Human Anatomy -1st year
2020-2021

Thoracic Cavity

Lecture (3)

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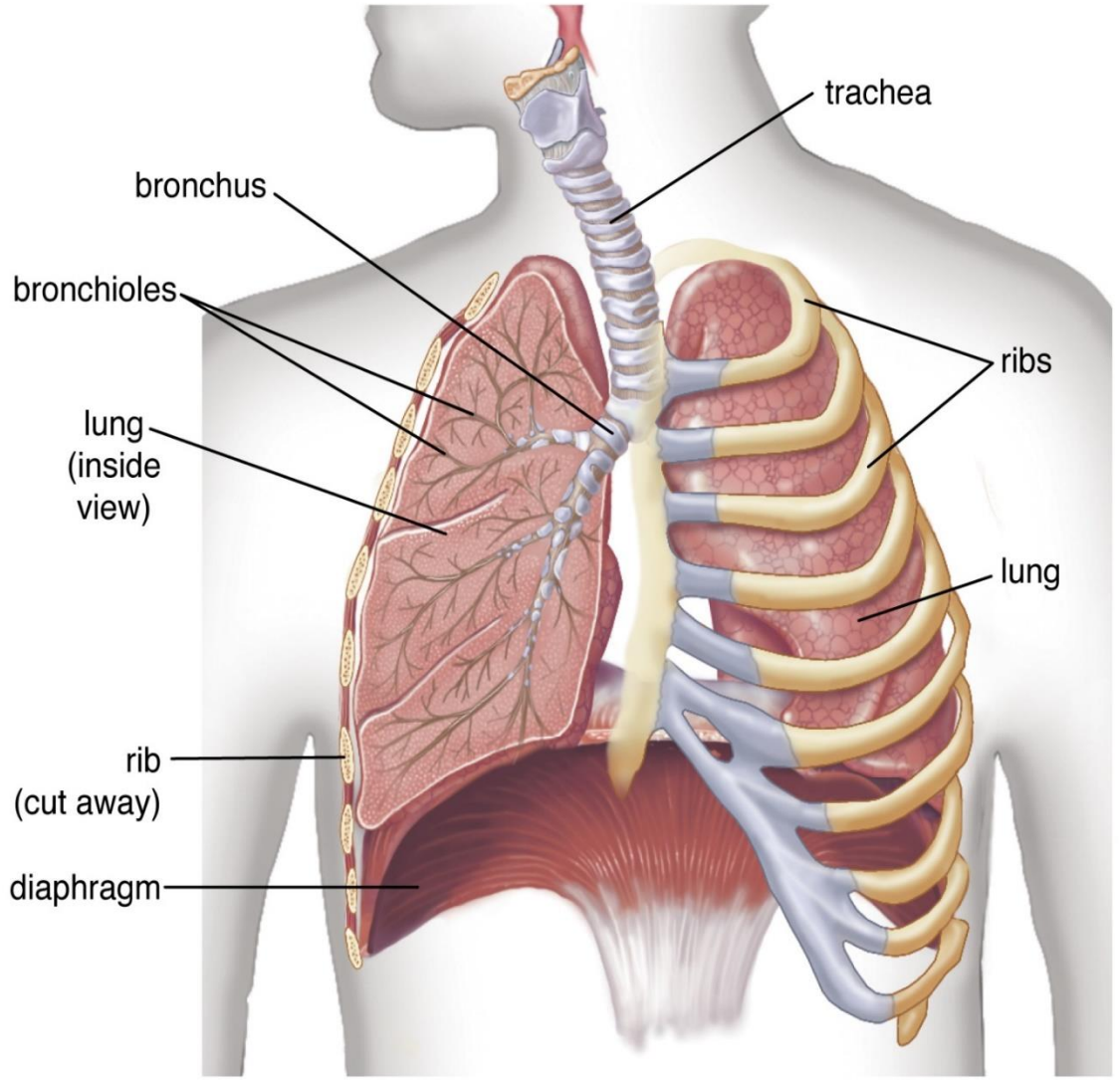
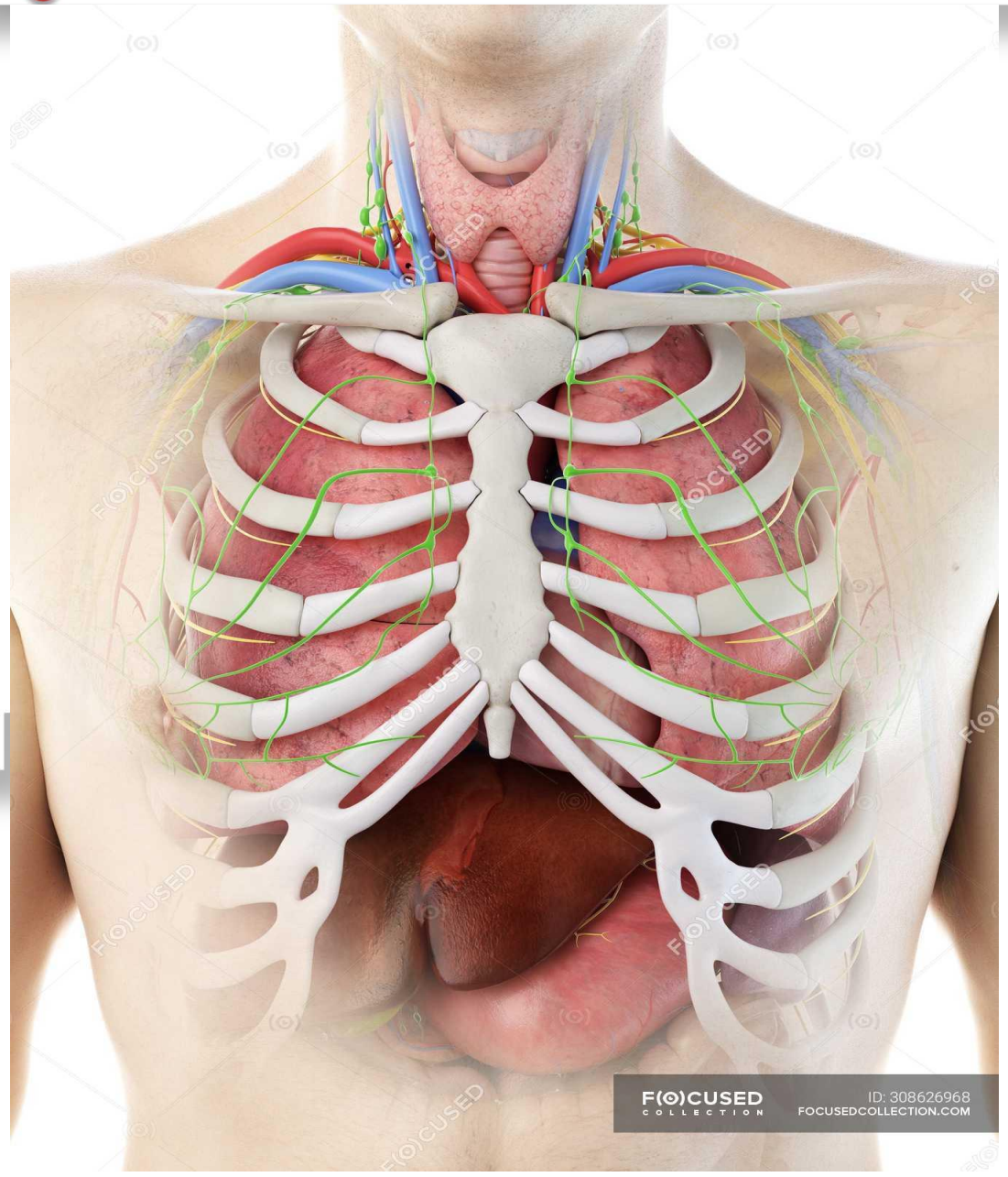


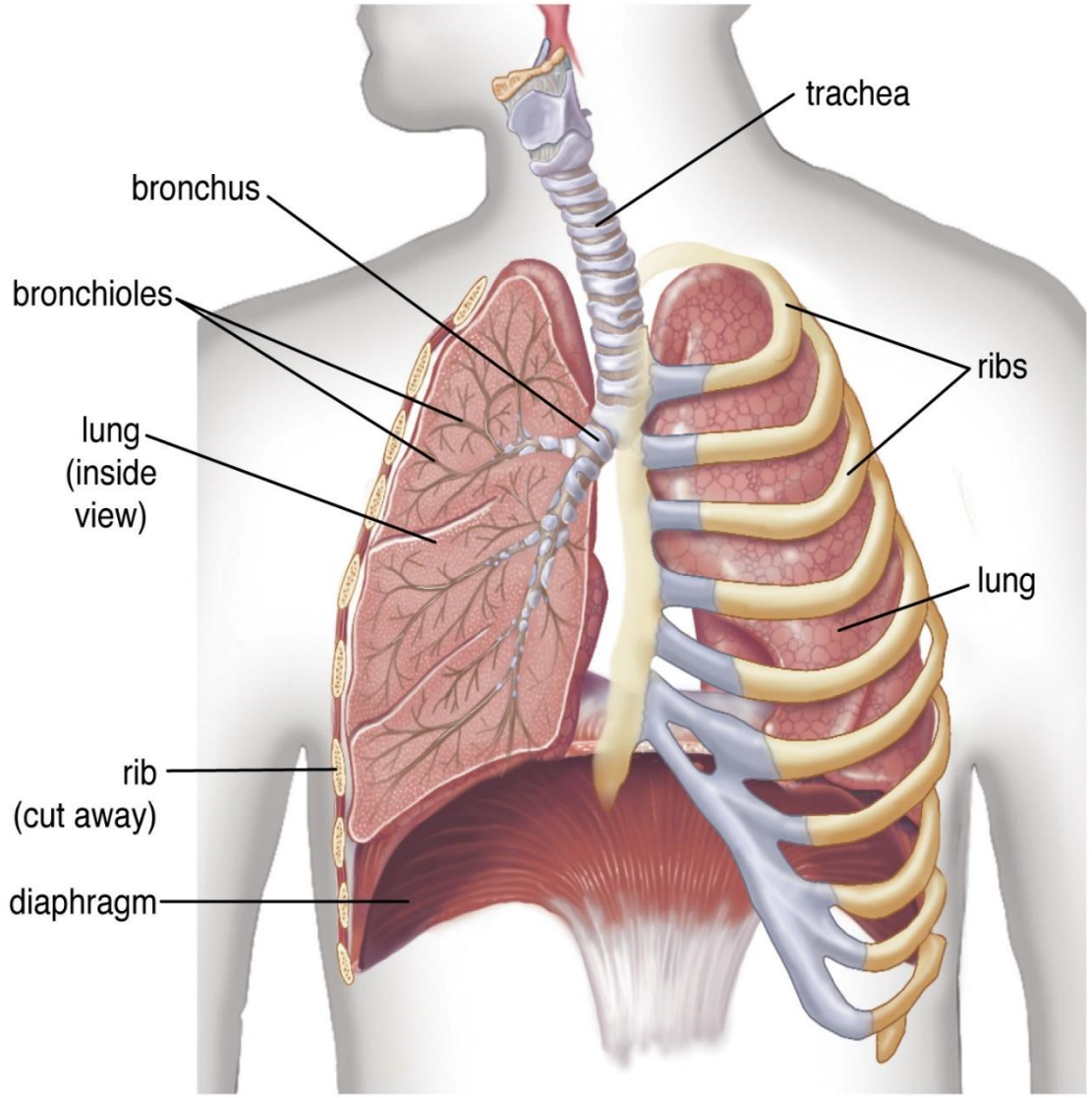
Learning Objective

*Divisions of thoracic cavity
*Definition of mediastinum
*Divisions of mediastinum
*Contents of mediastinum



Thoracic cavity

- The second largest cavity in the body. It is bounded by the chest wall anteriorly ,posteriorly and laterally.
- It extends upward into the root of the neck.
- Inferiorly ,it is separated from abdominal cavity by the diaphragm.



Thoracic cavity

Chest cavity can be divided into:

1. Median part :Mediastinum
2. lateral part :pleurae and lungs.

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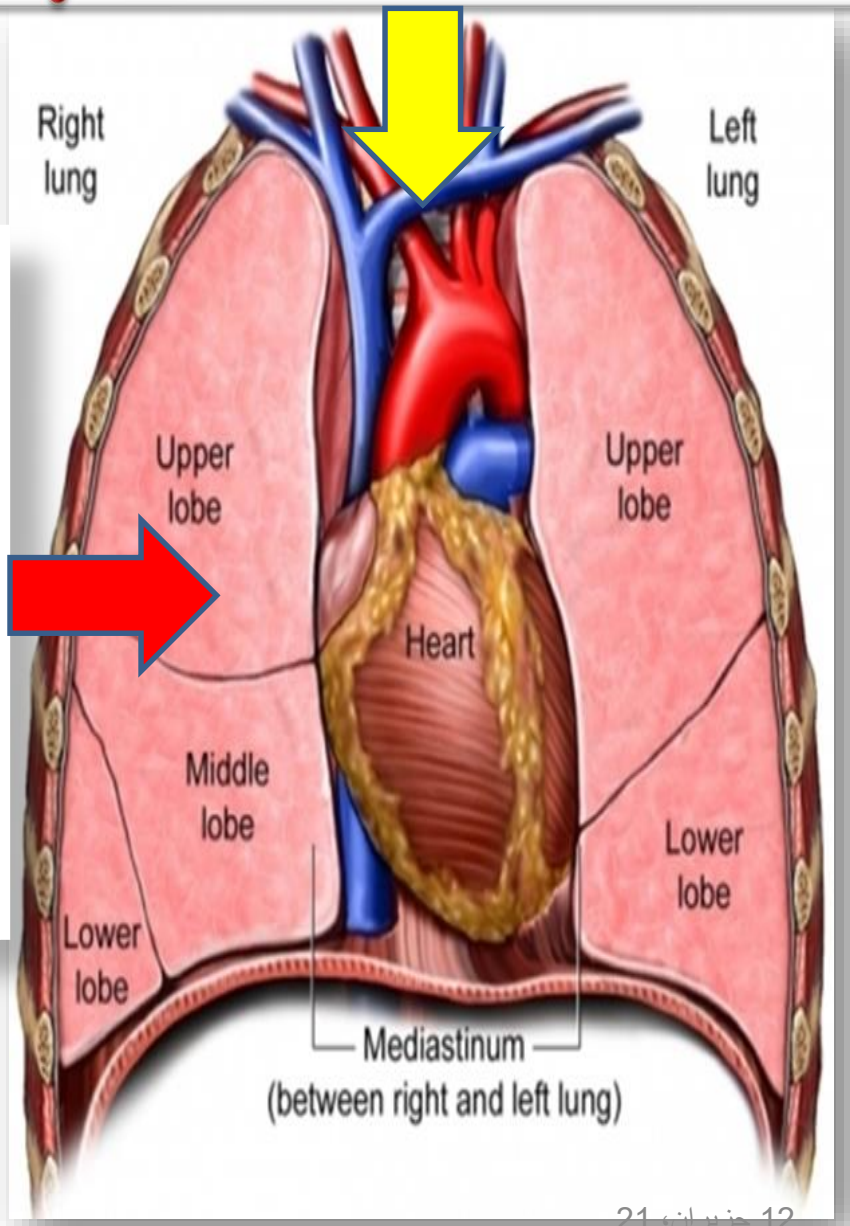
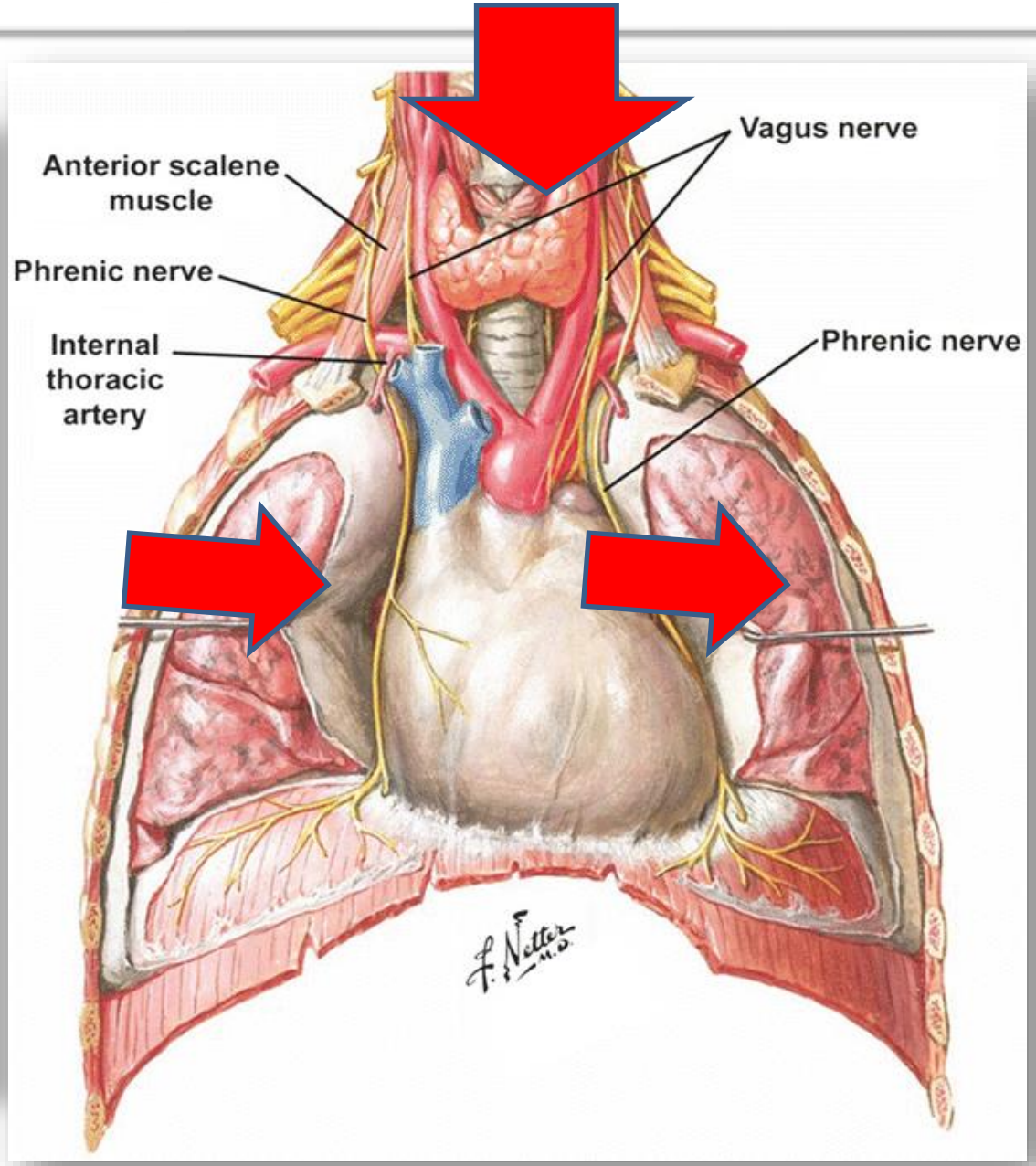


Mediastinum

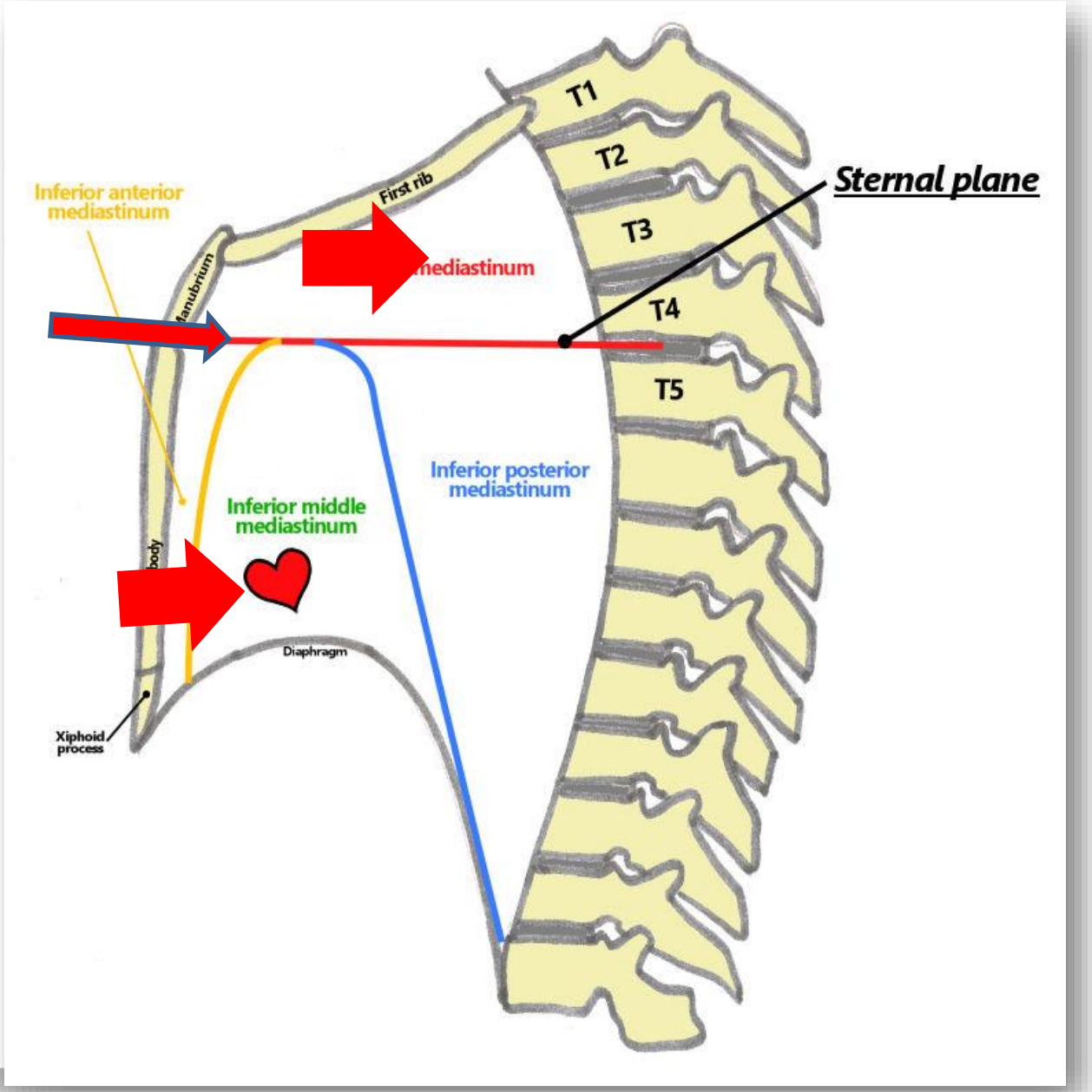
*It is the central part of thoracic cavity that, extends superiorly to superior thoracic aperture and the root of neck and inferiorly to diaphragm.
*It bounded anteriorly by the sternum and posteriorly by vertebral column.



Mediastinum

It can be divided by thoracic plane (Sternal plane) which is an imaginary plane extends from sternal angle anteriorly to the the lower border of T4 (disc between T4-T5) posteriorly into:

1. The superior mediastinum starts at the superior thoracic aperture and ends at the thoracic plane.
2. The inferior mediastinum from thoracic plane to the diaphragm.



1. Superior Mediastinum

Boundaries:

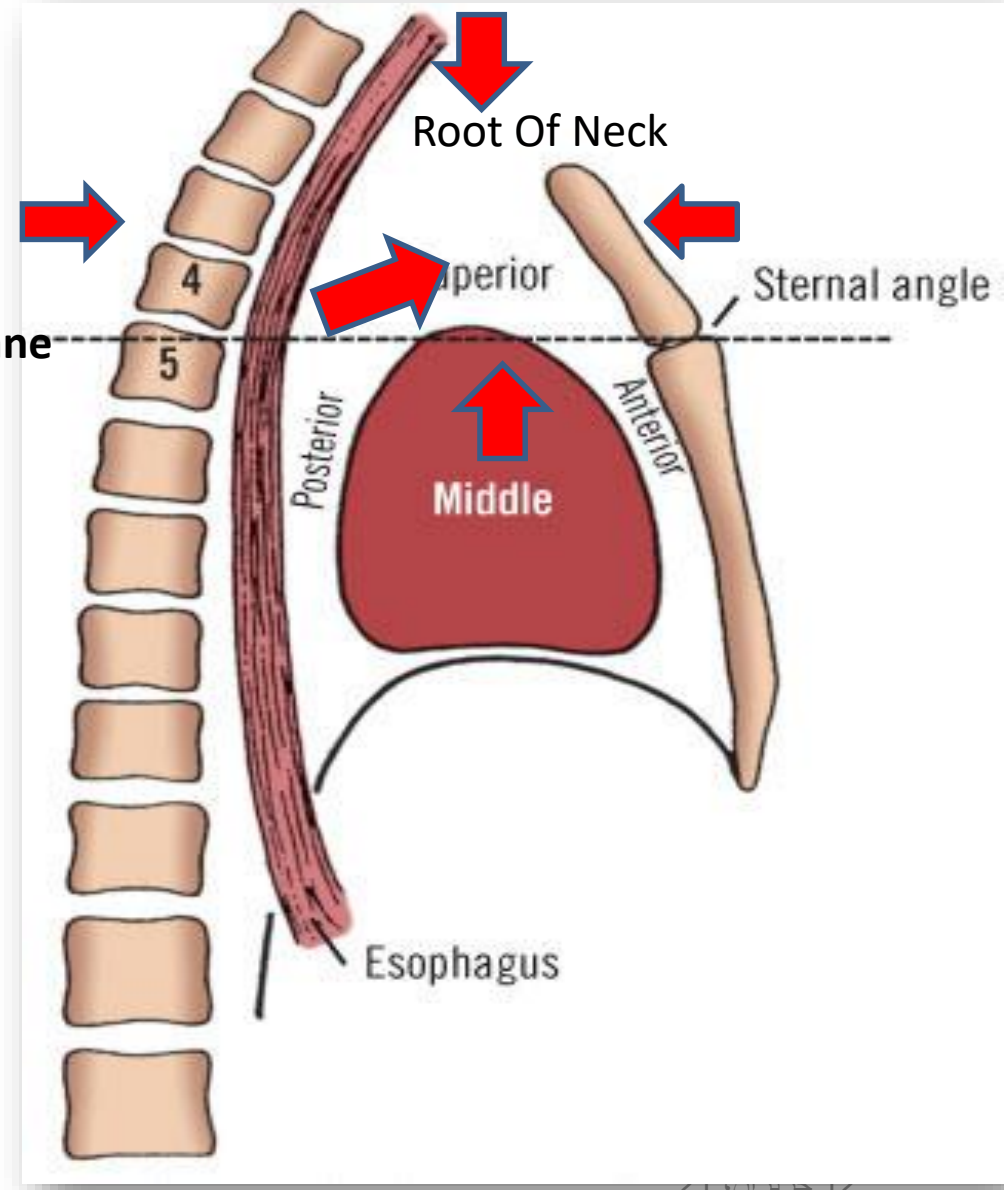
Superiorly : superior thoracic aperture at root of neck .

Inferiorly by the transverse thoracic plane.

Laterally by the pleurae

Anteriorly by the manubrium of the sternum.

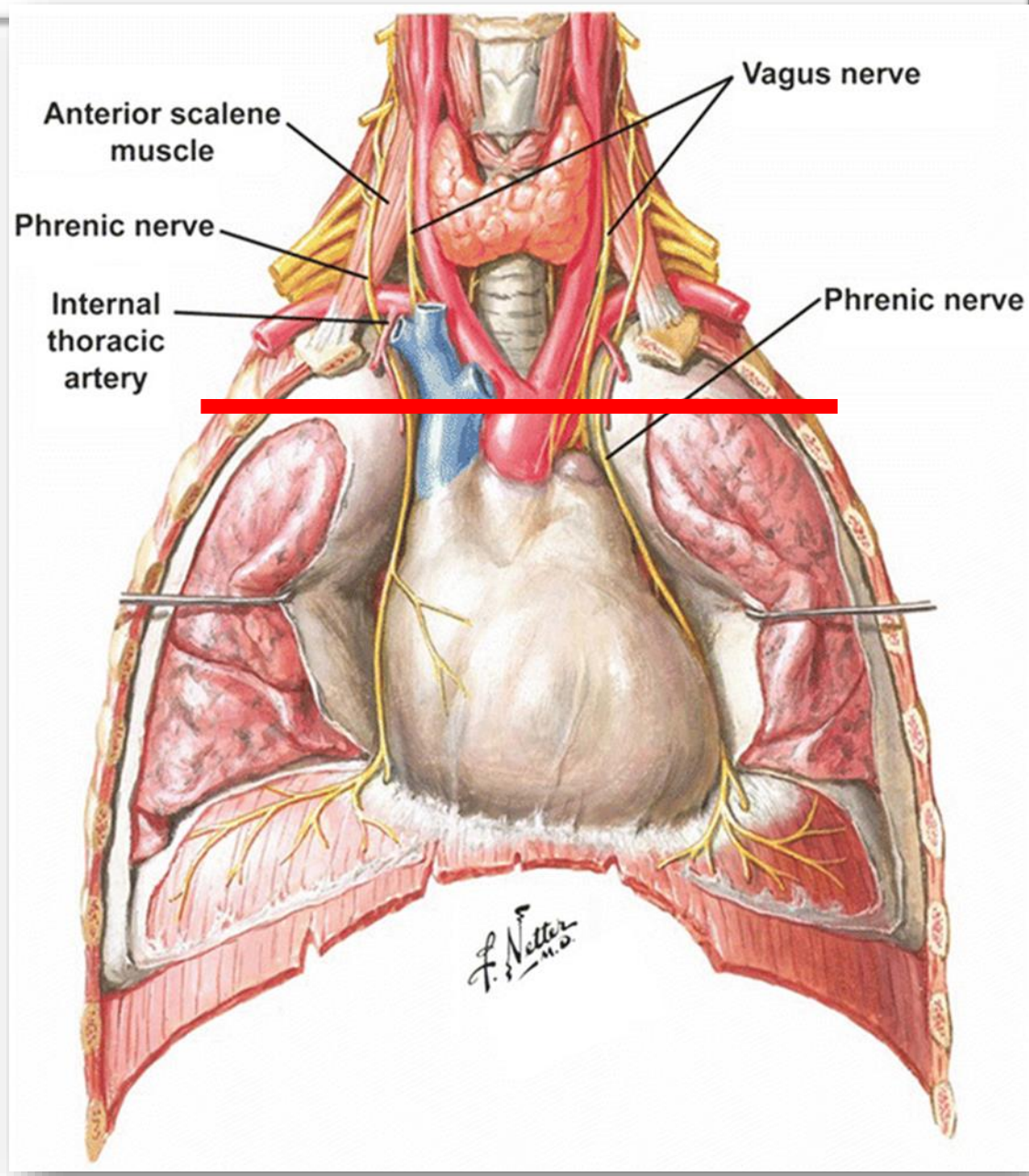
Posteriorly by the first four thoracic vertebrae.



Superior Mediastinum

Contents

*Thymus,
* Great blood vessels
*Trachea
*Esophagus
*Thoracic duct, and
*Sympathetic trunks.
*Phrenic nerve
* Vagus nerve



2. Inferior mediastinum

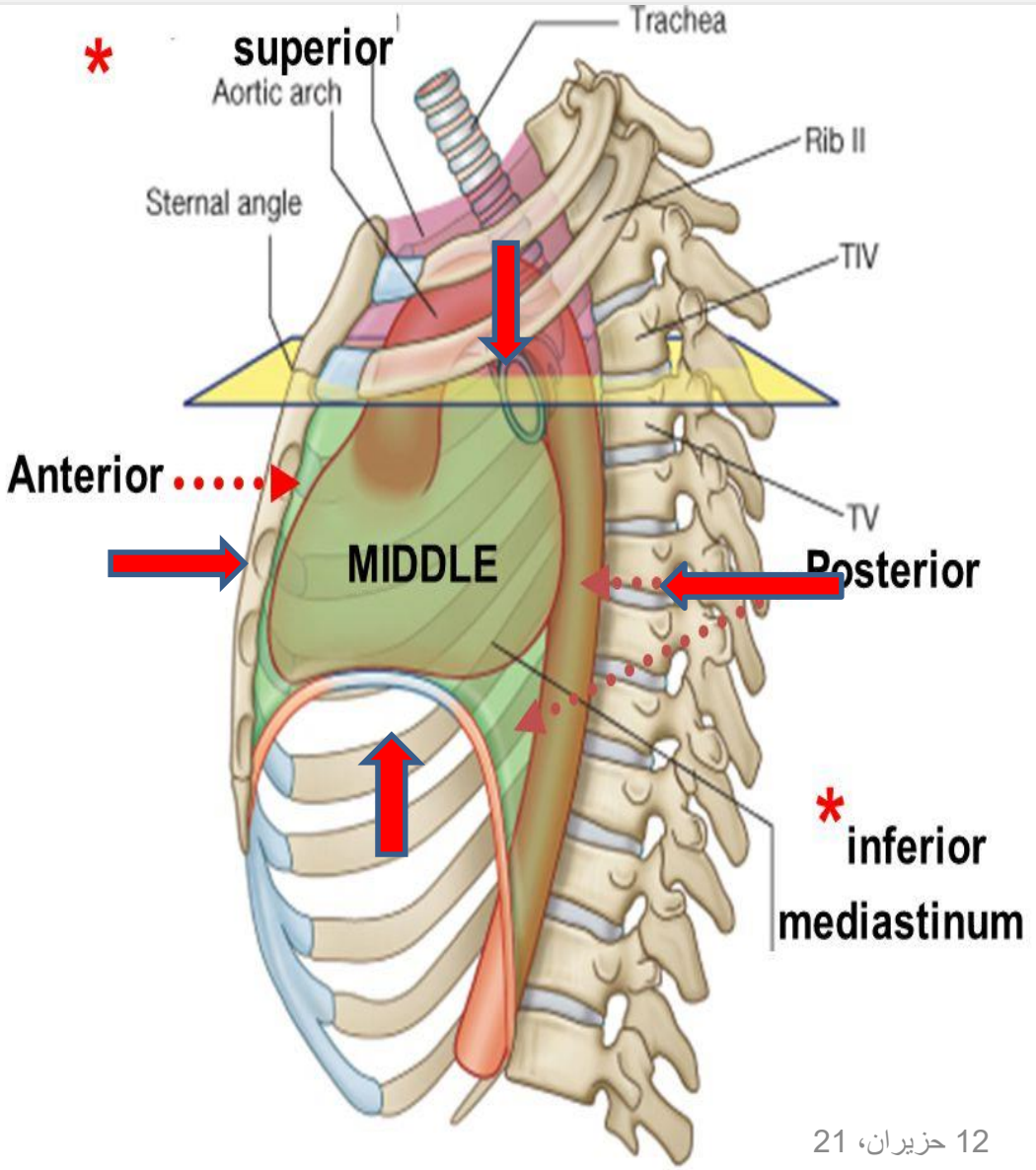
Boundaries:

*Anteriorly :by the body of the sternum

*Posteriorly : by the lower eight thoracic vertebrae

*Inferiorly by diaphragm

*Superiorly : by transverse thoracic plane.



Divisions of Inferior mediastinum

- **Anterior mediastinum :**

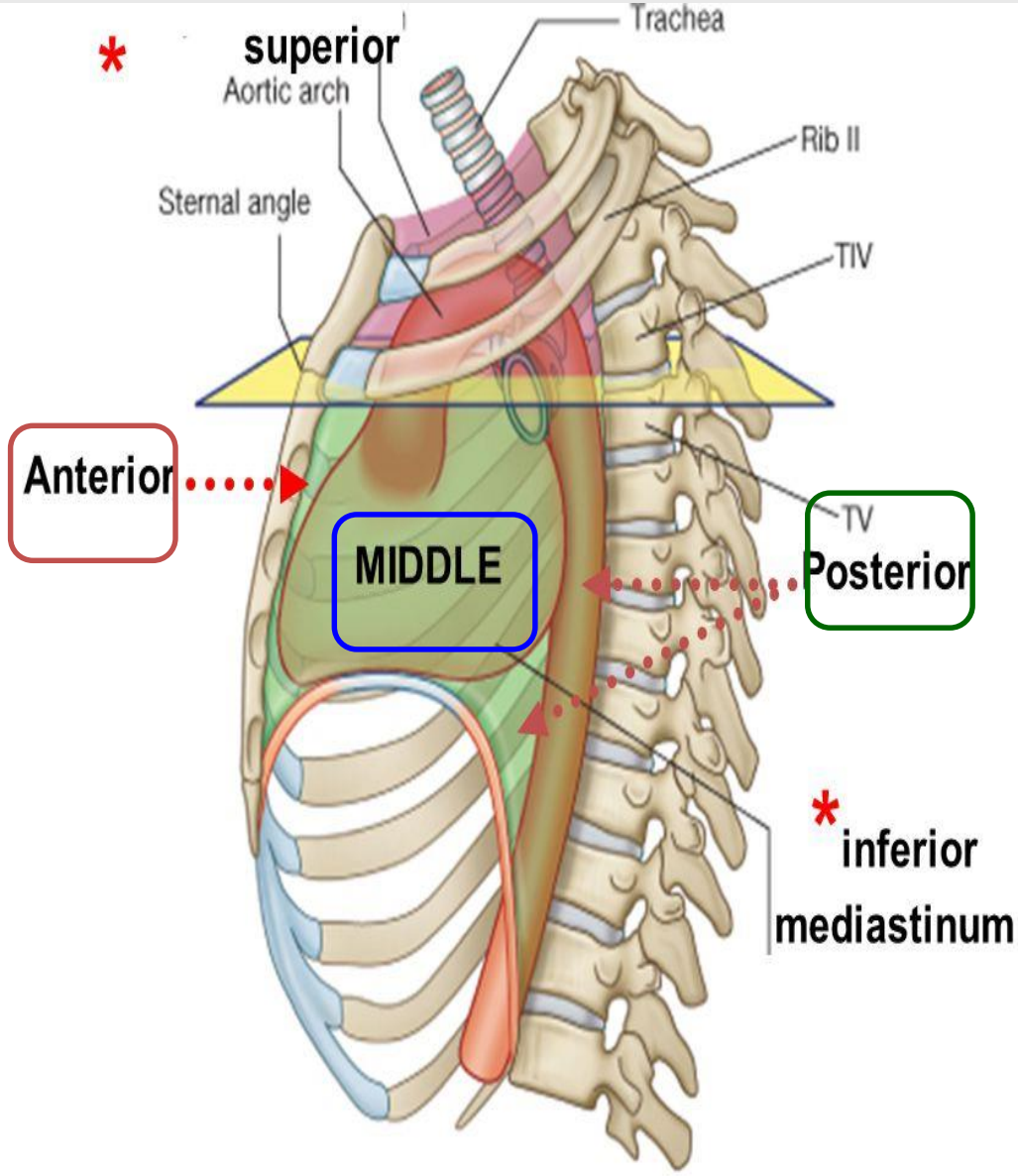
lies in front of pericardium, contains thymus, fat and lymph nodes

- **Middle mediastinum:**

consists of the pericardium & heart, Great blood vessels ,phrenic nerve Pericardiacophrenic artery

- **Posterior mediastinum**

lies between the pericardium and vertebrae ,contains esophagus, thoracic duct, Vagus nerves, aorta ,and sympathetic trunk.



1. Phrenic nerve

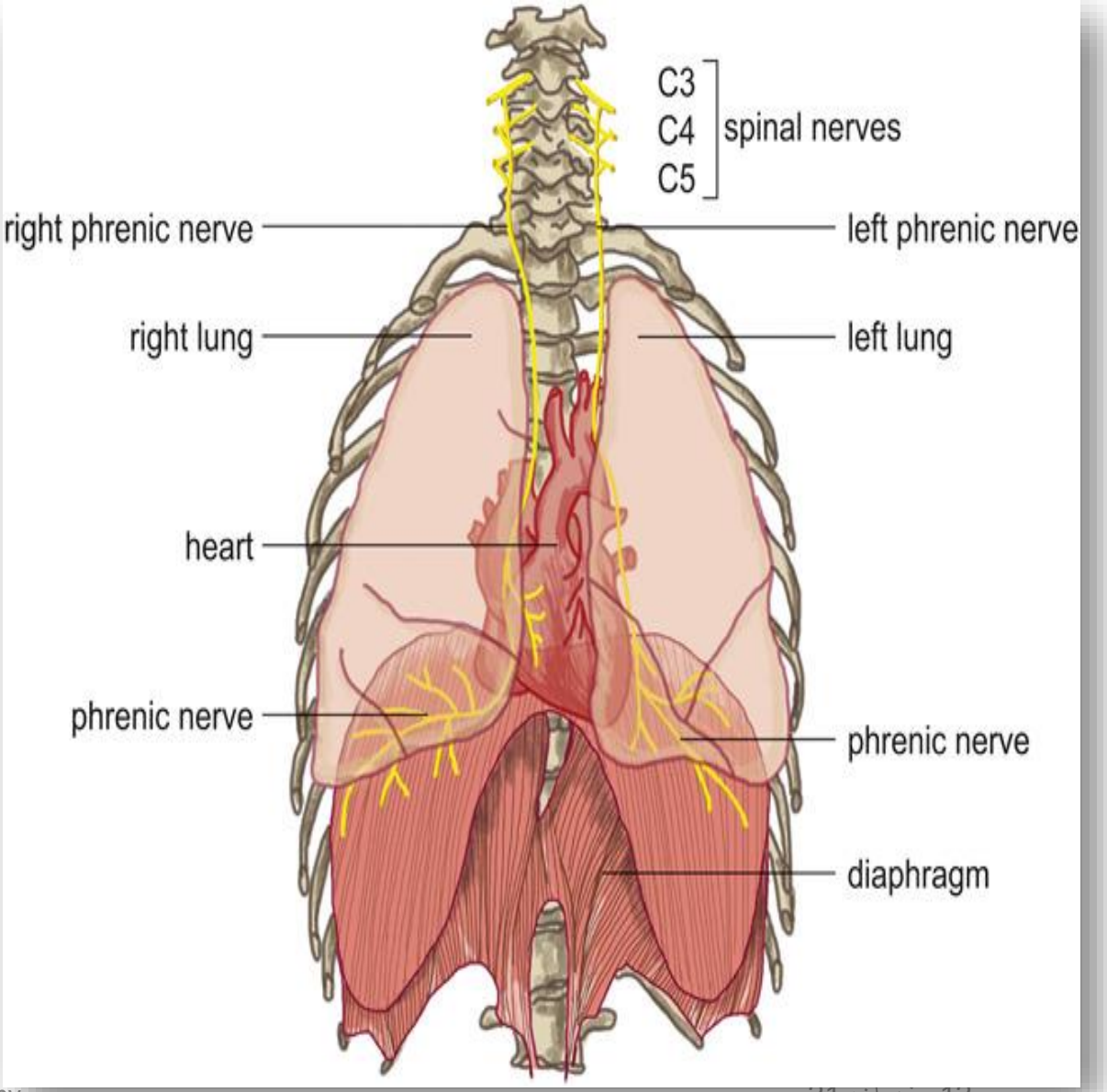
It is a mixed motor/sensory nerve which originates from the C3,C4 &C5 spinal nerves in the neck.

Passes down between the lung and heart in superior mediastinum to reach the diaphragm.

It provides :

1.Motor supply to the diaphragm as well as sensation to the central tendon.

2.In the thorax, each phrenic nerve supplies the mediastinal pleura and pericardium.



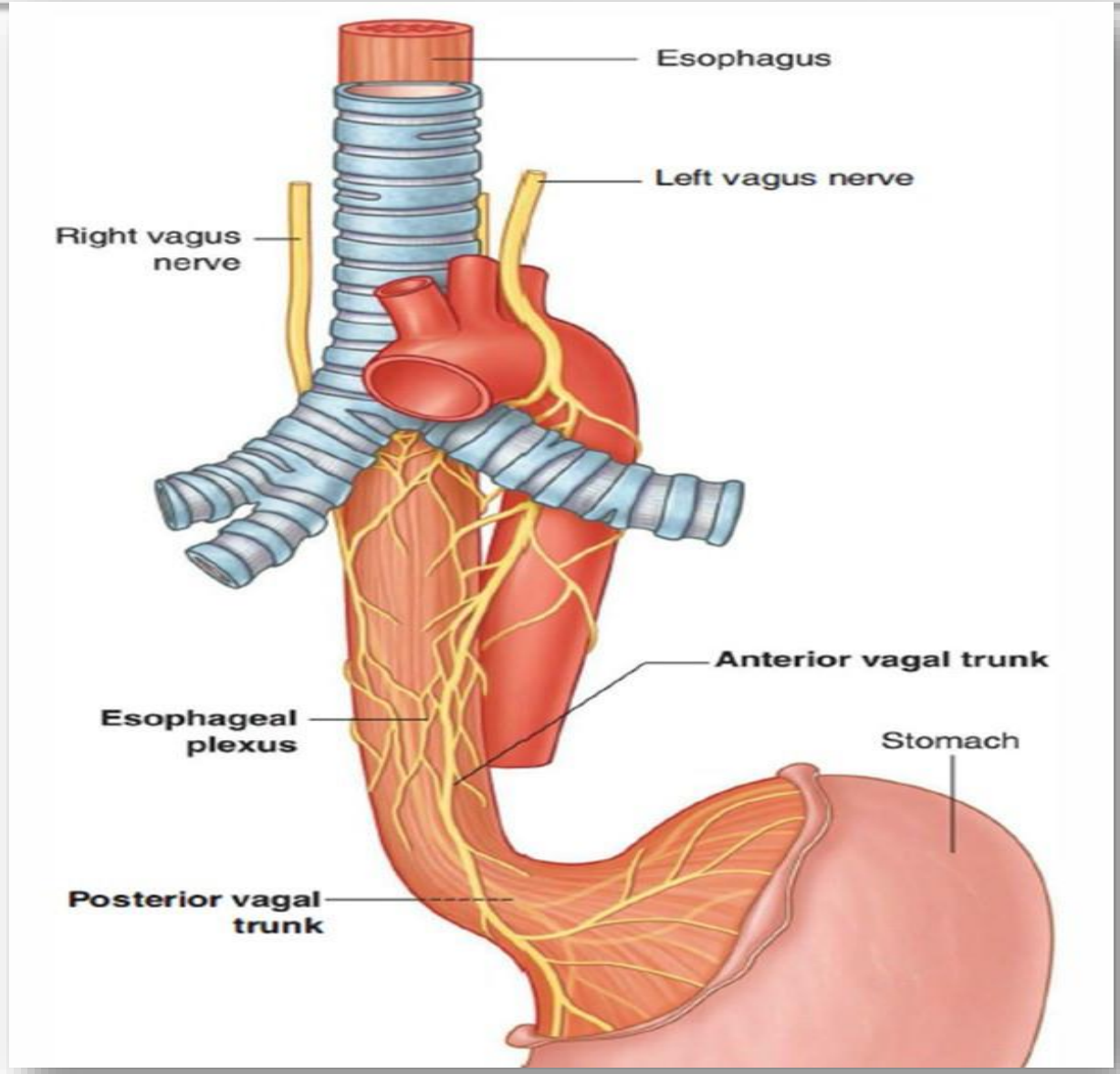
2. Vagus nerve

*Lies in superior and inferior posterior mediastinum .It is the tenth cranial nerve.

*There are two vagus nerves right and left

It is the longest nerve of the autonomic nervous system in the human body.

*It provides parasympathetic innervation to heart, lungs, and digestive tract.

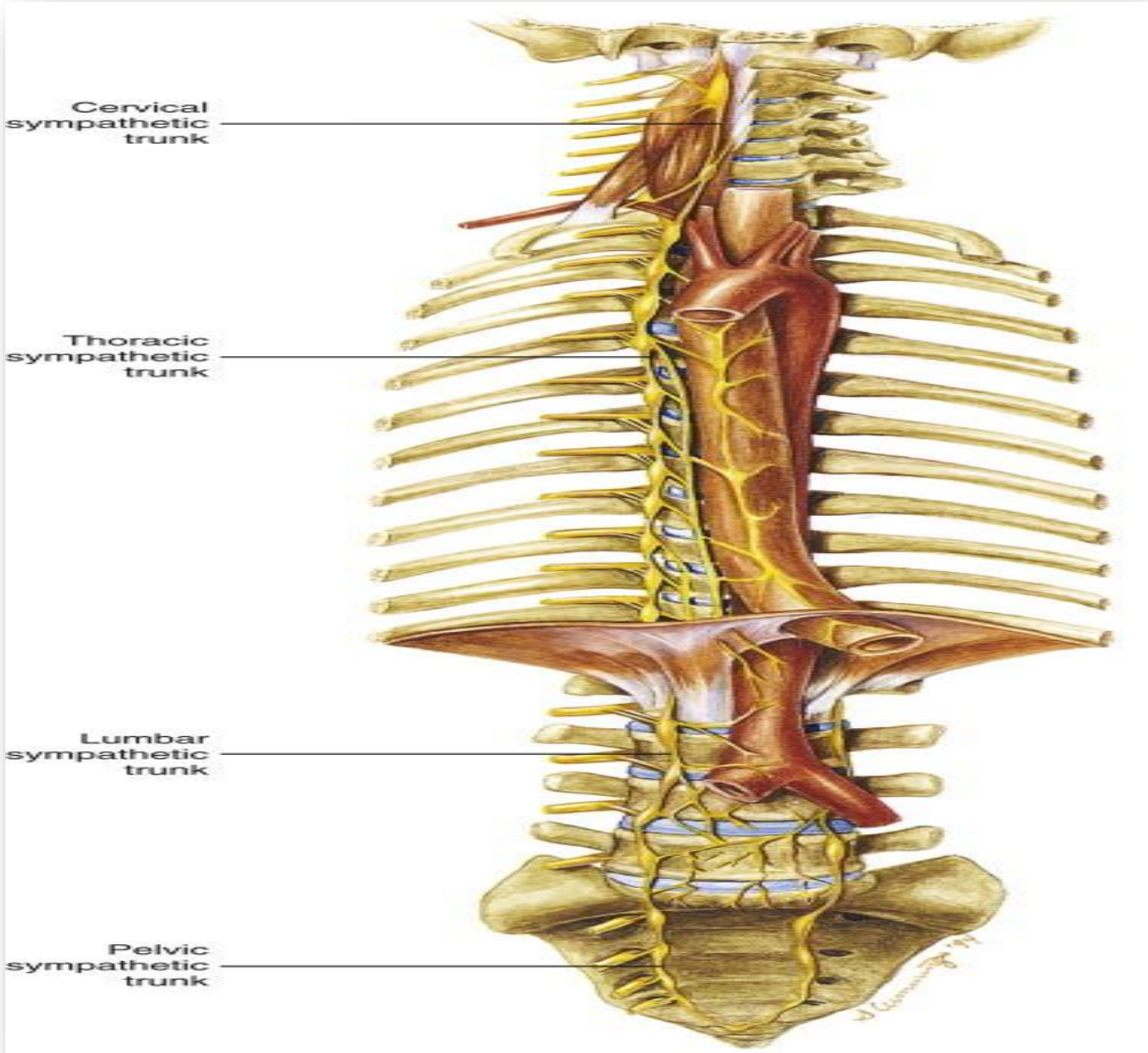


3. Sympathetic chain

*Right and left Sympathetic trunk are gangliated cord located in superior and inferior posterior mediastinum .

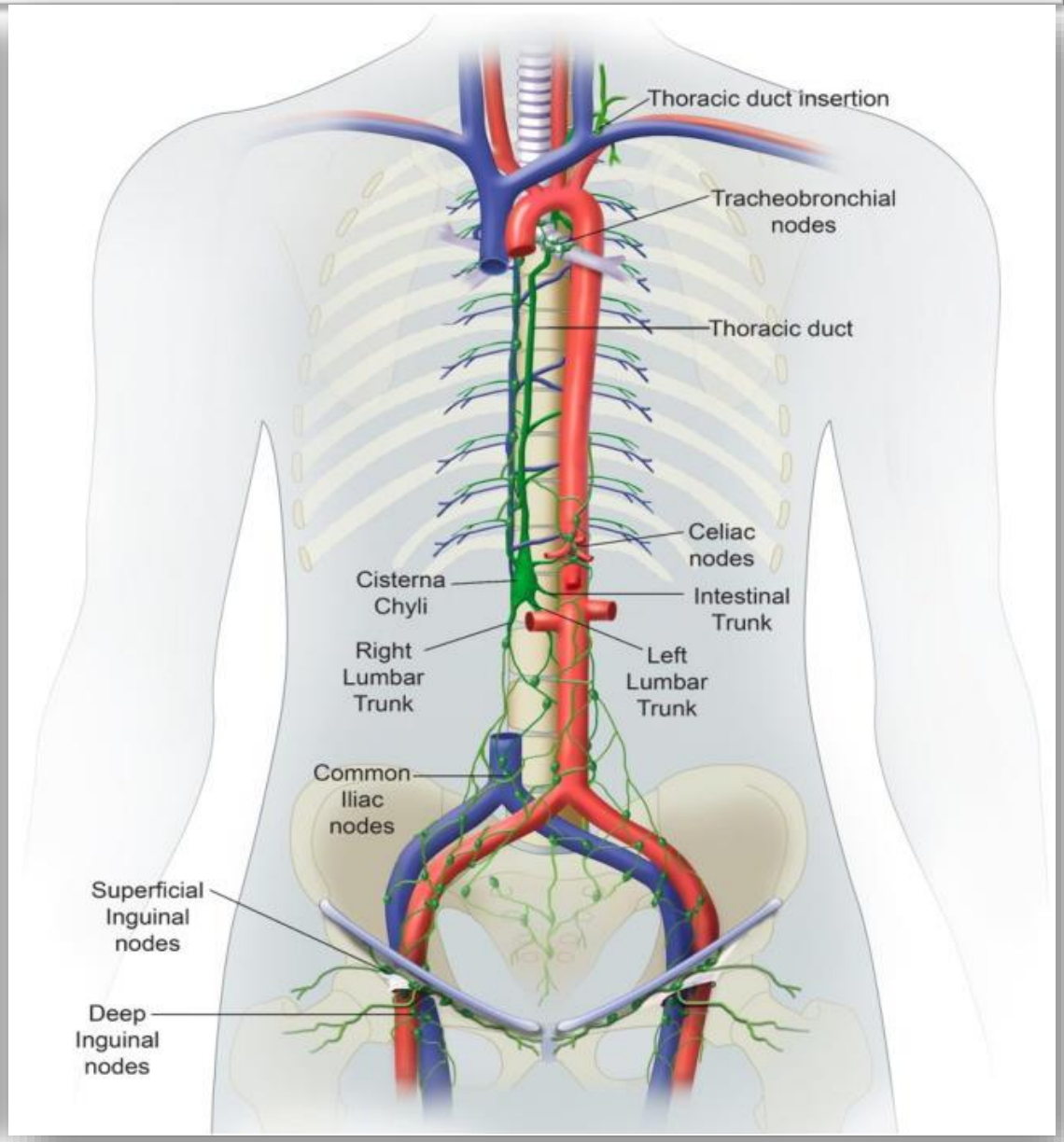
*It consists of bundle of nerve fibers that run from the base of the skull to the coccyx.

*The sympathetic trunk lies just lateral to the vertebral bodies for the entire length of the vertebral column.



4. Thoracic duct (Van Hoorne's canal)

*It is the largest lymphatic vessel in body.
It extends from the T12 to the root of the neck
*It originates from the confluence of left and right lumbar lymph trunks, as well as the left and right intestinal lymph trunks .
*It drains chyle (product of fat digestion & most lymph of body).
*Appears Beaded due to the presence of many valves in it.
Enters post mediastinum through aortic opening of diaphragm at (T12) .
Ends at angle formed by union of left int jugular vein & left subclavian vein



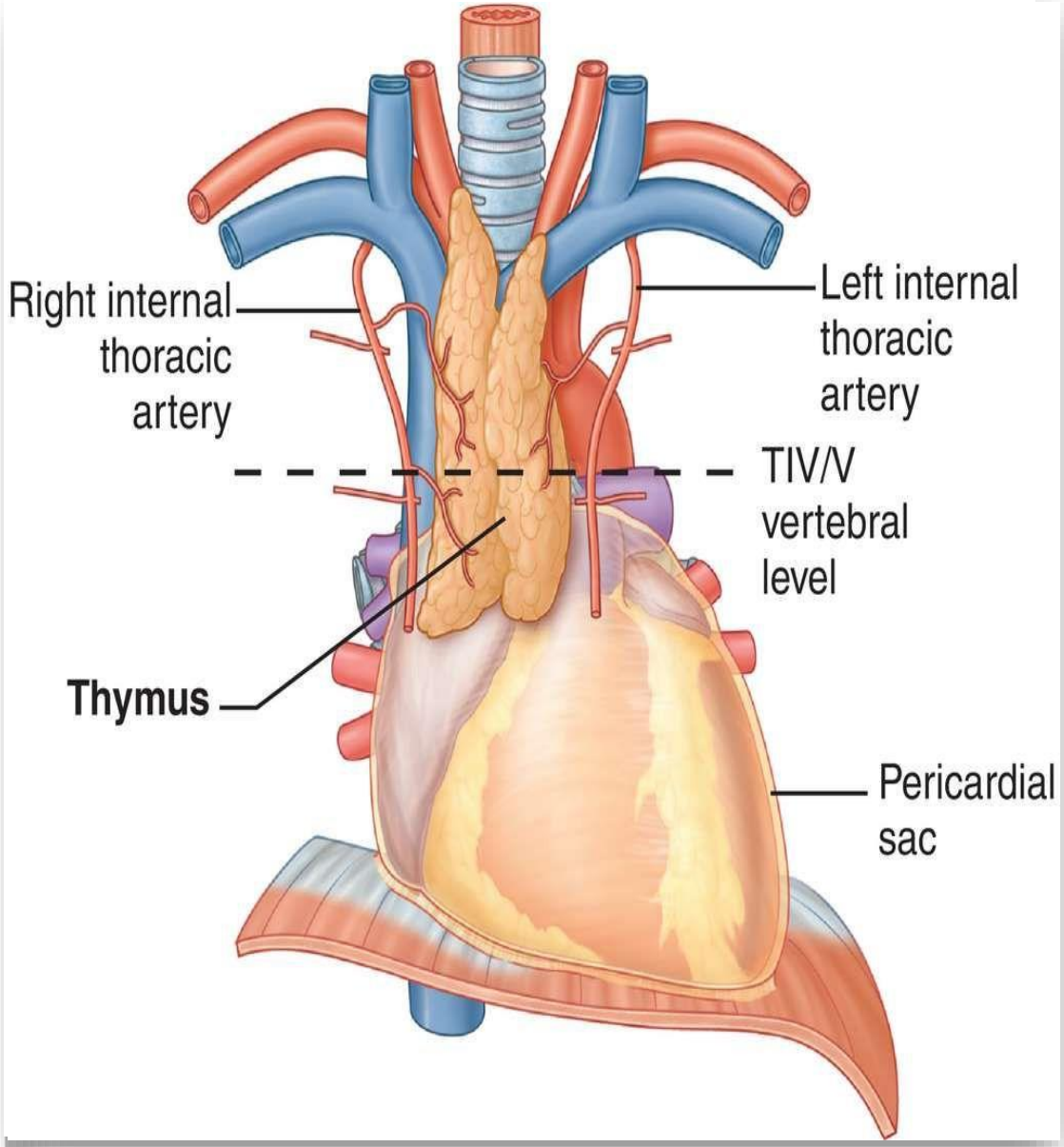
5. Thymus

It is a primary lymphoid organ and the initial site for development of T lymphocytes (T cell) .It is pink color and consists of two lobes connected by an isthmus. It extends between the thyroid gland (superiorly) and fourth costal cartilage (inferiorly) within the superior mediastinum and anterior part of inferior mediastinum.

Once you reach puberty, the thymus starts to slowly shrink and become replaced by fat. Fortunately, the thymus produces all of your T cells by the time you reach puberty..

The blood supply Internal thoracic artery, thyroid arteries (superior, inferior)

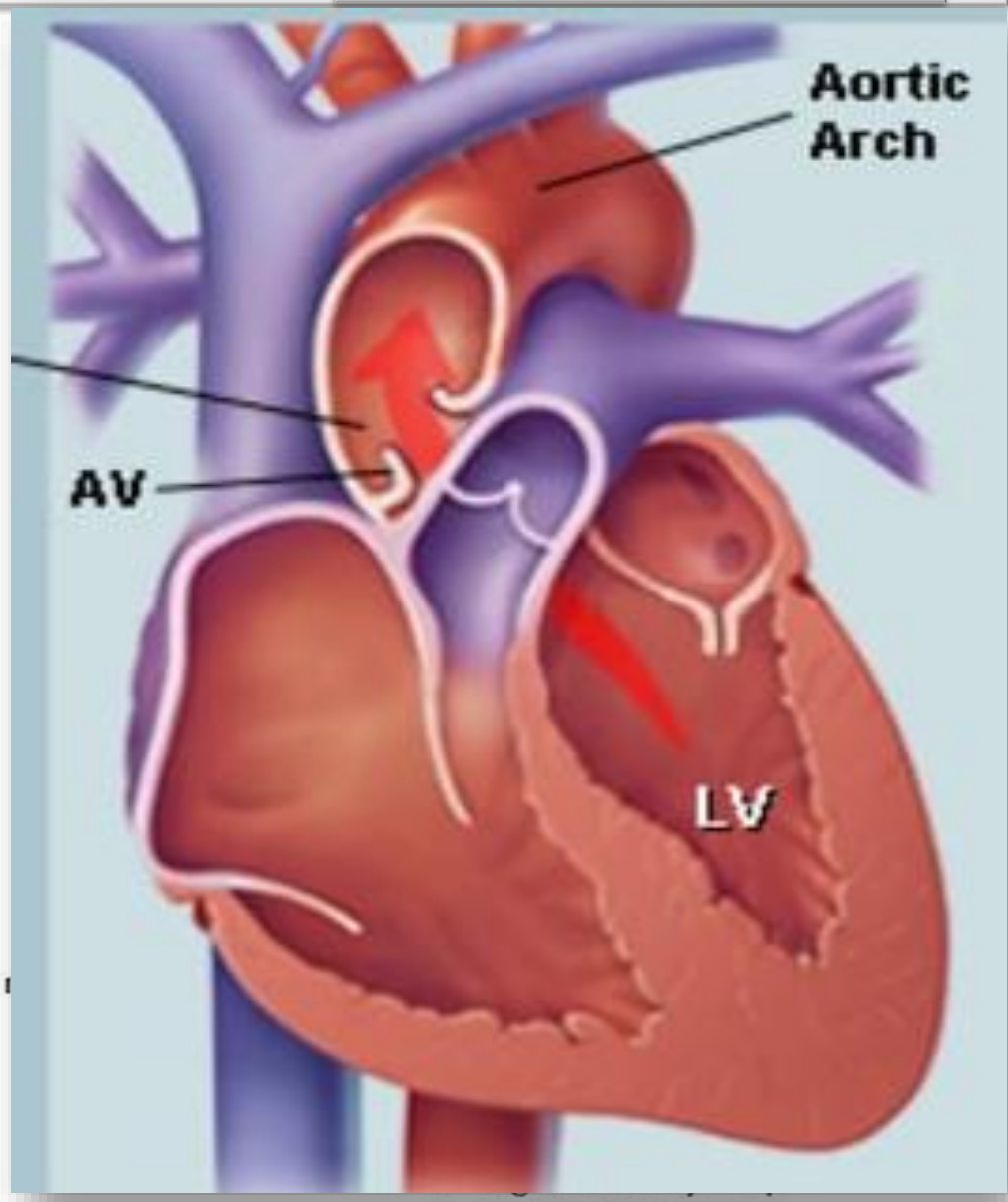
Nerve Supply through vagus nerve sympathetic nervous system



6. Great blood vessels

❶. Aorta

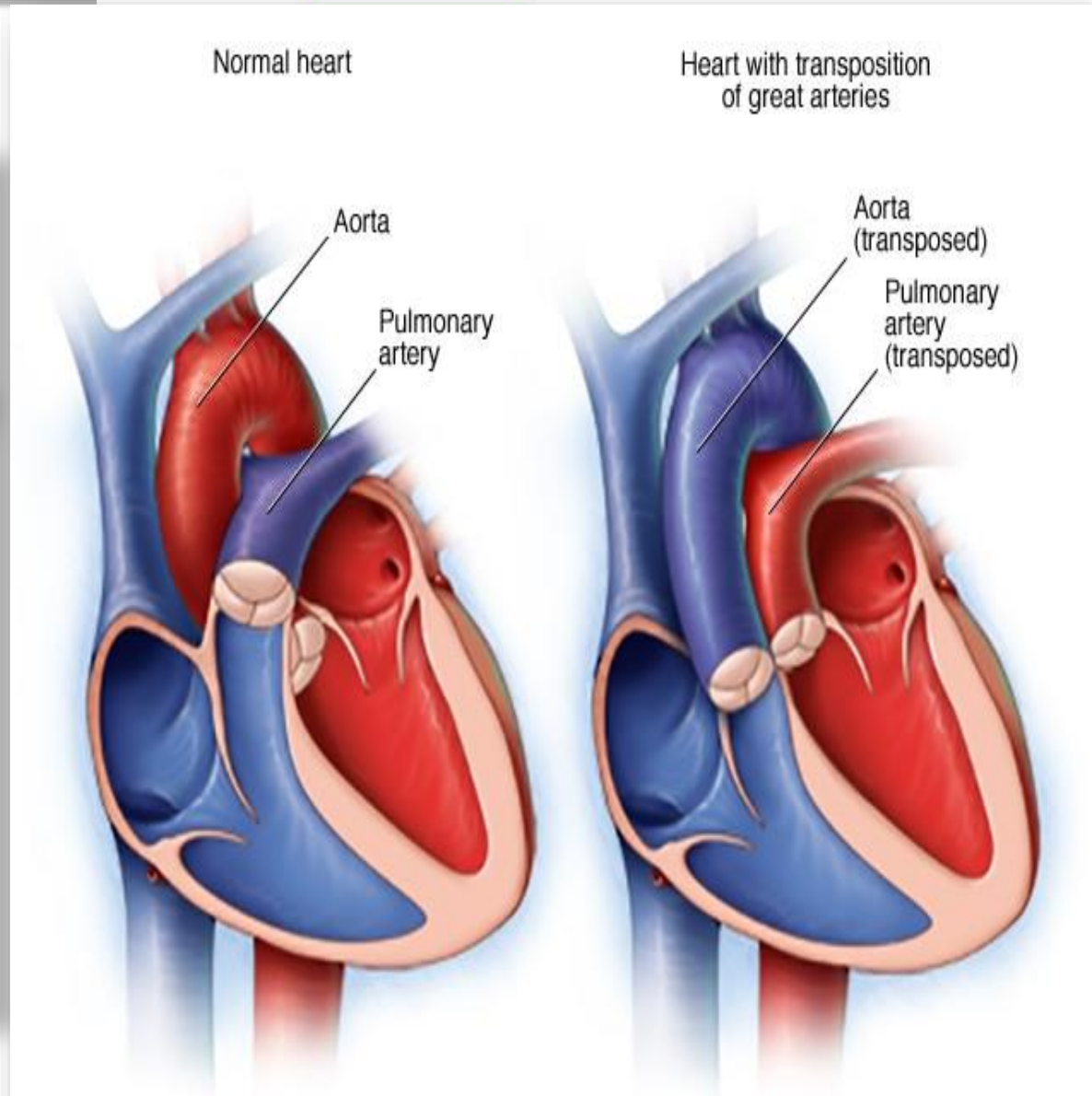
- The aorta is the largest artery in the body.
- Looks like question mark ((?)) but this depend on the age so in old age it becomes tortuous .
- Originated from the left ventricle.
- Guarded by aortic valve.



1. Ascending Aorta

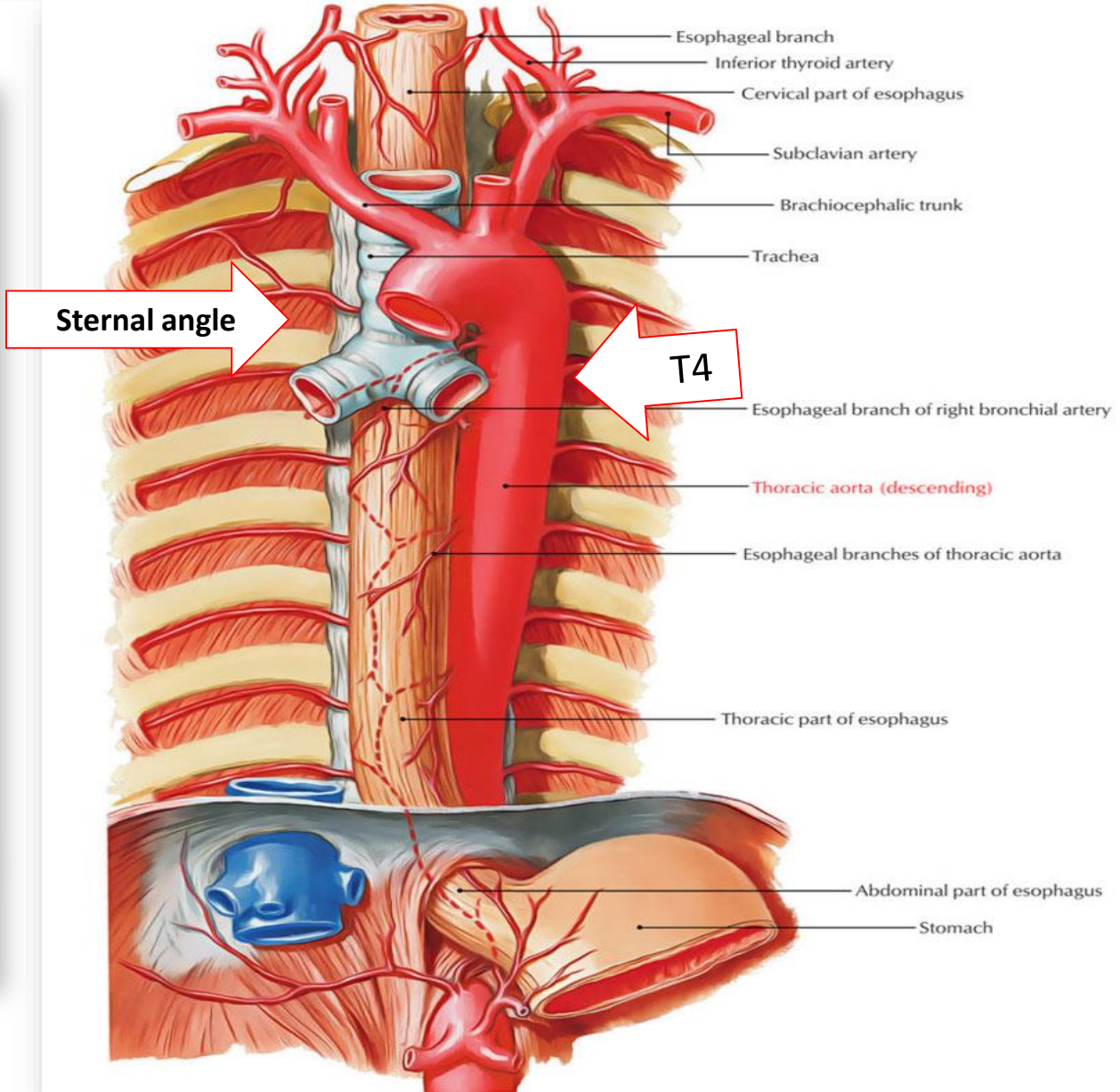
lies posterior to pulmonary trunk .It has two small branches, the left and right coronary arteries; these provide blood to the heart muscle.

Clinical Note : During angiogram If ascending aorta lies more anterior than the pulmonary trunks case known as (Transposition of great blood vessels)



2. Arch Aorta

It begins at the level of the upper border of the 2nd sternocostal articulation of the right side, and **runs** at first upward, backward, and to the left in front of the trachea. Then **travels** backward on the left side of the trachea and finally **passes** downward on the left side of the body of the fourth thoracic vertebra. At this point the aortic arch **continues** as the descending aorta.



Branches Of Arch Of Aorta

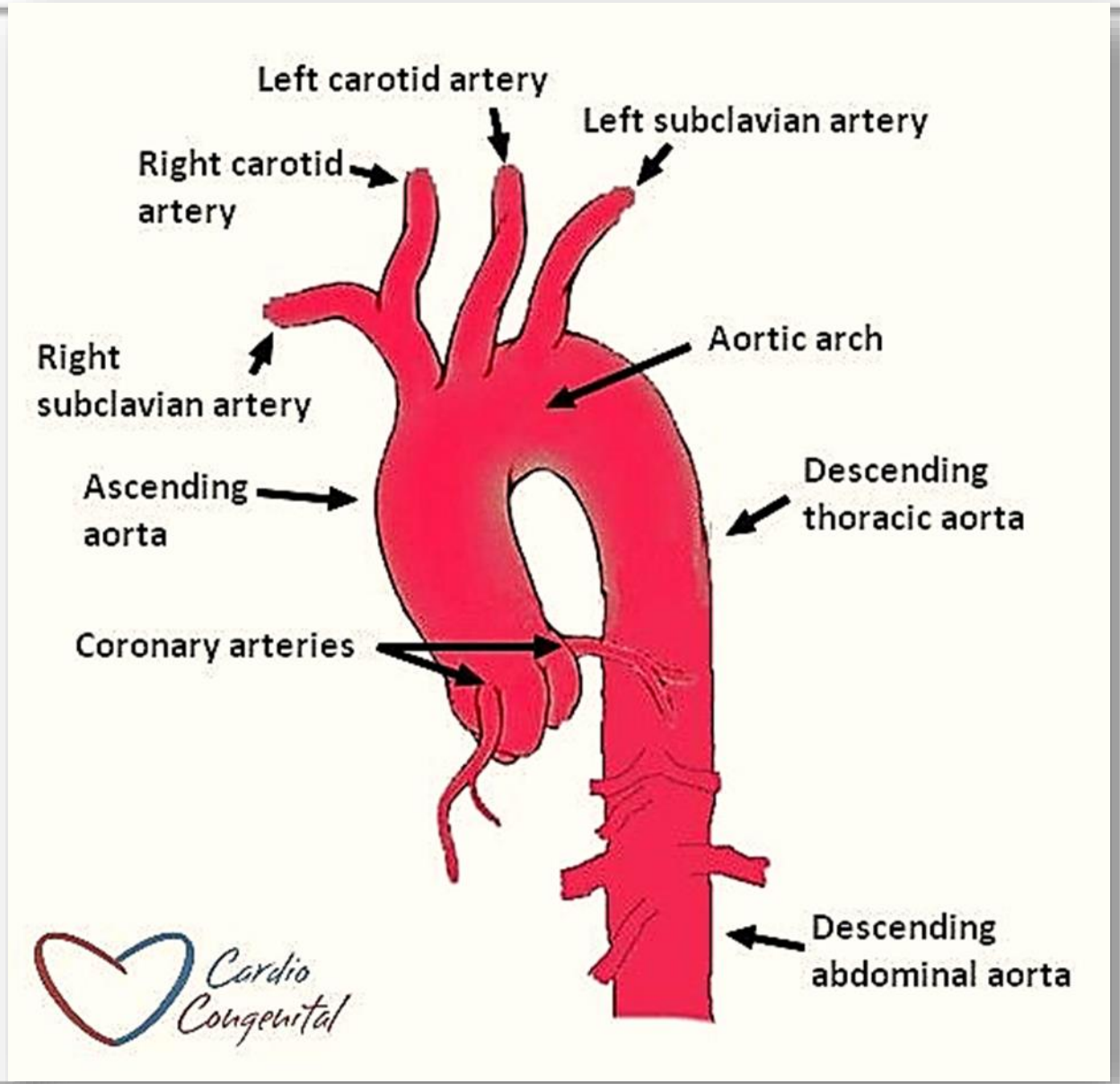
Have 3 branches:

①brachiocephalic artery (which divides into right common carotid artery and the right subclavian artery).

② Left common carotid artery.

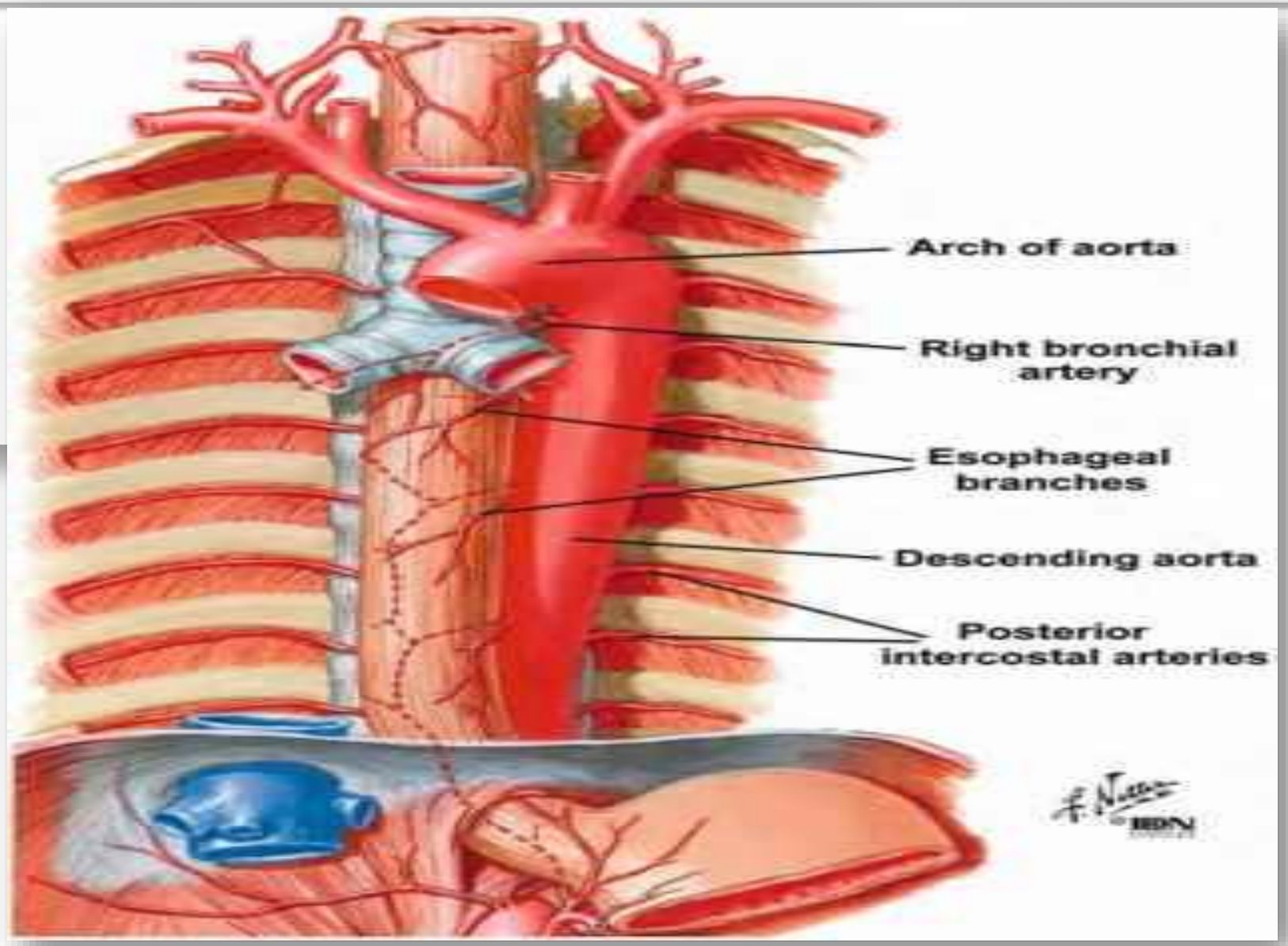
③Left subclavian artery.

These arteries provide blood to both arms and the head.



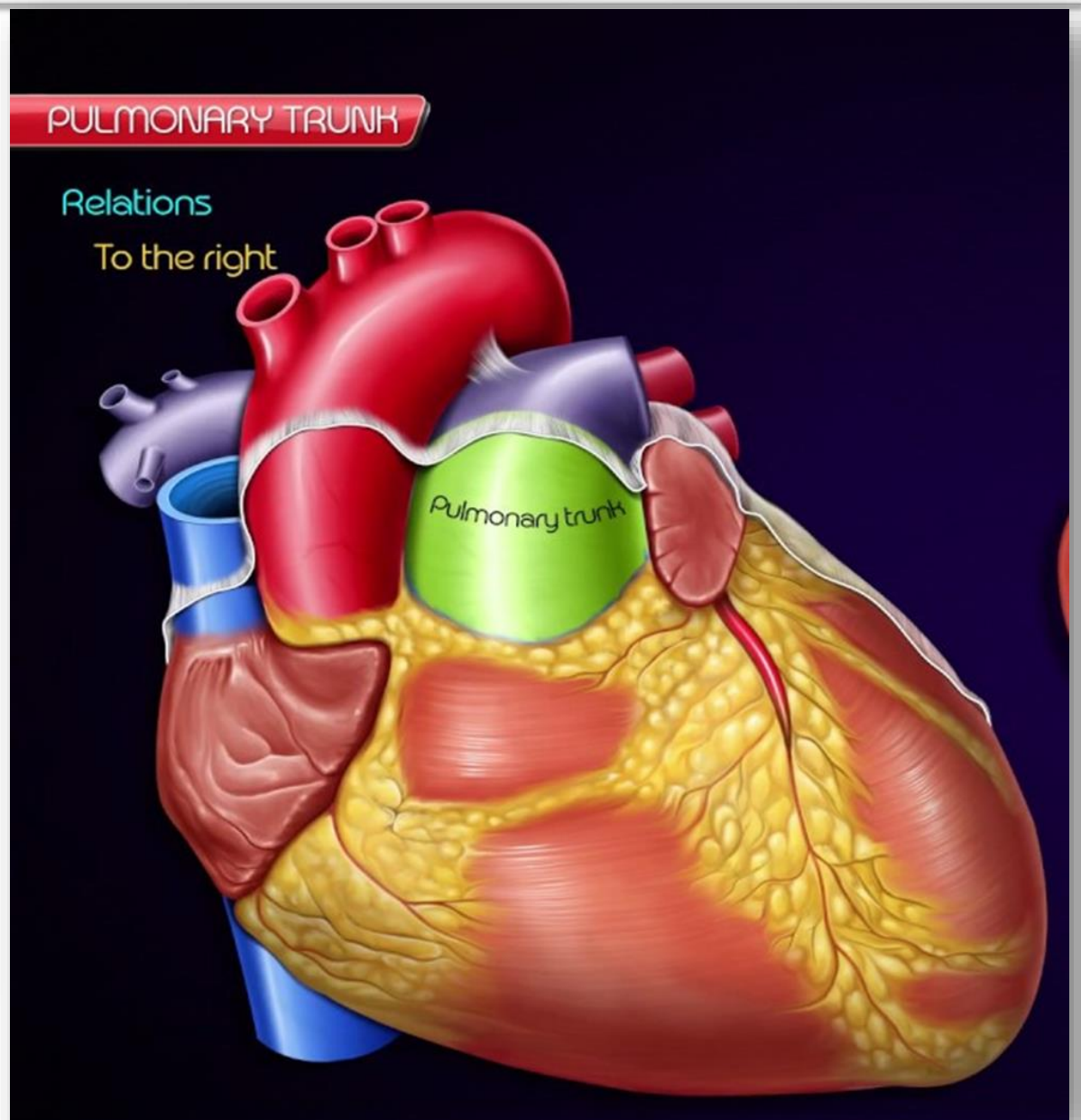
3. Descending Aorta

1. Thoracic aorta
2. Abdominal aorta



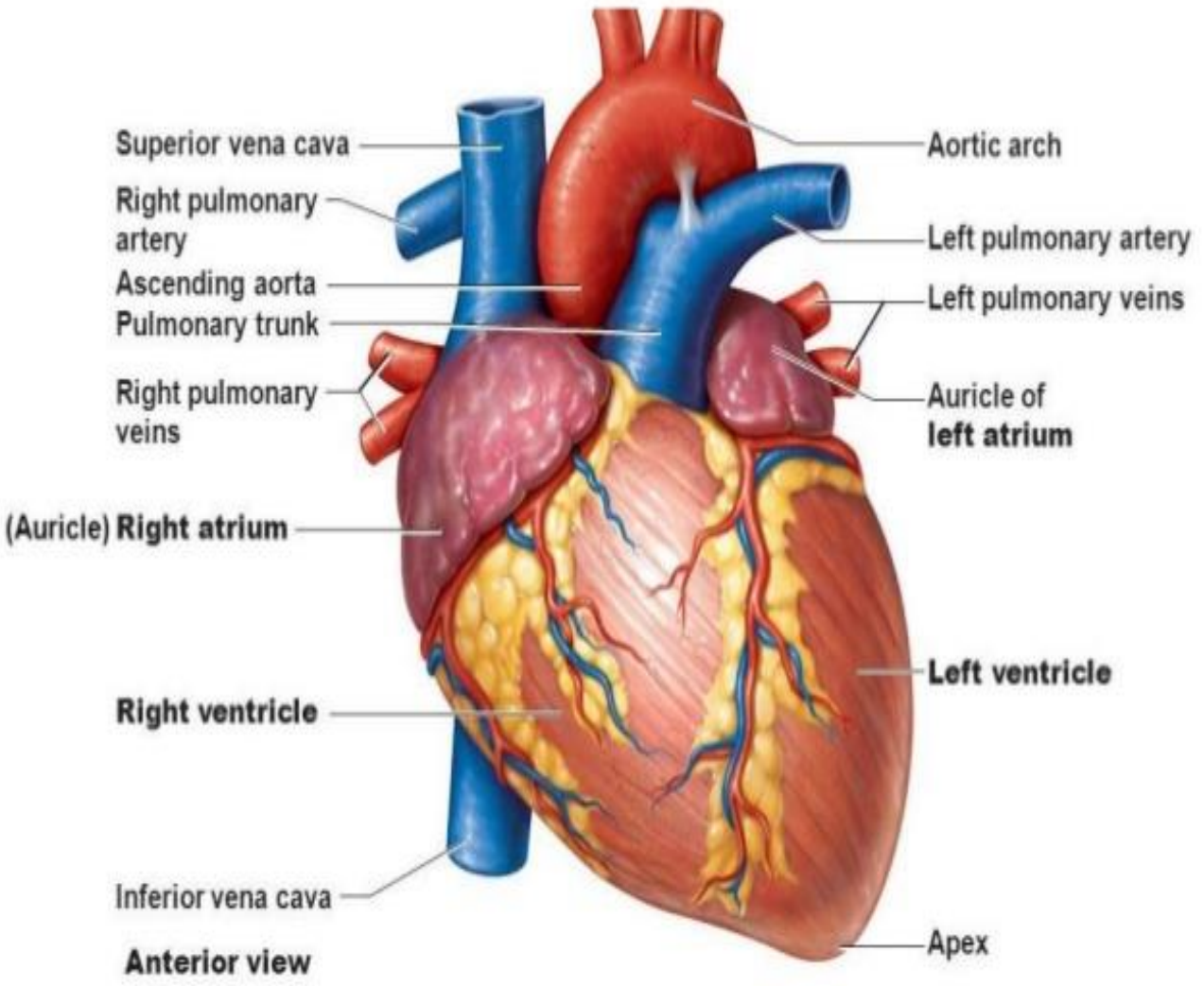
❷. Pulmonary Trunk

A thick and short vessel, which is separated from the right ventricle by the pulmonary valve. It is located anterior to ascending aorta sharing a common layer of pericardium with it. It continues upwards and divides into two arteries:



Pulmonary Arteries

☠.The pulmonary trunk splits into the right & left pulmonary arteries. Both arteries Supply the blood to the left and right lungs, The right pulmonary artery is the thicker and longer artery of the two.

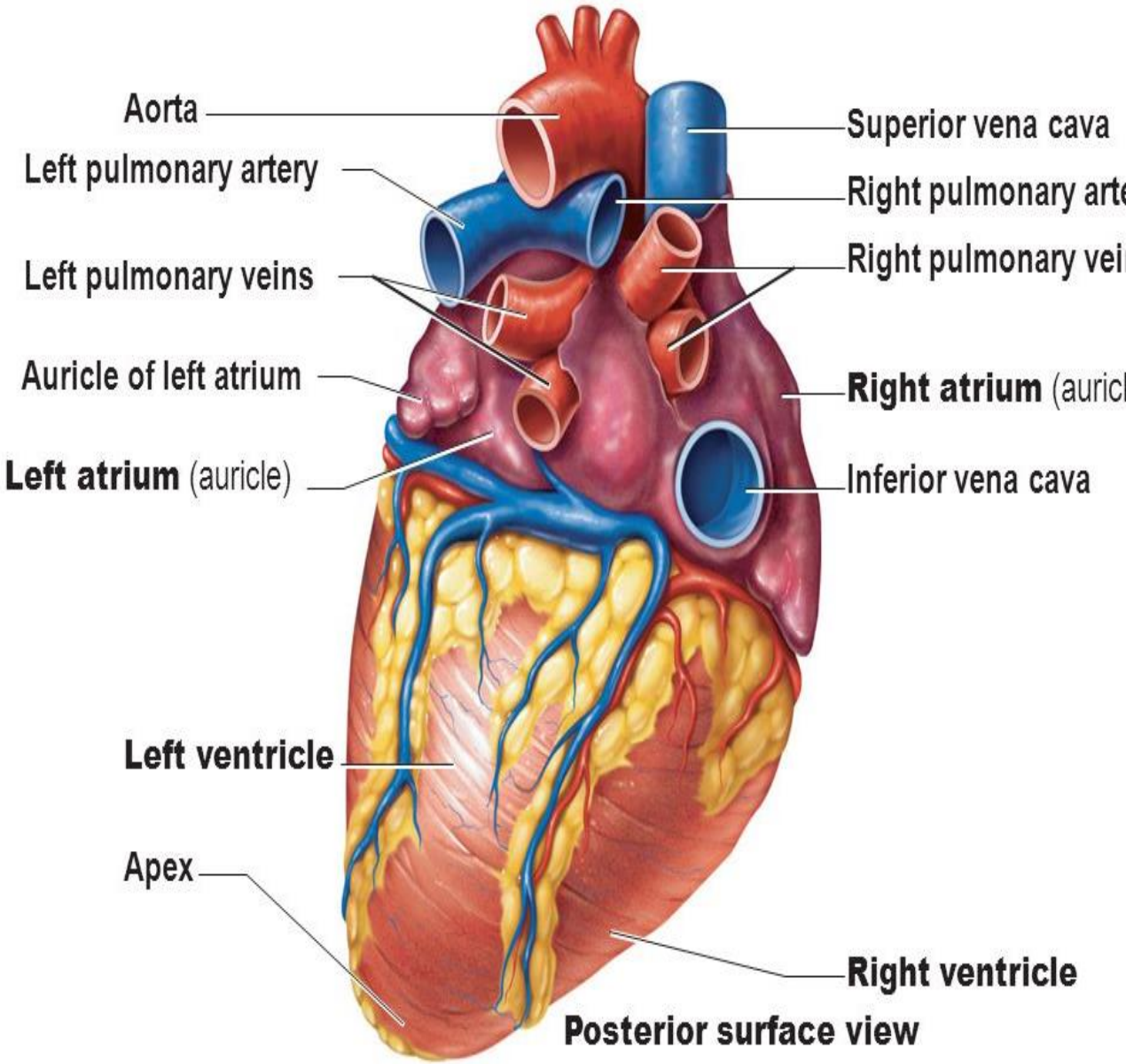


❸. Pulmonary Veins

***There are four pulmonary veins, with one superior and one inferior for each of the lungs.**

***They enter the pericardium to drain into the superior left atrium, on the posterior surface.**

***Receive oxygenated blood from the lungs, delivering it to the left side of the heart to be pumped back around the body.**



❹. Superior Vena Cava

☠It is formed by the two brachiocephalic veins

☠it is located in the right side of the superior mediastinum, before entering the middle mediastinum to lie beside the ascending aorta

☠Receives deoxygenated blood from the upper body, delivering it to the right atrium.

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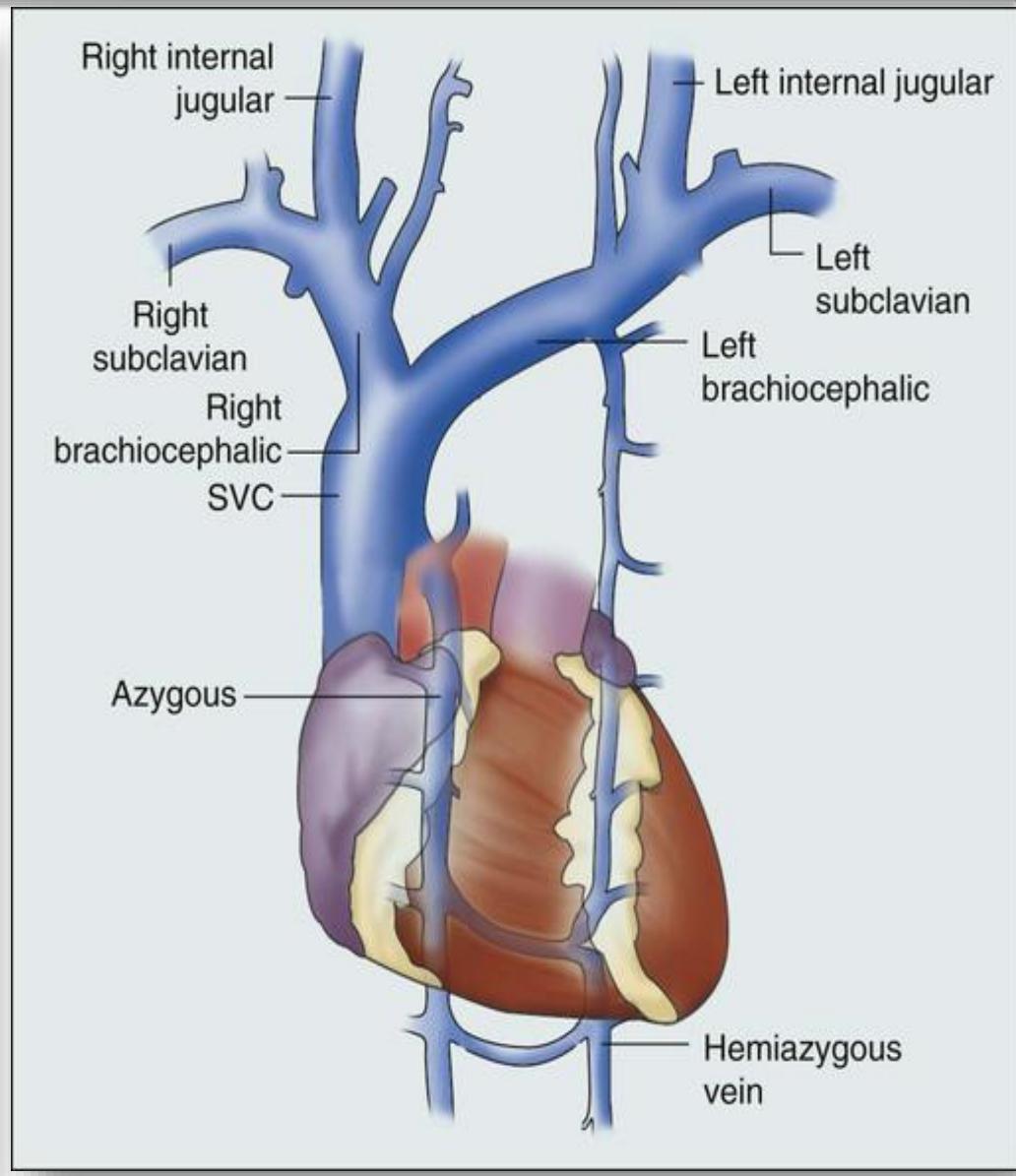


❺. Brachiocephalic vein

Right Brachiocephalic vein

which is formed by :

- ✓ right subclavian vein
- ✓ right internal jugular vein
- ✓ right external jugular vein .

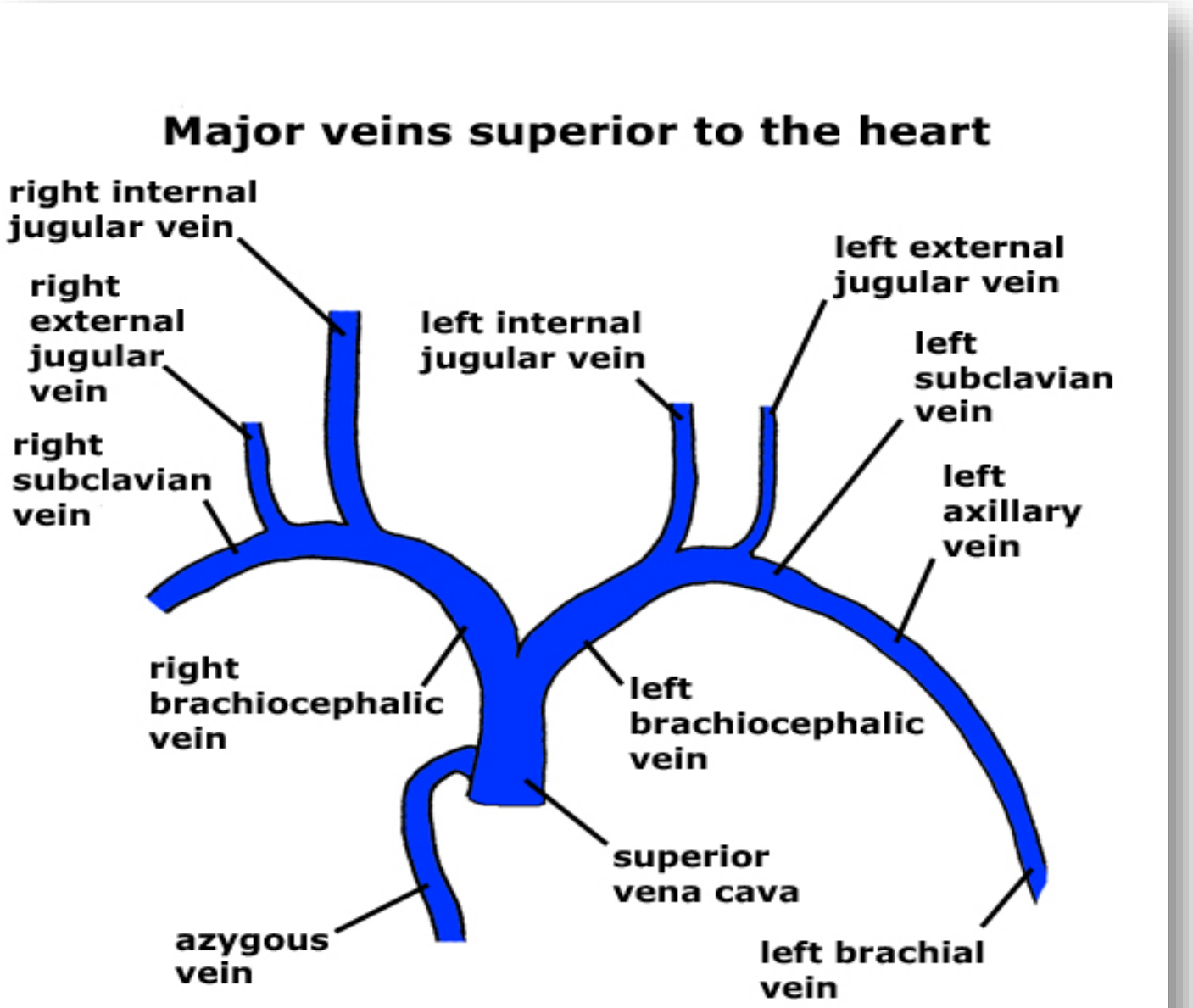
It carries blood to superior vena cava and then to right atrium

Left Brachiocephalic vein

which is formed by junction of

- ✓ left subclavian vein
- ✓ left internal jugular vein
- ✓ Left external jugular vein .

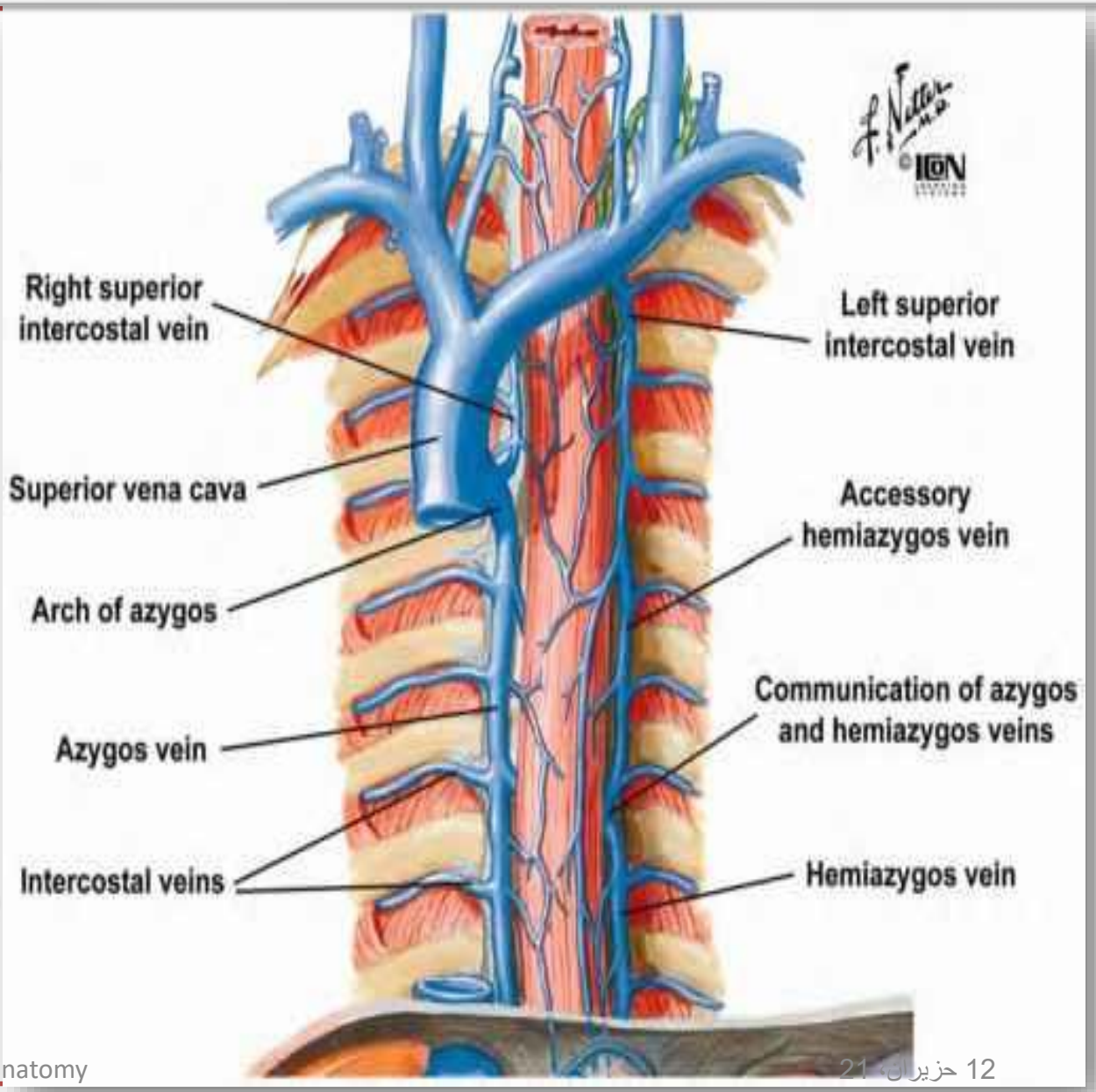
It carries blood to superior vena cava and then to right atrium.



⑥. Azygos system

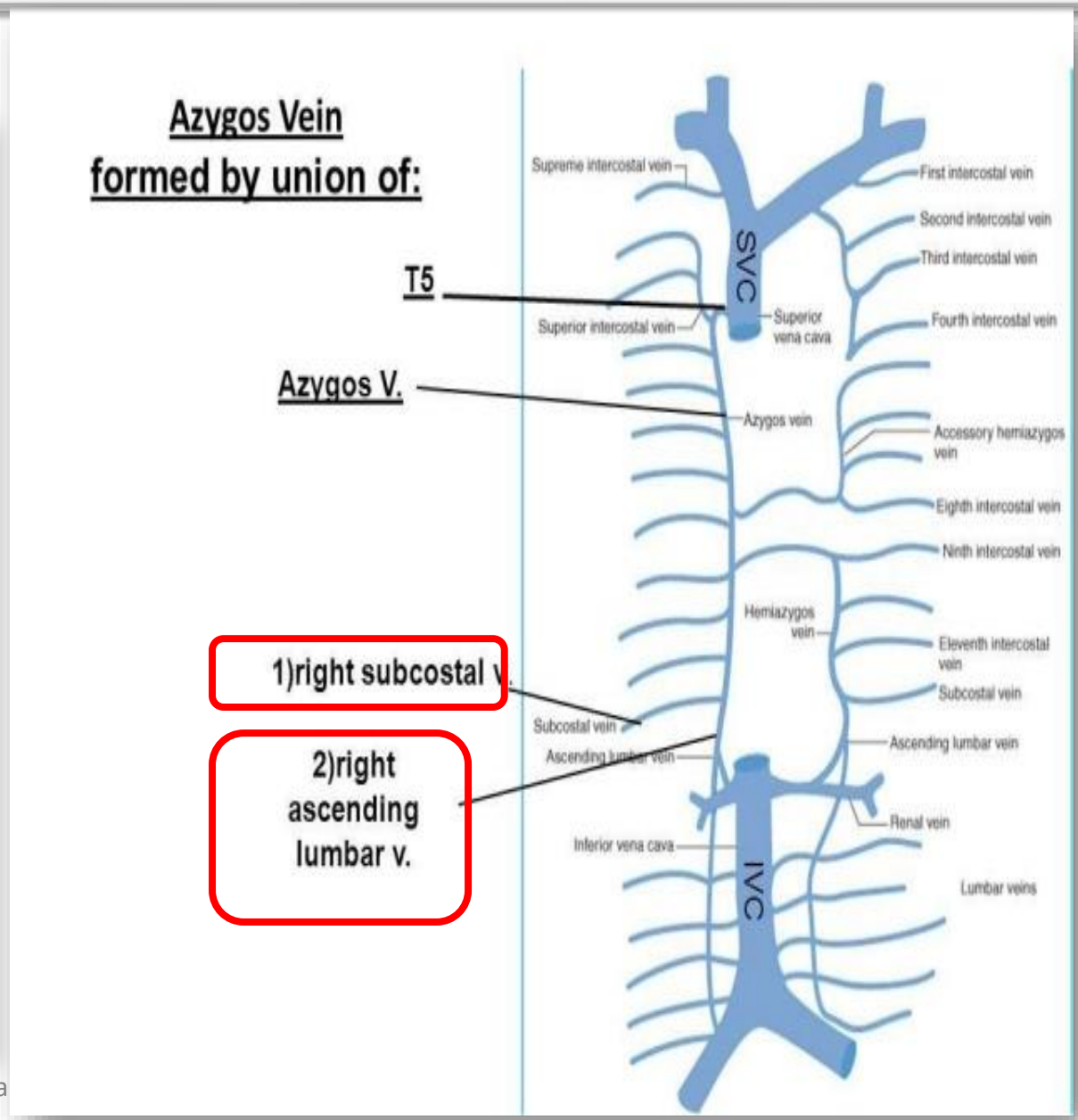
1. Azygos vein

- It is a vein running up on right side of the thoracic vertebrae draining blood towards the superior vena cava.
- It connects the systems of superior vena cava and inferior vena cava and can provide an alternative path for blood to the right atrium when either of the venae cavae is blocked.



⑥. Azygos system

Azygos vein is formed by the union of the ascending lumbar veins with the right subcostal veins at the level of the 12th thoracic vertebra, ascending in the posterior mediastinum, and arching over the right main bronchus posteriorly at the root of the right lung to join the superior vena cava.



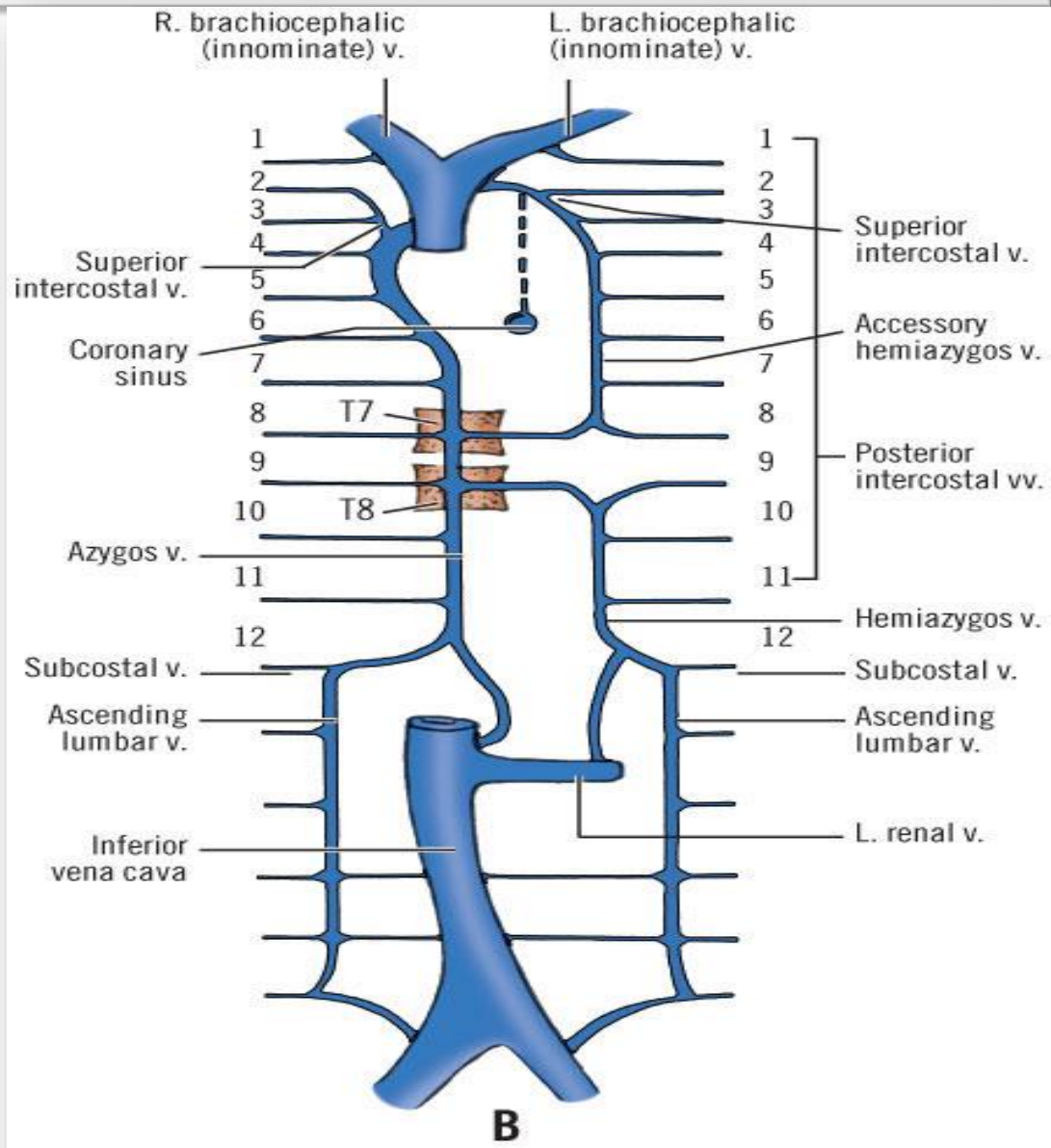
⑥. Azygos system

2. Hemiazygos vein

*The hemiazygos vein is mirrors the bottom part of the azygos vein.

*It runs superiorly in lower thoracic region to the left side of vertebral column

*It receives the 9th, 10th, and 11th posterior intercostal veins and the subcostal vein of the left side, and some esophageal and mediastinal veins.



⑥. Azygos system

3. Accessory hemiazygos vein

*Called also the superior hemiazygous vein is a vein on the left side of the vertebral column

*Generally drains posterior intercostal veins from 4th -8th on the left side of the body.

*Crosses the body of the eighth thoracic vertebra to join the azygos vein or ends in the hemiazygos.