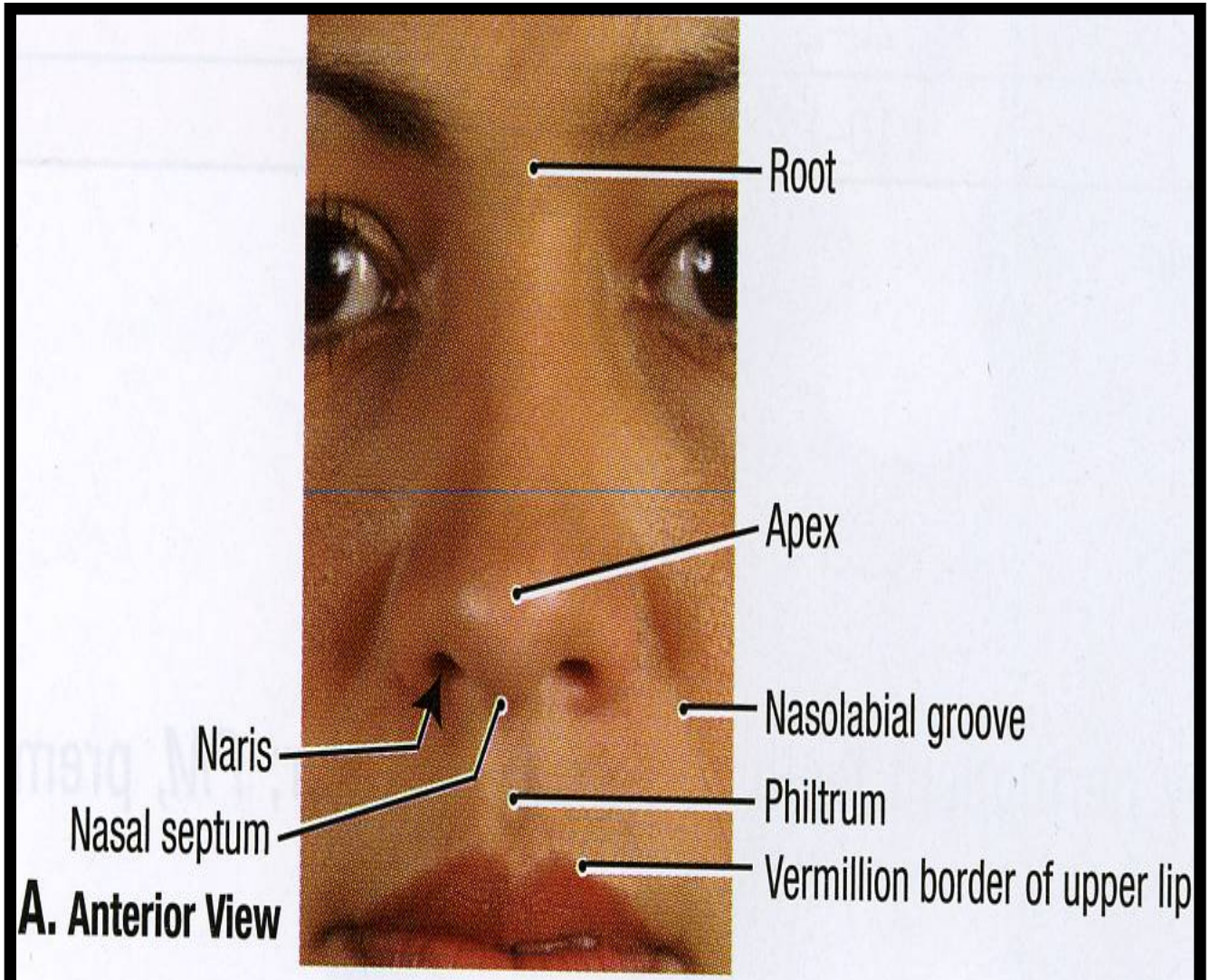
ANATOMY OF THE NOSE AND OLFACTORY NERVE

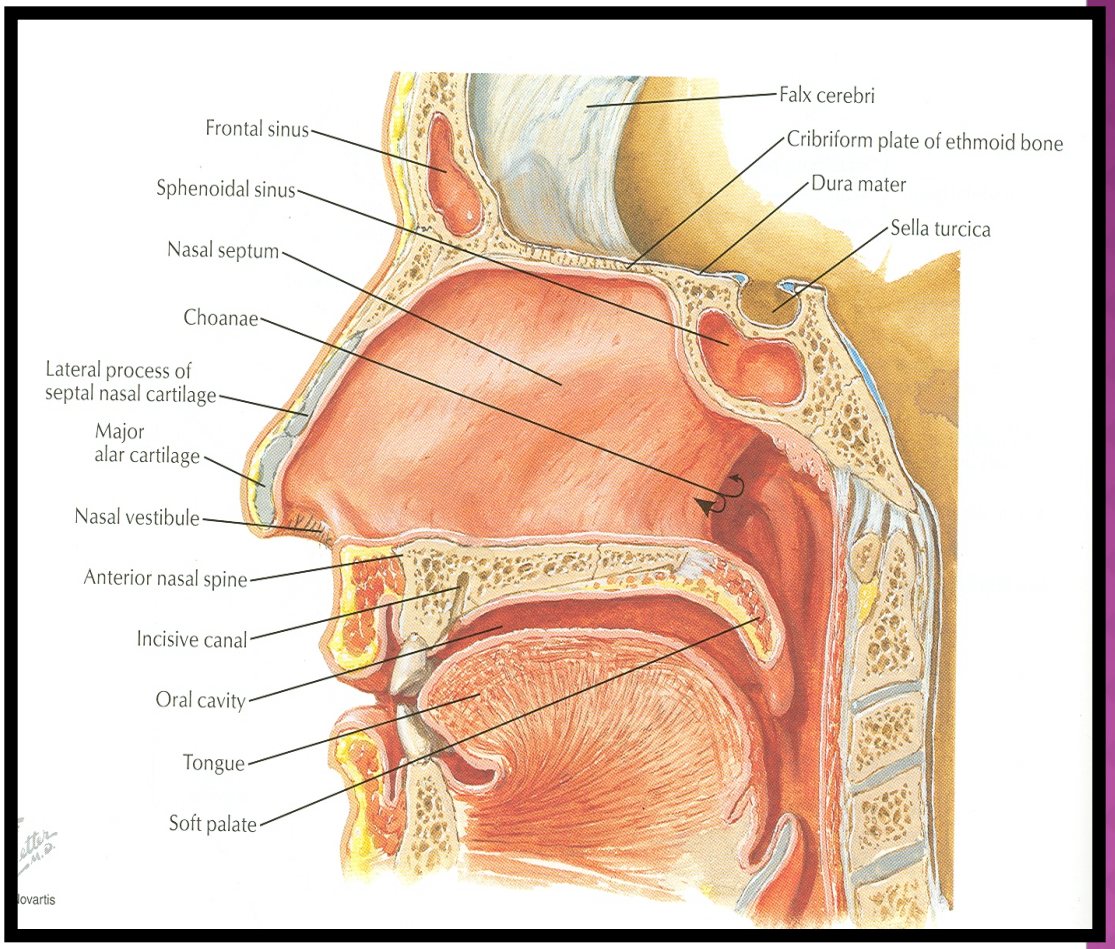


OBJECTIVES

- By the end of this lecture the students should be able to:
- Describe the structures forming the walls of the nasal cavity.
- List the main structures draining into the lateral wall of the nasal cavity.
- Differentiate between the respiratory and olfactory regions of the nasal cavity.
- List the main sensory and blood supply of the nose.
- Describe the olfactory pathway.

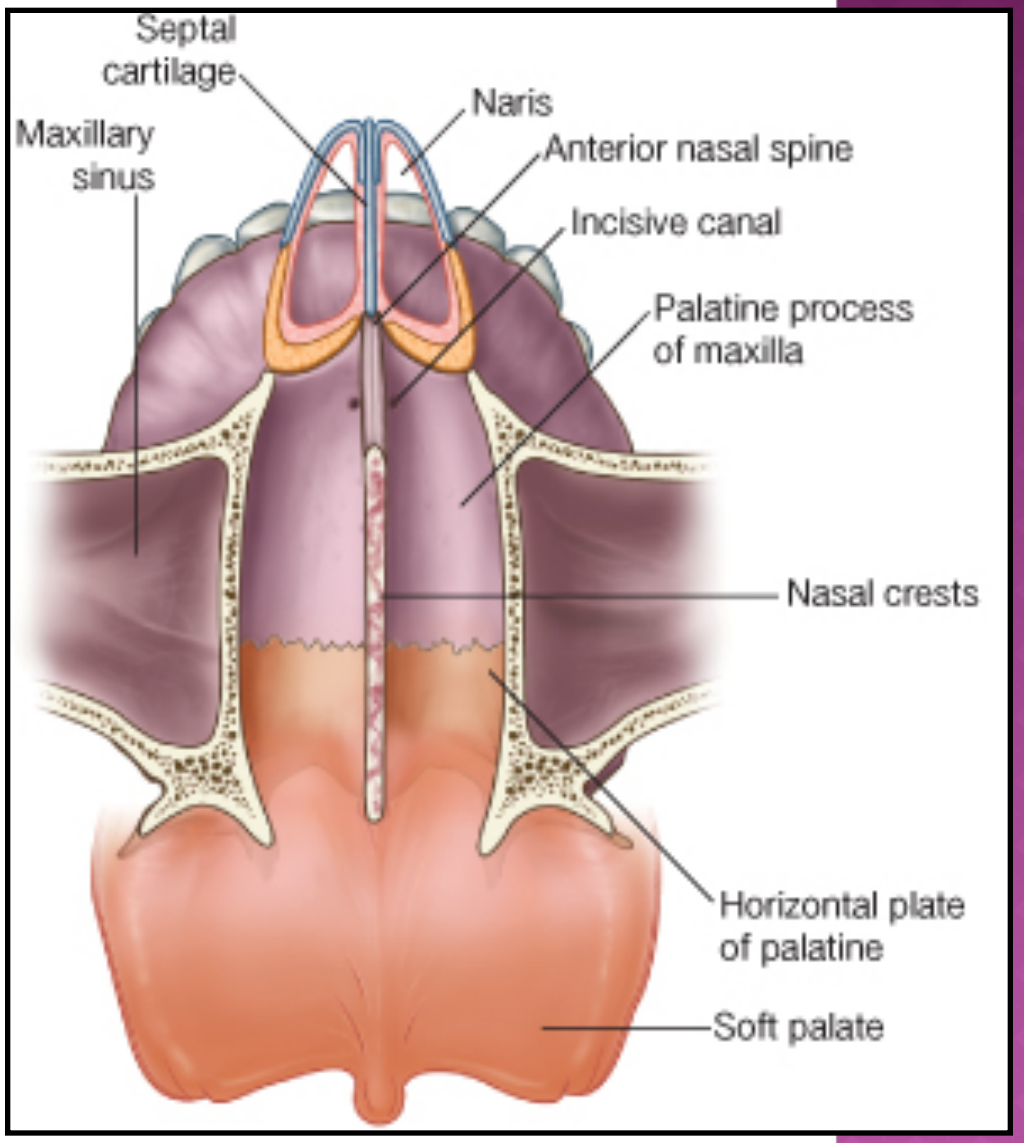
NASAL CAVITY

- It extends from nostrils anteriorly to the choanae posteriorly.
- Divided into right and left parts by the **nasal septum**.
- Each part has:
- **Roof**
- **Floor**
- **Lateral and**
- **Medial walls.**



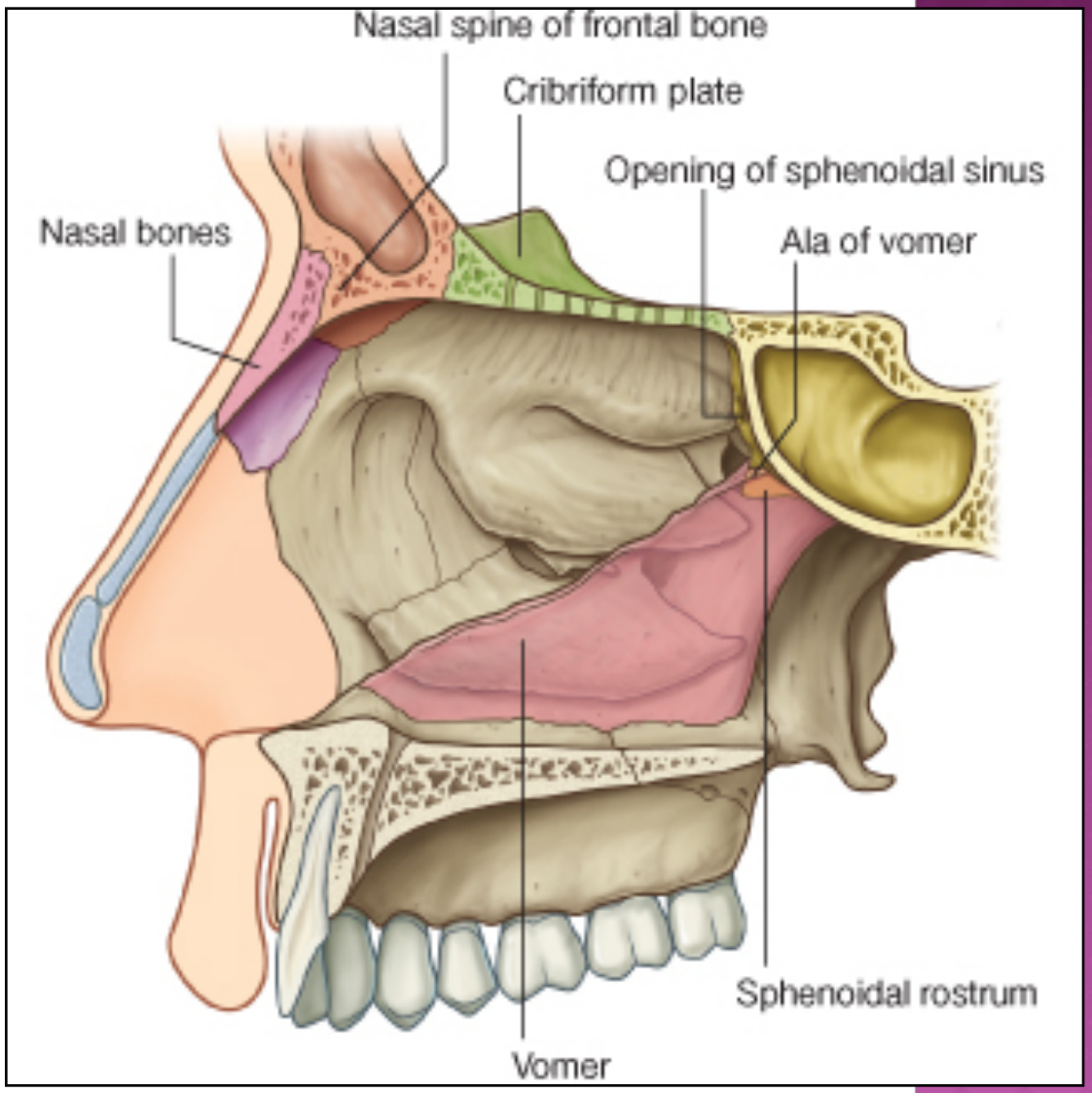
FLOOR

- **Formed by:**
- Nasal (upper)surface of the hard (bony) palate:
- Palatine process of maxilla, **anteriorly.**
- Horizontal plate of the palatine bone, **posteriorly.**



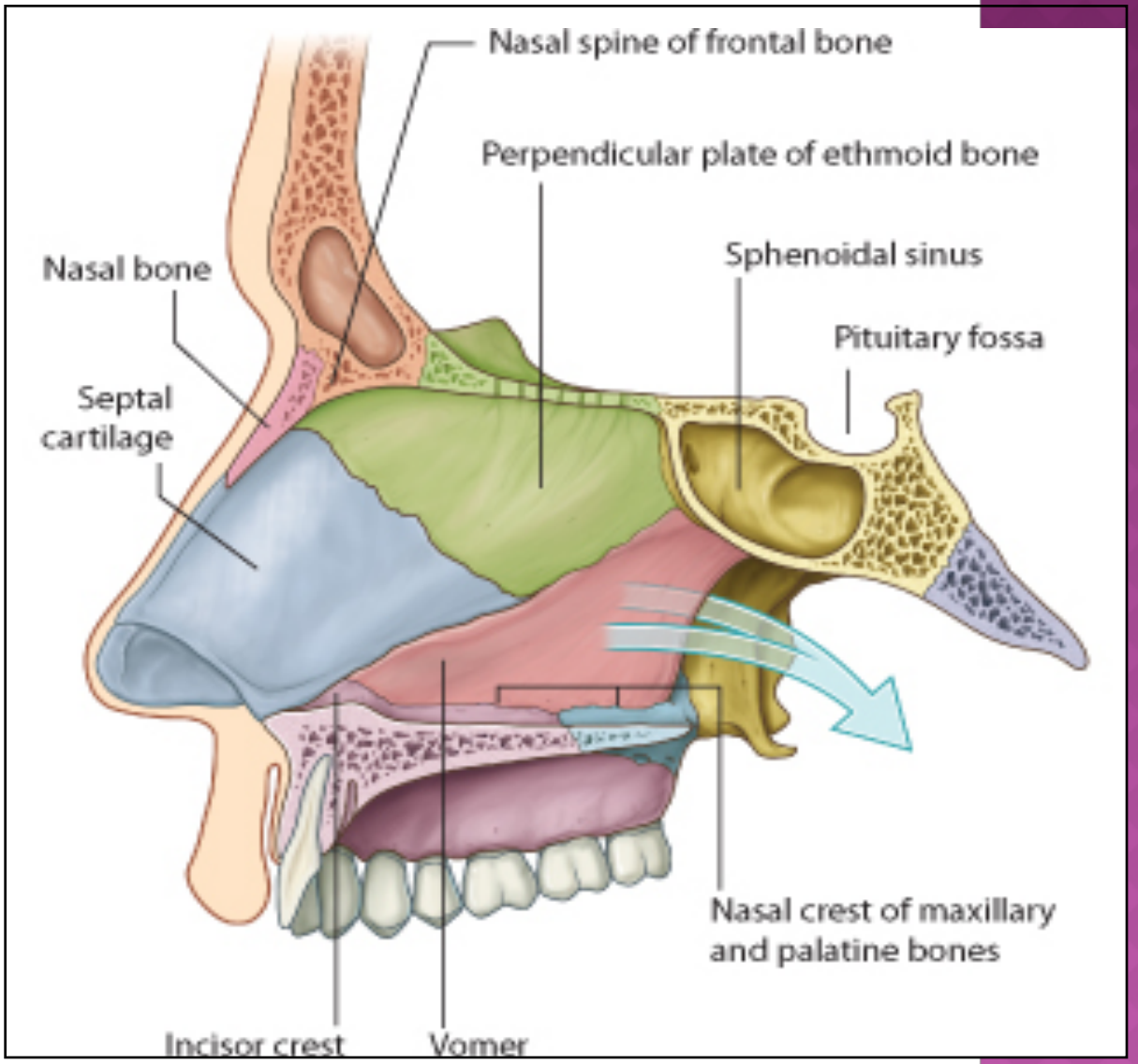
ROOF

- **Formed by:**
- Body of sphenoid, posteriorly.
- Cribriform plate of ethmoid, in the middle.
- Frontal, and nasal bones, Anteriorly.



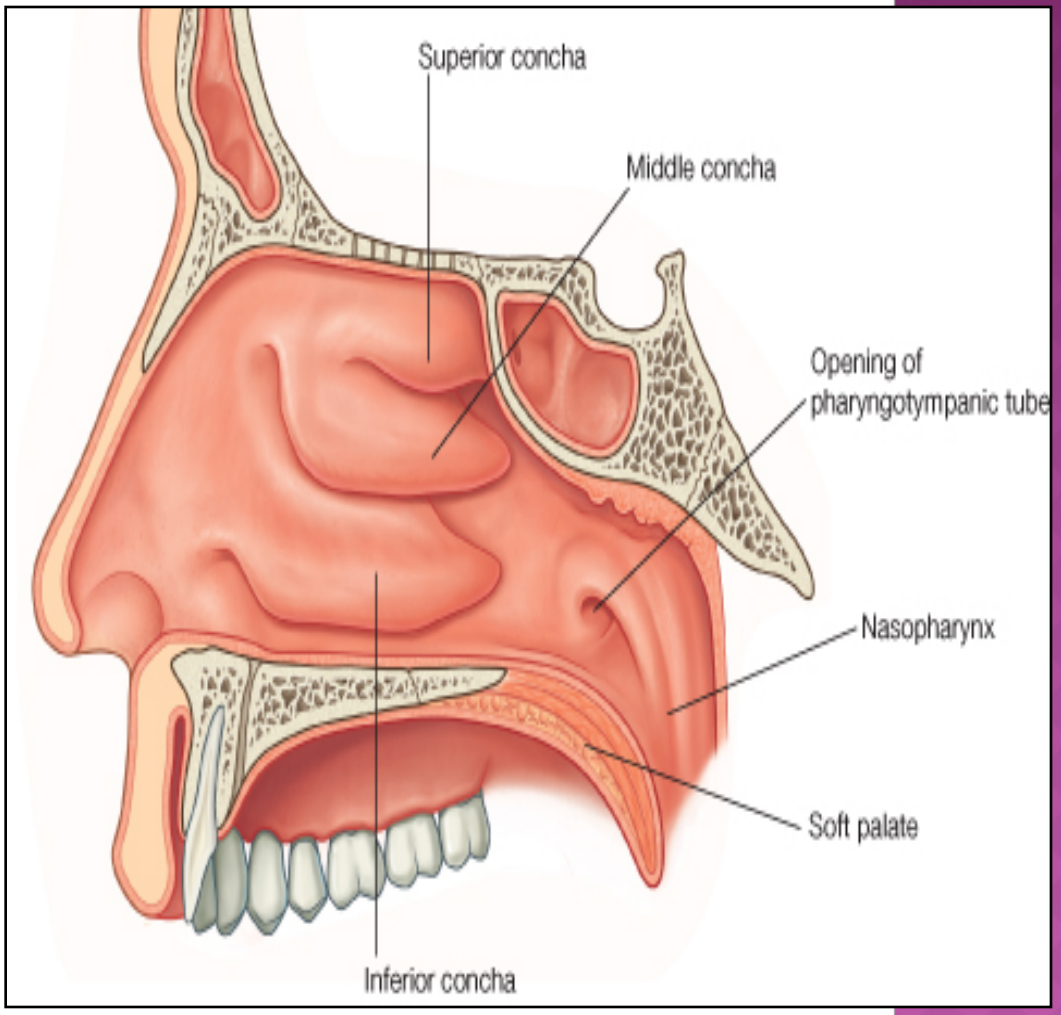
MEDIAL WALL

- The nasal septum :
- Vertical plate of ethmoid.
- Septal cartilage.
- Vomer.

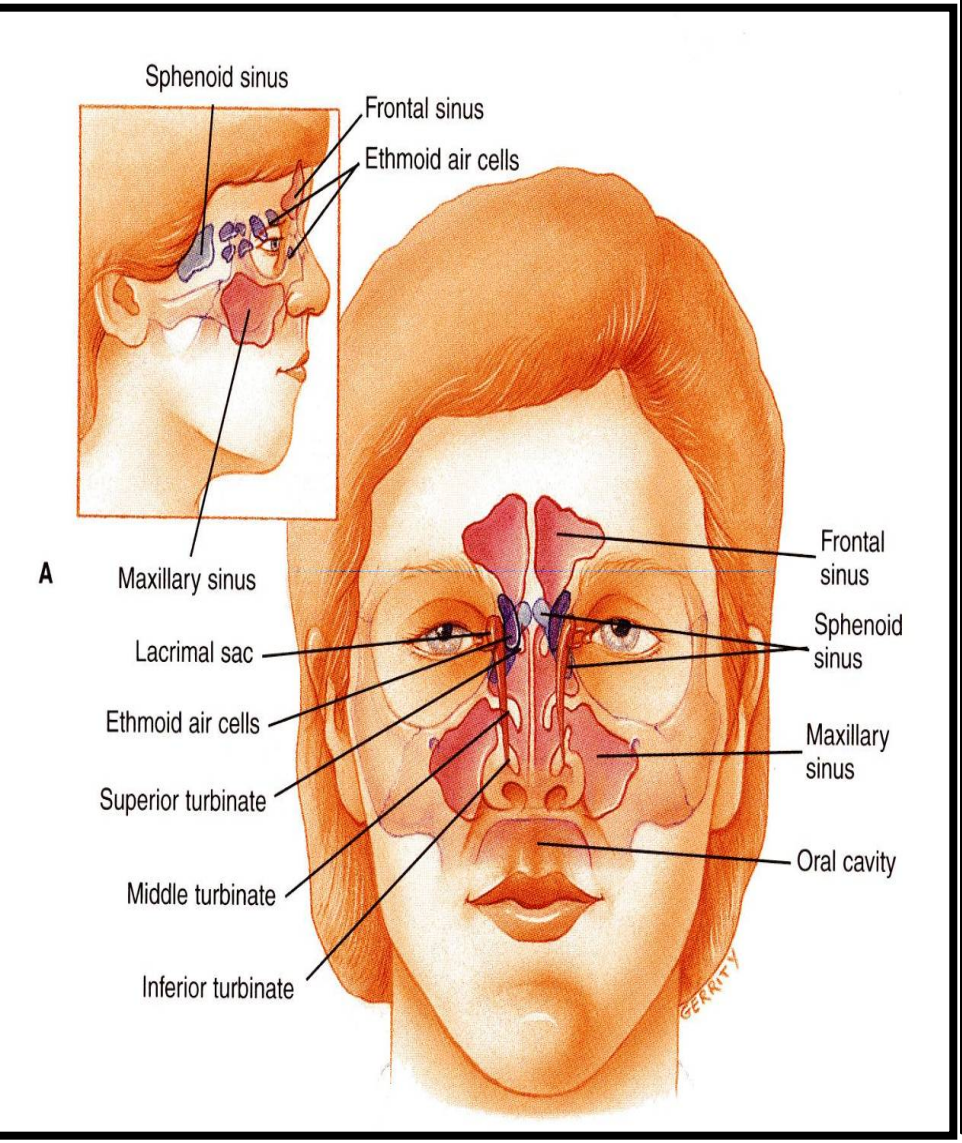


LATERAL WALL

- Marked by:
- Three projections (Nasal Conchae):
- **Superior, middle, and inferior**
- The space below each concha is called **Meatus.**
- **Superior, middle, and inferior meatus.**
- The space (fossa) above the superior concha is the **Sphenoethmoidal recess.**



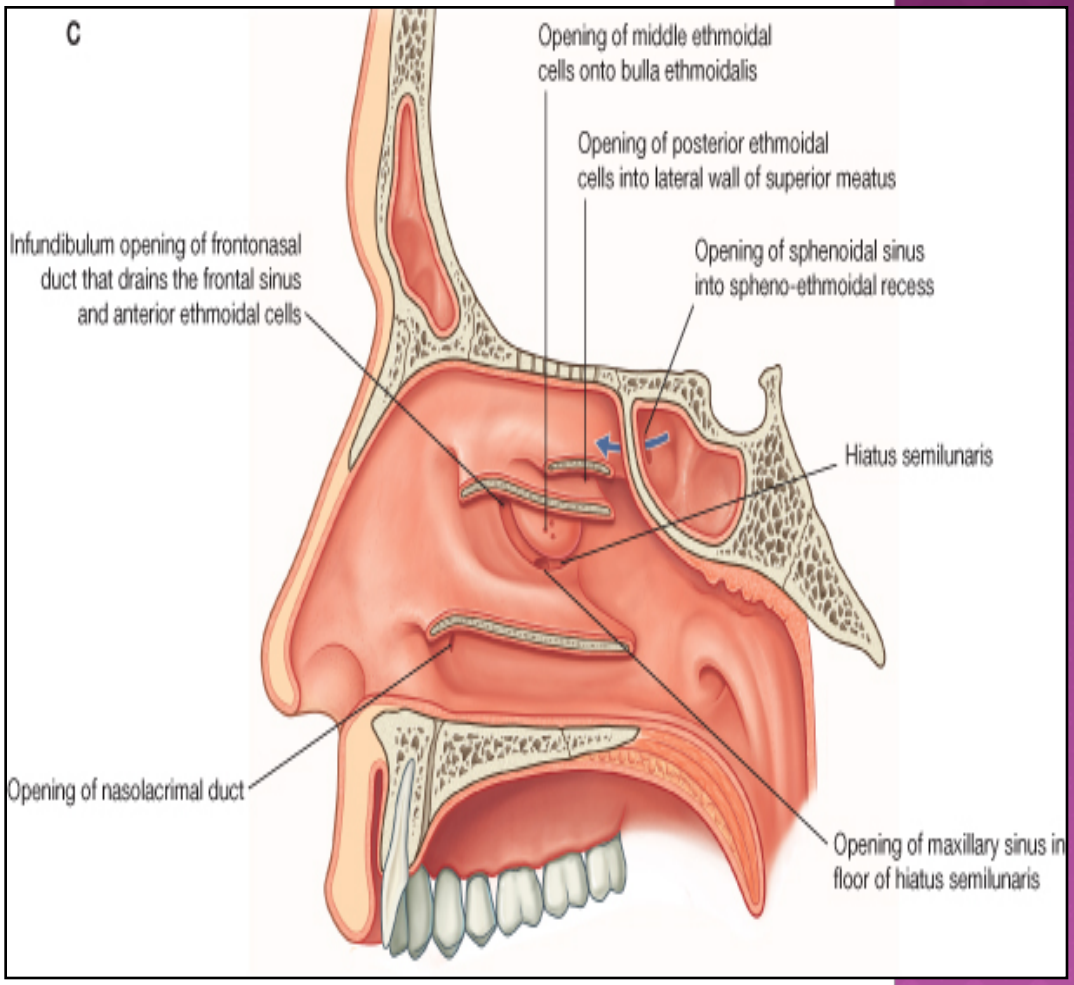
PARANASAL SINUSES

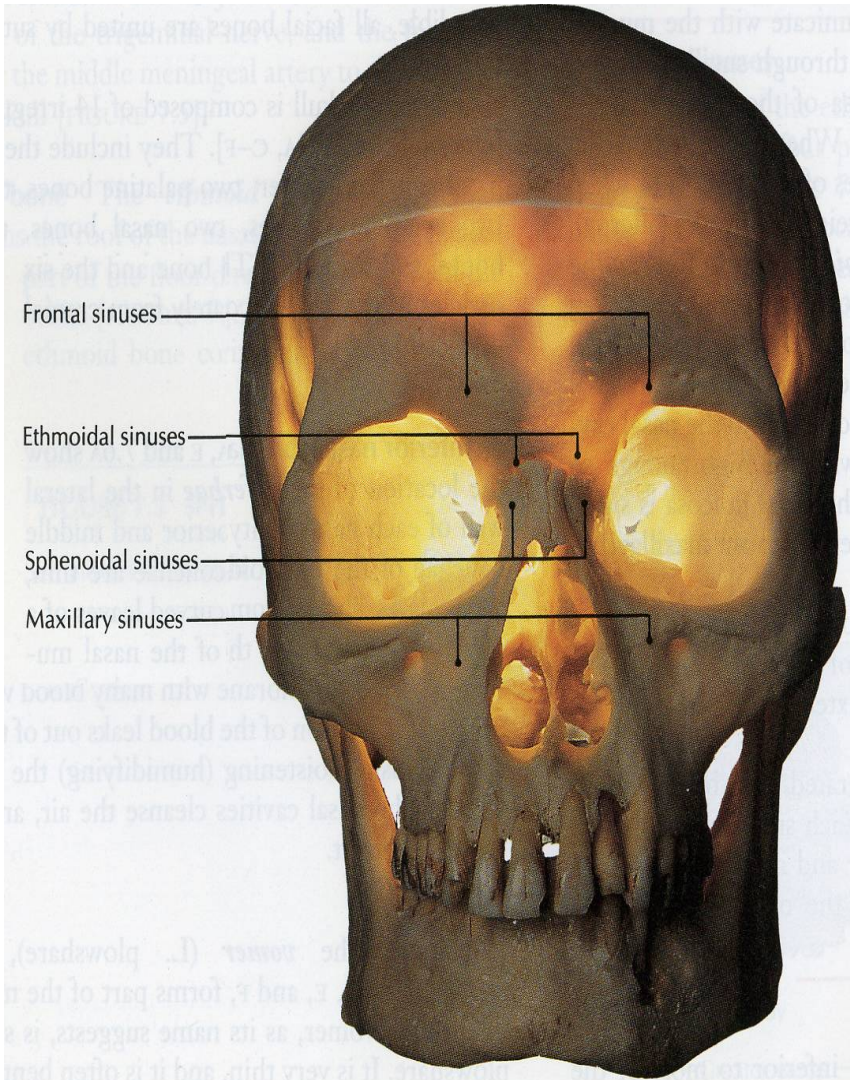


- They are **cavities** inside the:
  - Maxilla
  - Frontal bone
  - Sphenoid bone
  - Ethmoid bone
- They are:
  - **Lined** with mucoperiosteum;
  - **Filled** with air; &
  - Communicate with the nasal cavity.
  - Open in the lateral wall of the nasal cavity
  - **Function:**
    - Lighten the skull weight
    - Amplify the sound as we speak.

SINUSES OPENING IN LATERAL WALL

- **Sphenoethmoidal recess** receives the opening of **sphenoidal air sinus**
- **Superior meatus;** receives the opening of **posterior ethmoidal sinus.**
- **Middle meatus;** contains **bulla ethmoidalis** and hiatus semilunaris,
- Receives the openings of **maxillary, frontal, & anterior , middle ethmoidal sinuses.**
- **Inferior meatus**; receives the opening of **nasolacrimal duct.**





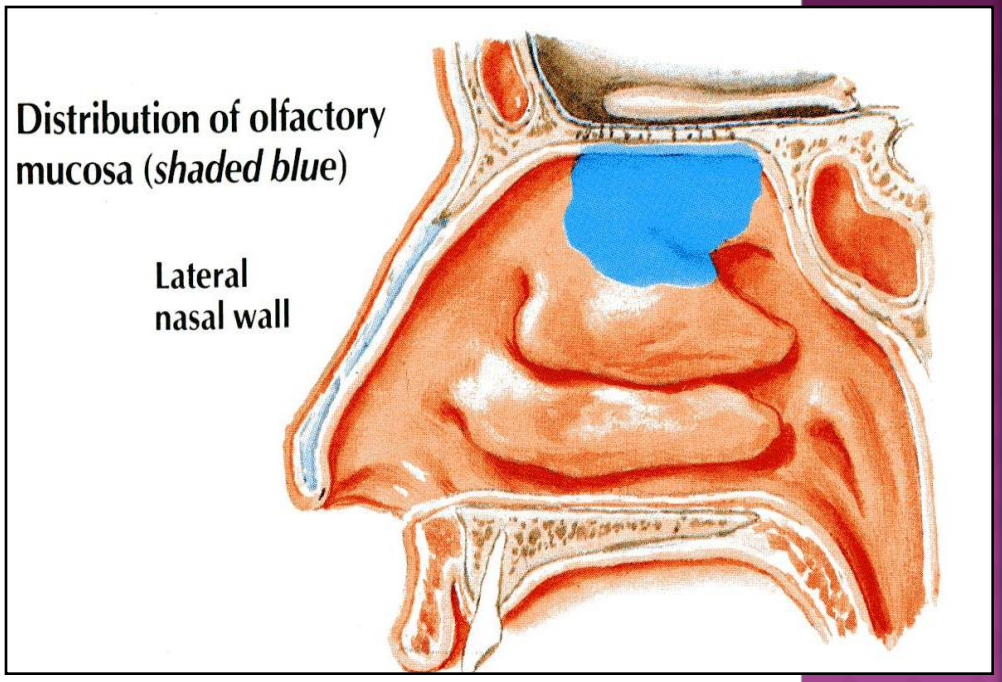
The mucosal lining of these sinuses is continuous with that in the nose and the throat. So infection in this area tends to migrate into the sinuses causing sinusitis.

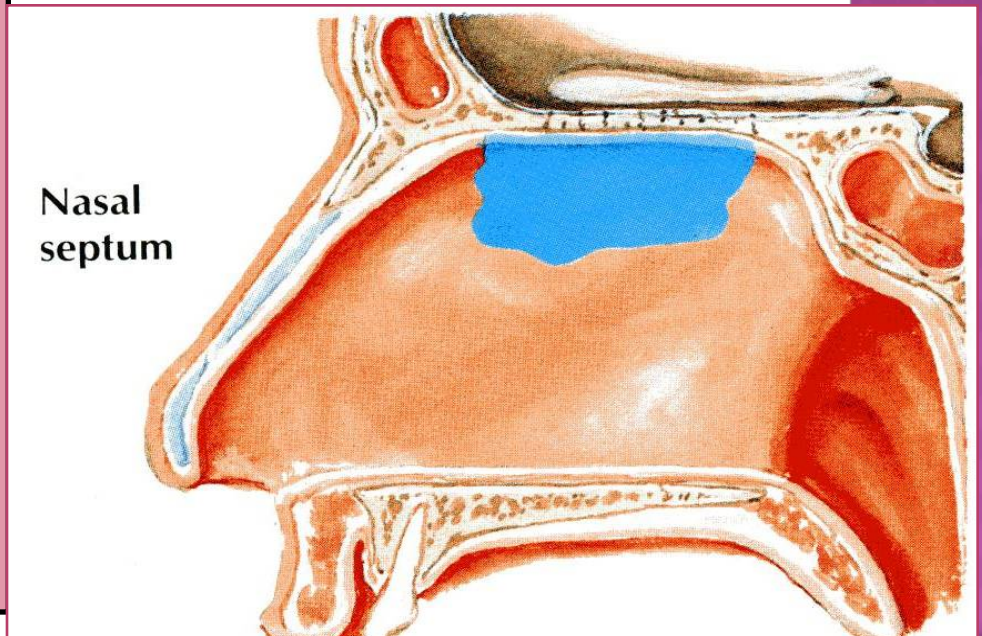
- **Note** : all sinuses open into the middle meatus **EXCEPT:**
- **Sphenoidal sinus :** in sphenoethmoidal recess.
- **Posterior ethmoidal sinus :** in superior meatus.

NASAL MUCOSA

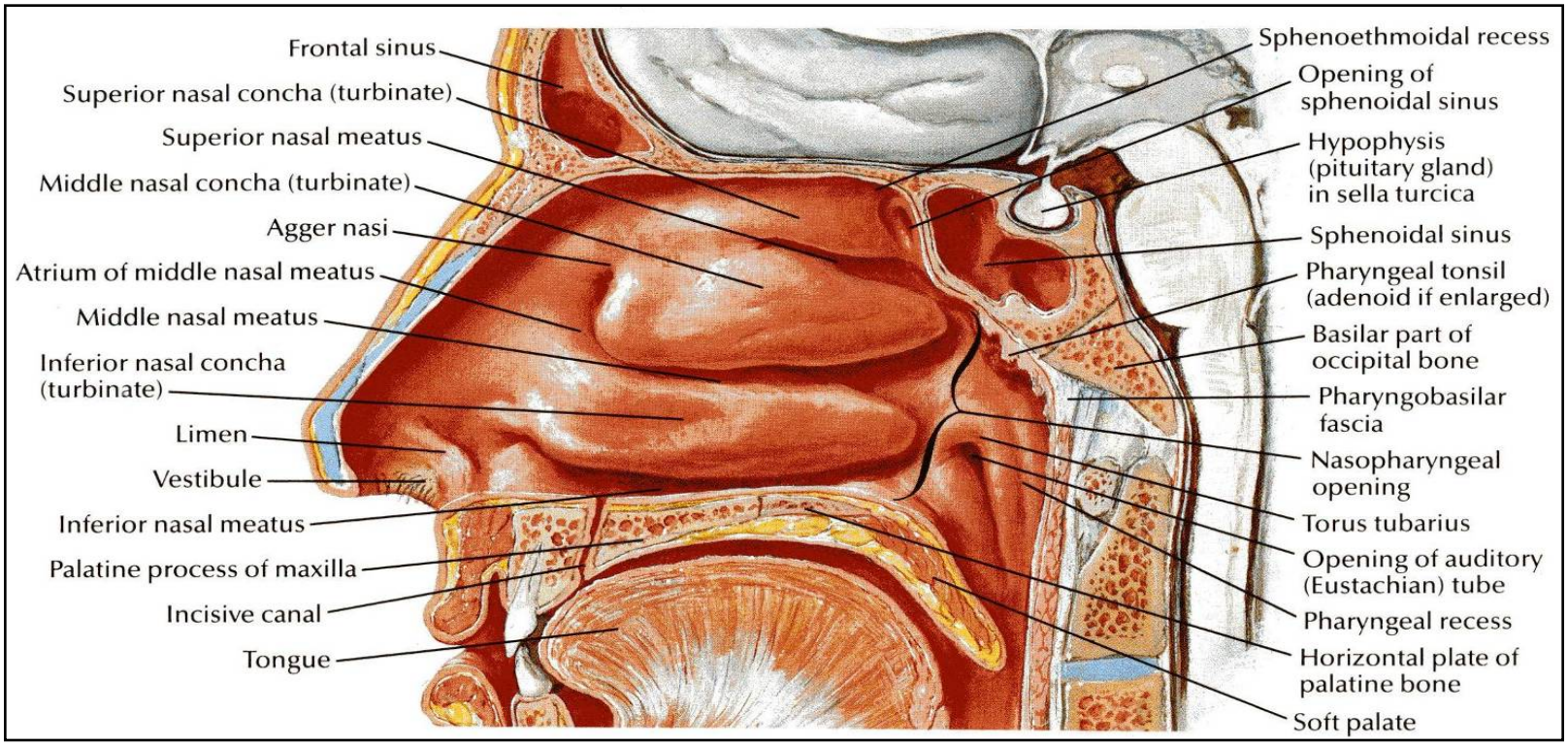
- Olfactory :
- It is delicate and contains olfactory nerve cells.

- It is present in the upper part of nasal cavity:
- Roof
- On the lateral wall, it lines the upper surface of the superior concha and the sphenoethmoidal recess.
- On the medial wall, it lines the superior part of the nasal septum.





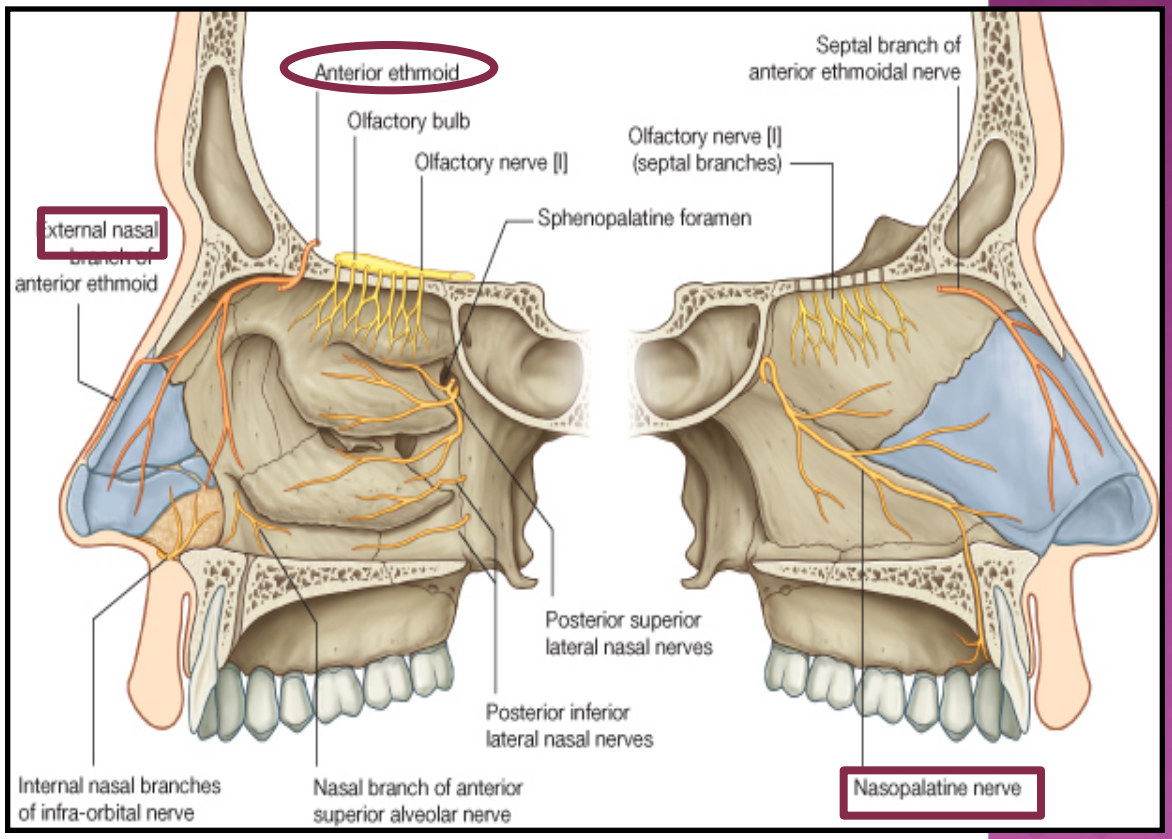
RESPIRATORY MUCOSA



- **It is thick, ciliated, highly vascular and contains mucous glands & goblet cells**
- It lines the **lower part** of the nasal cavity **(from skin of vestibule to the superior concha).**
- It functions to moisten, clean and warm the inspired air.
- The air **is moistened** by the secretion of numerous serous glands.
- It is **cleaned** by the removal of the dust particles by the ciliary action of the columnar ciliated epithelium that covers the mucosa.
- The air **is warmed** by a ***submucous venous plexus.***

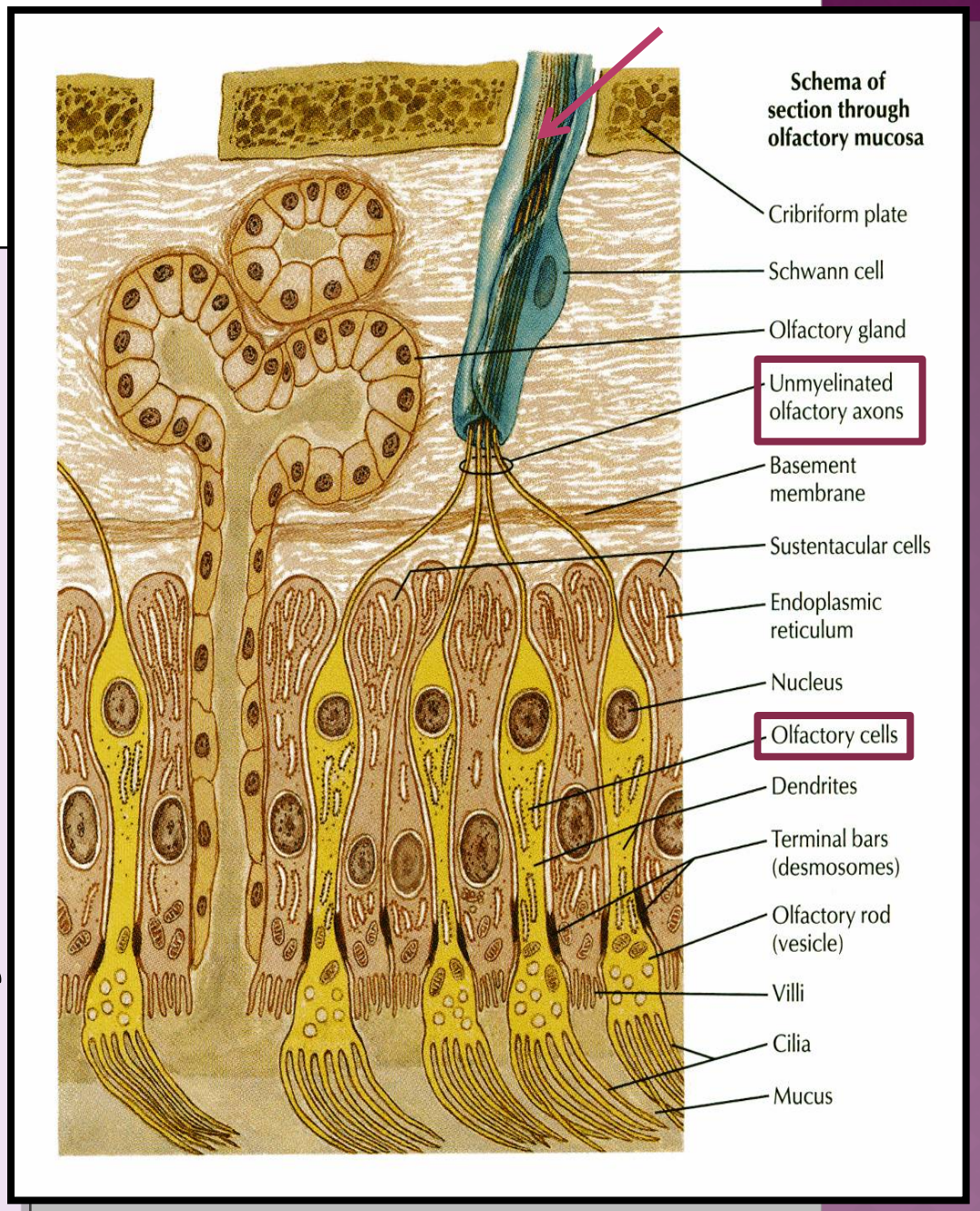
NERVE SUPPLY

- The **nerves of** General Sensation are derived from the Ophthalmic & Maxillary divisions of ***trigeminal nerve***.
- The ***anterior part is supplied by:*** **Anterior Ethmoidal nerve.**
- The ***posterior part is supplied by*** ***branches*** of the **pterygopalatine ganglion:**
- 1-*Nasopalatine,*
- *2- Nasal, and*
- *3- Palatine*

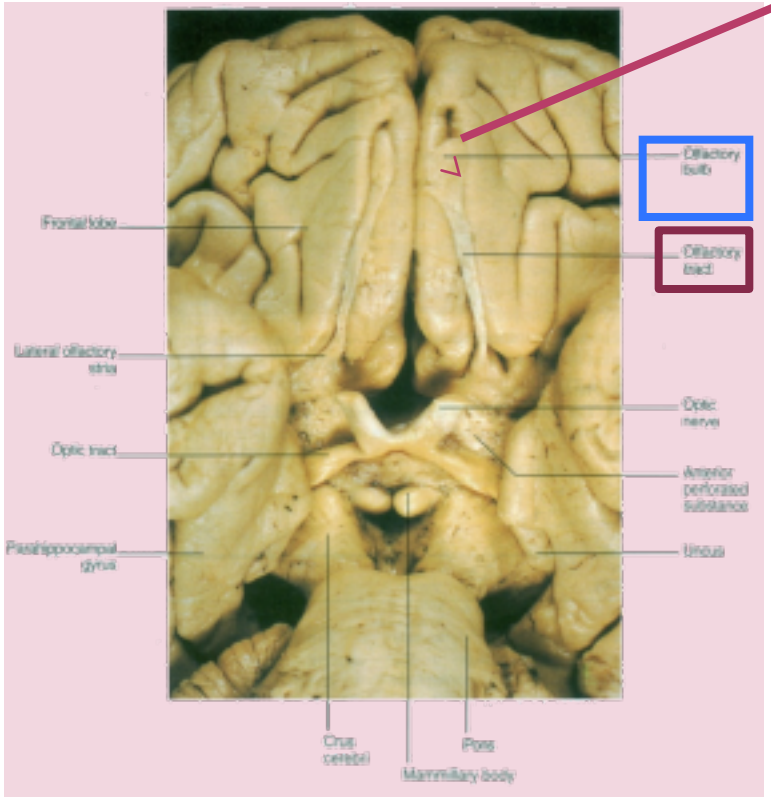


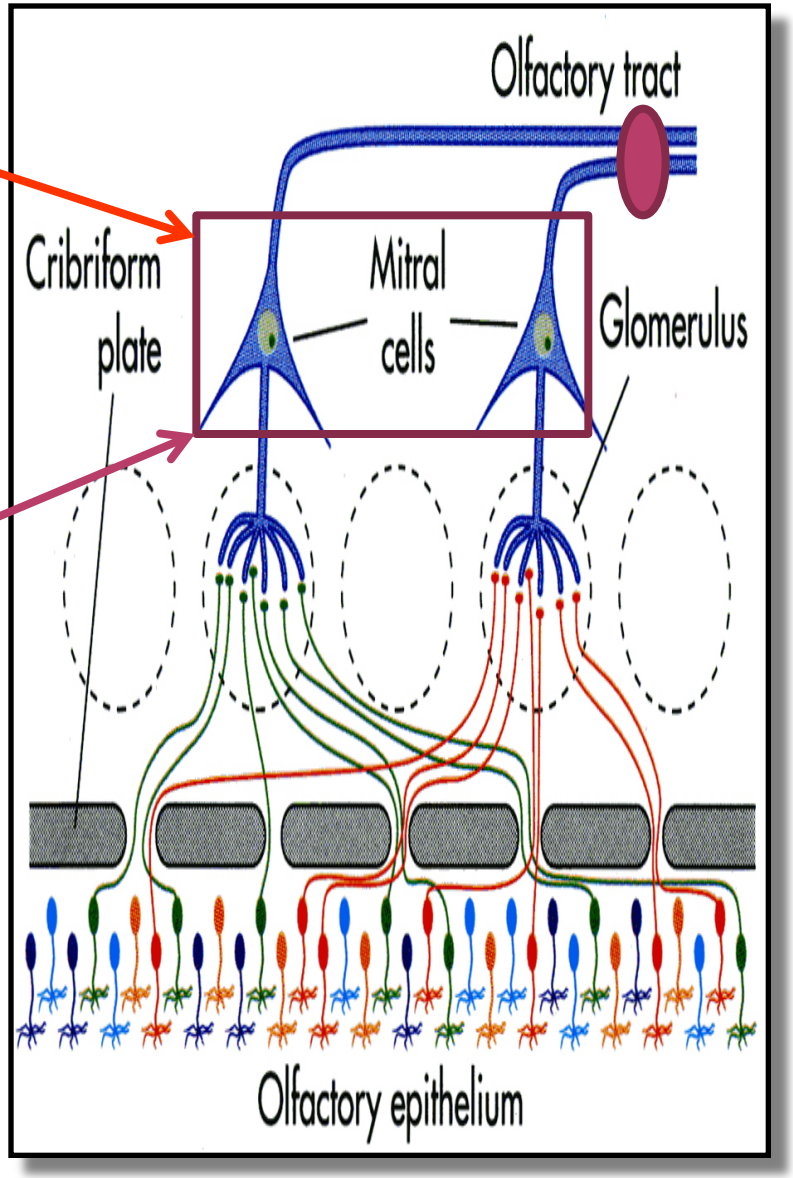
SPECIAL SENSATION OLFACTORY NERVE

- Olfactory pathway:
- 1st neurone:
- Olfactory receptors are specialized, ***ciliated*** **nerve cells** that lie in the olfactory epithelium.
- The axons of these bipolar cells 12-20 fibers form the true olfactory nerve fibers.
- Which passes through the cribriform plate of ethmoid.
- They join the **olfactory bulb**



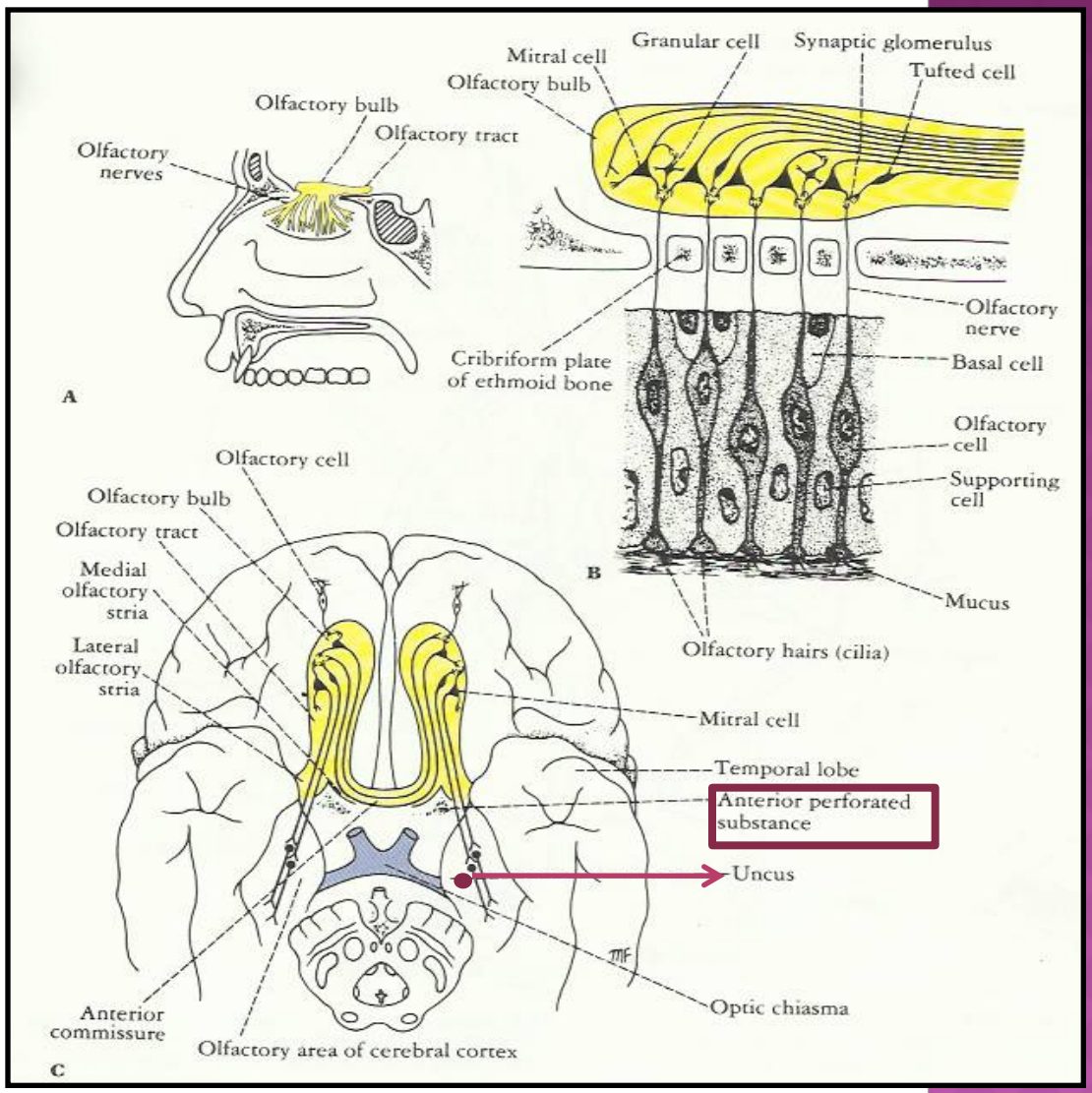
Preliminary processing of olfactory information is within the **olfactory bulb,** which contains interneurones and large Mitral cells; axons from the latter leave the bulb to form the **olfactory tract**.



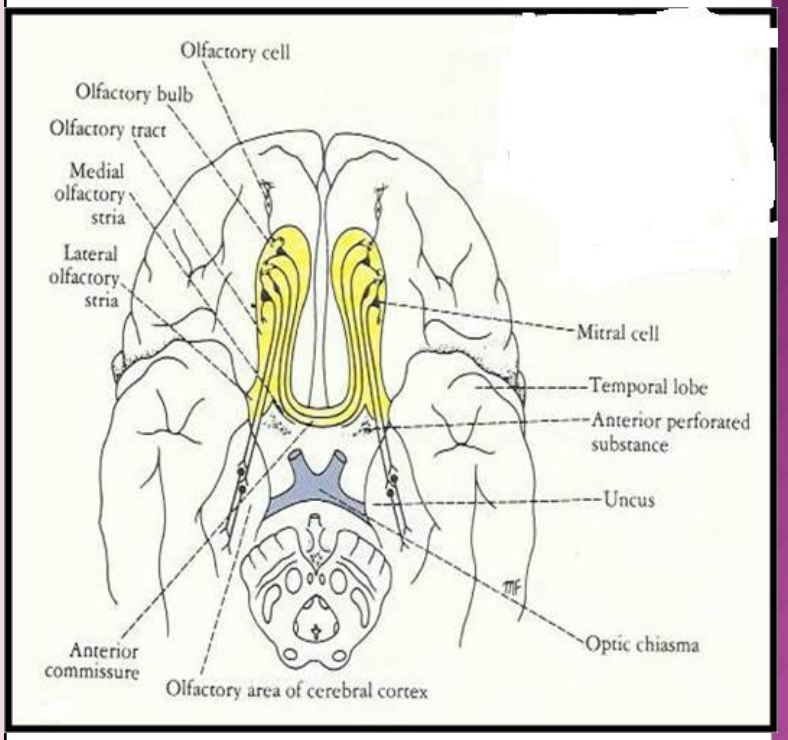


OLFACTORY PATHWAY

- **2nd neurone:**
- It is formed by the **Mitral cells of olfactory bulb.**
- The axons of these cells form the olfactory tract.
- **Each tract divides** into 2 roots at the anterior perforated substance:
- **Lateral root:**
- Carries olfactory fibers to end in cortex of the **Uncus** & adjacent part of **Hippocampal gyrus (center of smell).**



- **Medial root :**
- crosses midline through anterior commissure and joins the uncrossed lateral root of opposite side.
- It connects olfactory centers of 2 cerebral hemispheres.
- So each olfactory centre receives smell sensation from both halves of nasal cavity.
- **NB.** Olfactory pathway is the only sensory pathway which reaches the cerebral cortex without passing through the Thalamus.



ARTERIAL SUPPLY

- **Sphenopalatine artery** (maxillary) .
- **Anterior and Posterior Ethmoidal** (ophthalmic).
- **Superior labial** (facial).
- **Applied anatomy :**
- The most common site for **epistaxis** is at **the anterior & inferior part of nasal septum (Little's area) because of the** rich arterial anastomosis .
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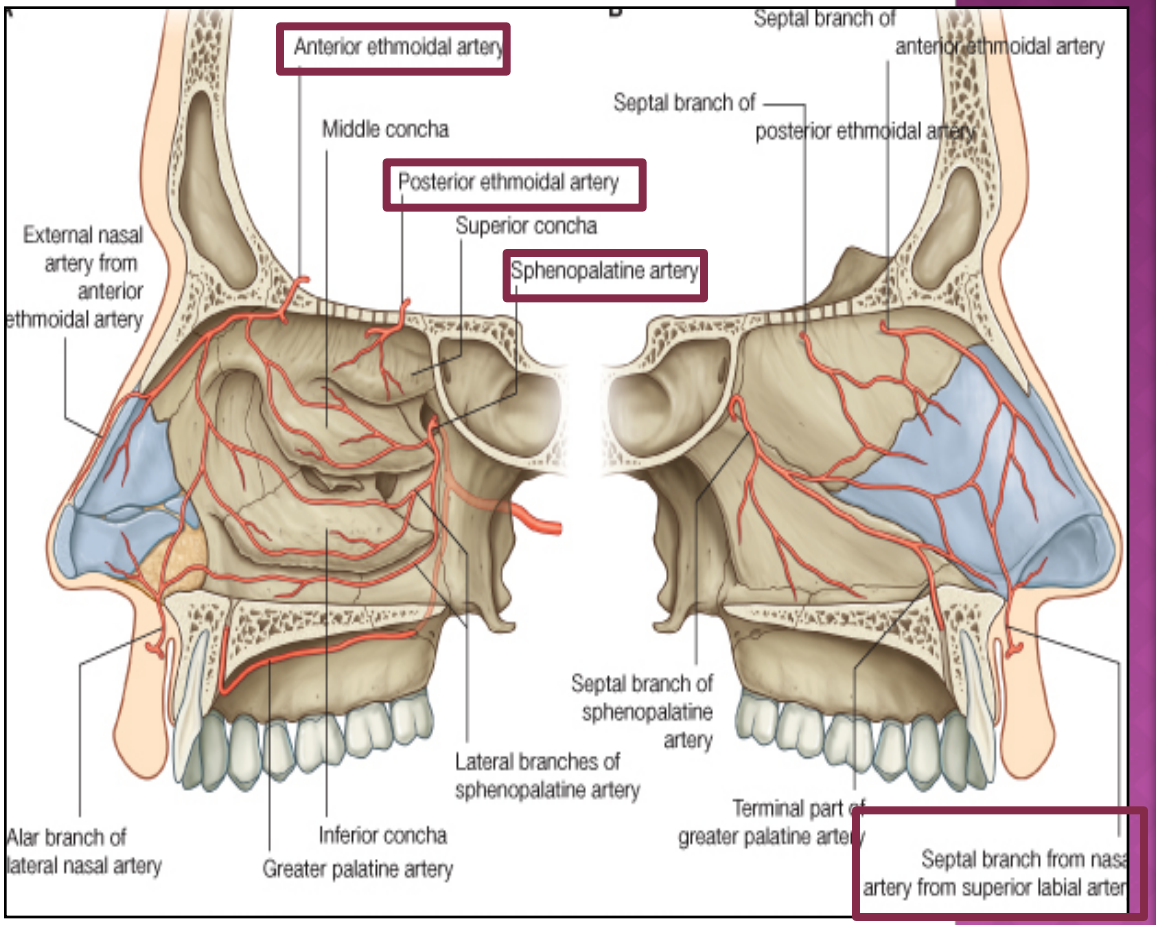
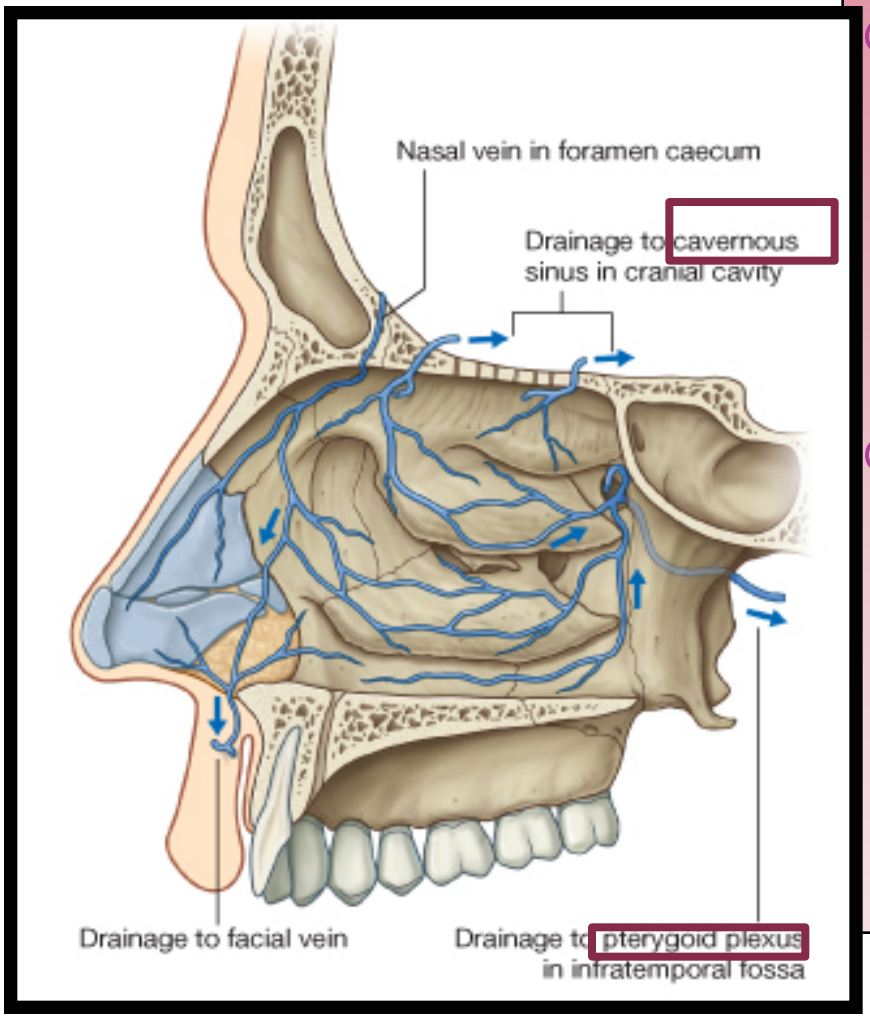


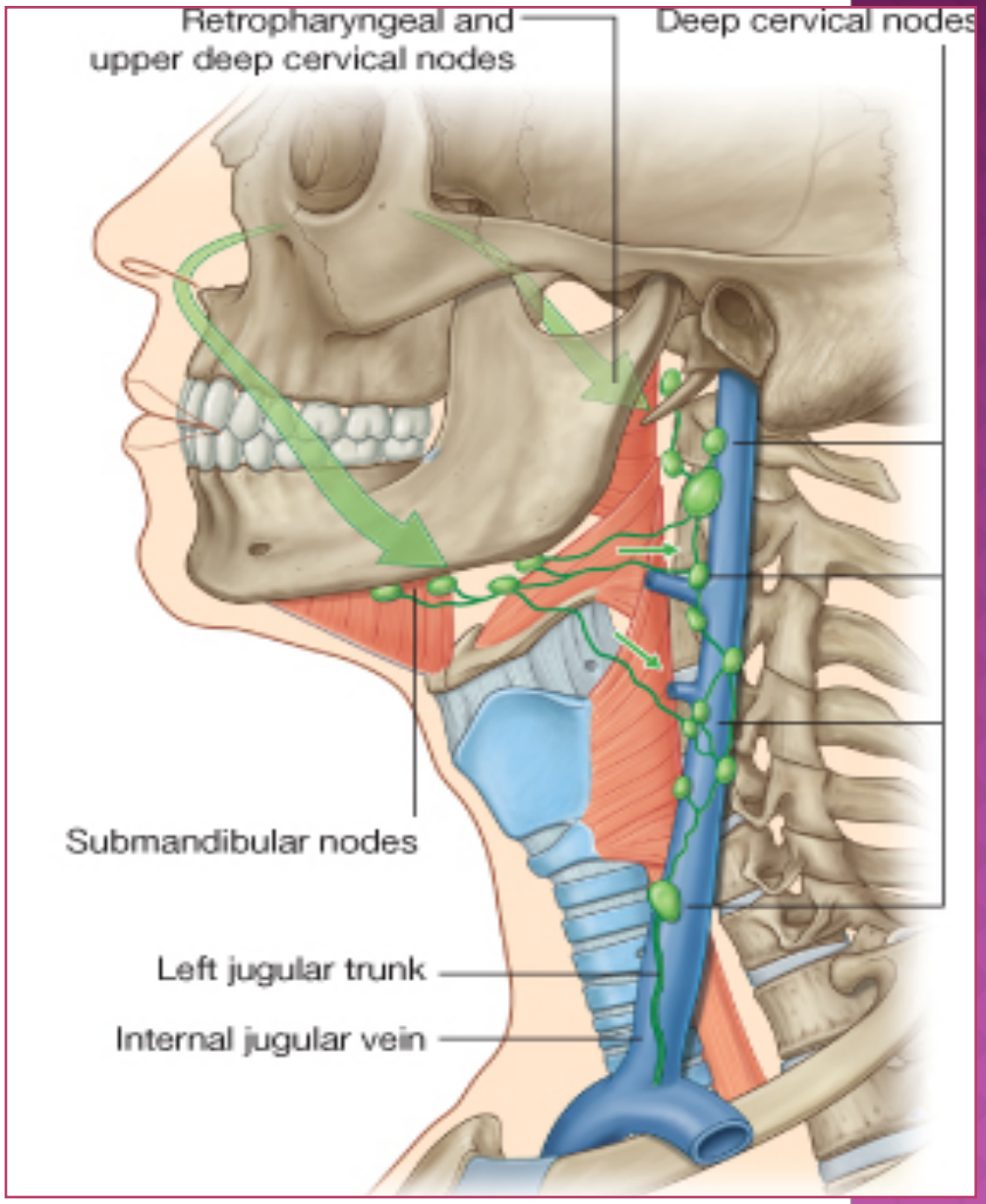
VENOUS DRAINAGE



- Venous plexus in the sub mucosa formed by veins accompanying the arteries
- They drain into cavernous sinus & pterygoid venous plexus.

LYMPH DRAINAGE

- To Submandibular &
- Upper deep cervical nodes.



THANK YOU