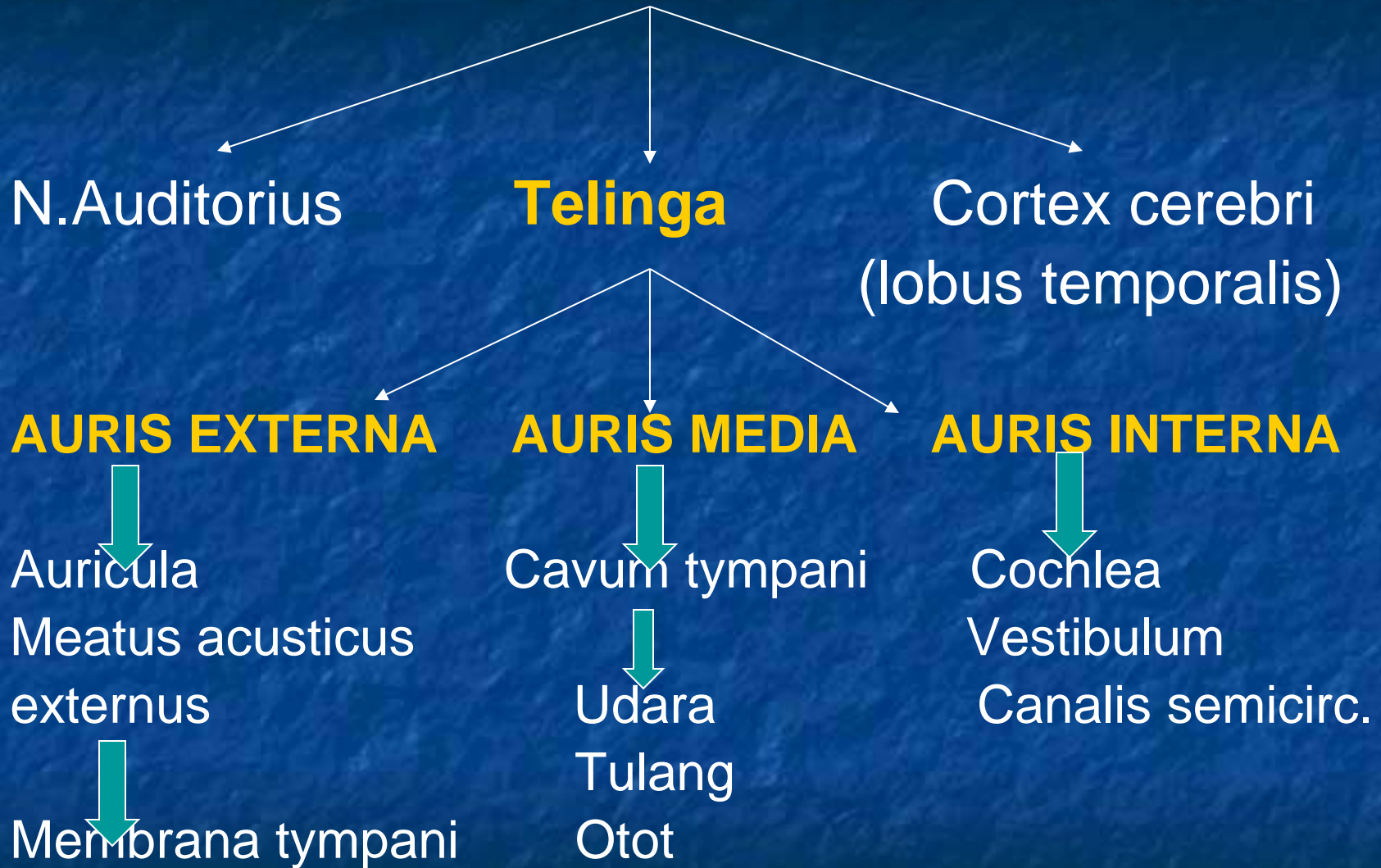
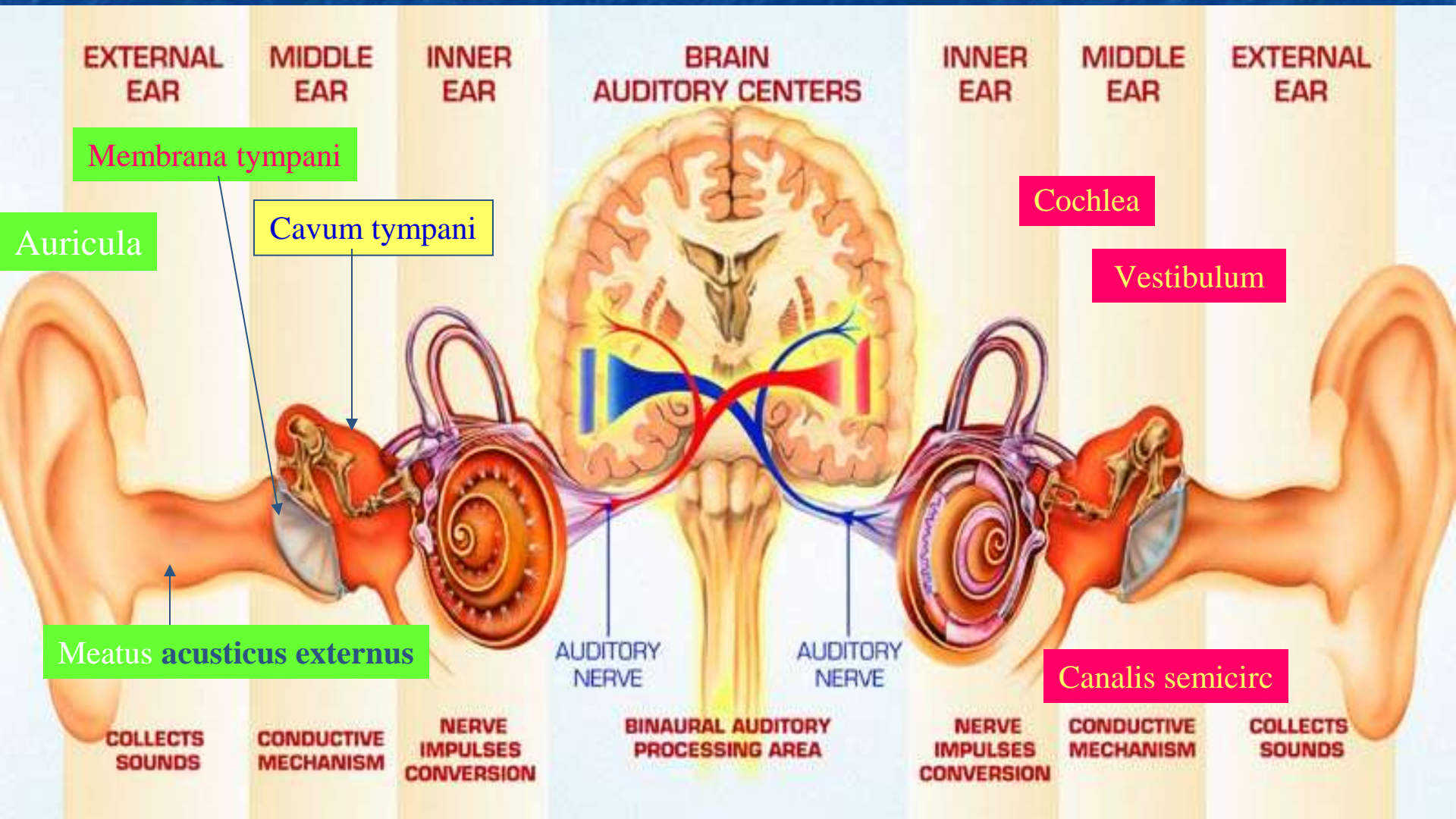


# TELINGA

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# ORGAN AUDITORIUS

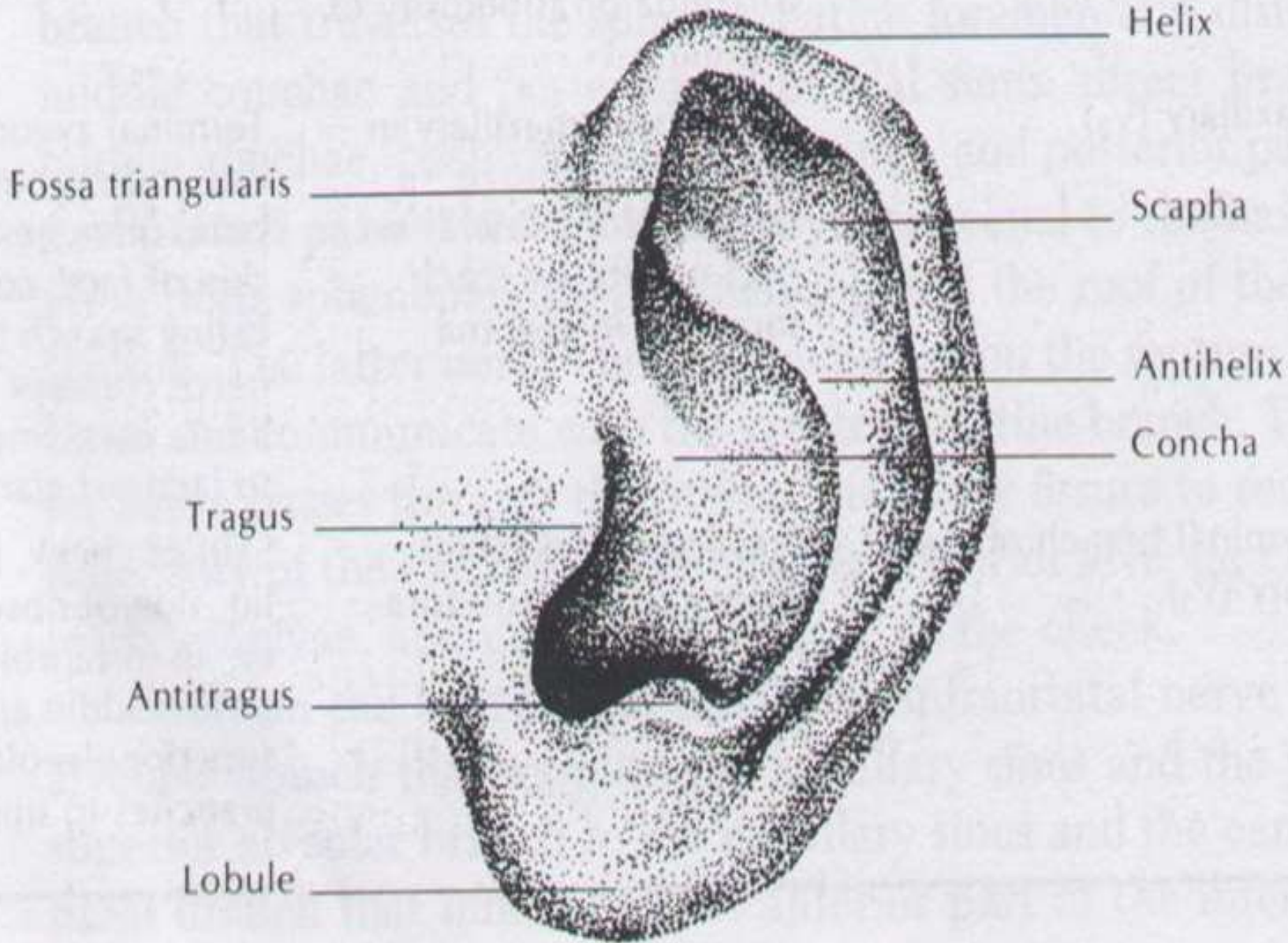




# AURIS EXTERNA

## 1. AURICULA

- Tdd. Tulang rawan
- Menangkap gelombang suara → Meatus acusticus externus
- **Musculi intrinsik** : M. helicis major  
M. helicis minor  
M. tragices  
M. anti tragices  
M. obliques auriculae  
M. transversus auriculae



Helix

Fossa triangularis

Scapha

Antihelix

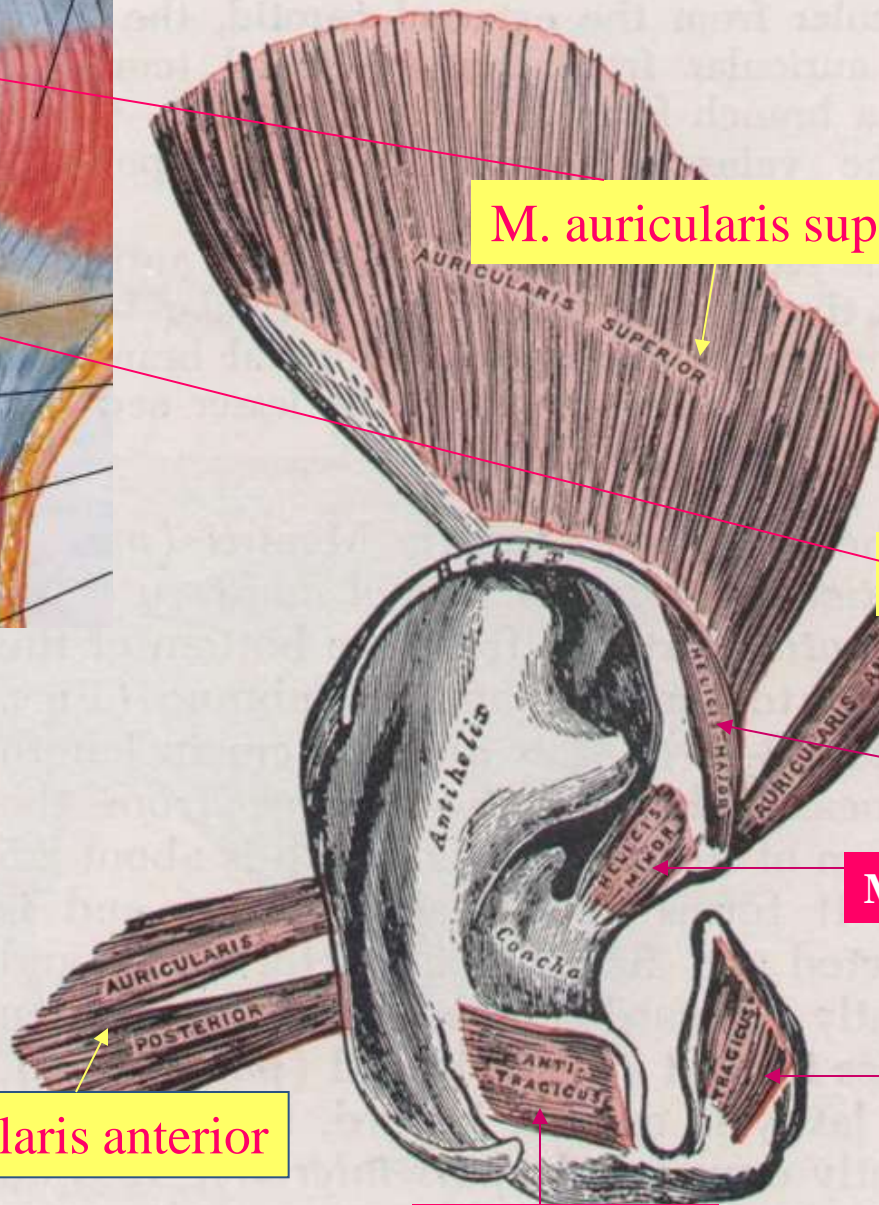
Concha

Tragus

Antitragus

Lobule

- **Musculi ekstrinsik** : M. auricularis anterior  
M. auricularis posterior  
M. auricularis superior
- **Innervasi Auricula:**
  - sensorik : N. occipitalis minor  
N. auricularis magnus  
N. auricularis temporalis  
R. auricularis nn. vagi
  - motorik : cabang n. vagus
- **Vascularisasi Auricula:** A. auricularis posterior  
A. temporalis superfisialis



M. auricularis superior

M. auricularis anterior

M. helicis major

M. helicis minor

M. tragiens

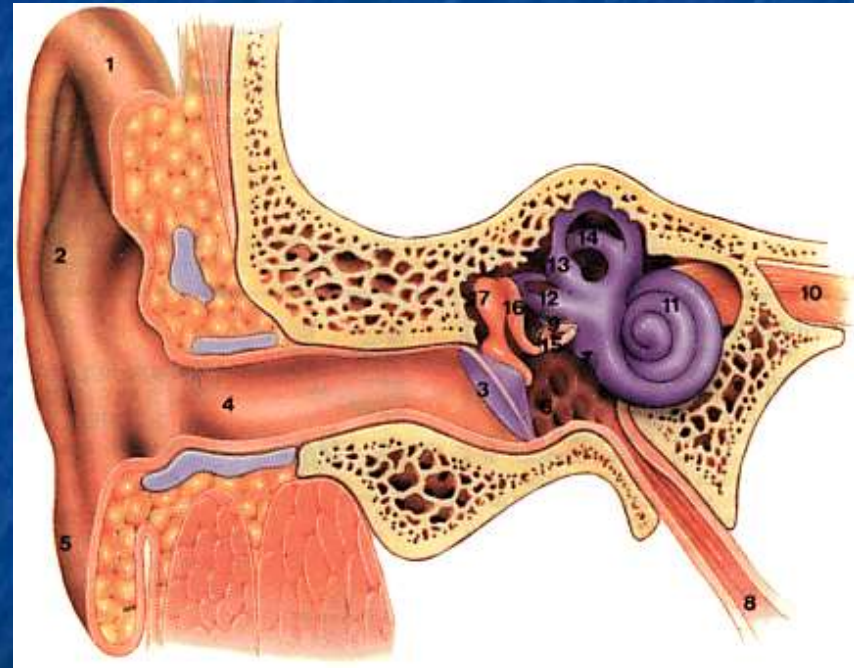
M. auricularis anterior

M. anti tragiens

FIG. 13-44.—The muscles of the auricle.

## 2. MEATUS ACUSTICUS EXTERNUS

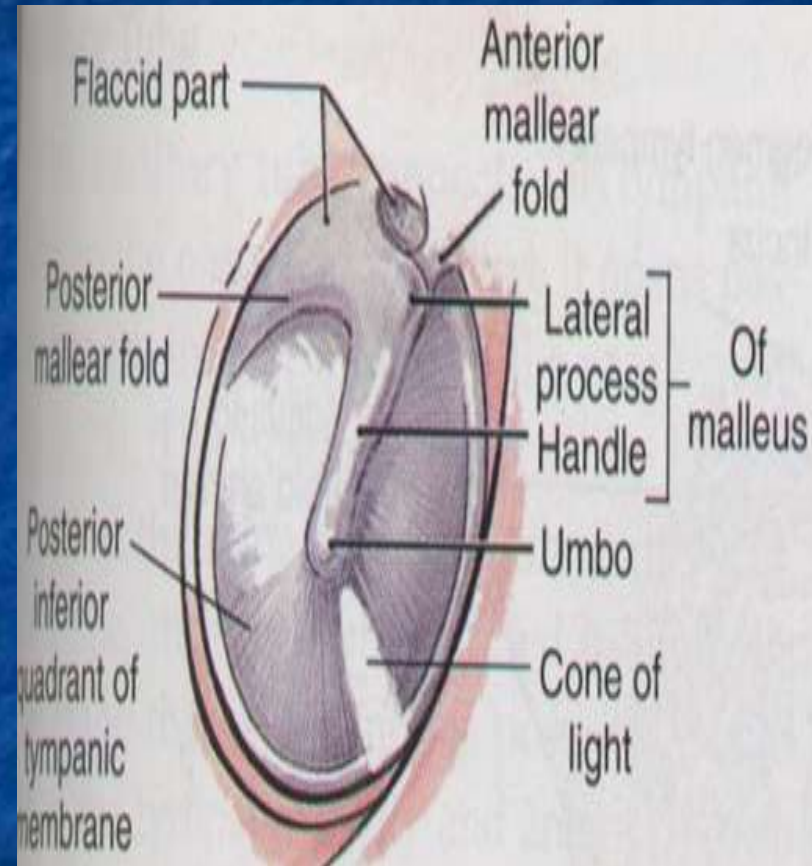
- Tdp. kelenjar ceruminosa & sebacea
- Berakhir pd membrana tympani
- Sebelah luar = cartilago
- Sebelah dalam = tulang
- Menyempit pada : perbatasan cartilago dengan tulang, isthmus
- Innervasi : N. auriculotemporalis  
R. auricularis n. vagus
- Vascularisasi :
- A. auricularis posterior
- A. temporalis superficialis

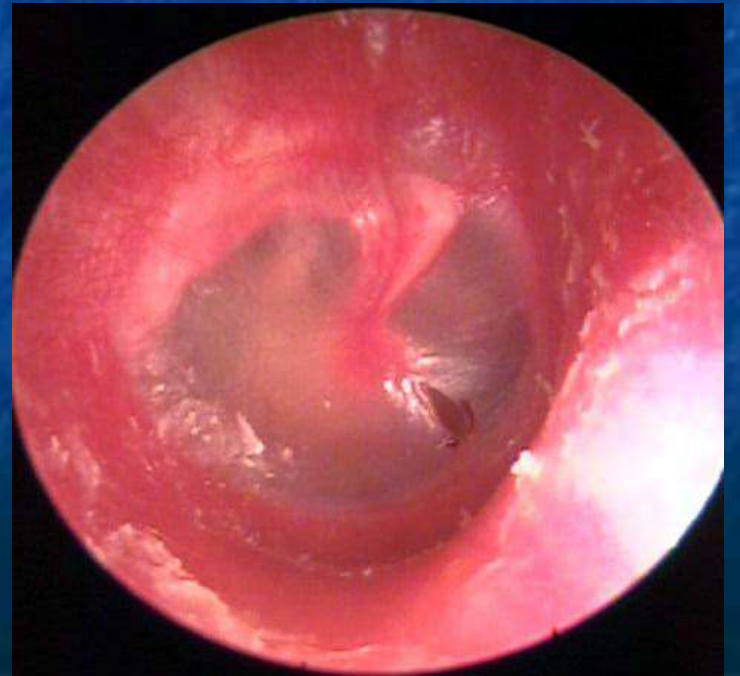
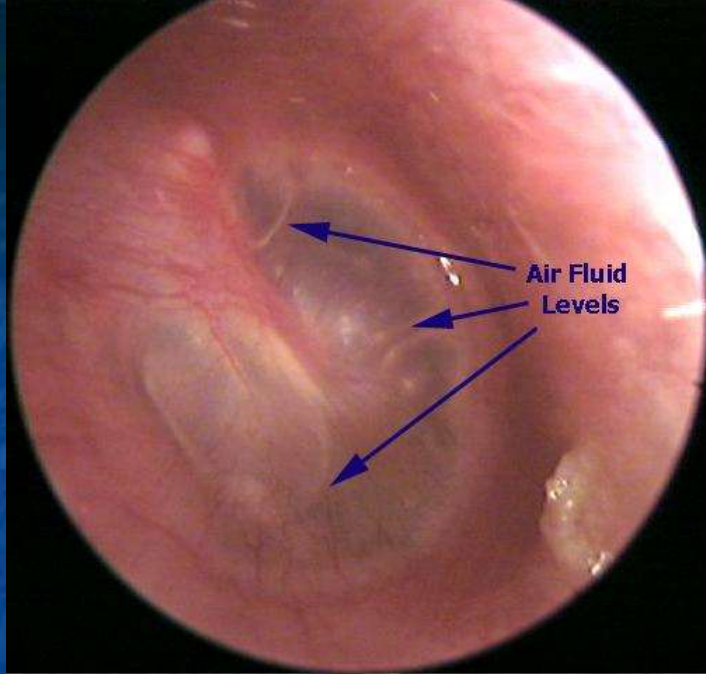




# MEMBRANA TYMPANI

- Melekat pd **os temporalis**
- Memisahkan auris externa dengan cavum tympani
- Permukaan lateral cembung pusatnya = **Umbo**
- Permukaan medial melekat **malleus**
- Terdiri dari : **pars tensa** dan **pars flaccida**
- Bila terjadi ruptur membrana tympani → tuli





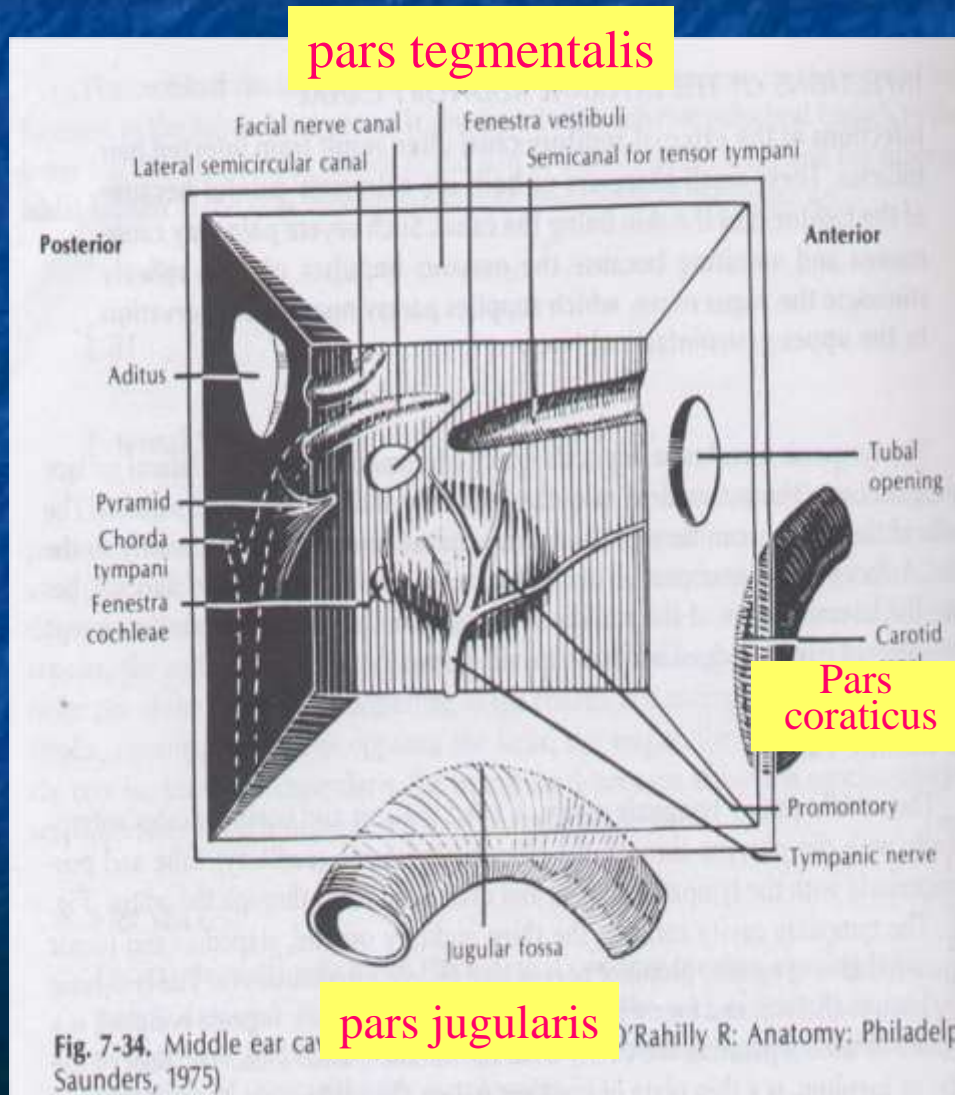
# AURIS MEDIA (CAVUM TYMPANI)

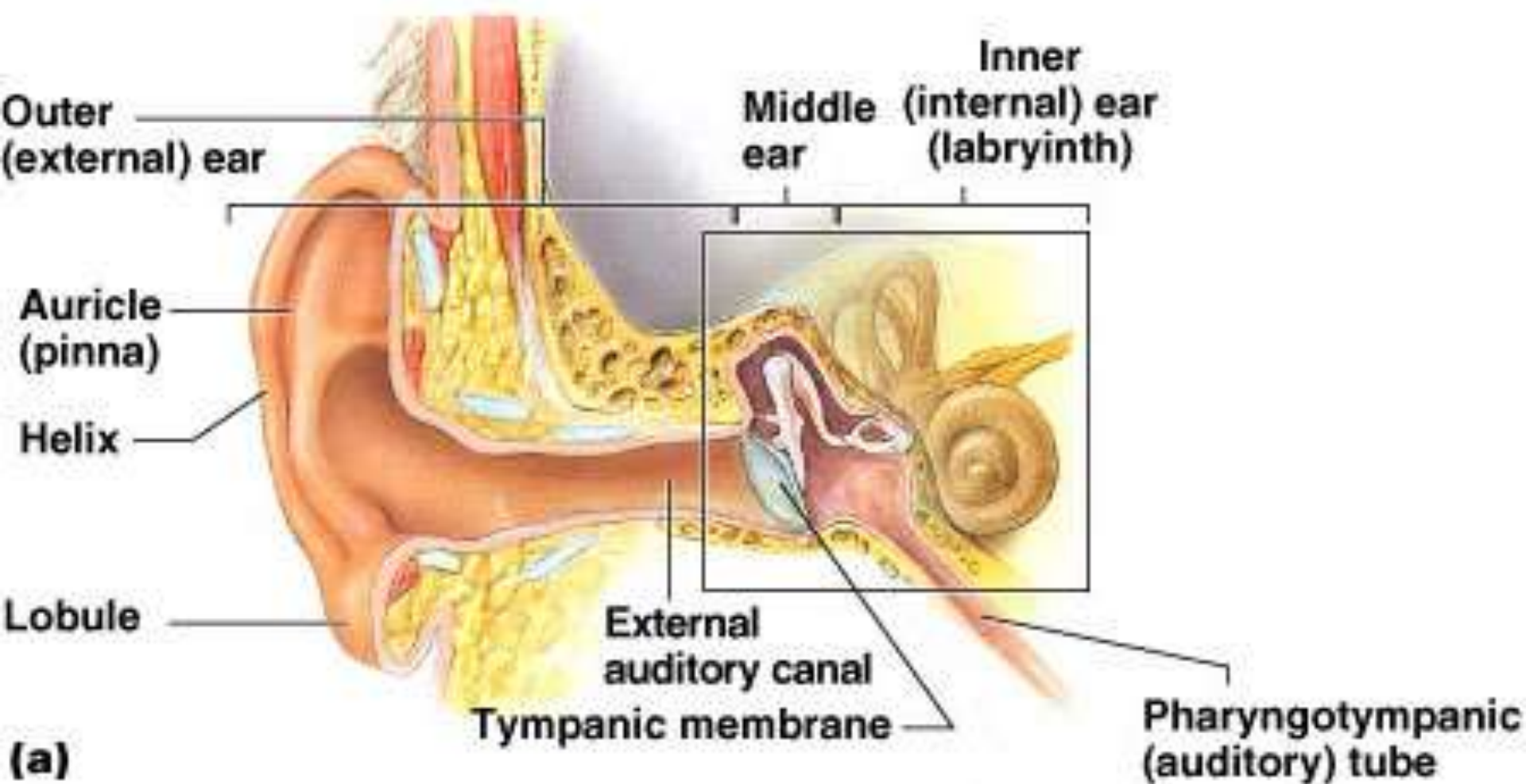
## Cavum tympani :

rongga udara di dalam os temporal berisi tulang pendengaran

## Batas cavum tympani :

cranial : pars tegmentalis  
caudal : pars jugularis  
lateral : pars membranacea  
medial : pars labyrinthicus  
posterior : pars mastoidea  
anterior : pars coraticus



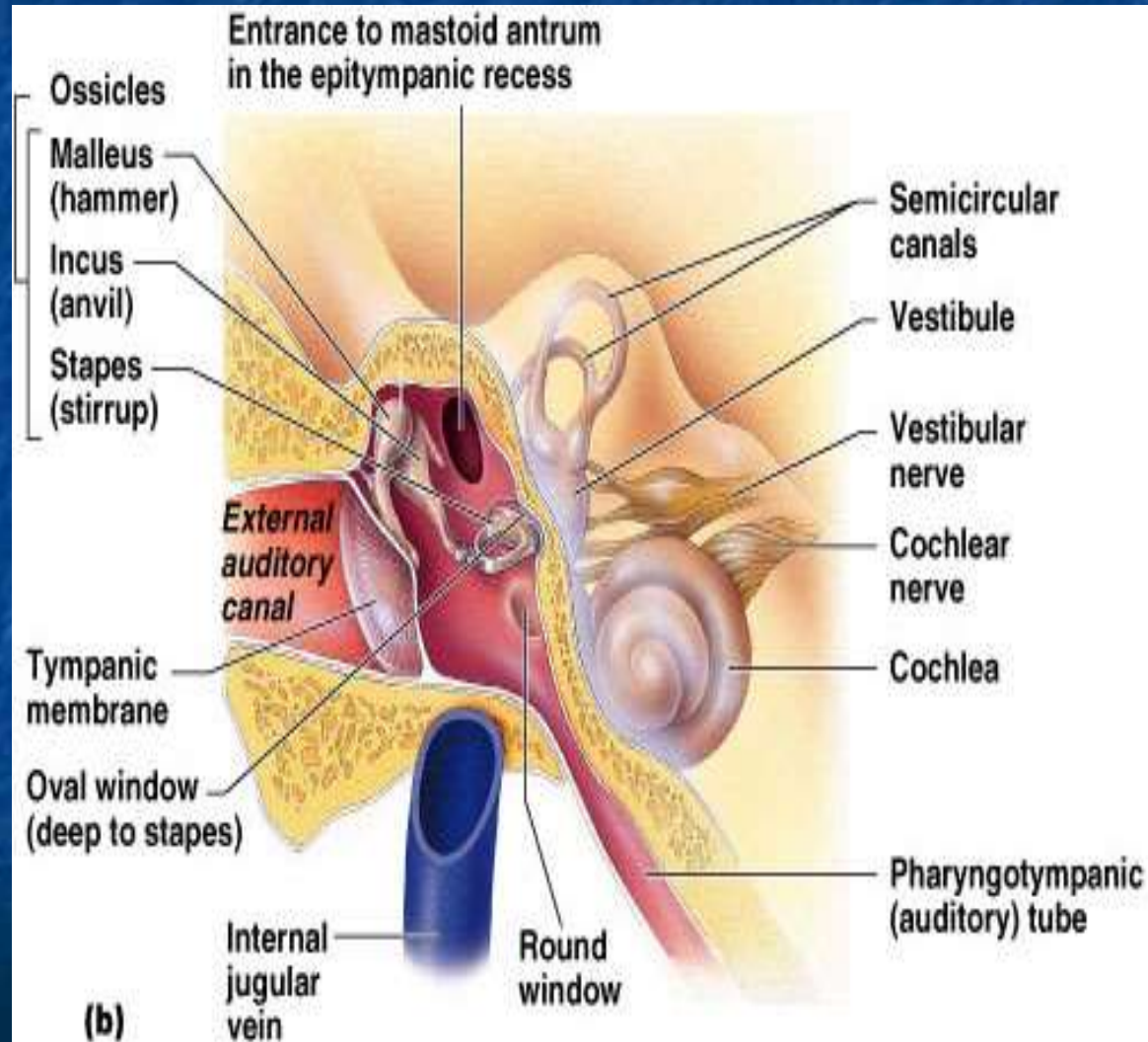


## Isi Cavum Tympani :




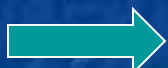

- Udara
- Tulang pendengaran :  
MALLEUS  
INCUS  
STAPES
- Otot : M. tensor tympani  
M. stapedius

## Foramen dalam cavum Tympani :

- muara meatus acusticus externus
- fenestra ovalis
- fenestra rotundum
- sinus mastoid
- tuba auditiva



# TUBA AUDITIVA :

- Menghubungkan auris media – nasopharynx
- Menjaga tekanan pd membrana tympani
- Sebagai jalan infeksi yg menyebar dari tenggorokan  auris media  sinus mastoid
- Tetap  tertutup kecuali  waktu mengunyah/menelan
- Bila terbuka udara dr hidung atau mulut tekanan pd permukaan dalam membrana tympani = tekanan pd permukaan luar membrana tympani  
 tidak terjadi ruptur membrana tympani

- **Vascularisasi telinga tengah**

  - A. tympanica anterior

  - A. auricularis posterior

- **Innervasi telinga tengah**

  - N. auriculotemporalis

  - R. auricularis n. vagus

  - N. tympanicus

# AURIS INTERNA ( LABYRINTH )



## Labyrinthus Osseus



- dibtk oleh os petrossa
- isi = perilymphe



CANALIS SEMICIRCULARIS  
VESTIBULUM  
COCHLEA

## Labyrinthus Membranaceus



- dlm labyrinthus osseus
- isi = endolymphe



DUCTUS SEMICIRCULARIS  
UTRICULUS  
SACCULUS  
DUCTUS COCHLEARIS



# LABYRINTH OSSEUS



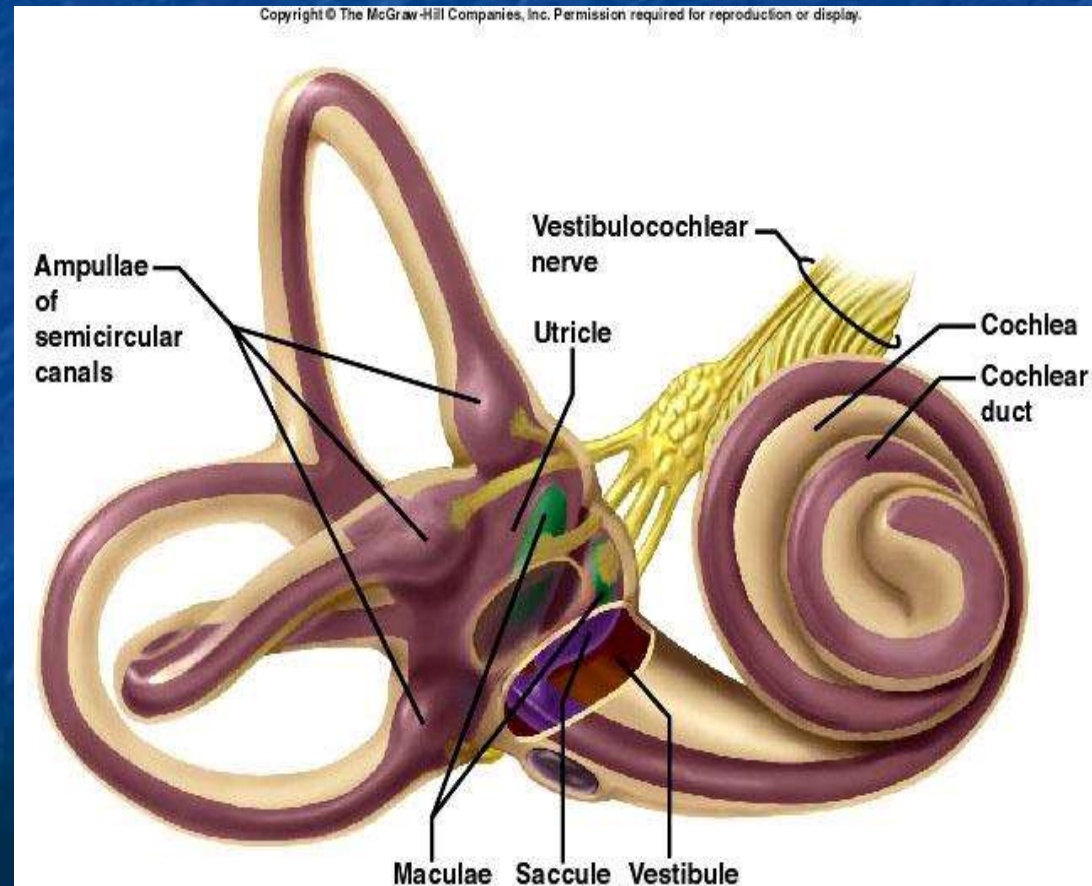
CANALIS SEMICIRCULARIS  
VESTIBULUM  
COCHLEA

# 1. CANALIS SEMICIRCULARIS

Ada 3 saluran (anterior/superior, posterior, lateral)

Ujung saraf pd AMPULLA terangsang oleh getaran cairan

- three canals at right angles
- ampulla
  - swelling of membranous labyrinth that communicates with the vestibule
- crista ampullaris
  - sensory organ of ampulla
  - hair cells and supporting cells
  - rapid turns of head or body stimulate hair cells

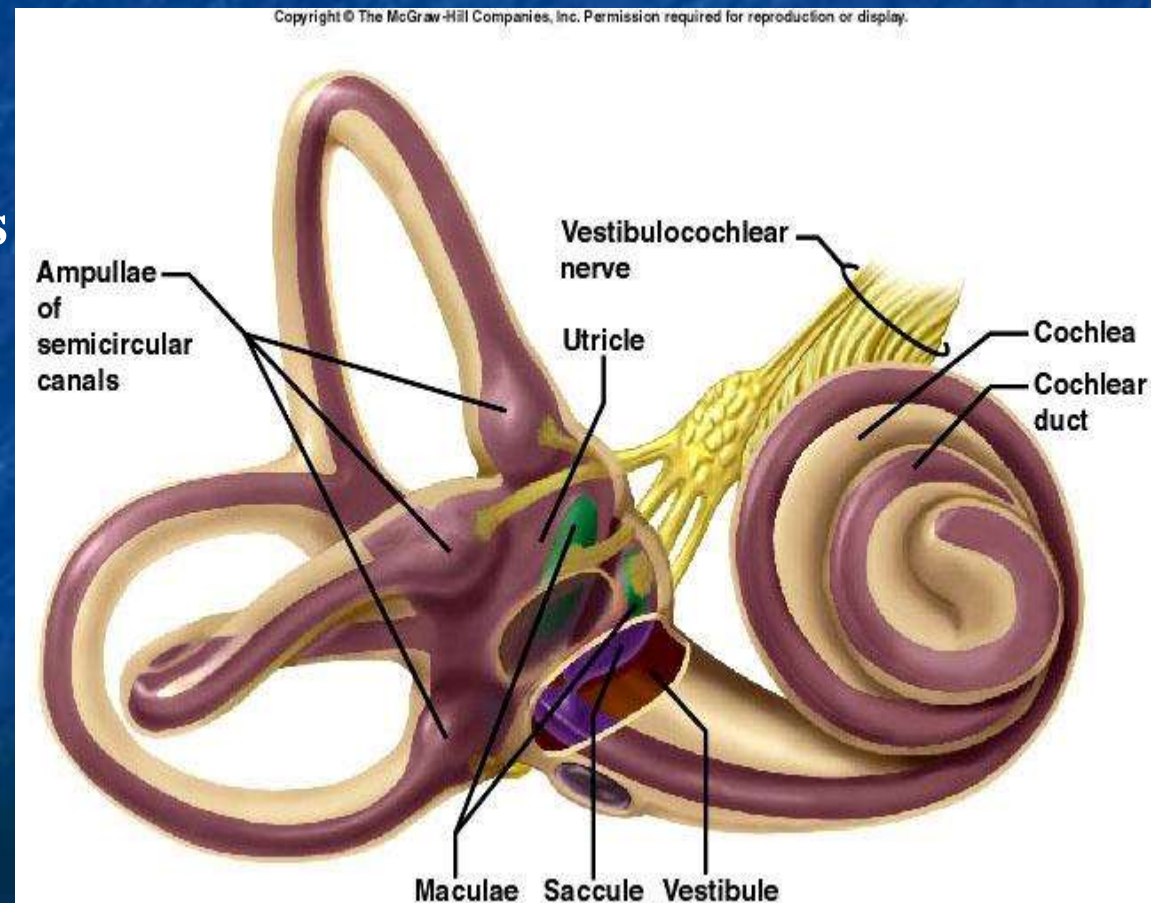


## 2. VESTIBULUM Terdiri dari :

- UTRICULUS - SACULLUS

Serabut N. Vestibularis berakhir di utriculus dan Sacullus

- **Utricule**
  - communicates with saccule and membranous portion of semicircular canals
- **Saccule**
  - communicates with cochlear duct
- **Macula**
  - hair cells of utricule and saccule



# Equilibrium

## Static Equilibrium

- vestibule
- sense position of head when body is not moving

## Dynamic Equilibrium

- semicircular canals
- sense rotation and movement of head and body

### 3. COCHLEA

Saluran berbentuk spiral



Membrana Basillaris



SCALA VESTIBULI

SCALA TYMPANI



Membrana Vestibularis



SCALA VESTIBULI

SCALA MEDIA / DUCTUS COCHLEARIS

# Cochlea

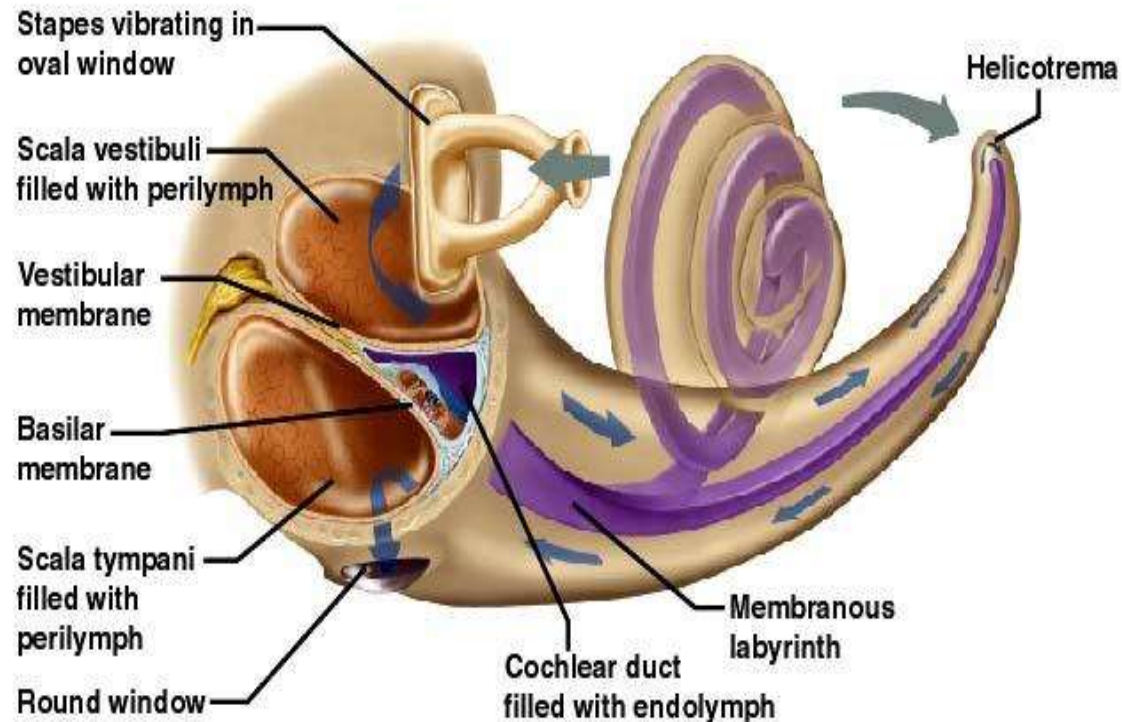
## Scala vestibuli

- upper compartment
- leads from oval window to apex of spiral
- part of bony labyrinth

## Scala tympani

- lower compartment
- extends from apex of the cochlea to round window
- part of bony labyrinth

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## Alat Keseimbangan :

1. Macula utriculi
2. Macula sacculi
3. Crista ampullaris

## Alat Pendengaran :

**Organon Corti** (di dasar dustus cochlearis)

Innervasi oleh N. VIII (N .vestibulocochlearis)

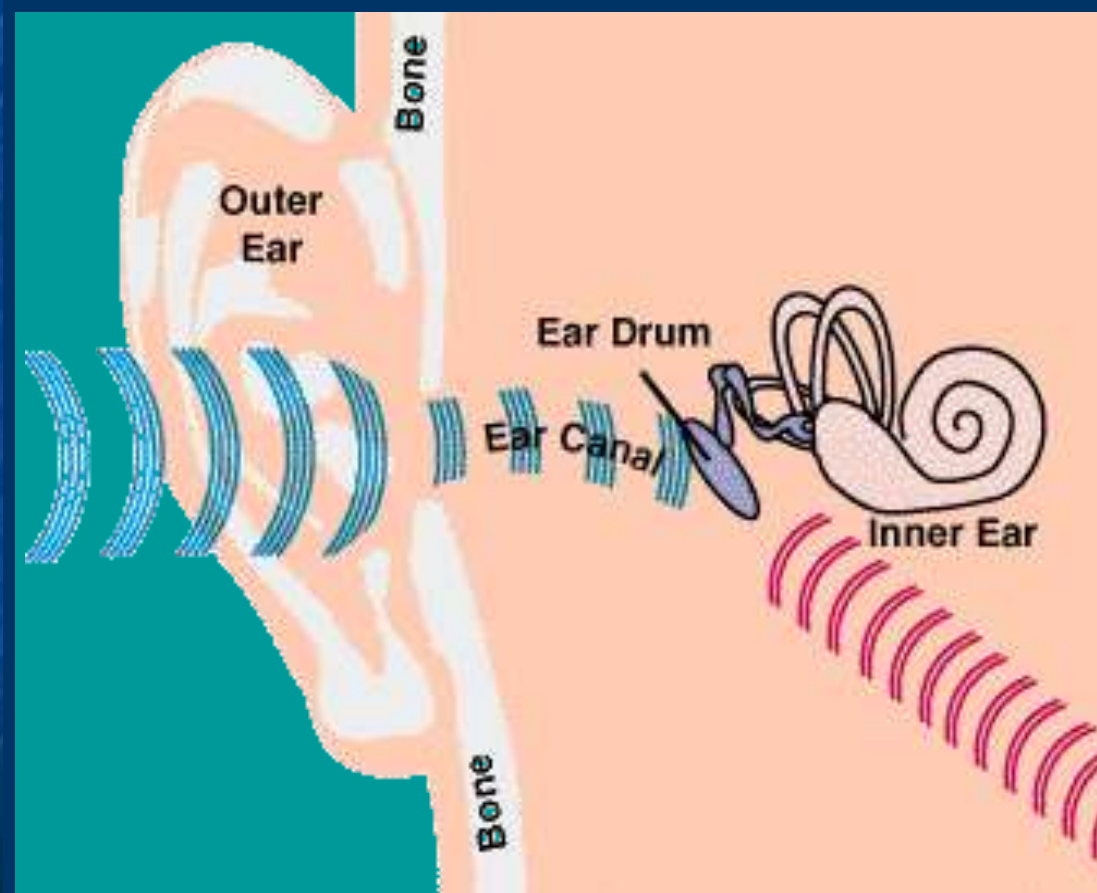
Vascularisasi oleh A. Auditiva Interna

# Inner Ear: structures + functions

<u>Tulang Labyrinth</u>	<u>Membranous Labyrinth</u>	<u>Function of Membranous Labyrinth</u>
1. Semicircular canals	Semicircular ducts	Equilibrium; rotational acceleration of head
2. Vestibule	Utricle + Saccule	Equilibrium; static equilib + linear equilib of head
3. Cochlea	Cochlear duct	Hearing

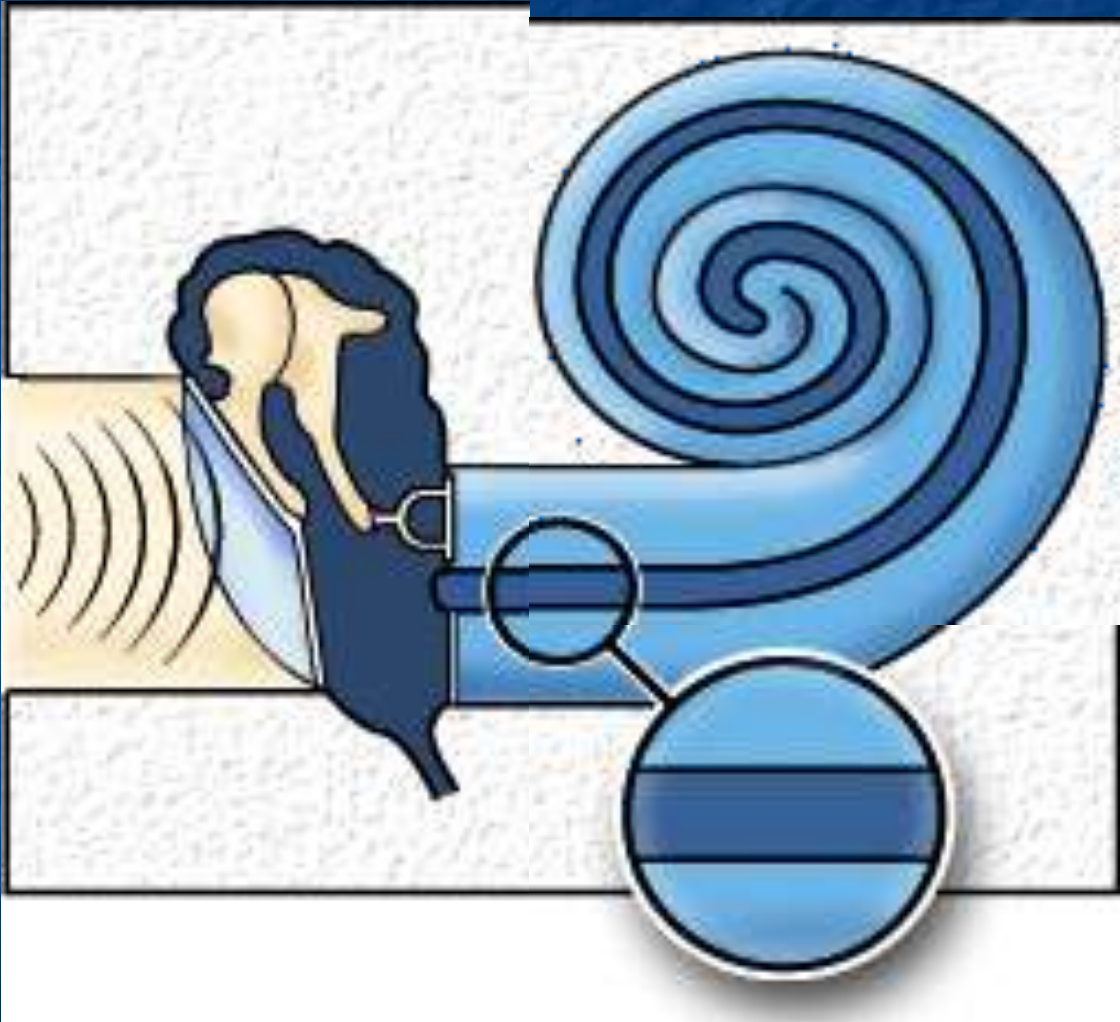


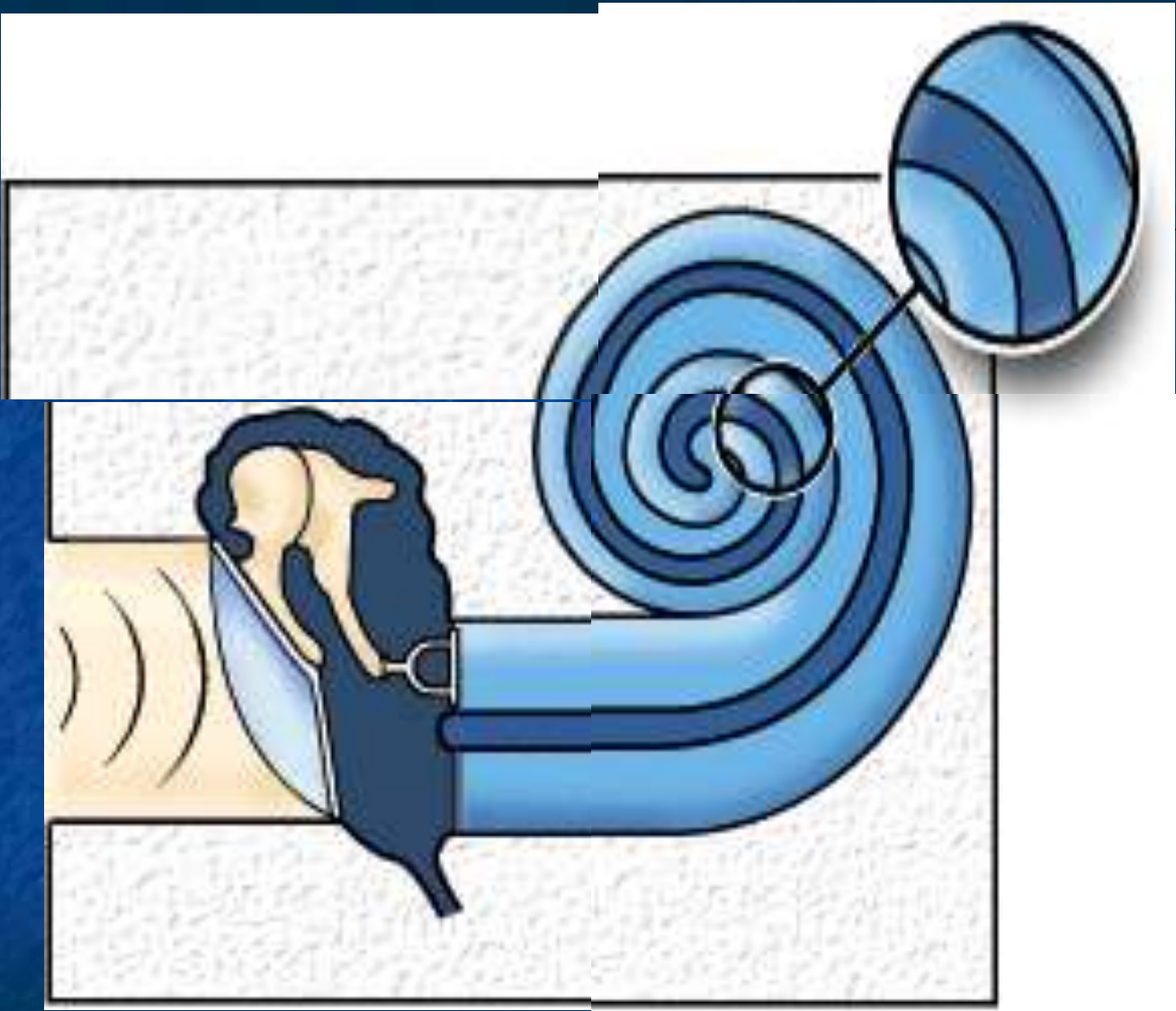
# Noise Convection and Conduction





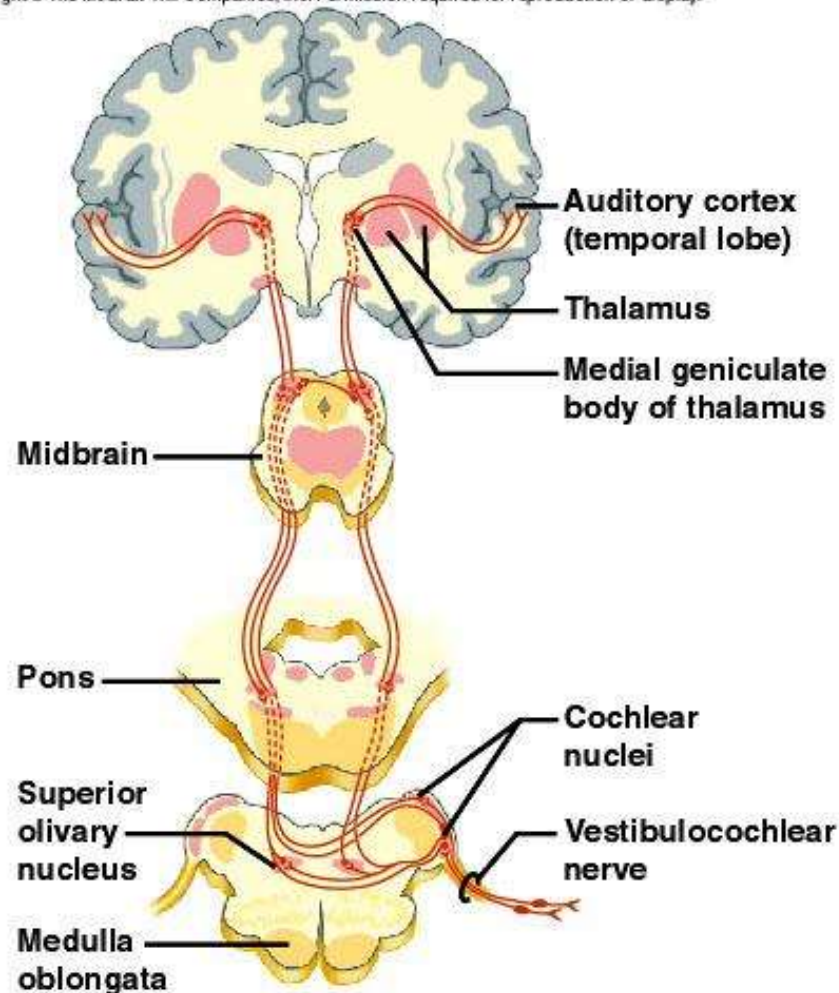
# Operation of the Cochlea





# Auditory Nerve Pathways

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# Summary of the Generation of Sensory Impulses from the Ear

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**TABLE 12.4** Steps in the Generation of Sensory Impulses from the Ear

1. Sound waves enter the external acoustic meatus.
2. Waves of changing pressures cause the tympanic membrane to reproduce the vibrations coming from the sound-wave source.
3. Auditory ossicles amplify and transmit vibrations to the end of the stapes.
4. Movement of the stapes at the oval window transmits vibrations to the perilymph in the scala vestibuli.
5. Vibrations pass through the vestibular membrane and enter the endolymph of the cochlear duct.
6. Different frequencies of vibration in endolymph move specific regions of the basilar membrane, thus stimulating specific sets of receptor cells.
7. A receptor cell becomes depolarized; its membrane becomes more permeable to calcium ions.
8. In the presence of calcium ions, vesicles at the base of the receptor cell release neurotransmitter.
9. Neurotransmitter stimulates the ends of nearby sensory neurons.
10. Sensory impulses are triggered on fibers of the cochlear branch of the vestibulocochlear nerve.
11. The auditory cortex of the temporal lobe interprets the sensory impulses.



**H I D U N G**

# ORGANON OLFAKTUS



- 1. NASUS EXTERNUS**
- 2. CAVUM NASI**
- 3. SINUS PARANASALIS**



# NASUS EXTERNUS

Dibagi dua bagian oleh Septum Nasi

## ■ Bagian Tulang :

- Os nasalis
- Proc. Nasalis os frontalis
- Proc. Frontalis os maxilla

## Bag.tulang rawan :

- Cartilago septalis
- Cartilago lateralis
- Cartilago alaris major
- Cartilago alaris minor

## Vascularisasi :

- Cabang a. facialis
- Cabang a. ophthalmicus

**Proc. Nasalis os frontalis**

**Os nasalis**

**Cartilago septalis**

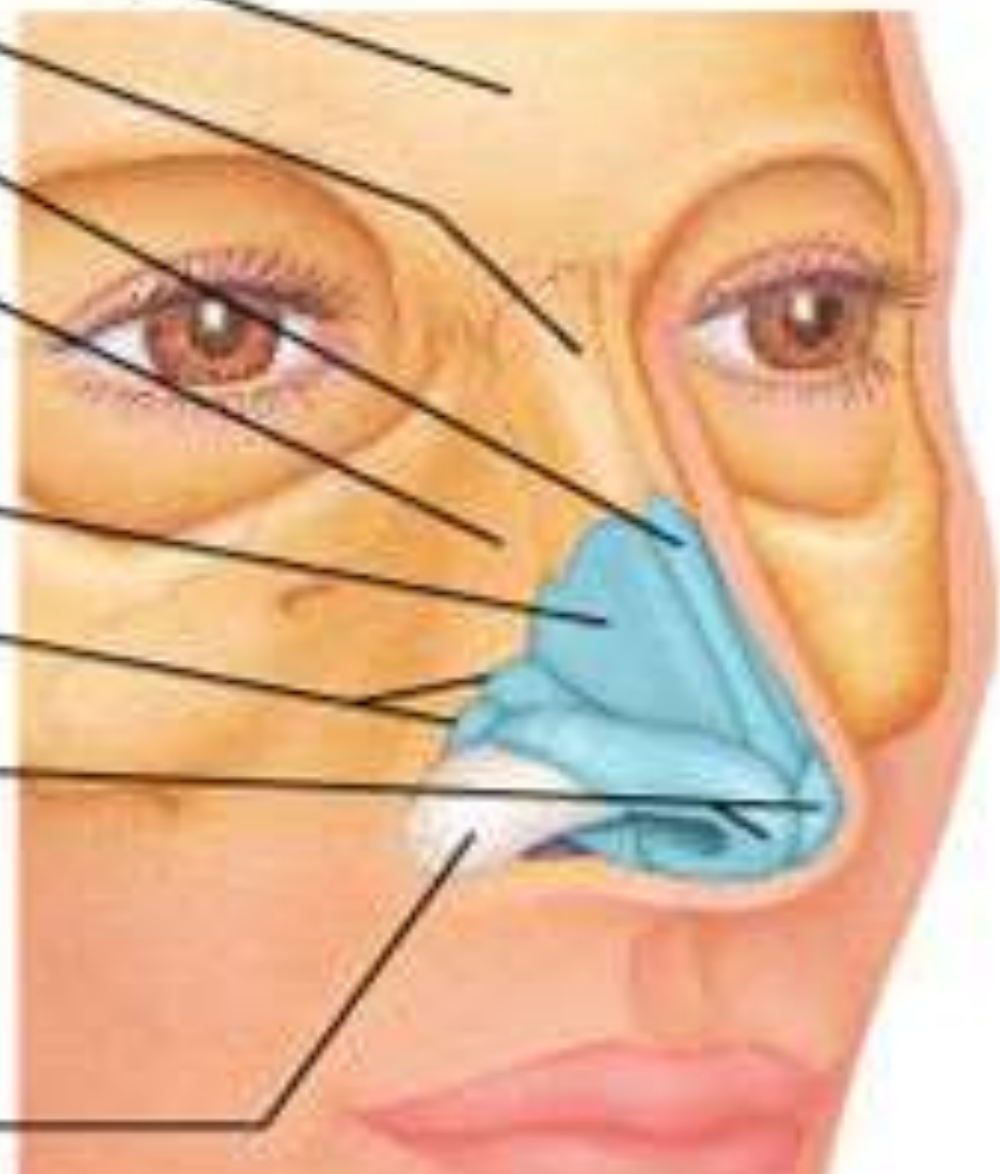
**Proc. Frontalis os maxilla**

**Cartilago lateralis**

**Cartilago alaris minor**

**Cartilago alaris major**

**Dense fibrous  
connective tissue**



**NASUS EXTERNUS**

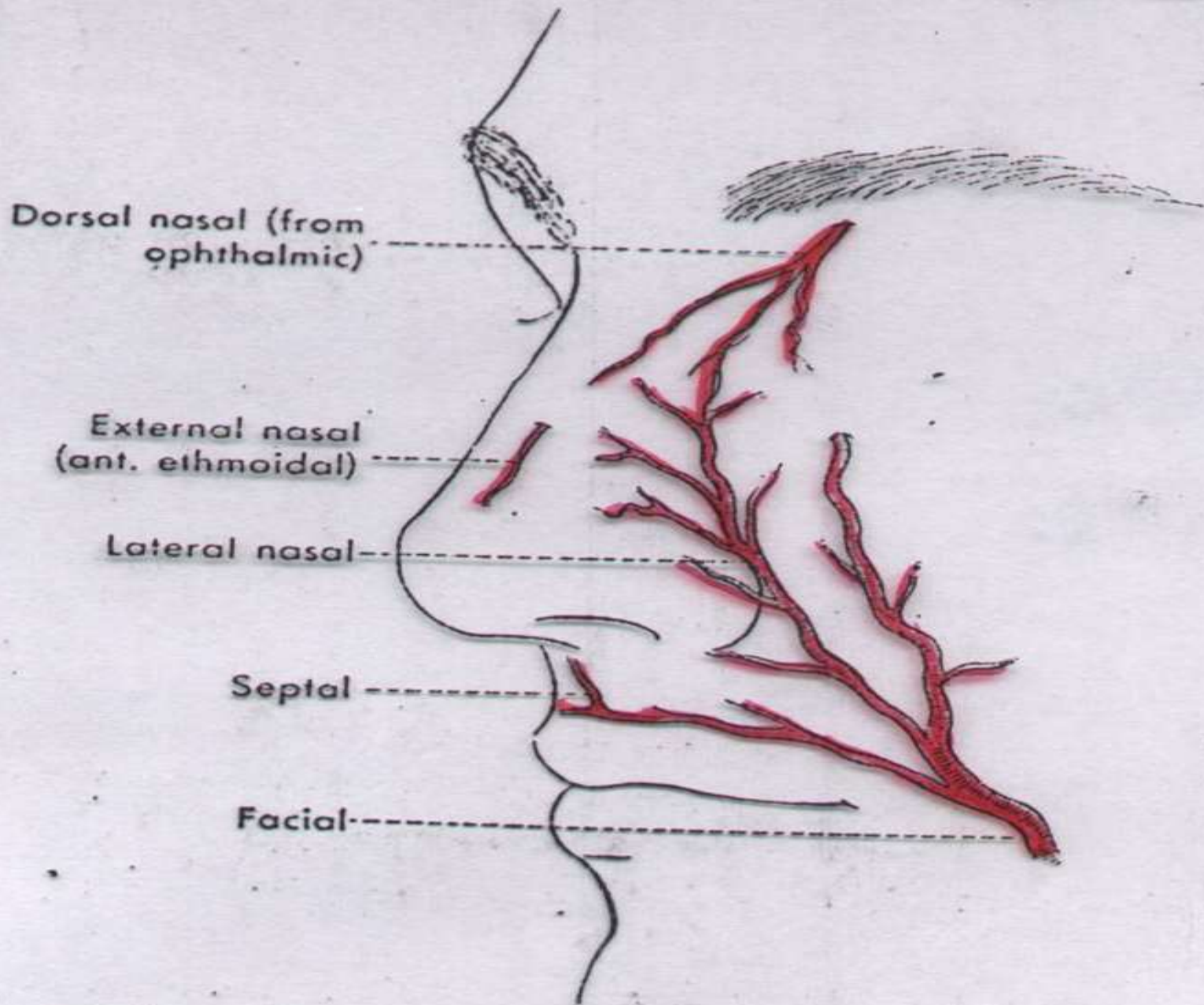


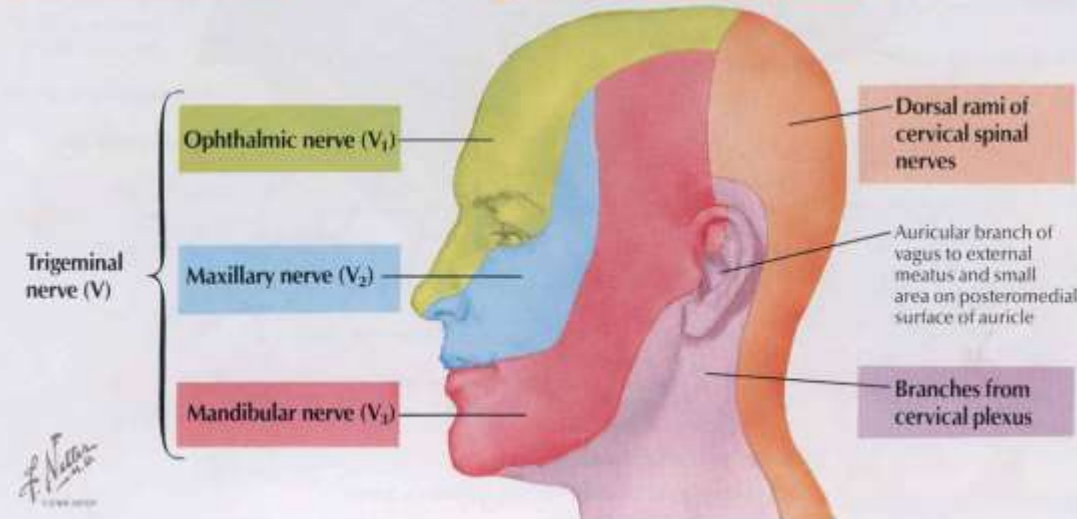
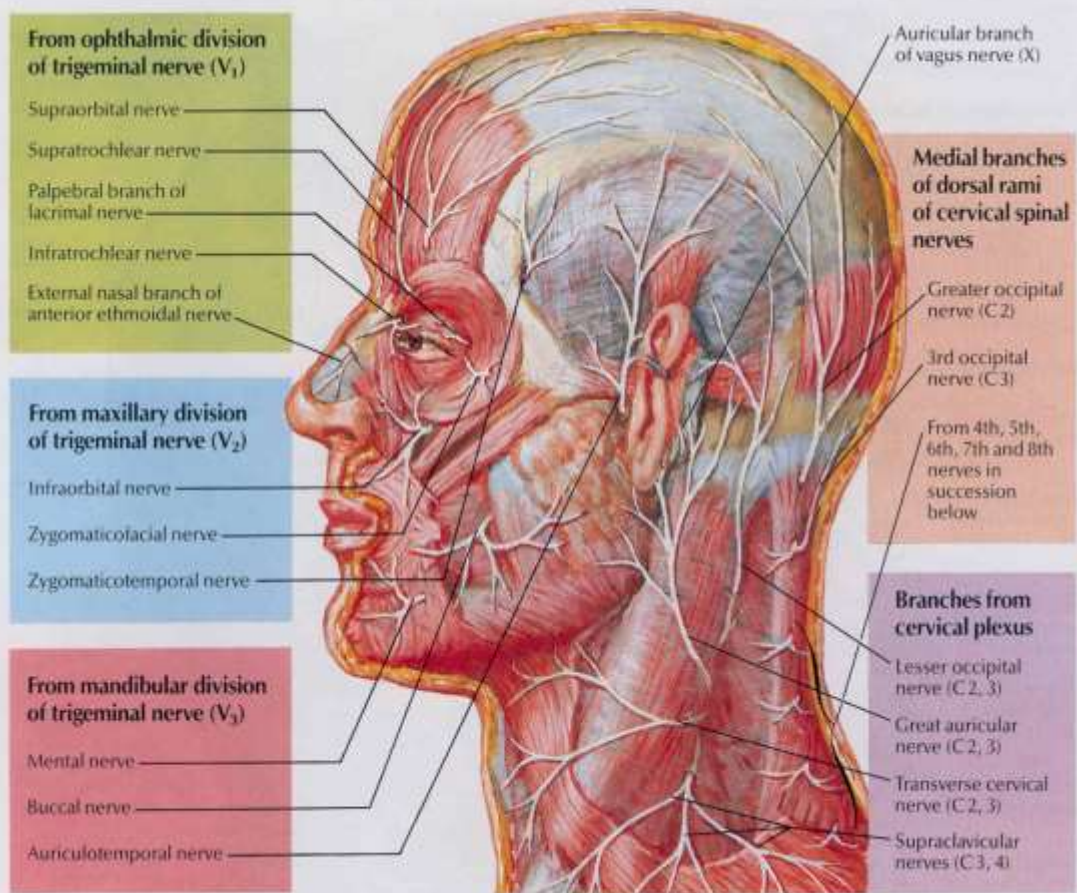
Fig. 126. Chief arteries about the external nose.

# Innervasi kulit hidung:

**Bag. Lateral :**  
 R.infraorbitalis  
 N.maxillaris

**Ujung hidung :**  
 R. nasalis ext. N.  
 ethmoidalis ant.

**Bag. Atas :**  
 N. intratrochlearis +  
 N.supratrochlearis



# CAVUM NASI

■ Mulai dari : Nares – Choane, terbagi menjadi :

## 1. Vestibulum

- Mulai Nares – Apex nasi
- Tdp. kel.sebacea, kel. keringat, rambut

## 2. Regio olfactorius ( 1/3 superior )

- Pd. septum nasi superior & concha nasalis sup.
- tdp bundel serabut n. olfactorius → lamina  
cribrosa os ethmoidalis → bulbus  
olfactorius

## 3. Regio respiratorius ( 2/ 3 inferior )

- Tunica mucosa, epithel bersilia

# DINDING CAVUM NASI

**ATAP :**

- Os nasal
- Os sphenoidalis
- Os frontal
- Lamina cribrosa
- os ethmoidalis

**DASAR :**

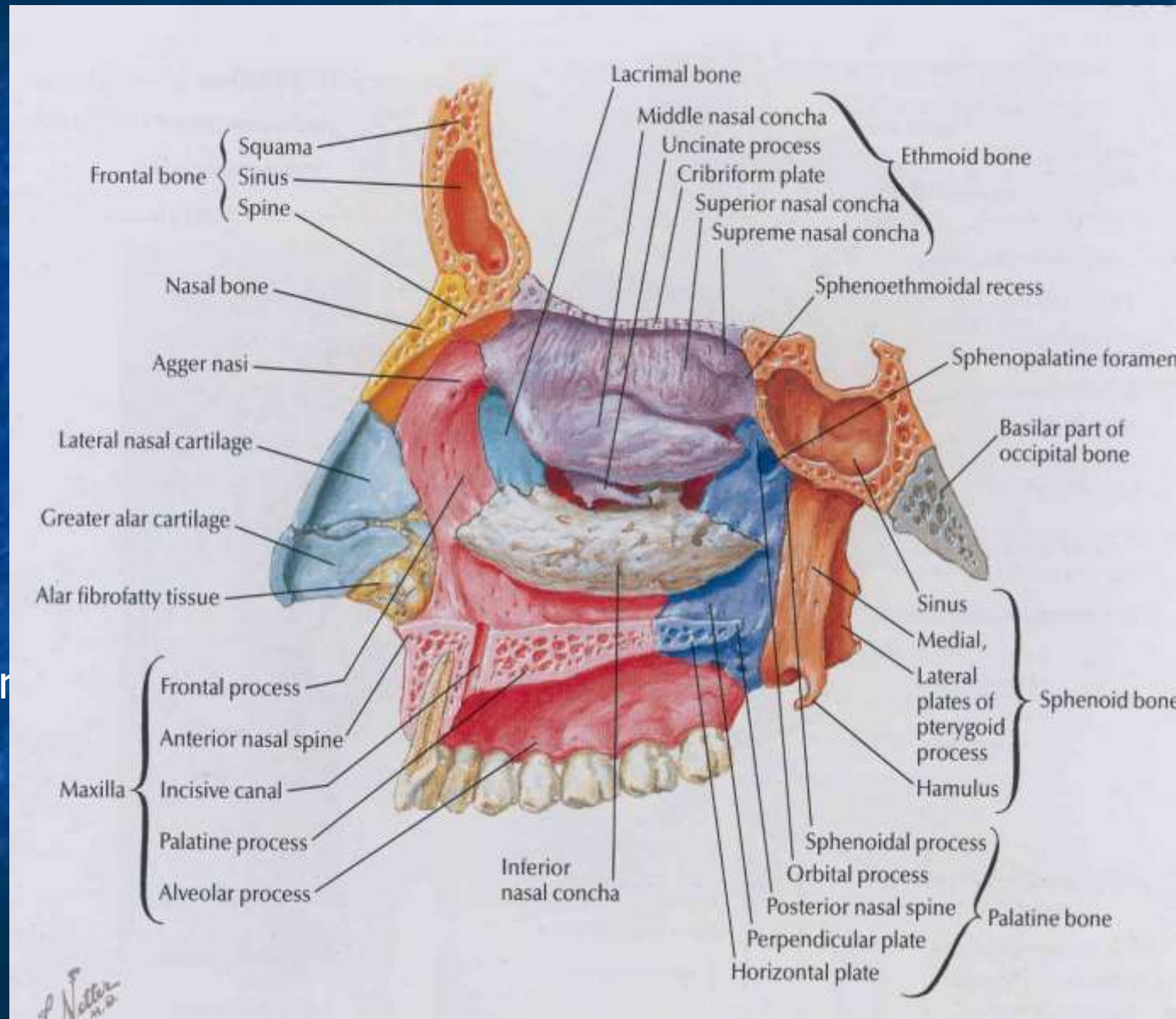
- Palatum durum

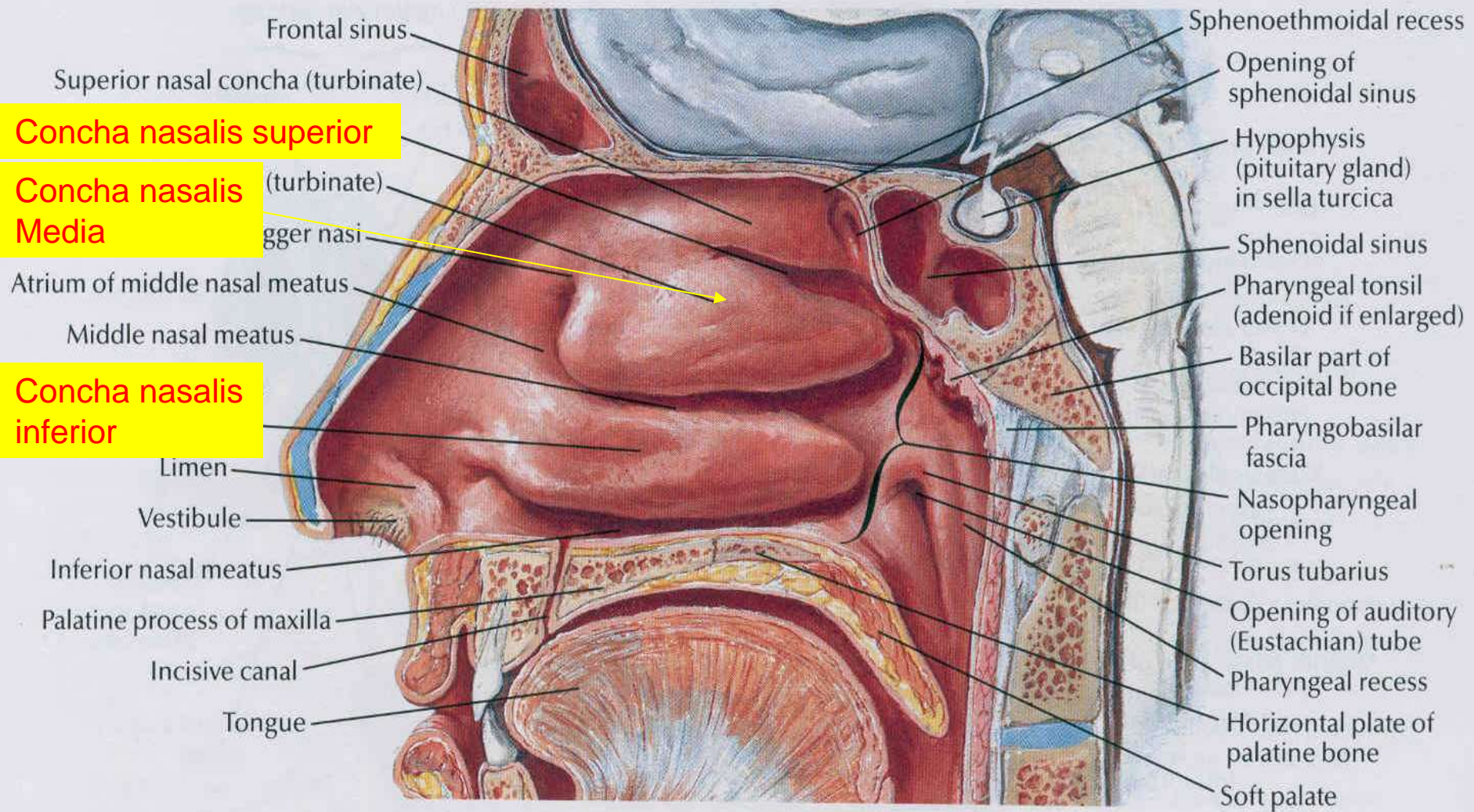
**LATERAL :**

- Concha nasalis superior
- Concha nasalis media
- Concha nasalis inferior

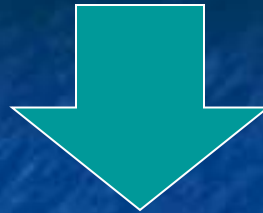
**MEDIAL :**

- Os vomer
- Lamina perpendicularis
- os ethmoidalis

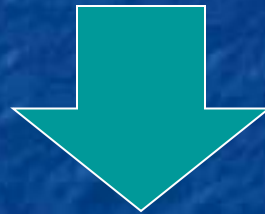




# VASCULARISASI



## PLEXUS KIESSELBACH



A. SPHENOPALATINA

A. ETHMOIDALIS ANTERIOR

A. ETHMOIDALIS POSTERIOR

A. PALATINA MAJOR

A. SEPTALIS

dinding lateral

SEPTUM NASI



A. ETHMOIDALIS ANTERIOR

A. ETHMOIDALIS POSTERIOR

Kiesselbach's area

A. SPHENOPALATINA

(septal) branch of sphenopalatina

A. SEPTALIS/LABIALIS SUPERIOR

superior labial

A. PALATINA MAJOR

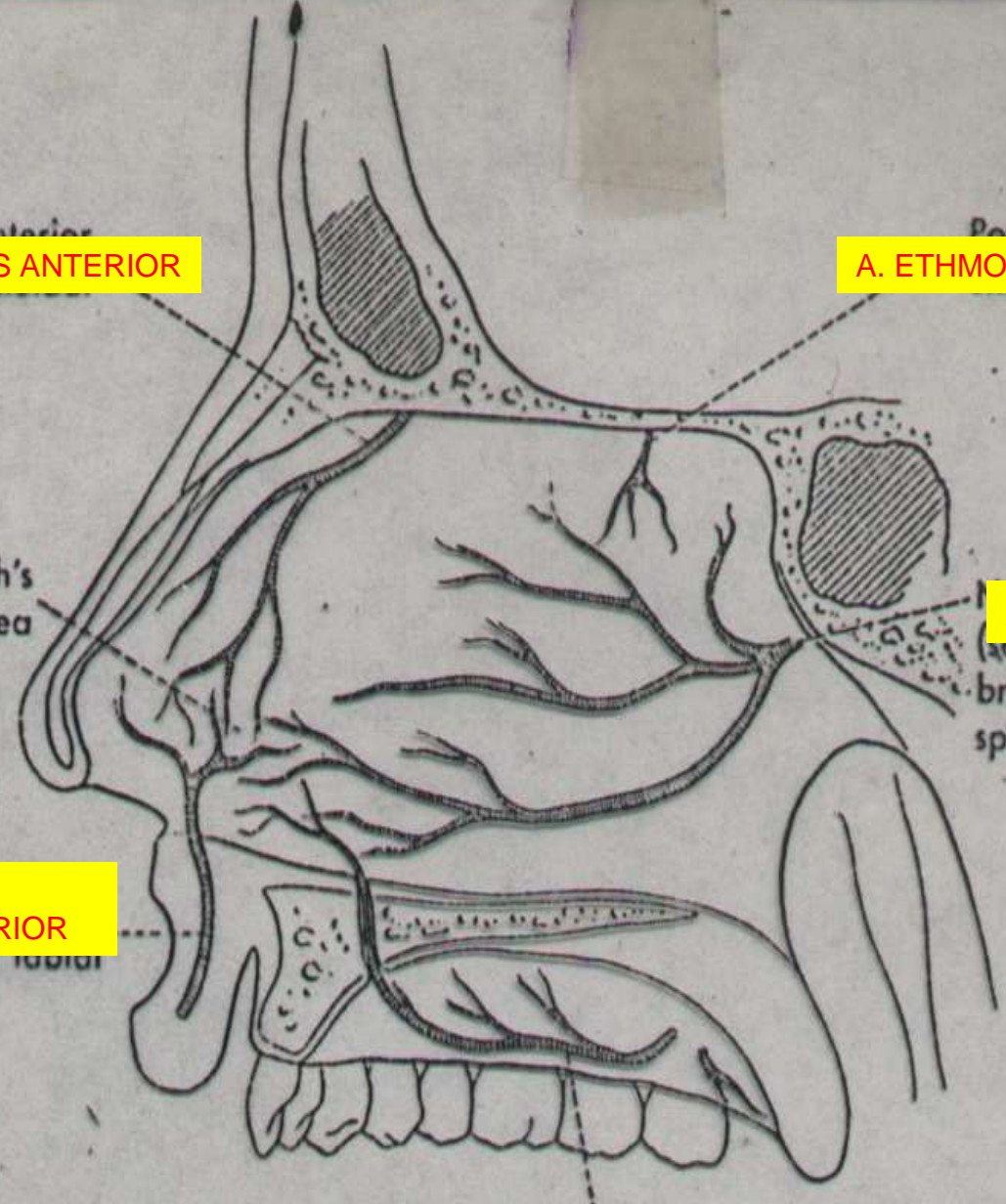
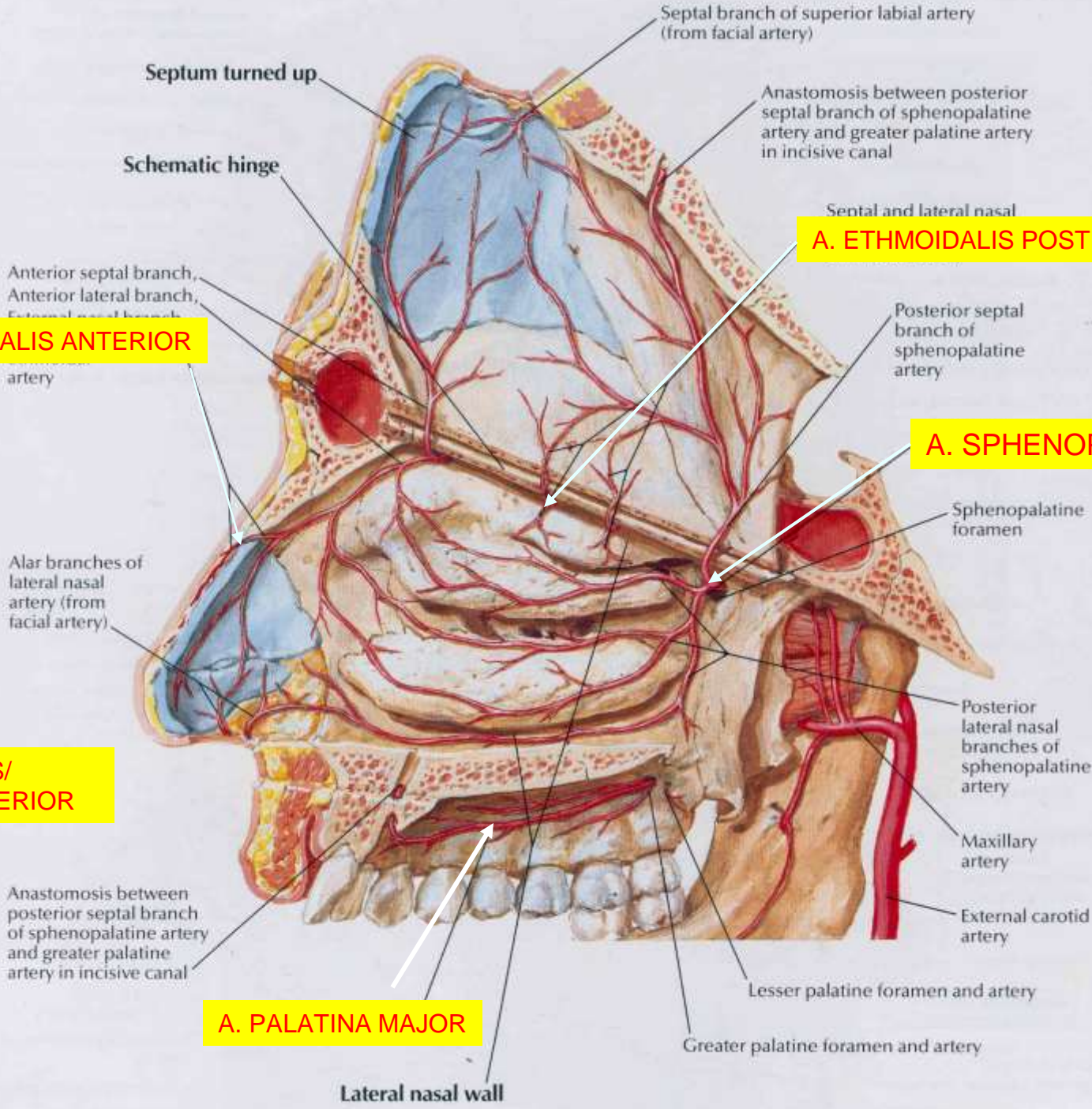


Fig. 141. Arteries of the nasal septum.



**A. ETHMOIDALIS ANTERIOR**

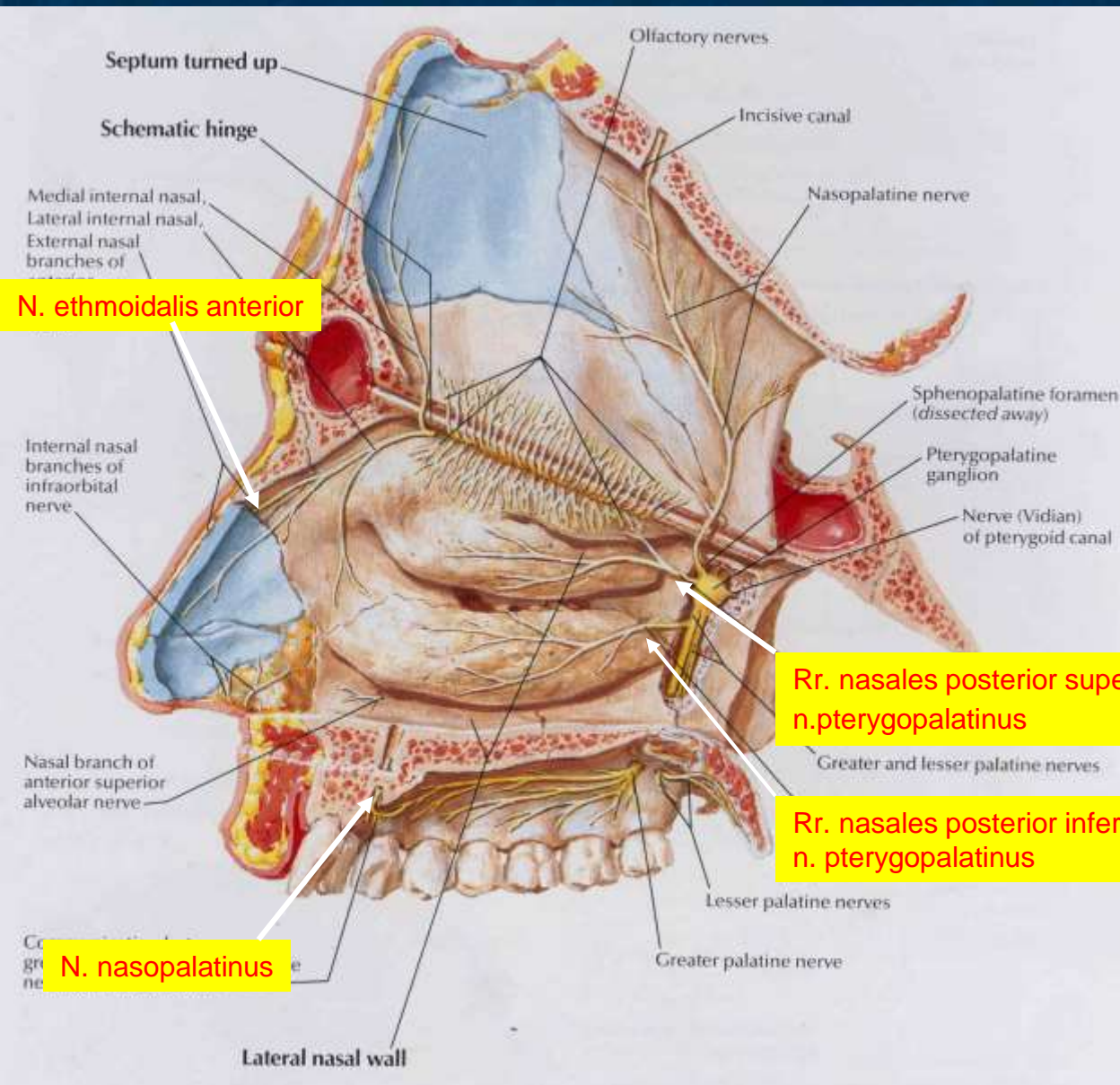
**A. ETHMOIDALIS POSTERIOR**

**A. SPHENOPALATINA**

**A. SEPTALIS/LABIALIS SUPERIOR**

**A. PALATINA MAJOR**

# INNERVASI



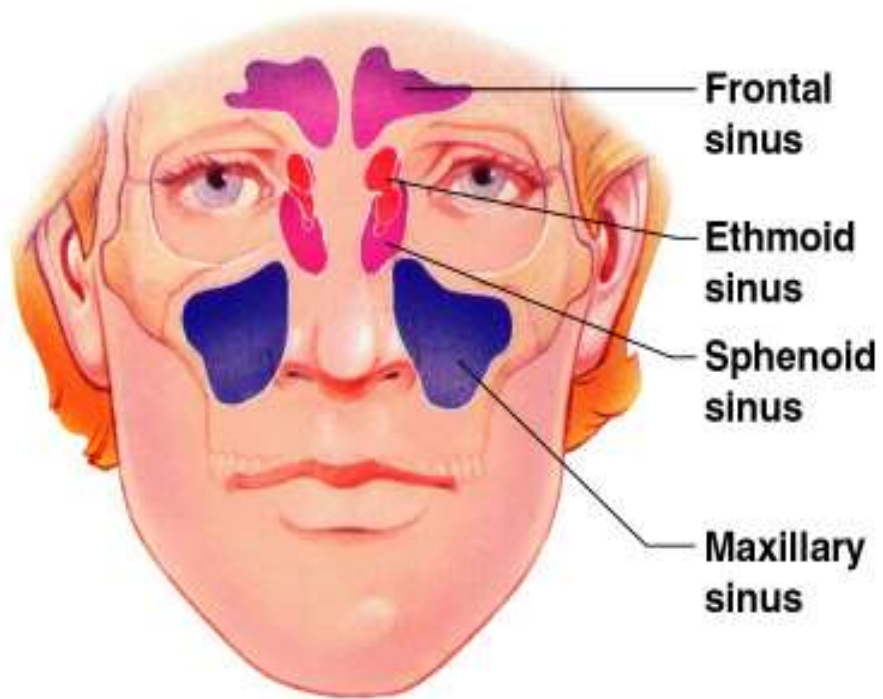
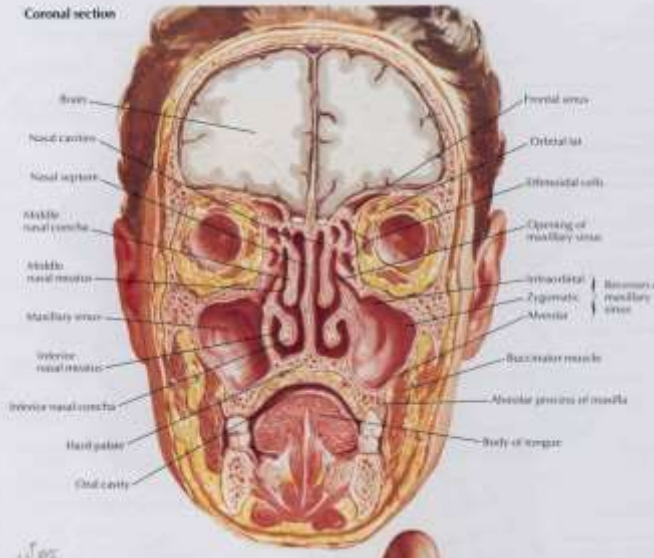
- N. ethmoidalis anterior
- N. nasopalatinus
- Rr. nasales posterior superior n. pterygopalatinus
- Rr. nasales posterior inferior n. pterygopalatinus

# SINUS PARANASALIS

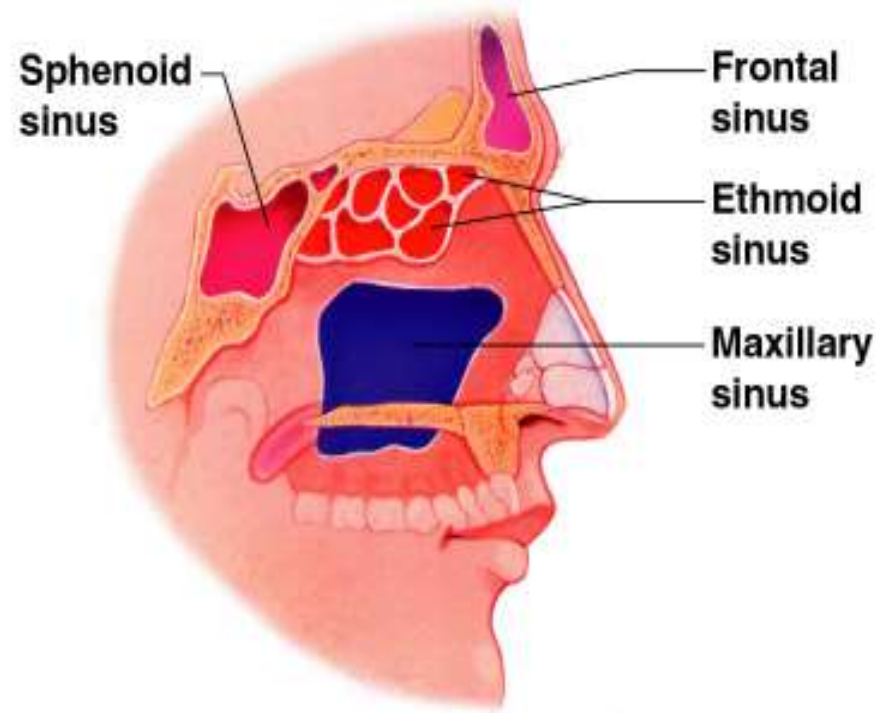


- SINUS FRONTALIS
  - SINUS MAXILLARIS
  - SINUS ETHMOIDALIS ANT.
  - SINUS ETHMOIDALIS POST.
  - SINUS SPHENOIDALIS
- MEATUS NASI MEDIA
- MEATUS NASI SUP.
- RECCESUS SPHENO-ETHMOIDALIS
-

Coronal section



(a)



(b)

# SINUS MAXILLARIS

- Terbesar, bentuk piramid, tdp.pd. Corpus maxilla
- Apex ke depan sampai os zygomaticus
- Atap dari sinus dibentuk oleh dasar cavum orbita
- Radix gigi M2 sering menonjol ke dasar sinus
- Bermuara ke meatus nasi media
- Letak muara lebih cranial dari dasar sinus



Terima kasih