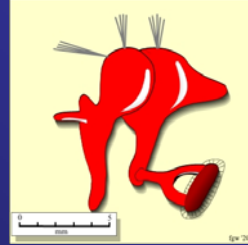
Nerve: 1



# Middle Ear Cavity Function

Physiology

Magnification of sounds



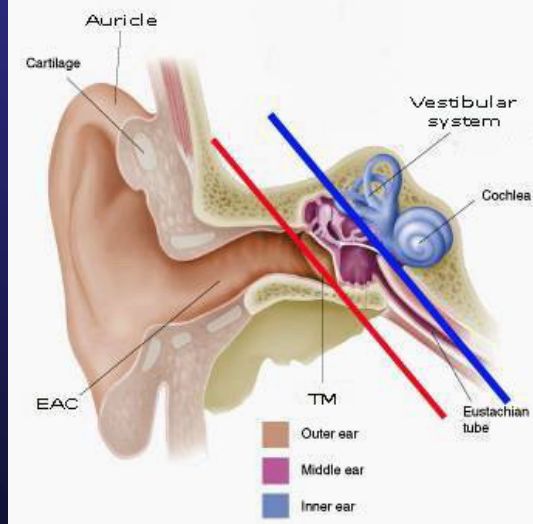
Protection of inner ear  
from high sounds



# Parts of the Ear

ANATOMY

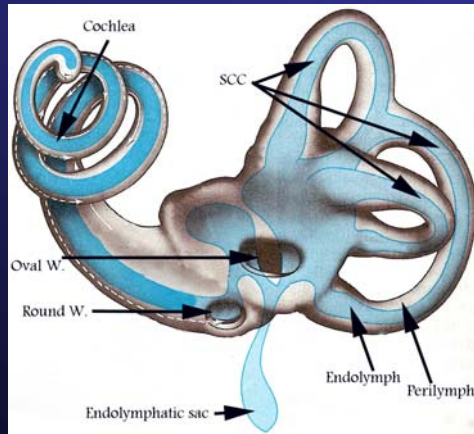
External Ear



Inner Ear

Middle Ear Cleft

# Inner Ear Labyrinth

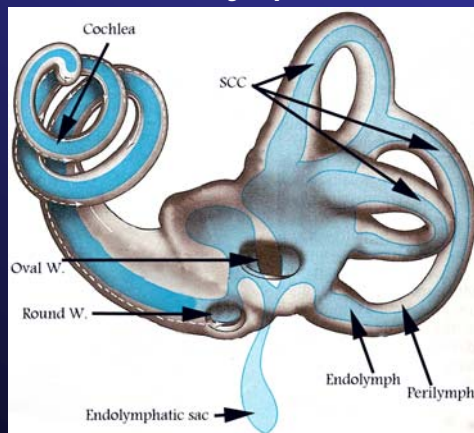


Hearing  
• Cochlea

Equilibrium  
• Vestibular apparatus

# Inner Ear Labyrinth

Outer Bony: Perilymph  
Inner Membranous: Endolymph



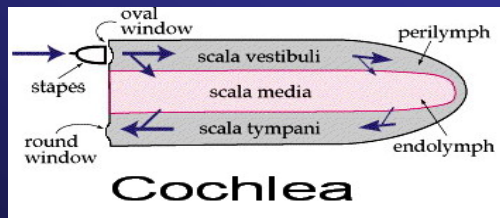
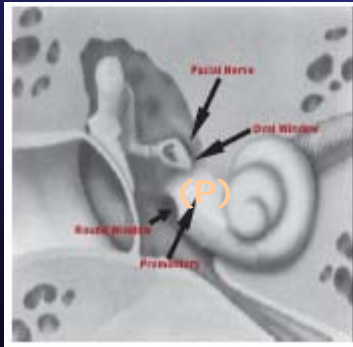
Hearing  
• Cochlea

Equilibrium  
• Vestibular apparatus



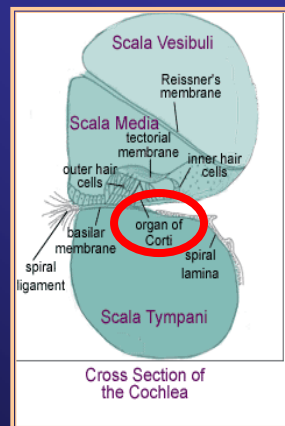
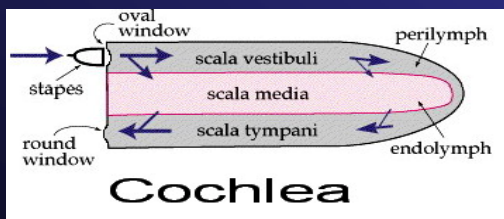
# Inner Ear Cochlea

Physiology

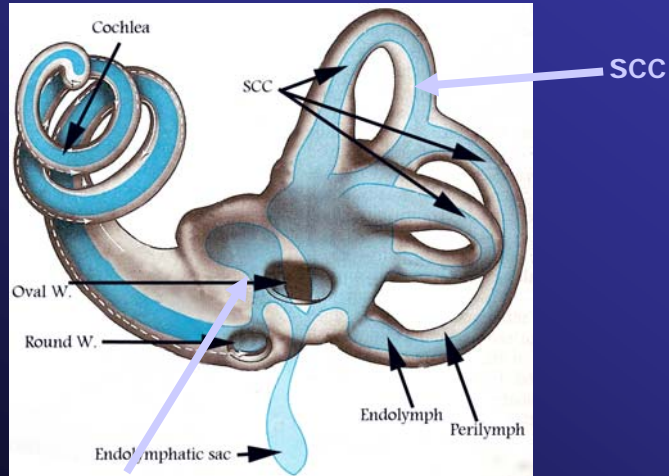


# Inner Ear Cochlea

Physiology



# Inner Ear Vestibular apparatus



**Vestibule**  
(utricle & saccule)

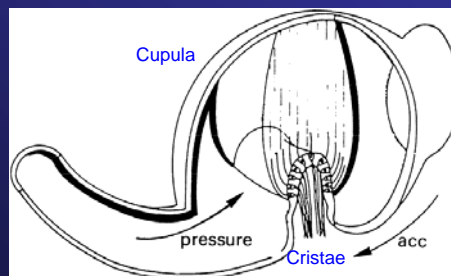
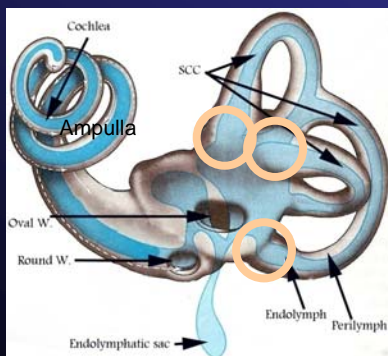
# Inner Ear Vestibular apparatus

## SCC (3)

Angular acceleration

## Ampulla of SCC

Cristae ampullaris

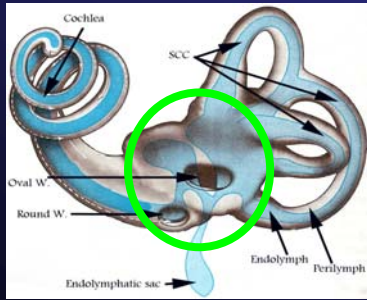


# Inner Ear

## Vestibular apparatus

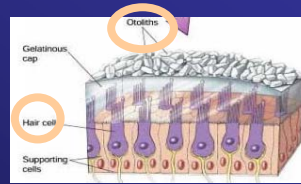
### Vestibule

Linear acceleration



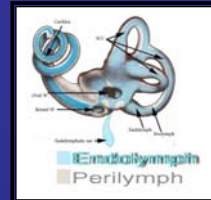
### Utricle & Saccule

Maculae



# Inner Ear

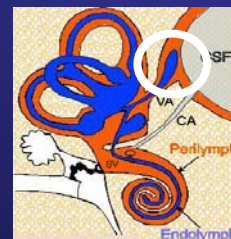
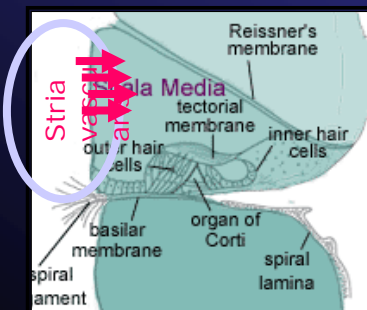
## Fluid



Formation

Endolymph (K<sup>+</sup>)

Absorption



Cochlea: Stria vascularis

Endolymphatic sac

# Inner Ear Fluid

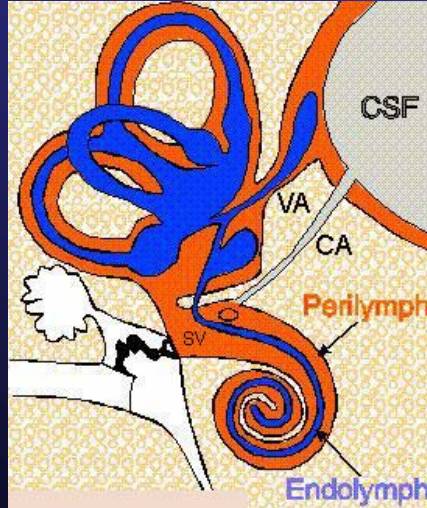
Perilymph (Poor K<sup>+</sup>)

Formation

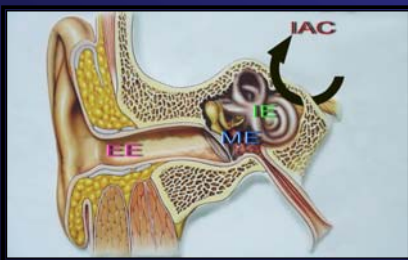
CSF

Absorption

venules



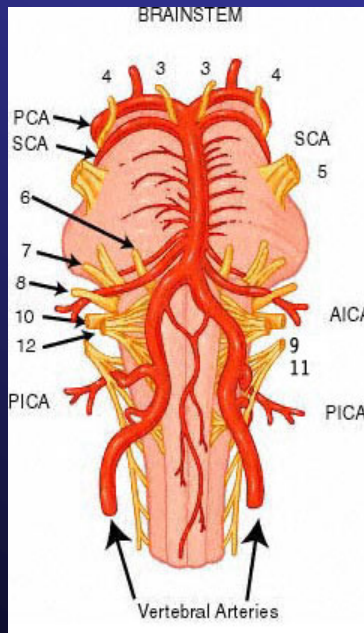
# Internal Auditory Canal



Facial Nerve  
Vestibulocochlear Nerve

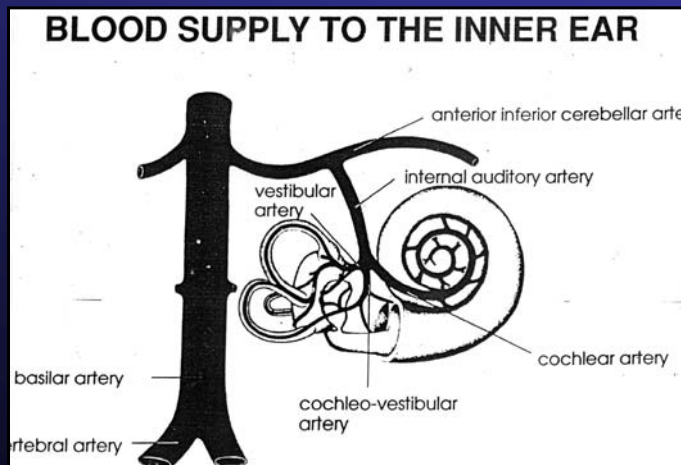
# Vasculature

ANATOMY



# Vasculature

ANATOMY



**END**