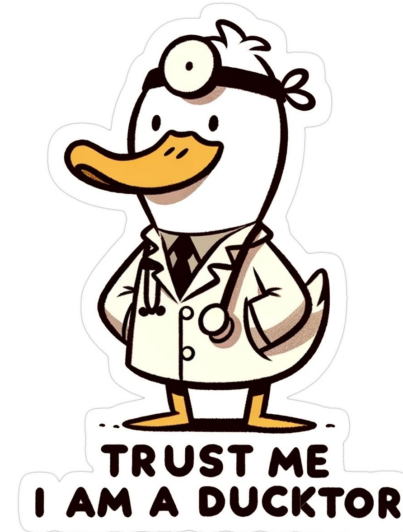


Jordan University
Faculty Of Medicine



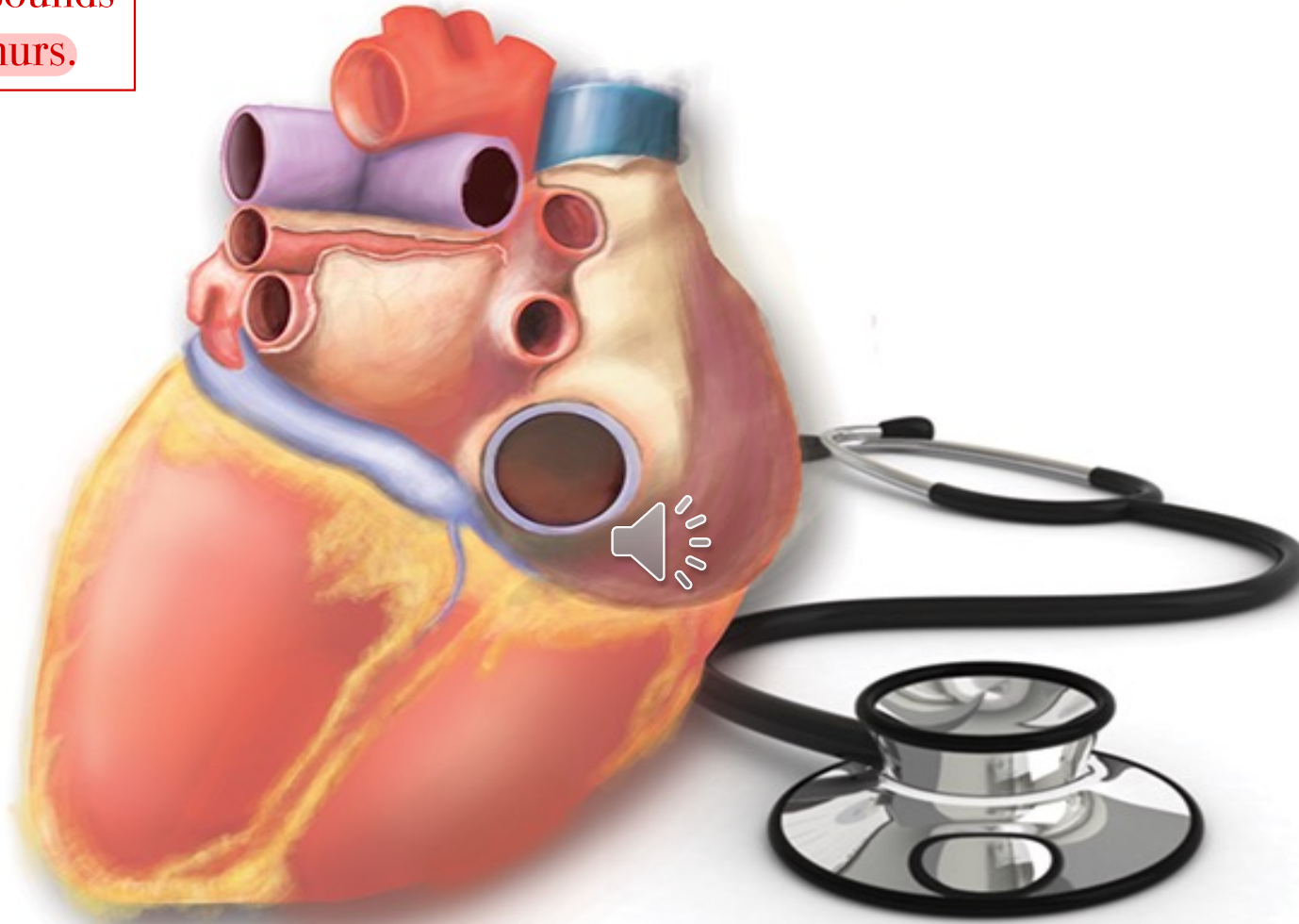
Cardiovascular system

DR. AHMED SALMAN

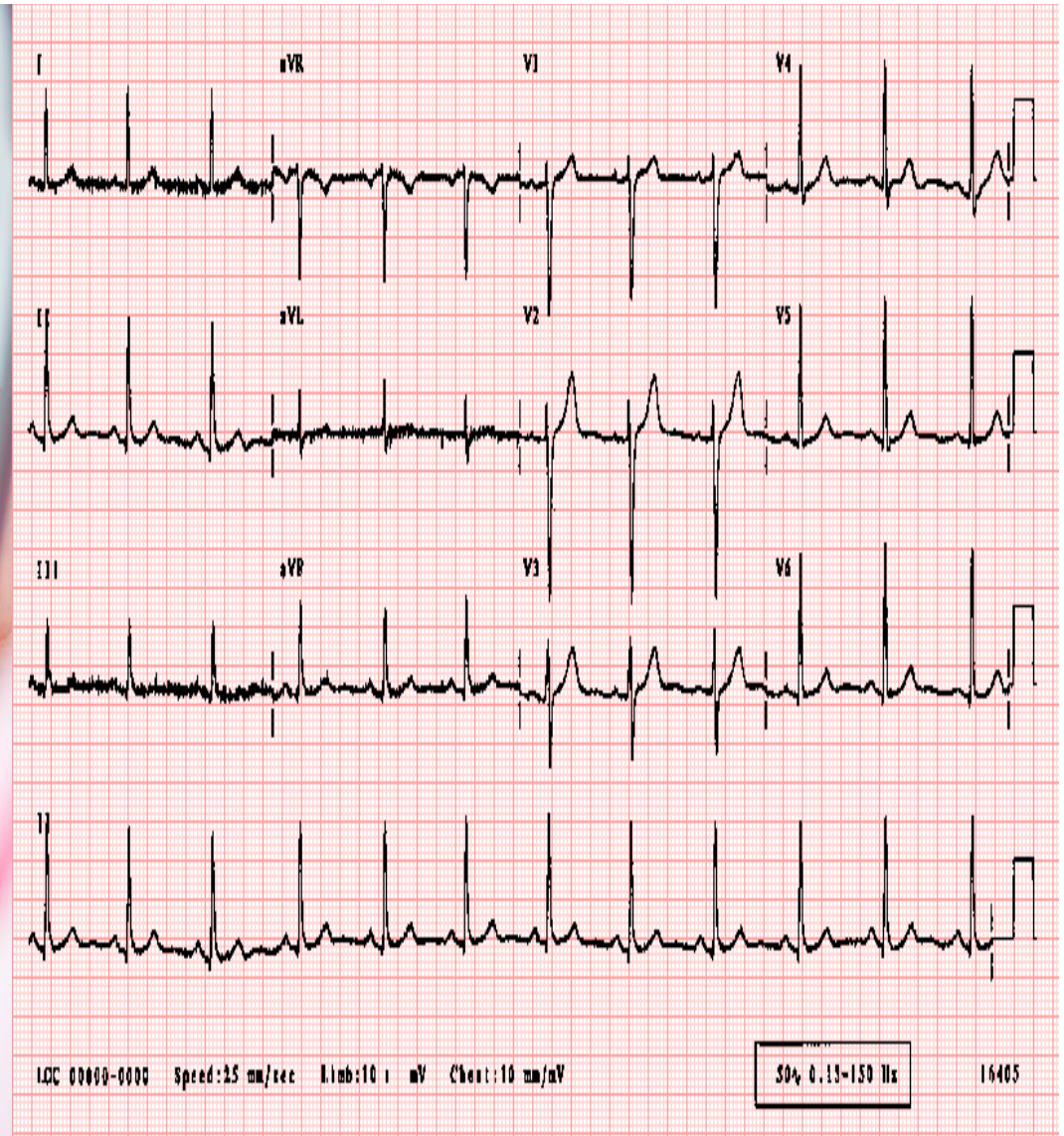
Associate professor of anatomy & embryology



Normal heart sounds are present, accompanied by pathological heart sounds referred to as **murmurs**.



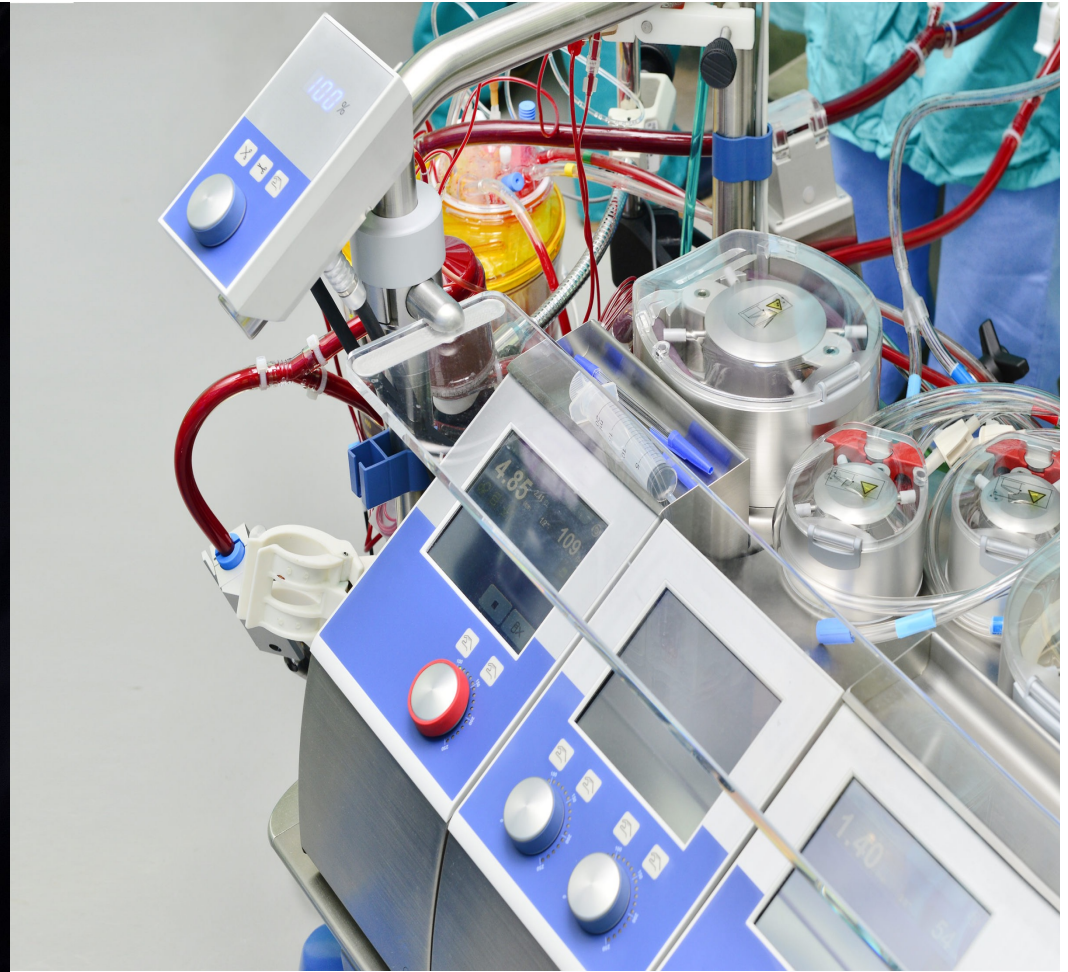
ECG = Electrocardiogram



DC shock following cardiac arrest, preceded by initial cardiopulmonary resuscitation (CPR).



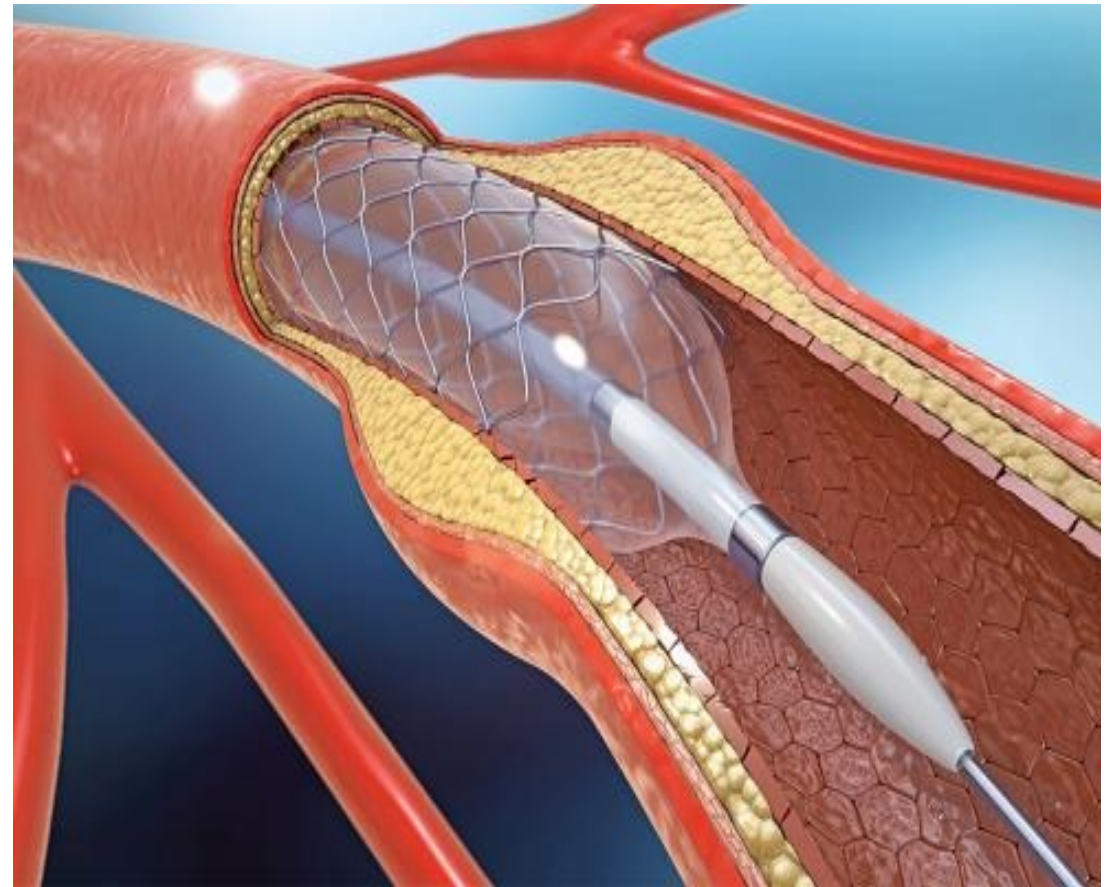
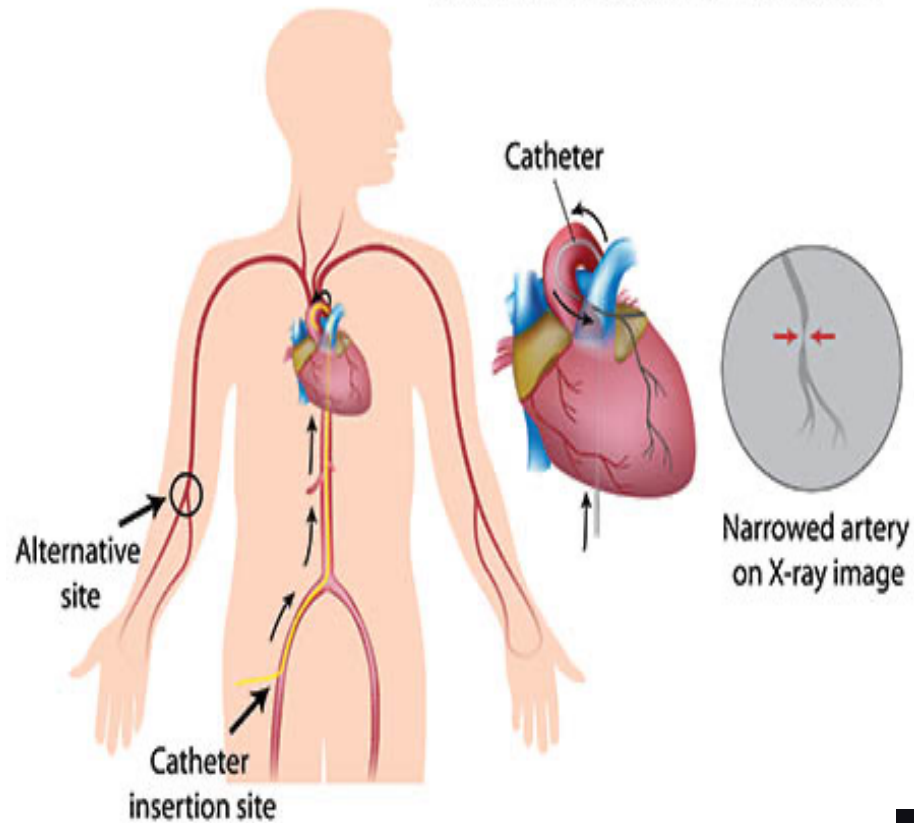
Open-heart surgery , utilised for cardiac valve replacement, valvuloplasty (valve repair), and coronary artery bypass grafting (CABG).



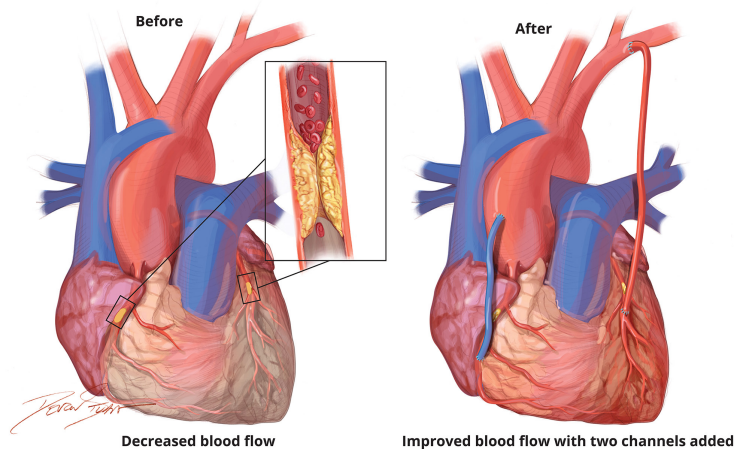
Heart lung machine

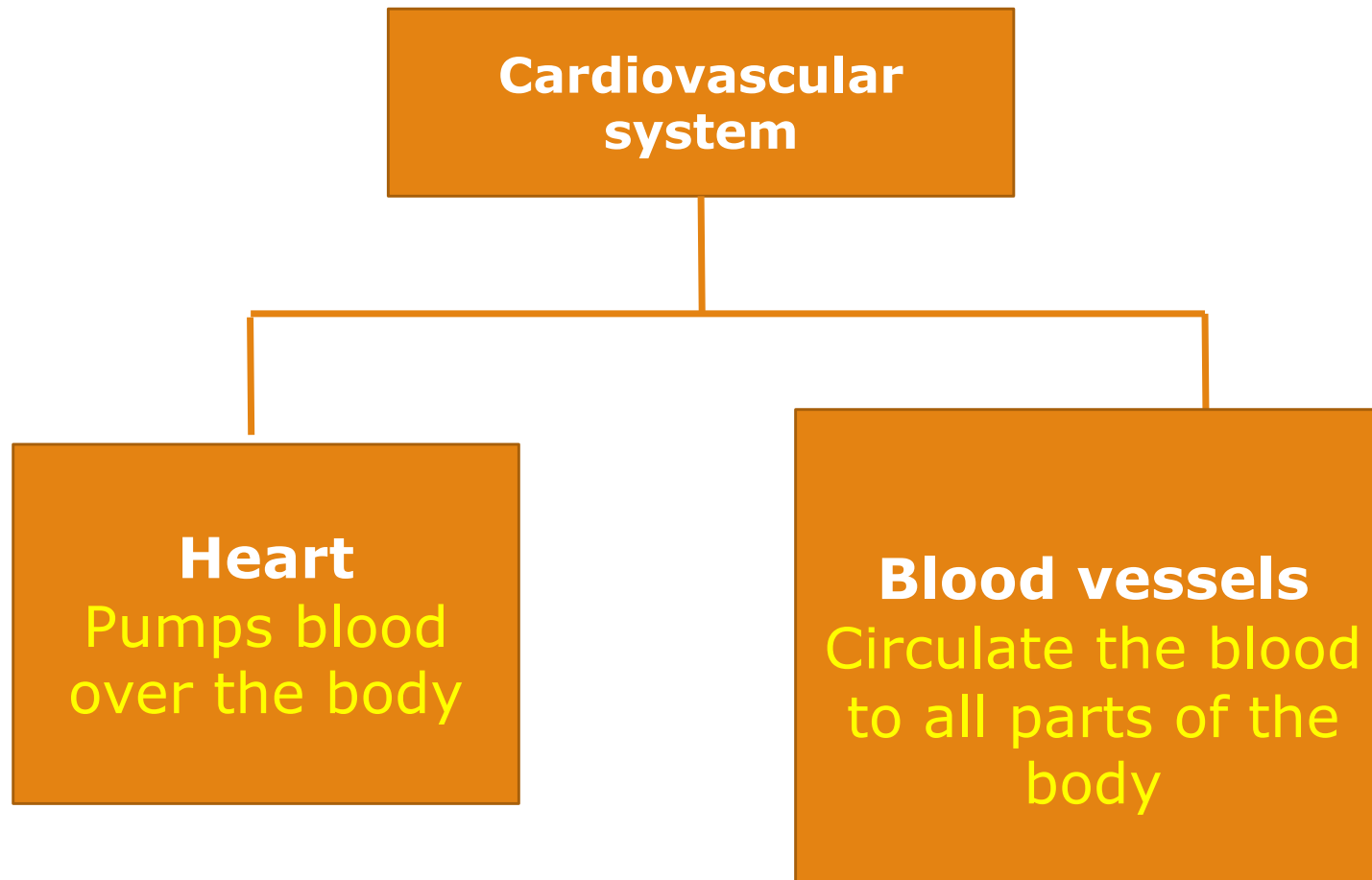
A heart-lung machine, also called a cardiopulmonary bypass machine, is a device that temporarily takes over the function of the heart and lungs during open-heart surgery. It diverts venous blood from the patient, oxygenates it, removes carbon dioxide, and then returns the oxygen-rich blood to the arterial system, allowing the heart to be still during the operation.

Cardiac Catheterization

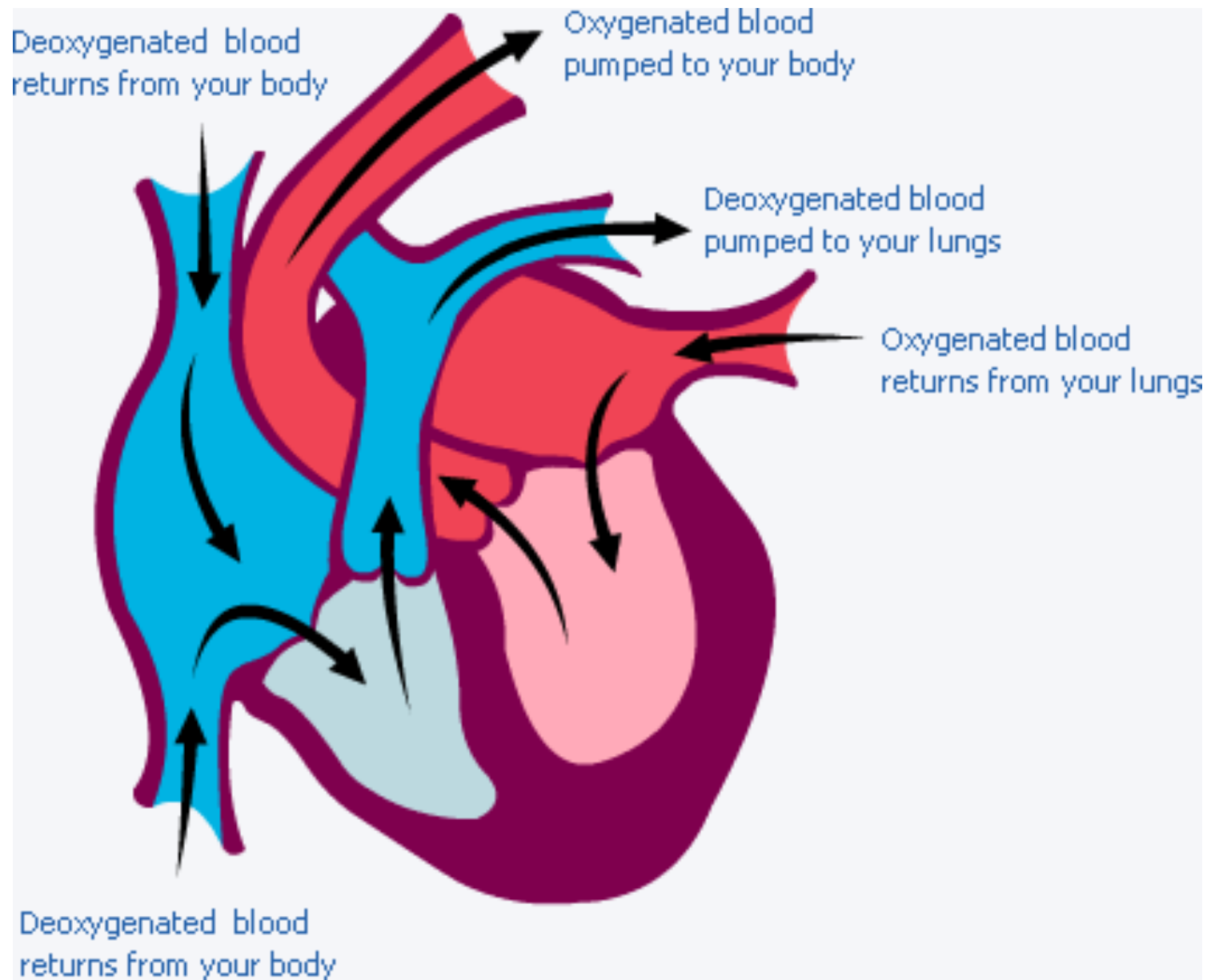


Coronary artery bypass graft (CABG) surgery is a major surgical procedure that restores blood flow to the heart muscle by creating a new path, or "bypass," around narrowed or blocked coronary arteries. This is achieved by using a healthy blood vessel, or graft, taken from another part of the body, such as the chest, leg, or arm. [@](#)

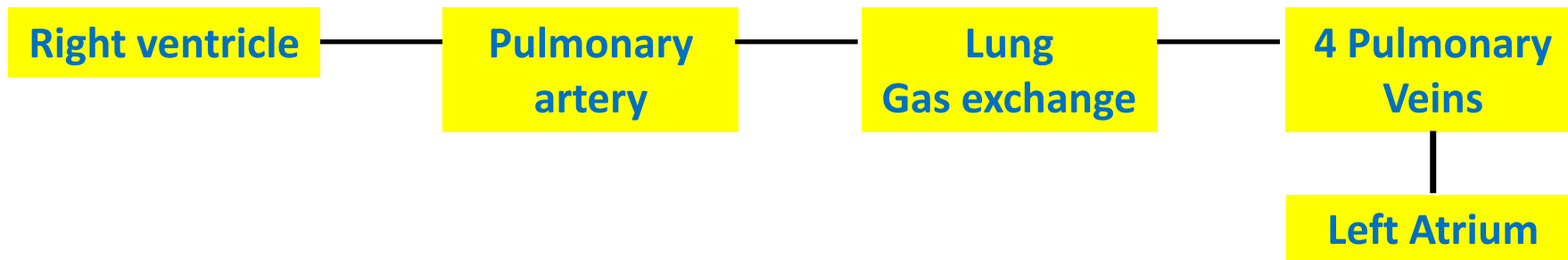




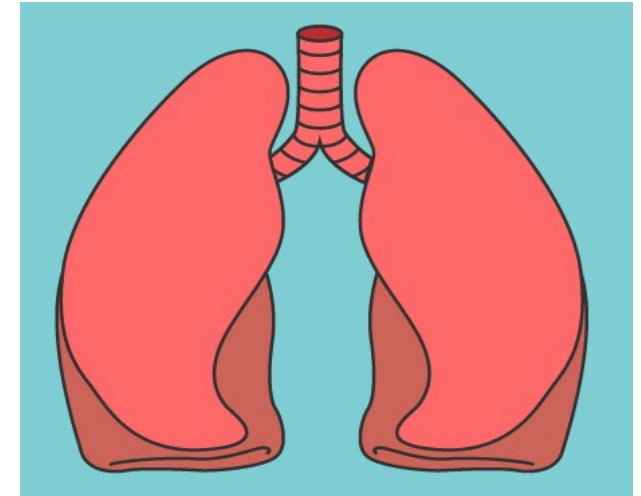
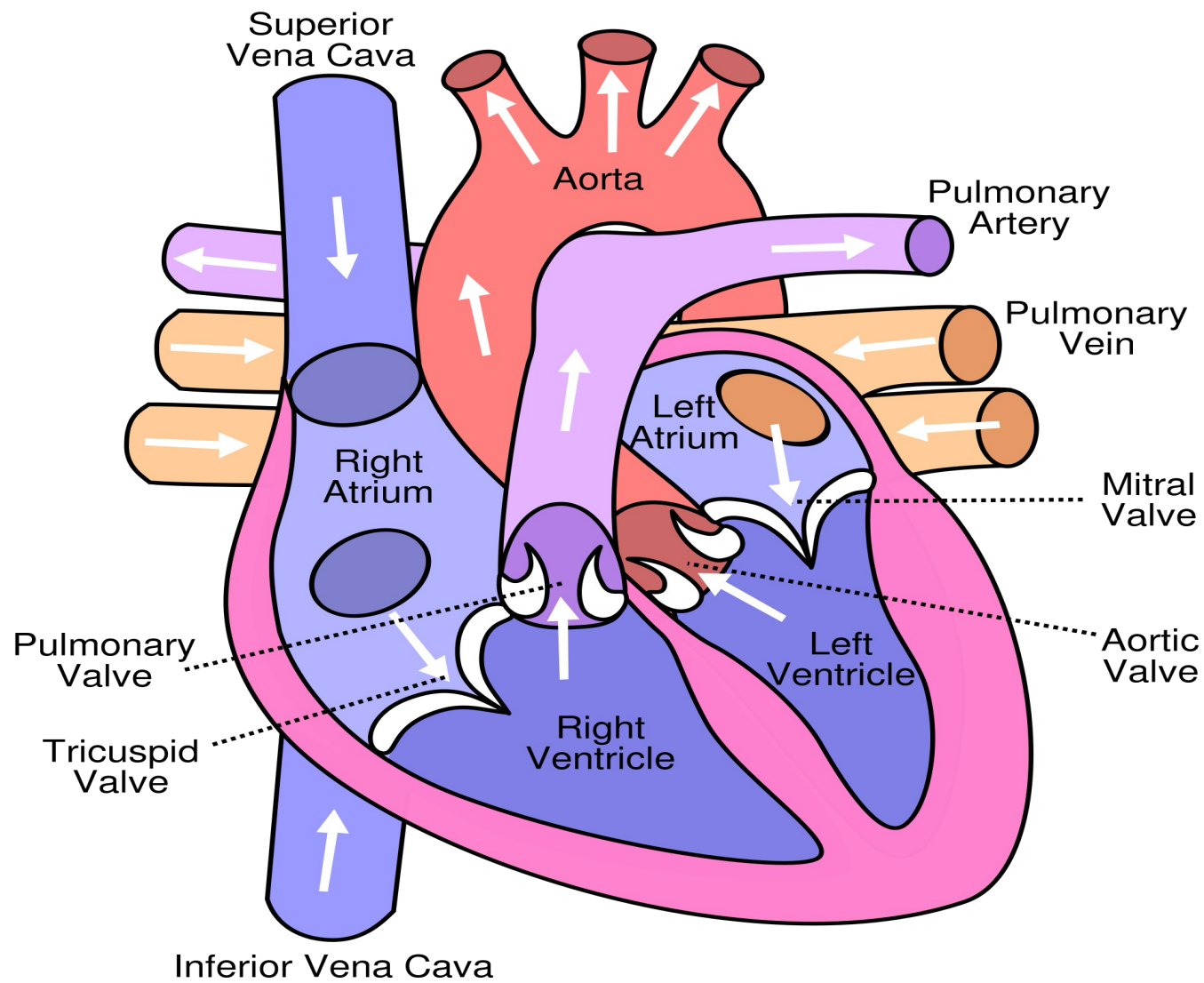
The function cardiovascular system is to carry oxygen and nutrients and to eliminate carbon dioxide and other waste products from the body.



Pulmonary Circulation

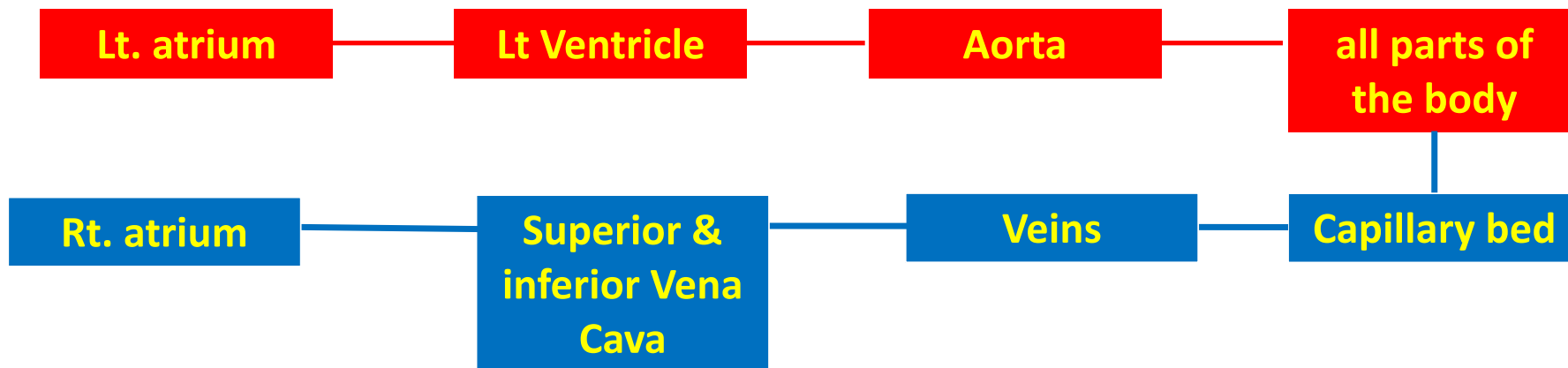


- Pulmonary veins are the only veins that carry oxygenated blood
- Pulmonary arteries are the only arteries that carry deoxygenated blood



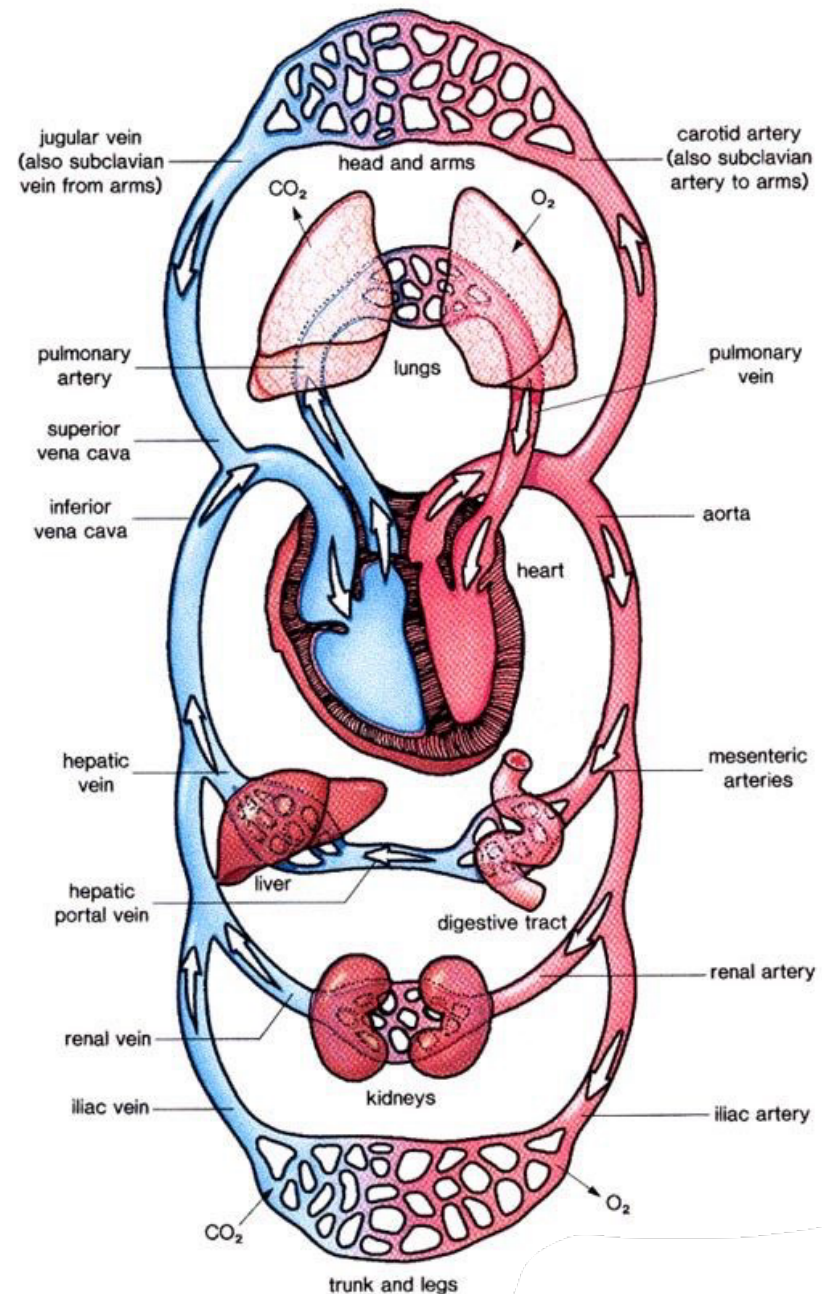
Systemic Circulation

It carries the oxygenated blood from the heart to the body.
And return deoxygenated blood from the body to heart.

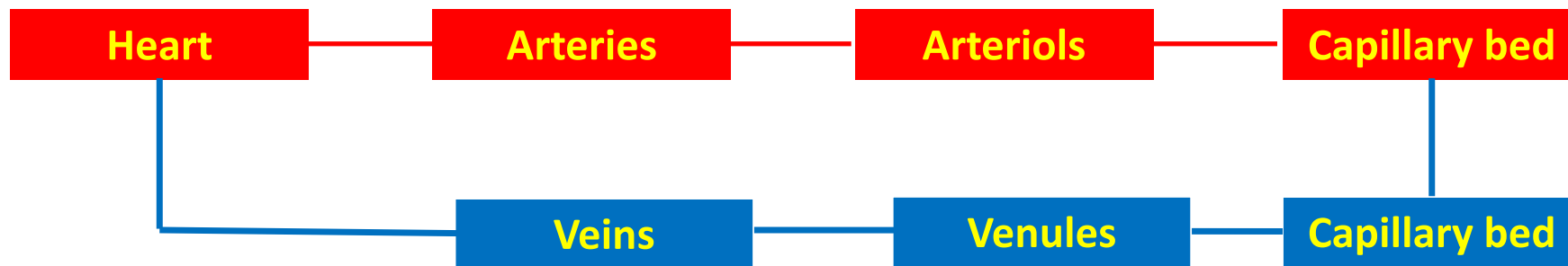


Systemic + pulmonary circulation

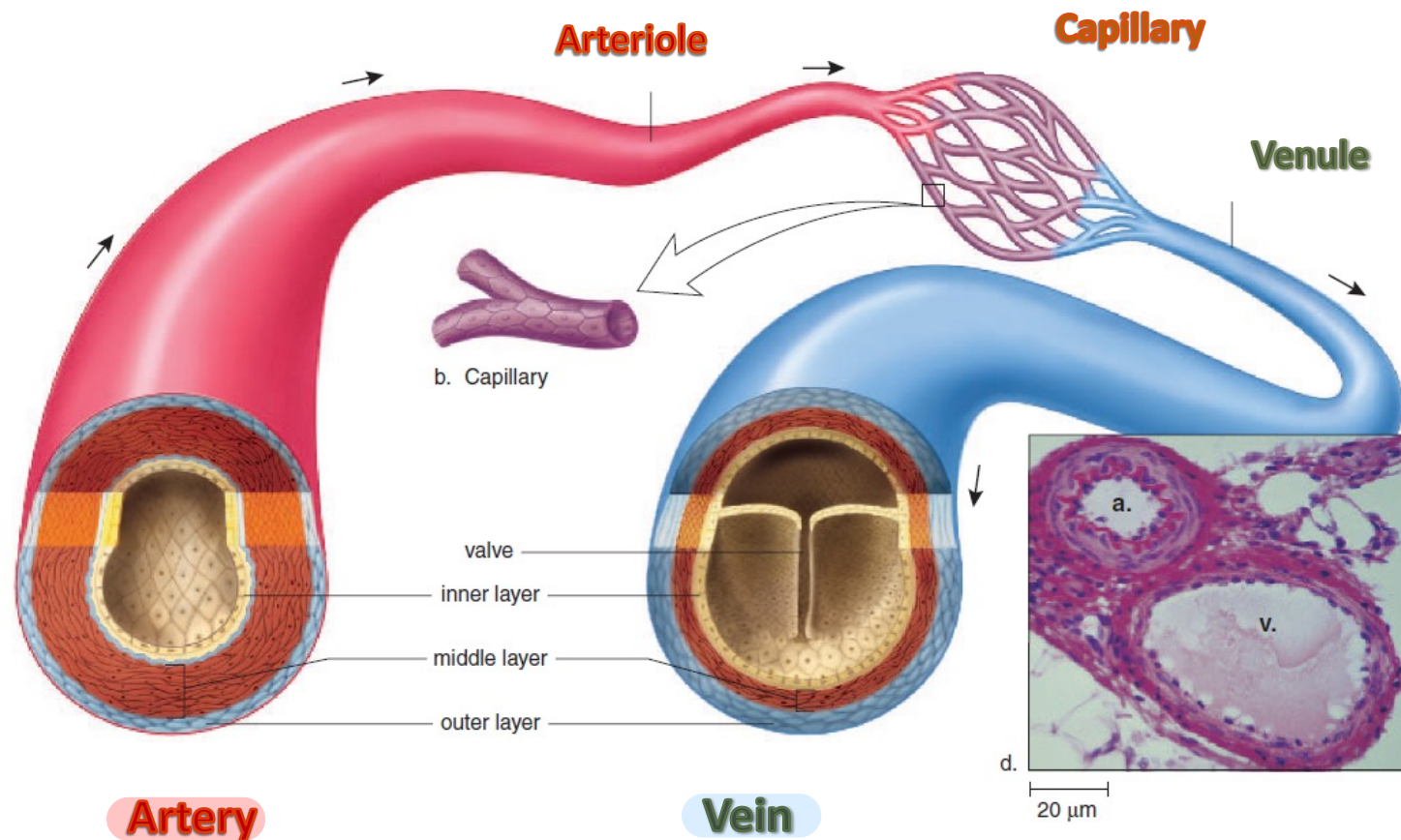
Deoxygenated blood from the systemic circulation returns to the heart via the superior vena cava, draining the upper body, and the inferior vena cava, draining the lower body. This blood enters the right atrium and then flows into the right ventricle through the tricuspid valve. Upon ventricular contraction, blood is ejected through the pulmonary valve into the pulmonary artery, which carries it to the lungs for gas exchange. Oxygenated blood then returns via the four pulmonary veins into the left atrium, passes through the bicuspid (mitral) valve into the left ventricle, and is subsequently pumped into the aorta and its branches to supply the systemic circulation.



Peripheral Circulation



- ✓ Blood flow in capillaries is regulated by smooth muscle sphincter called precapillary sphincter *control the blood pressure*
- ✓ Vein with large diameter have valves that allow blood flow in one direction only (to the heart)



any vessel exit from the heart called

Any vessel inter the heart called

Thoracic wall

Boundaries :

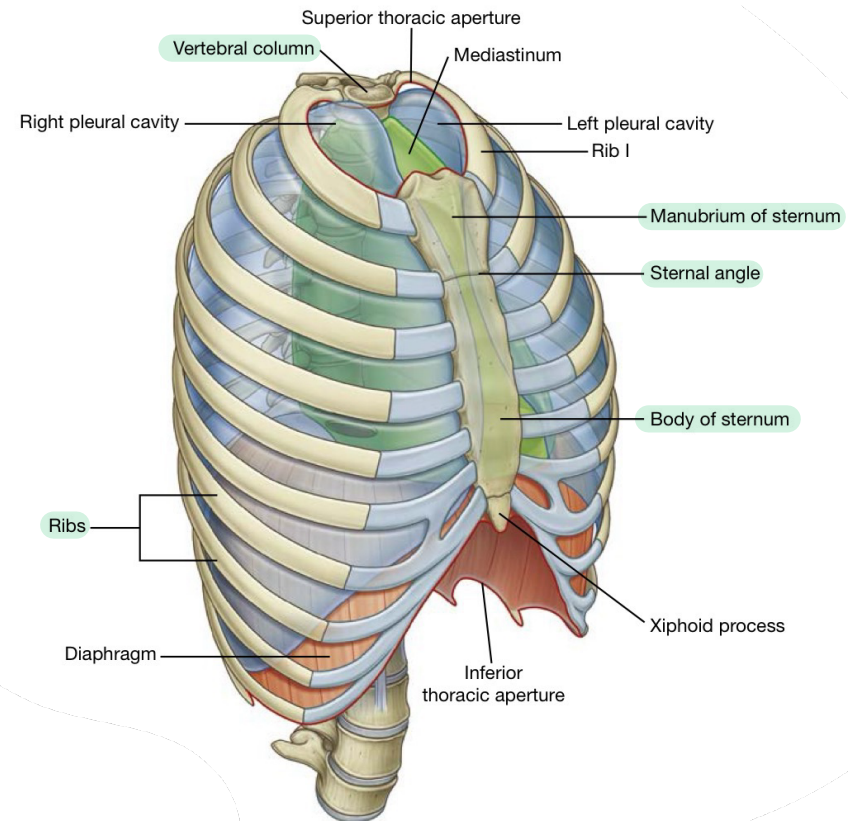
Anteriorly : sternum and costal cartilages

Posteriorly : vertebral column

On either side : ribs and intercostal spaces

The thoracic wall is composed of :

- 1- Skeleton (Thoracic cage)
- 2- Intercostal muscles
- 3- Intercostal vessels
- 4- Intercostal nerves



Skeleton of the thorax

This is an Osseo cartilaginous cavity composed of :

1-Sternum

2-Ribs

3-Costal cartilage

4-Thoracic Vertebrae

Sternum

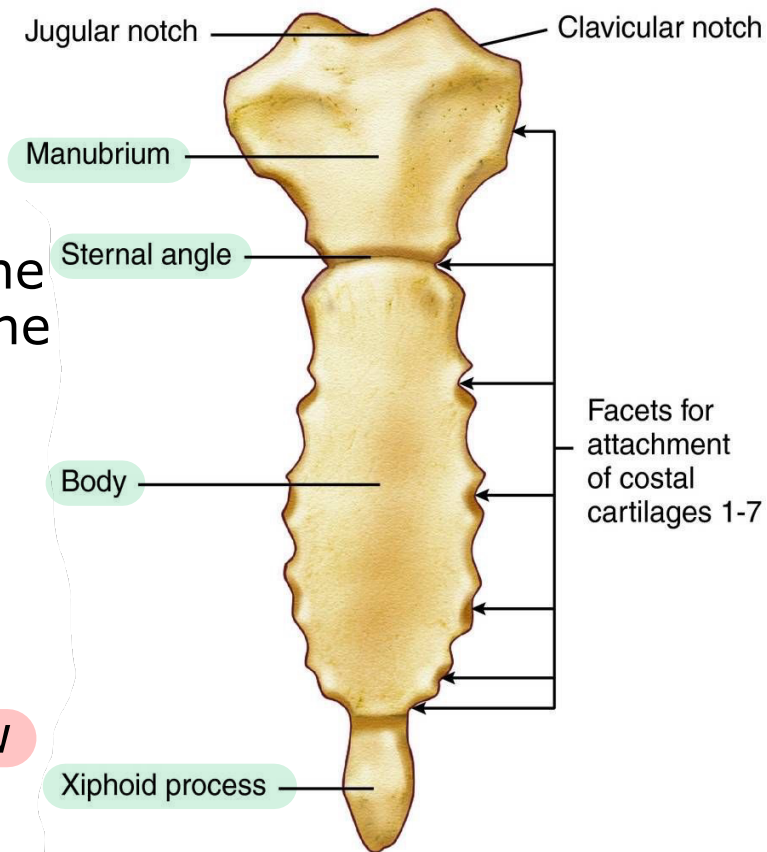
It has Three parts

- Manubrium
- Body
- Xiphoid process
- The sternal angle (angle of Louis) it formed by the articulation of the manubrium with the body of the sternum
- It is at the level of the second costal cartilage

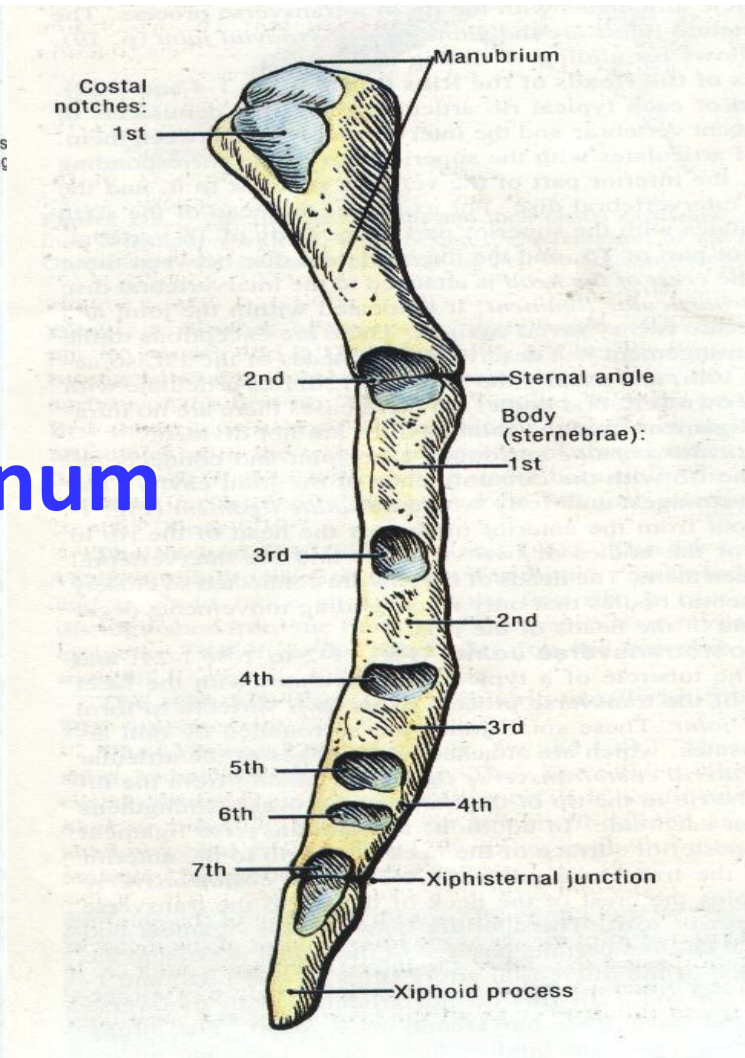
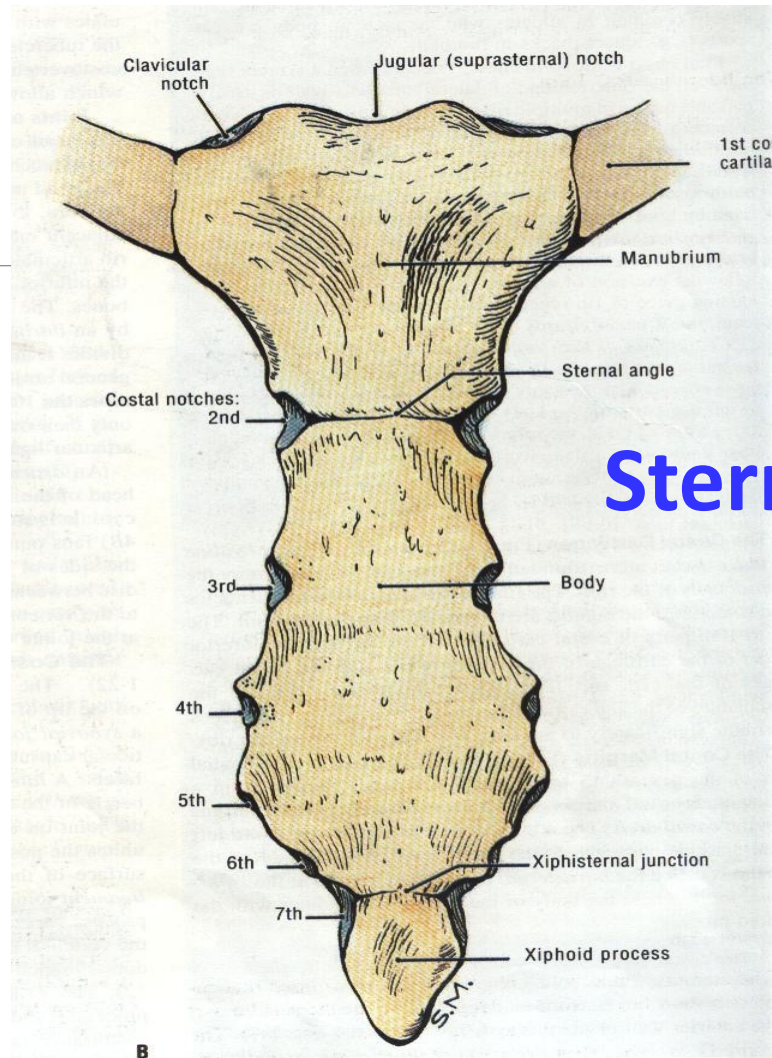
Q. What is function of sternal angle ?

A. Counting of the ribs

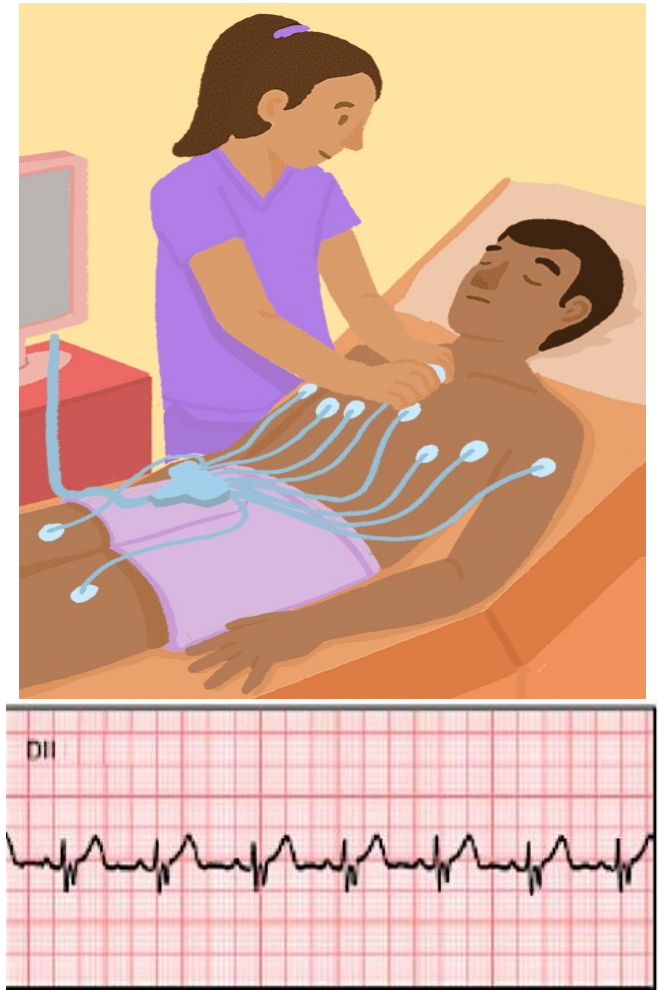
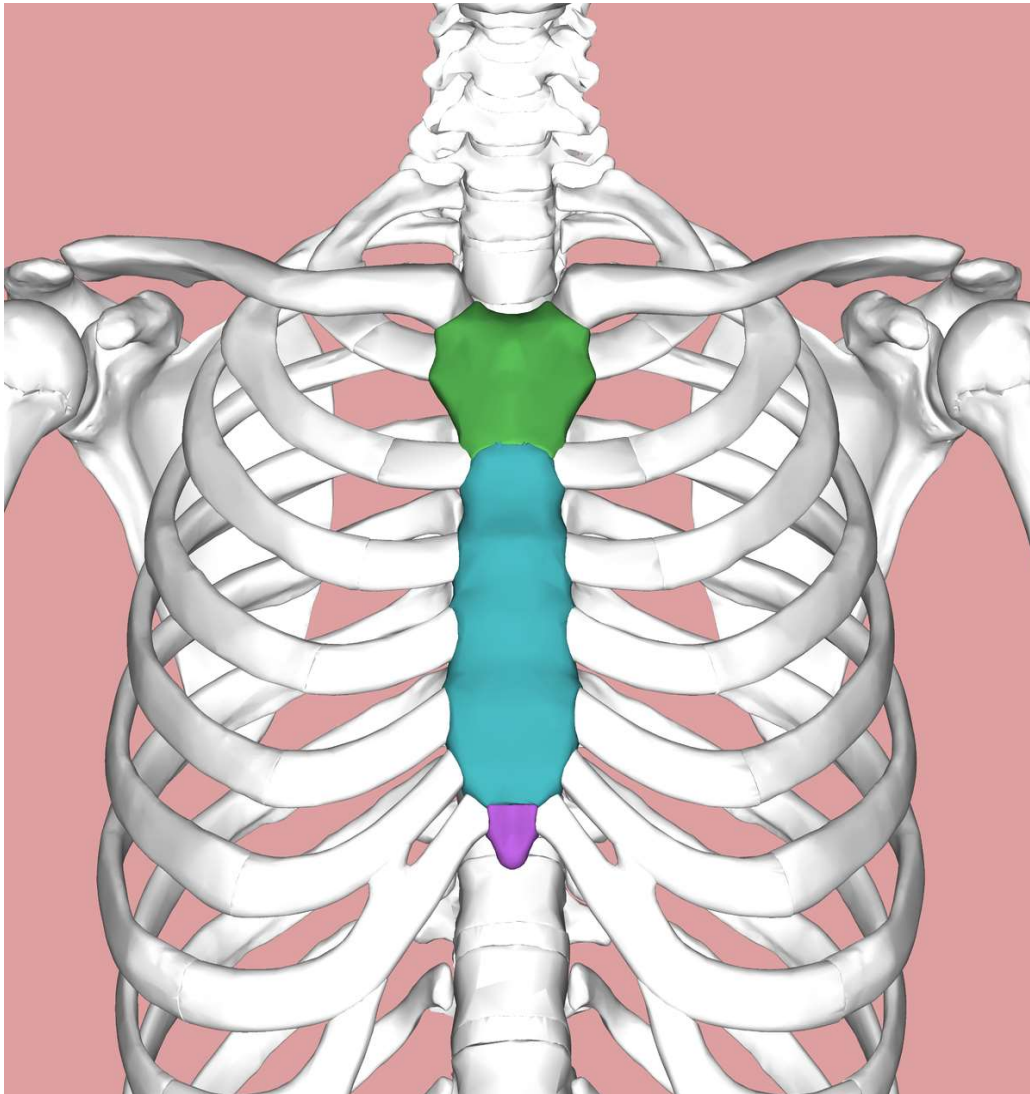
N.B : Sternum is one of sites to take Bone marrow biopsy + *the iliac crest*

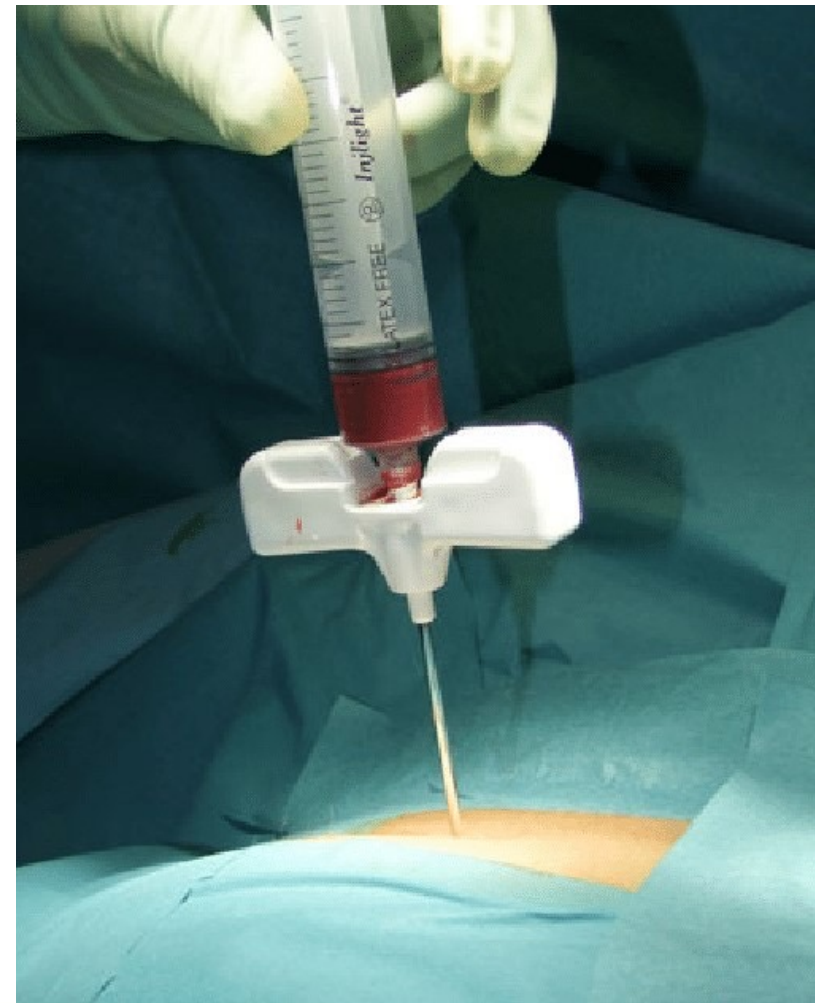
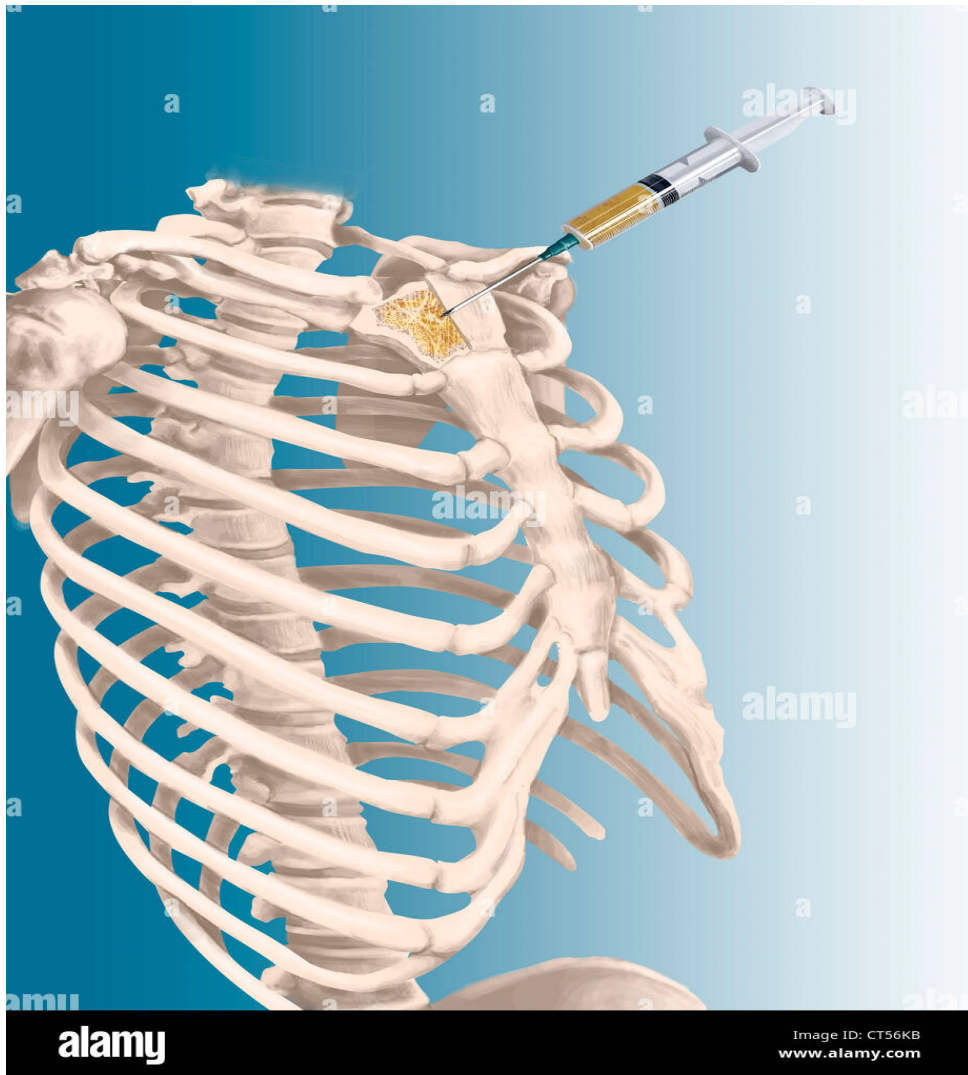


The rationale for counting the ribs is to accurately identify anatomical landmarks for proper placement of electrocardiogram (ECG) electrodes , to ensure safe needle insertion during procedures such as fluid respiration thus avoiding iatrogenic injury to the lungs or heart and facilitating the diagnosis or management of thoracic trauma.



Sternum



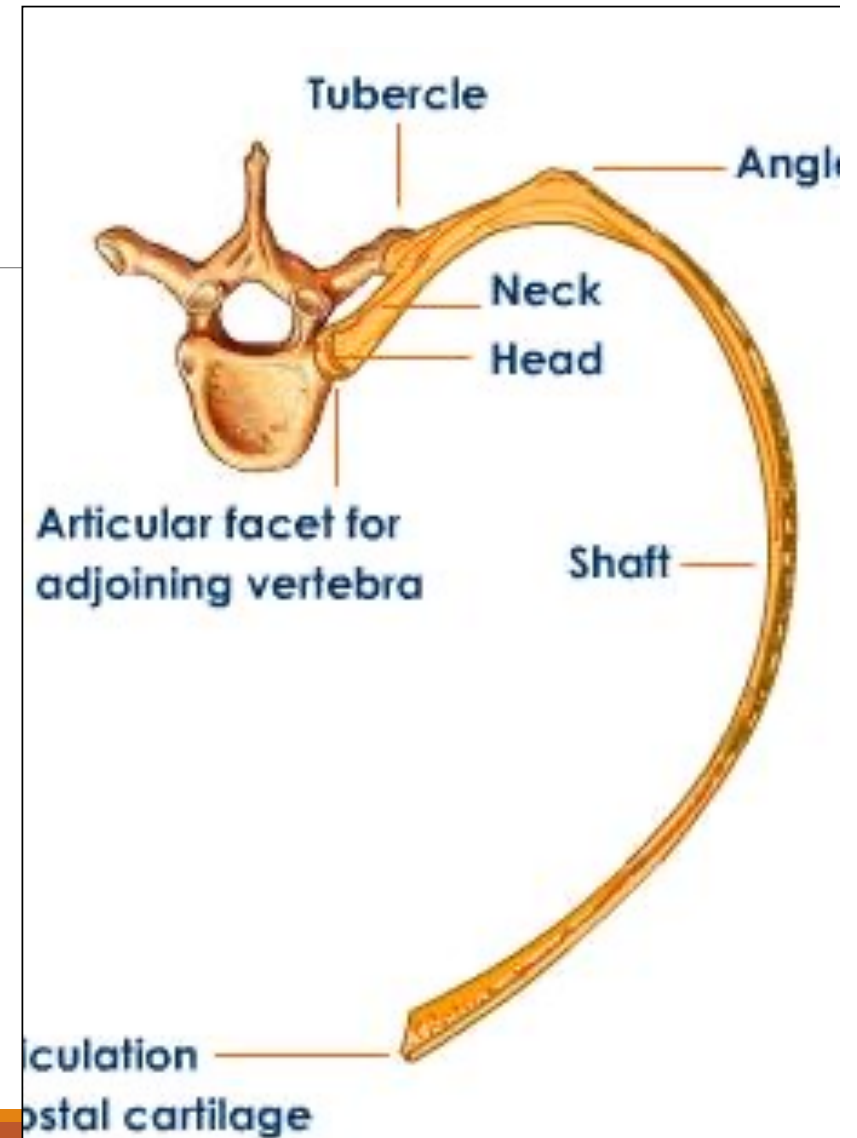


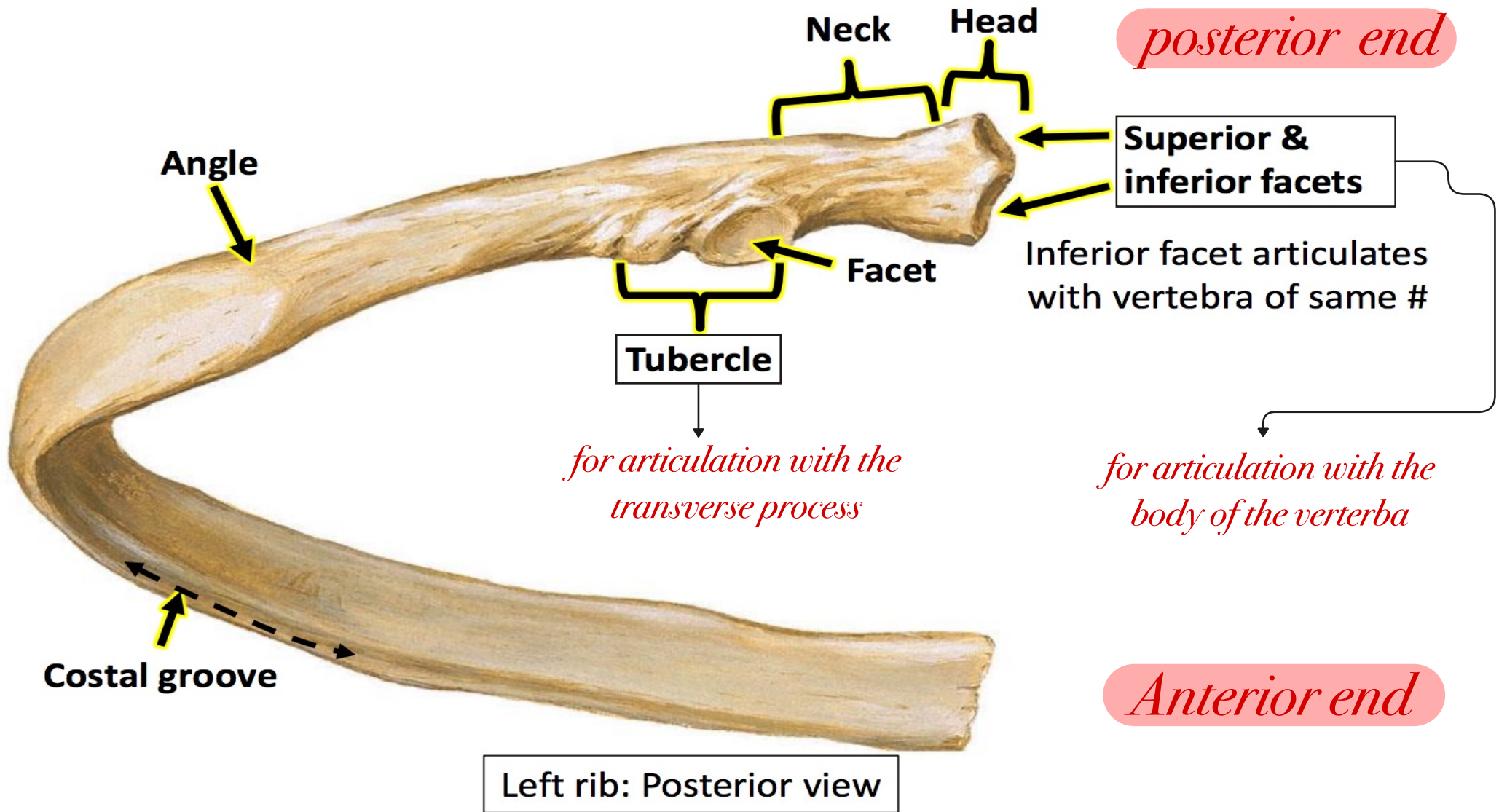
Bone marrow biopsy

Ribs

Typical Rib should has this landmarks

- Head
- Neck
- Tubercle
- Angle
- Shaft or body
- **Subcostal Groove** , contains
 - A-Intercostal **V**ein
 - B-Intercostal **A**rtery
 - C-Intercostal **N**erve



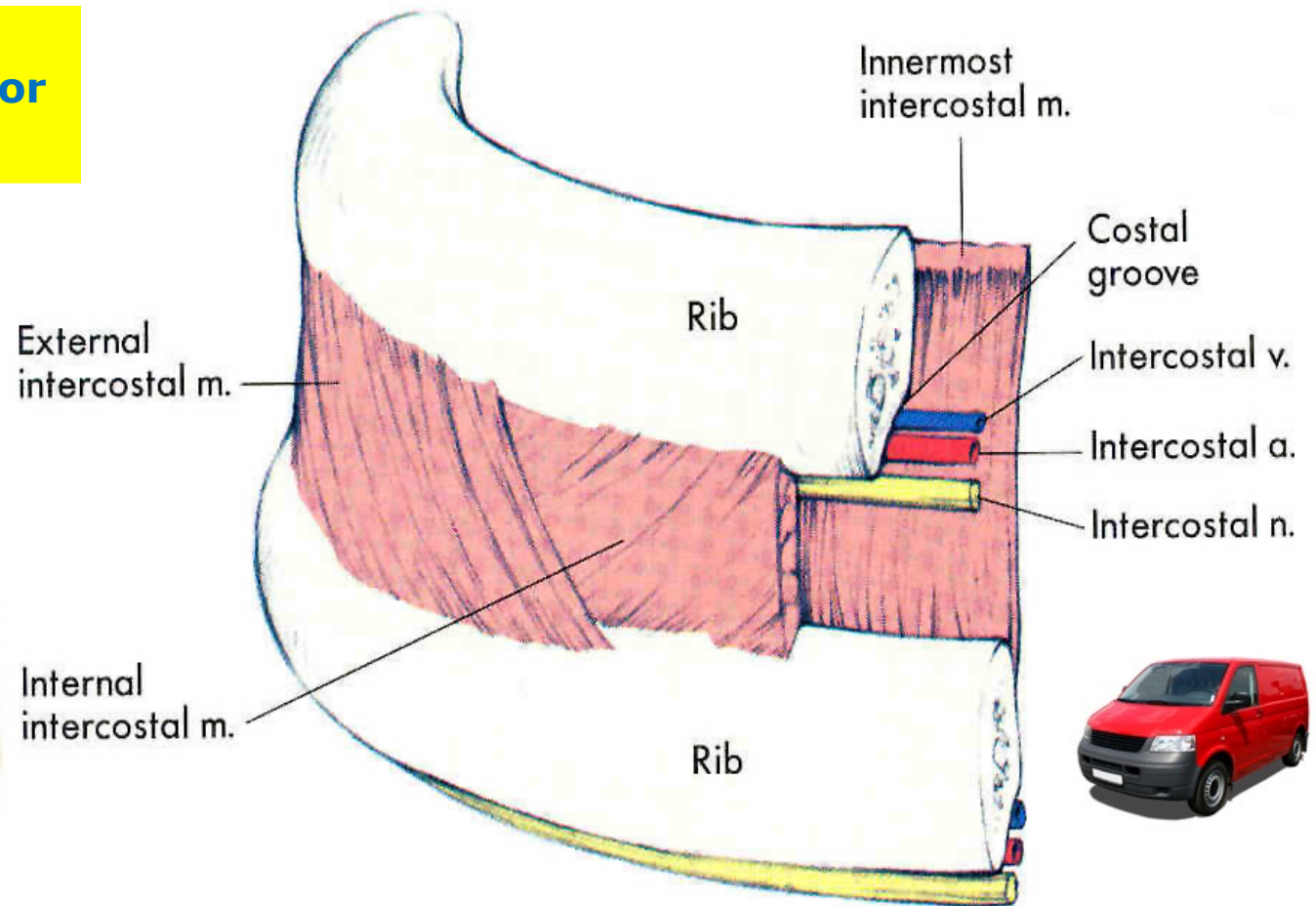
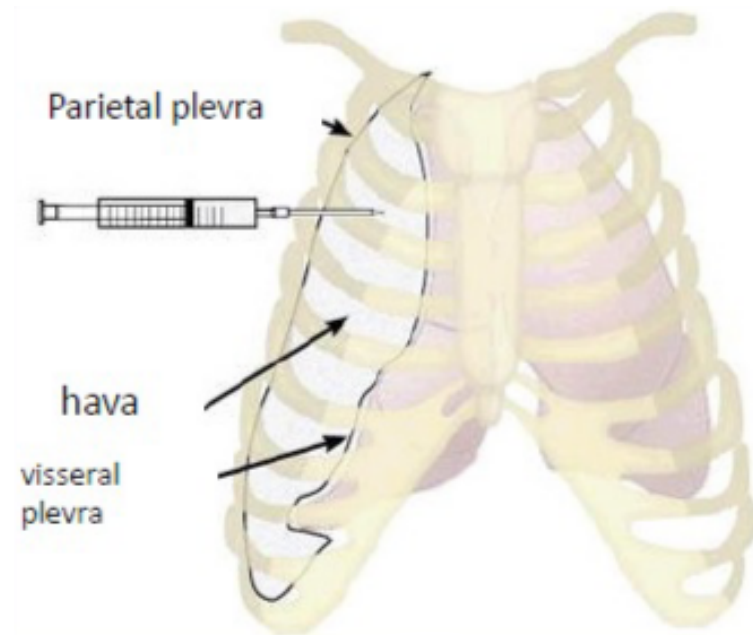


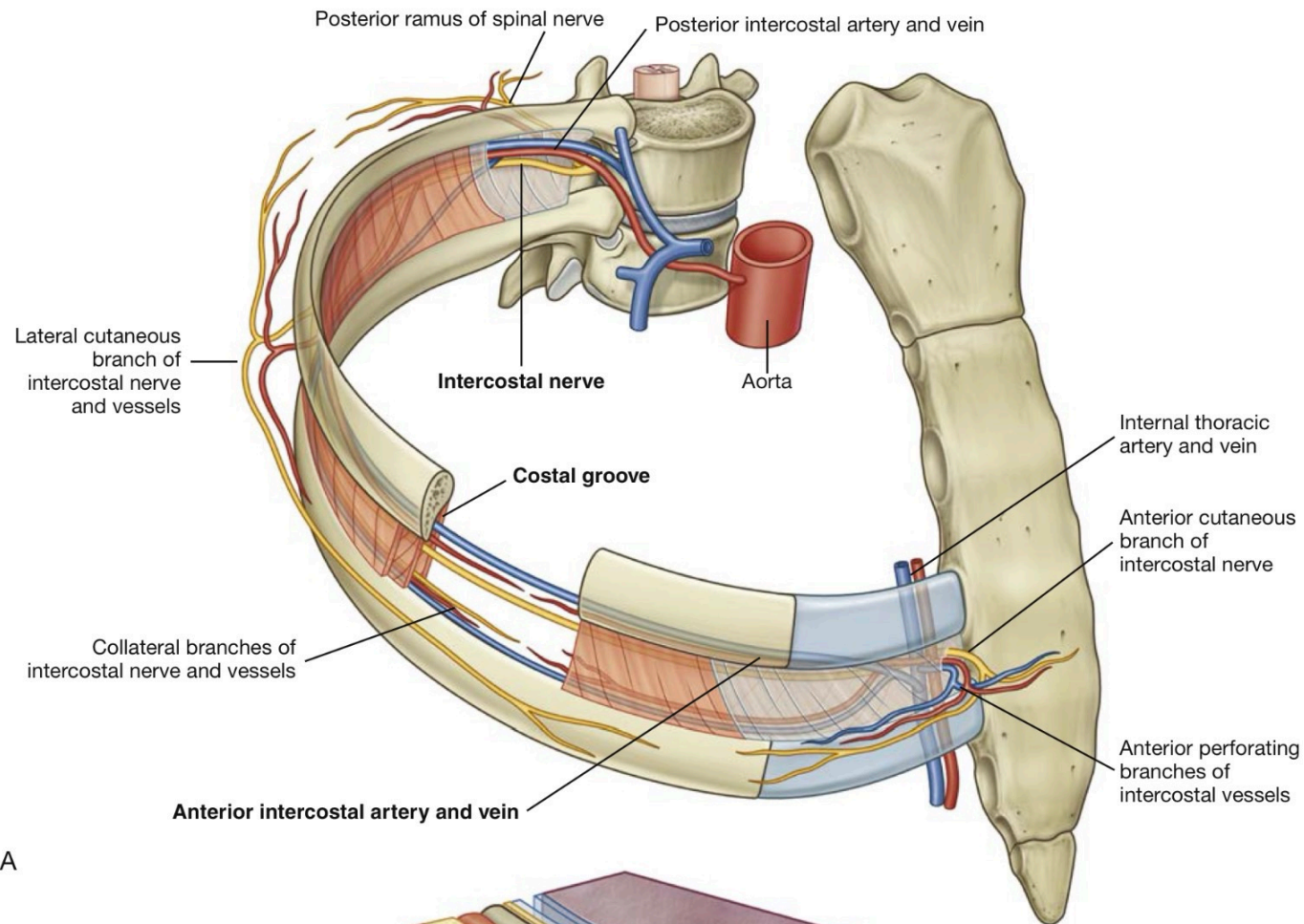
Subcostal Groove : contains; Intercostal vein Intercostal artery and Intercostal nerve

VAN

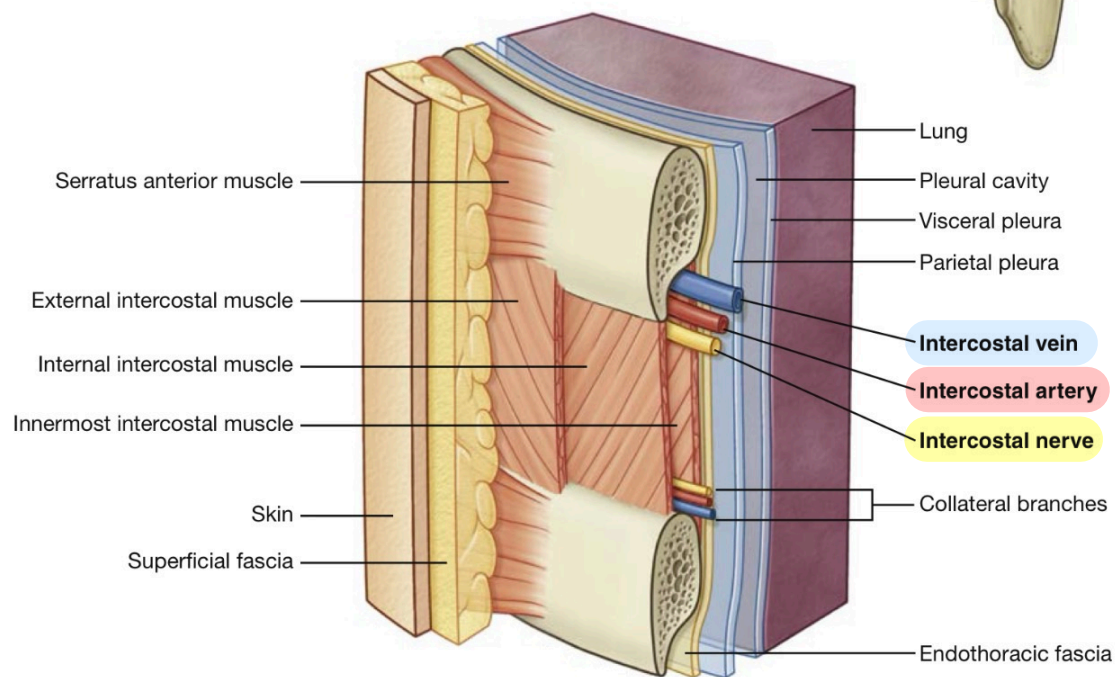
to avoid any injury to the subcostal groove contents

The needle should be inserted above the superior border of the rib



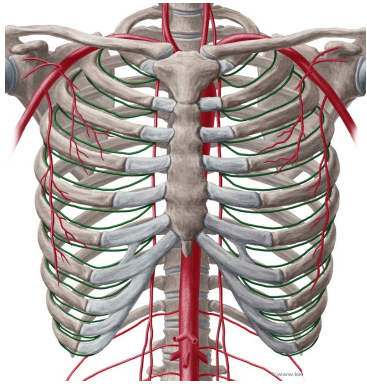


A



B

*There are 11 intercostal spaces posteriorly and 9 anteriorly.
(The 11th and 12th ribs do not reach the sternum and are referred to as floating ribs.)*



Arterial supply of thoracic wall

Anterior wall

9 on each side

2 in each space

Upper 6 from internal thoracic artery.

7,8,9 from musculophrenic artery

Posterior wall

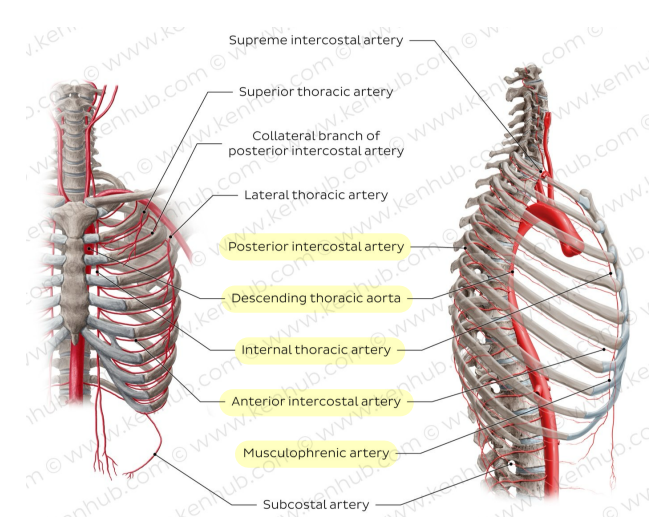
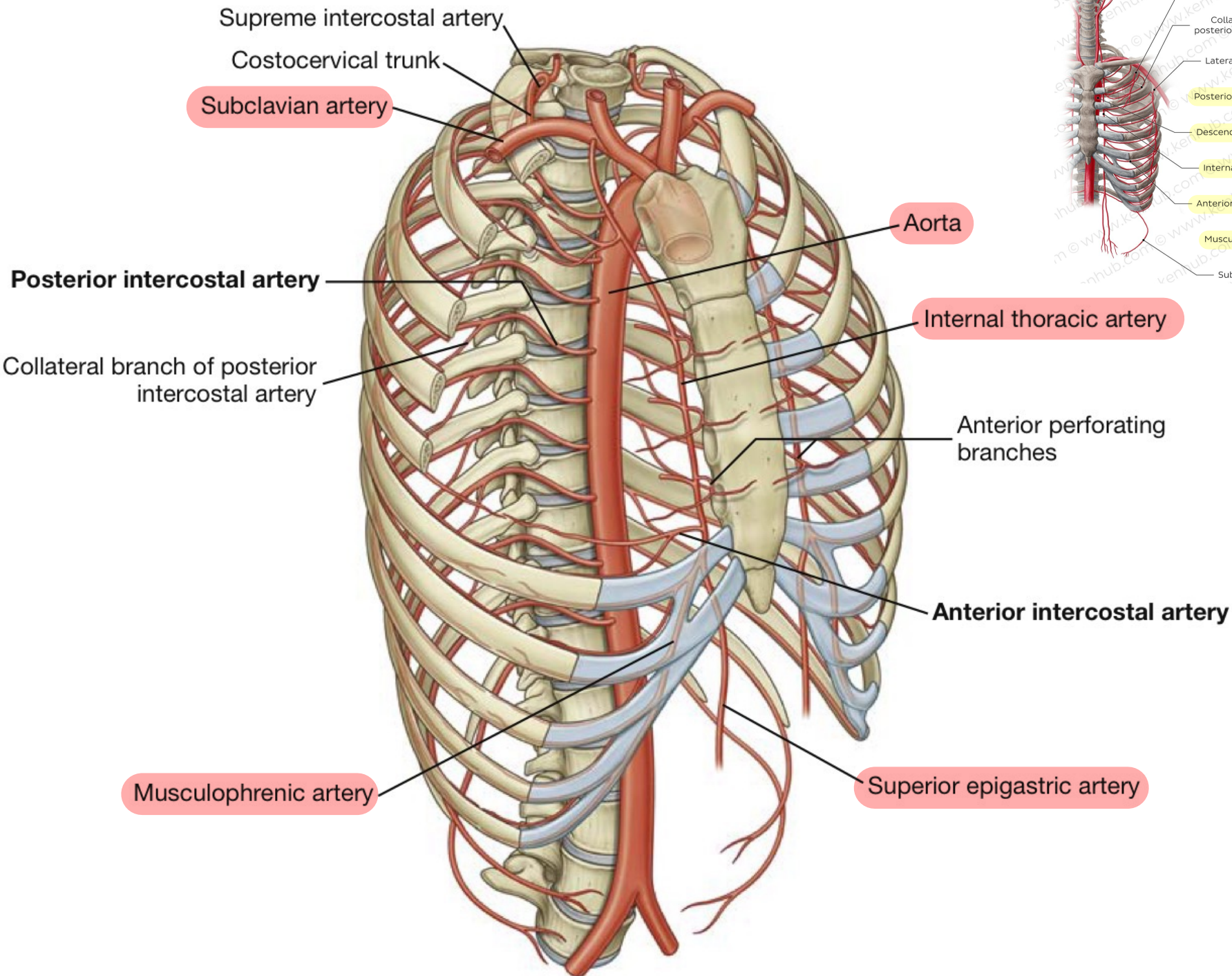
11 on each side

One in each space

1st, 2nd from superior intercostal artery.

3 -11 from descending thoracic aorta.

It is a division of the costocervical trunk, which is itself a branch of the subclavian artery



Internal Thoracic (Mammary) artery

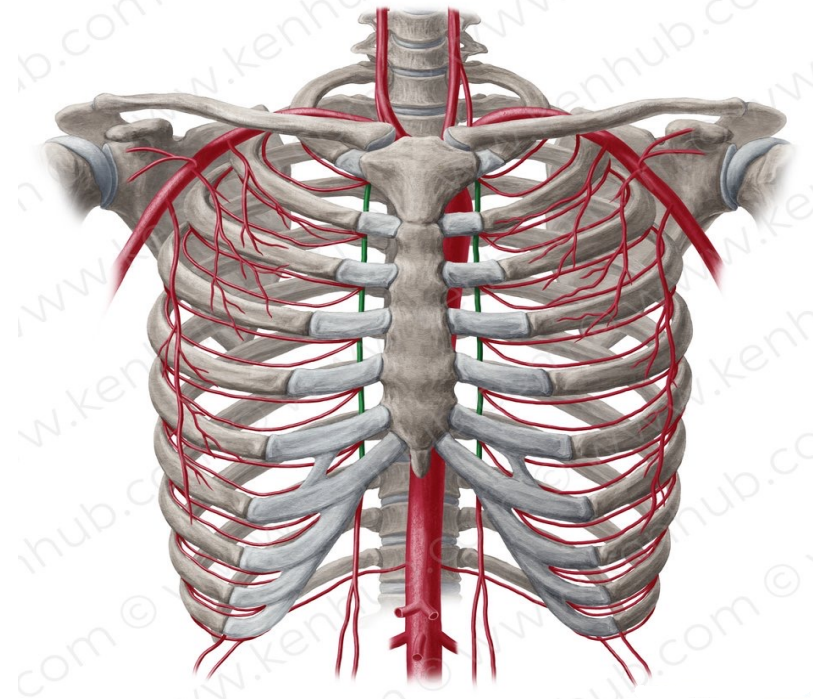
Origin: branch of 1st part of subclavian artery

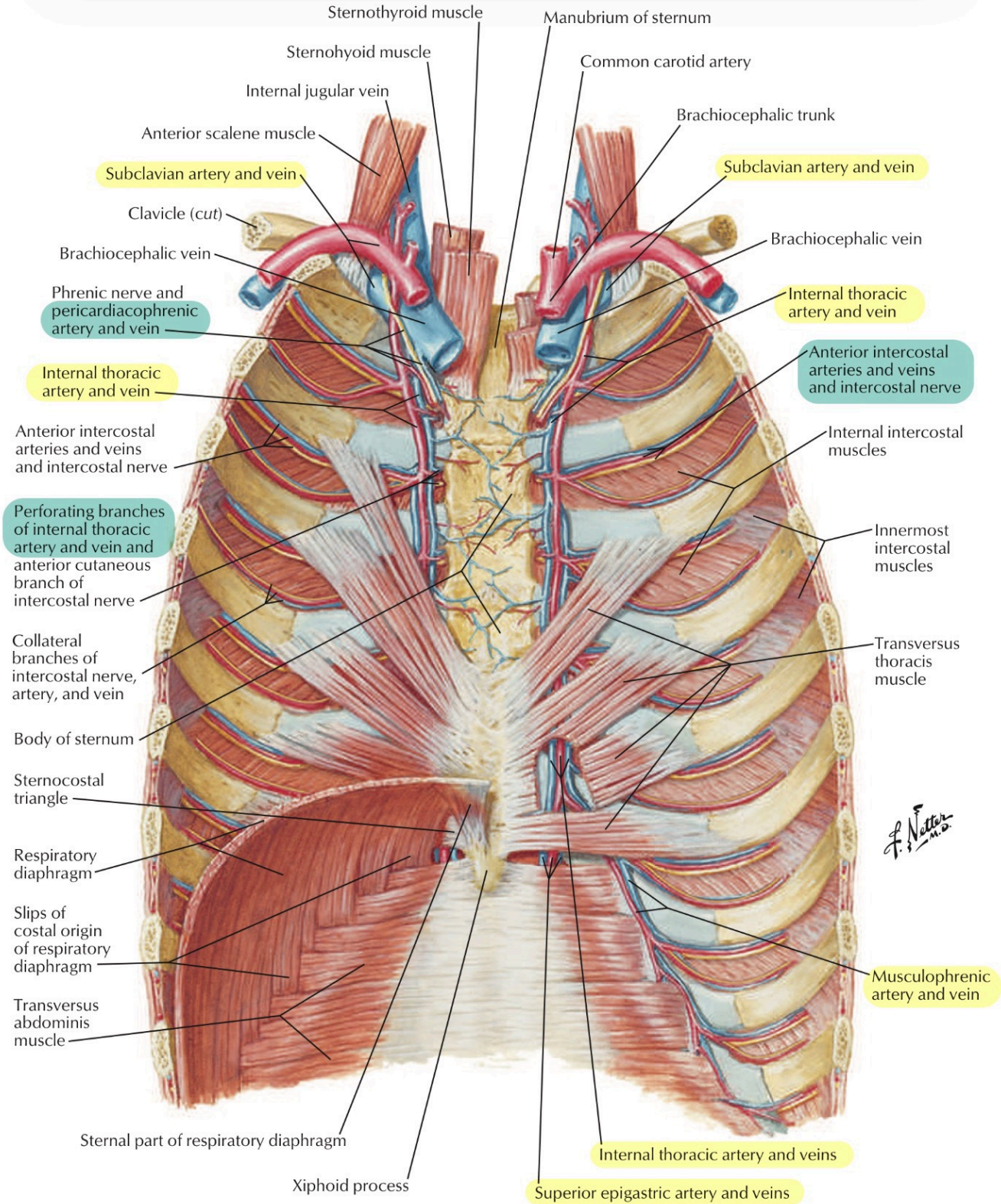
Course: it descends vertically behind upper 6 costal cartilages and intercostal spaces

Termination: opposite the 6th intercostal space into : superior epigastric A. and Musculophrenic A.

Branches :

- 1-Pericardio-phrenic
- 2- Pericardial branches
- 3- Anterior intercostal a to upper six spaces.
- 4- Perforating branches to skin , muscles and mammary gland.





Venous drainage of thoracic wall

Anterior wall

Anterior intercostal veins
Drain into Internal thoracic vein

Posterior wall

1st intercostal vein drains into
brachiocephalic vein

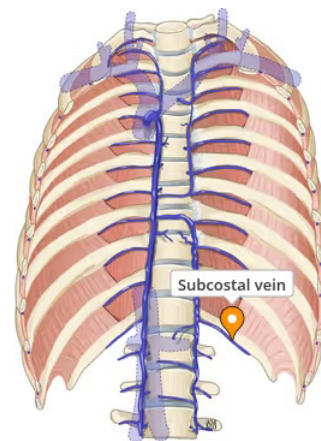
Right

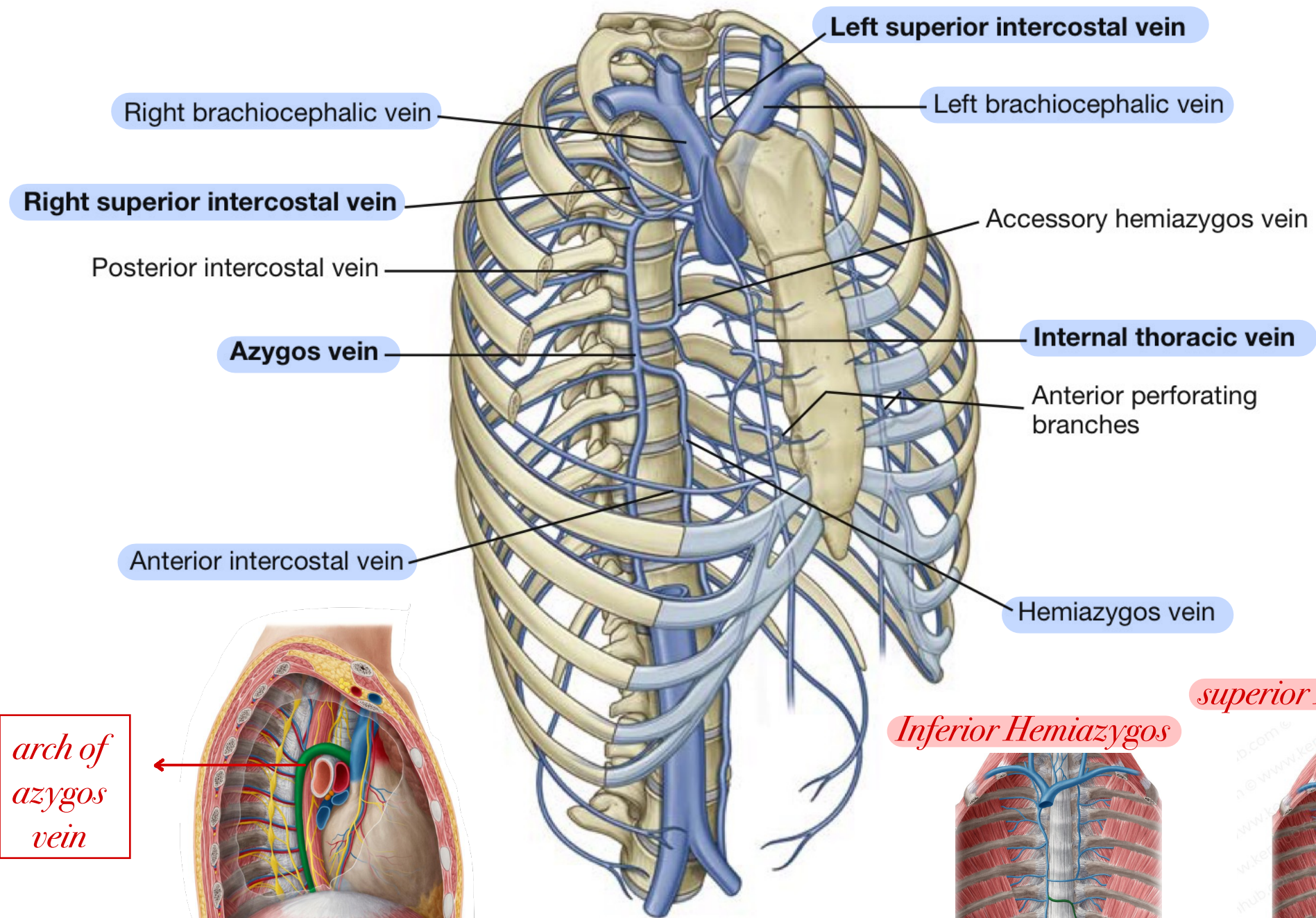
2nd, 3rd drain into right superior intercostal vein which drains into arch of azygos.
4th -11th and subcostal veins drain into azygos vein

Left

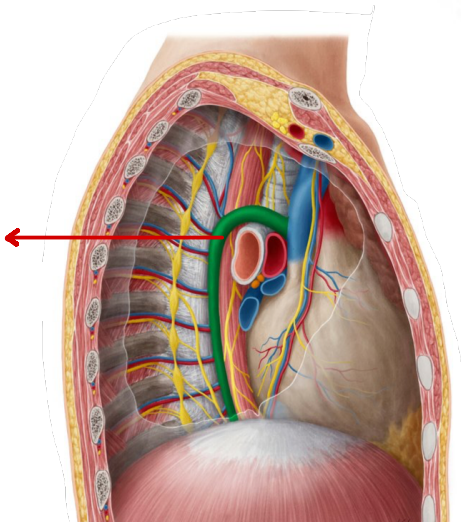
- - 2nd 3rd into left superior intercostal vein which drains into left brachiocephalic vein
- 4th -8th drain into superior hemiazygos vein
- 9th -11th and subcostal veins drain into inferior hemiazygos vein

The posterior intercostal veins of the 2nd and 3rd (and occasionally 4th) intercostal spaces unite to form a trunk called the superior intercostal vein

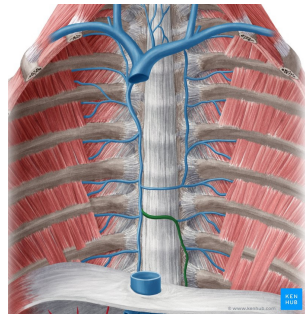




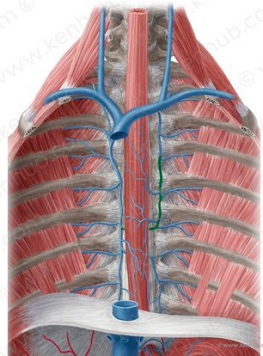
*arch of
azygos
vein*

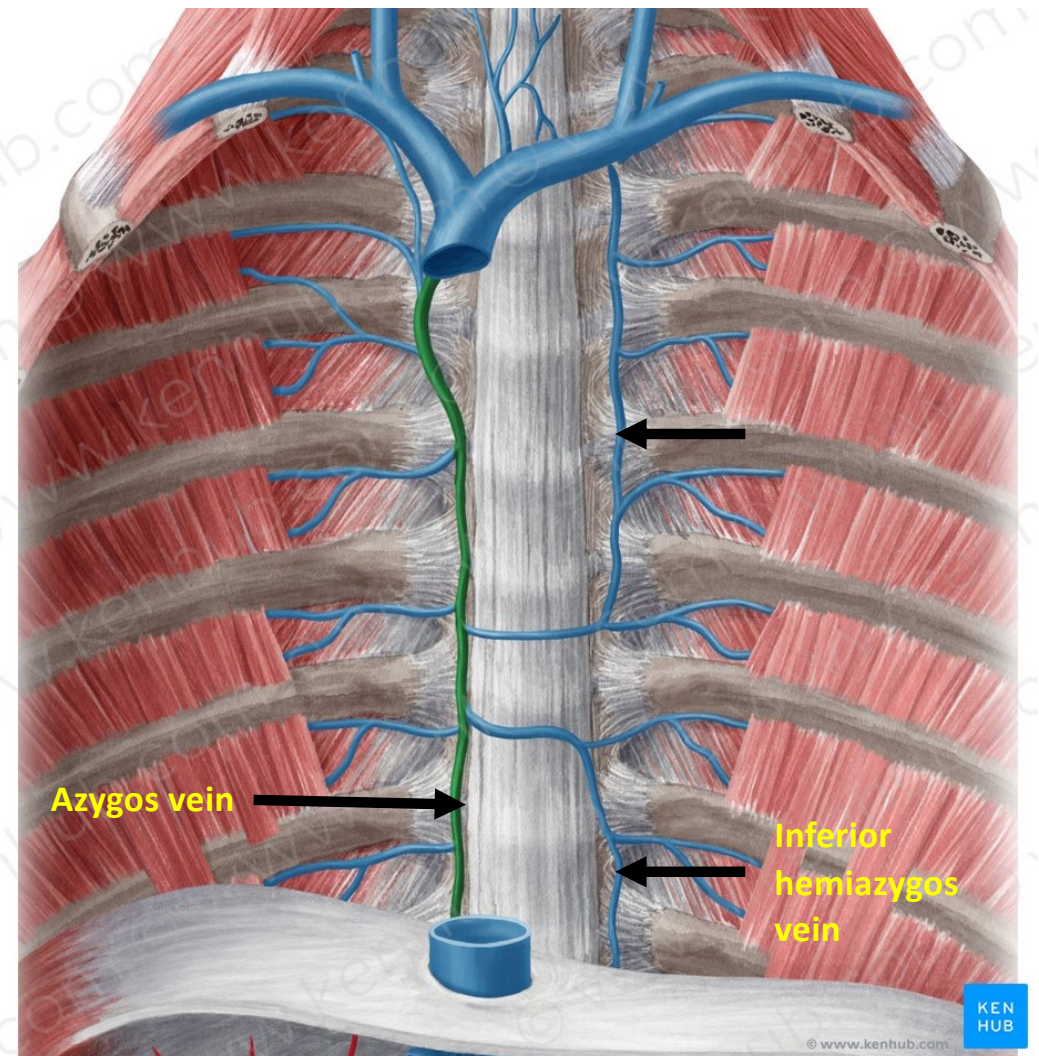
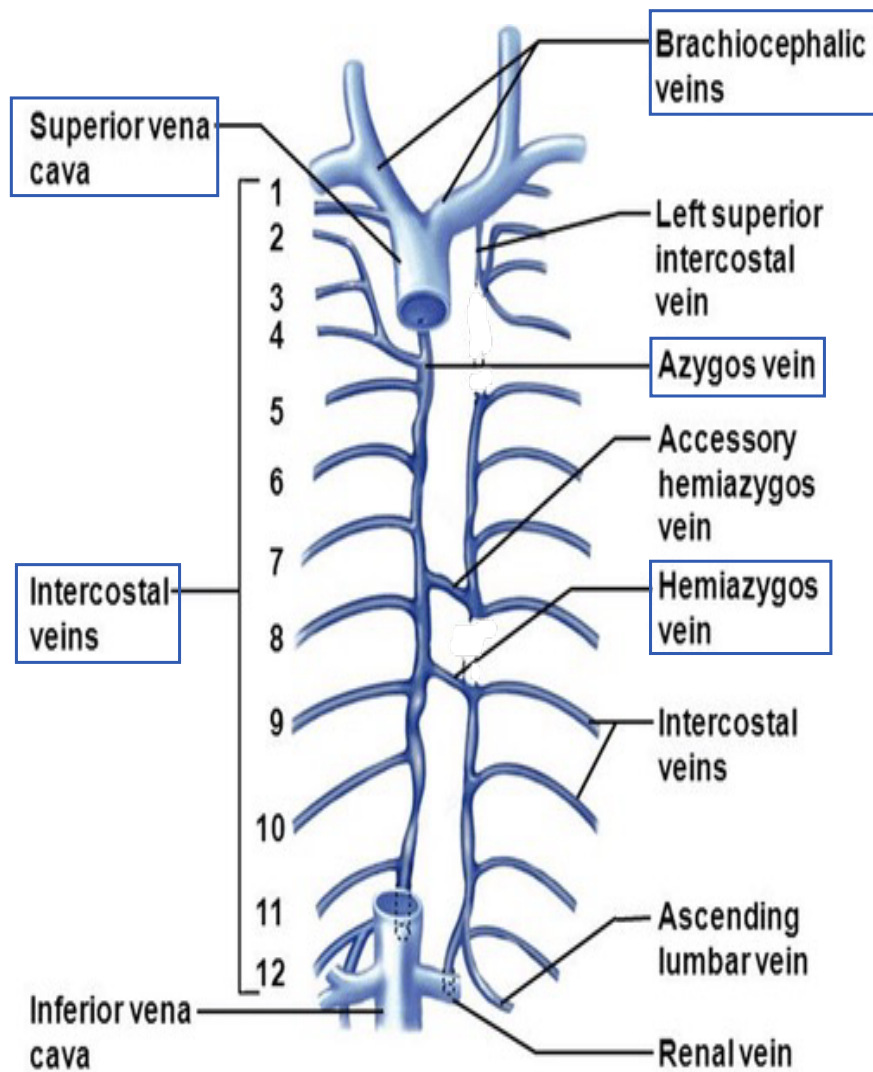


Inferior Hemiazygos



superior Hemiazygos





The spinal cord is enclosed by the dura mater, which constitutes the outermost meningeal layer, and is further protected anteriorly by the vertebral body. Between the dura mater and the vertebral body, within the vertebral canal, lies the vertebral venous plexus.

Vertebral venous plexus

Is a valveless plexiform of veins

Location : epidural space between the wall of the vertebral canal and the dura mater

Tributaries from

- ✓ Spinal cord
- ✓ Vertebrae
- ✓ Vertebral veins
- ✓ Basilar plexus
- ✓ Occipital and sigmoid dural sinuses

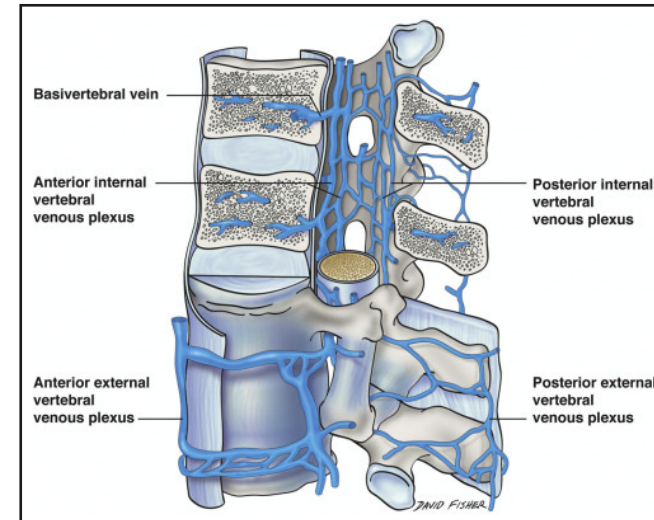
Communication

Anteriorly receive the basivertebral veins, which lie within the vertebral bodies.

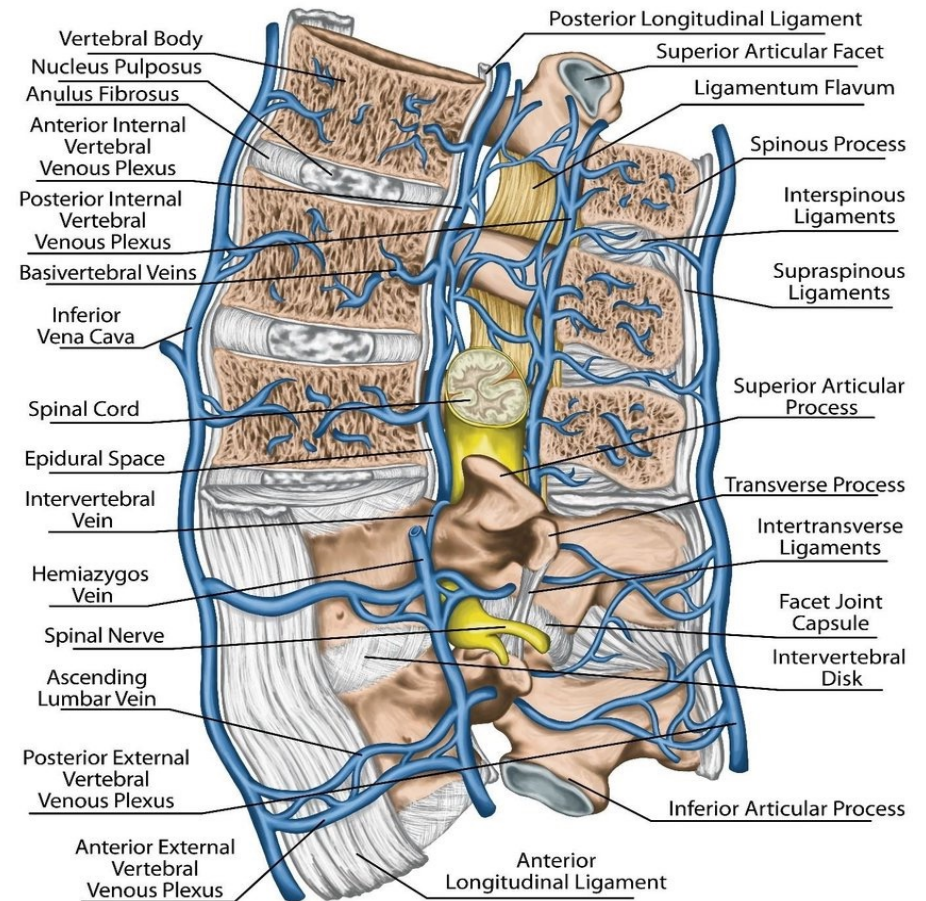
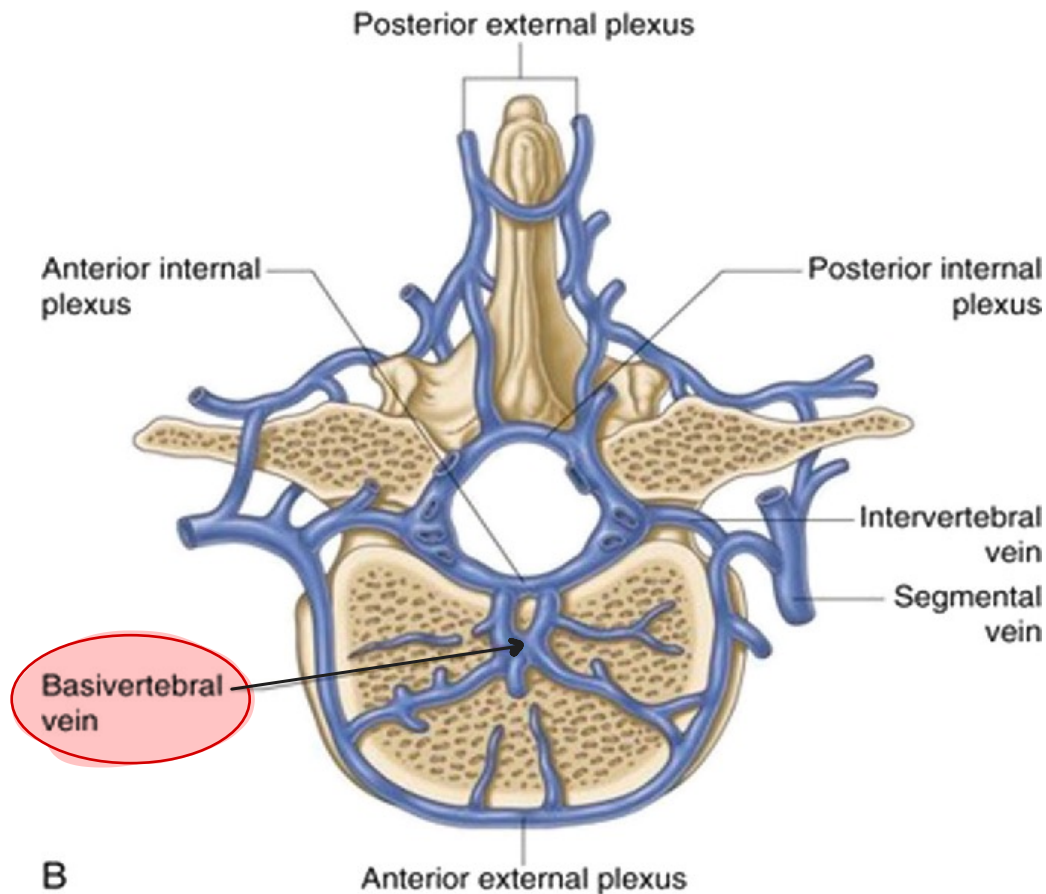
Superiorly with the cranial dural sinuses

Inferiorly with the pelvic veins

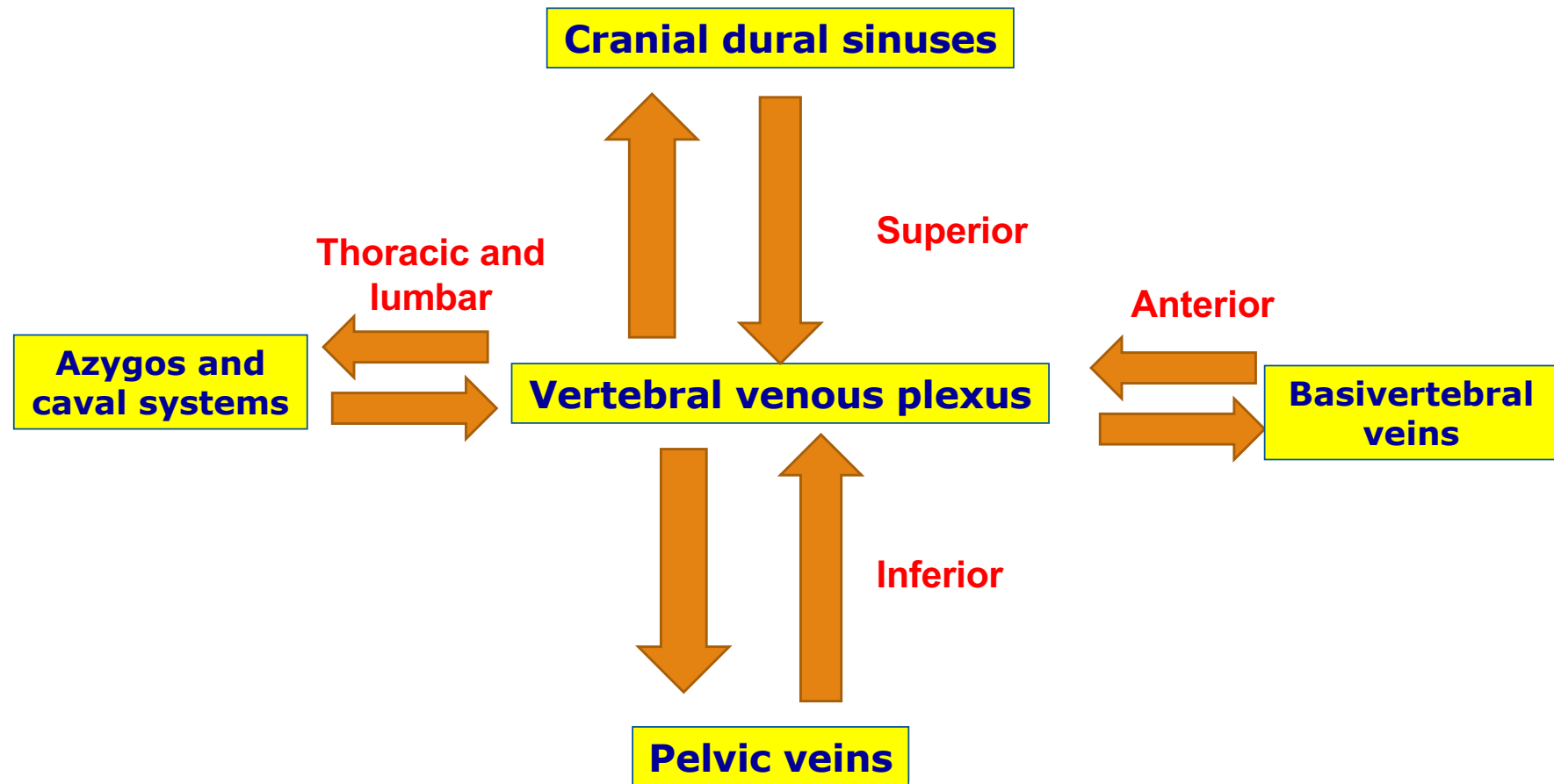
It communicates with both the azygos and caval systems in the thoracic and abdominal regions



It is the route of early metastasis of carcinoma from the lung, breast, and prostate gland to bones and the central nervous system (CNS).

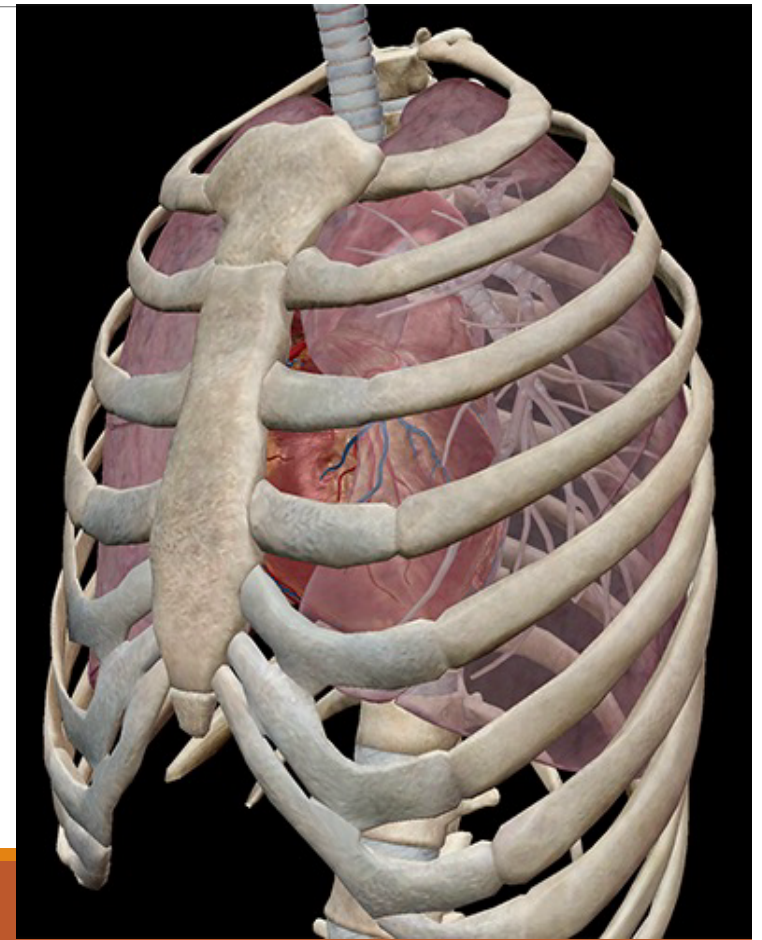


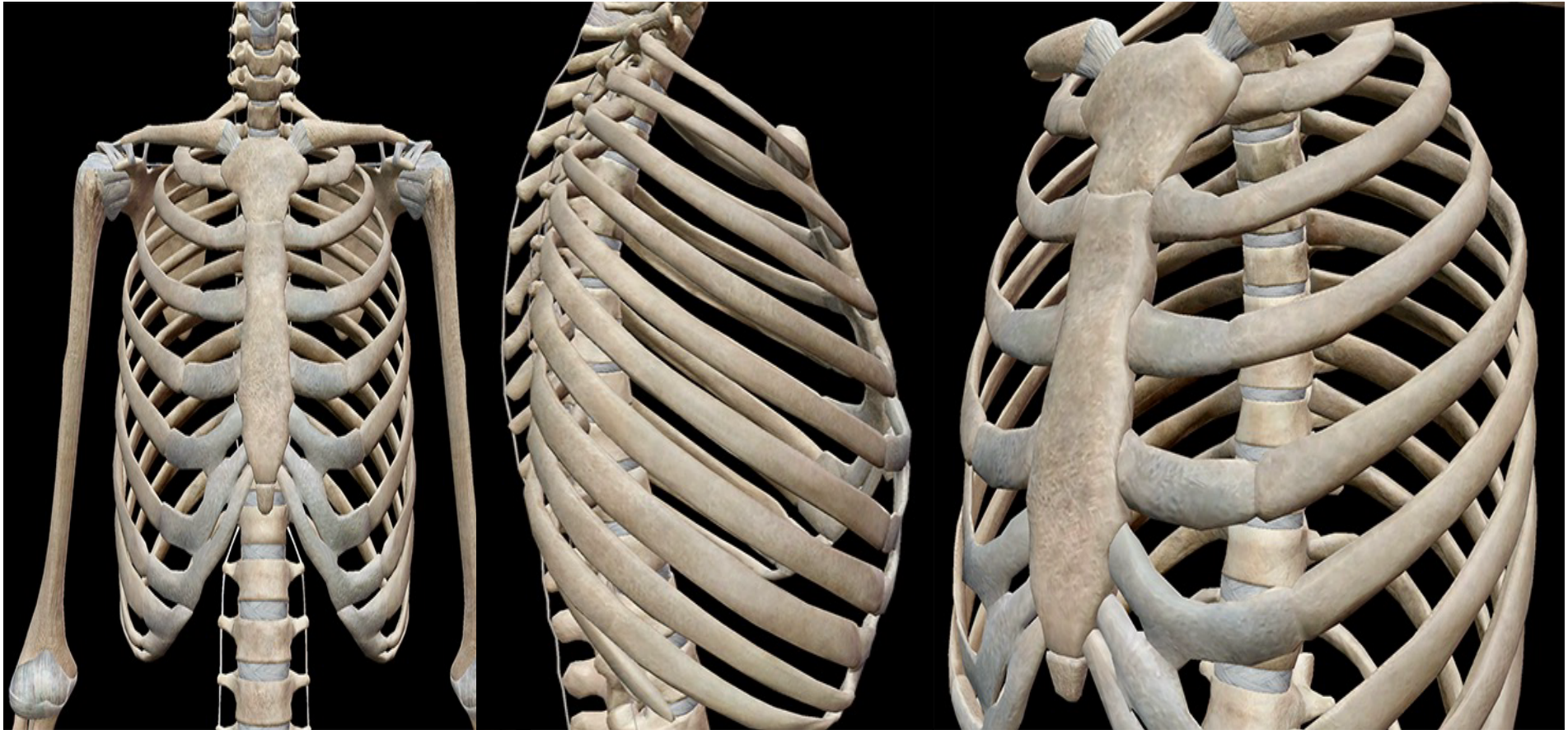
The most common site for metastasis of prostate cancer is the bone through the venous plexus



Thoracic cavity

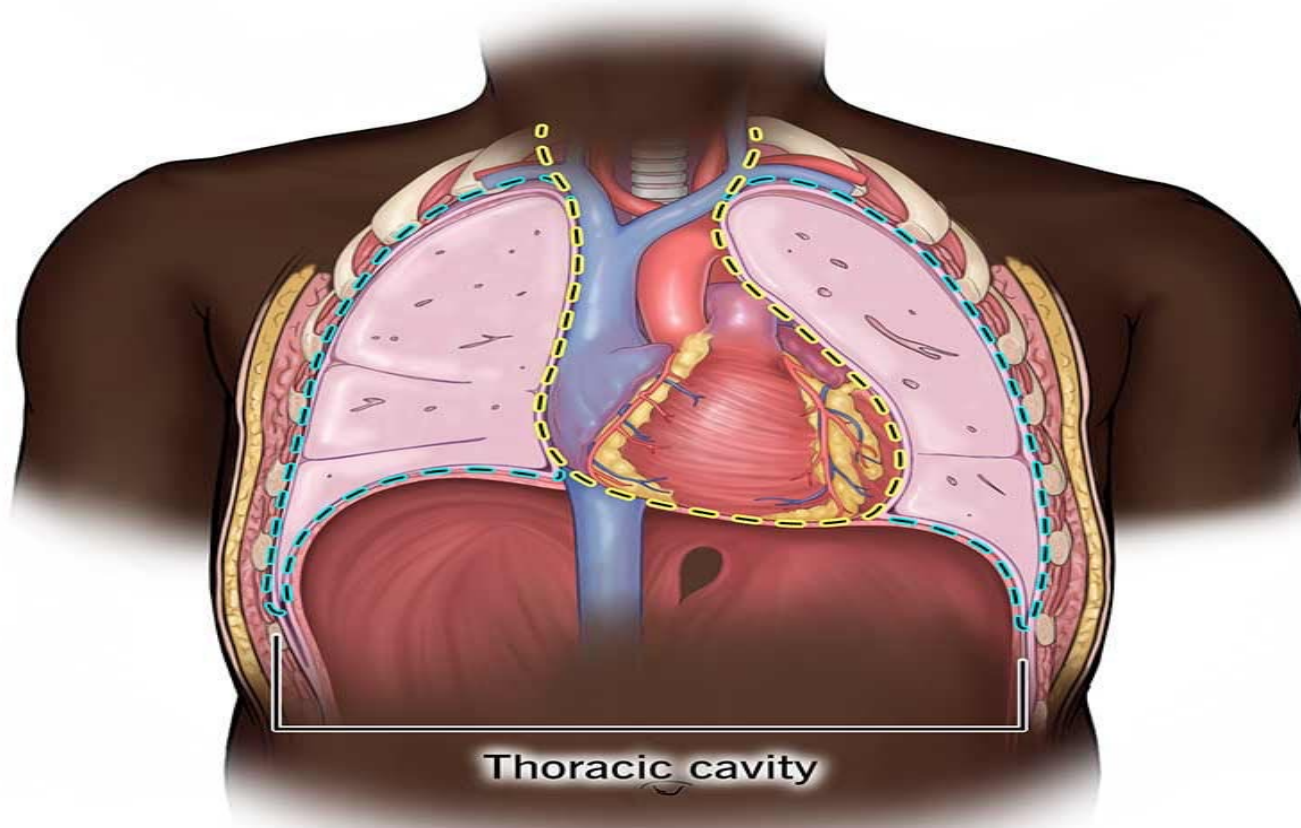
- ❑ It bounded by thoracic cage , diaphragm.
- ❑ It extends upward into the root of the neck
About one finger breadth above the clavicle
on each side
- ❑ It contains two pleural cavities containing
lungs and mediastinum





Watch me  <https://youtu.be/FSbQHigjCG4?si=FXMjD3CmMd7V2GAn>

Mediastinum



 Mediastinum

 Pleural cavities

Mediastinum

It is the region between the two pleural cavities.

Boundaries :

sternum + ribs

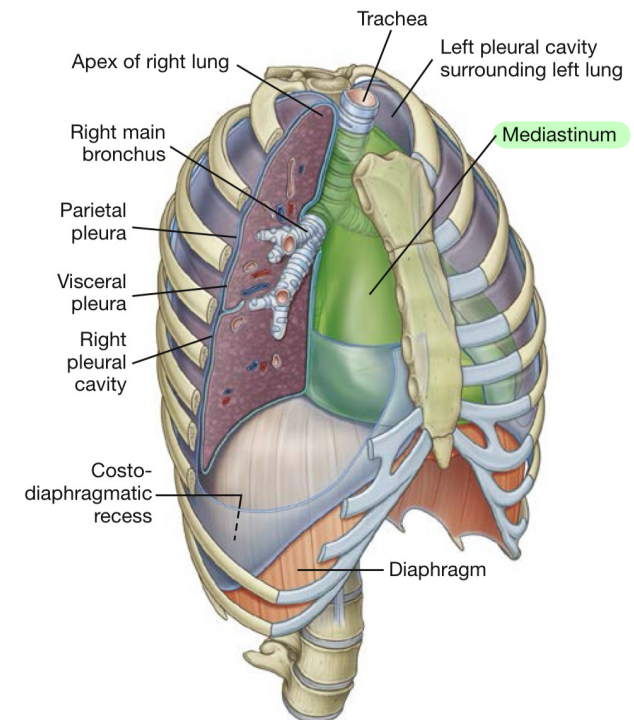
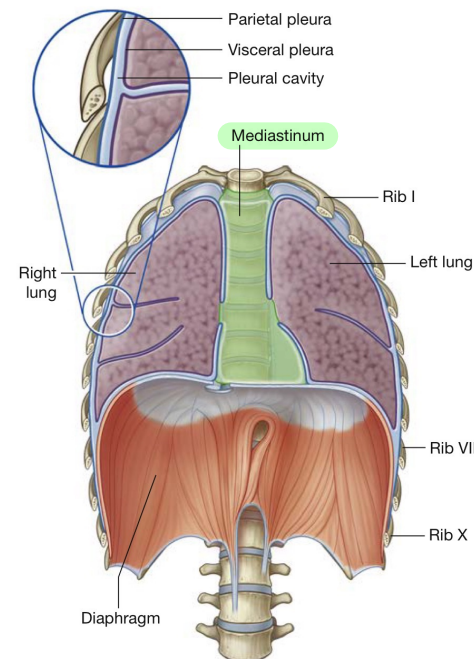
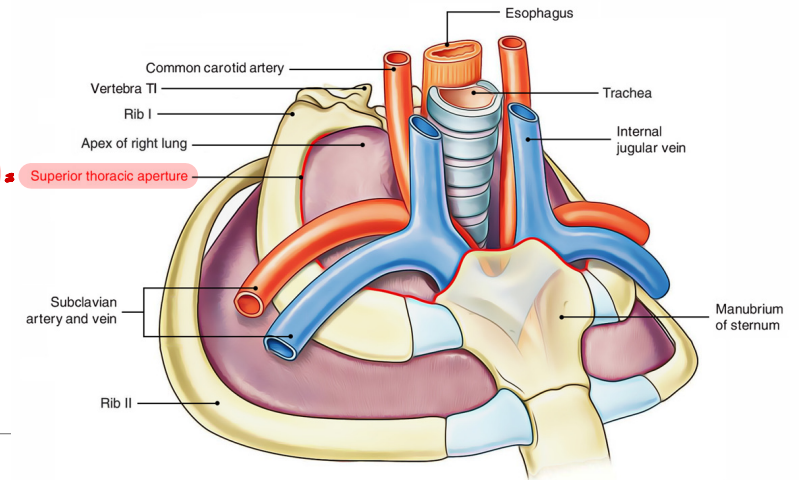
Superior: Thoracic Inlet

Inferior: Diaphragm

Anterior: Sternum

Posterior: Vertebral column

thoracic inlet

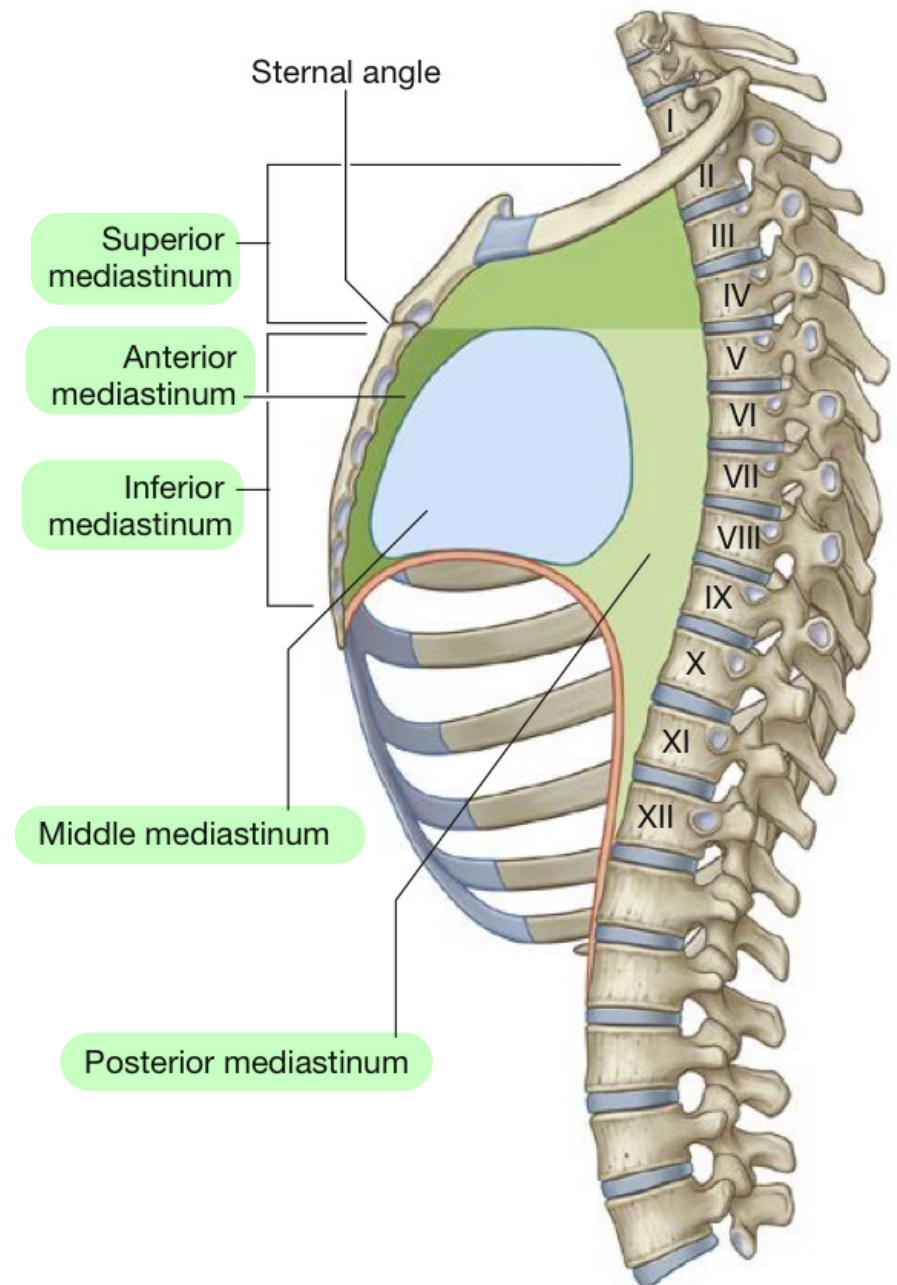
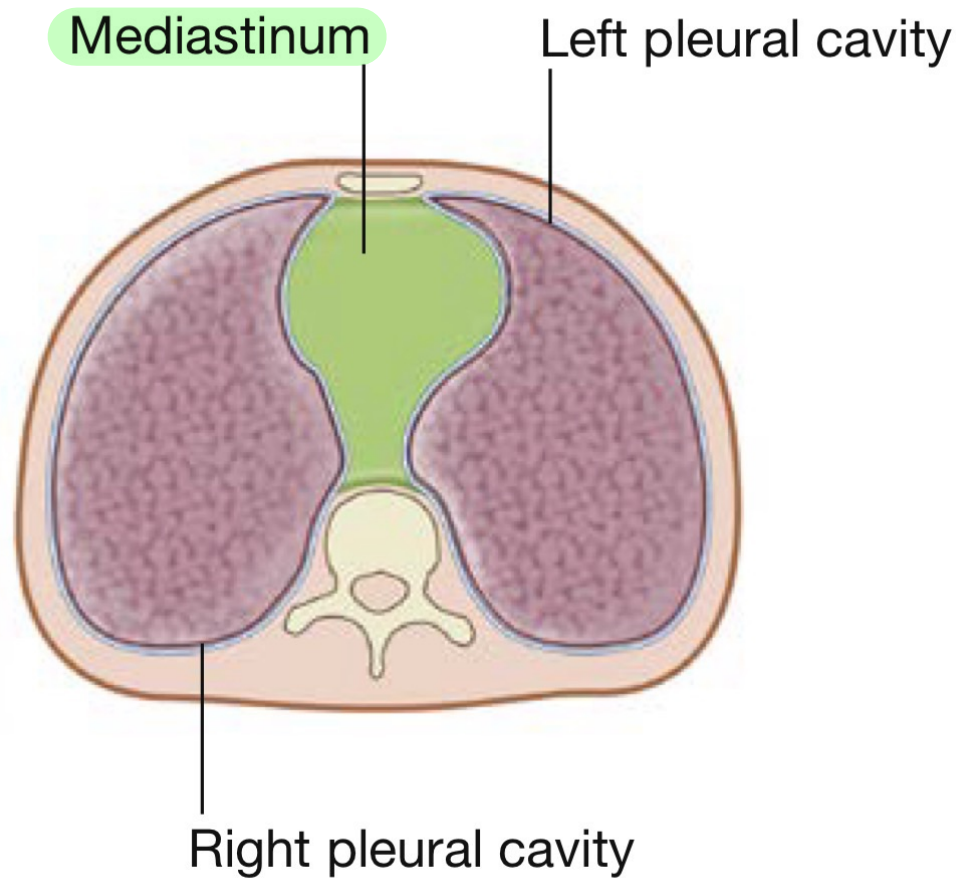


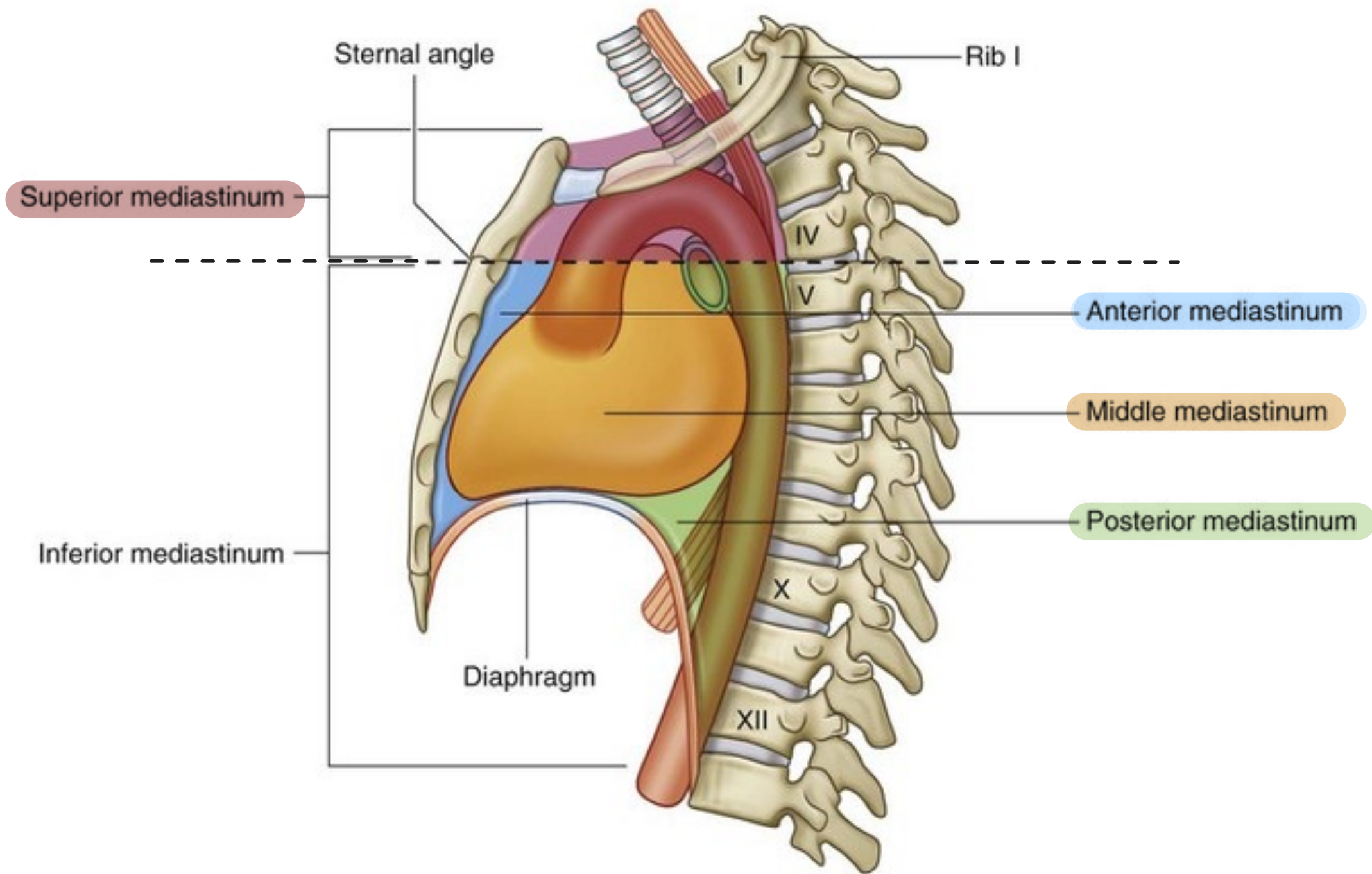
REED ONLY

N.B:

Anatomists refer to the superior thoracic aperture as the thoracic inlet because non-circulating substances (air and food) may enter the thorax only through this aperture.

When clinicians refer to the superior thoracic aperture as the thoracic outlet, they are emphasizing the arteries and T1 spinal nerves that emerge from the thorax through this aperture to enter the lower neck and upper limbs





Subdivisions

Division :

second costal cartilage

the disk between the 4th and 5th rib

● An imaginary line from sternal angle to lower border of 4th thoracic vertebra divide mediastinum into :

- ✓ **Superior mediastinum** above the line and inferior mediastinum below the line.
- ✓ **Inferior mediastinum** divided into ;
 - **Middle mediastinum** contains heart and pericardium
 - **Anterior mediastinum** in front middle mediastinum
 - **Posterior mediastinum** behind middle mediastinum

Mediastinum

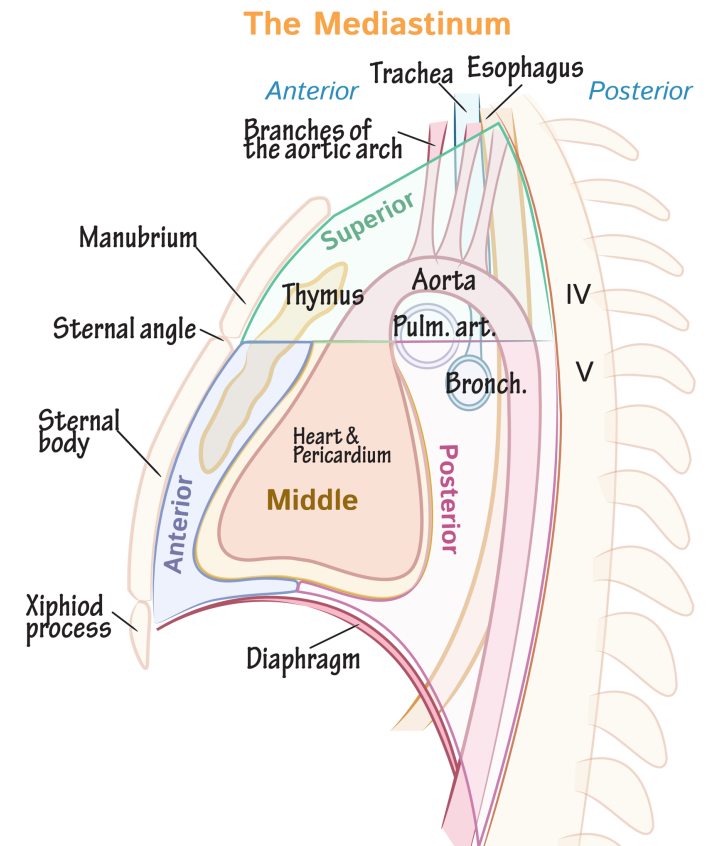
Superior

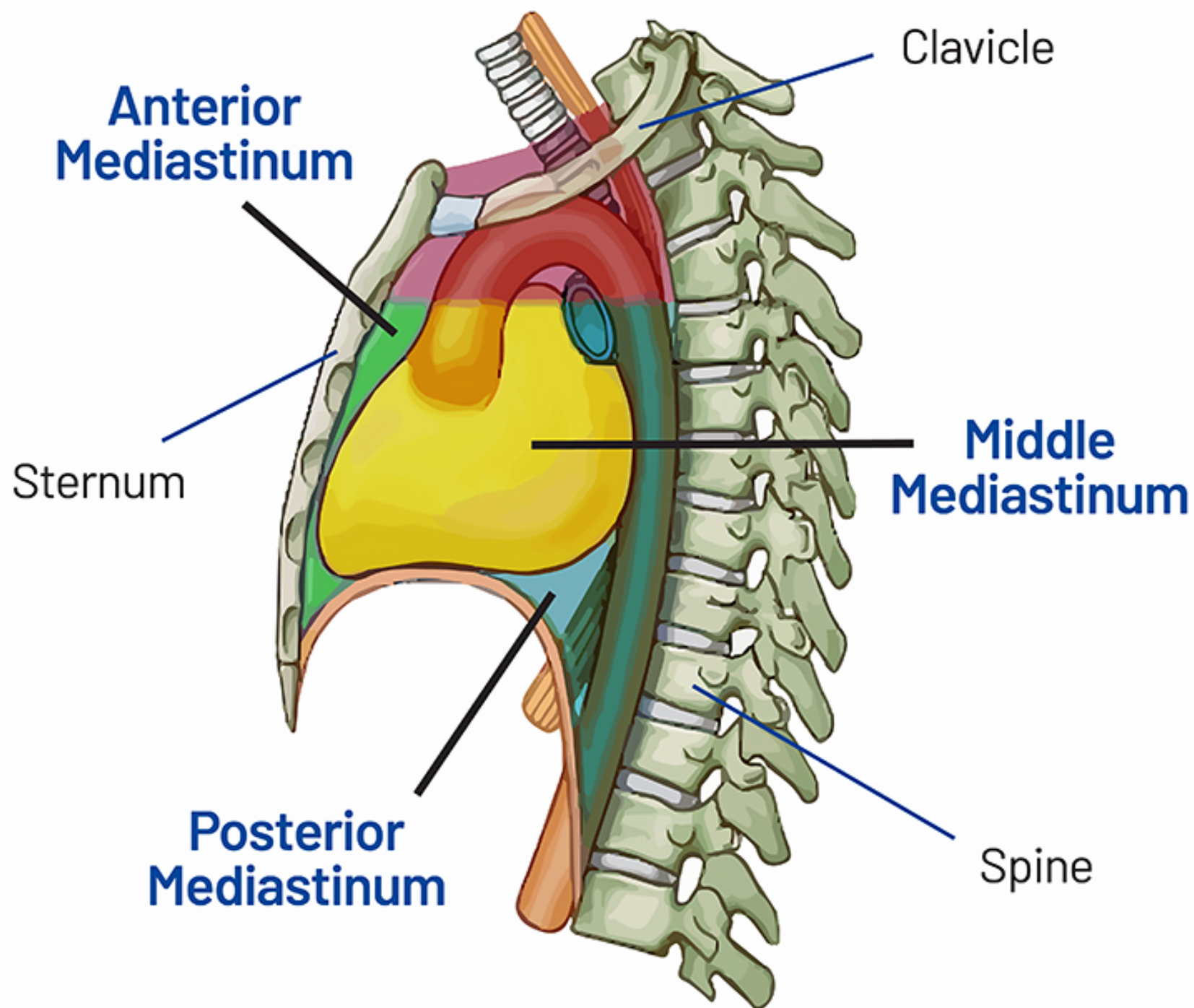
Inferior

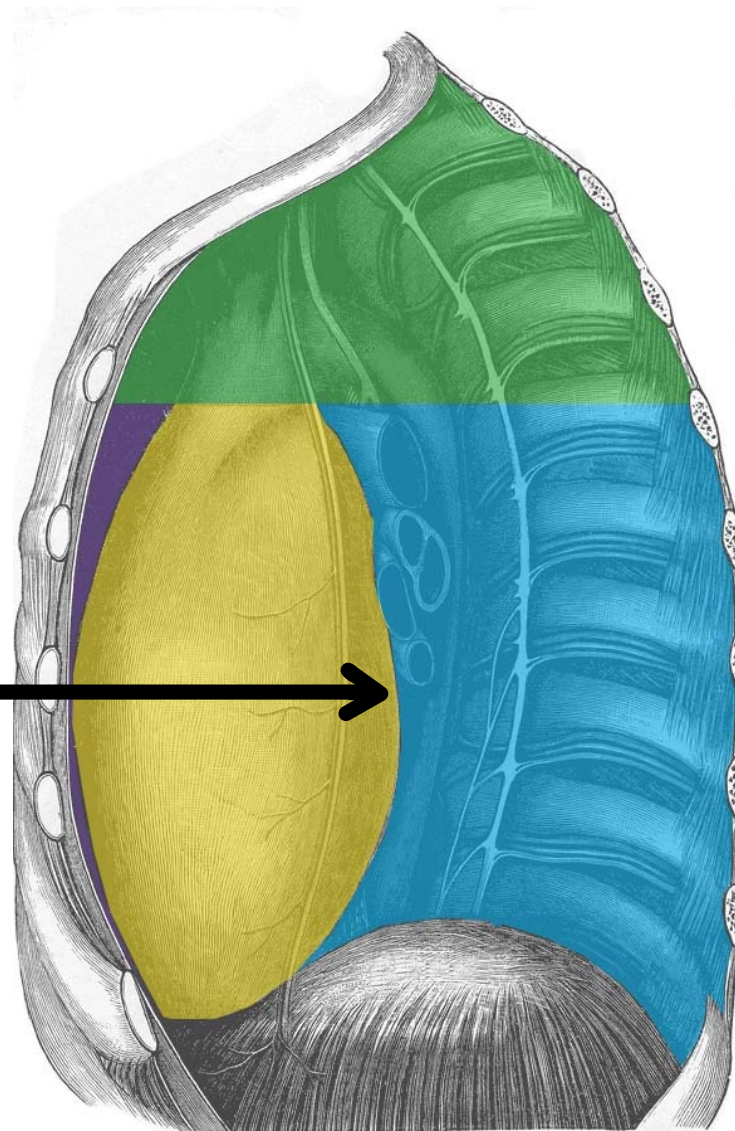
Anterior

Middle

Posterior







- Superior mediastinum
- Anterior mediastinum
- Middle mediastinum
- Posterior mediastinum

middle mediastinum 😊💧



The Superior mediastinum

Boundaries:

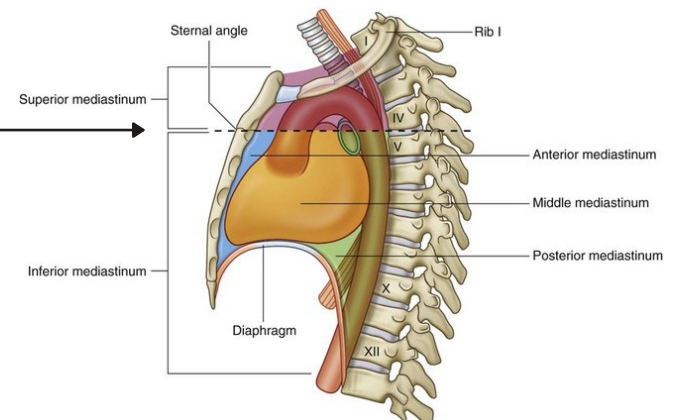
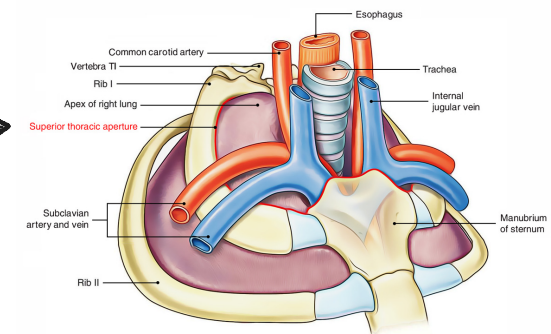
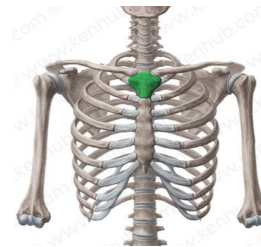
Anteriorly: manubrium sterni.

Posteriorly: upper four thoracic vertebrae.

Superiorly: thoracic inlet.

Inferiorly: imaginary plane.

On each side: mediastinal pleura.



Superior mediastinum content

*give right common carotid artery
and right subclavian*

2. Trachea

1. Esophagus *most posterior*

Brachiocephalic artery

Left common carotid artery

Right vagus nerve

Left recurrent laryngeal nerve

Left subclavian artery

Right brachiocephalic vein

Left brachiocephalic vein

Left vagus nerve

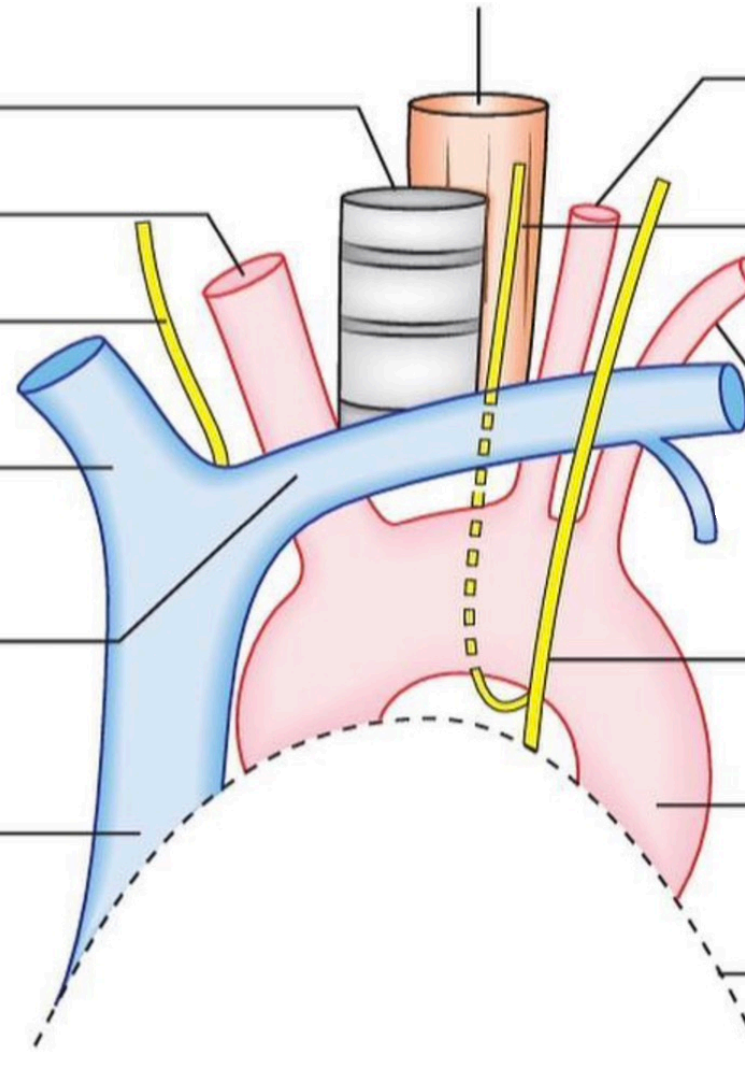
4. Superior vena cava

3. Arch of aorta

Pericardium

*By union of the internal jugular and subclavian veins
note: Not part of the superior mediastinum*

*The ascending aorta in the middle mediastinum
The descending aorta in the posterior mediastinum*

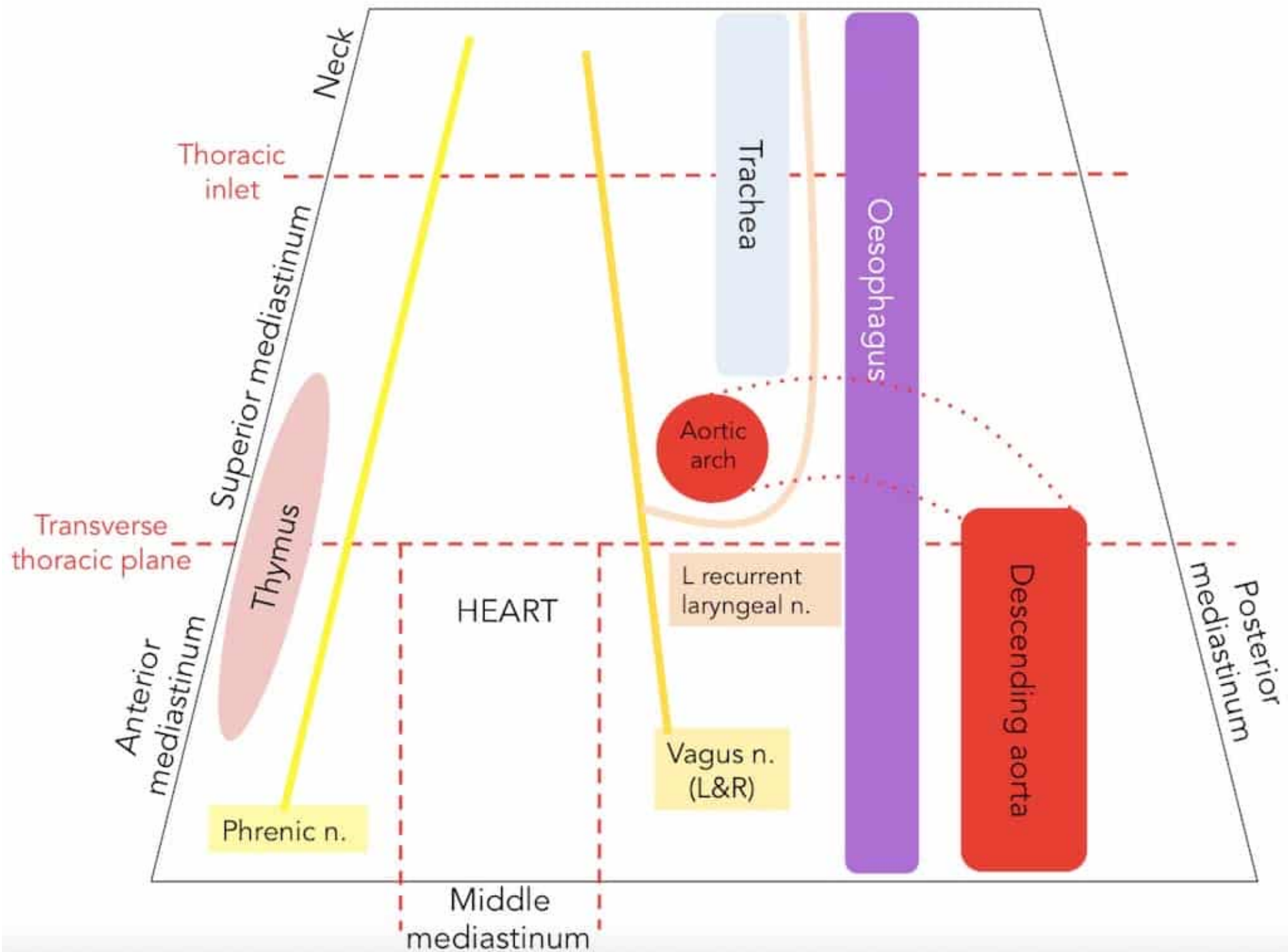


Contents of superior Mediastinum

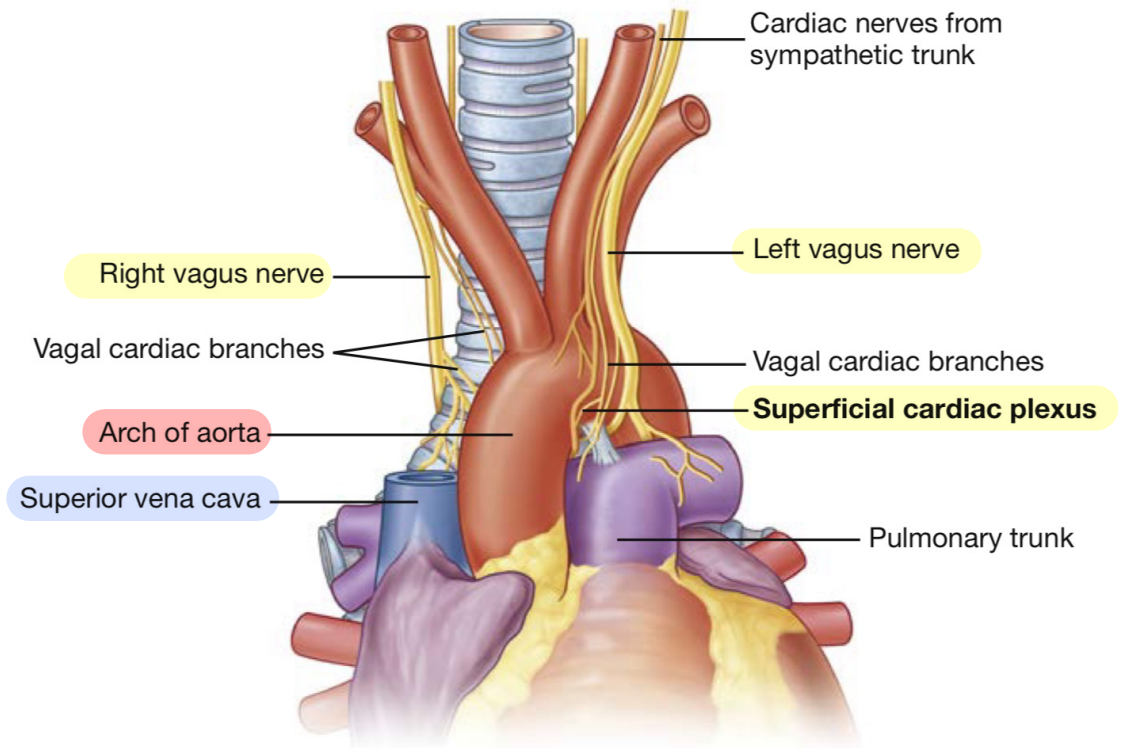
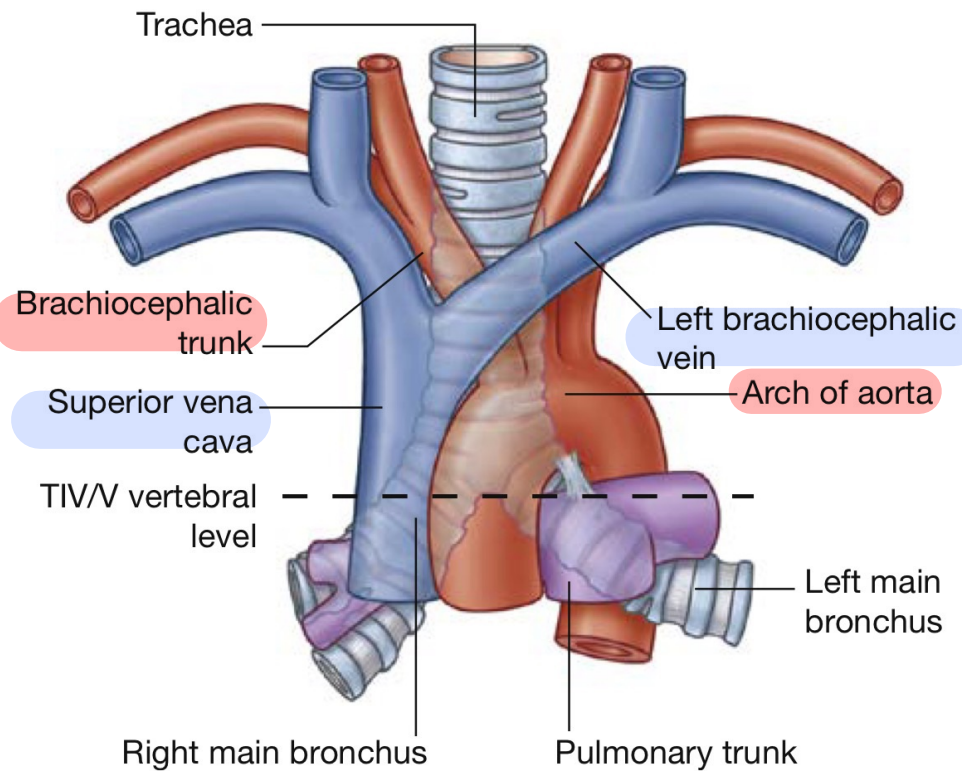
- 1- Arch of Aorta and its branches
- 2- Brachiocephalic veins and superior vena cava
- 3- Thoracic duct
- 4- Thymus
- 5- Phrenic and vagus nerves
- 6- Trachea
- 7- Oesophagus

Q: arrange these structure from posterior to anterior :

Oesophagus → trachea → arteries → vein



Superior Mediastinum - contents

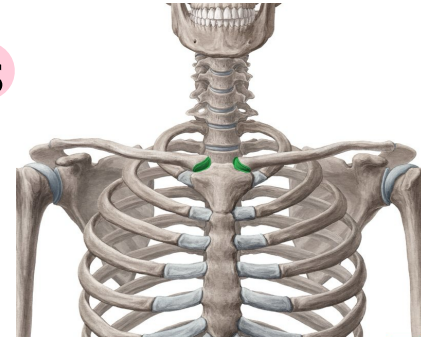


Brachiocephalic vein (Right and left)

Formation : By union internal jugular and subclavian veins

Beginning : Posterior to the sternoclavicular joint

Termination : 1st right costal cartilage



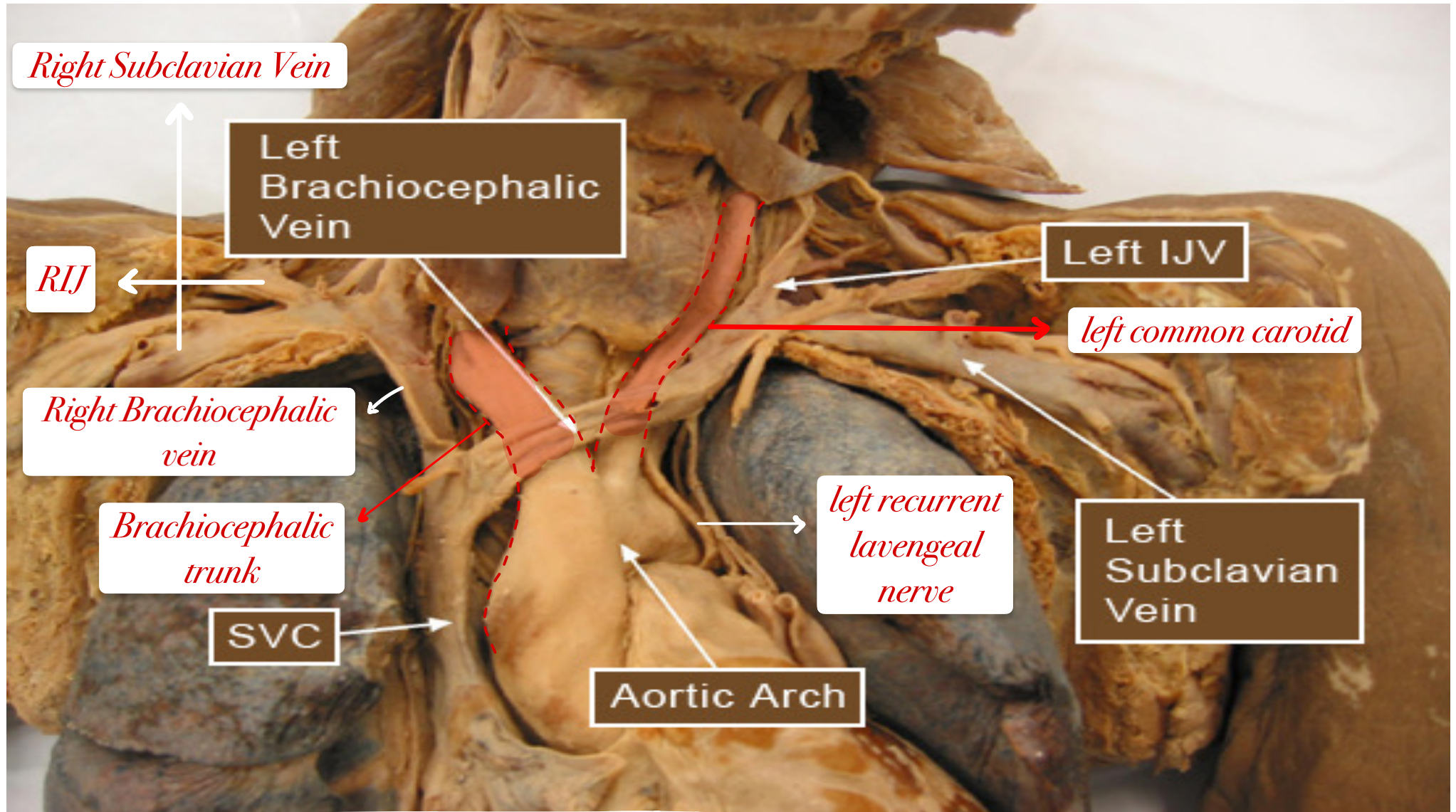
Both right and left Brachiocephalic veins joined together to form superior venae cava

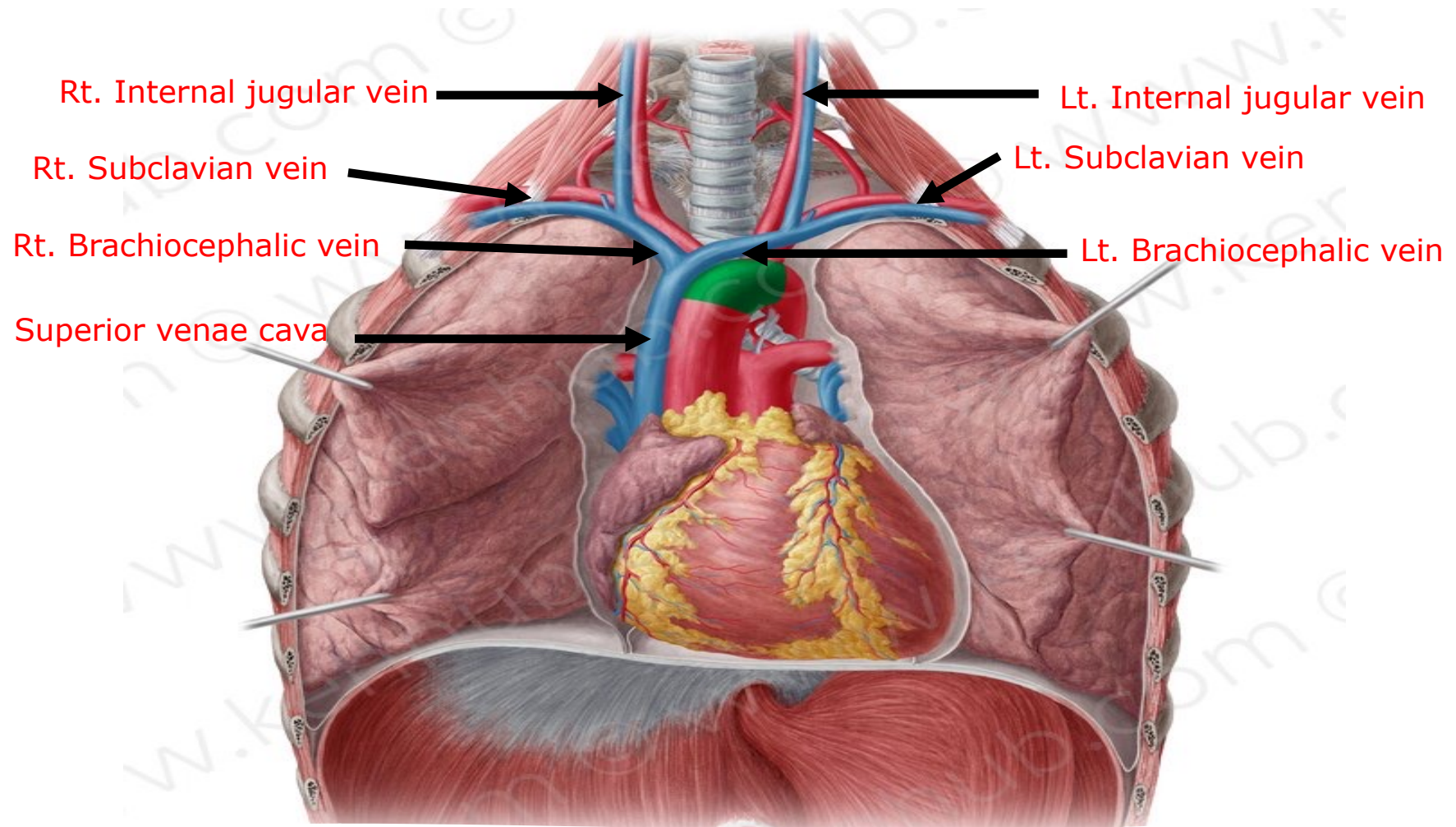
N.B : The left Brachiocephalic vein is longer than the right

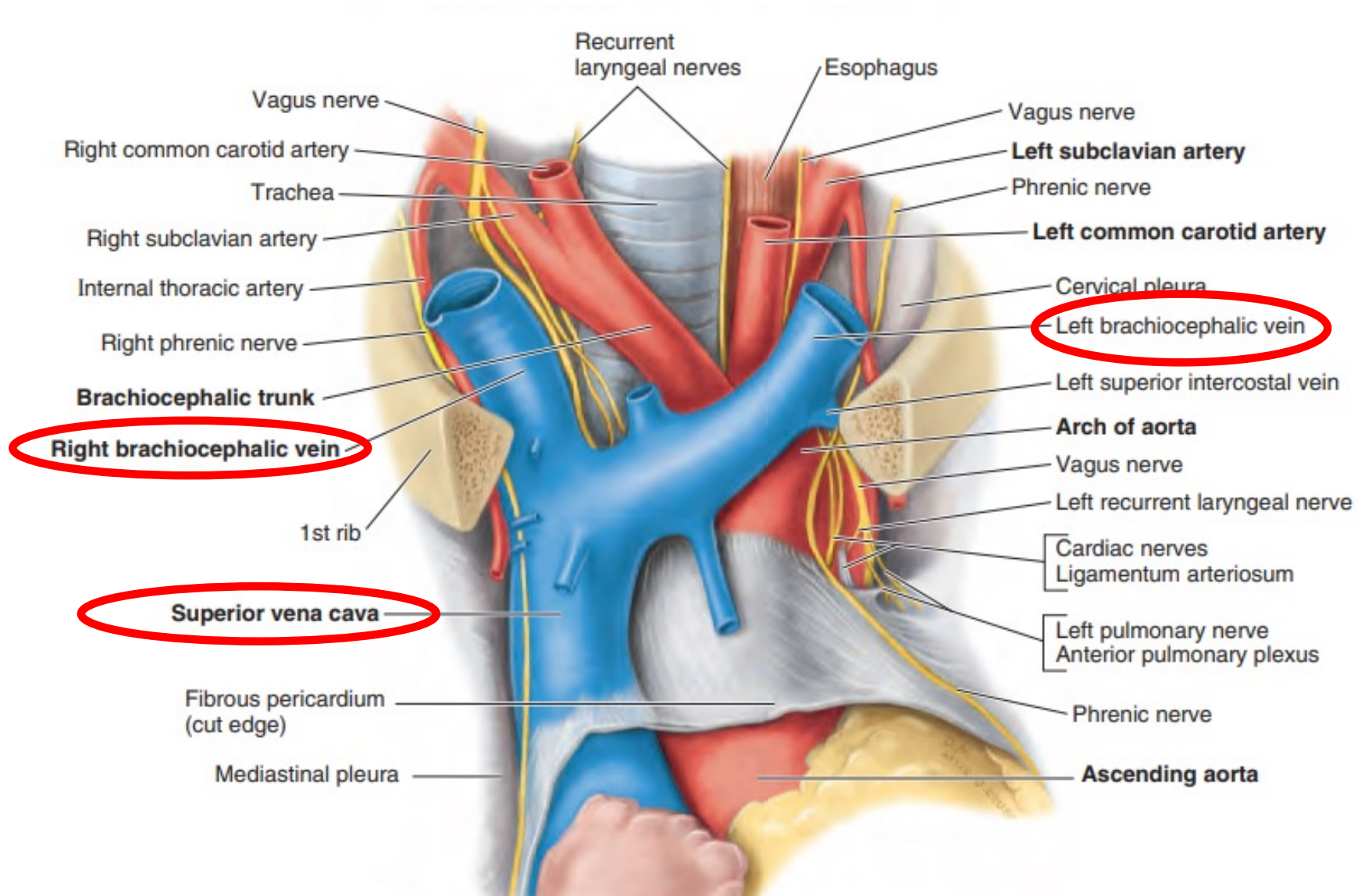
Brachiocephalic vein **WHY ??**

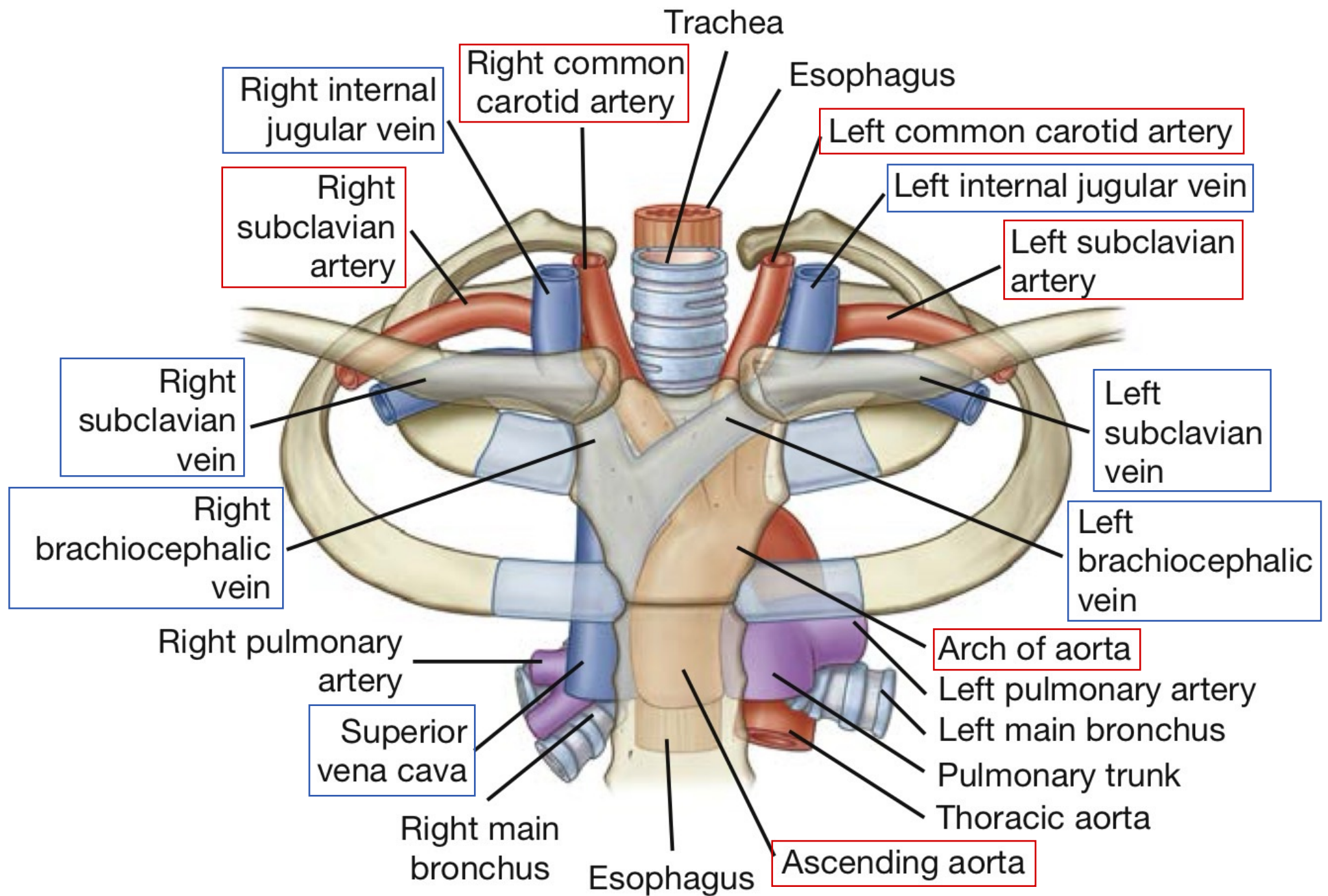
It passes from the left to the right side, anterior to the roots of the three major branches of the arch of the aorta

where is the left subclavian 🤔🤔 ??





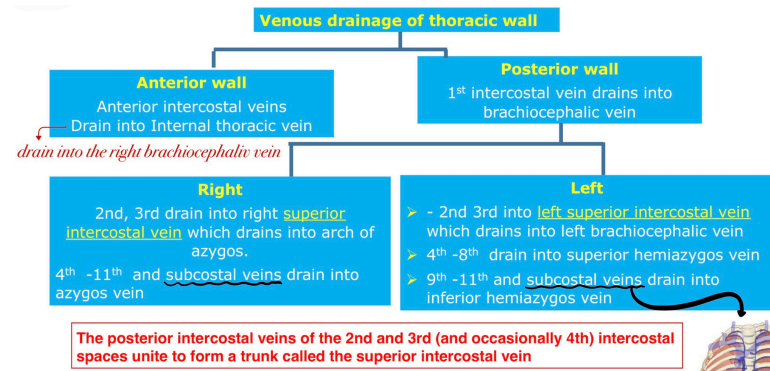




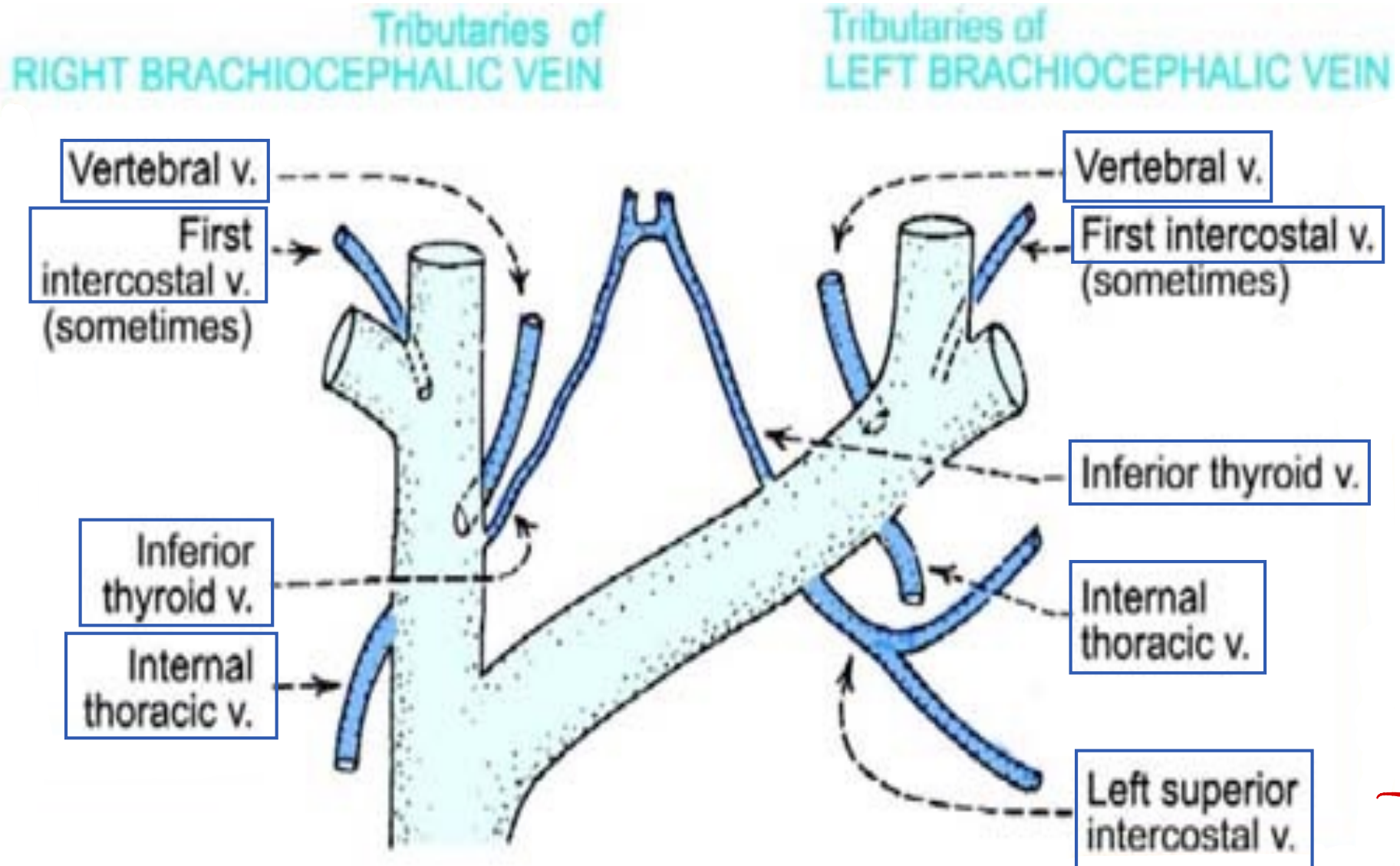
Tributaries of Brachiocephalic vein

Rt. Brachiocephalic vein	Lt. Brachiocephalic vein
Inferior thyroid vein	Inferior thyroid vein
Right vertebral vein	Left vertebral vein
Right Internal thoracic vein	Left Internal thoracic vein
Right first posterior intercostal	Left first posterior intercostal vein
	Left superior intercostal vein

Remember from the last lecture : Venous drainage of thoracic wall, Vertebral venous plexus



كيف عرفت ال right من ال left ؟؟؟



Right jugular trunk

Right subclavian trunk

Right lymphatic duct

Left jugular trunk

Left subclavian trunk

Thoracic (left lymphatic) duct

Right venous angle

Left venous angle

Venous angle

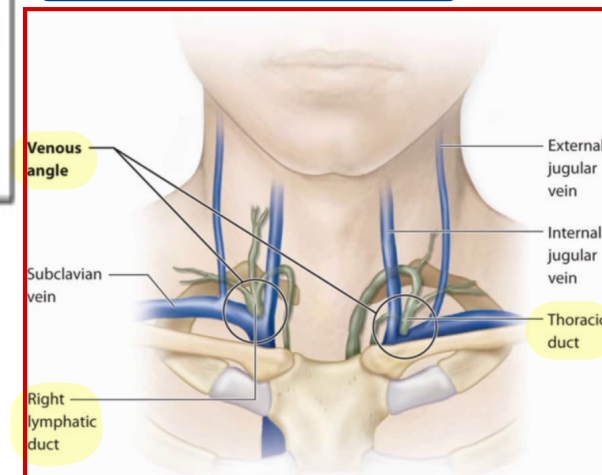
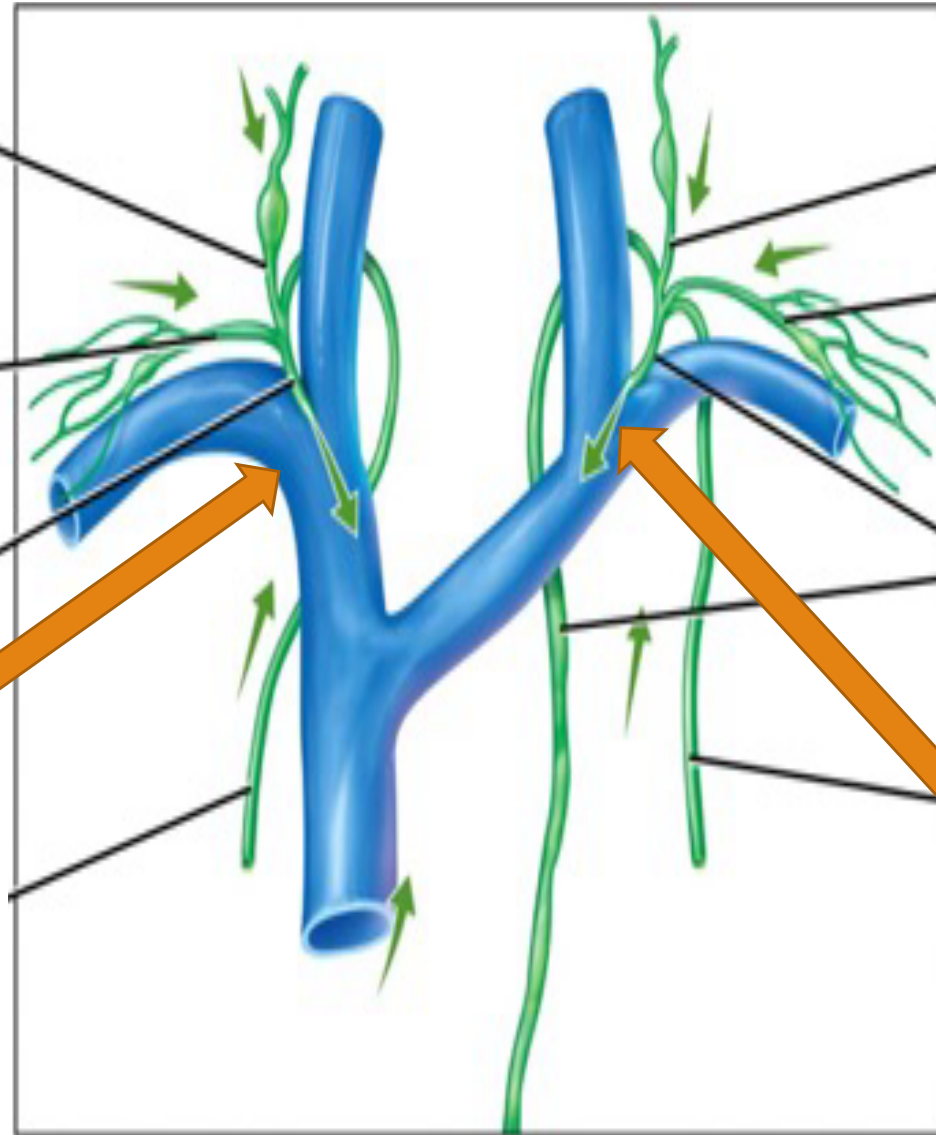
Subclavian vein

Right lymphatic duct

External jugular vein

Internal jugular vein

Thoracic duct



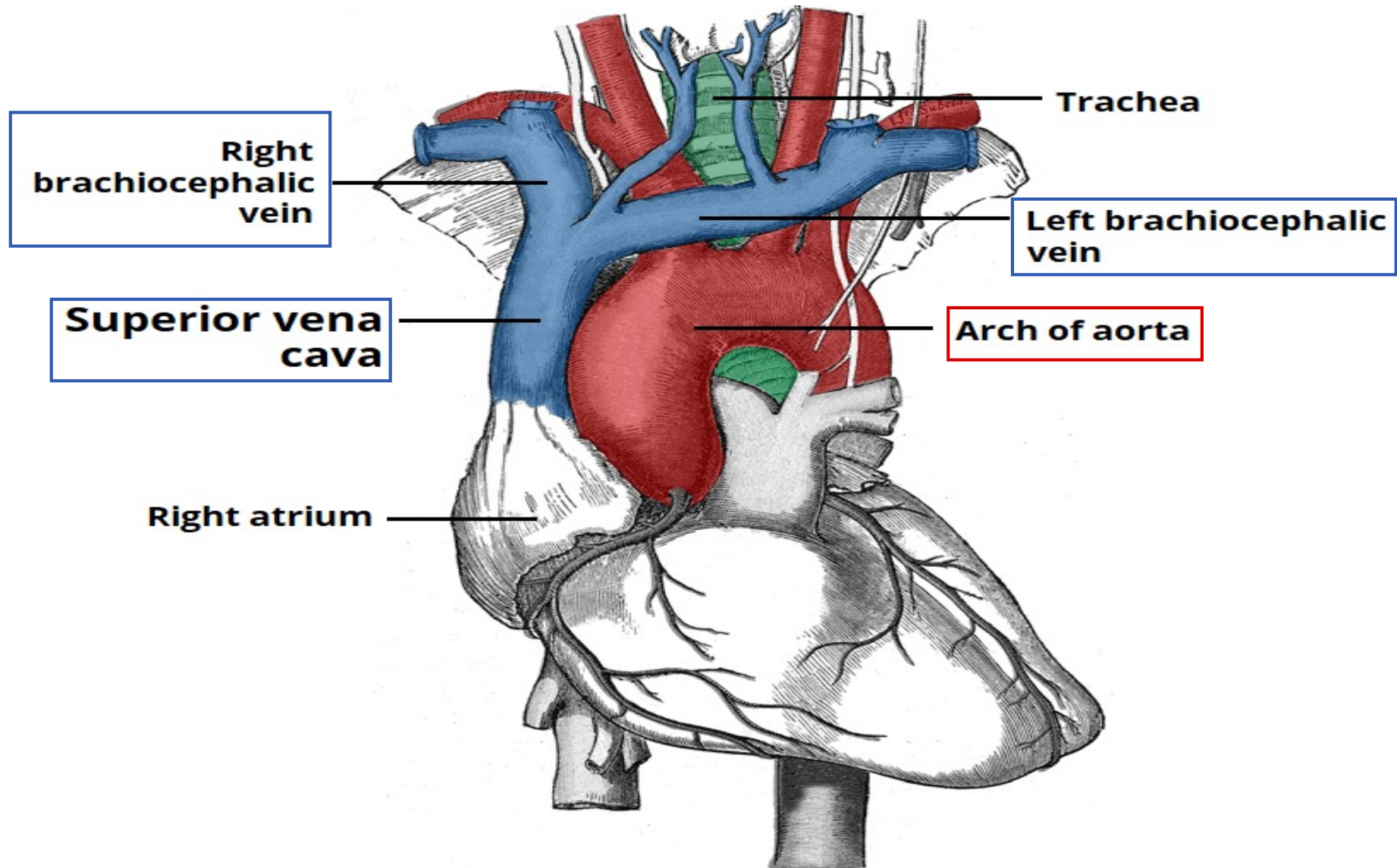
Superior venae cava

Formation : By union the right and left Brachiocephalic veins

Beginning : 1st right costal cartilage

Termination : 3rd right costal cartilage *for sure it's not near the vertebrae*
as it enters the right atrium of the heart

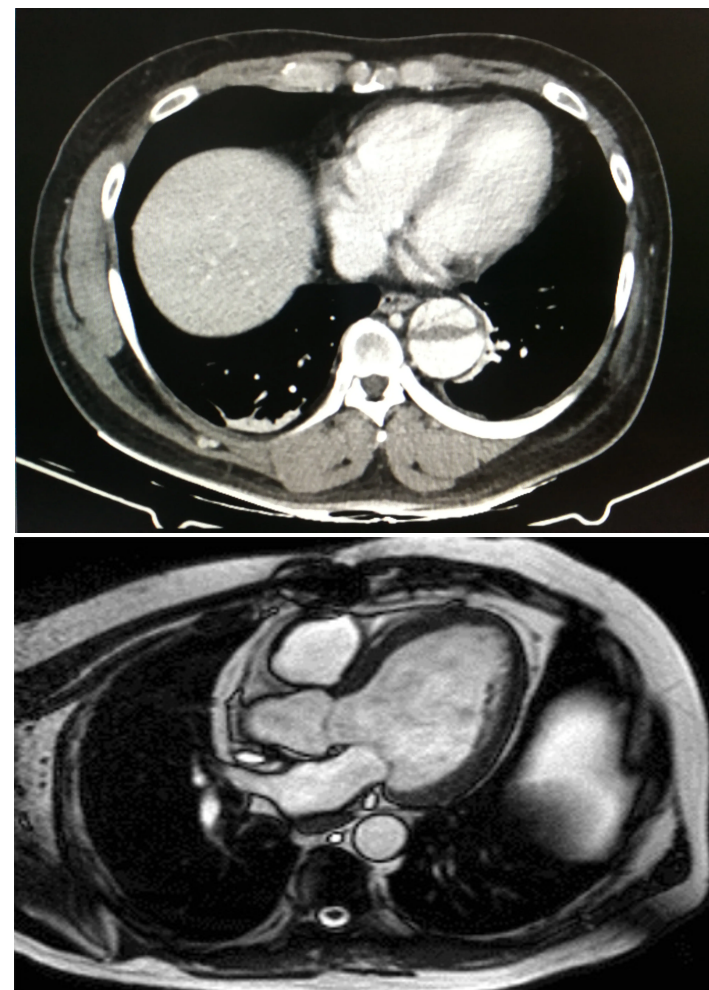
It receives the venous return from the upper half of the body,
above the diaphragm



Determining Right and Left Sides on CT and MRI Imaging

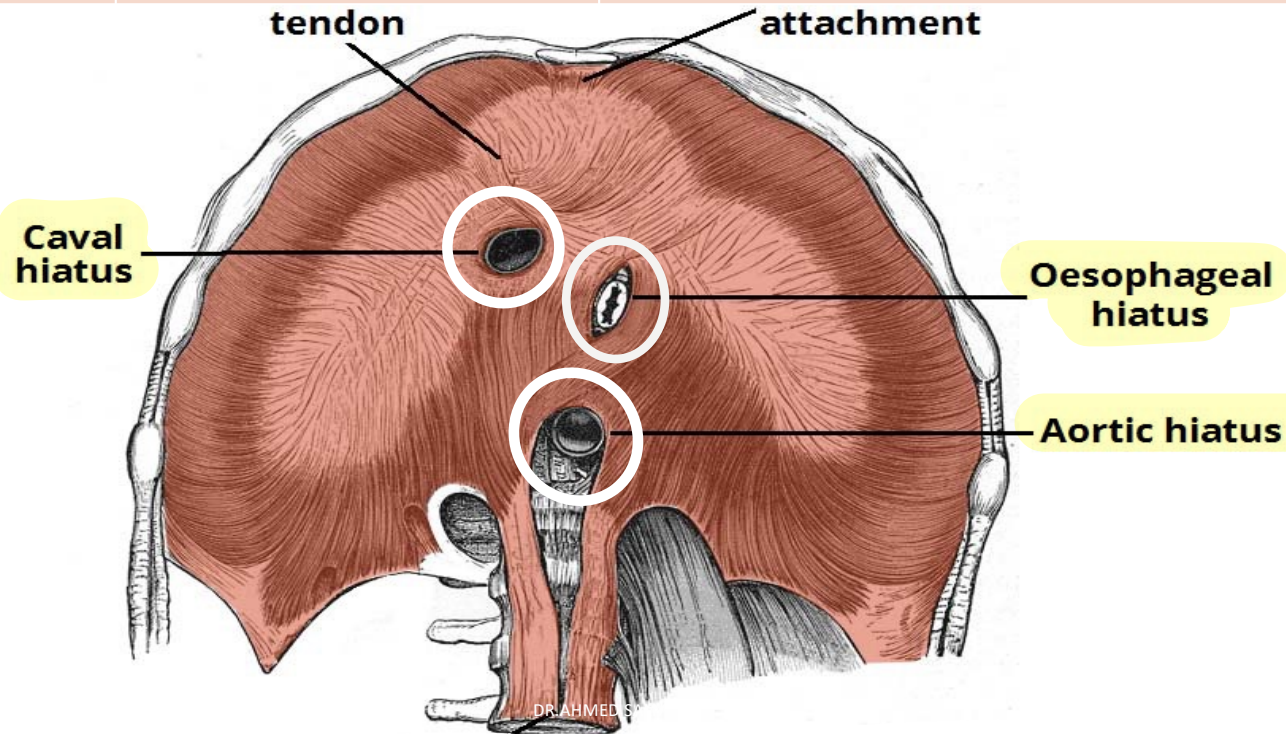
When interpreting cross-sectional imaging such as CT or MRI, it is essential to correctly identify the patient's right and left sides. Images are conventionally displayed in the radiologic orientation: the patient is assumed to be lying supine (face up), and you are viewing the images as though standing at their feet, looking toward their head.

- **Radiologic Orientation:** The right side of the image corresponds to the patient's left side, and the left side of the image corresponds to the patient's right side.
- **Practical Application:** If you imagine holding the image in front of you, your right hand will align with the patient's left side, and your left hand will align with the patient's right side.
- **Summary:** Always mentally reverse your own left and right to ensure accurate laterality identification during image analysis.



Opening of the diaphragm :

Opening	Level	Structures passing through it
Vena Caval <i>right</i>	8 th thoracic vertebra	It transmits the inferior vena cava and terminal branches of the right phrenic nerve.
Oesophageal <i>left</i> (Oesopha gus)opening	10 th thoracic vertebra	oesophagus, the right and left va gus nerves
Aortic <i>Middle</i>	12 th thoracic vertebra	aorta, the thoracic duct, and the azygos vein.



Despite this, the beginning and the end are not at the same level because, as you recall, the level of vertebrae and costal cartilage are not the same.

Arteries of the superior mediastinum

I-Arch of the aorta

Beginning : Right border of sternum at 2nd right costal cartilage

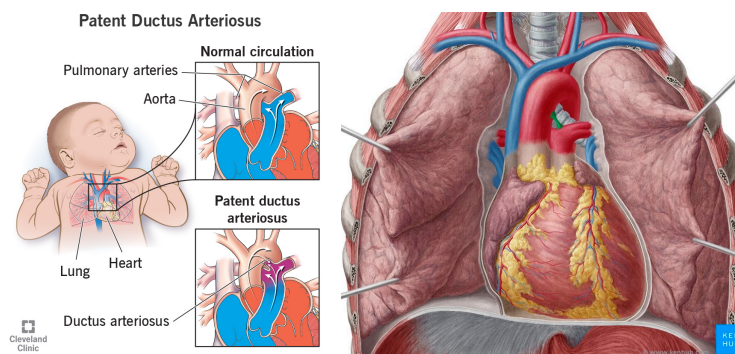
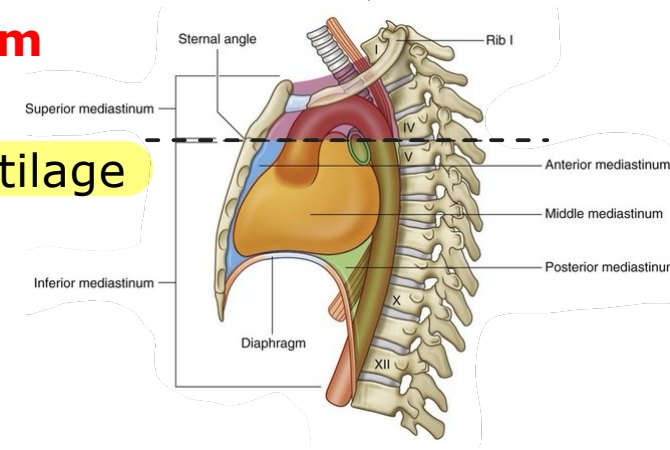
Termination: Lower border 4th thoracic vertebra
by becoming the thoracic (descending) aorta

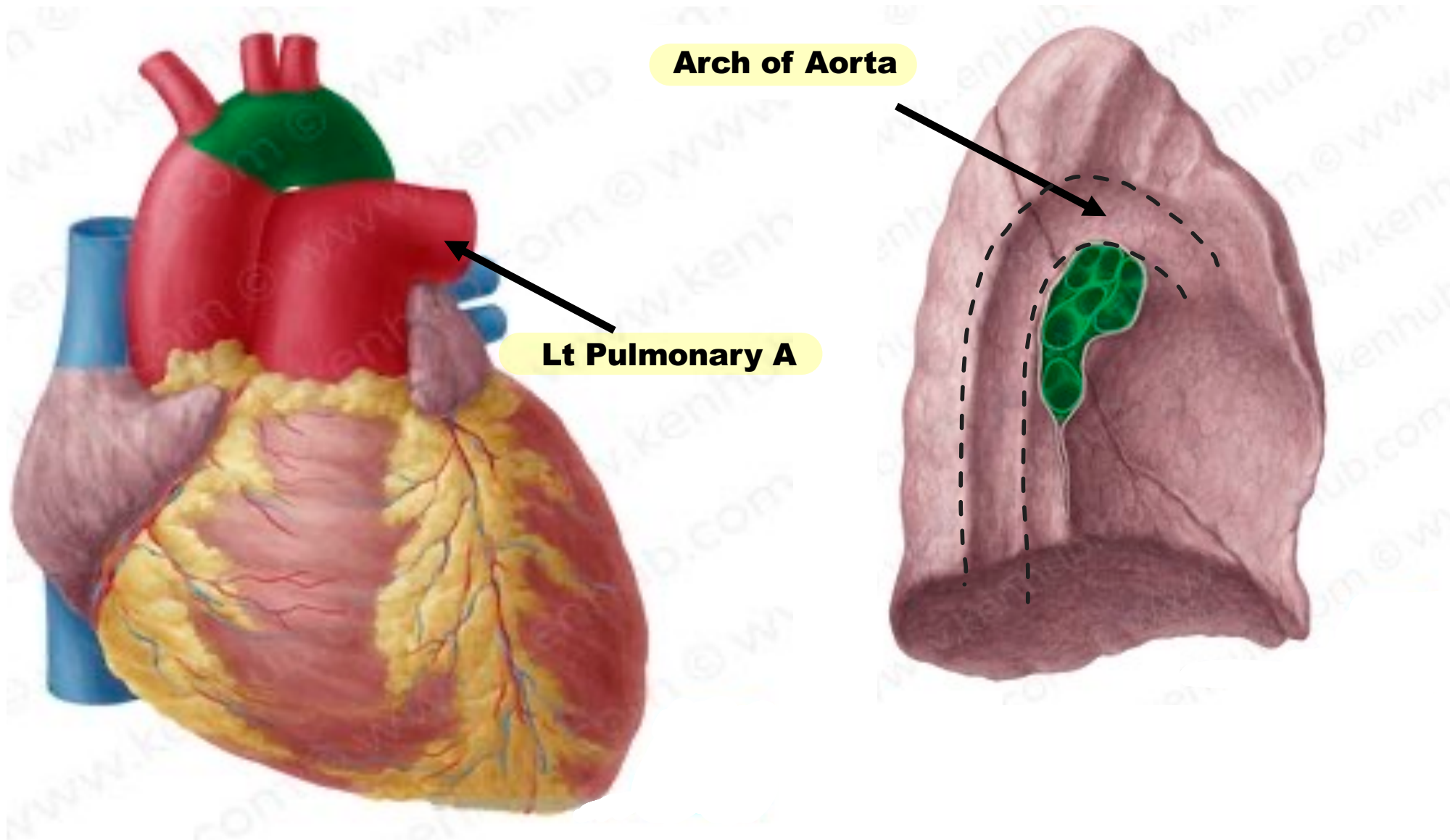
Course:

- It arches superiorly, posteriorly and to the left, and then inferiorly.
- The arch ascends anterior to the right pulmonary artery and the bifurcation of the trachea.
- It passes over the root of the left lung to become at the left side of the trachea and esophagus

N.B The ligamentum arteriosum :

- it is the remnant of the fetal ductus arteriosus.
- It passes from the root of the left pulmonary artery to the inferior surface of the arch of the aorta





Arch of Aorta

Lt Pulmonary A

Relations

Anteriorly and to the left:

left phrenic, left vagus and left superior intercostal vein 2N-1✓

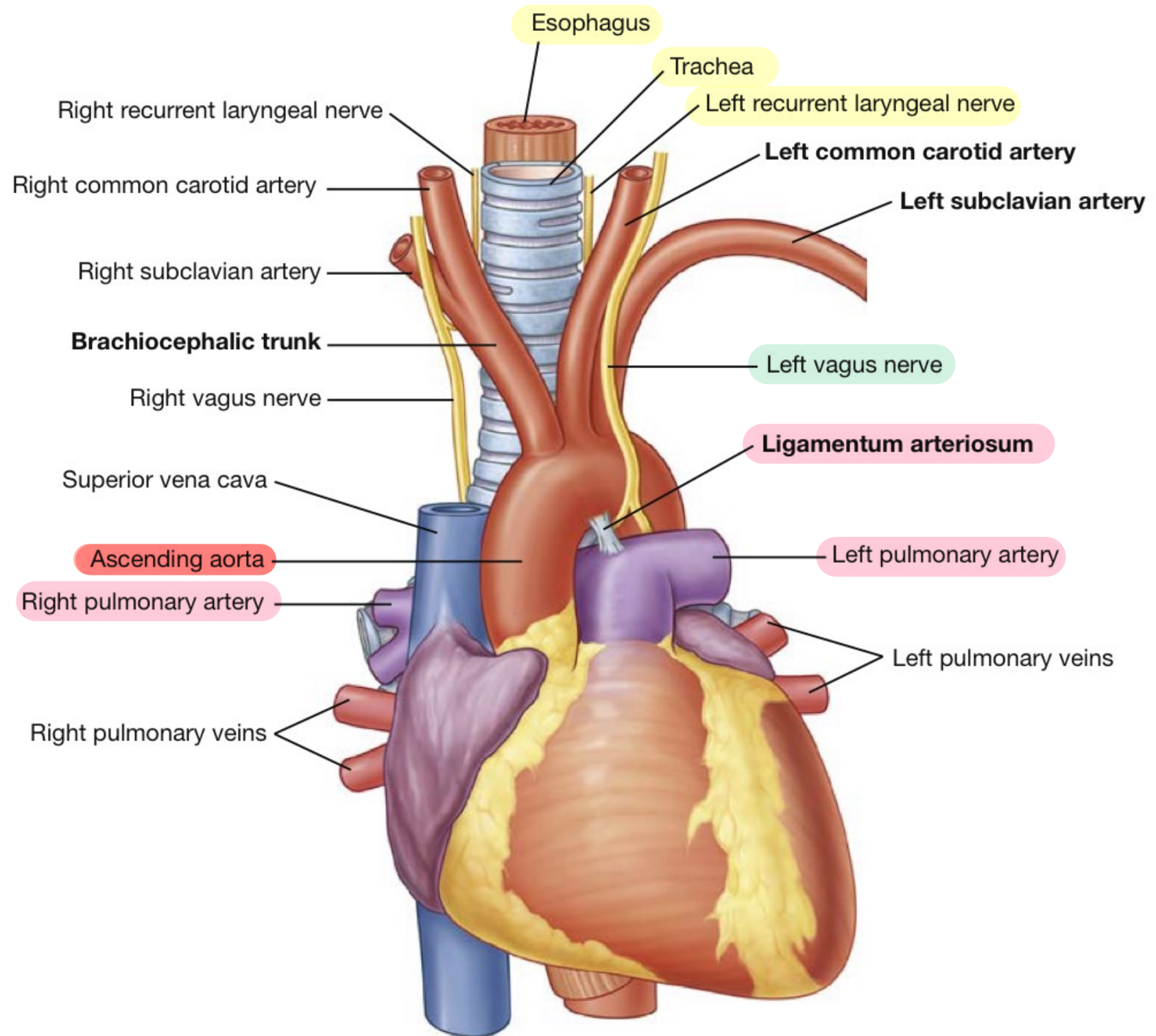
Posteriorly and to the right:

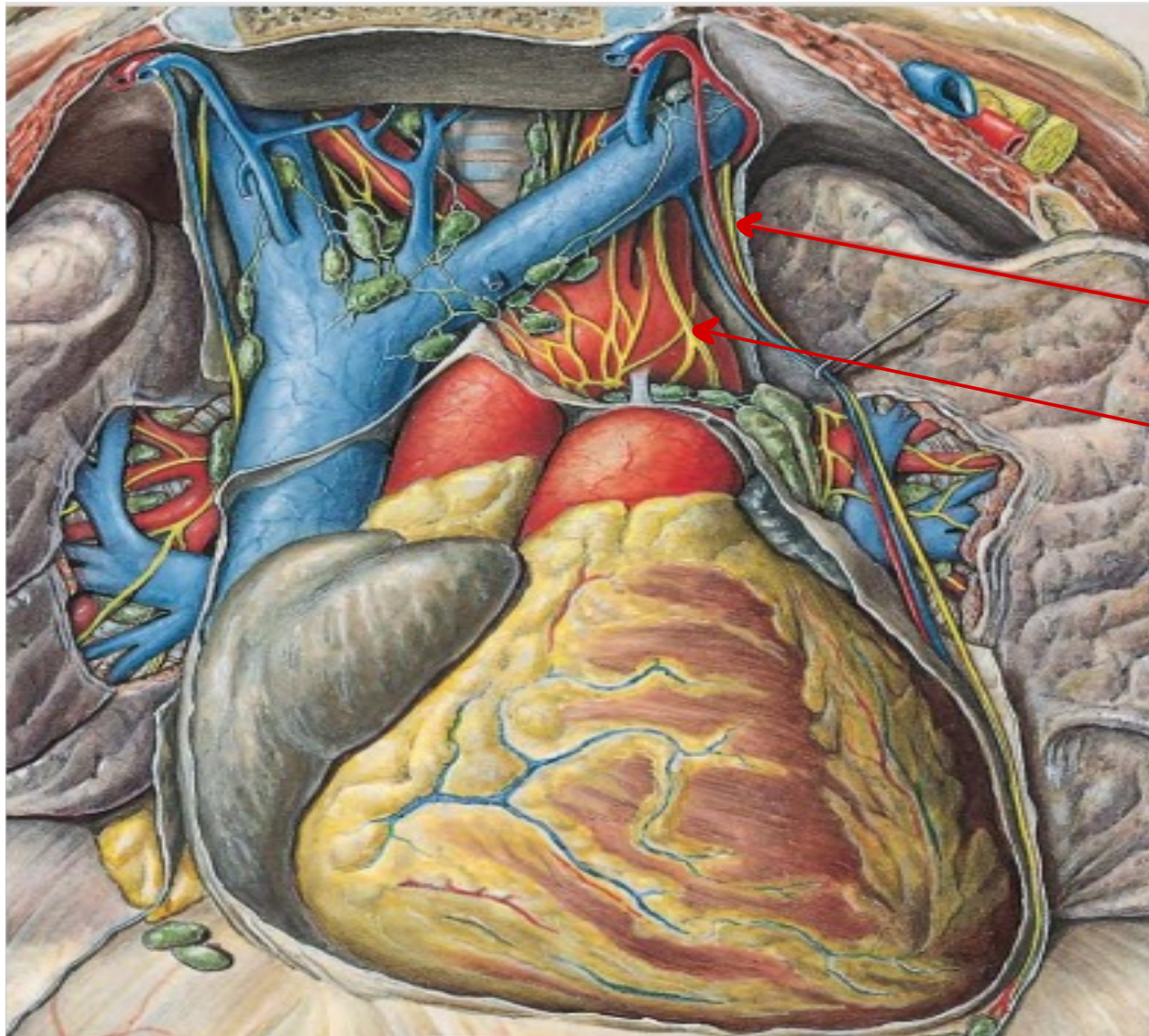
Esophagus, trachea, left recurrent laryngeal nerve and thoracic duct

Inferiorly :

- ✓ Bifurcation of pulmonary trunk
- ✓ Ligamentum arteriosum.
- ✓ Superficial cardiac plexus
- ✓ left recurrent laryngeal nerve. →
- ✓ Left main bronchus

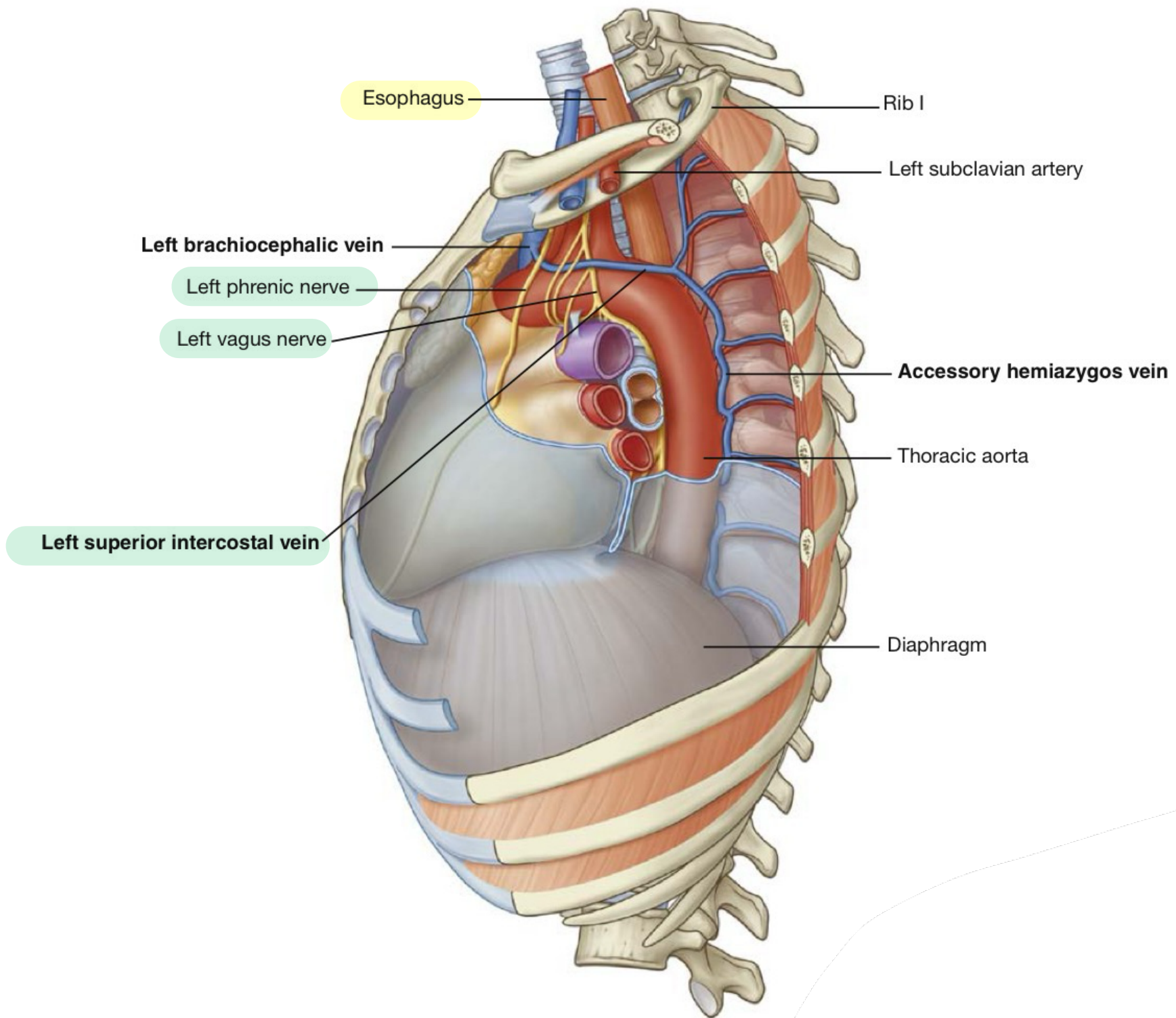
A branch from the vagus nerve which contribute to the formation of superficial cardiac plexus

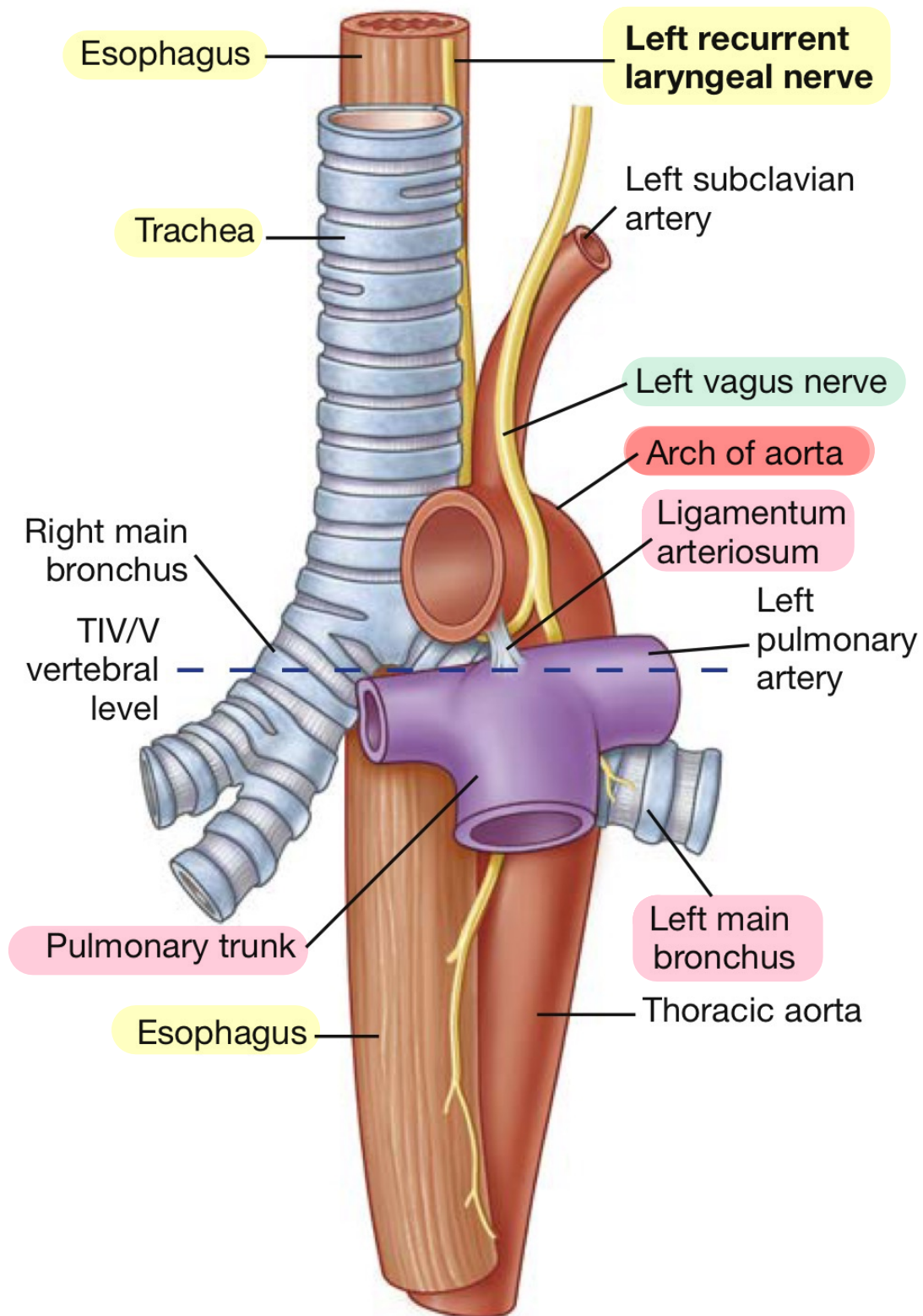




Left phrenic nerve

superficial cardiac plexus

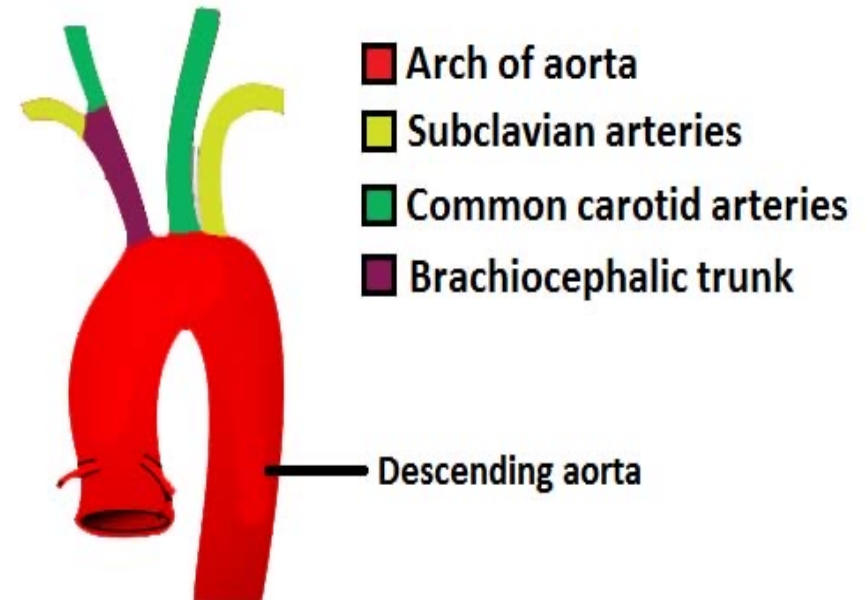
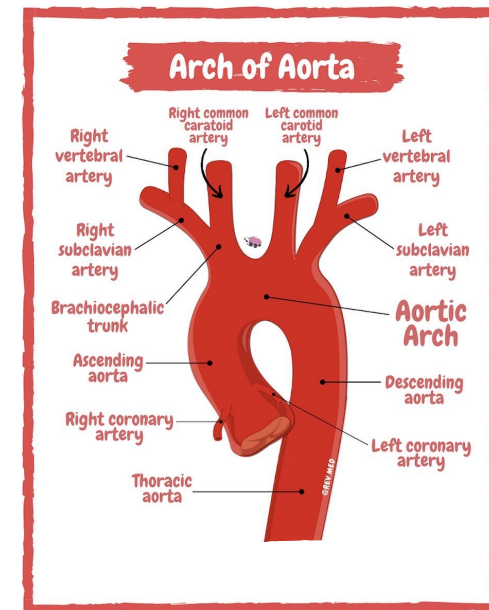




Aortic arch branches

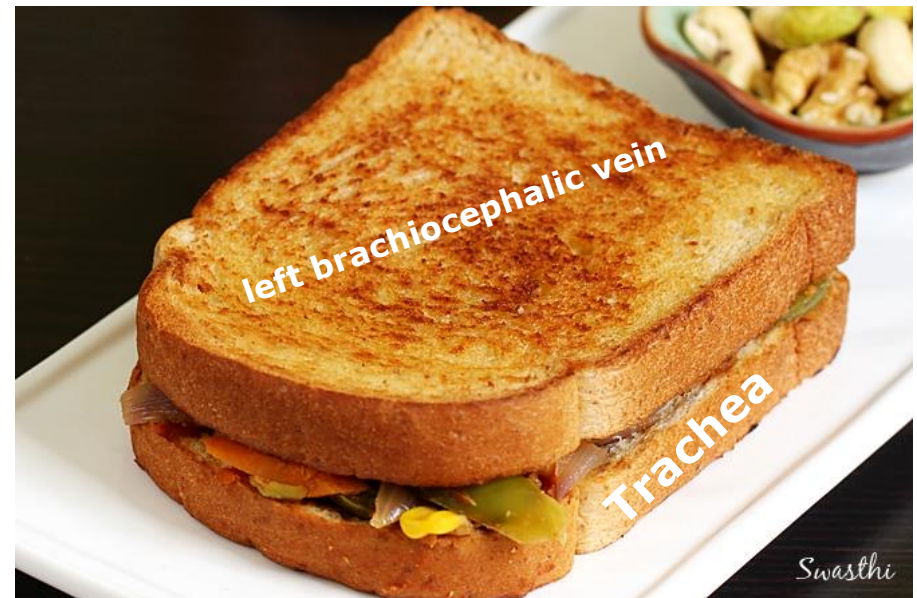
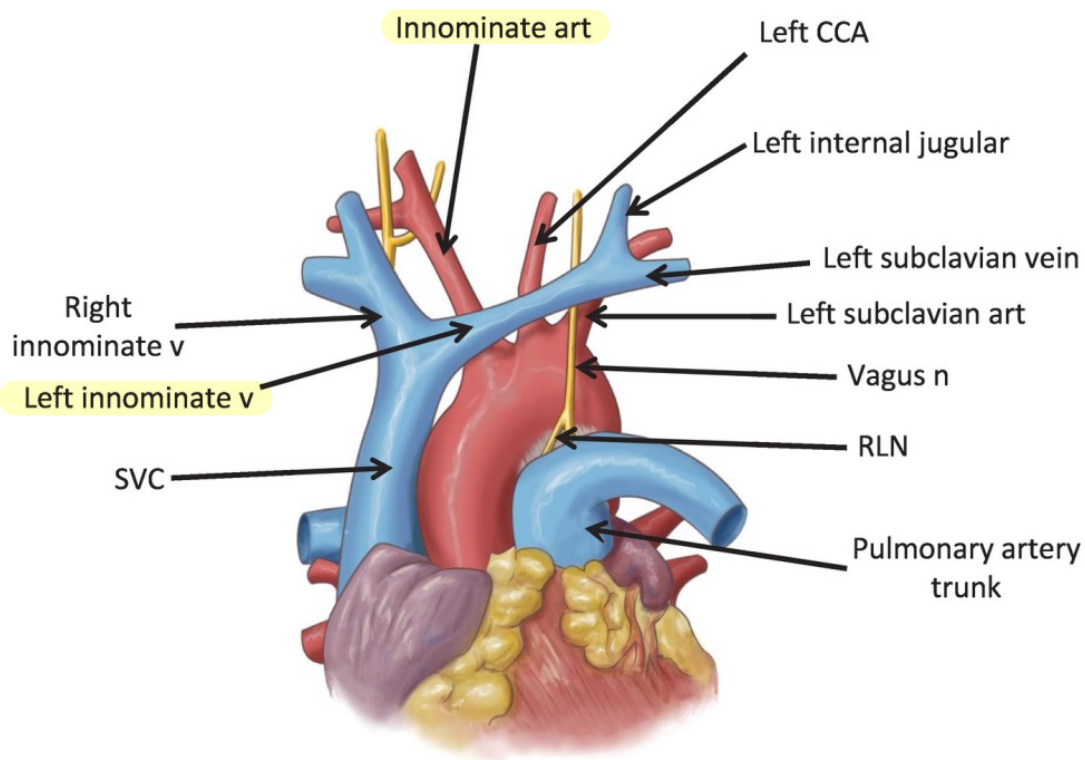
Three branches

1. Brachiocephalic trunk
2. Left common carotid artery
3. Left subclavian artery



The brachiocephalic trunk:

- It arises posterior to the manubrium, where it is anterior to the trachea and posterior to the left brachiocephalic vein
- At the **right sternoclavicular (SC) joint**, it divides into the right common carotid and right subclavian arteries.



The left common carotid artery:

- It arises posterior to the manubrium
- It enters the neck by passing posterior to the **left SC joint.**

The left subclavian artery :

- It arises from the posterior part of the arch behind left common carotid artery
- It leaves the thorax and enters the root of the neck by passing posterior to the **left SC joint.**

4 Events at the Sternoclavicular Joint :

1. Formation of the Brachiocephalic Veins:

- *Each brachiocephalic vein is formed posterior to the sternoclavicular joint by the union of the internal jugular and subclavian veins.*

2. Division of the Brachiocephalic Trunk:

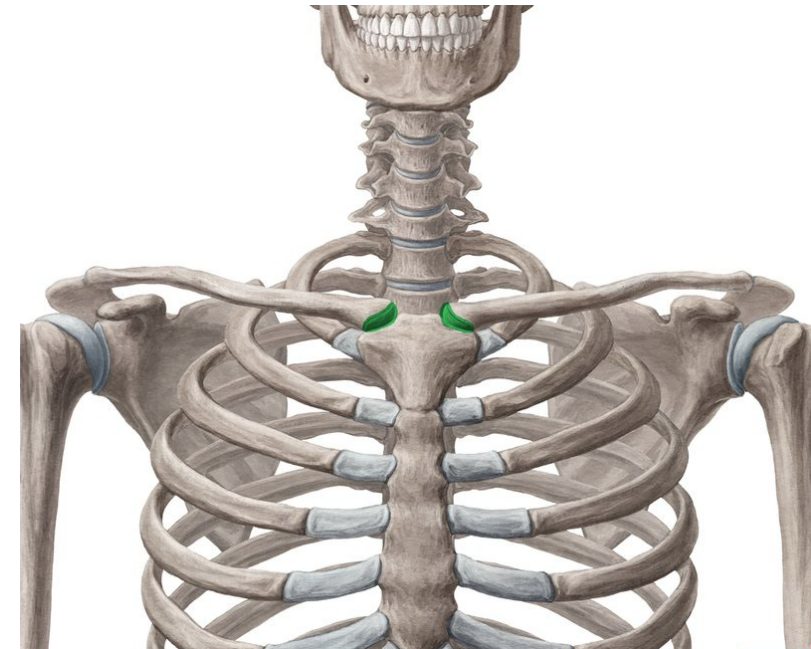
- *The brachiocephalic trunk ascends posterior to the manubrium, and at the right SC joint, it divides into the right common carotid and right subclavian arteries.*

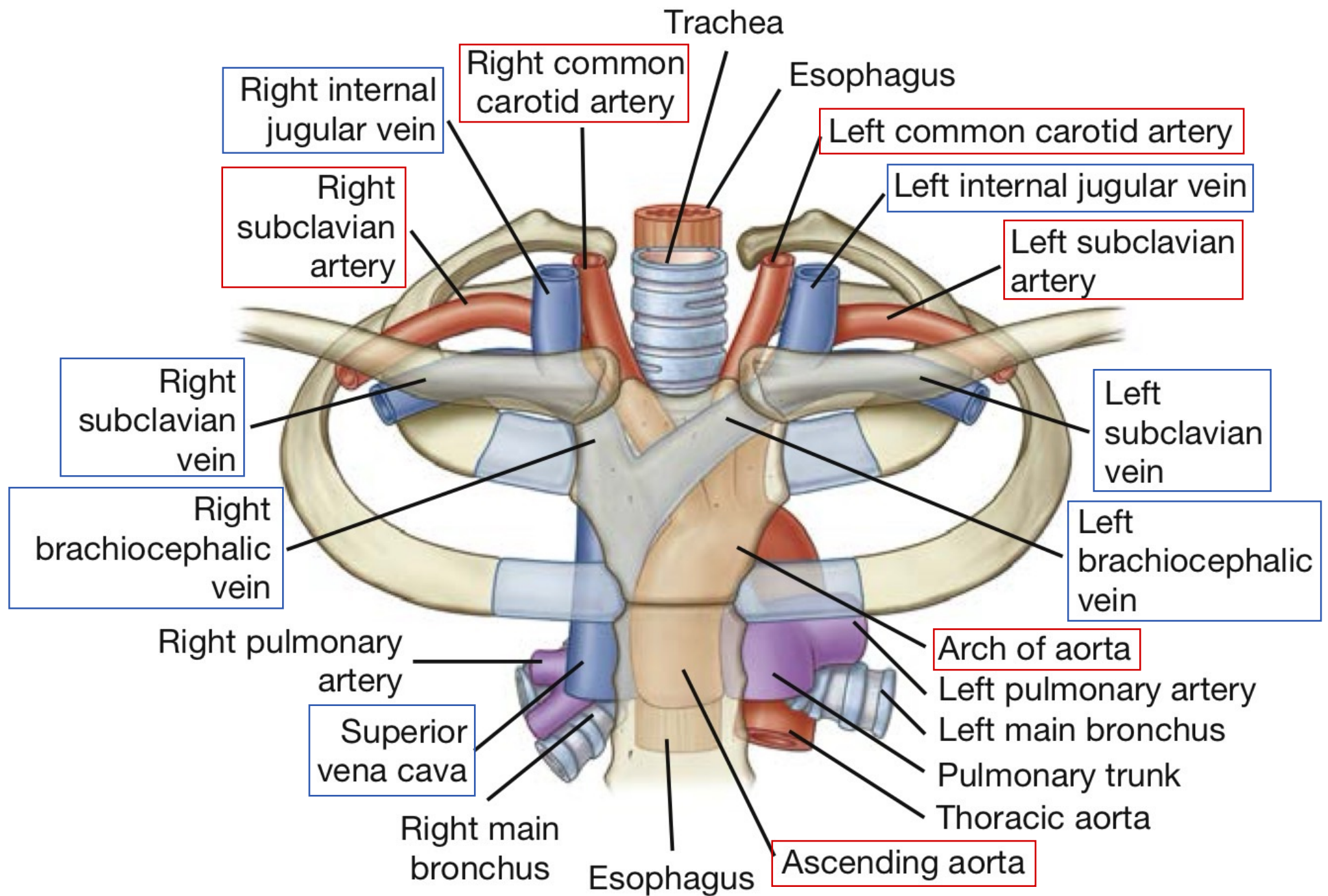
3. Course of the Left Common Carotid Artery:

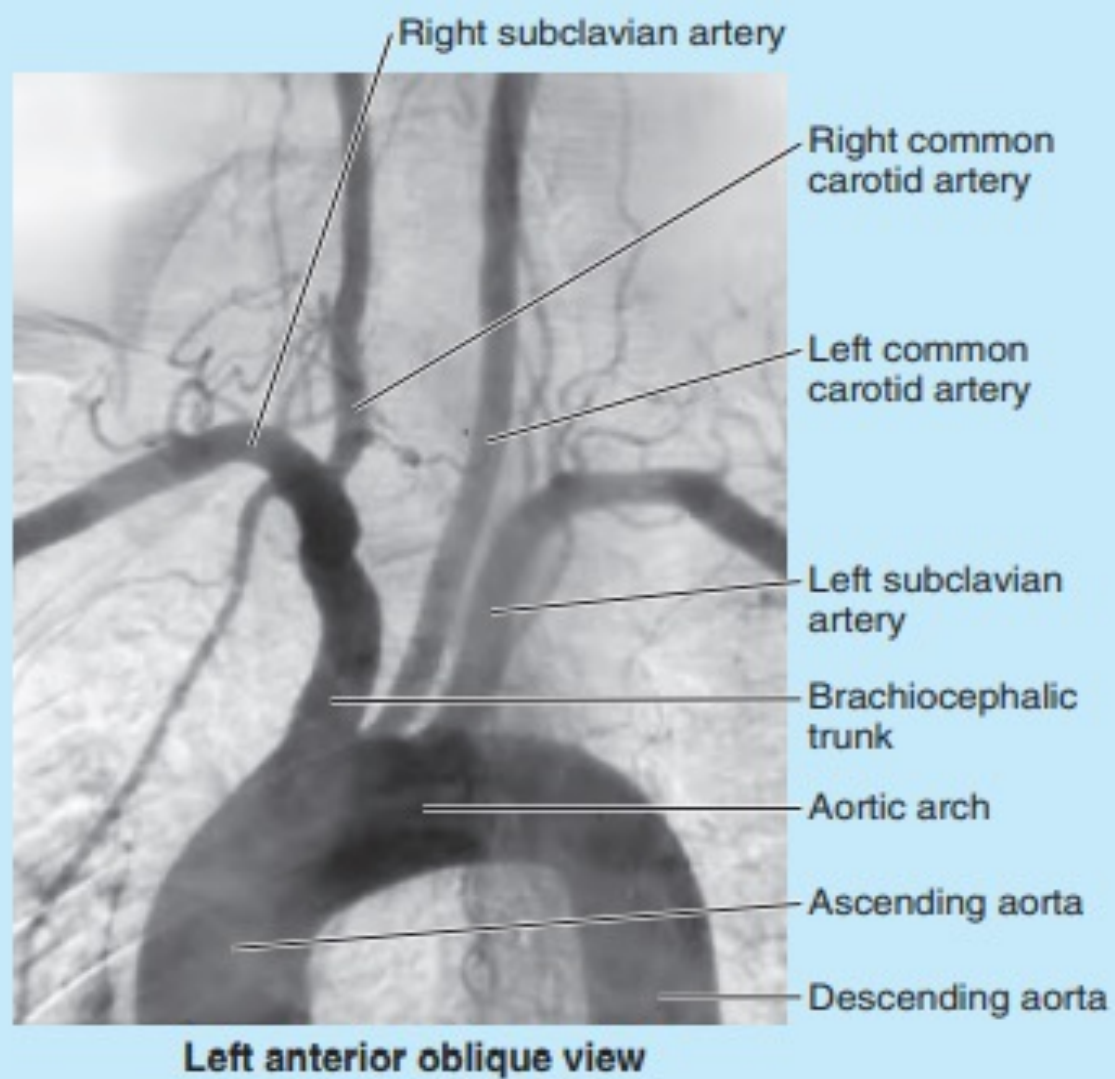
- *The left common carotid artery arises posterior to the manubrium and enters the neck by passing posterior to the left SC joint.*

4. Course of the Left Subclavian Artery:

- *The left subclavian artery, arising from the arch of the aorta behind the left common carotid, leaves the thorax and enters the neck by passing posterior to the left SC joint.*







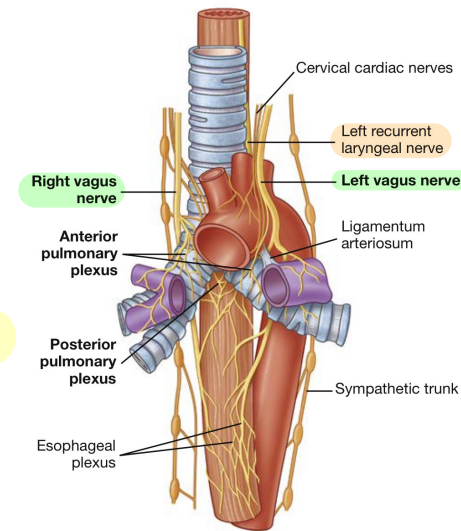
Aortic angiogram (aortogram)
Clinically Oriented Anatomy. keith moore.

Nerves of the superior mediastinum

I-Vagus Nerve

Right vagus nerve

- ❑ Passes on the right side of the trachea ,then posterior to the right brachiocephalic vein, SVC
- ❑ It contributes to Rt. pulmonary, esophageal and cardiac plexuses
- ❑ It gives right recurrent laryngeal nerve ,which hooks around the right subclavian artery and ascends between the trachea and esophagus to supply the larynx

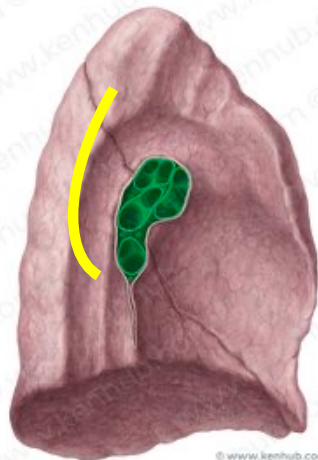


The left vagus nerve

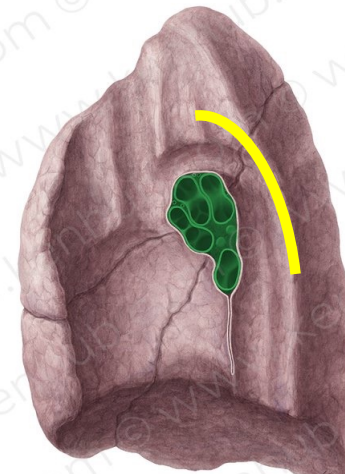
- ❑ It enters the mediastinum between the left common carotid artery and left subclavian artery.
- ❑ It gives left recurrent laryngeal nerve which hooks around the arch of the aorta, lateral to the ligamentum arteriosum, and ascends in the groove between the trachea and the esophagus to supply the larynx

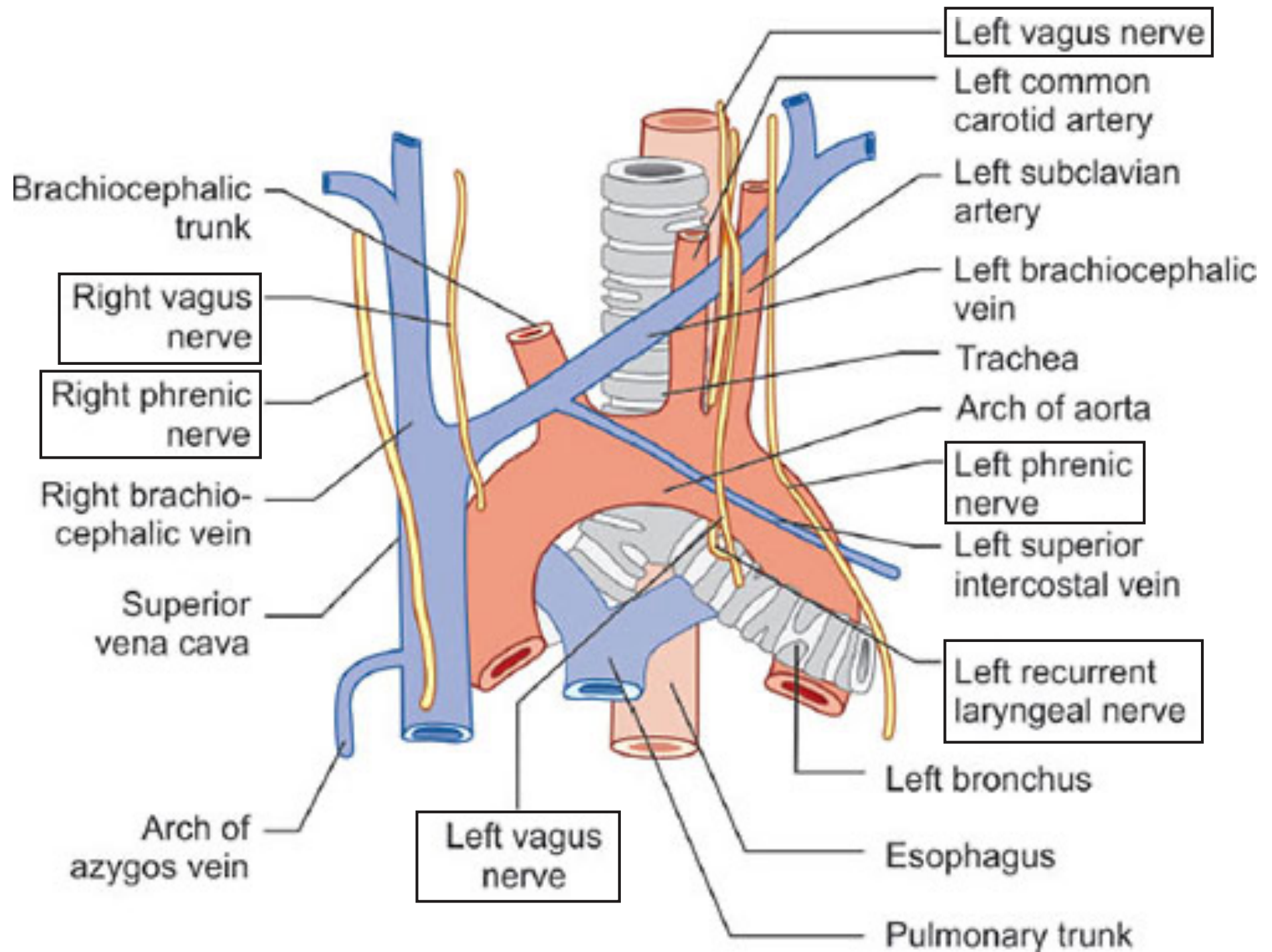
Both vagi are passing behind the root of the lung

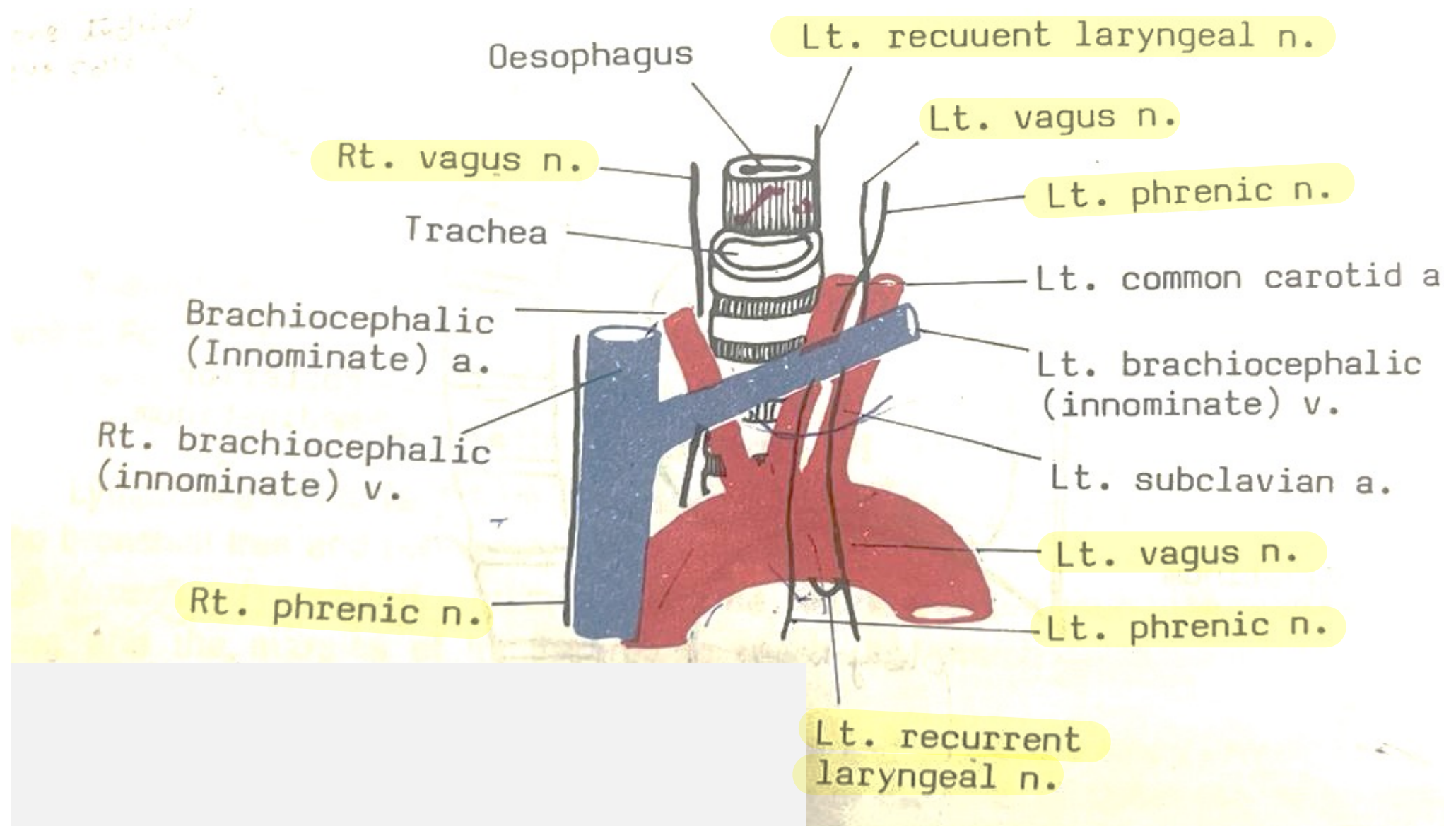
Left Lung



Right Lung







The phrenic nerves : is motor and sensory nerve supply for the diaphragm and sensory to the pericardium and mediastinal pleura.

The right phrenic nerve : passes along the right side of the right brachiocephalic vein, SVC, and the pericardium over the right atrium and descends on the right side of the IVC to passes through caval opening of the diaphragm.

The left phrenic nerve :

It crosses the left vagus ,then ,it runs along the fibrous pericardium , the left atrium and ventricle of the heart.

It pierces the diaphragm to the left of the pericardium

Both phrenic nerves are passing anterior to the root of the lungs

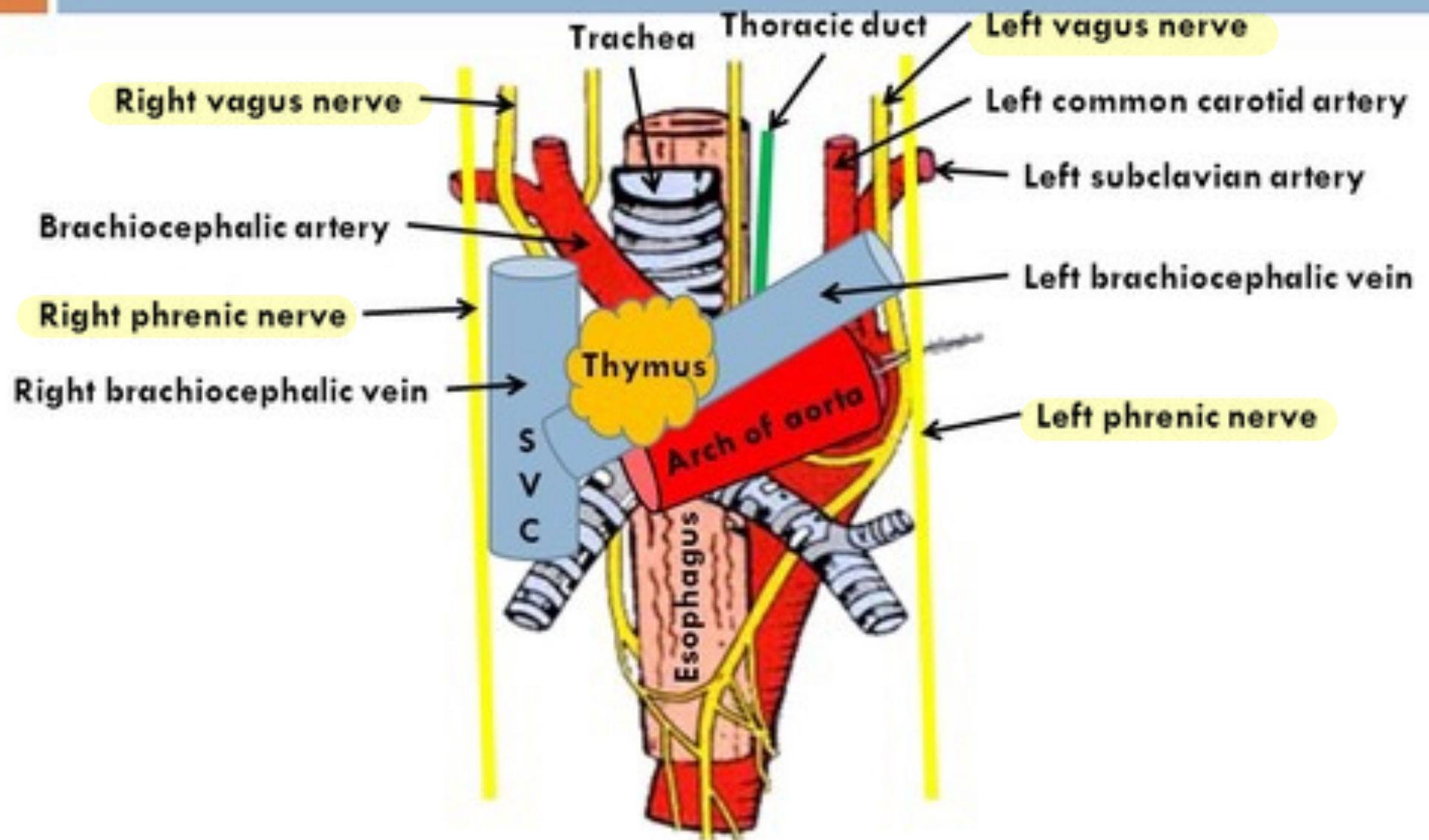
Both the vagus nerve and the phrenic nerve are located in the superior mediastinum.

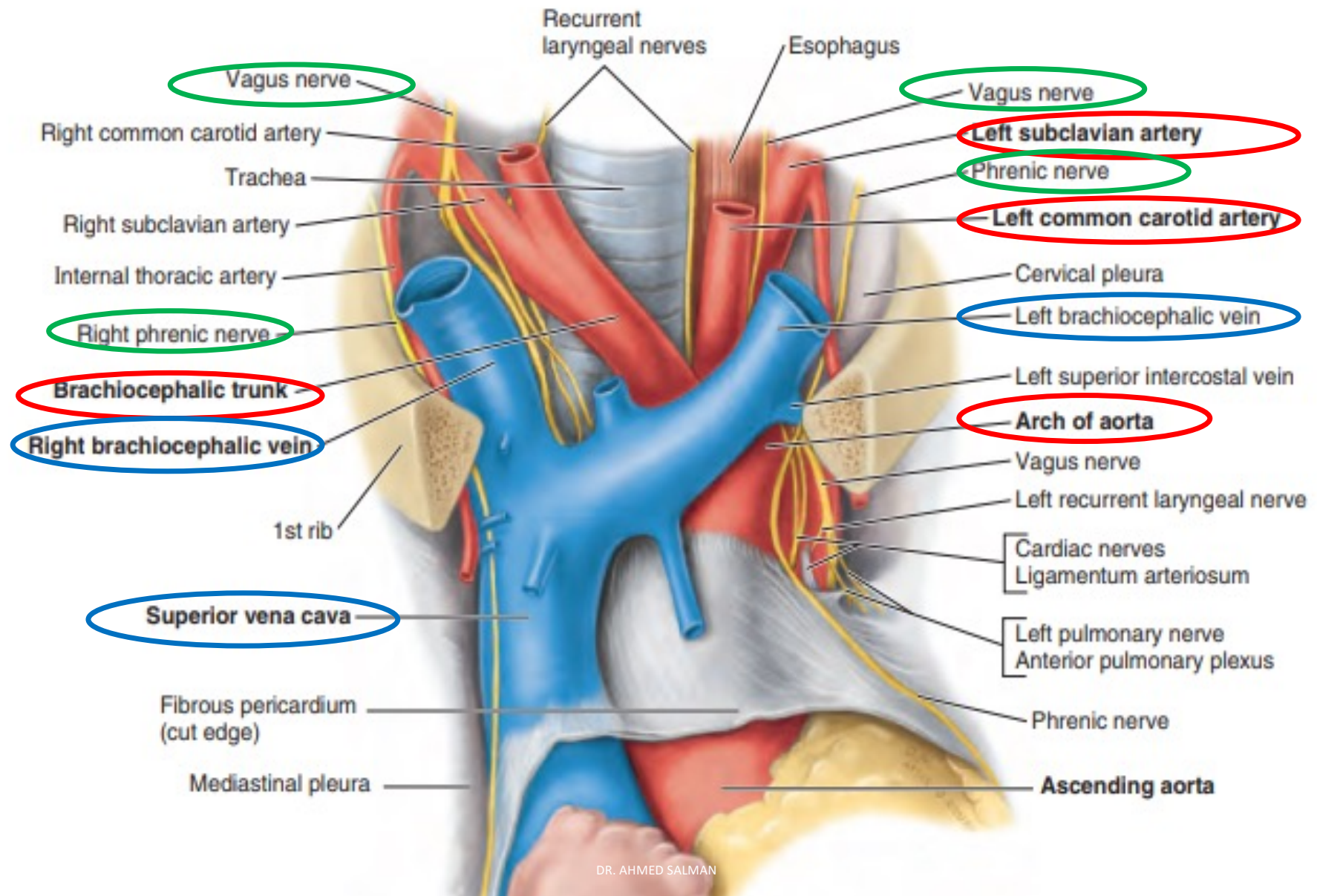
It is certain that they will descend inferiorly. The vagus nerve travels to the abdomen, while the phrenic nerve travels to the pericardium . Therefore, they will confine themselves in the inferior mediastinum, which part?

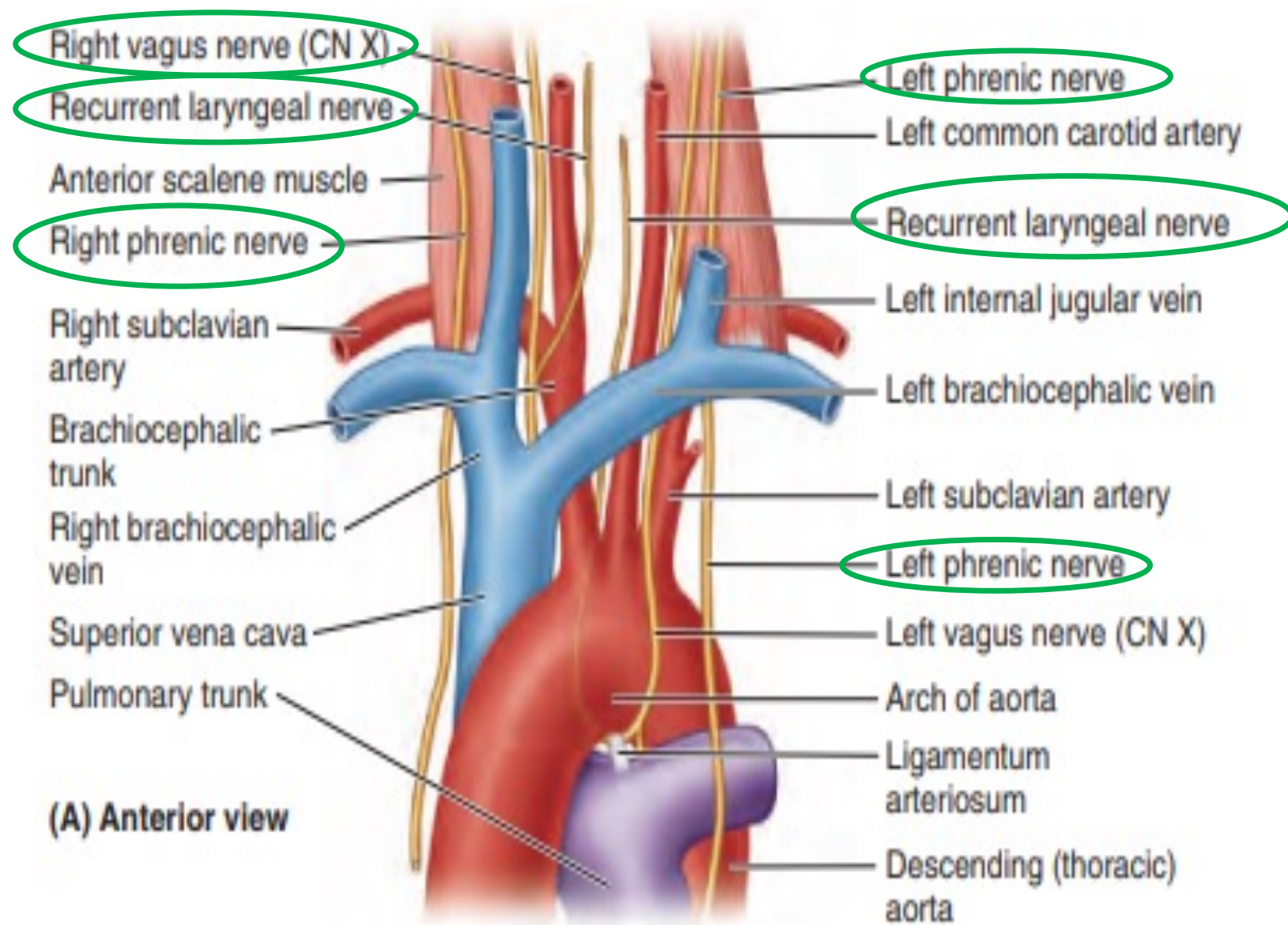
Anterior, middle, or posterior ??

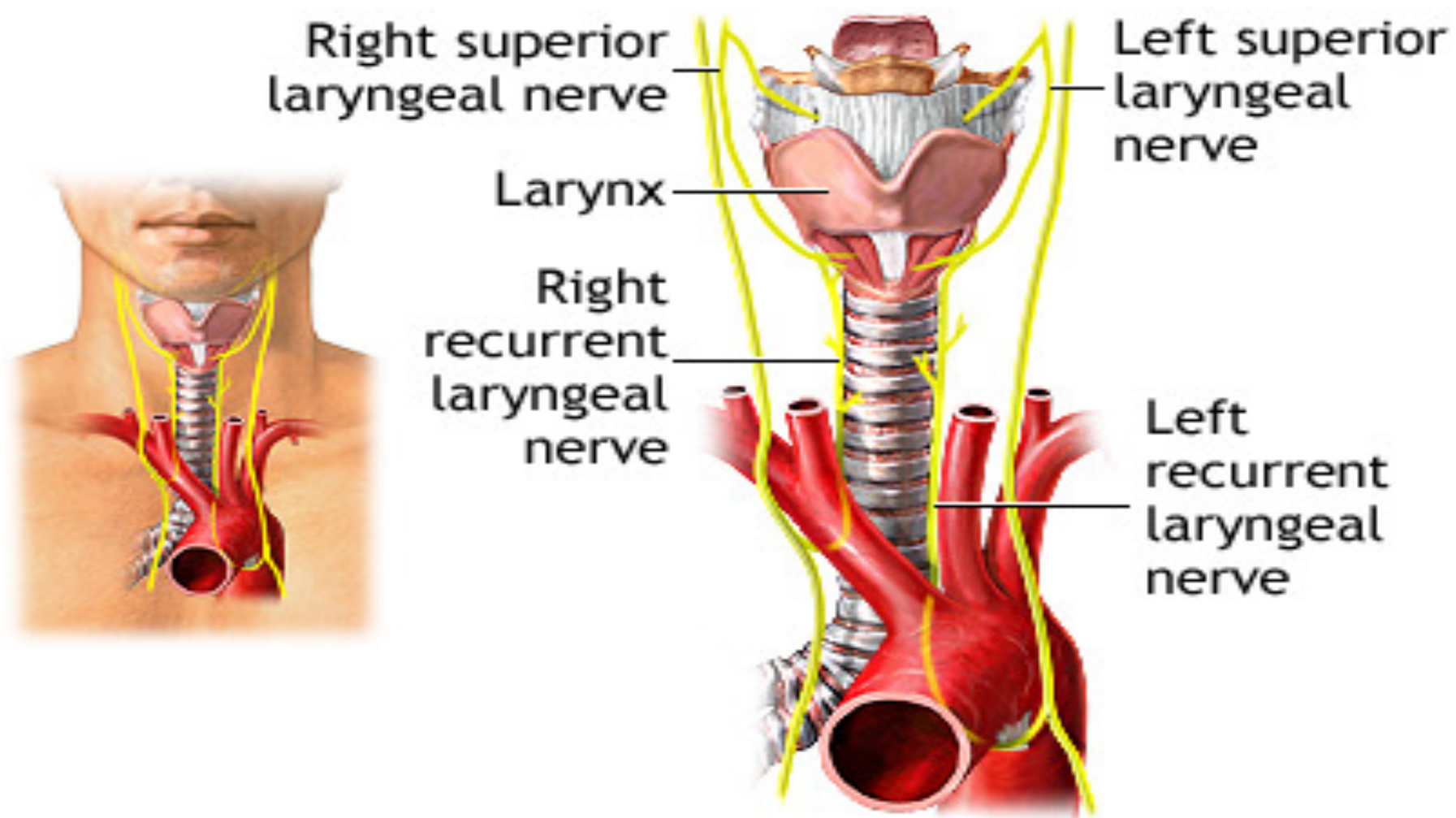
The vagus nerve continues in the posterior, while the phrenic nerve continues in the middle.

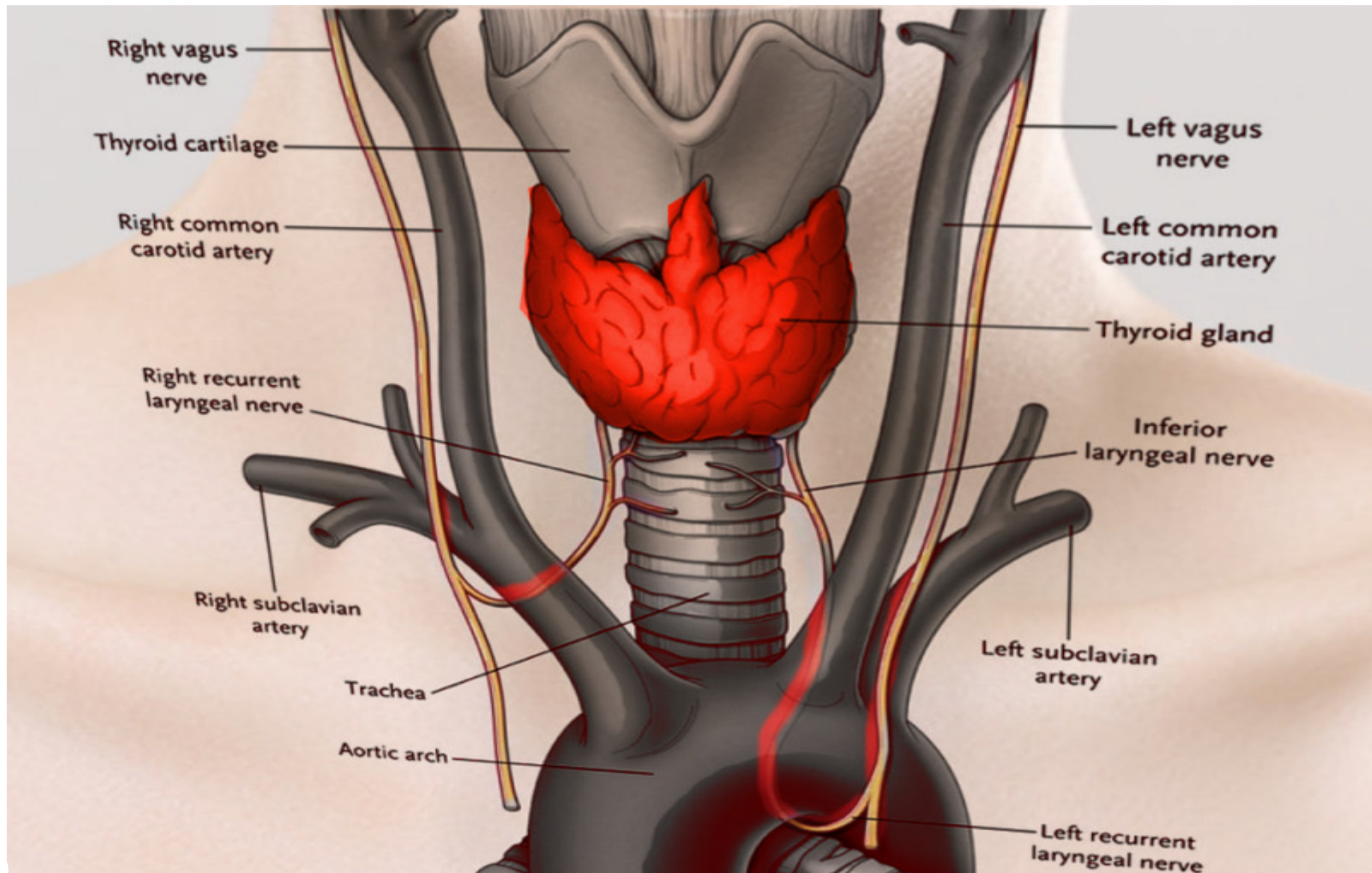
CONTENTS OF SUPERIOR MEDIASTINUM

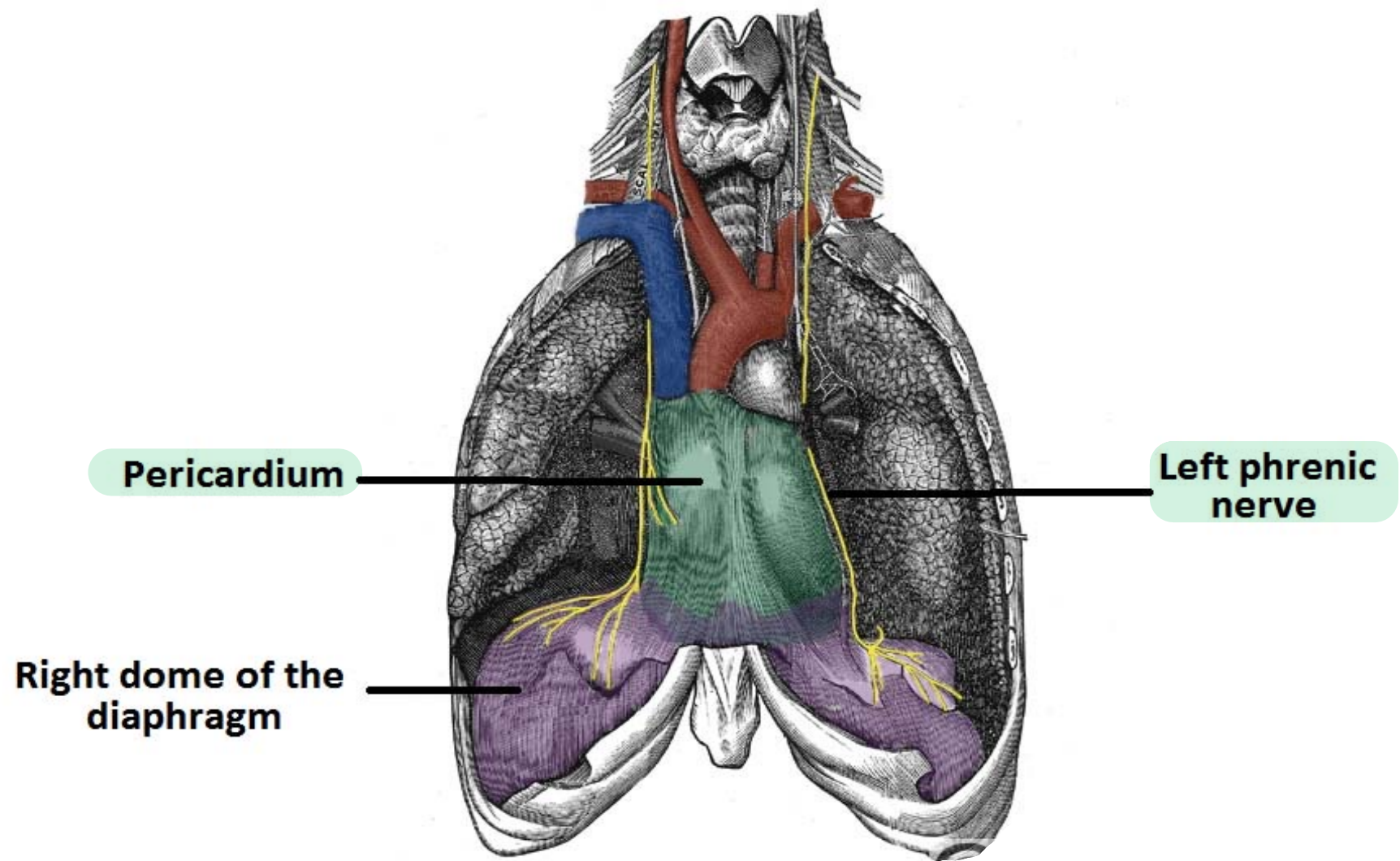


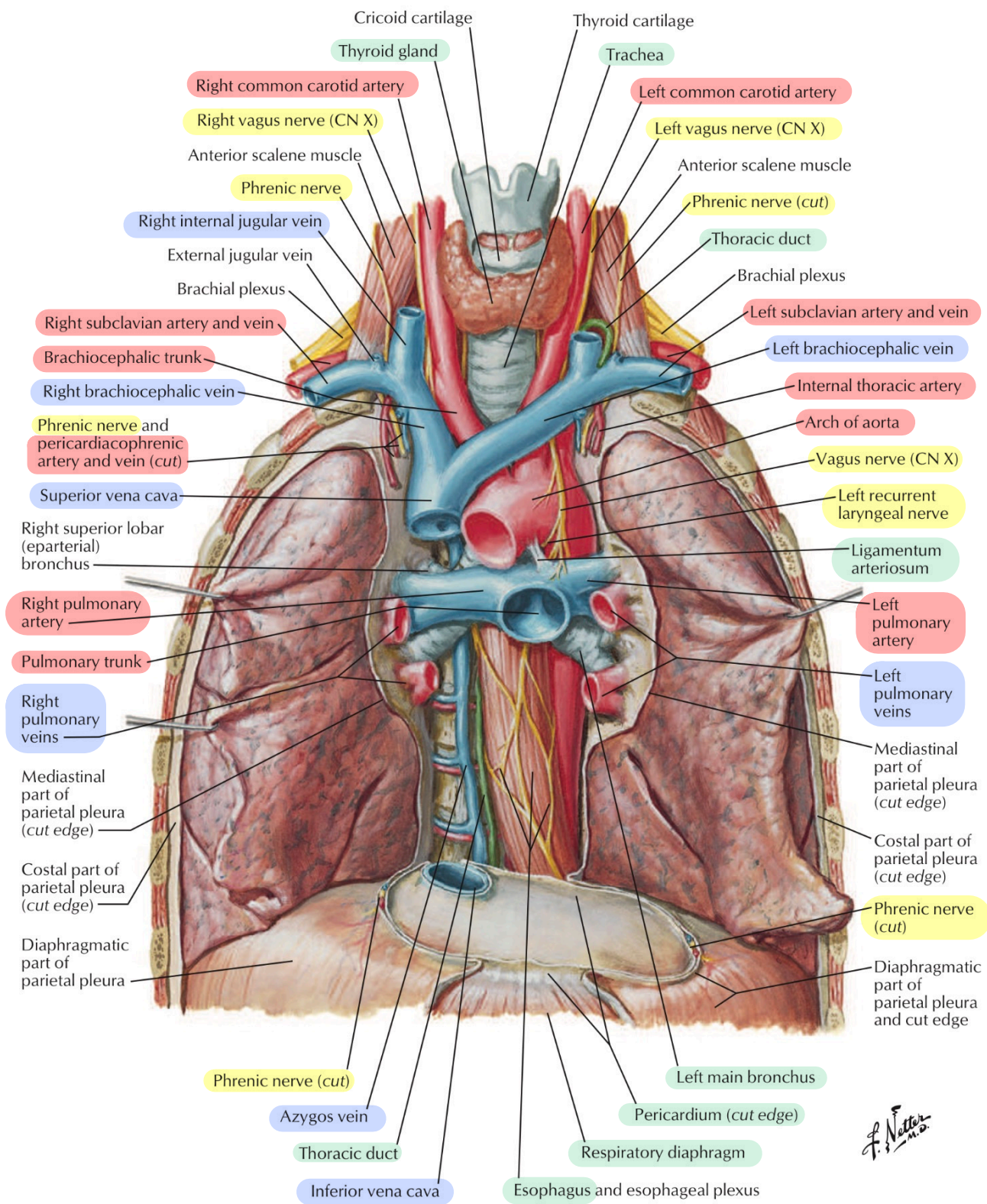


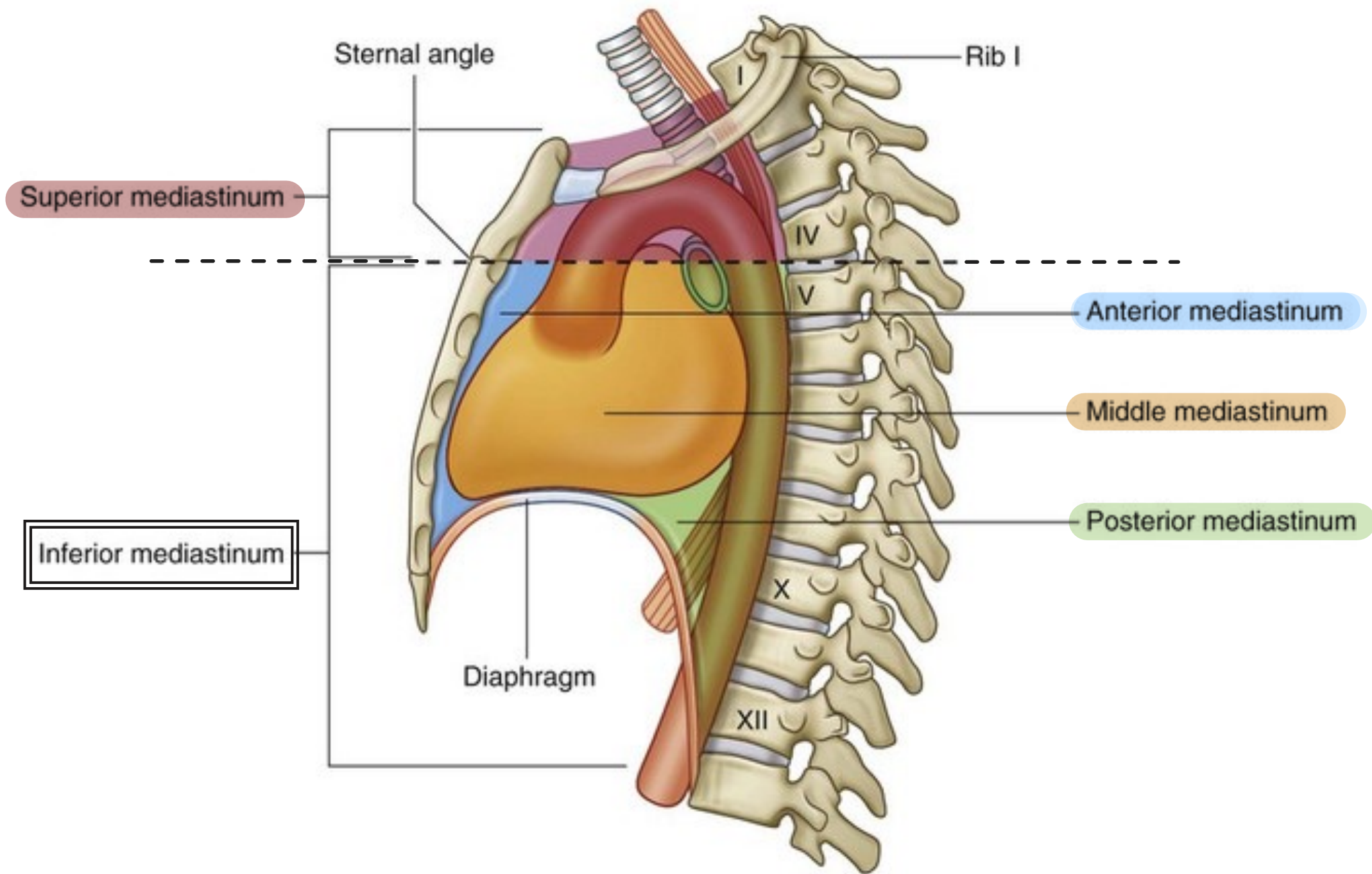












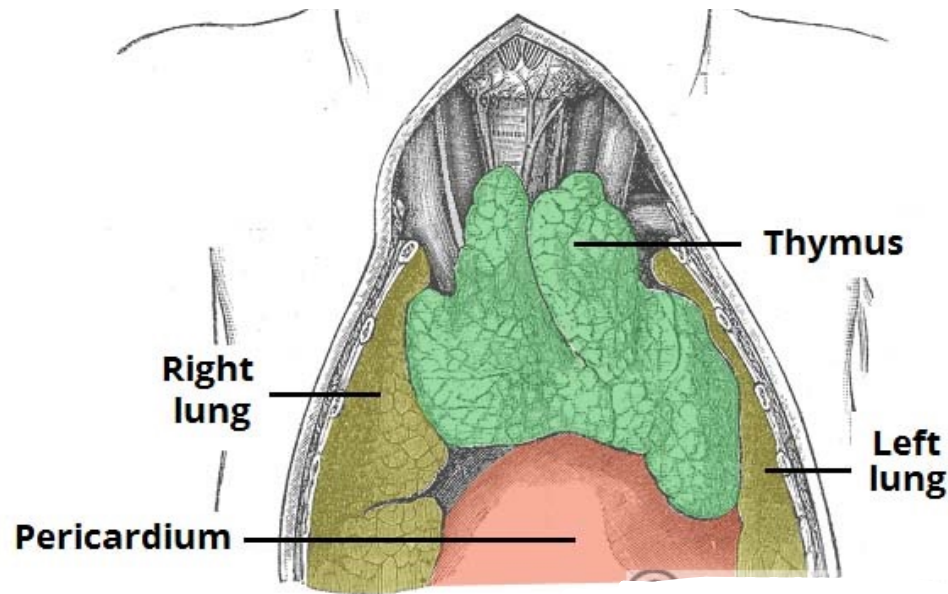
Inferior Mediastinum

Anterior Mediastinum

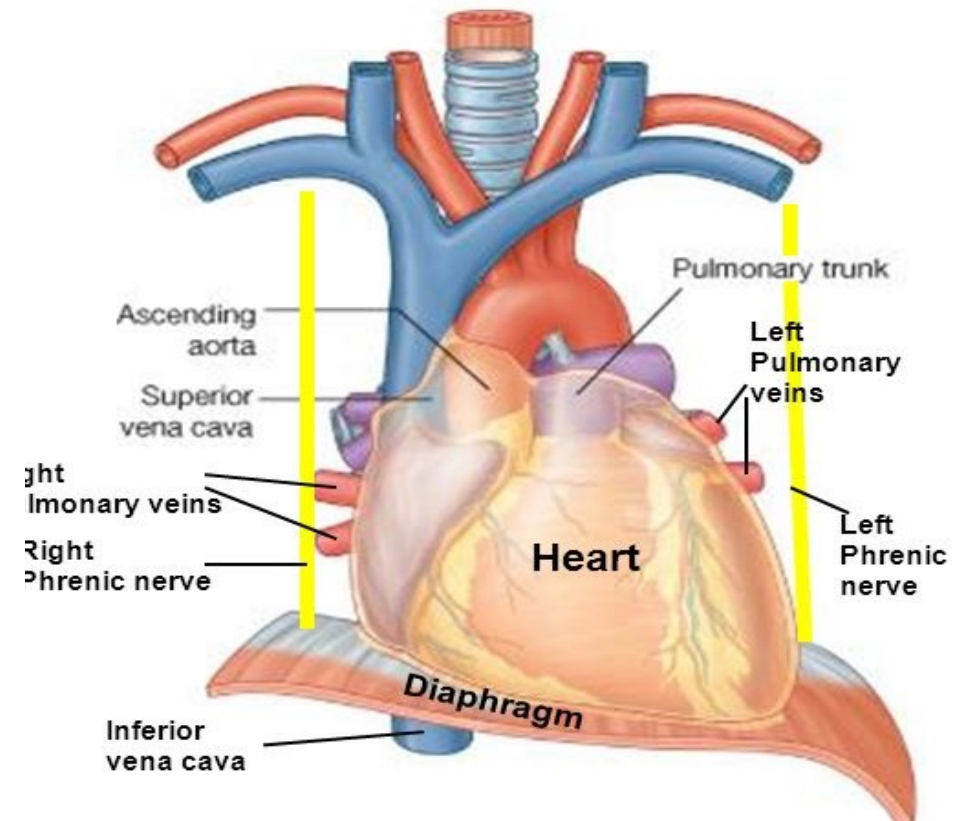
It lies between pericardium and sternum

Contents :

- 1- Superior and inferior sterno-pericardial ligaments
- 2- Mediastinal branches of internal thoracic artery.
- 3- Remains of thymus gland.
- 4- Lymph nodes.



Anterior Mediastinum



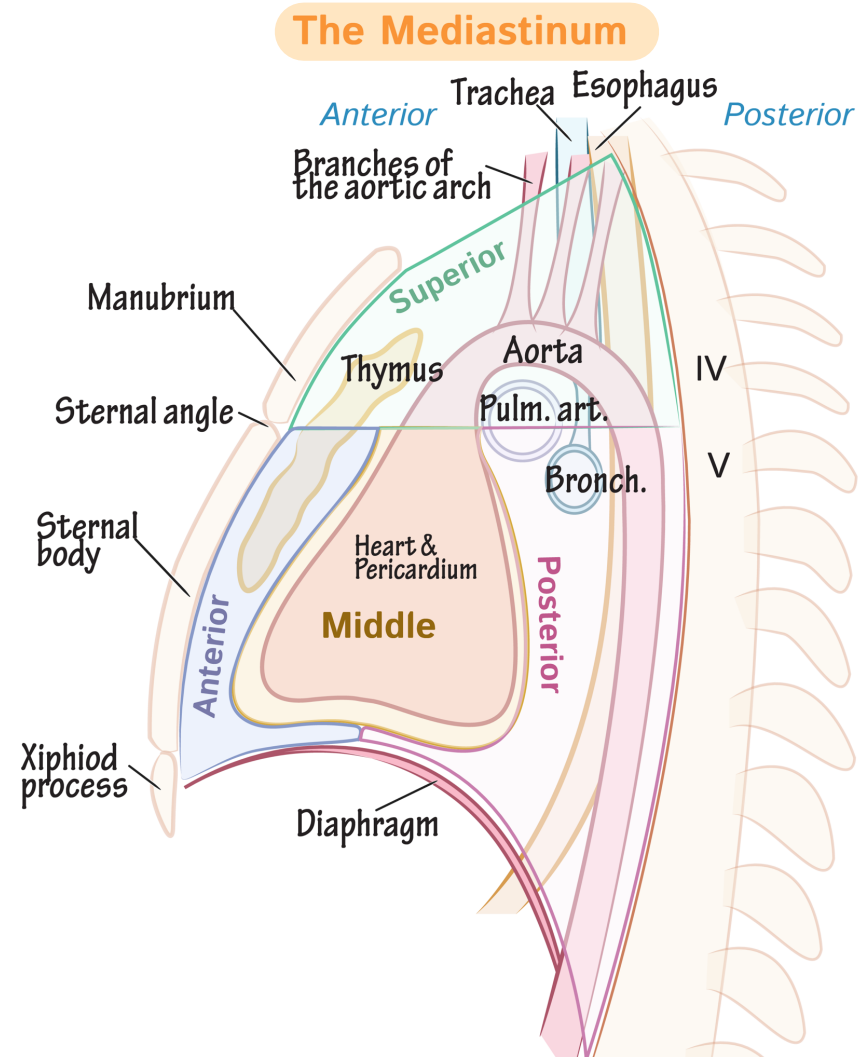
Posterior mediastinum

Boundaries:

Anteriorly : Pericardium & heart.

Posteriorly : Lower 8 thoracic vertebrae.
(T5-T12)

Laterally : Mediastinal pleura on each side.



Contents of posterior mediastinum:

1. Descending thoracic aorta (**Artery**)
 2. Azygos vein (**Vein**)
 3. Superior and inferior hemiazygos veins (**Vein**)
 4. Thoracic duct (**Lymph**)
 5. Posterior mediastinal lymph nodes (**Lymph**)
 6. Right and left vagi (**Nerve**)
 7. Esophagus (**Tube**)
- 

The inferior vena cava pierces the diaphragm directly into the heart, preventing it from traversing the posterior mediastinum.

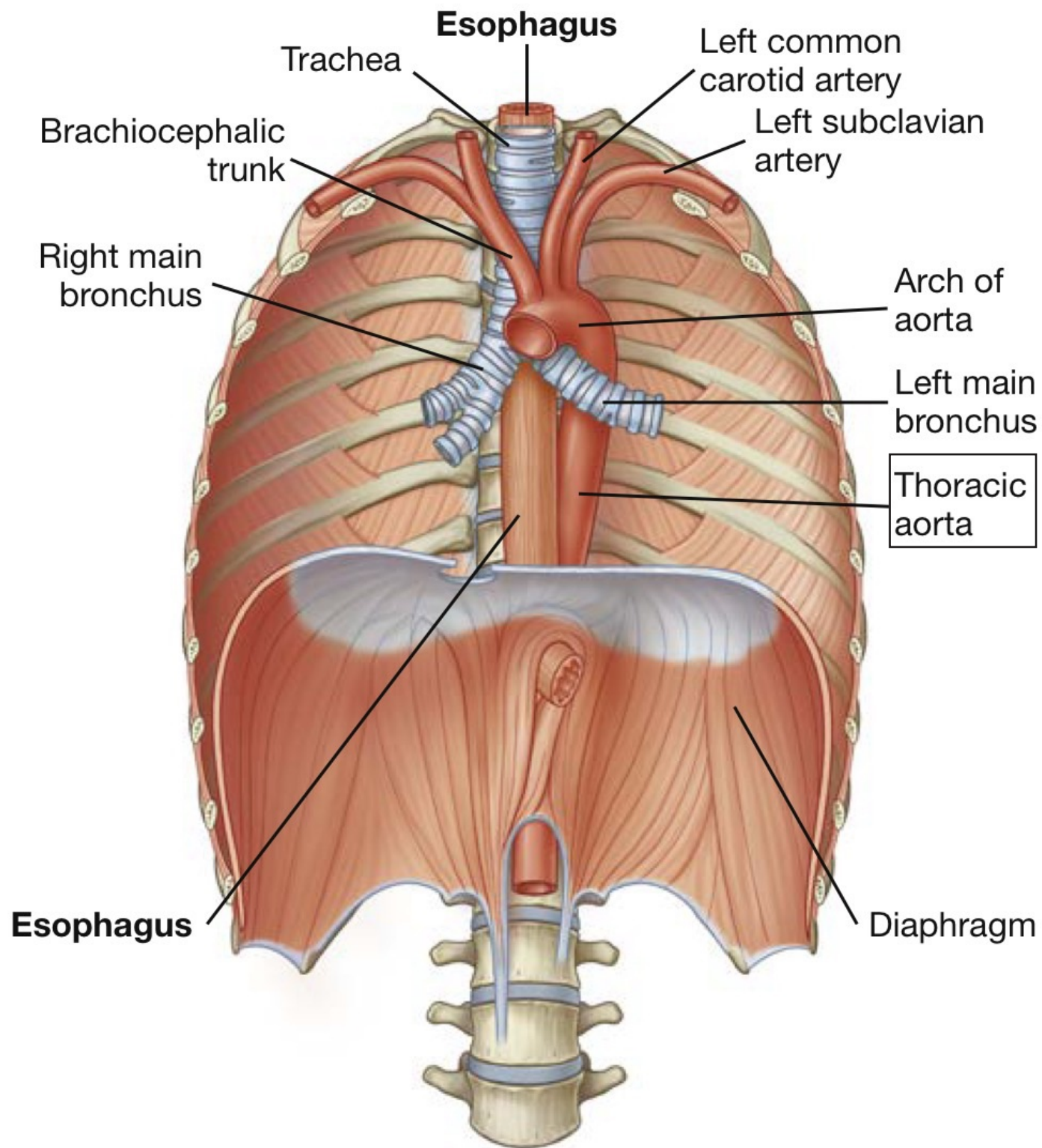
Descending thoracic aorta

Beginning : as a continuation of the arch of the aorta on the left side of the inferior border of the body of the **T4** vertebra

Course : It descends on the posterior mediastinum on the left sides of the **T5–T12** vertebrae

- It lies posterior to the root of the left lung and pericardium.
- The esophagus descends on the right side of aorta then crosses in front of it at level of **T7**.

Termination : It becomes abdominal aorta as it enters abdomen at **T12** vertebra through the aortic hiatus in the diaphragm



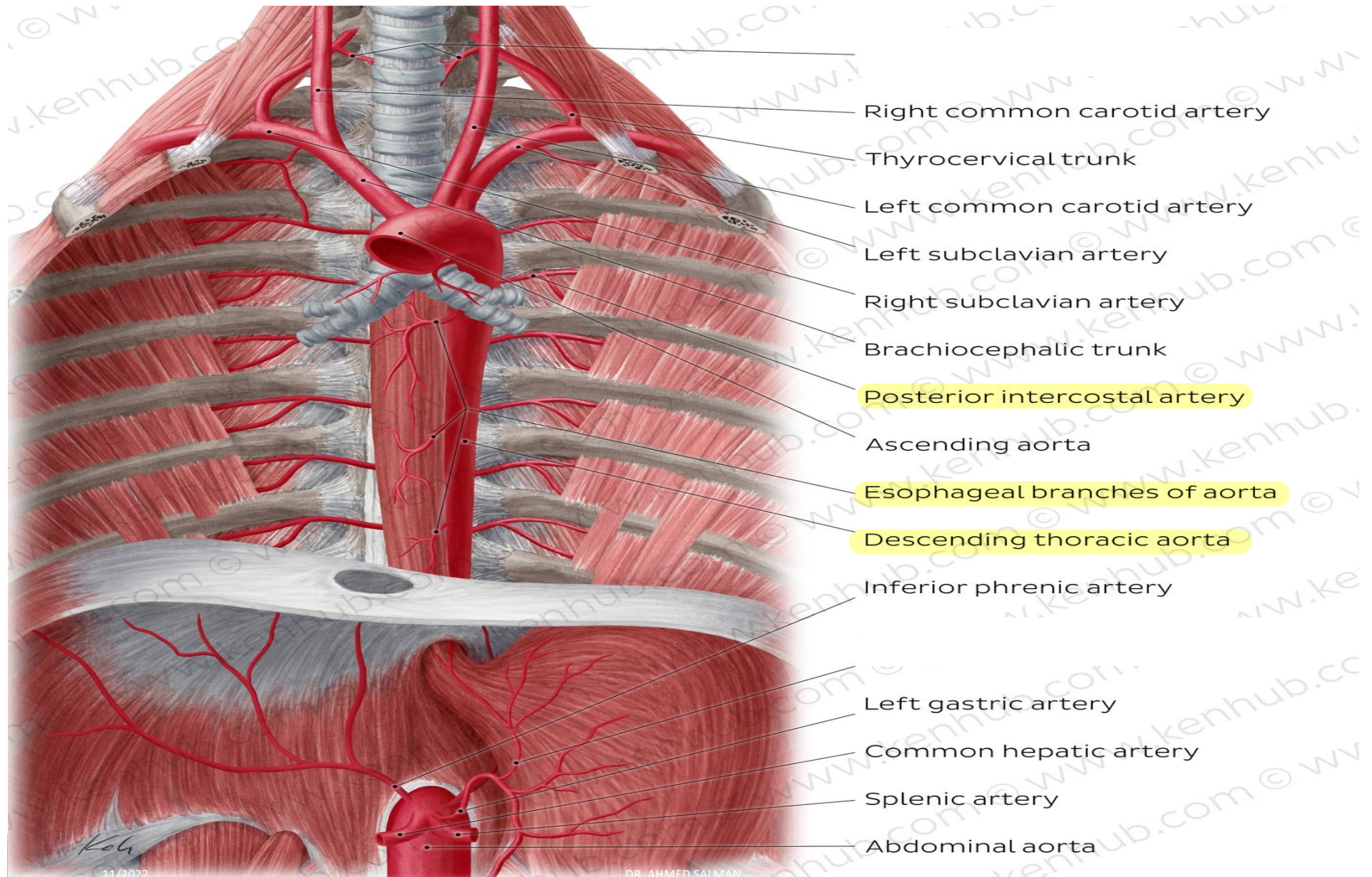
Branches:

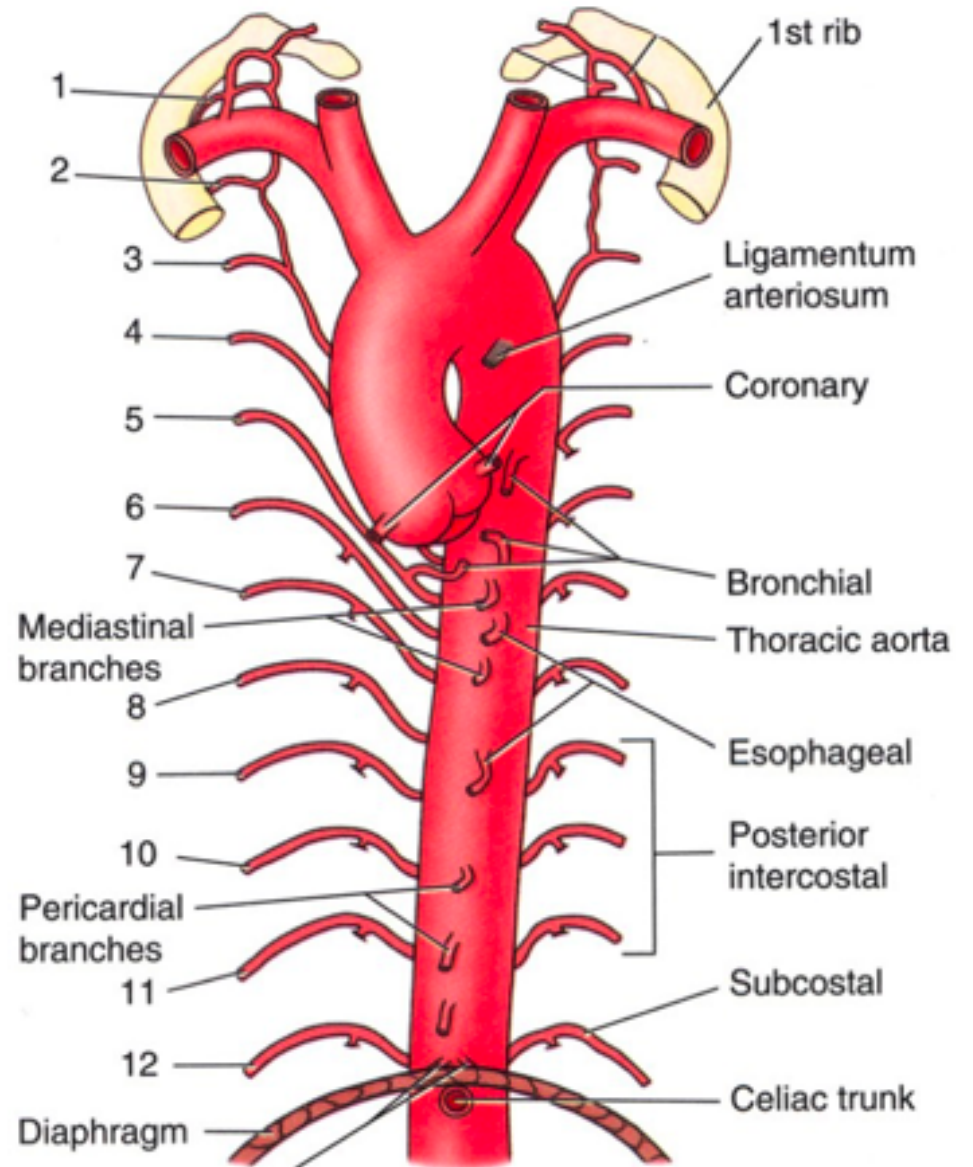
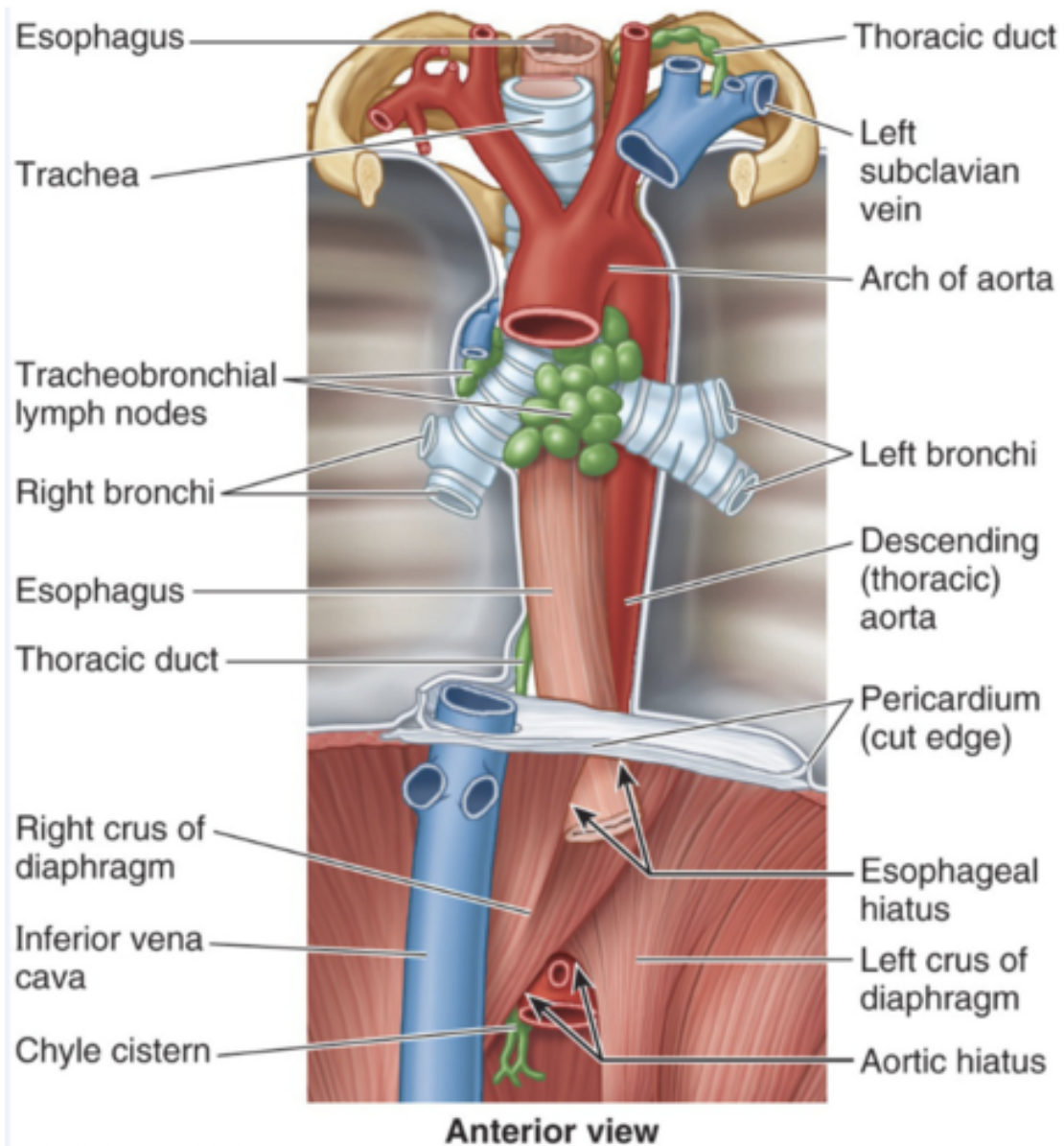
➤ **Parietal branches:**

1. Posterior intercostal arteries from 3-11.
2. Subcostal artery.
3. Superior phrenic artery.

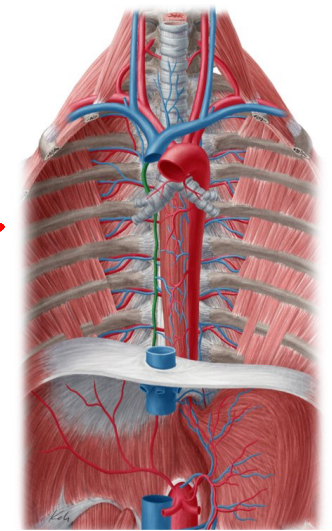
➤ **Visceral branches:**

1. Bronchial arteries.
2. Esophageal branches.
3. Pericardial branches.
4. Mediastinal branches.





Azygos Vein →



Beginning : *whatever* 😊

- From the back of IVC opposite **L2** (level of renal vein)
- Or by union of right subcostal and right ascending lumbar veins.

Course:

- It ascends through **aortic** opening of diaphragm. *At the level of T12*
- Then it ascends in posterior mediastinum till **T4** where it arches forwards above right bronchus

Termination: the back of SVC opposite **right 2nd costal cartilage.**

*REM the imaginary line : same level of the arch of Aorta
(here it come from the anterior to the posterior)*

SVC

1st CC

Beginning

2nd CC

Receive Azygos

3rd CC

Termination

Tributaries:

2. Right ascending lumbar vein.
3. Right posterior intercostal veins from 4-11
(2nd and 3rd posterior intercostal veins drained into right superior intercostal vein which drained into arch of azygos.
4. Right subcostal vein
5. Superior and inferior hemiazygos veins.
6. Right bronchial veins.
7. Esophageal veins.
8. Pericardial veins.
9. Mediastinal veins.

Branches of descending aorta:

Posterior intercostal arteries from 3-11.

Subcostal artery.

Superior phrenic artery.

Bronchial arteries.

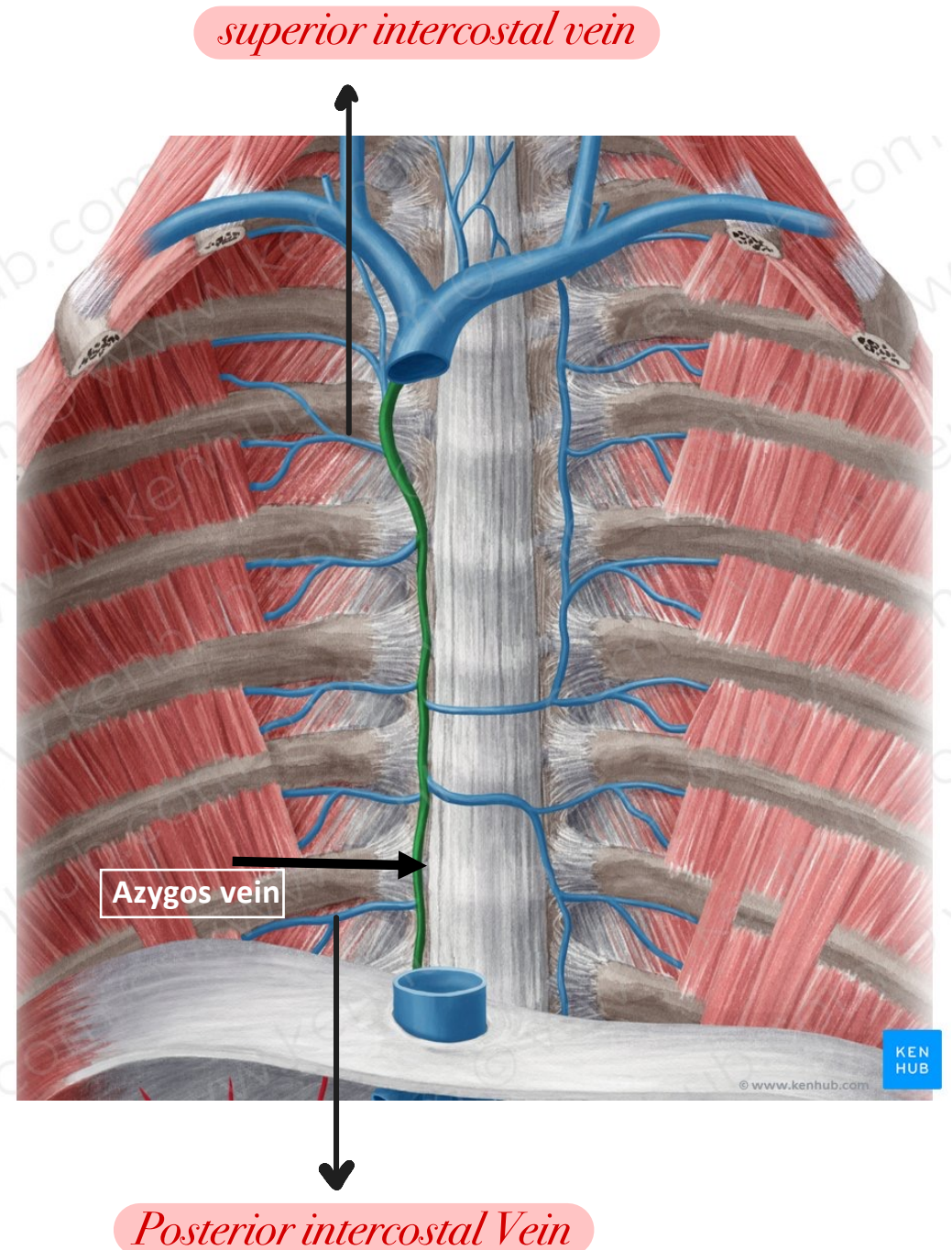
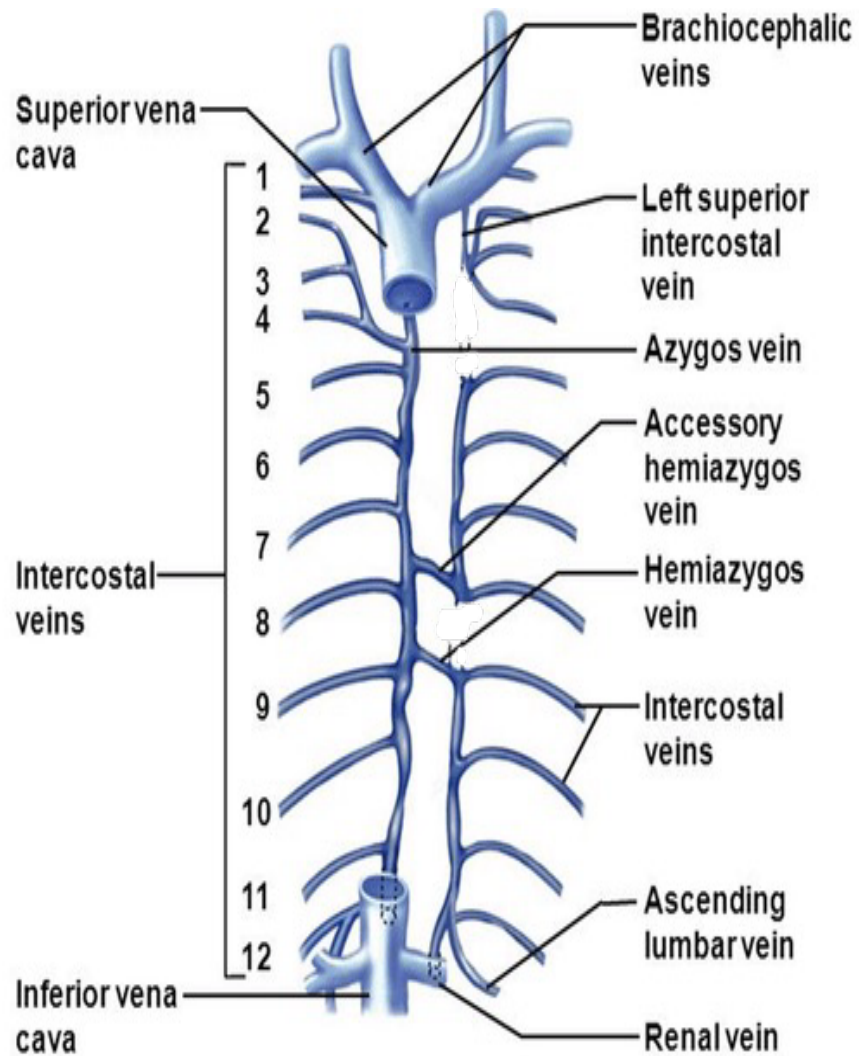
Esophageal branches.

Pericardial branches.

Mediastinal branches.

Clinical note:

- Azygos vein is a direct link between SVC and IVC .
- So, it can help in cases of thrombosis of SVC or IVC
- The azygos vein communicates with the vertebral venous plexuses that drain the back, vertebrae, and structures in the vertebral canal.



Superior hemiazygos

It is a longitudinal venous channel that descends on the left side of vertebral body

Termination:

At the level of **T7**, it curves to right to end in azygos vein.

Tributaries:

1. Left posterior intercostal veins from 4-8
2. Left bronchial veins.

Inferior hemiazygos vein

Beginning : From the back of the left renal vein opposite L2.

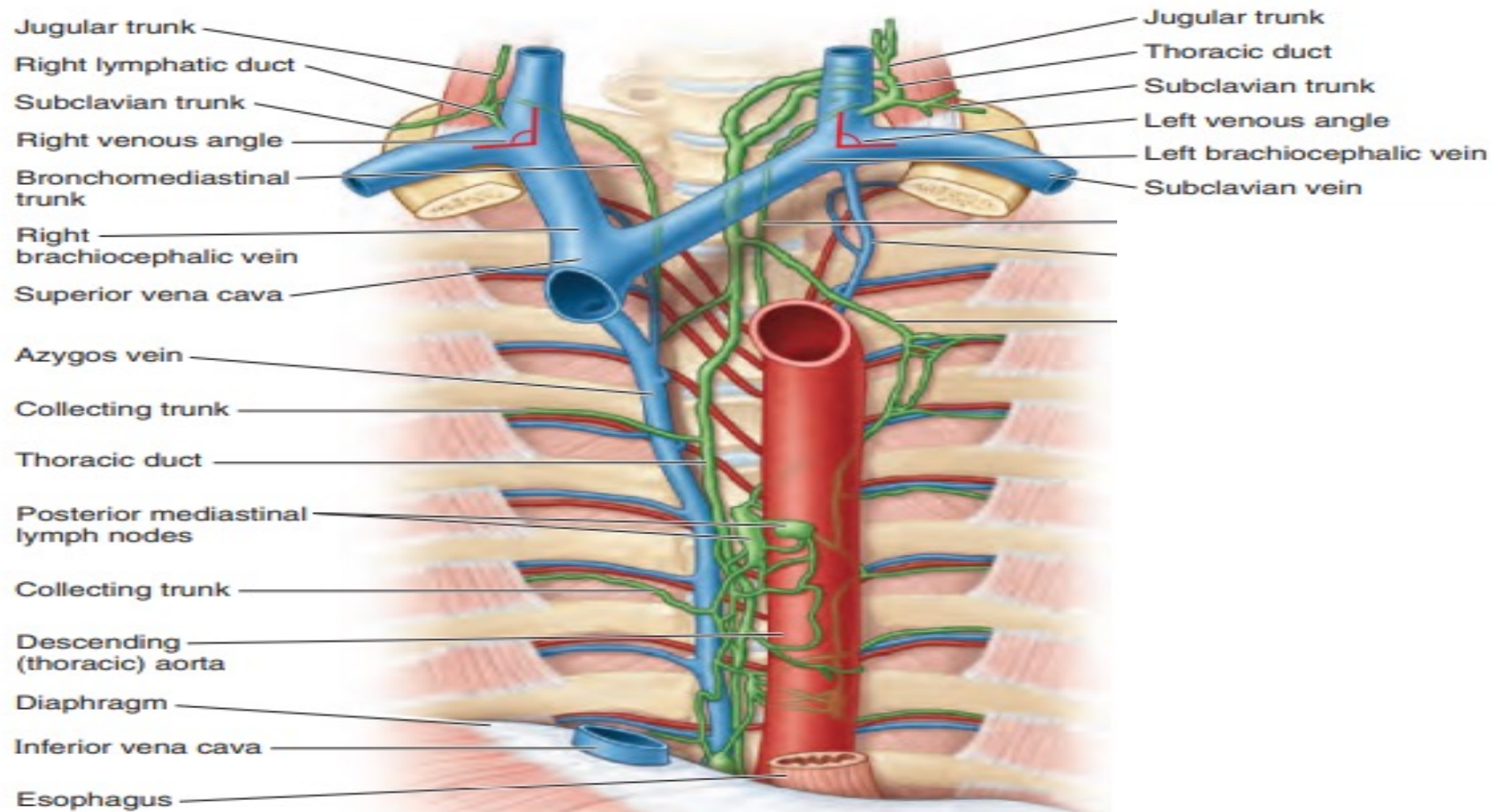
- Or by union of left subcostal and left ascending lumbar veins.

Termination :

- At the level of **T8**, it curves to the right to end into azygos vein.

Tributaries:

1. Left posterior intercostal veins from 9-11.
2. Left subcostal and left ascending lumbar veins.



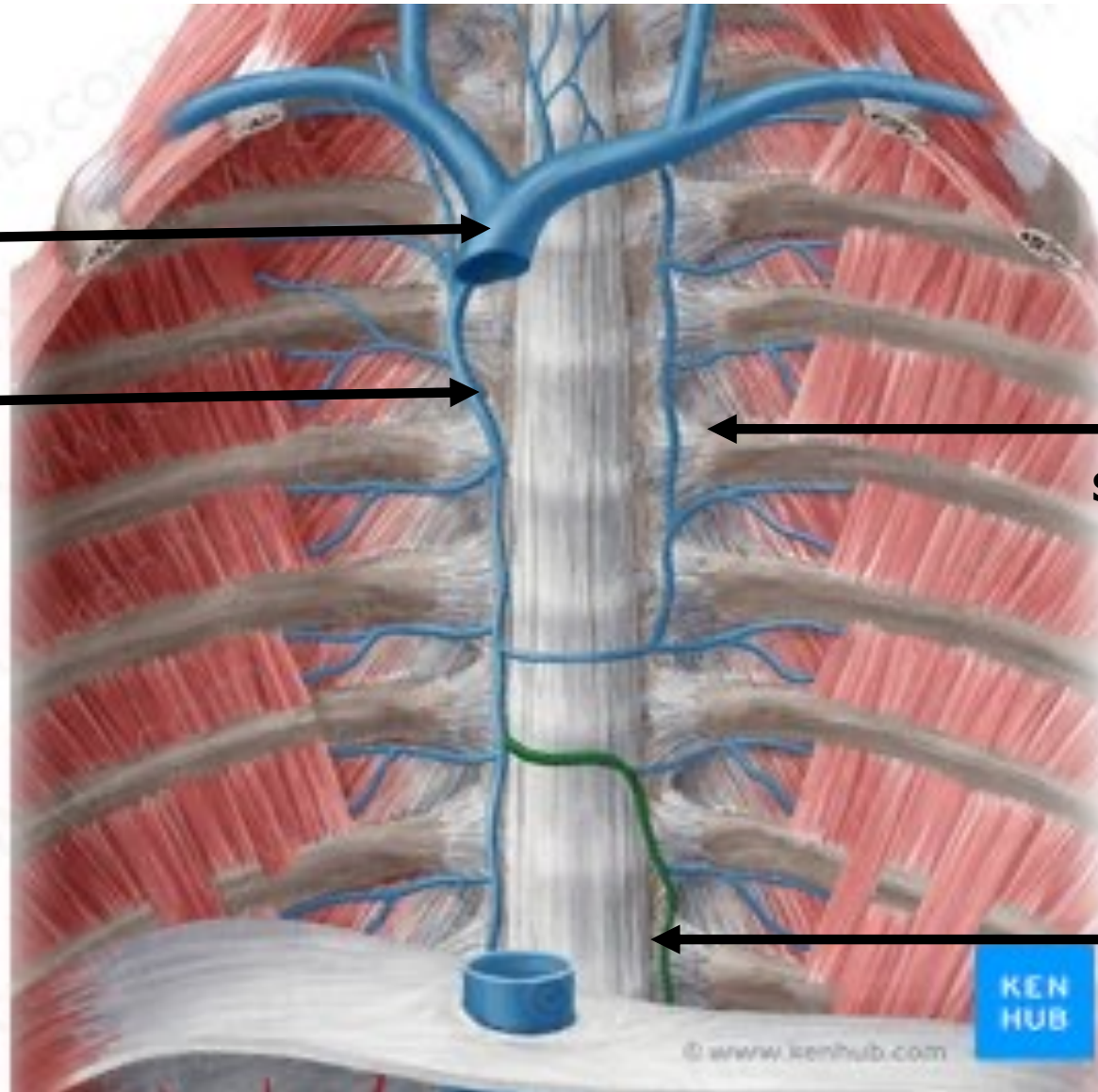
(A) Anterior view

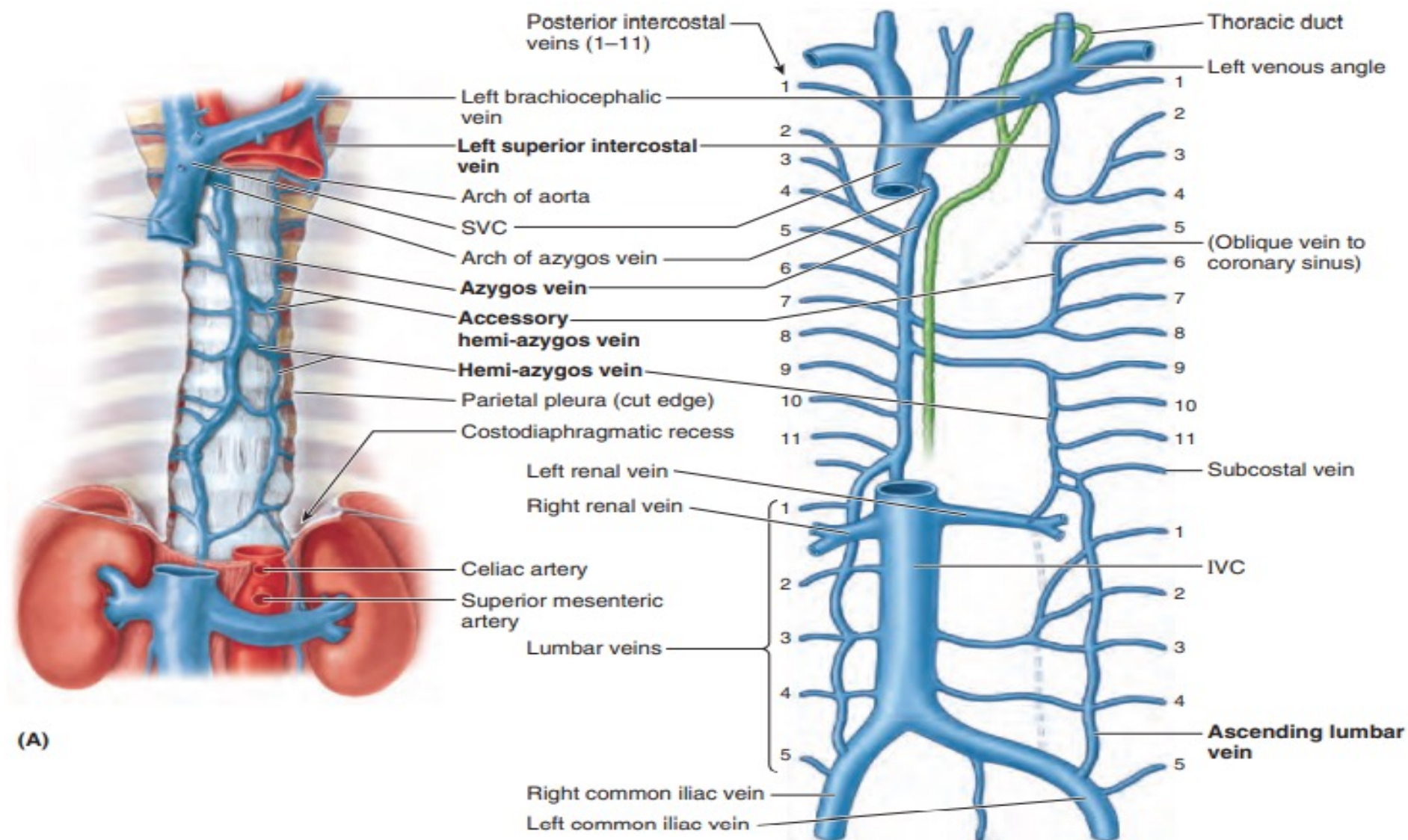
SVC

**Azygos
vein**

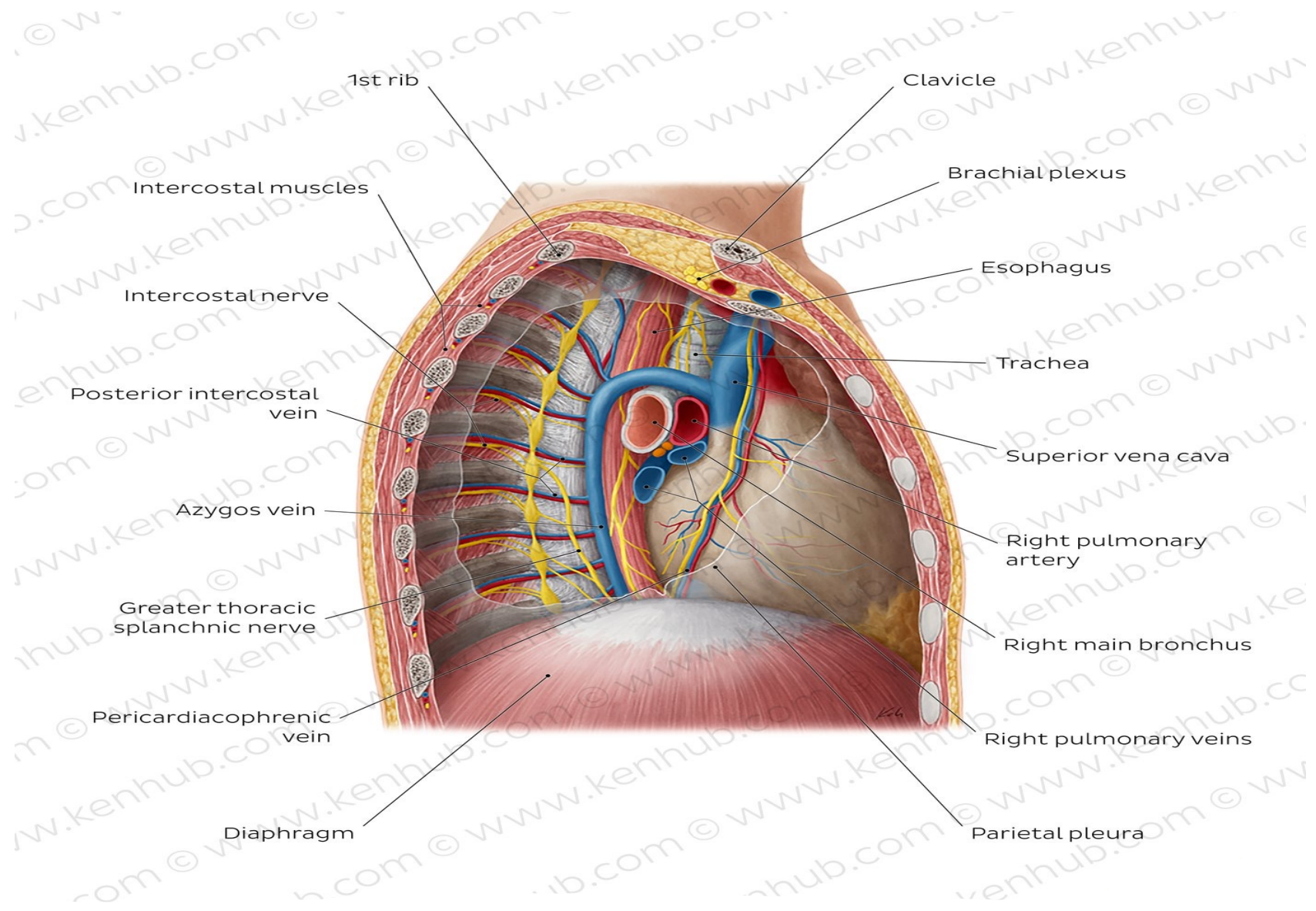
**Superior hemiazygos
vein**

**Inferior hemiazygo
vein**





(A)



1st rib

Intercostal muscles

Intercostal nerve

Posterior intercostal vein

Azygos vein

Greater thoracic splanchnic nerve

Pericardiophrenic vein

Diaphragm

Clavicle

Brachial plexus

Esophagus

Trachea

Superior vena cava

Right pulmonary artery

Right main bronchus

Right pulmonary veins

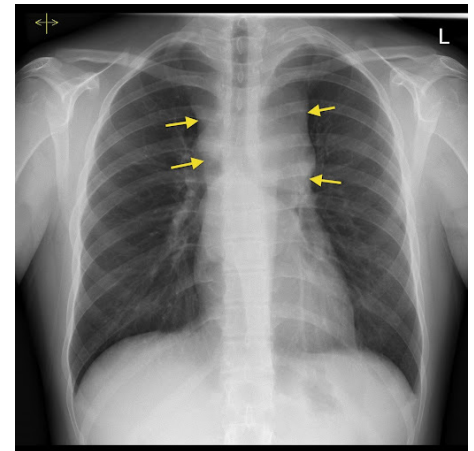
Parietal pleura

Mediastinal syndrome

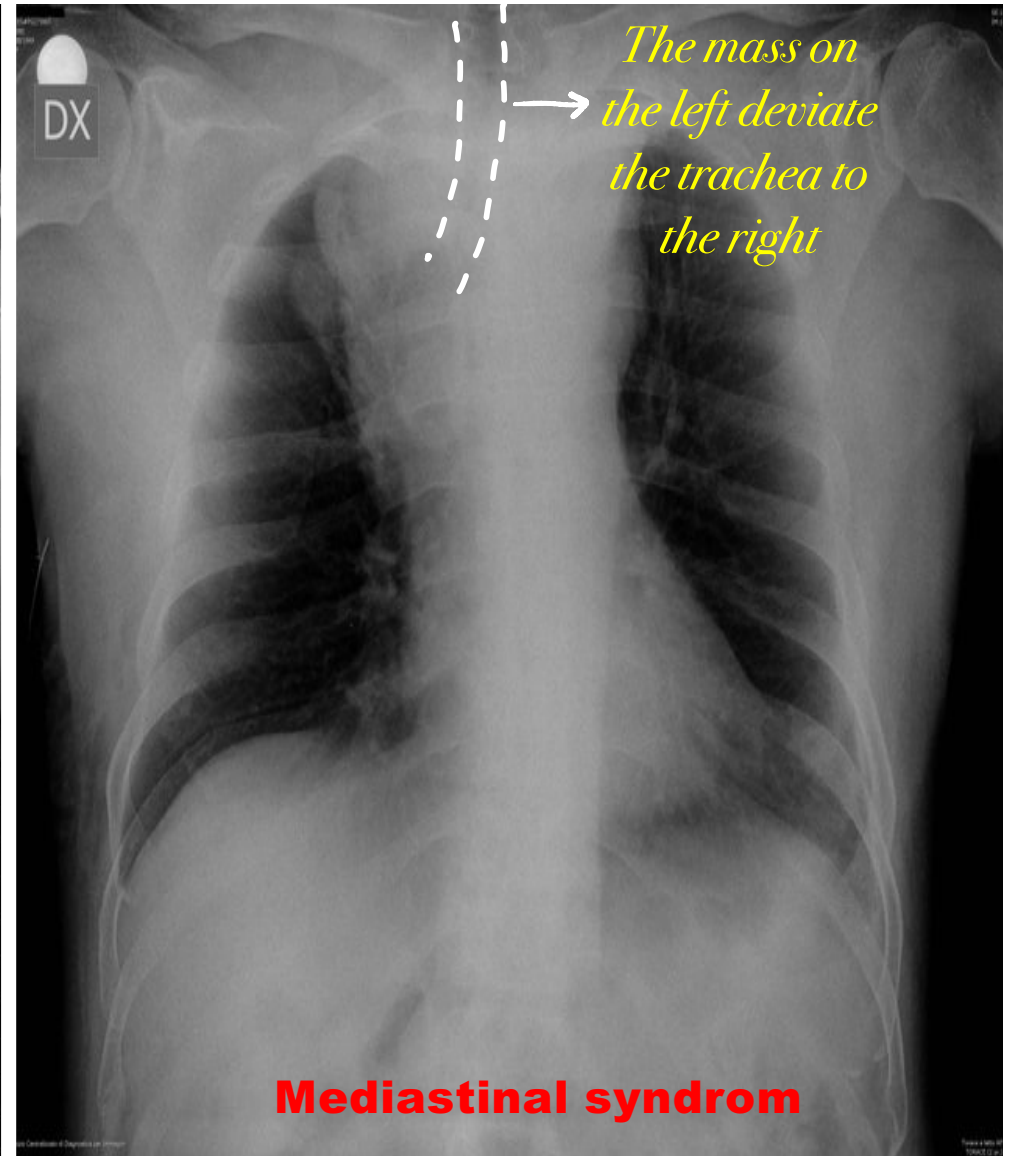
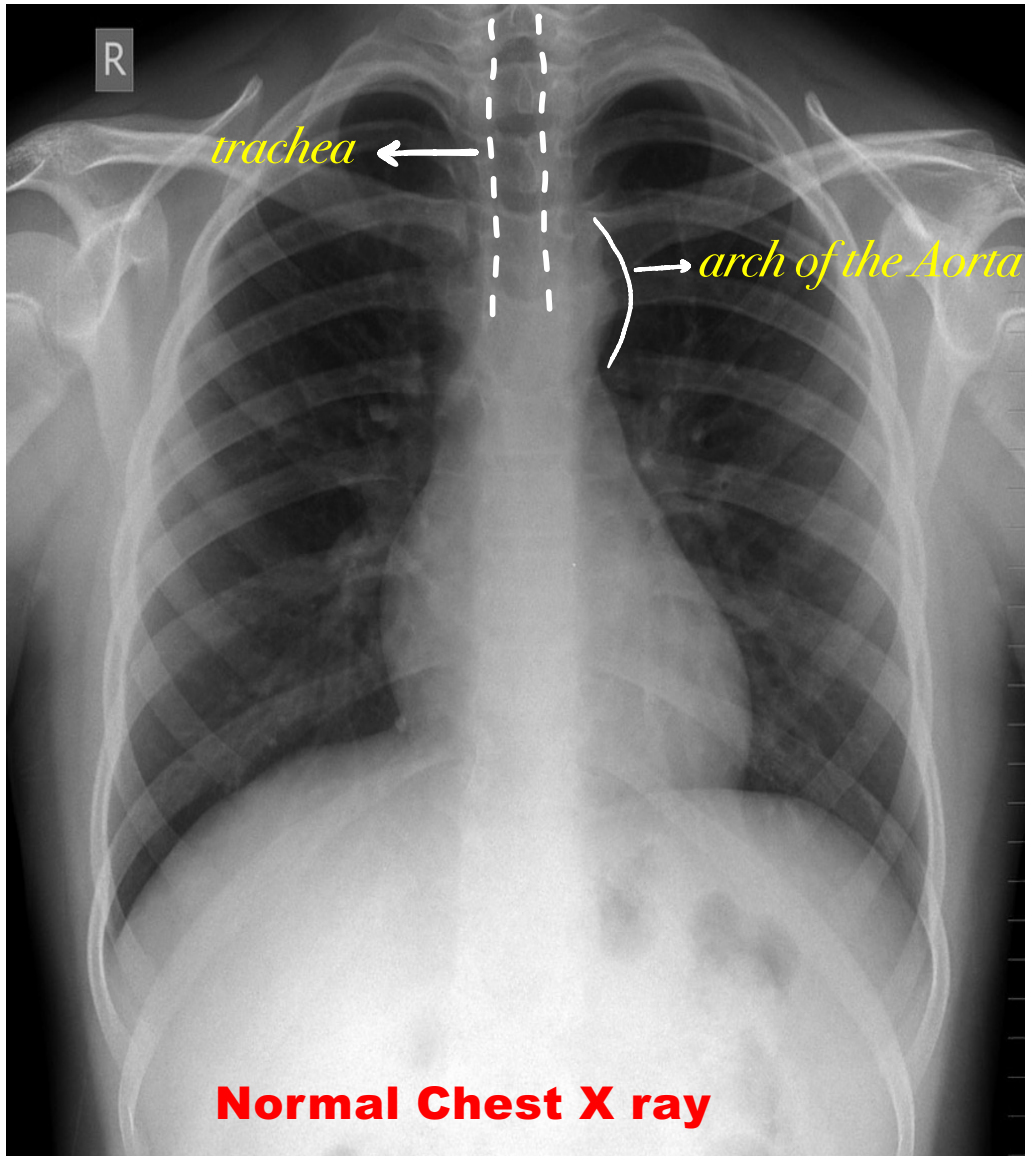
Definition: group of symptoms due to compression of the mediastinal contents by a space-occupying lesion.e.g. malignant tumour as lung cancer or non-Hodgkin's lymphoma

Symptoms:

- **Dyspnea**: due to compression of **trachea**.
- **Dysphagia**: due to compression of **esophagus**.
- **Congestion of veins**: due to compression of **SVC**.
- **Ischemia**: due to compression of **branches of arch of aorta**.
- **Hoarseness of voice**: due to compression on **left recurrent laryngeal nerve**.
- **Paralysis of hemi-diaphragm**: due to compression on **phrenic nerve**.



Where do you think the Mass located right? Left? 🤔



A 62 years old male patient has diagnosed as lung cancer . He is a heavy smoker, diabetic, and hypertensive. During a chemotherapy session for lung cancer, he complained of dyspnea for a week, and the doctor noticed edema in the face and arms . The doctor asked him to raise his hands above the head, and he noticed increased the edema.

What is your provisional diagnosis ??

Superior Vena Cava Syndrome

Superior vena cava syndrome is when something presses on or blocks a big vein in your chest, disrupting blood flow. Lung cancer and certain implanted medical devices are the most common causes. Early signs include swelling and bulging veins in your upper body. Providers treat this condition with procedures, medications and (rarely) surgery.



Superior vena cava syndrome (SVCS)

Due to obstruction of Superior vena cava *The venous return will increase upward*

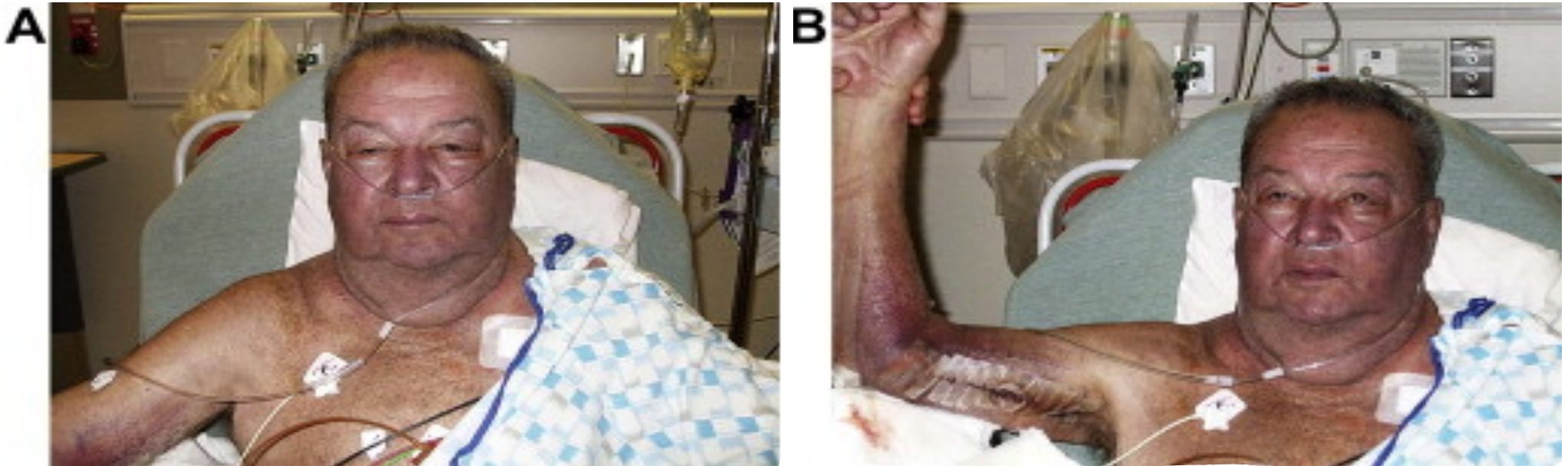
Manifestation

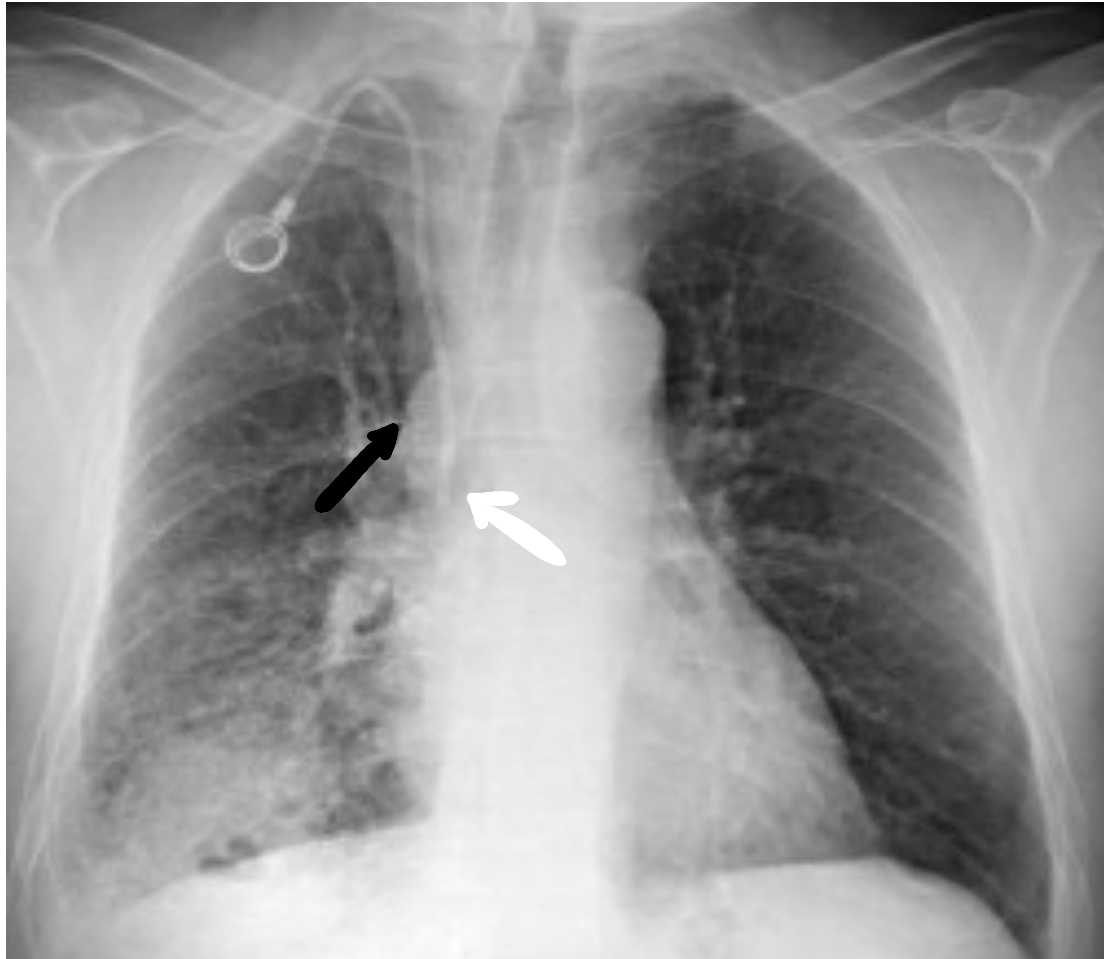
Dyspnea and edema in the face and arms

Pemberton sign:

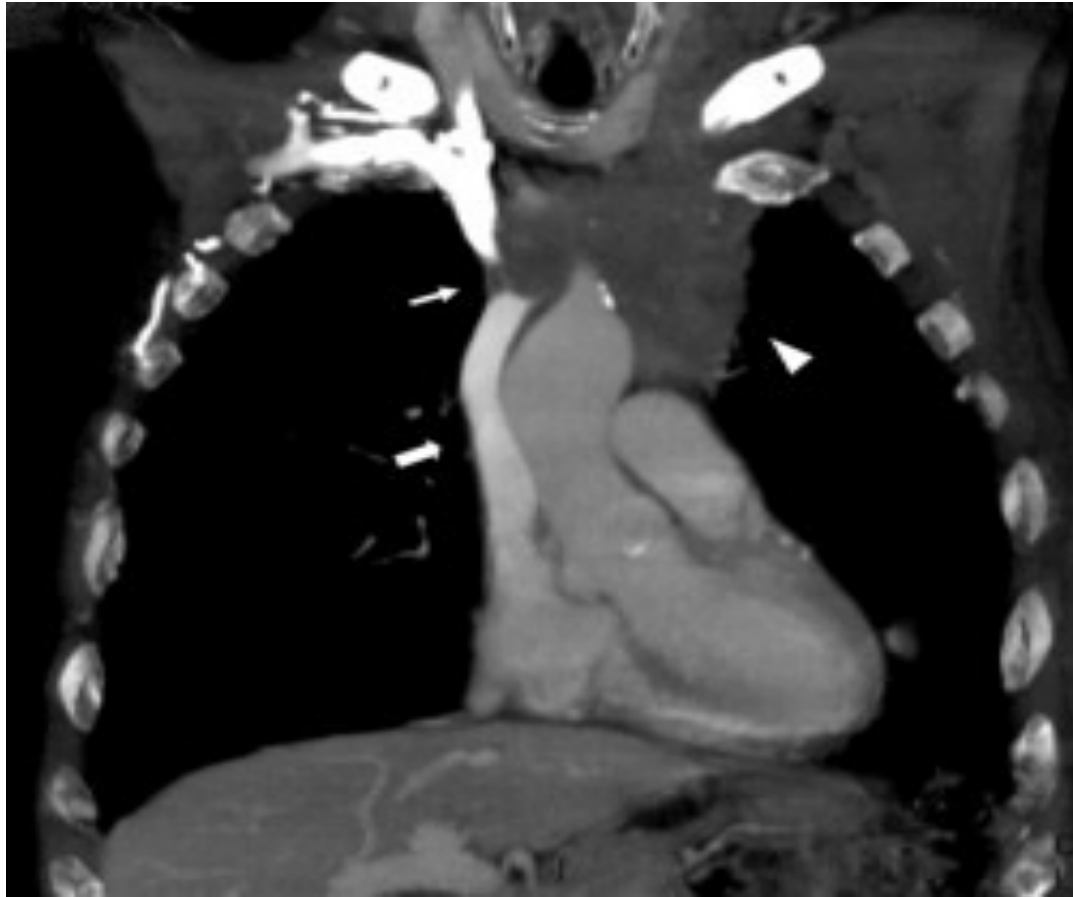
Ask the patient to raise both arms above head, facial edema or cyanosis indicates SVCS

<https://www.youtube.com/watch?v=dz4CEkntWPM>





Front chest X-ray showing the overly short distal catheter (white arrow) and the dilation of the arch of the azygos vein (venous shunt) indicating the obstruction of the superior vena cava.



The CT scan (coronal reconstruction) detects the tumoral mass (tip of arrow) provoking a focal occlusion of the superior vena cava (SVC) (arrow). The underlying SVC (wide arrow) is permeable and opacified by the collateral veins (re-entry by the azygos vein). Stasis of the contrast product in the SVC underlying the obstacle.

Jugular venous pressure (JVP)

Read Only

- ✓ It provides an indirect measure of central venous pressure.
- ✓ The internal jugular vein connects to the right atrium without any intervening valves ,thus acting as a column for the blood in the right atrium.

Difference between carotid and jugular pulse

The jugular venous pulse is:

Not palpable.

Obliterated by pressure.

Variable with respiration - it decreases with inspiration.

Causes of increased Jugular venous pressure

Heart failure.

Constrictive pericarditis

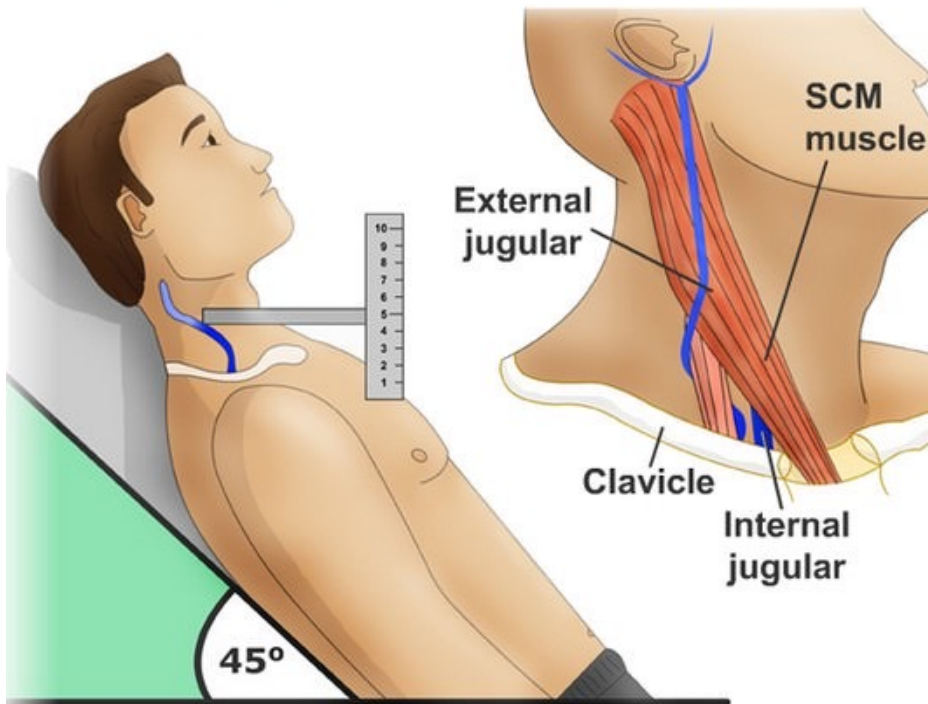
Pulmonary hypertension.

Fluid overload – eg. renal disease.

Superior vena cava obstruction .

<https://www.youtube.com/watch?v=4YBXaWWG3Ns>

Jugular venous pressure



Reed Only

