

- Why the ear is like the Tripartite Alliance?
- Why the creator gave us a middle ear?
- What ontologically speaking, makes us all, "airheads"?
- Which is the most common, and arguably the most NB cell in the body?
- What makes the ear and trachea 1st cousins?
- By what routes may toxins and germs enter the inner ear from the middle ear? (Labyrinthitis)
- What is the 2nd, forgotten part of the eardrum
- What adenoids have to do with the ear?
- Why, Dear Lord, did you give us mucus?

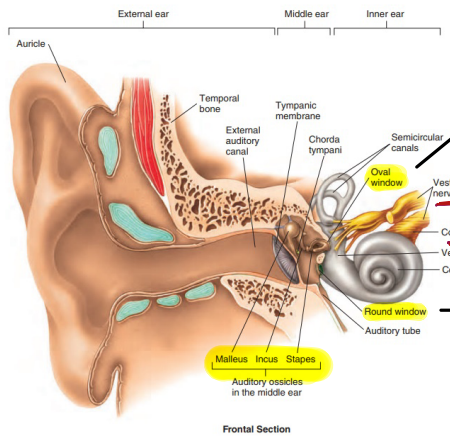
Why Ears?
 - Balance
 - Hearing

Why external & middle ears?

- Air = weak medium for sound
 - fluid = good medium for sound (more dense)
 ↳ middle ear = helps convert sound from air medium to a fluid medium (in doing this it also amplifies the sound)
 due to amplification

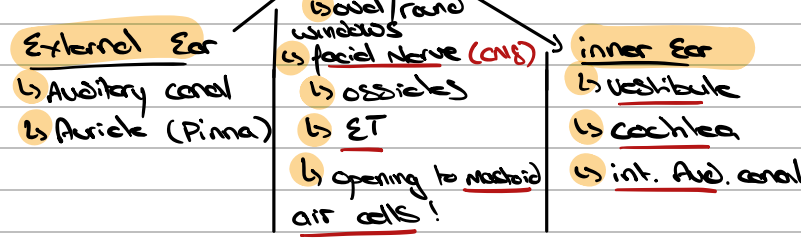
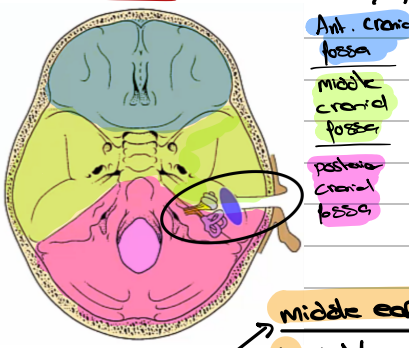
Transduction mechanism:

Air → Bone → fluid



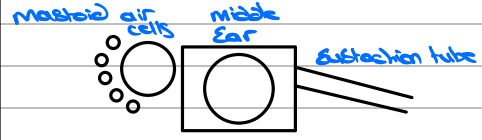
oval & round window = allows decompression in or out of oval window
 = pressure
 Acoustic nerve (VIII) (CNS)
 oval = stapes
 Round = other side

Location:
 - Base of skull under brain
 -> In Petrous temporal bone
 ↳ Between middle & posterior cranial fossae

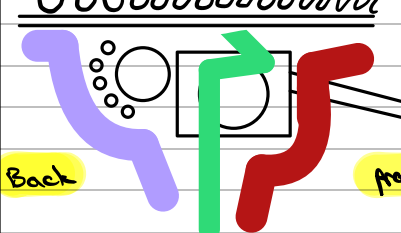


Middle Ear Parts & Relations:

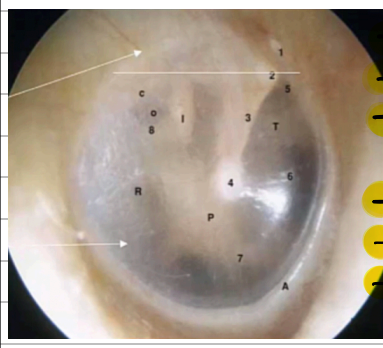
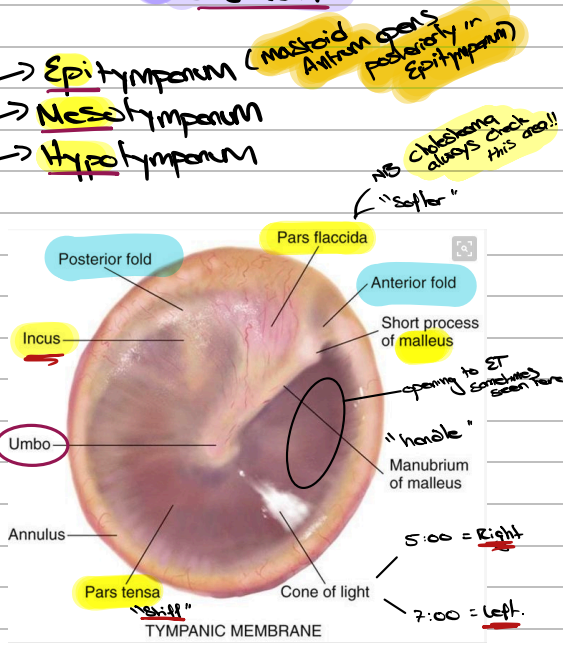
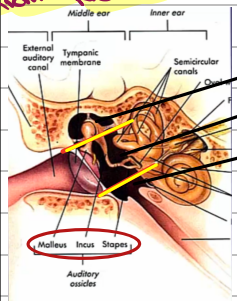
3 parts



Relations:



meninges
 ↳ ear infection can spread easily to Brain = death
 ↳ lateral venous sinus
 ↳ facial nerve
 ↳ Int. Carotid AA.
 Ear infection = avoid
 ↳ lead to facial nerve palsy
 ↳ Hanging/drooping face S&S ear!
 ↳ Jug. bulb
 ↳ IJ vein
 Mastoiditis = can have thrombosis; NB complication



R = Round window membrane
 b = ET opening
 - just below 8 = stapes
 foot plate on oval window
 - I = long process of Incus
 - 8 = limb of stapes (one of)
 - P = Cochlea bulging into middle ear

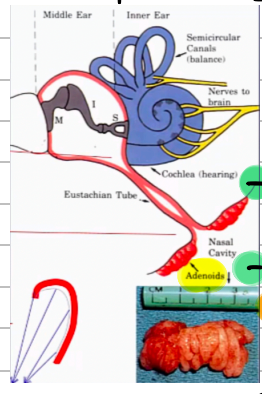
NB Middle Ear mucosa = RE
 ↳ NB Goblet cells
 ↳ Pseudostratified ciliated columnar Epithelium
 ↳ Flat - non-ciliated epithelium nearer to Mastoid
 ↳ Simple cuboidal
 ↳ Aeration
 ↳ Mucociliary clearance
 ↳ Sound Amplification

Middle Ear Physiology

Aerchion:

if always open = would always hear self breath

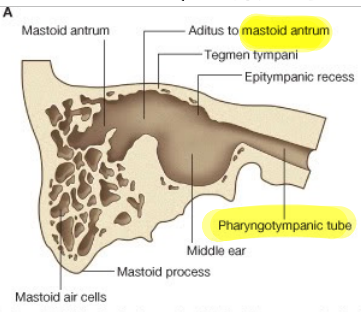
↳ ET (Eustachian Tube) → cartilaginous → closed until opened (tensor vel palatini)



↳ opens in **NE** & **Nasopharynx**
↳ Bone (always open)
Swallow + Valves ET opens!
Swallowing → closes nasopharynx
prevent food go into nose

Infected Adenoids = can obstruct ET & impair ET function + tubal tonsils
Nasopharyngeal Ca. Also *

↳ Mastoid Air cell system (Reservoir)
→ Behind ears → in case ET blocked
= air can still somewhat balance pressure



NB (Mastoiditis)
Super Dangerous complication
↳ otomastoiditis
↳ cephalalgia

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1) Swallowing ← Mucous ET ventilation Swallow food } Lots of 3's
EE → ME → IE

2) Hearing + Balance → External → inner → Sound Amplification

3) Air Reservoir → Mastoid Air cell system → sinuses

4) RE: ciliated pseudostratified columnar epithelium

5) Both lined with RE

6) ET (Adenoid)
↳ oval window
↳ Round window

7) Pars tensa } Always check both
Pars flaccida }
↳ Hidden Disease here [Cholesteatoma]
↳ Supposed to protect

8) Adenoids → infection = Swell + block ET = can't balance pressure

9) Clearance mechanism
↳ lubrication of oesophagus eating food
→ trap particles (Clearance via mucociliary action)

Mucociliary Clearance:

- ↳ mucus blanket (goblet cells) → traps.
- ↳ cilia = RE
- ↳ RE cilia = sweep foreign sub out of area
- ↳ cilia: 50-100 per cell
- ↳ ± 13 beats per second
- ↳ Nasal transit time = 11 min

⇒ Swallow = Rid mucus (nose & ET) } Tripartite Alliance
= Ventilate (ET)
= Swallow food

Sound transmission & Amplification:

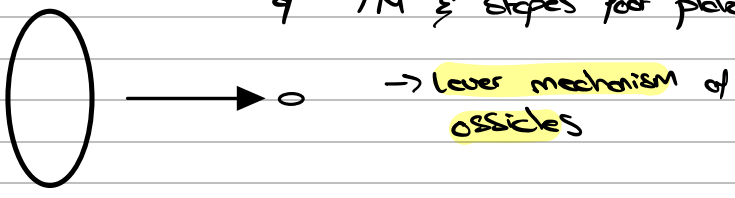
- ↳ TM (Tympanic membrane)
- ↳ ossicles (Bones) → Max sound catching

TM: → cone shaped to tip of malleus
↳ collect sound waves & conducts them to first ossicle (malleus) (umbo)
↳ (Incus)
↳ (Stapes)

Ossicles:

- ↳ conduct sound across ME space
- Stapes footplate creates waves in fluid of inner ear — CN V III
- Auditory Nerve etc. = sound.

Amplification → due to surface Area ratio of TM & stapes foot plate



Mastoiditis = want food out perichondria
→ otomastoiditis
→ cephalalgia.