

وَقُلْ رَبِّ زِدْنِي عِلْمًا



# RESPIRATORY SYSTEM

## HAYAT BATCH



SUBJECT : Anatomy

LEC NO. : 2 part 2+part 1 lec 3

DONE BY : Shahed Tanineh ✨

# PHARYNX

ال pharynx له ٣ أجزاء

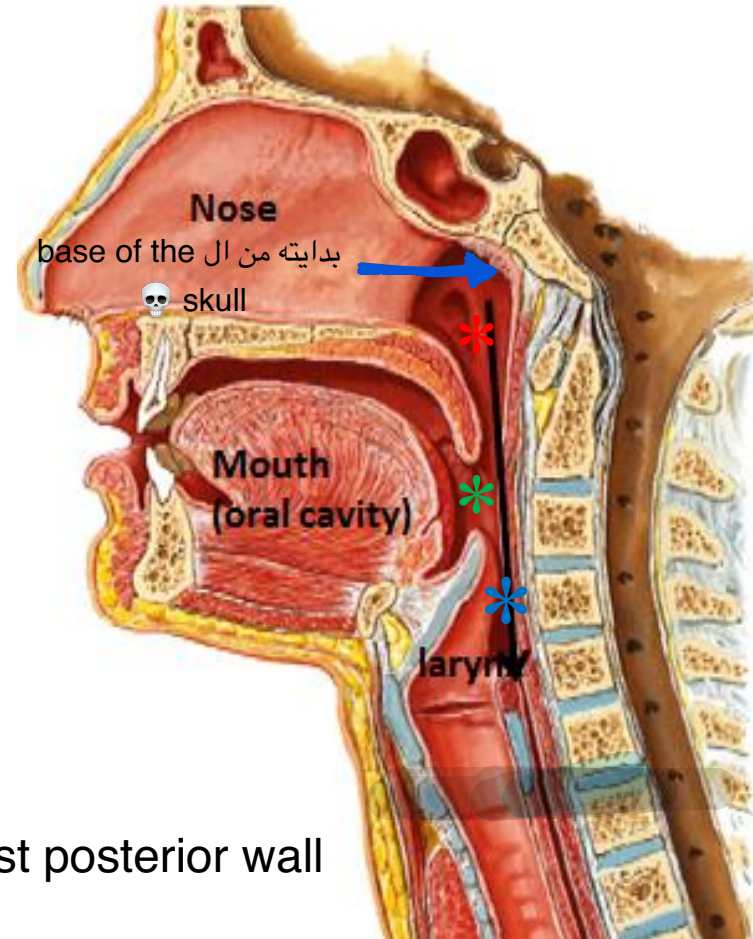
جزء ورا ال nose رح اسميه nasopharynx

وجزء ورا ال mouth رح اسميه oropharynx

وجزء ورا ال larynx رح اسميه laryngopharynx

- 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.

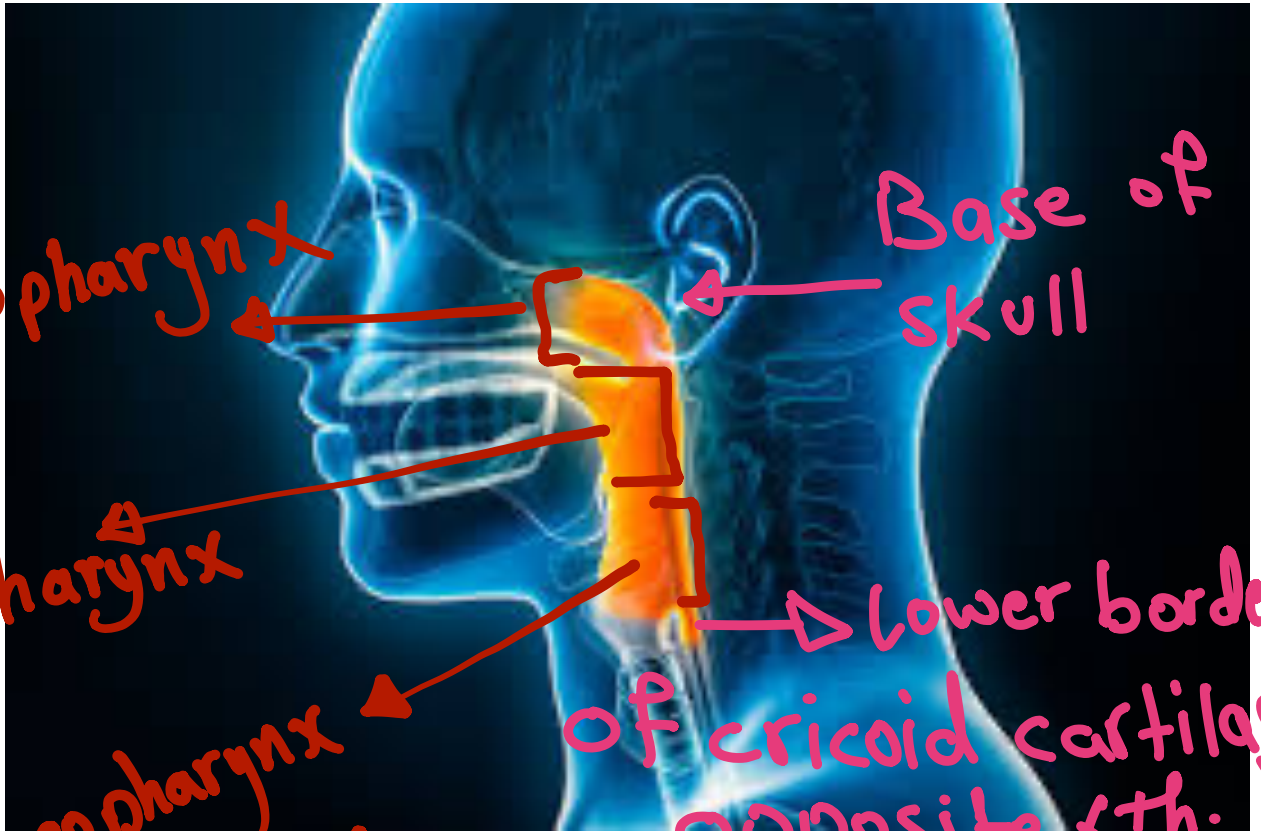


لانه فاتح ع ال cavities عطول  
 ال nasopharynx فاتح ع ال nose  
 ال oropharynx فاتح ع ال mouth  
 و ال laryngopharynx فاتح ع ال larynx

- **- It has no anterior wall.** → Just posterior wall



# Respiratory System



nasopharynx

Base of skull

oropharynx

Lower border of cricoid cartilage opposite 6th.

Laryngopharynx

cervical vertebra

← جدار الـ esophagus يبتلى الـ

شوفوكيف هم واقفين

قدام الـ Pharynx هو

معطينها فرصة تعمل  
Anterior wall

ما خلوا بيالكلم  
Just posterior wall

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← في حال ما تبغفوا وحبسوا تعرفوا

$$1 \text{ inch} = 2.54 \text{ cm}$$

- **Length:** 5 inches.

- **Width:**

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

2- The middle part is narrower, than the upper part. → oropharynx  
الوسط وسط

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

\* أصغر مساحة : قطع دائرة

→ The narrowest part of pharynx is?

1. oropharynx
2. laryngopharynx
3. nasopharynx

# Boundaries

**\*Superiorly:** base of skull

**\*Inferiorly:** continuous with the esophagus.

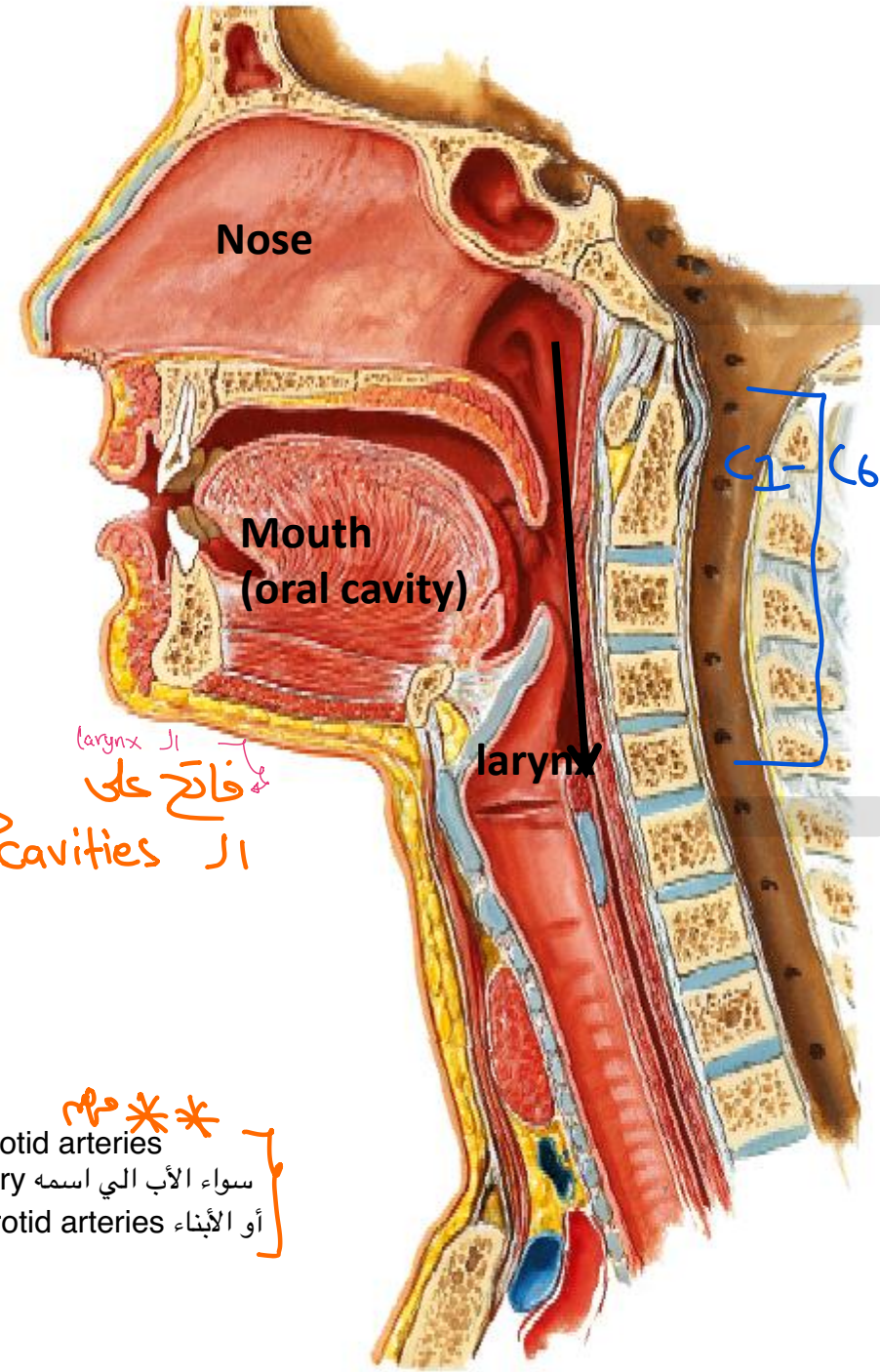
**\*Posteriorly:** C1-C6 vertebrae, separated from it by prevertebral fascia.

**\*Anteriorly:** communicates with the nose, oral cavity & larynx.

حكيما عنهم في معطين الـ larynx فـرصة يعلـ الـ wall Anterior

**\*Laterally:** related to styloid apparatus & **CCA, ICA & ECA** with its branches.

Related to Carotid arteries  
سواء الأب الي اسمه Common carotid artery  
أو الأبناء internal & external carotid arteries

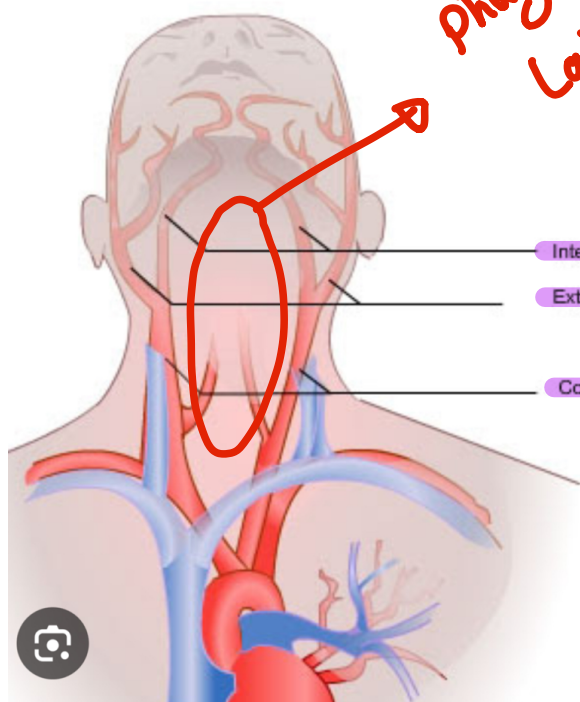




# Respiratory System

لاهوره توفيقية  
لل laterally :-

هون تبكون ال  
Pharynx  
فتشوفوا كيف  
Laterally  
بجرها ال



Carotid  
arteries

407 × 360

وَقُلْ رَبِّ زِدْنِي عِلْمًا

# Structure of pharynx

للزيم من الداخل الى الخارج  
→ From inside to outside

4 layers from inside to outside:

1 - Inner mucous membrane.

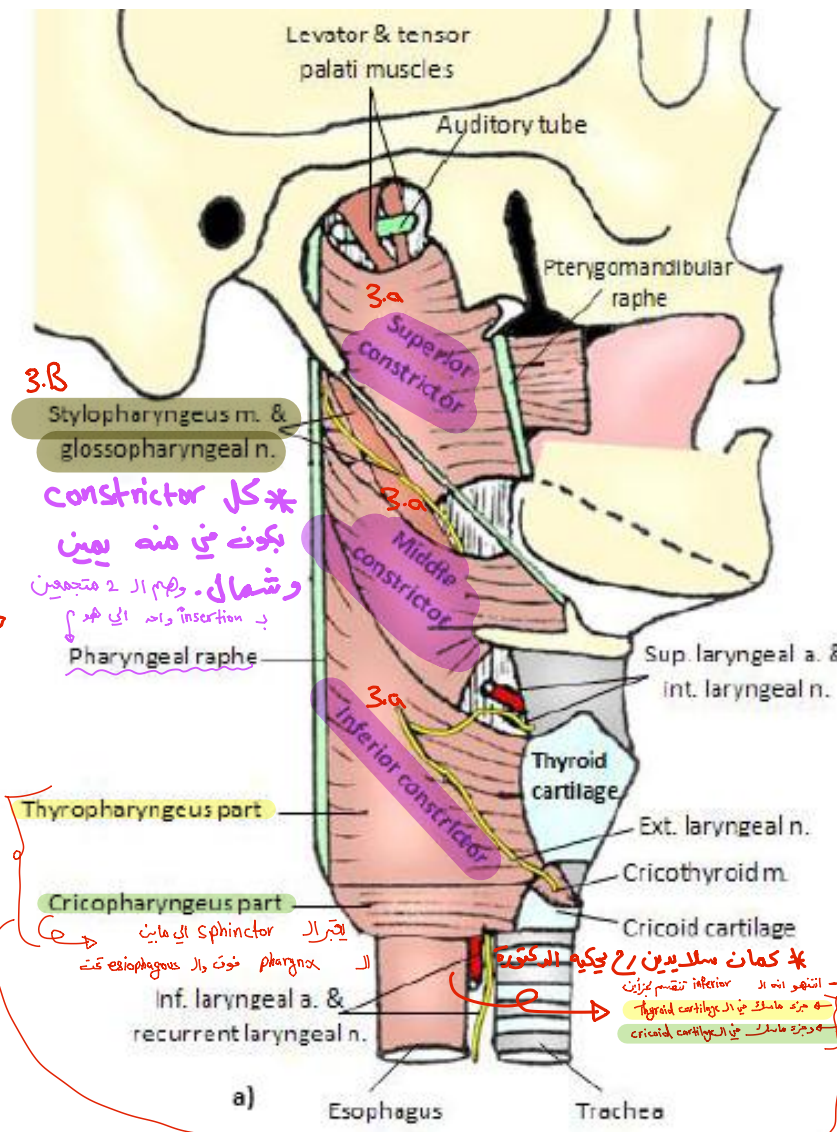
2 - Pharyngo-basilar fascia

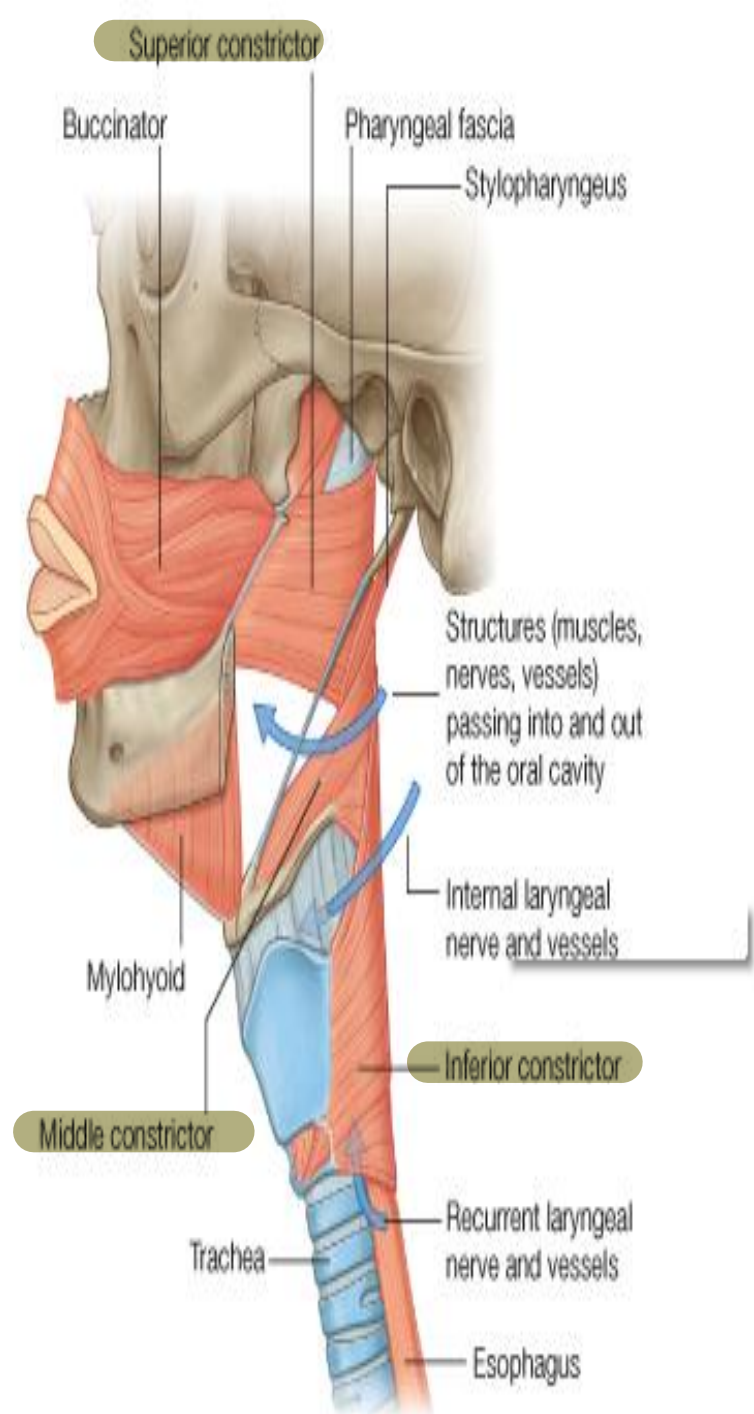
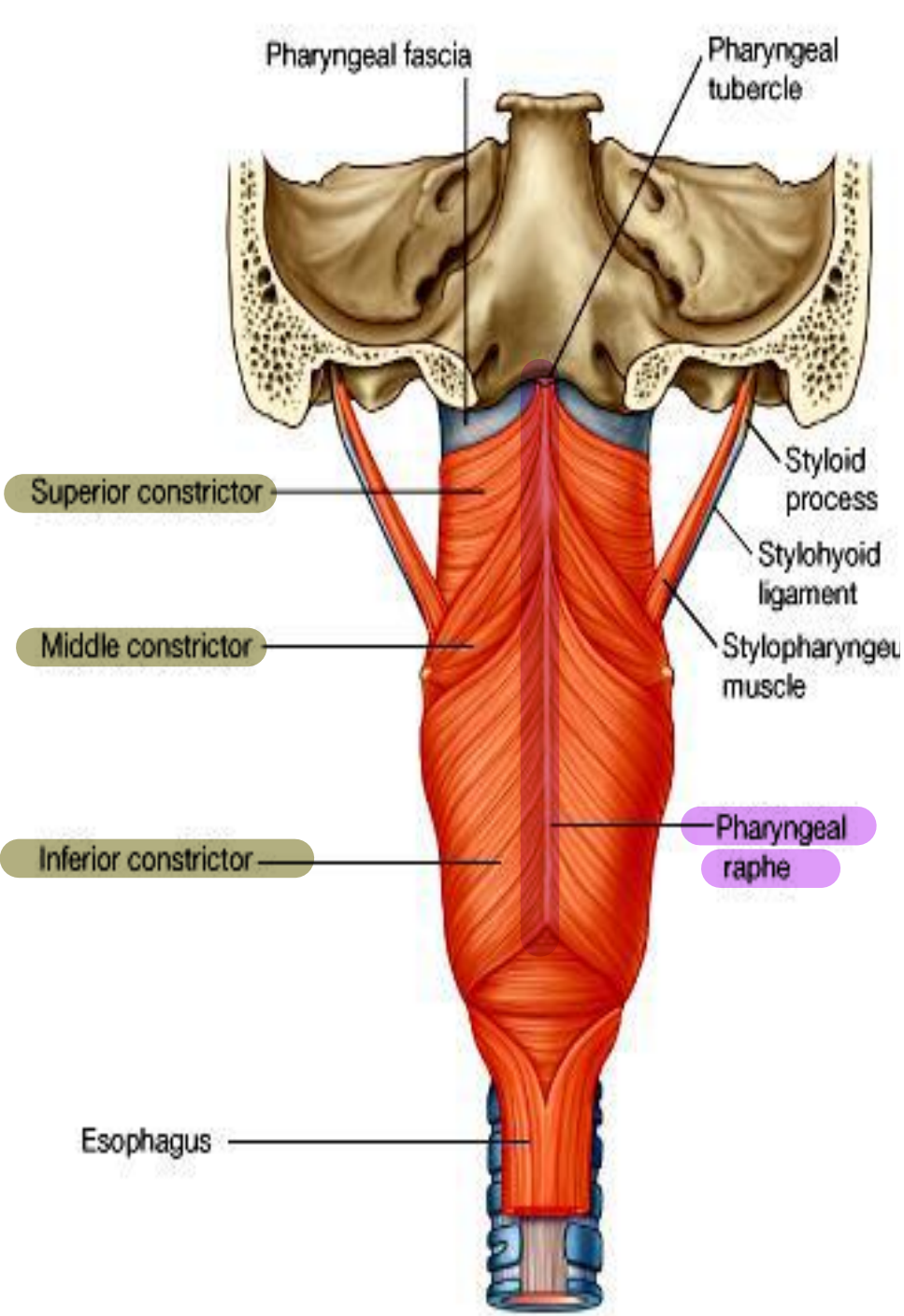
3 - Muscular layer: formed of 2 layers:

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

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

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








# Relations of the pharyngeal muscles

\* كثره :-

Gap number	Site	Structures pass through
<p><b>1<sup>st</sup> gap (largest)</b>  <b>"sinus of Morgagni"</b></p>  <p>مرجان احمد مرجان</p>	<p><b>Above <u>upper border of superior constrictor muscle</u></b>  <i>&amp; base of skull</i></p>	<p><b>Auditory tube</b>  <b>Levator palati muscle</b>  <b>Tensor palati muscle</b>  <b>Ascending pharyngeal artery</b></p>
<p><b>2<sup>nd</sup> gap</b></p>	<p><b>Between superior constrictor muscle and middle constrictor muscle</b></p>	<p><b>Stylopharyngeus muscle</b>  <b>Glossopharyngeal nerve</b>  <b>Stylohyoid muscle</b></p>
<p><b>3<sup>rd</sup> gap</b></p>	<p><b>Between middle constrictor muscle and inferior constrictor muscle</b></p>	<p><b>Internal laryngeal nerve</b>  <b>Superior laryngeal artery</b></p>
<p><b>4<sup>th</sup> gap</b></p>	<p><b>Between inferior constrictor muscle and esophagus</b></p>	<p><b>Recurrent laryngeal nerve</b>  <b>Inferior laryngeal artery</b></p>

تذكروا  
 هودن  
 من وين  
 كانوا يورا  
 المحاضرة  
 للمراجعة؟

احفظوهم :-



# Action of pharyngeal muscles

- **Superior, middle constrictor ms& thyropharyngeal part of inferior constrictor are propulsive muscles during swallowing.**  
أول ما اللقمة (الاكل ) تنزل من ال mouth تنزل على ال pharynx يحصل constriction بال superior constrictor  
تعدى اللقمة لناعية ال middle constrictor يحصلها contraction تعدي اللقمة لل inferior constrictor لغاية ما  
اوصل لل esophagus
- **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

\* ال NS تاع ال pharynx هو ال pharyngeal plexus  
المعقول جوا ال middle constrictor خيط مين بشارك  
من ال ال pharyngeal plexus ← 11213  
↓

- by **pharyngeal plexus** that lies on middle constrictor, formed of:
- **1-Pharyngeal branch of vagus n (cranial accessory n): mainly motor.** ← *motor supply* *وده مسئول ال ال يدي العضلات*
- **2-Pharyngeal branch of glossopharyngeal n: mainly sensory to mucosa of oropharynx.**
- **3- Pharyngeal branch of sup. cervical sympathetic ganglion: mainly vasomotor.**

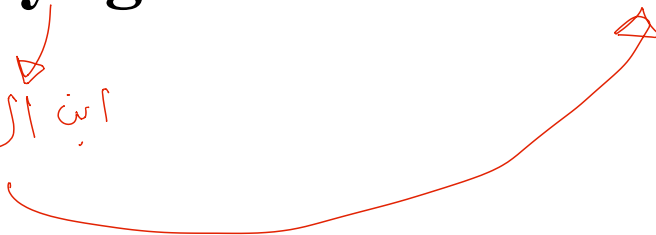
*pharyngeal gland* ← *vasomotor branch* ← *ده يسي*

# 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  
أبن ال

vagus  
أبن ال



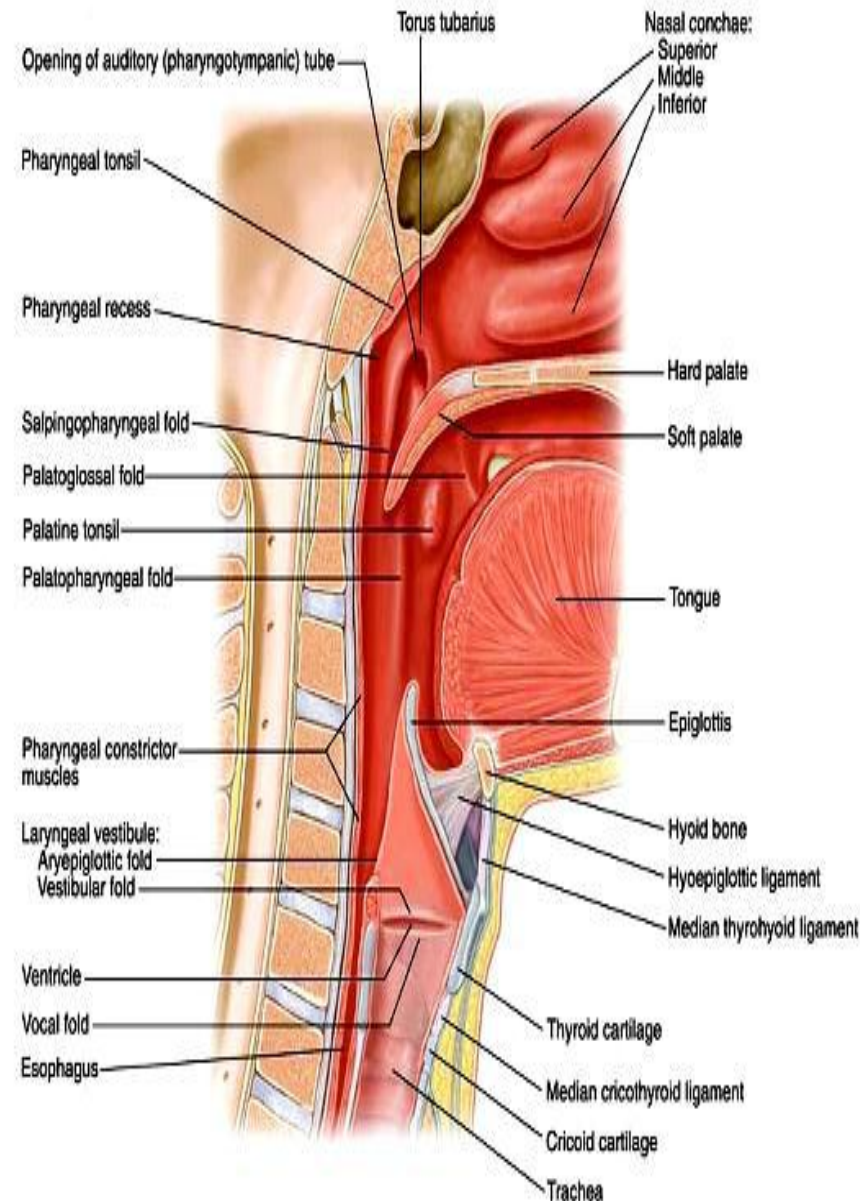
# INTERIOR OF THE PHARYNX

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

- \***Roof:** Body of sphenoid bone

- \***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:**

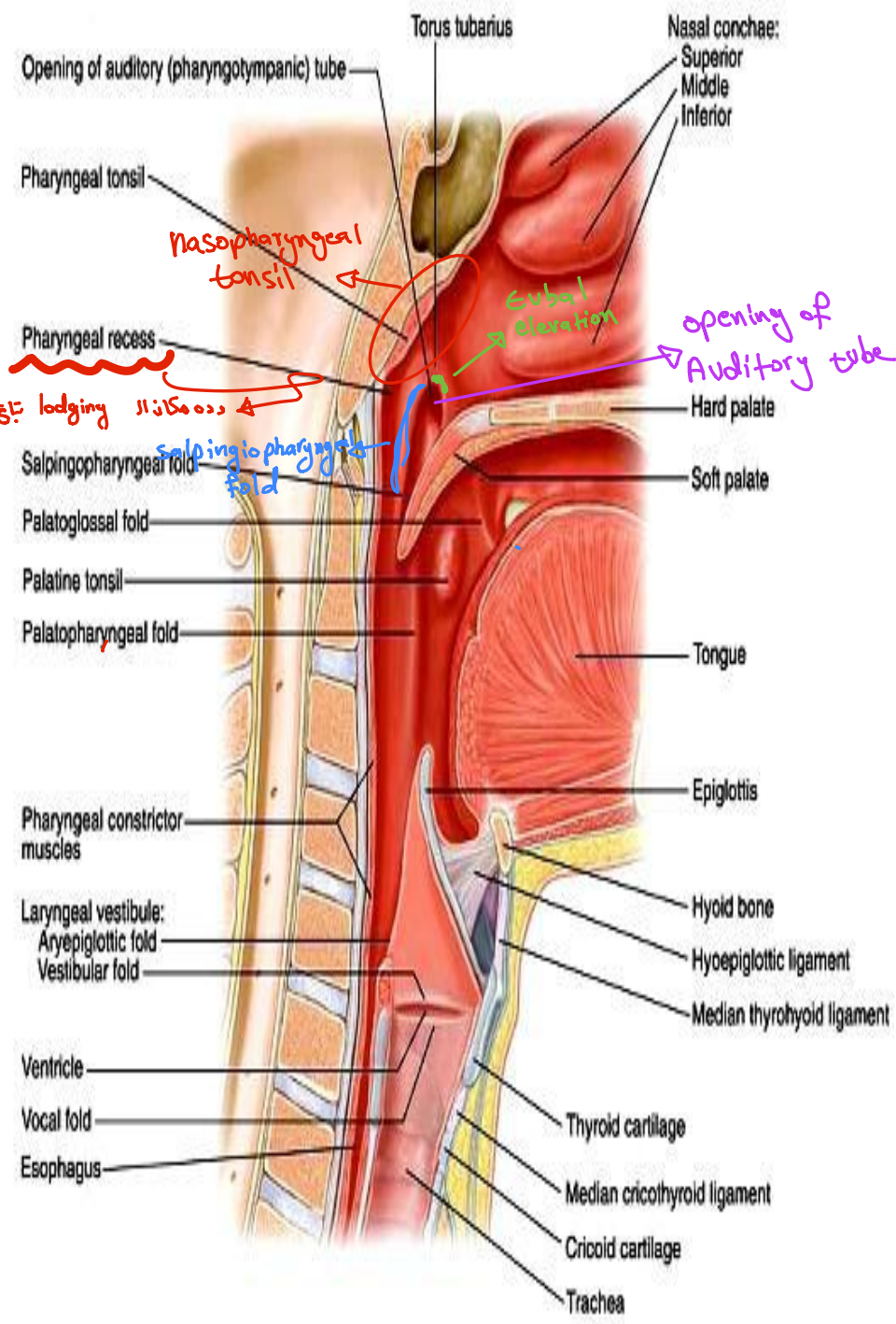
**1- nasopharyngeal tonsil.**

**2-pharyngeal recess: lodge ICA.**

**3- opening of Auditory tube.**

**4-tubal elevation. → العكاز**

**5-salpingopharyngeal fold 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.

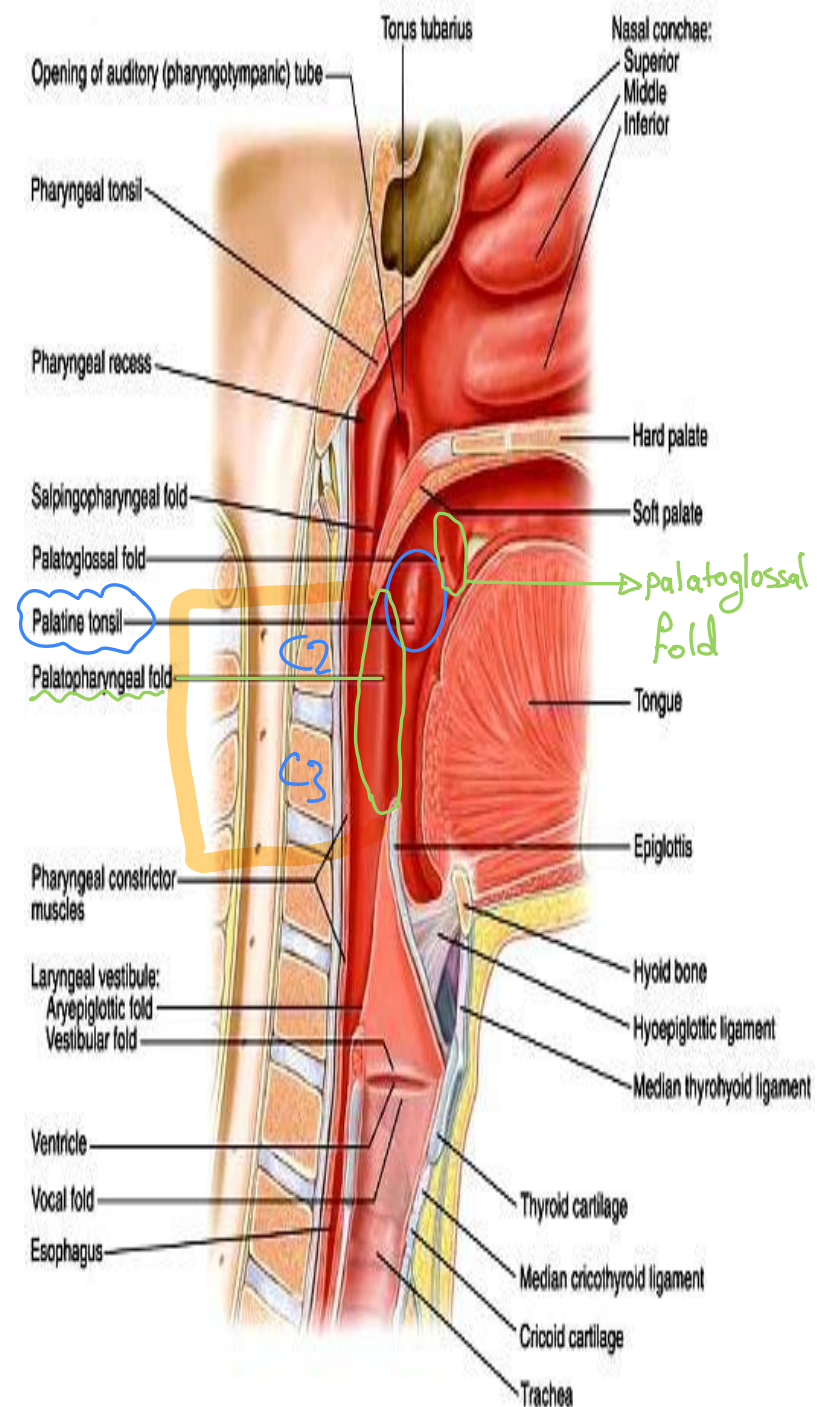
\***Roof:** soft palate.

\***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.

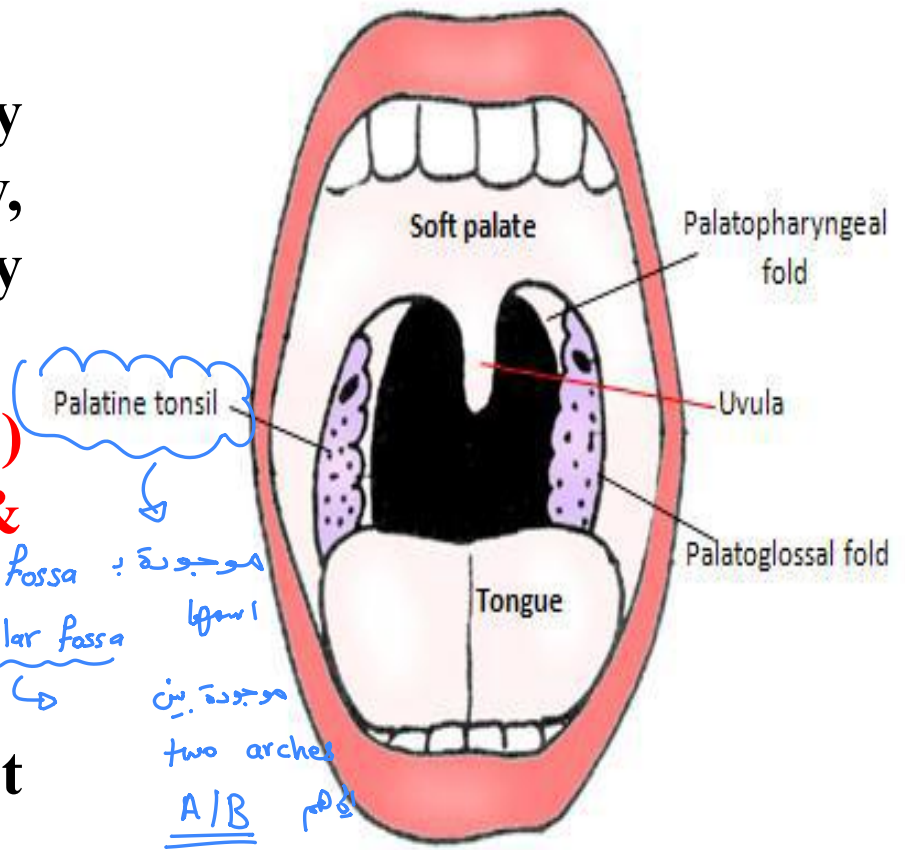
\***Lateral wall:** shows palatoglossal and palatopharyngeal arches with the *palatine tonsil* lying in the fossa in between.



# THE PALATINE TONSILS

ال Palatine tonsils ده عبارة عن lymphoid organ موجود في Area اسفها palatine fossa  
 المعلومات اي بي اعرفها :  
 ان ال palatine tonsils هي وحدة من ال tonsils ال موجوده حولين ال mouth cavity

- **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 (A) palatoglossal (B) palatopharyngeal arches.**
- **Shape: oval or almond shape. It has 2 borders, 2 poles, 2 surfaces.**





## \* Blood Supply:-

### I) Arterial supply:-

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

2- Additional sources:

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

هاد ذوال من الدكتور .



\* لو مريض حابه repeated inflammation Tonsils  
متر يشيل ال Tonsils هل هاد minor Surgery or major

← جهازه هسه لانه لانشيل organ اهم اشي نزيح ال Artery عشان ما يغير نزيح  
كانه الضغط جال ال Artery اقل من ال vein بس هون ال paratonsillar vein ضغطه عالي ضيقه ربطه هو د ال Artery  
ولو ما ربطناه ال مريض يح يغير معه نزيح ويمكن يموت او يحتاج نقل دم .

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

\* Lymphatic drainage: jugulodigastic 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

بكتريا أو فيروسات  
bacteria أو virus

- 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.

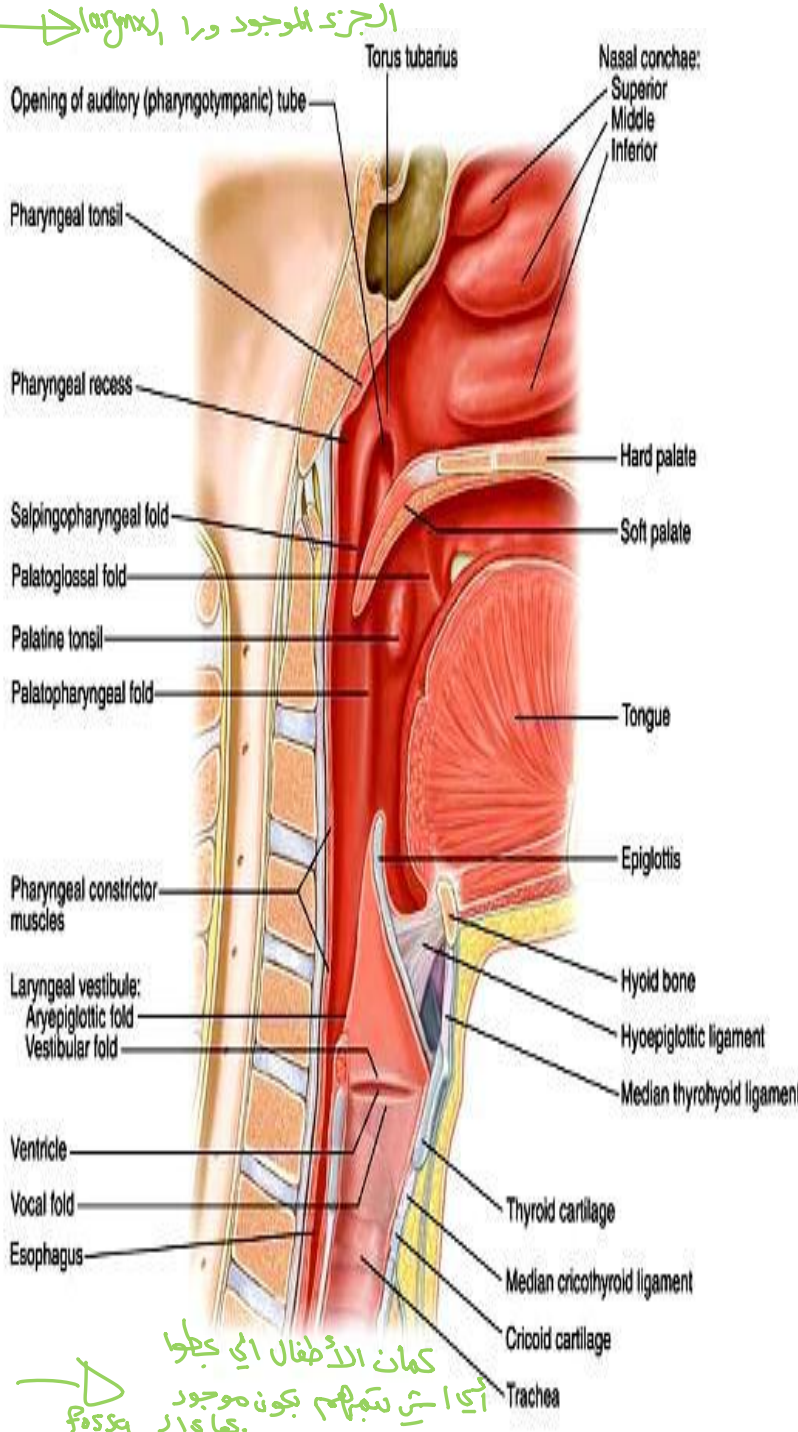
• **Laryngopharynx:** lies behind laryngeal inlet and posterior surface of the larynx. -It extends from upper border of epiglottis to lower border of cricoid cartilage where it is continuous with oesophagus.

\***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)

دي ال Fossa اي لما تاكل سمك لو اكلت شوكه حسن انه (آآه .. انا مش نار) ال fish bone دي لما تعلق بتعلق بال piriform fossa





# 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

@A fibromuscular tube.

يمكن تلافيفها يكتب تانيه جاسم  
Fibrocartilaginous tube

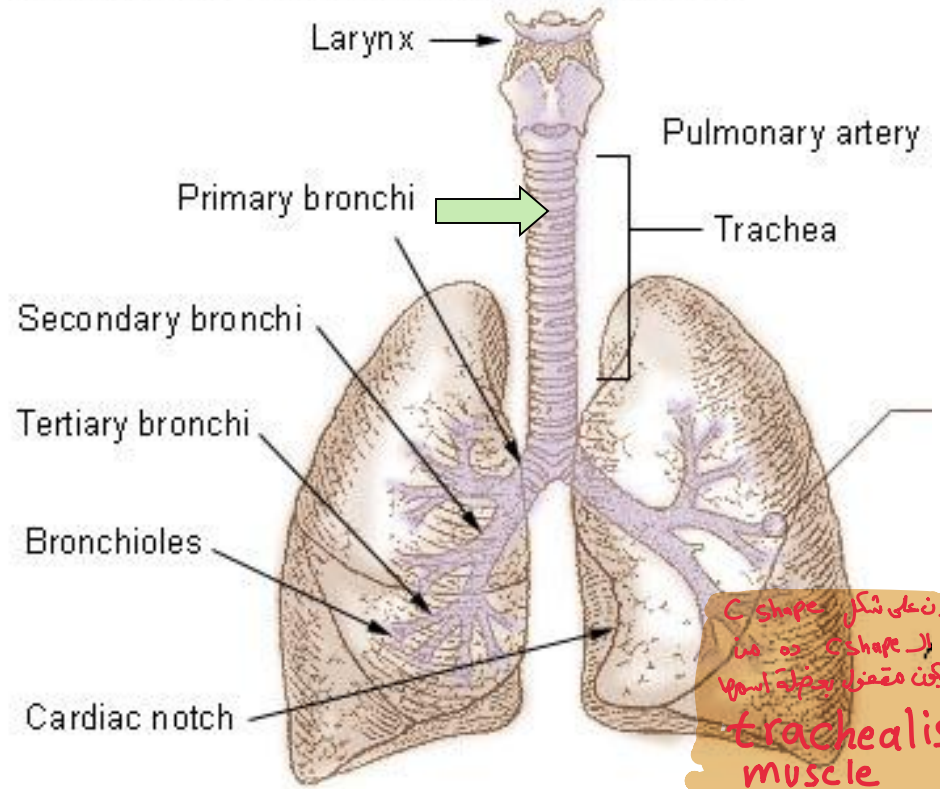
@Has incomplete cartilage rings to keep it always opened.

@Carries air into & out of the lungs.

@ It is 10-12cm long

خارجية اذا حابين  
توفيح

## Bronchi, Bronchial Tree, and Lungs

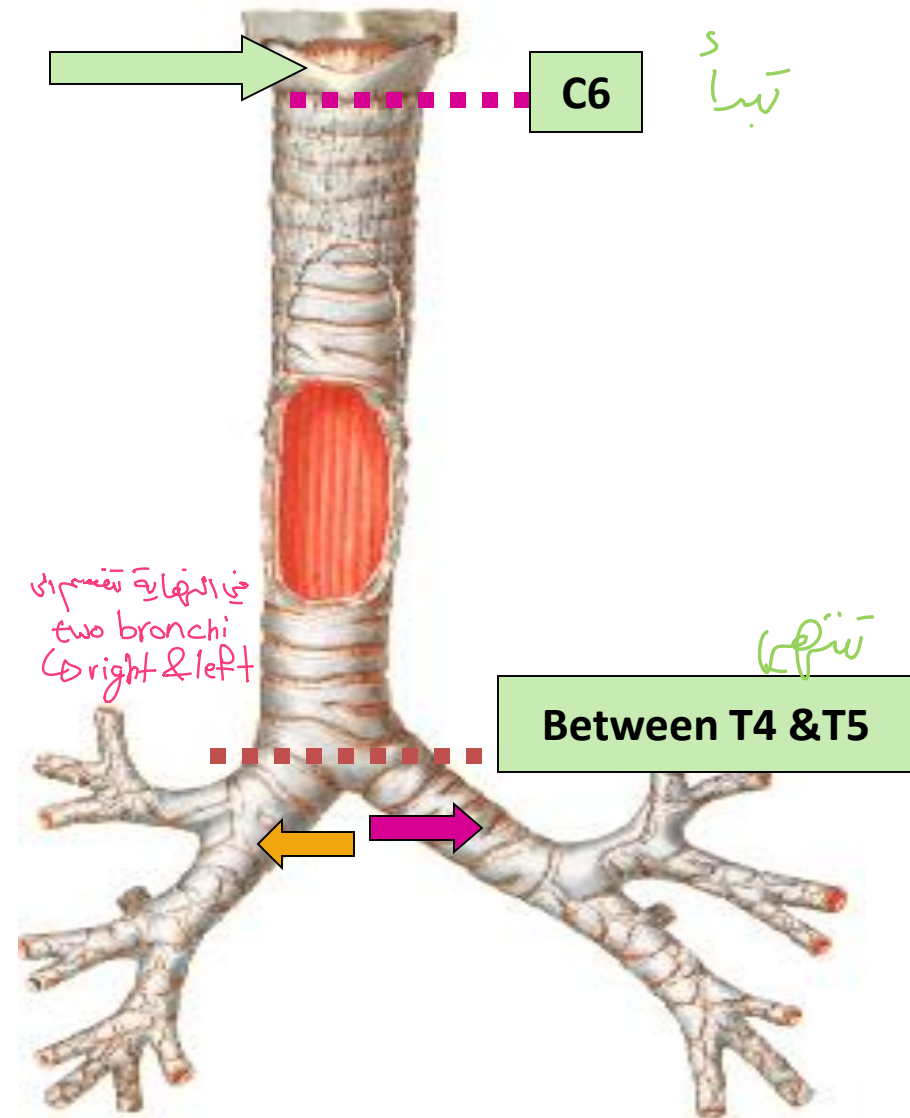


العضلة التي تسمى "العضلة المشطوفة" أو "العضلة الشكلية" هي العضلة التي تحيط بالقصبة الهوائية (trachea) وتشكل شكل حرف "سي" (C shape). هذه العضلة تساعد في دعم القصبة الهوائية ومنع انغلاقها أثناء التنفس.

# 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. )

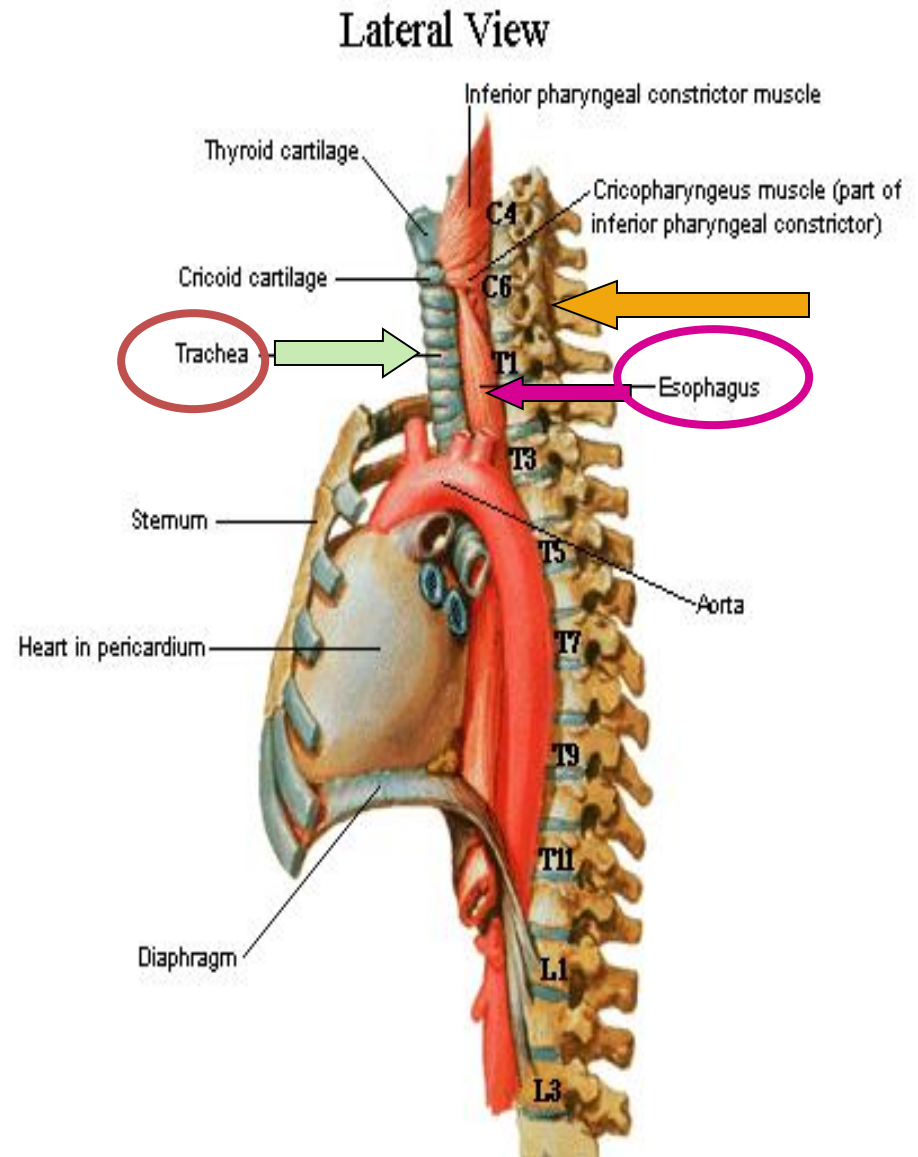
@Upper ½ of trachea lie in the neck.

@Lower ½ of trachea lies in the thorax.

@Relations :

@Posteriorly :

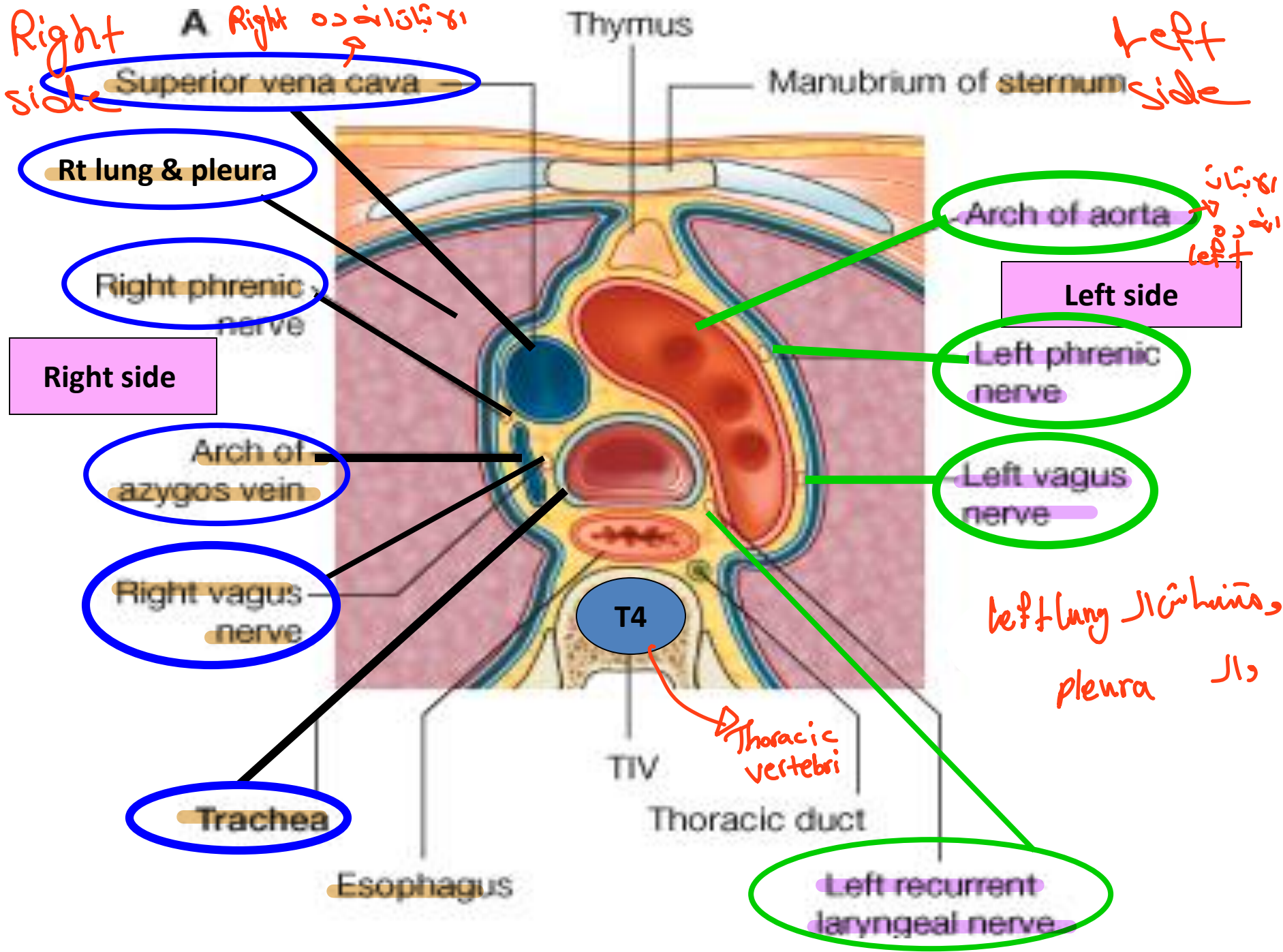
\*Oesophagus which lies immediately anterior to the vertebral column.





# Relations of trachea

<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>

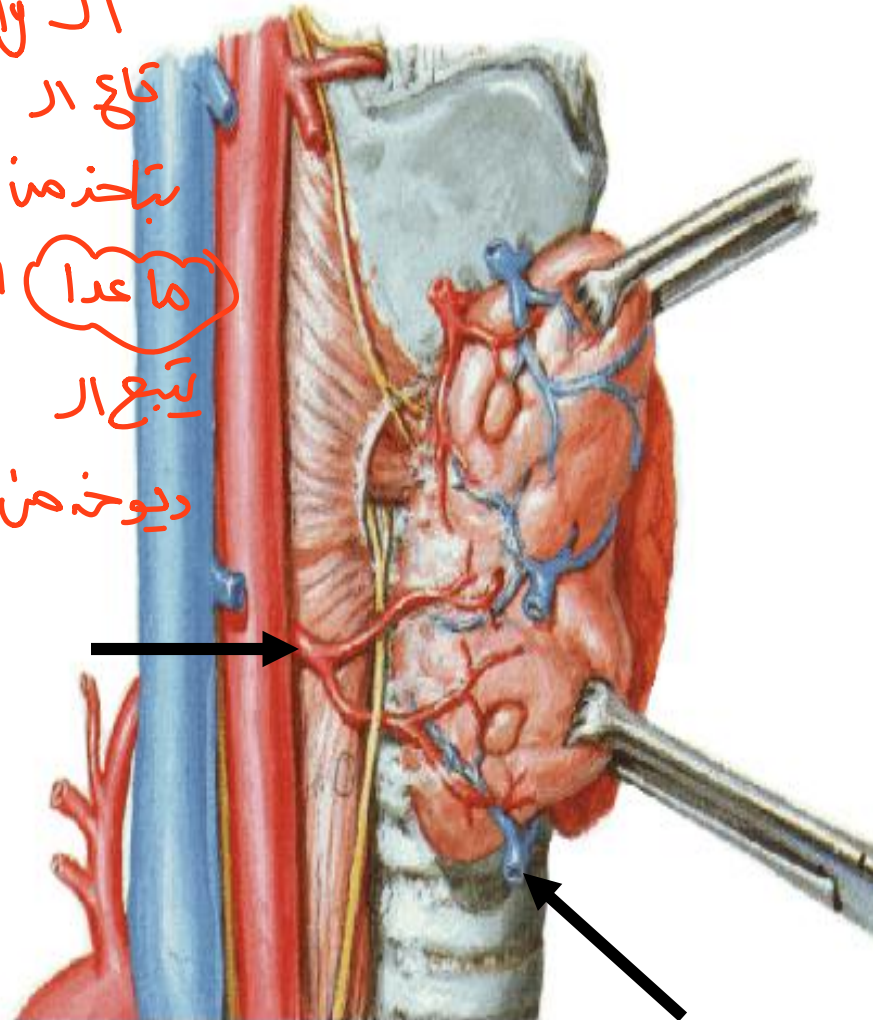


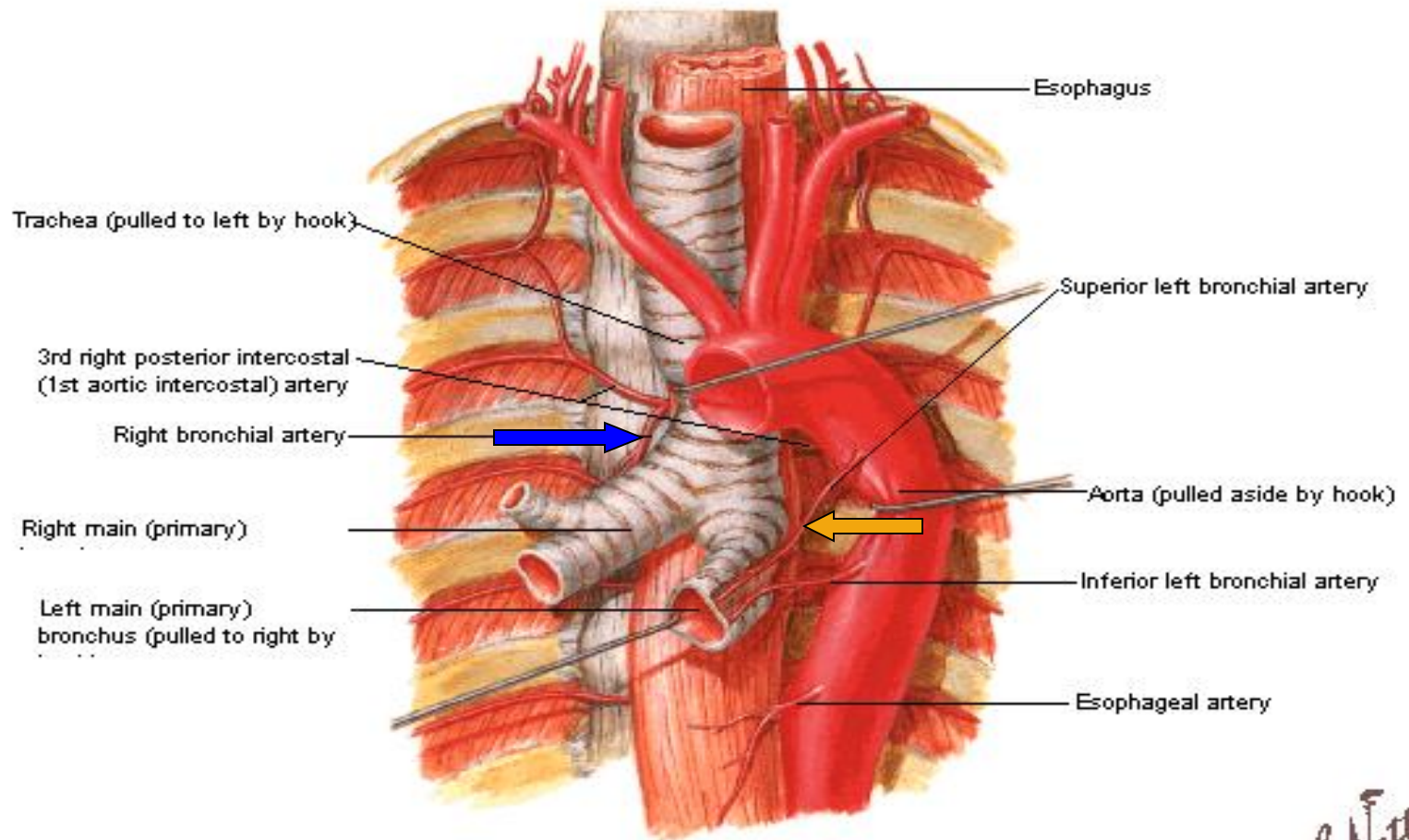
# Blood supply of trachea

- @Arterial supply:** Blood supply ال قاع ار  
Trachea قاع ار  
• Mainly from inferior ← بتاخز من  
thyroid artery Bi furcation ال (ما عدا)  
• Region of bifurcation lung يتبع ال  
→ bronchial arteries. ديوخه من

## **@Venous drainage :**

- Into inferior thyroid veins to left
- brachiocephalic vein





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

# Lymphatic drainage of the trachea

\* ال trachea من الحاجبان اي حواليها lymph nodes كبير

قدامها وعلر جوانبها

@Pretracheal &

paratracheal LNs.

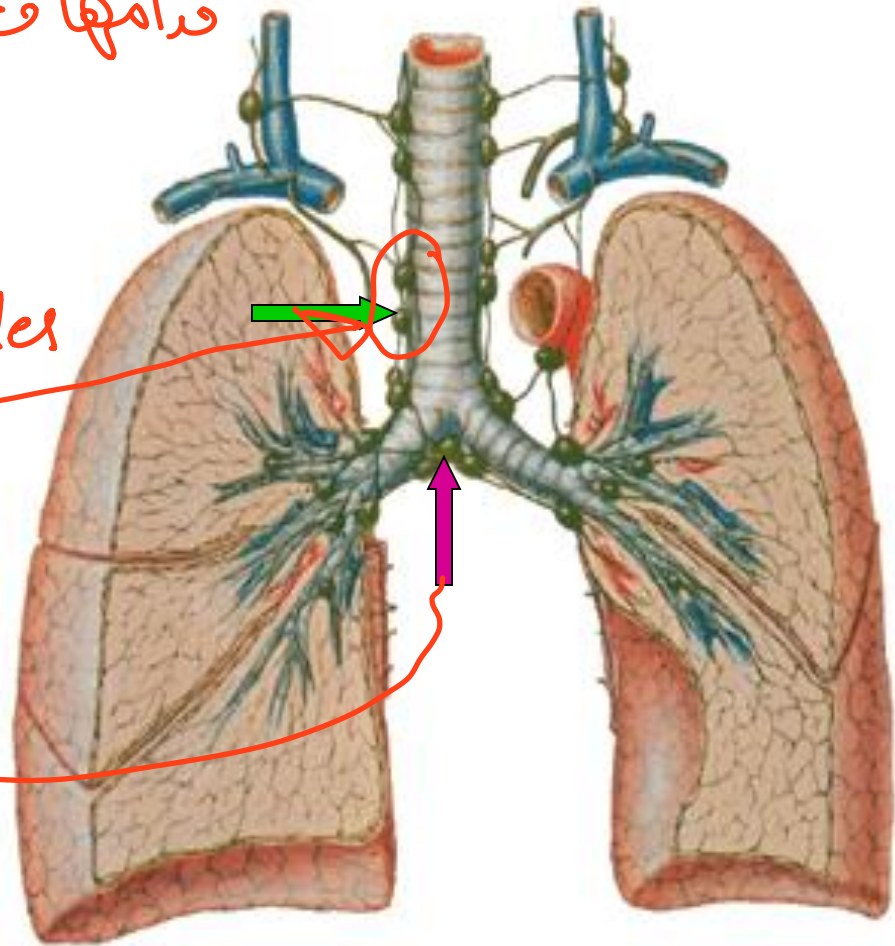
lymph nodes

@Region of

bifurcation →

tracheobronchial

LNs.



Trachea ١١ \*

١١

Sympathetic

& Parasympathetic Nerve Supply

# Nerve supply of trachea

@ Sympathetic from  
thoracic  
sympathetic  
trunks.

• Parasympathetic  
from both Vagi &  
recurrent  
laryngeal nerves.

right  
& left

