

وَقُلْ رَبِّ زِدْنِي عِلْمًا



# RESPIRATORY SYSTEM

HAYAT BATCH

SUBJECT : Anatomy

LEC NO. : 3

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# Respiratory system

## Larynx & Pharynx

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# **By the end of this lecture you must know:**

- 1- Larynx (definition, extension, size and construction).**
- 2- Laryngeal ligaments and membranes.**
- 3- Laryngeal inlet and laryngeal cavity.**
- 4- Laryngeal muscles , actions and nerve supply.**
- 5- Blood supply of the larynx.**
- 6- Histology of the larynx**
- 7- Pharynx (structure, boundaries and parts).**
- 8- Pharyngeal muscles (names, action, relations and nerve supply).**
- 9- Sensory innervation of the pharynx.**
- 10- Interior of the pharynx**
- 11- Palatine tonsils (Anatomy and applied anatomy).**

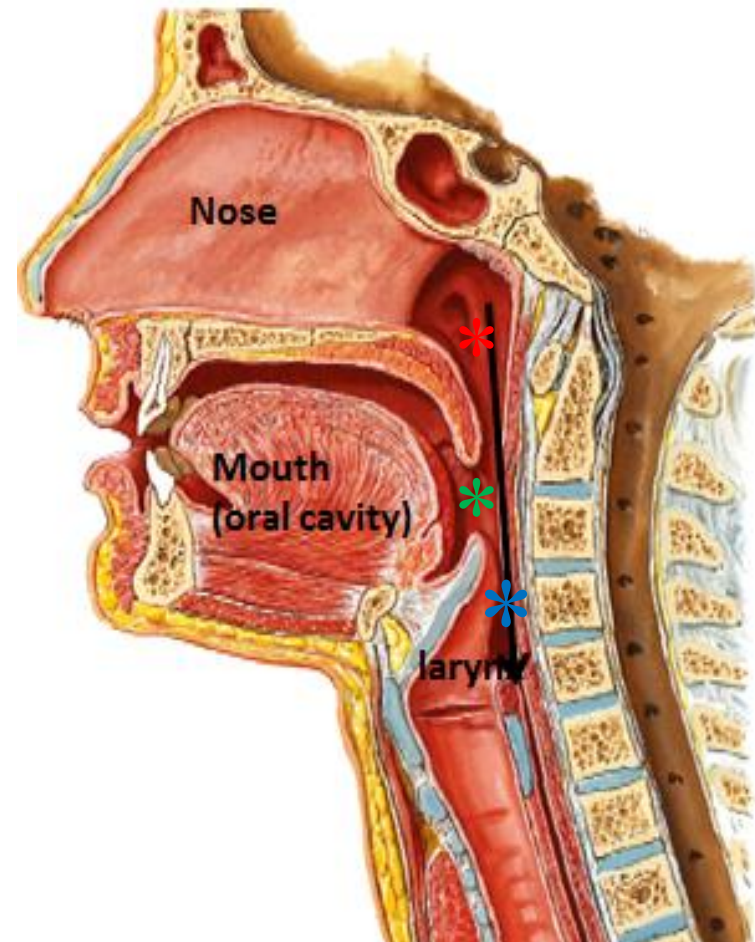
# PHARYNX

- A wide muscular tube situated behind nose (nasopharynx \*), mouth (oropharynx\*) & larynx (laryngopharynx \*).
- It begins at base of the skull & ends at lower border of cricoid cartilage opposite 6<sup>th</sup> cervical vertebra.

Trachea بداية

بس الـ posterior wall لانه فاتح ع ال cavity ع طول

- - It has no anterior wall.



- **Length: 5 inches.**

- ***Width:***

Nasopharynx

1-The upper part is the **widest** (*1 ½ inch*).

2- The middle part is **narrower**, than the upper part.

Laryngopharynx

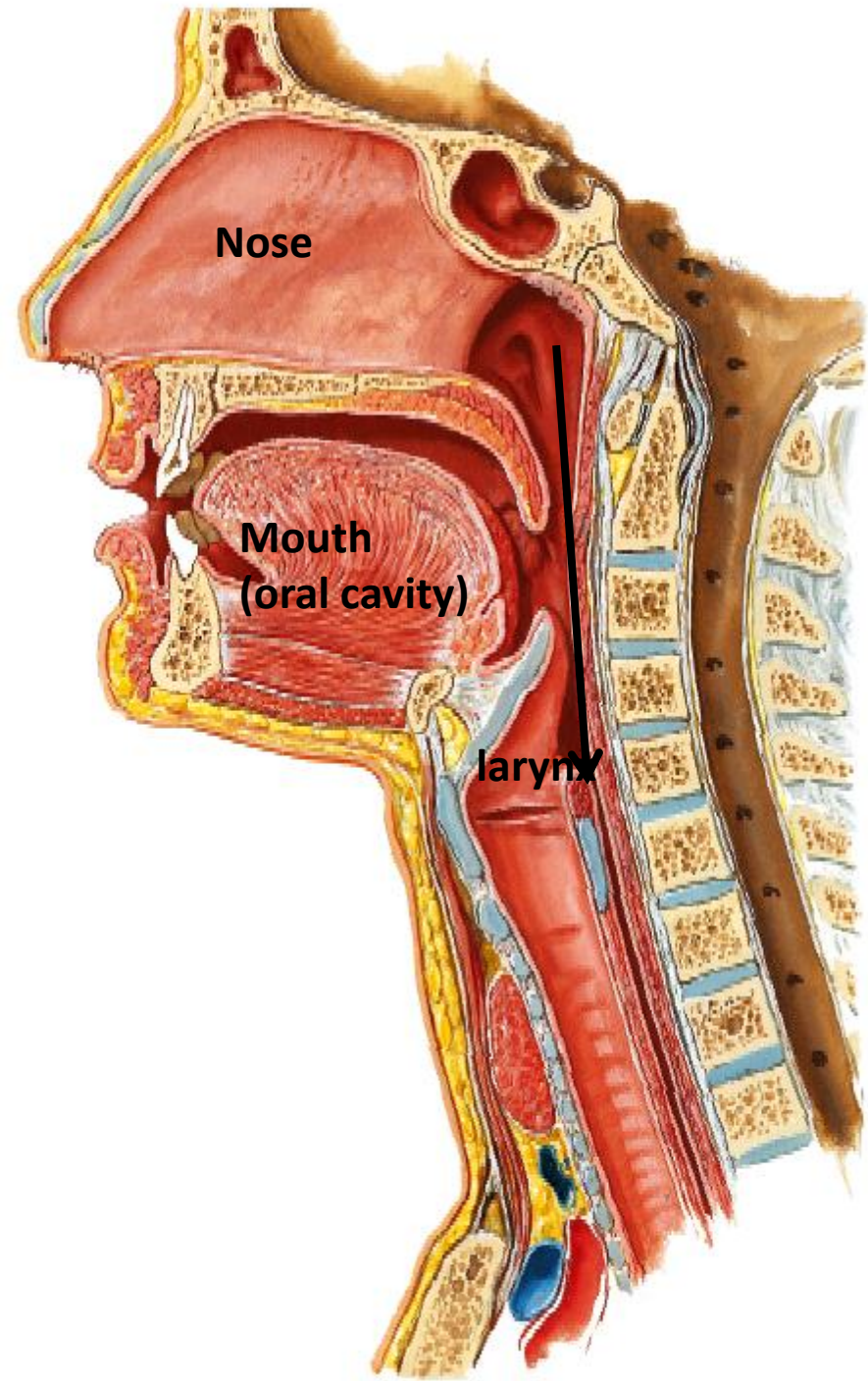
3-The lower part is the **narrowest** (*1.5cm*).

# Boundaries

- \*Superiorly:** base of skull
- \*Inferiorly:** continuous with the esophagus. عند C6
- \*Posteriorly:** C1-C6 vertebrae, separated from it by prevertebral fascia.
- \*Anteriorly:** communicates with the nose, oral cavity & larynx.
- \*Laterally:** related to styloid apparatus & CCA, ICA & ECA with its branches.

(CA) Carotid artery

Common, internal, external



# Structure of pharynx

4 layers from **inside to outside**:

1 - **Inner mucous membrane.**

2- **Pharyngo-basilar fascia**

3- **Muscular layer:** formed of 2 layers:

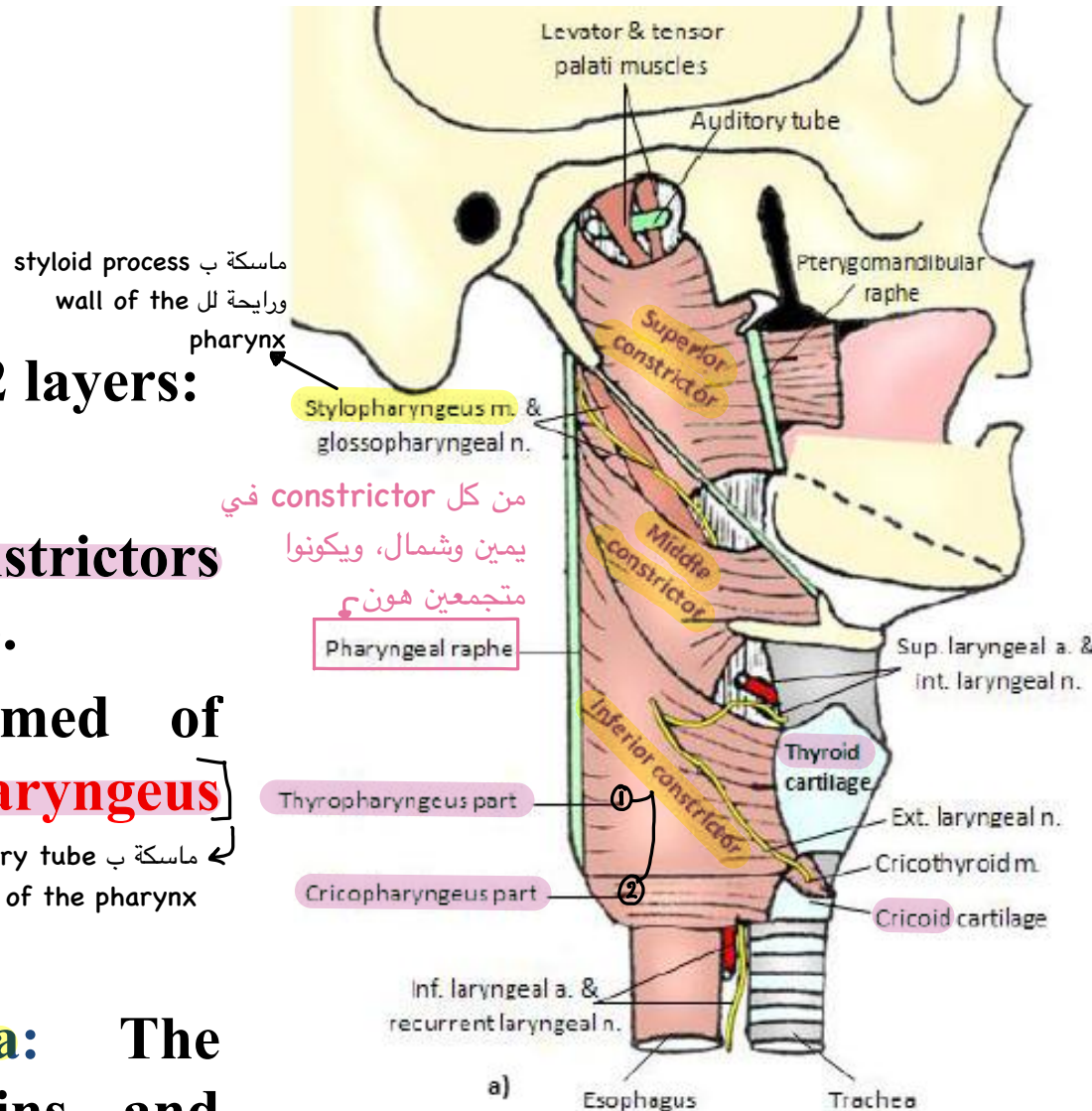
a- **Outer circular:** 3 **constrictors** (superior, middle and inferior).

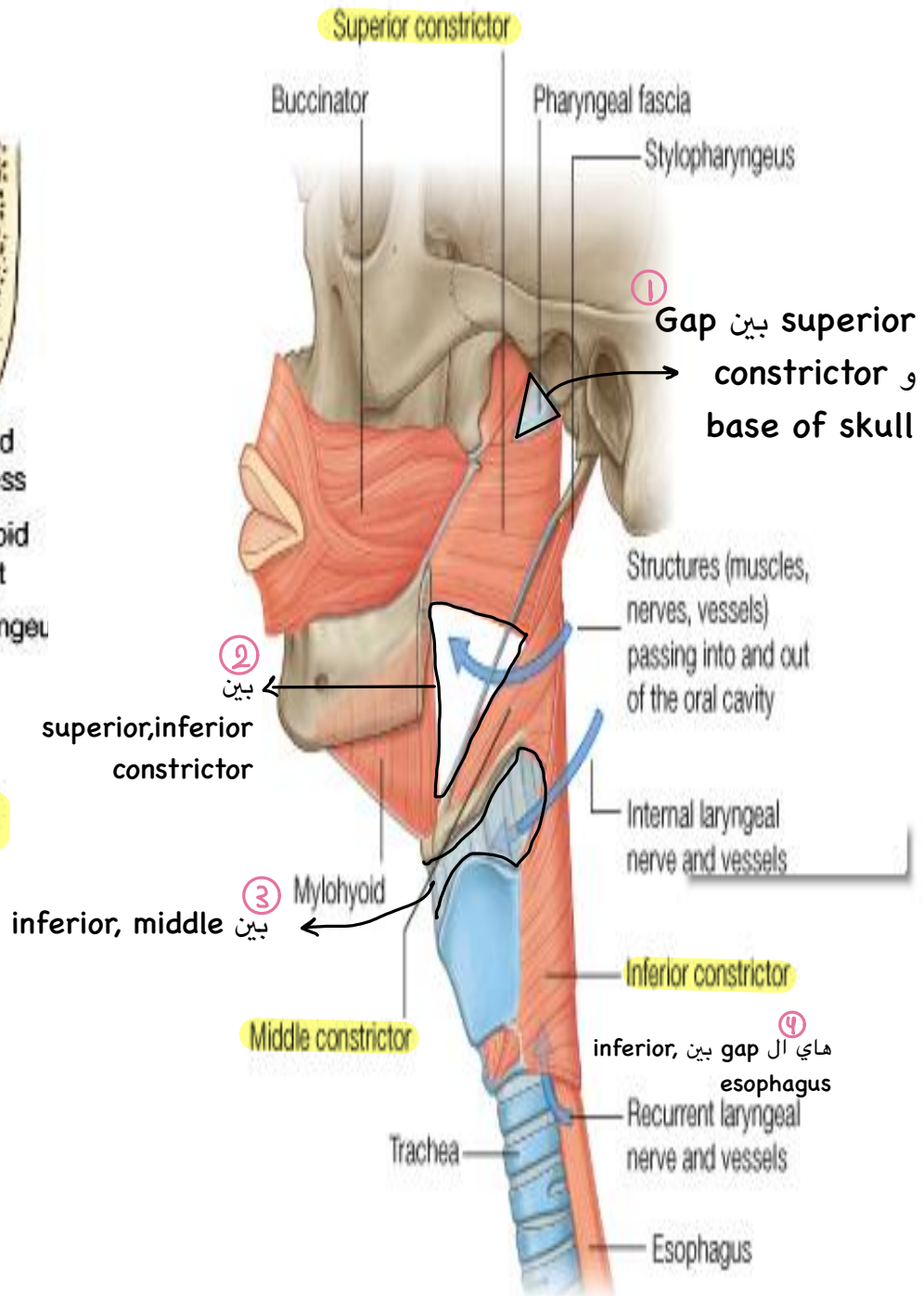
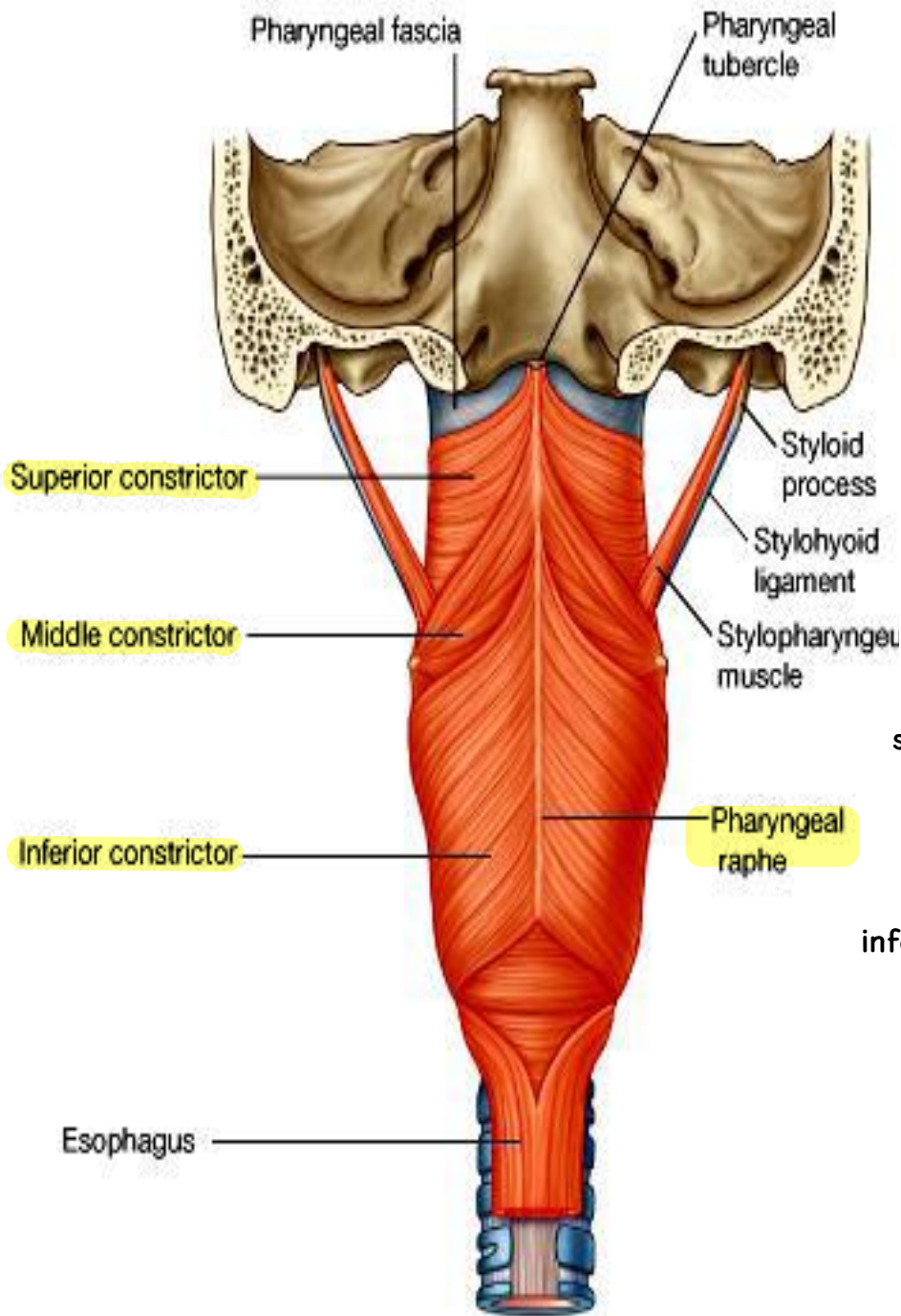
b- **Inner longitudinal:** formed of **stylopharyngeus, [salpingopharyngeus] & palatopharyngeus.**

جاية من palate

ماسكة ب auditory tube ورايحة لل wall of the pharynx

4- **Buccopharyngeal fascia:** The pharyngeal plexuses of veins and nerves lie beneath this fascia.







Very important

# Relations of the pharyngeal muscles

Gap number	Site ✓	Structures pass through
<b>1<sup>st</sup> gap (largest)</b> * "sinus of Morgagni" ← بالصورة مومبينة هيك ركزوا	Above upper border of superior constrictor muscle	<b>Auditory tube</b> <b>Levator palati muscle</b> <b>Tensor palati muscle</b> <b>Ascending pharyngeal artery</b>
<b>2<sup>nd</sup> gap</b>	Between superior constrictor muscle and middle constrictor muscle	<b>Stylopharyngeus muscle</b> <b>Glossopharyngeal nerve</b> <b>Stylohyoid muscle</b>
<b>3<sup>rd</sup> gap</b>	Between middle constrictor muscle and inferior constrictor muscle	<b>Internal laryngeal nerve</b> <b>Superior laryngeal artery</b>
<b>4<sup>th</sup> gap</b>	Between inferior constrictor muscle and esophagus	<b>Recurrent laryngeal nerve</b> <b>Inferior laryngeal artery</b>

# Action of pharyngeal muscles

- **Superior, middle** <sup>to esophagus</sup> **constrictor ms & thyropharyngeal part of inferior constrictor** are propulsive muscles during **swallowing**. *second degree*
- **The cricopharyngeal part of inferior constrictor** is a **sphincter** to lower end of pharynx preventing suction of air into the **esophagus**, (*relaxes at the end of 2nd stage of swallowing to allow passage of food into the esophagus*).
- **The 3 longitudinal muscles** pull larynx & pharynx upward in 2nd stage of swallowing to close the laryngeal inlet.

# Nerve supply

- by pharyngeal plexus that lies on <sup>جوا</sup> middle constrictor, formed of:
- 1-Pharyngeal branch of vagus n (cranial accessory n): mainly motor.
- 2-Pharyngeal branch of glossopharyngeal n: mainly sensory to mucosa of oropharynx.
- 3- Pharyngeal branch of <sup>superior</sup> sup. cervical sympathetic ganglion: mainly vasomotor.

# Sensory Nerve Supply of Pharynx

- **Nasopharynx:** (V) maxillary nerve (pharyngeal branch of pterygopalatine ganglion).
- **Oropharynx:** (IX) glossopharyngeal (sensory branch that joins the pharyngeal plexus).
- **Laryngopharynx:** (X) vagus (internal laryngeal branch of superior laryngeal nerve).

Superior من  
↑  
Vagus من  
↓

# INTERIOR OF THE PHARYNX

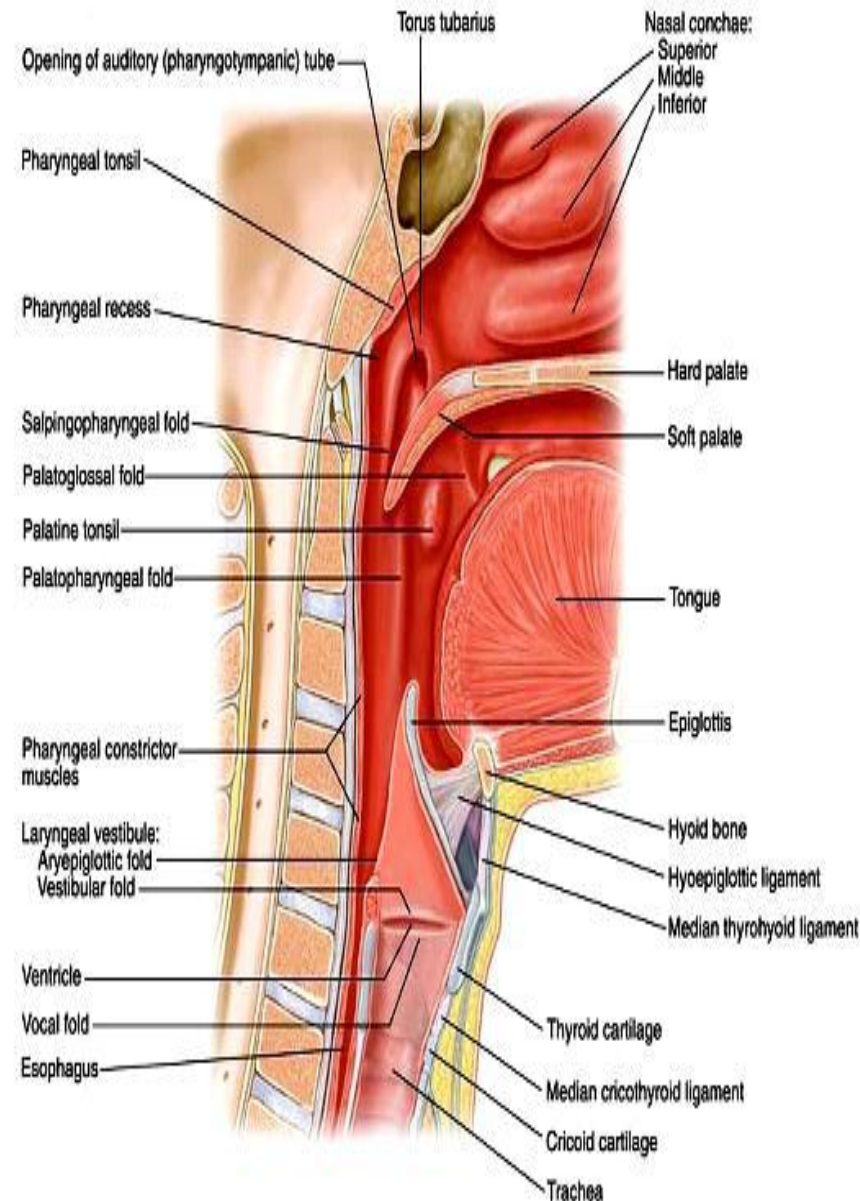
# ما على الكر من هيك هون

- **Nasopharynx:** lies behind the nasal cavities.

- \* **Roof:** Body of sphenoid bone [Base of the skull]

- \* **Floor:** Soft palate. -Between the free edge of the soft palate and the posterior wall of pharynx, the nasal and oral parts of the pharynx communicate through a space, the **pharyngeal isthmus.**

- \* **Anterior wall:** Deficient and opens into the nose



**\*Features of nasopharynx:**

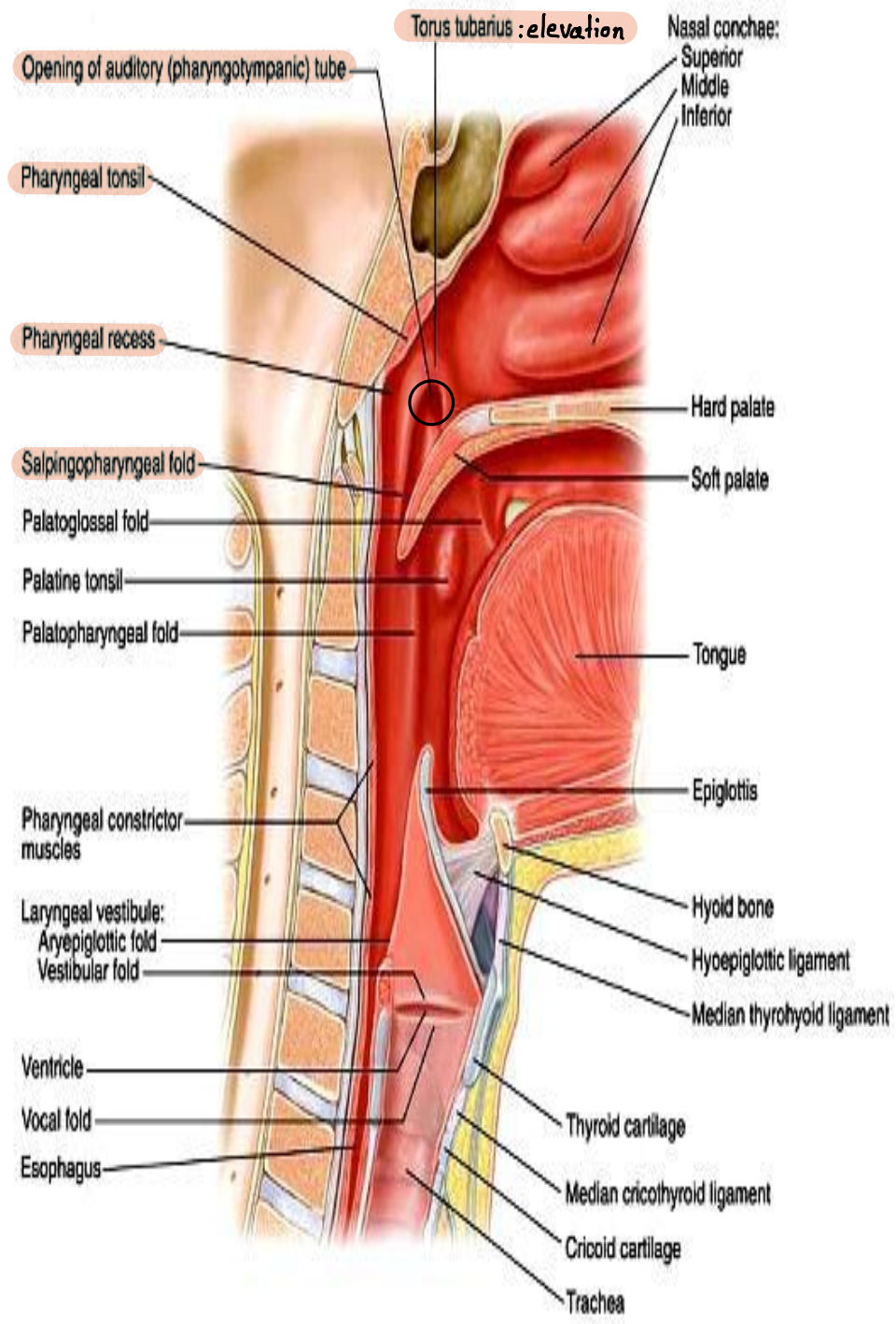
**1- nasopharyngeal tonsil.**

**2-pharyngeal recess:** <sup>حبيب</sup> lodge ICA.

**3- opening of Auditory tube.**

**4-tubal elevation.** ذراع العصاية التي يمسك

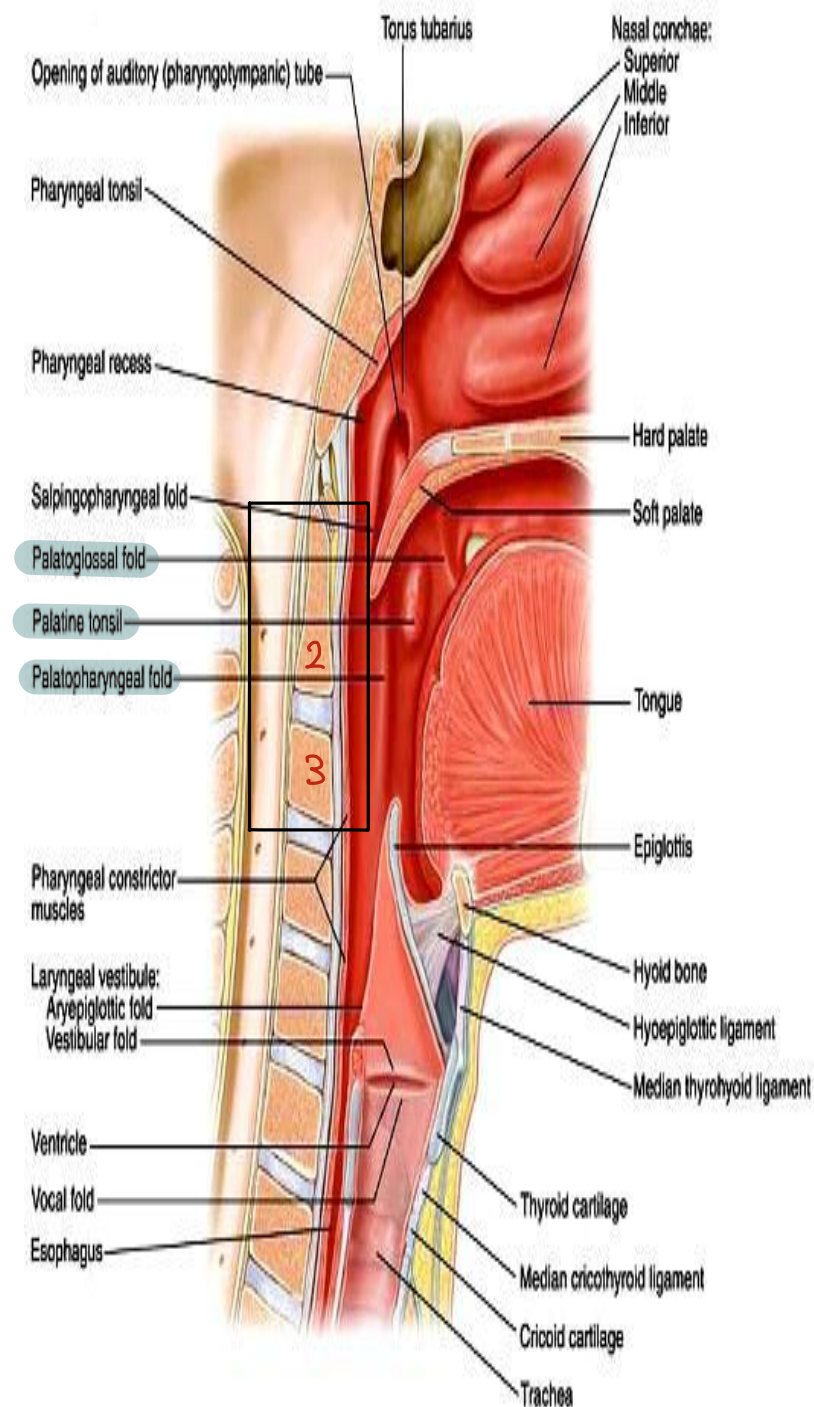
**5-salpingopharyngeal fold** <sup>باقي العصاية</sup> below it presence of salpingopharyngeal muscle



- **Oropharynx** - Oropharynx lies behind the oral cavity and extends from soft palate superiorly to level of upper border of epiglottis inferiorly.

بین C2, C3

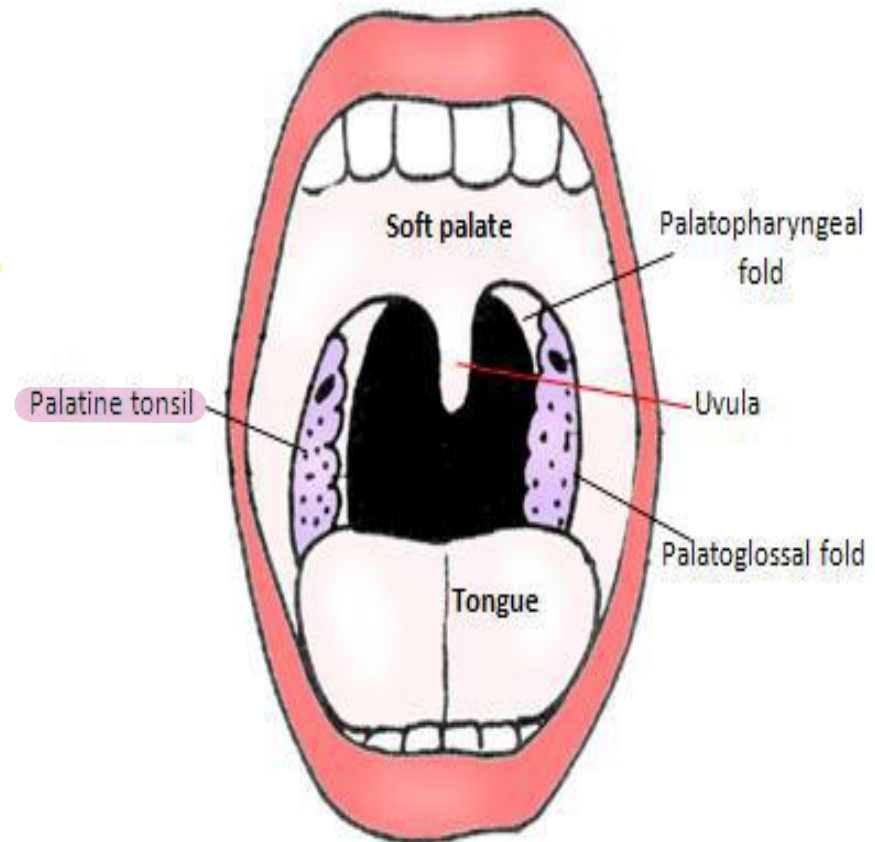
- \***Roof:** soft palate.
- \***Floor:** posterior part of tongue.
- \***Anterior wall:** deficient and communicates with oral cavity through *oropharyngeal isthmus*.
- \***Posterior wall:** supported by second and third cervical vertebrae.
- \***Lateral wall:** shows palatoglossal and palatopharyngeal arches with the *palatine tonsil* lying in the fossa in between.



# THE PALATINE TONSILS

- **A large lymphoid mass situated in lateral wall of oropharynx.**
- **Represents the lateral part of Waldeyer's ring**
- - This ring is formed by pharyngeal tonsils superiorly, palatine & tubal tonsils laterally & lingual tonsils inferiorly.
- **Site: Tonsillar fossa (sinus) between palatoglossal & palatopharyngeal arches.**
- **Shape: oval or almond shape. It has 2 borders, 2 poles, 2 surfaces.**

عبارة عن lymphoid organ موجود ب palatine fossa , وهي وحدة من tonsils الموجودة حولين mouth cavity و ال ring الموجودة حولين digestive system اسمها waldeyer's ring





## \* Blood Supply:- PALATINE TONSILS

### I) Arterial supply:-

1- The main source: tonsillar branch of facial artery.

2- Additional sources: ما احتياهم

- - Ascending palatine of facial artery.
- - Ascending pharyngeal artery, a branch of EC.
- - Tonsillar branch of greater palatine artery.
- - Dorsal lingual artery.

لو حد صابه repeated inflammation بال tonsils وراح للدكتور وقرر يثبيل ال tonsils.. هل هاد minor surgery or major

هي major.. لما نيحي نشيل اي organ لازم نربط ال artery عشان ما يصير نزيف لانو ضغط ال artery اعلى ، بس هون ال paratonsillar vein ضغطه عالي كمان ف بنربطه هو و artery ، ولو ما ربطناه المريض يا بموت يا بنقله دم

II)-The venous drainage: accompany the arteries to end in paratonsillar vein, pharyngeal vein or facial vein.

\* Lymphatic drainage: jugulodigastric L.N.

\*Nerve supply: glossopharyngeal & lesser palatine nerves.

\*Function: trapping the foreign materials & bacteria by their crypts then initiate the formation of antibodies against them.

# Applied anatomy

آول سلاح د فایحے

- Septic infection of the **tonsils** is called tonsillitis, it may be **removed by operation** (*tonsillectomy*).
- 2-Tonsillitis may lead to **referred pain in the ear**.

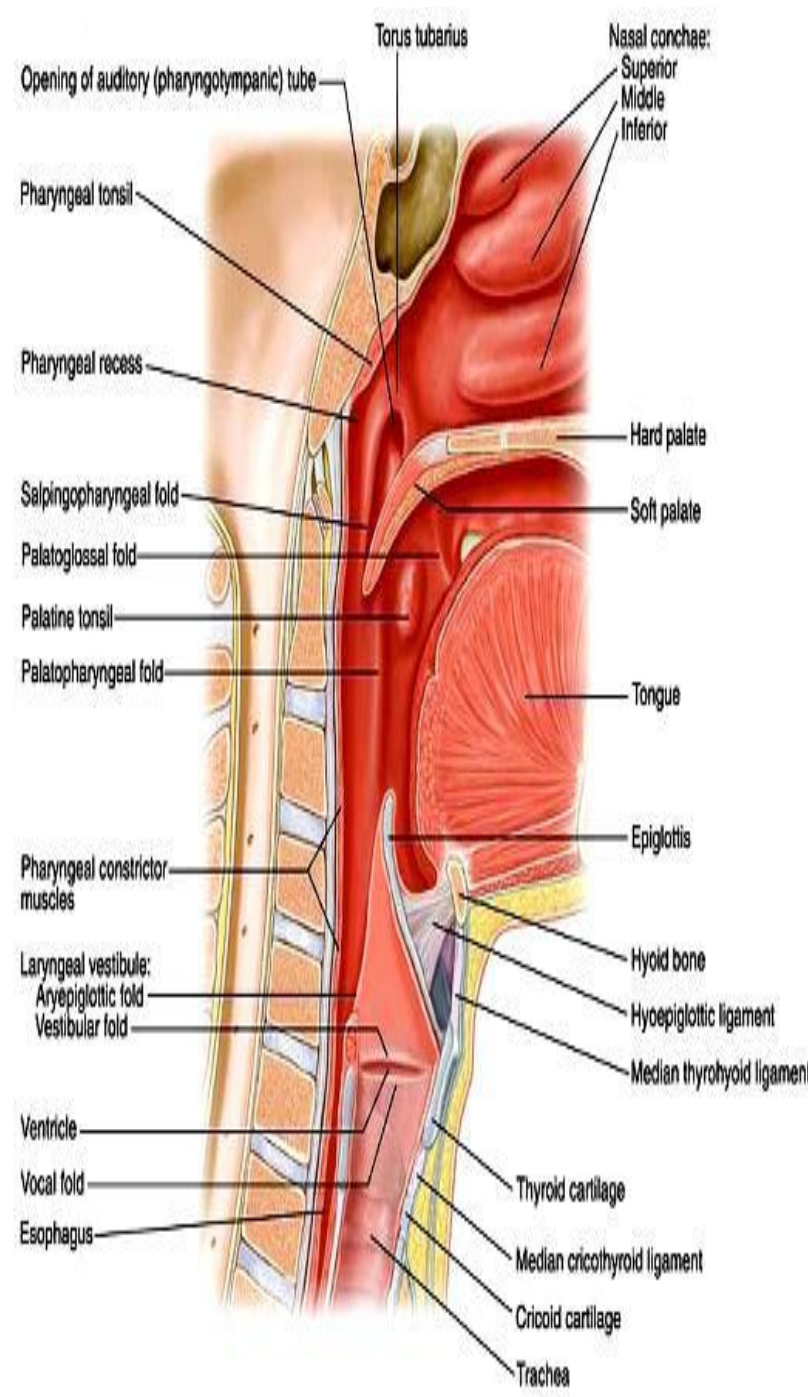
- **Laryngopharynx:** lies behind laryngeal inlet and posterior surface of the larynx. -It extends from upper border of epiglottis to lower border of cricoid cartilage where it is continuous with oesophagus.

- \***Anterior wall:** inlet of larynx (superiorly) and back of cricoid (inferiorly).

- \***Posterior wall:** supported by bodies of 3-6 cervical vertebrae.

- \***Lateral wall:** shows the **piriform fossa**: (Foreign bodies (as fish bones) may lodge in the piriform fossa)

شوك السمك يعلق بـ  
piriform fossa





Thank You  
Thank You  
Thank You!!!!



# Respiratory system

## Trachea & Bronchi

By

**Dr. Mohamed Fathi**  
**Ass. Prof. of Anatomy**

# **By the end of this lecture you must know:**

- **Trachea (begin, end and important relation).**
- **Blood supply of trachea.**
- **Lymphatic drainage of trachea**
- **Nerve supply of trachea**
- **Comparison between right and left main bronchus.**
- **Segmental divisions of bronchi.**
- **Bronchopulmonary segments.**
- **Histology of trachea.**
- **Histology of bronchial tree.**

# The Trachea

مسكرة من ورا ب  
tracheal muscle  
fibris

Fibrocartilaginous

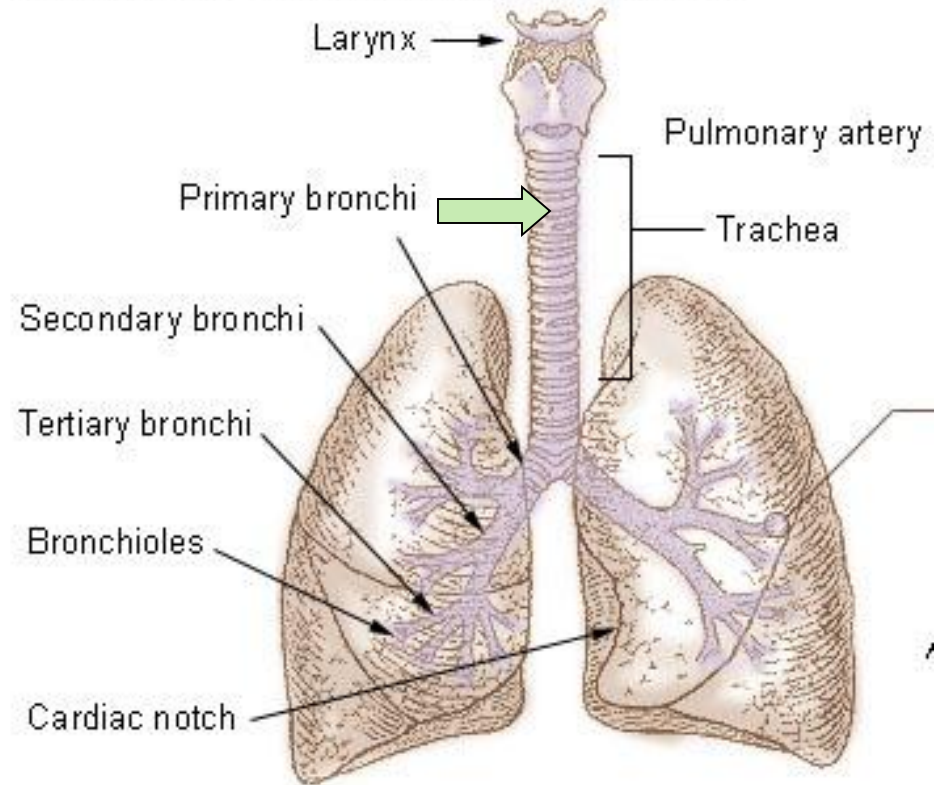
@A fibromuscular tube.

@Has incomplete cartilage rings to keep it always opened. *T Shape*

@Carries air into & out of the lungs.

@ It is 10-12cm long

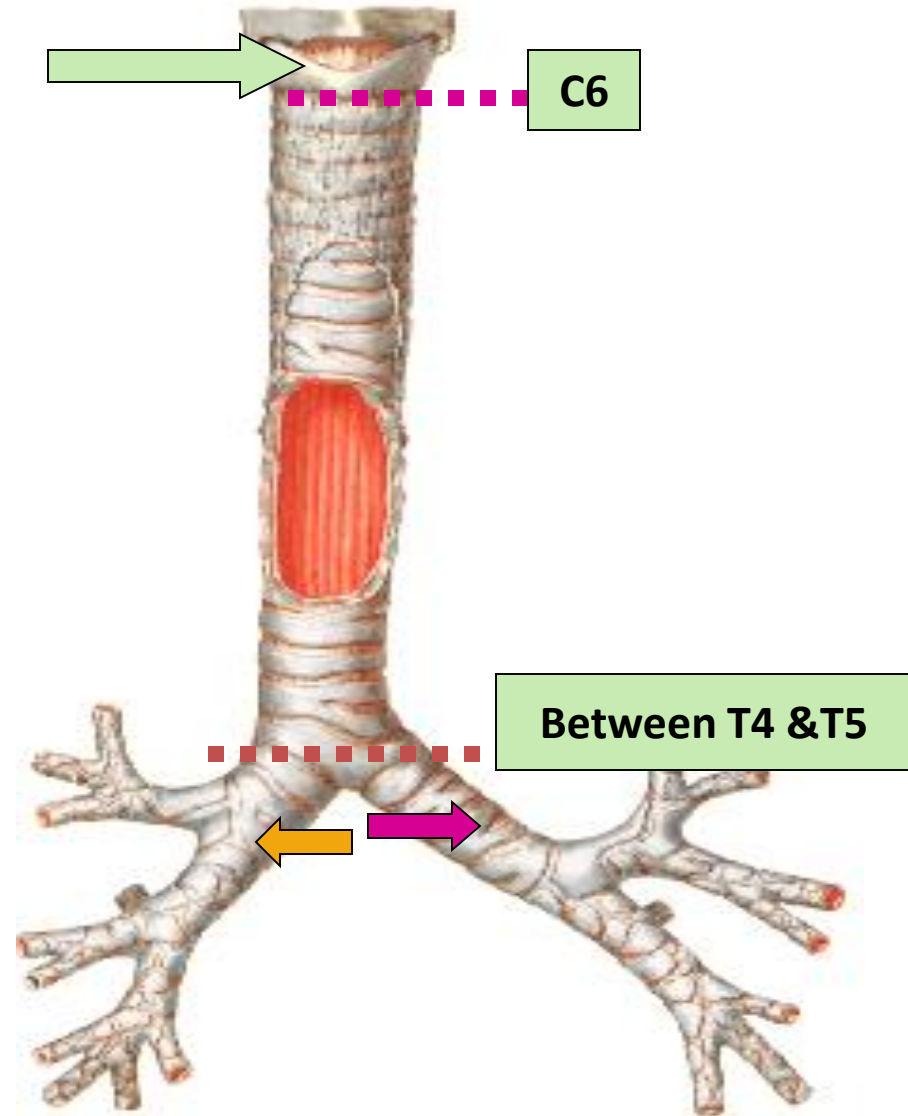
**Bronchi, Bronchial Tree, and Lungs**



# Trachea (cont.)

**@Begins** : in median plane at lower border of cricoid cartilage of larynx opposite lower border of C6 vertebra.

**@Ends** : opposite sternal angle between T4 & T5 vertebrae by dividing into **right & left** main bronchi.





# Trachea ( cont. )

@Upper ½ of trachea lie in the neck.

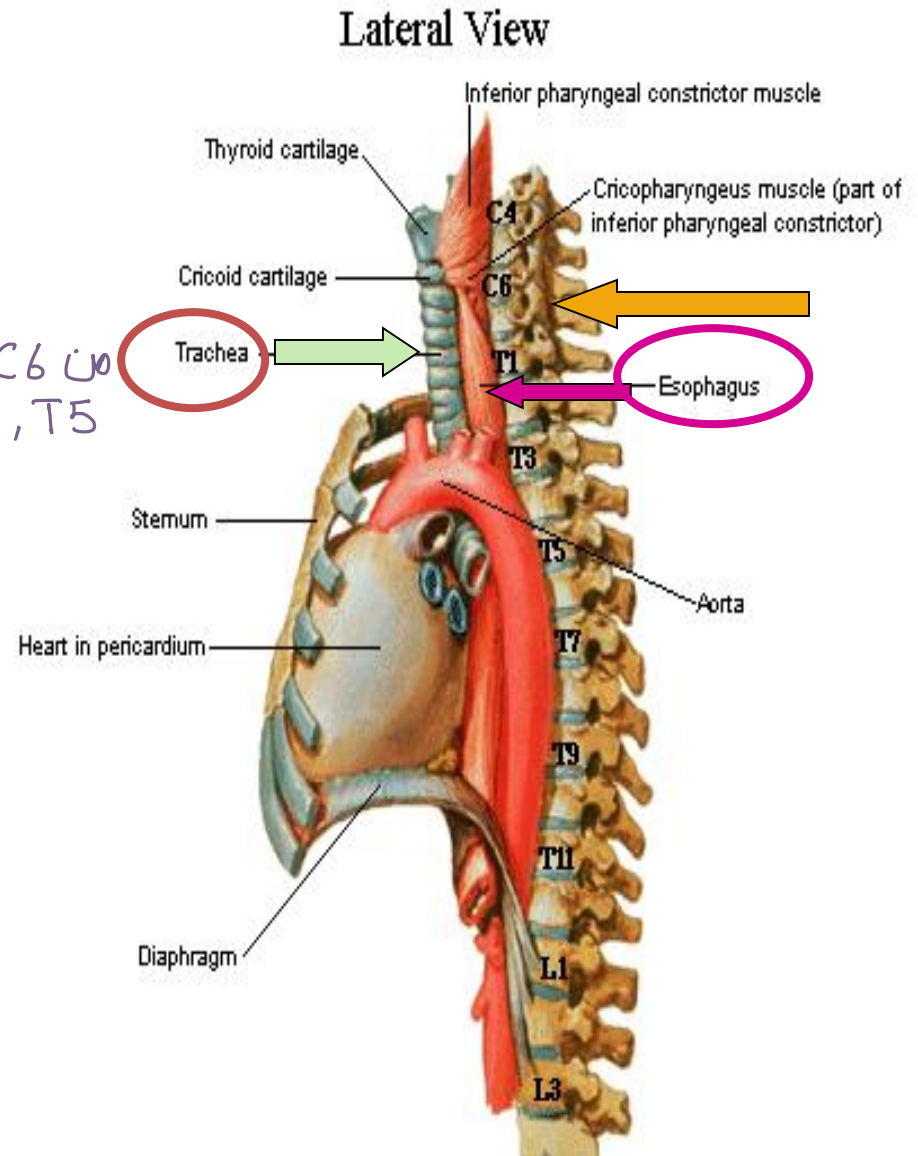
@Lower ½ of trachea lies in the thorax.

@Relations :

@Posteriorly :

\***Oesophagus** which lies immediately anterior to the **vertebral column**.

من C6 لـ بين T4, T5



\*\*اهم واحد

# Relations of trachea

کامل

<b>On its right side</b>	<b>On its left side</b>
<b>1. Right vagus nerve.</b>	<b>1. Left vagus nerve.</b>
<b>2. Arch of azygos vein.</b>	<b>2. Arch of aorta (&amp; its 3 big branches).</b>
<b>3. Right phrenic nerve.</b>	<b>3. Left phrenic nerve.</b>
<b>4. SVC.</b>	<b>4. Left recurrent laryngeal nerve (in groove between trachea &amp; oesophagus).</b>
<b>5. Right lung &amp; pleura.</b>	<b>5. Left lung &amp; Pleura.</b>



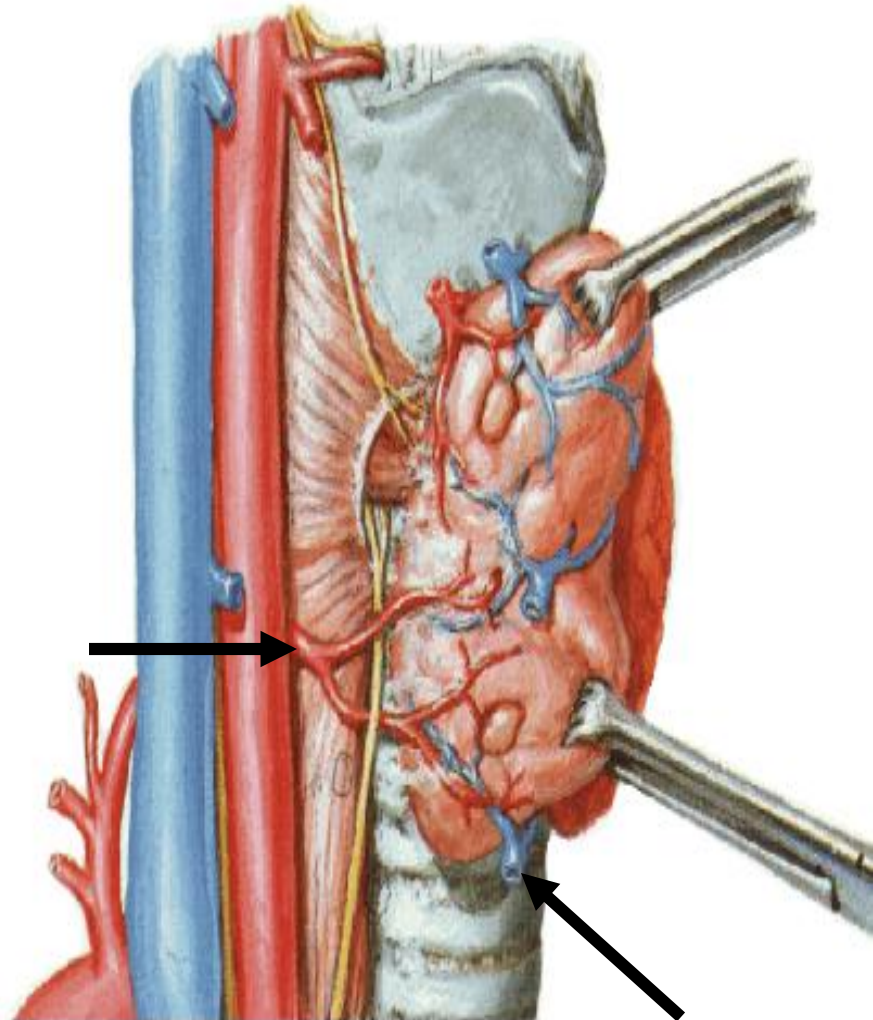
# Blood supply of trachea

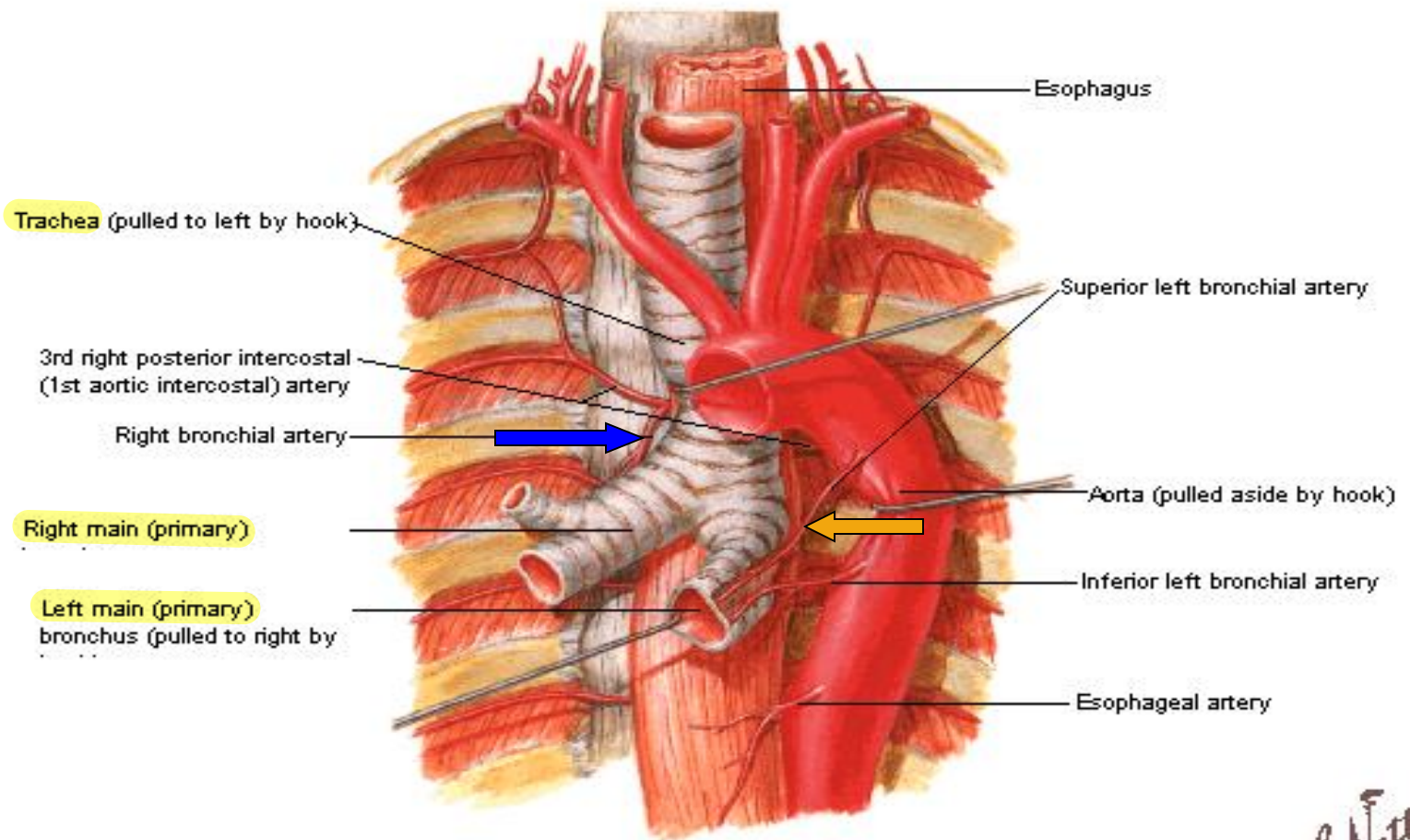
## @Arterial supply:

- Mainly from inferior thyroid artery
- except* • Region of bifurcation\*  
→ bronchial arteries.

## @Venous drainage :

- Into inferior thyroid veins to left
- brachiocephalic vein





*e. Net!*

**Region of bifurcation of trachea is supplied by Bronchial vessels**

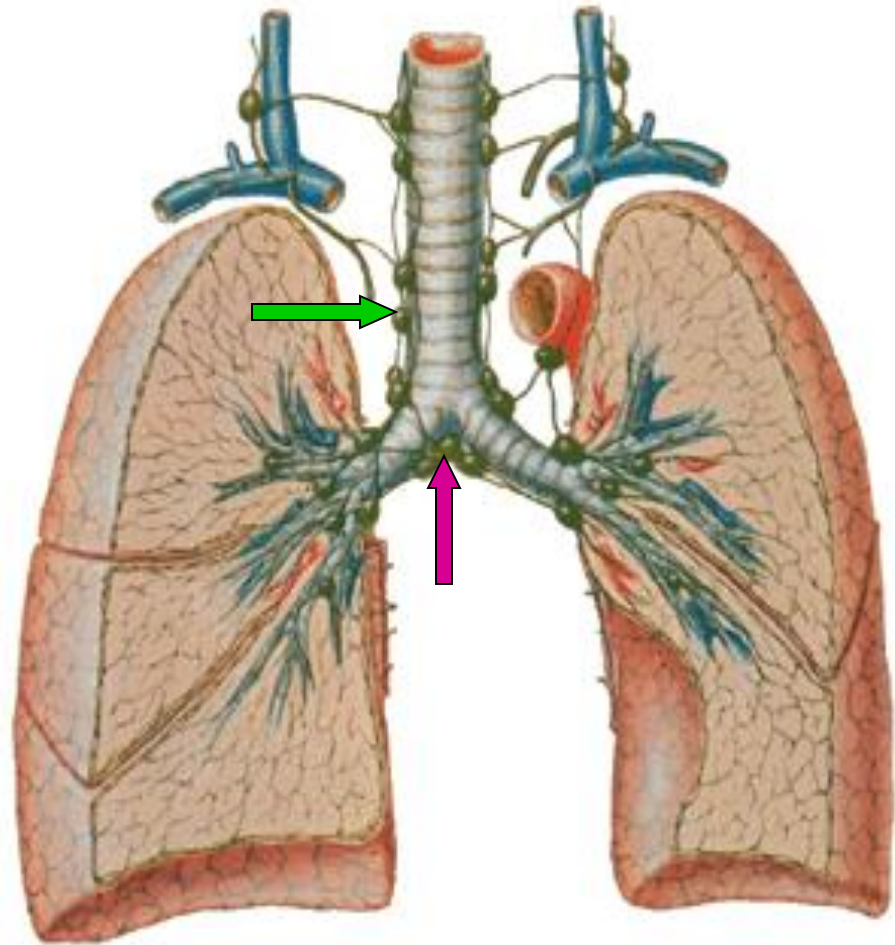
# Lymphatic drainage of the trachea

حولين trachea في lymph nodes كثير

قدامها وعلى جناحها

@Pretracheal &  
paratracheal LNs.

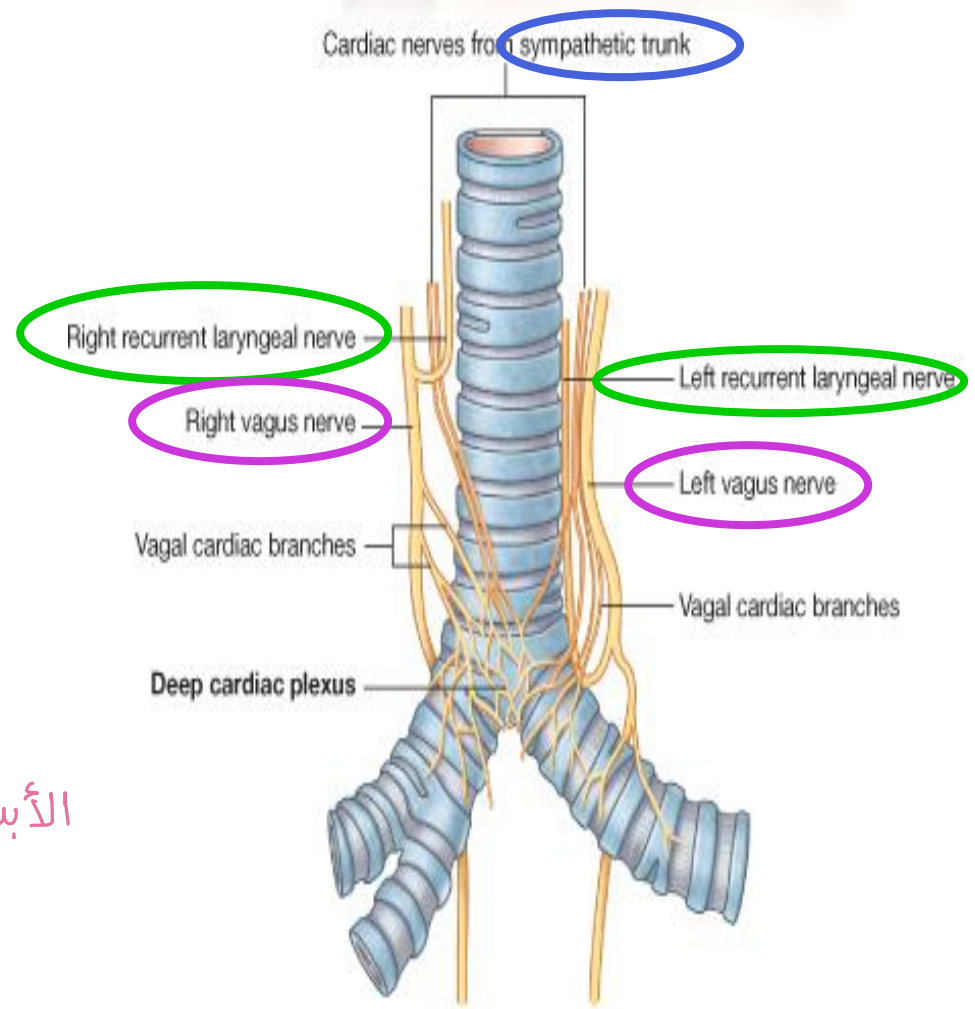
@Region of  
bifurcation →  
tracheobronchial  
LNs.



# Nerve supply of trachea

@Sympathetic from thoracic sympathetic trunks.

- Parasympathetic from both Vagi & recurrent laryngeal nerves. الأبناء





# بالتوفيق ..❤️📌  
لا تنسوا اهلنا بغزة من دعائكم 🙏👐

*dans*