

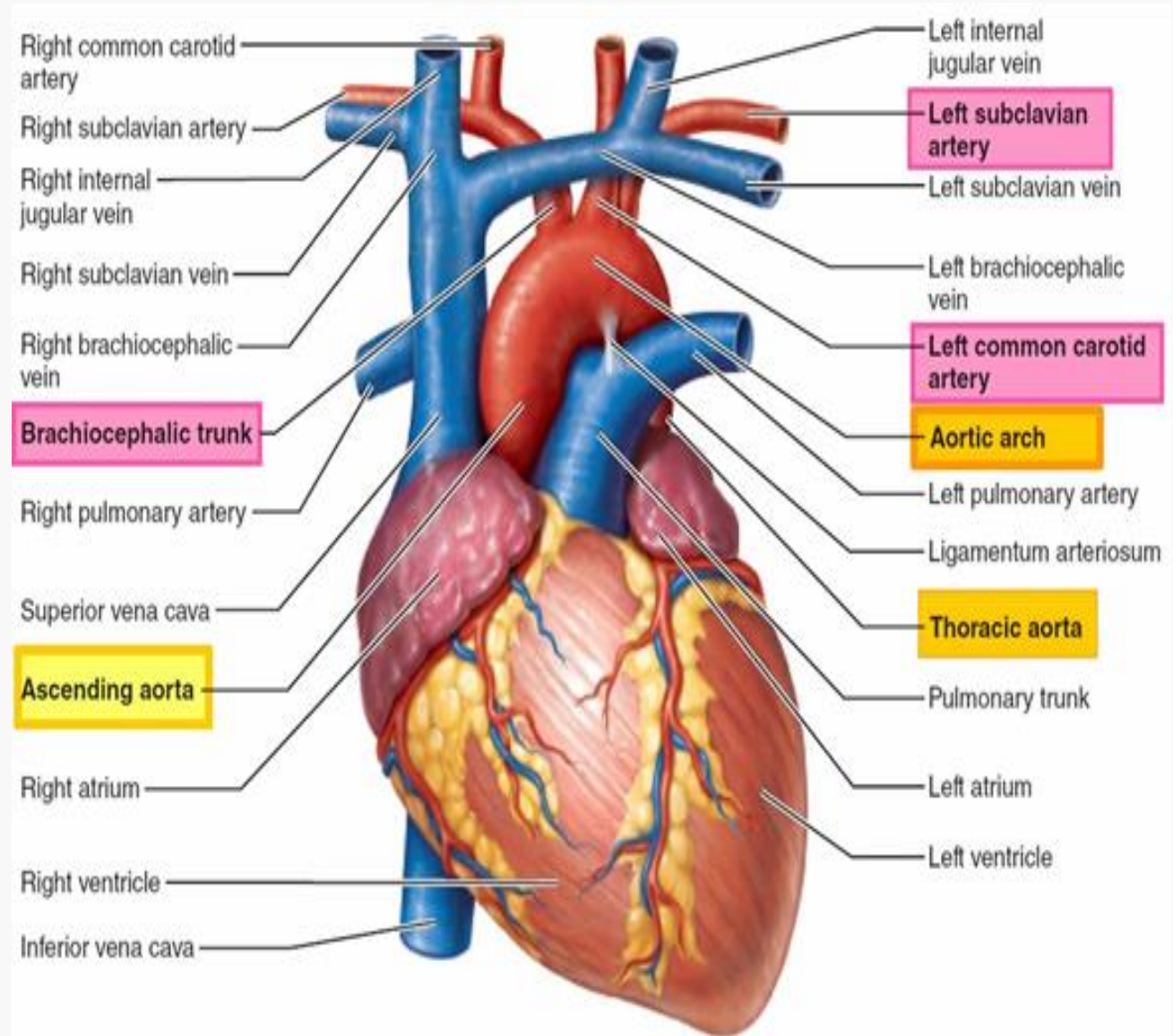
Blood vessels of the thorax& abdomen

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Large Arteries of the Thorax

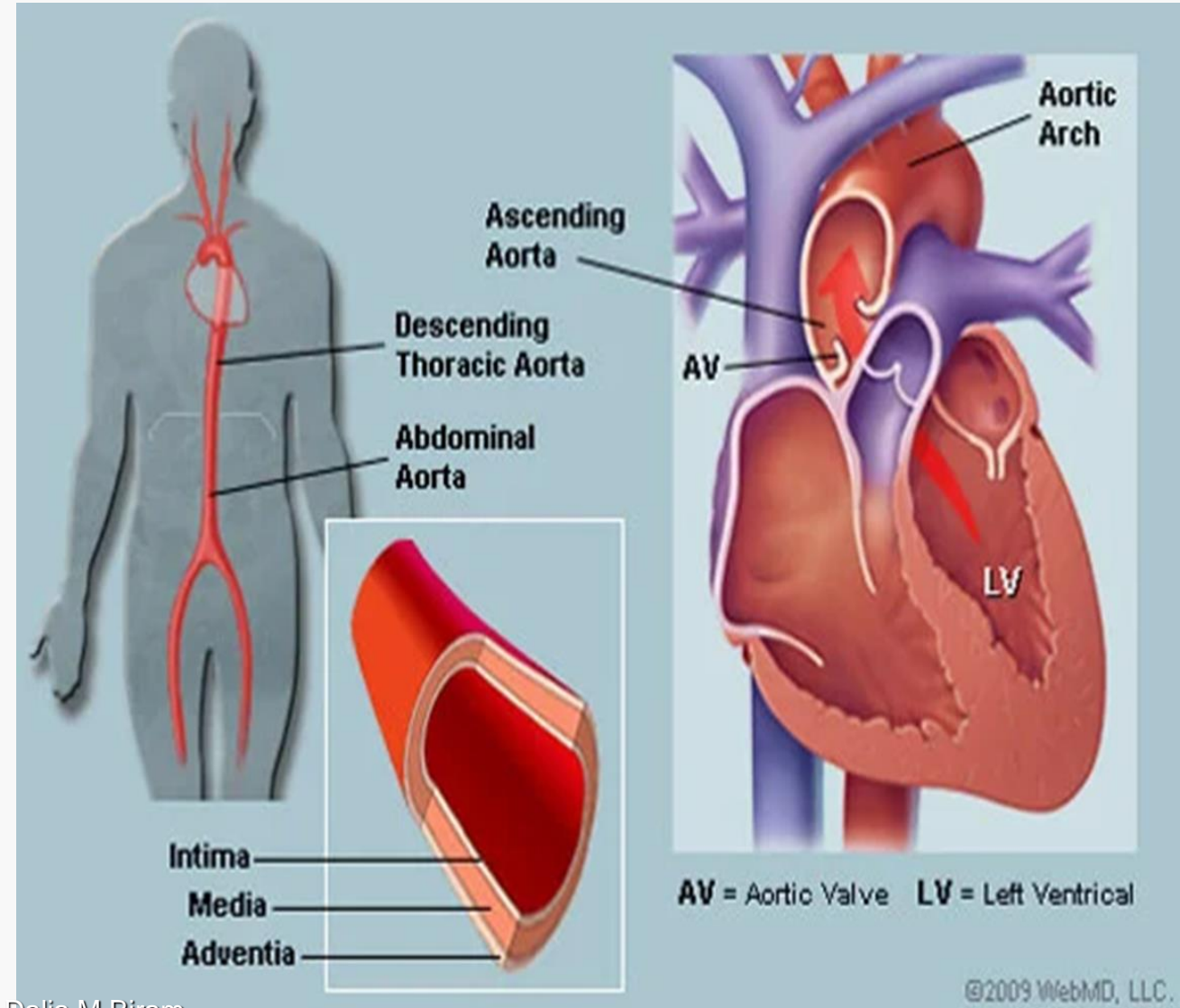
I) Thoracic Aorta

- The aorta is the largest artery in the body.
- It carries oxygenated blood from the heart to the whole body.
- It runs first in the thorax then in the abdomen.
- Its thoracic part is divided into ascending aorta, arch of aorta and descending aorta.

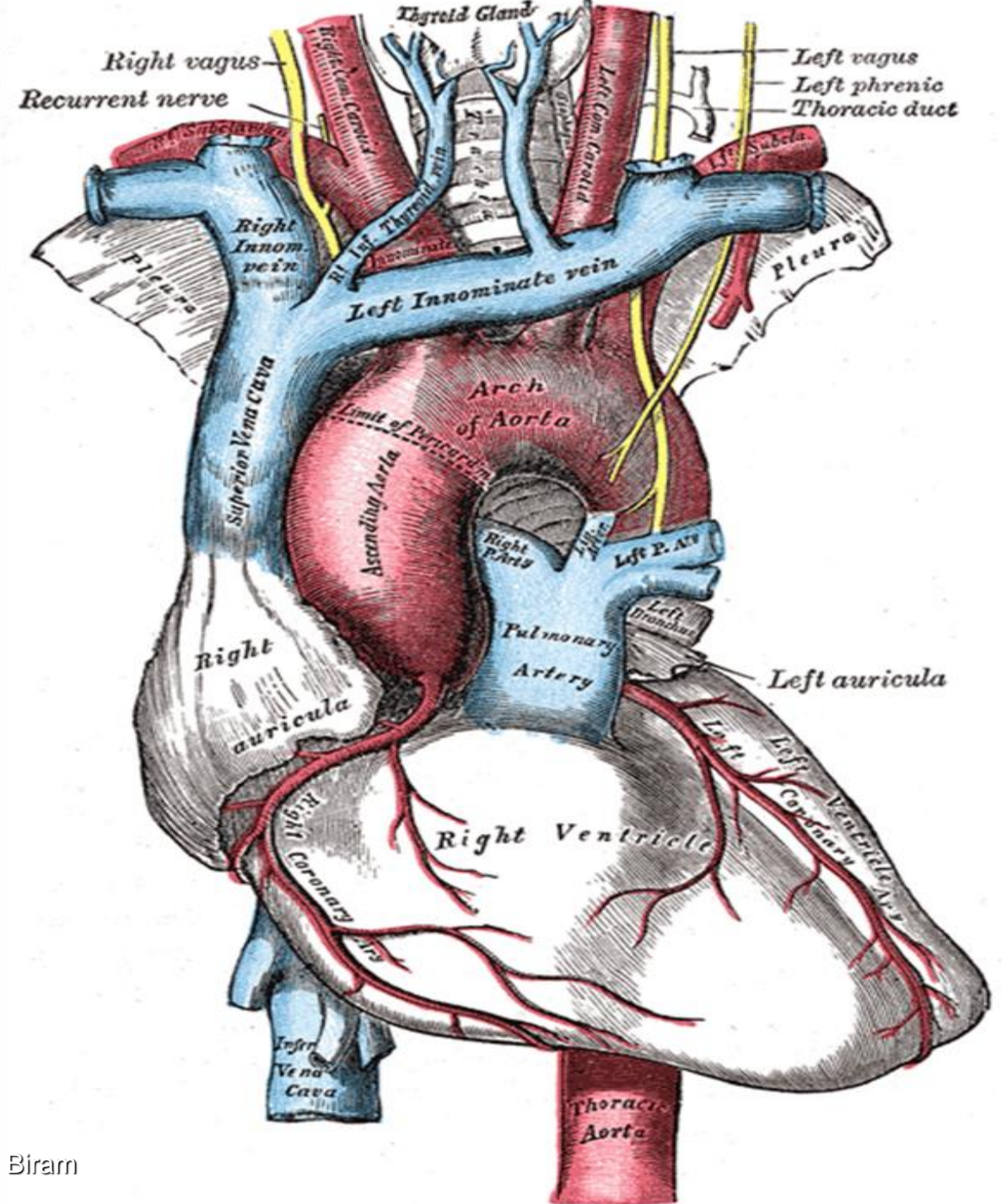


A) Ascending Aorta

- ★ A short wide artery.
- ★ It is 5 cm long with its whole length lies inside the fibrous pericardium.
- ★ It begins at the aortic orifice of the left ventricle behind the left border of the sternum opposite the 3rd left intercostal space.
- ★ It runs obliquely upwards, forwards and to the right to end behind the 2nd right sternocostal junction by becoming arch of aorta.

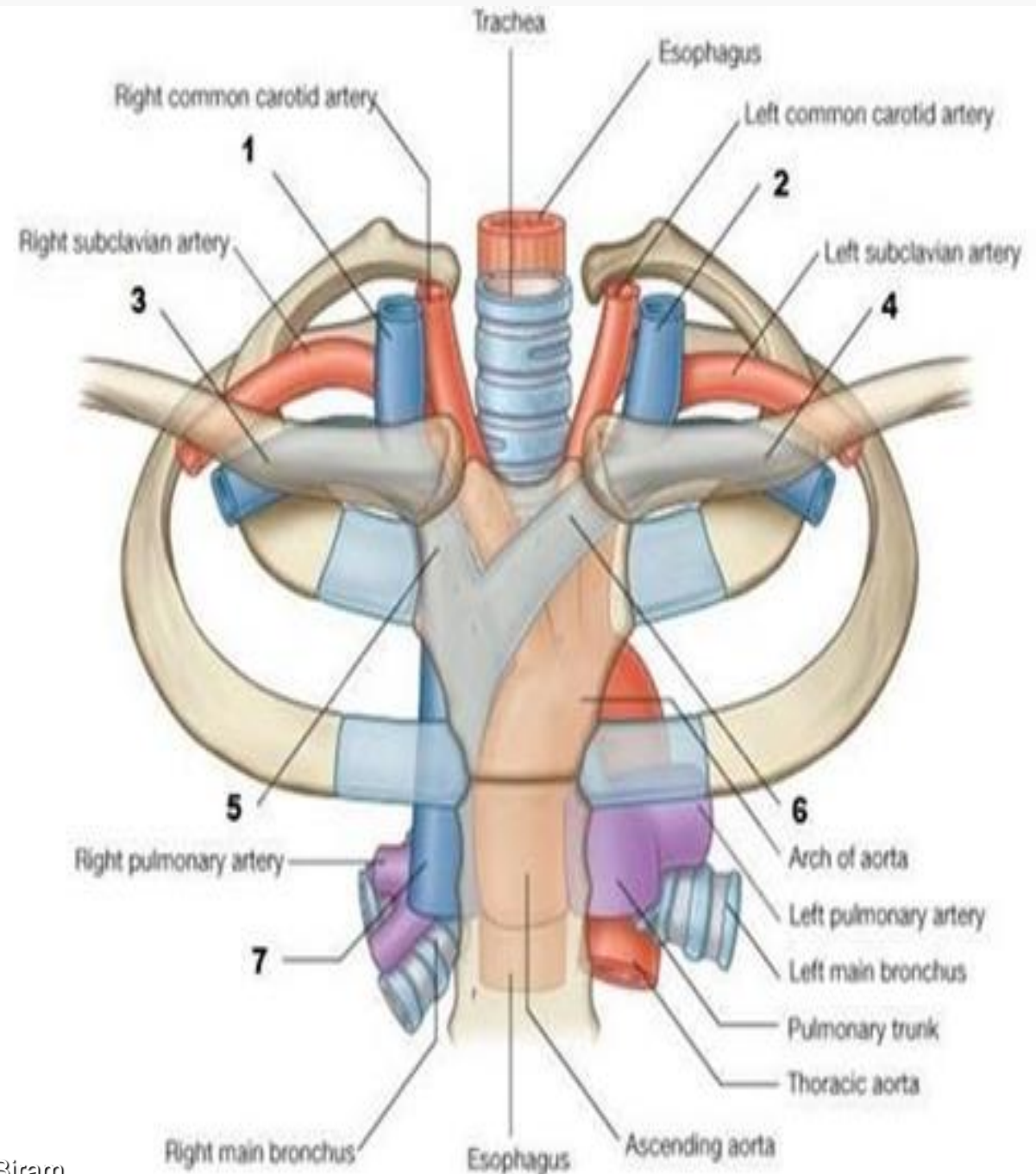


- □ **Branches of ascending aorta:**
- • At its beginning, the ascending aorta has 3 dilatations opposite the cusps of the aortic valve called the aortic sinuses (one anterior and two posterior) which give 2 branches:
 - 1. Right coronary artery: arises from the anterior aortic sinus.
 - 2. Left coronary artery: arises from the left posterior aortic sinus.



B) Arch of Aorta

- ★ **It begins** at the 2nd right sternocostal junction as a continuation of ascending aorta.
- ★ It passes first upwards, backwards and to left in front of the trachea & behind the lower 1/2 of the manubrium sterni, then backwards and downwards on the left side of the trachea.
- ★ It **ends** on the left side of lower border of T4. vertebra by becoming the descending thoracic aorta.

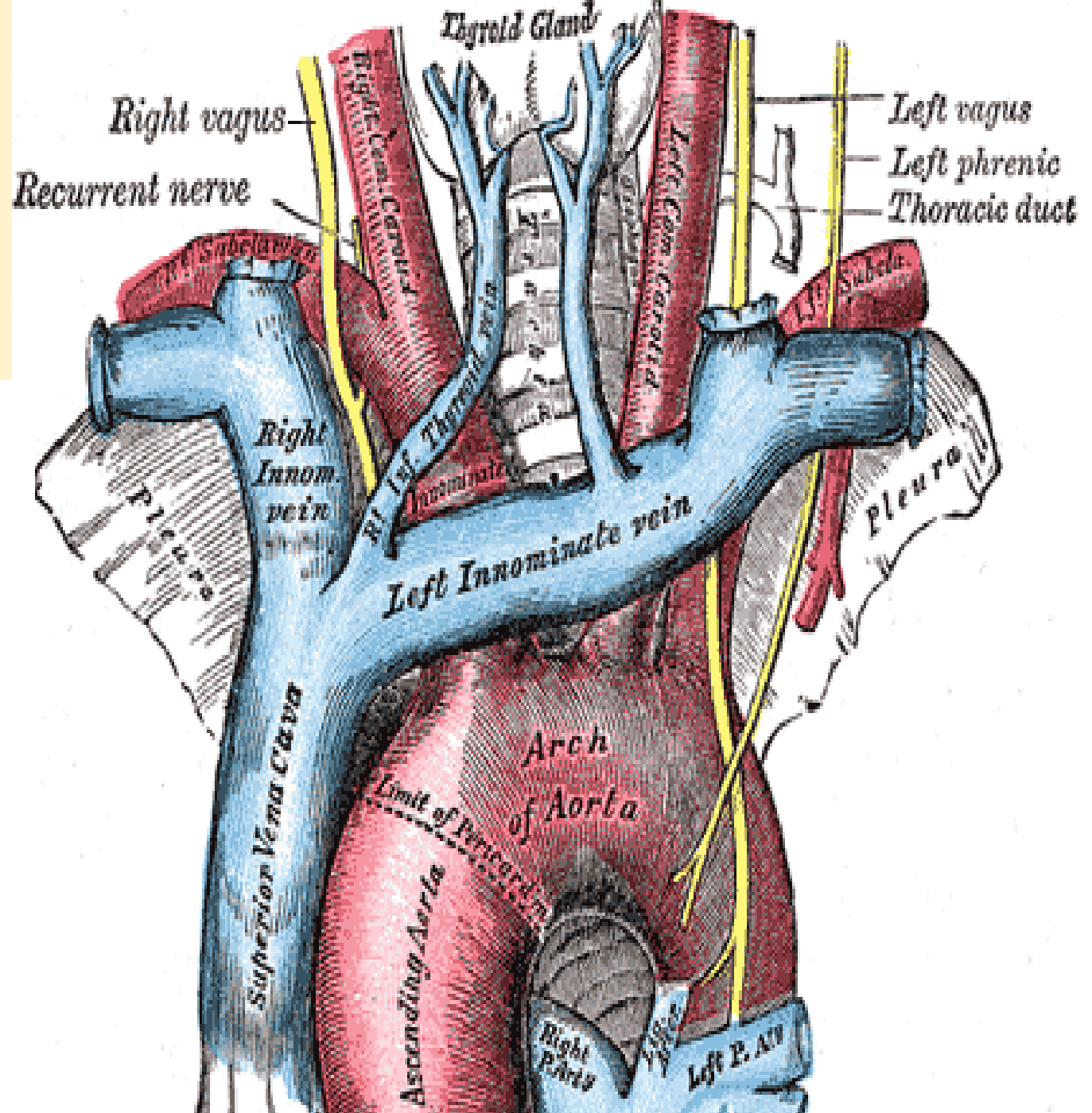


BRANCHES

- A. Brachiocephalic (innominate) artery.
- B. Left common carotid artery.
- C. Left subclavian artery.
- Occasionally, a fourth branch referred to as thyroidea ima artery may originate from the arch of aorta.

Points to be noted in the course of arch of aorta

- A. The arch of aorta arches over the root of left lung.
- B. It begins and ends at the same level, i.e., at sternal angle.
- C. It begins anteriorly and ends posteriorly.



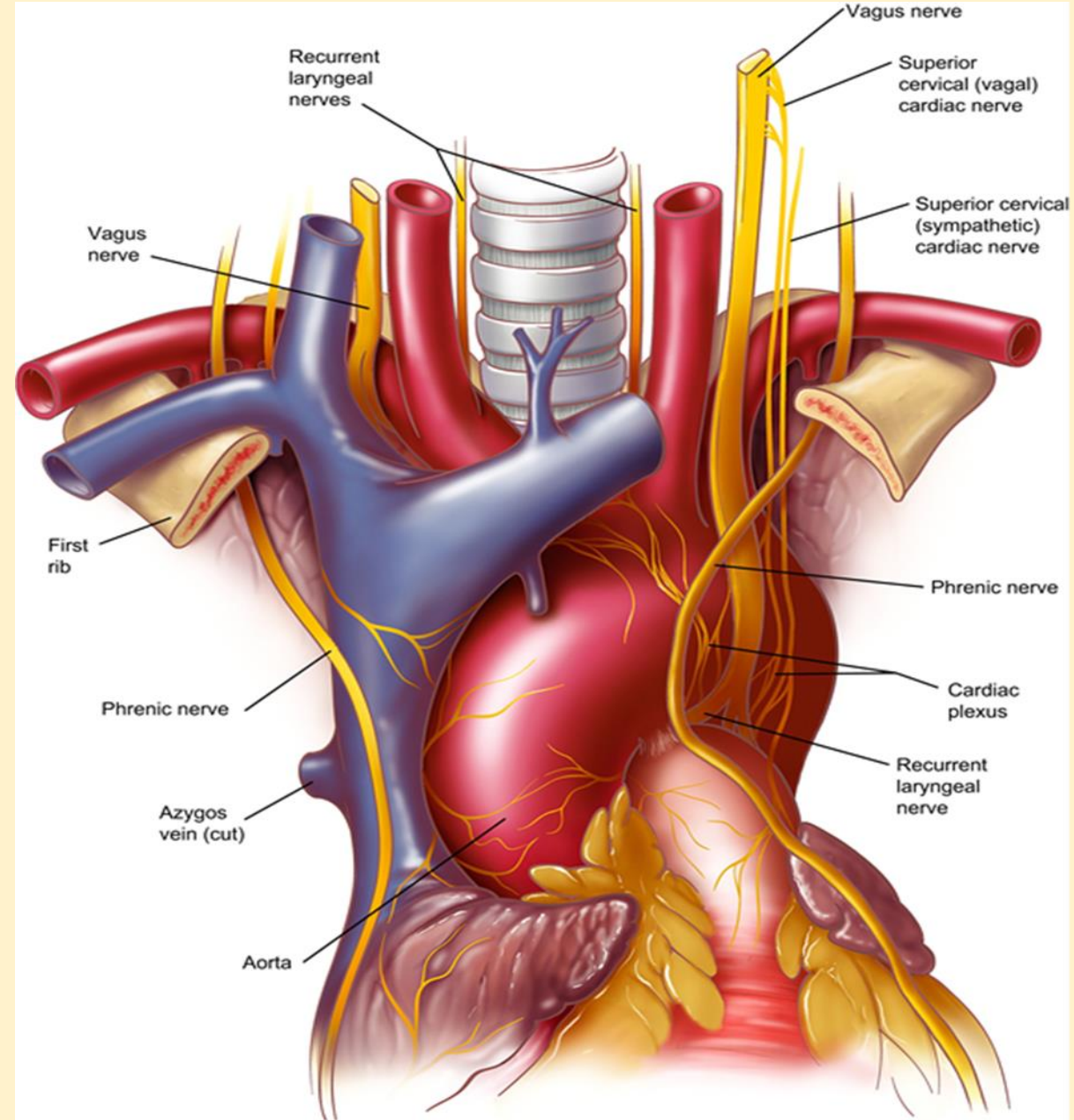
Relations of the arch of aorta

a-The upper convex aspect is related to:

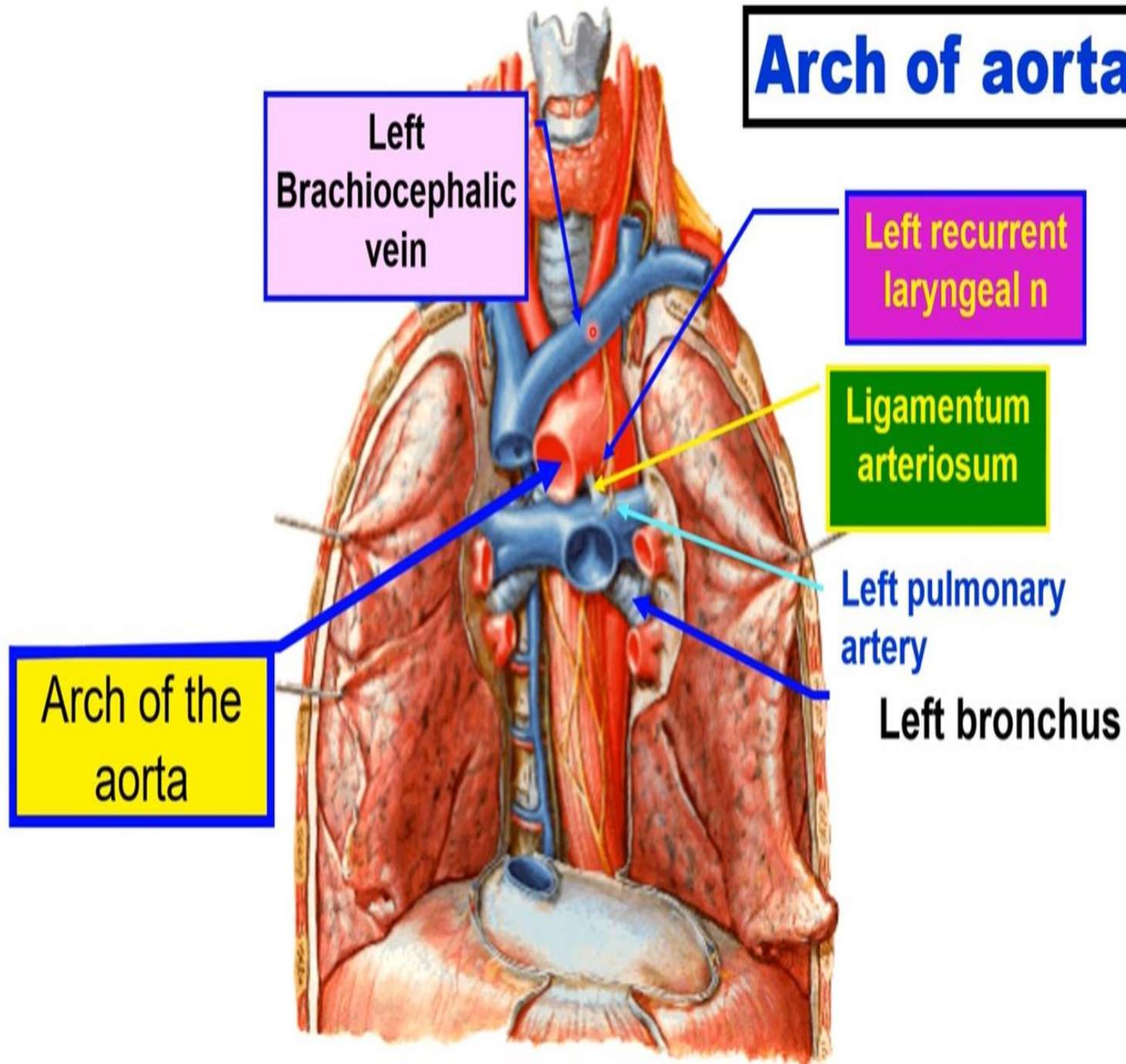
1. Origins of its 3 large branches:

- Brachiocephalic artery arises behind center of manubrium.
- Left common carotid artery to the left of brachiocephalic artery
- Left subclavian artery behind the left common carotid artery.

2. Left brachiocephalic vein: runs obliquely along upper border of the arch of the aorta in front of the origin of its main branches



Arch of aorta



a. **The lower concave** aspect is related to:

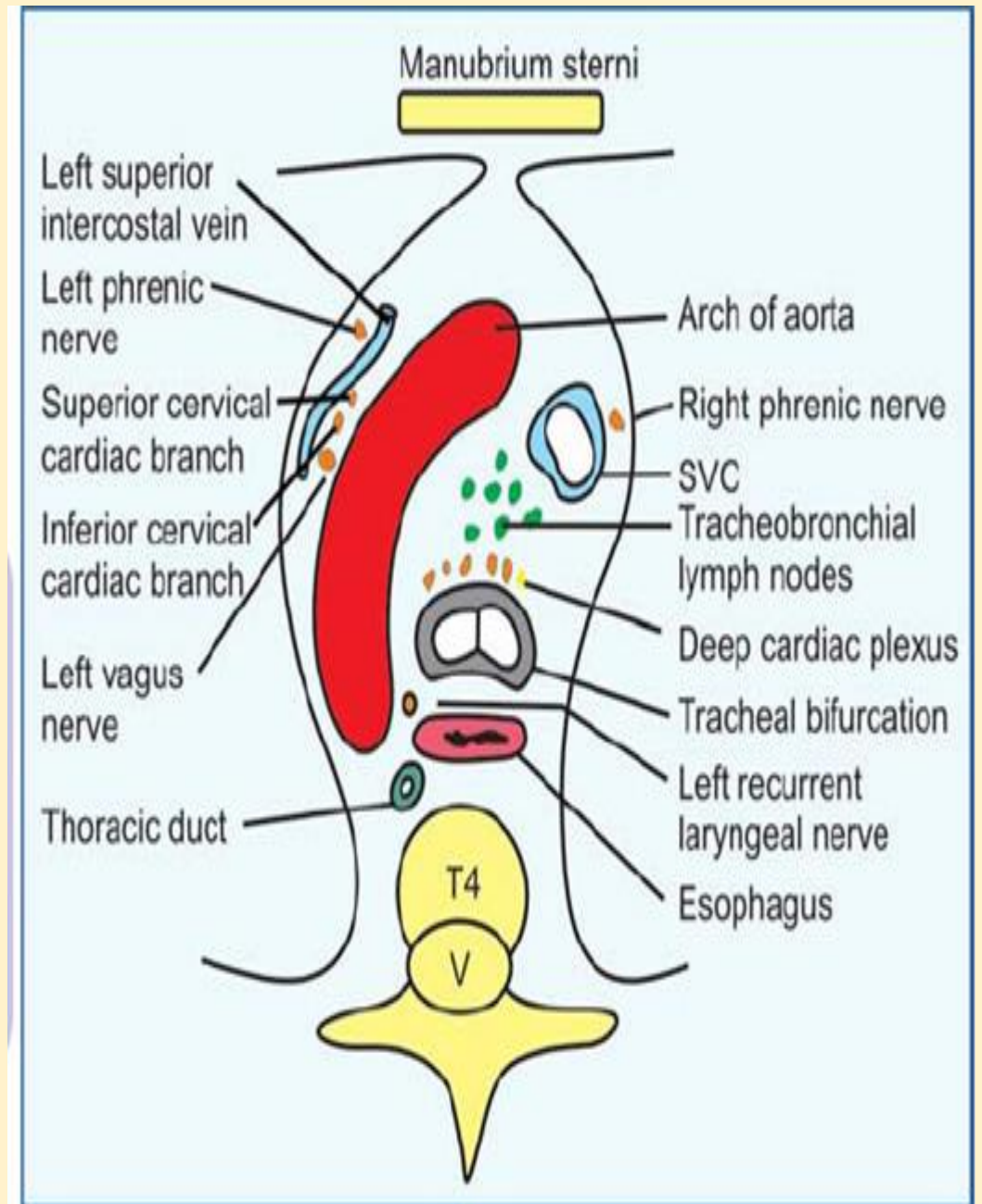
1. Bifurcation of pulmonary trunk into right and left pulmonary arteries.
2. Ligamentum arteriosum (fibrosed ductus arteriosus of the fetus) extends between the left pulmonary artery and lower surface of arch of aorta.
3. Superficial cardiac plexus in front of ligamentum arteriosum.
4. Left recurrent laryngeal nerve.
5. Left principal bronchus.

- **c- The left anterior aspect is related to:**

1. The mediastinal surfaces of the left pleura and lung.

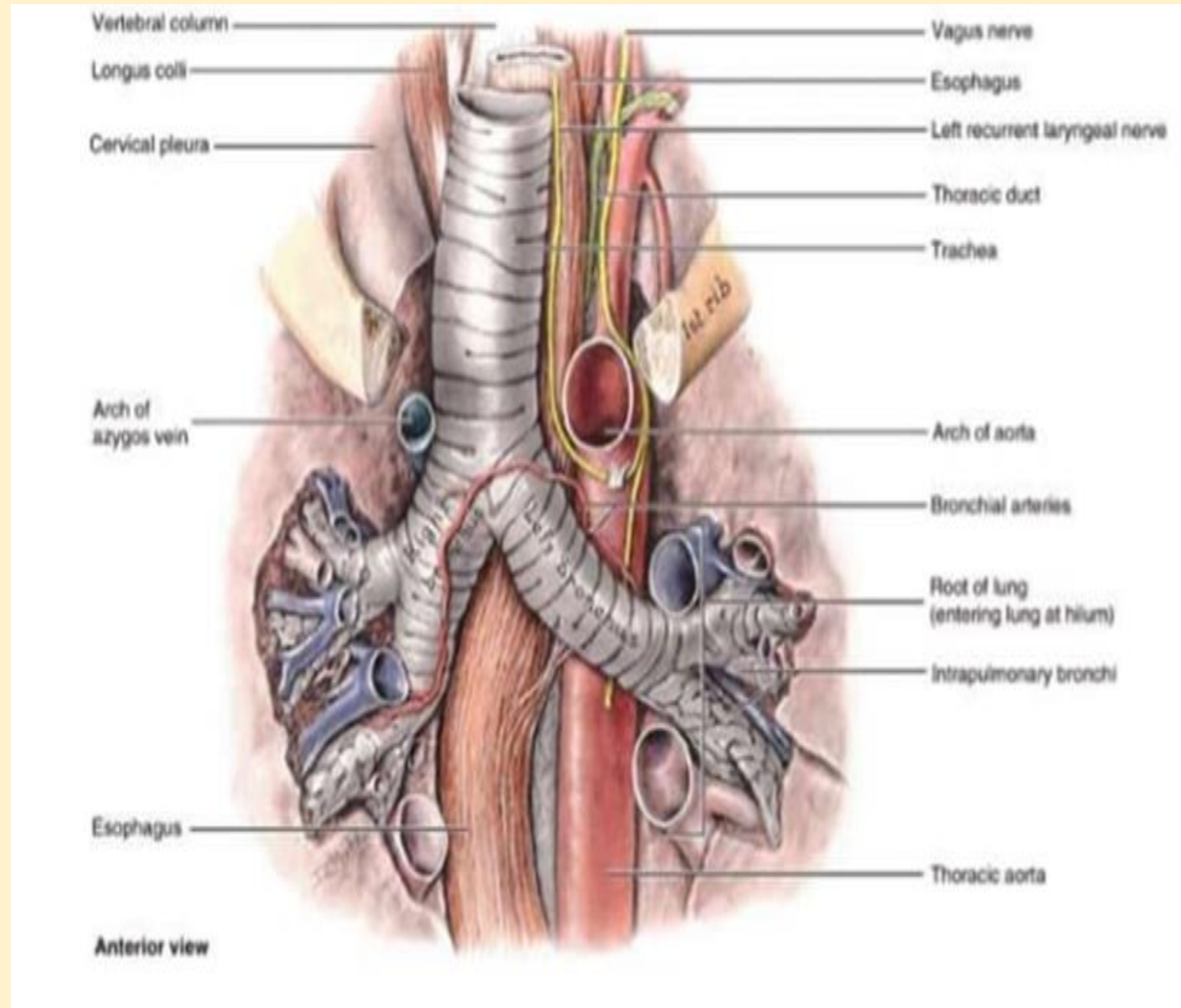
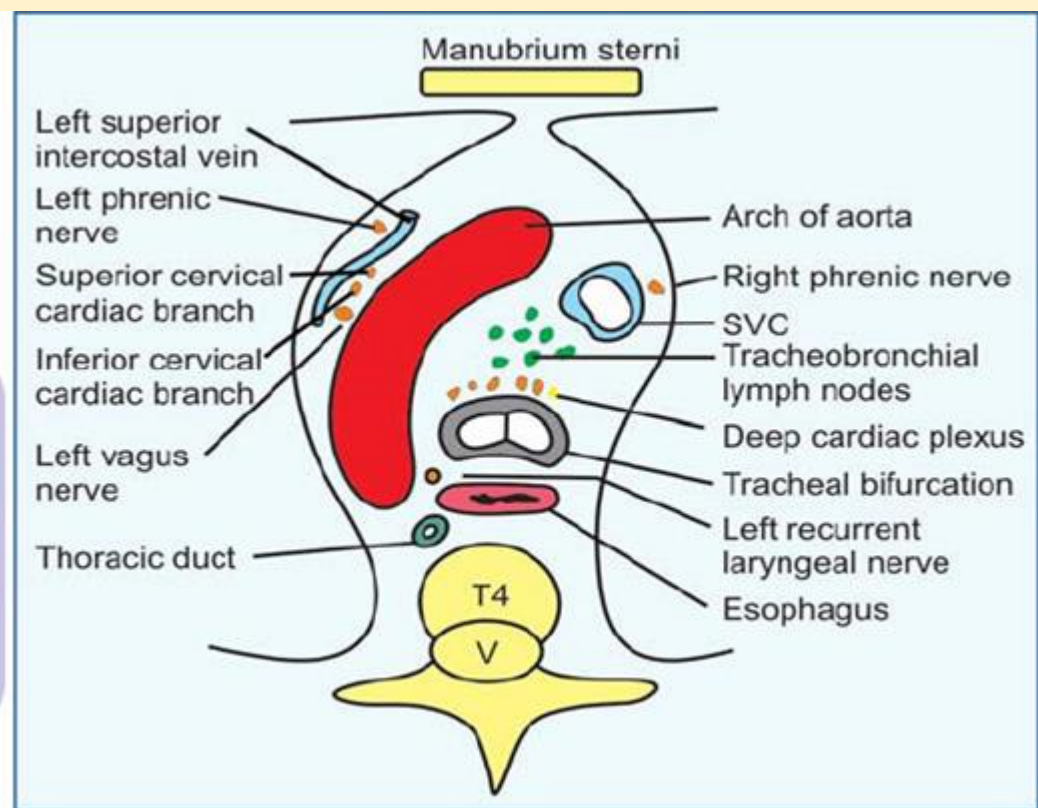
2. The structures crossing the arch:

- A. Left phrenic nerve and pericardiophrenic vessels.**
- B. Left vagus nerve, crossed superficially by the left phrenic nerve.**
- C. Superior cervical cardiac branch of left sympathetic chain.**
- D. Inferior cervical cardiac branch of left vagus nerve.**
- E. Left superior intercostal vein**



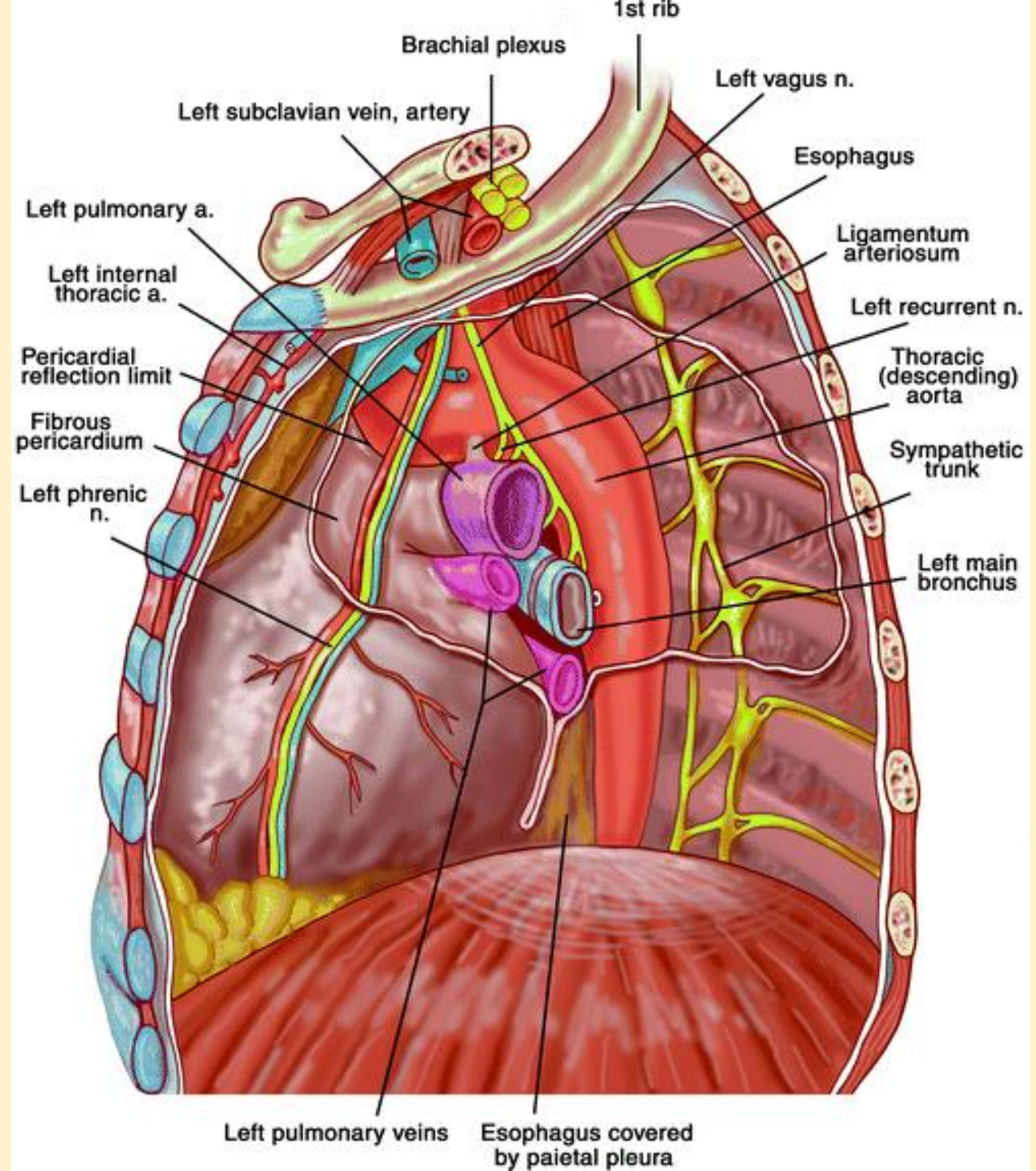
a. The right posterior aspect is related to:

- 1. Trachea.**
- 2. Deep cardiac plexus & tracheobronchial lymph nodes: on the bifurcation of the trachea.**
- 3. Oesophagus: behind the trachea.**
- 4. Left recurrent laryngeal nerve: in the groove between trachea and oesophagus.**
- 5. Thoracic duct: behind left border of the oesophagus.**



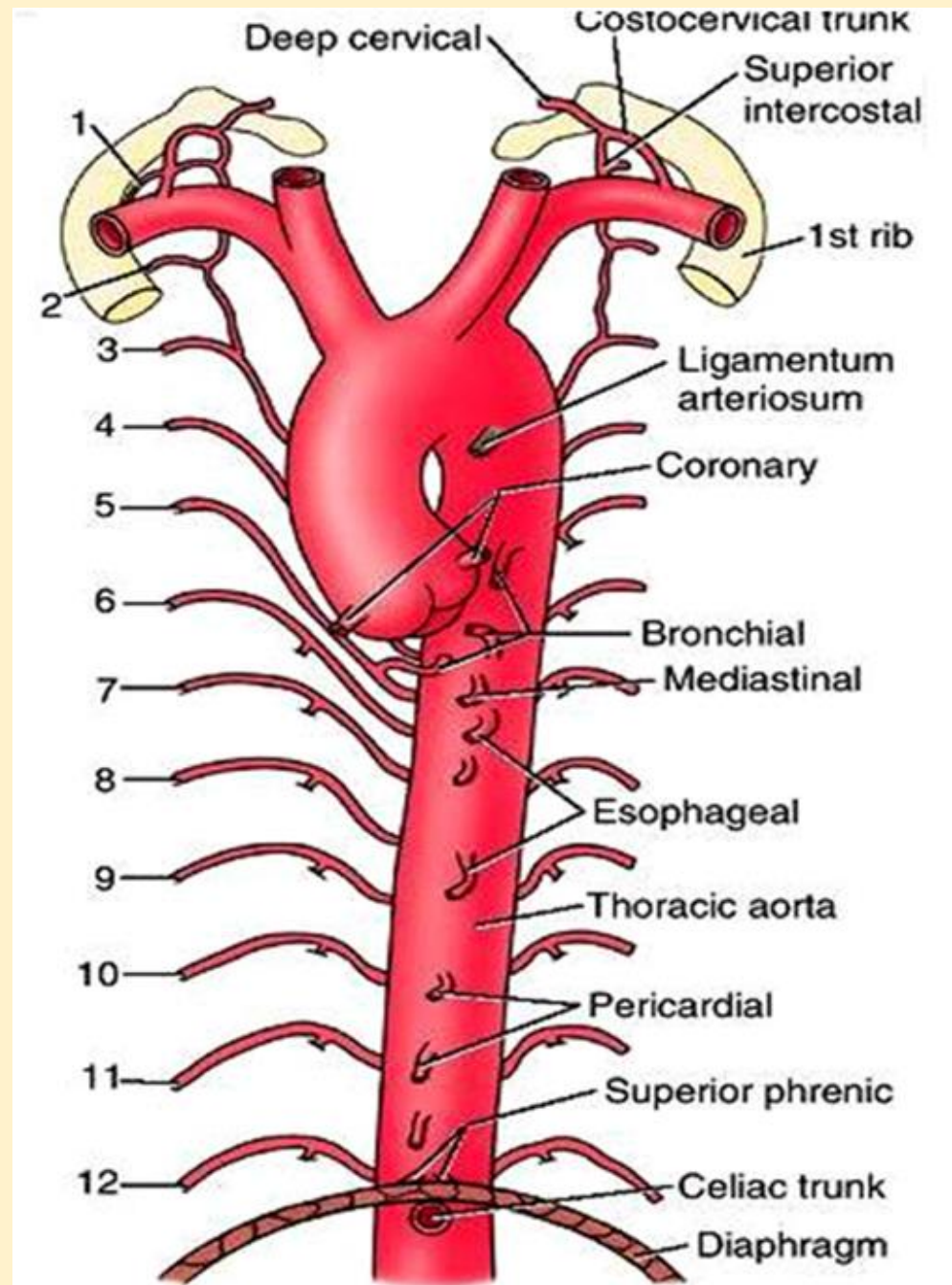
DESCENDING AORTA

- The descending aorta is the section of the **thoracic aorta** which is contained in the posterior mediastinum.
- It originates leveled along with the lower boundary of the **T4 vertebra**, consistent with the aortic arch, and also terminates anterior to the lower boundary of the **T12 vertebra** within the **aortic hiatus**.
- it initially begins to the left of the vertebral column but approaches the midline as it descends. It leaves the thorax via the **aortic hiatus** in the diaphragm, and becomes the abdominal aorta.



★ **Branches:**

- 1. Nine pairs of posterior intercostal arteries (from 3rd to 11th).**
 - 2. One pair of subcostal arteries.**
 - 3. bronchial arteries.**
 - 4. oesophageal branches.**
- **Few small twigs to the pericardial, mediastinal and superior phrenic branches**



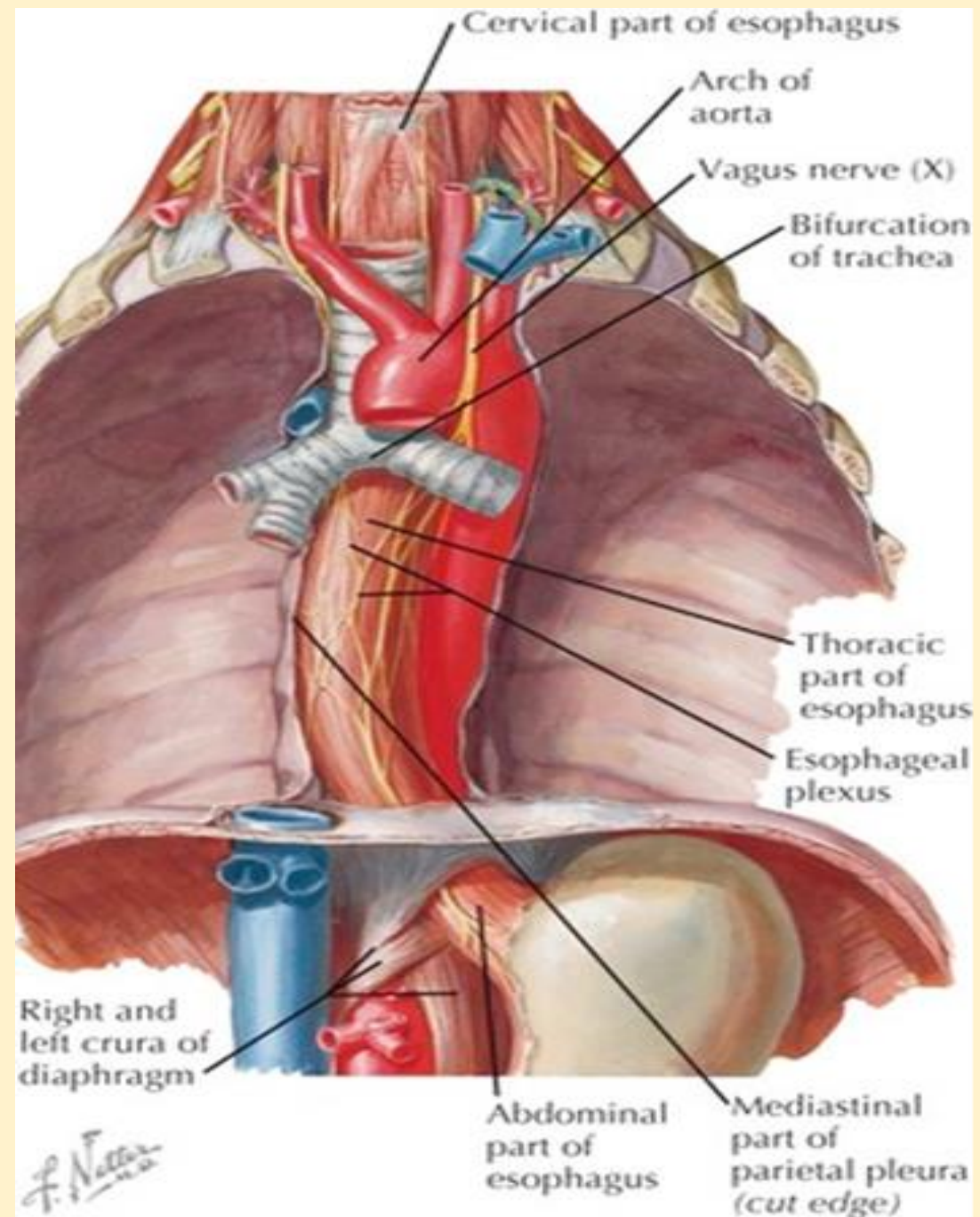
★ **Relations:**

a. Anteriorly: from above downwards, it is related to the followings:

- The left principal bronchus.
- Fibrous pericardium & Oblique sinus of serous pericardium separating it from the left atrium.
- Oesophagus cross from right to left in front of aorta at **T₇ vertebra**.
- Diaphragm.

a. Posteriorly: from above downwards it is related to the followings:

- Lower 5 thoracic vertebrae (T8-T12).
- The superior and inferior hemiazygos veins (cross from left to right behind the aorta at T8 and T9 vertebrae respectively).

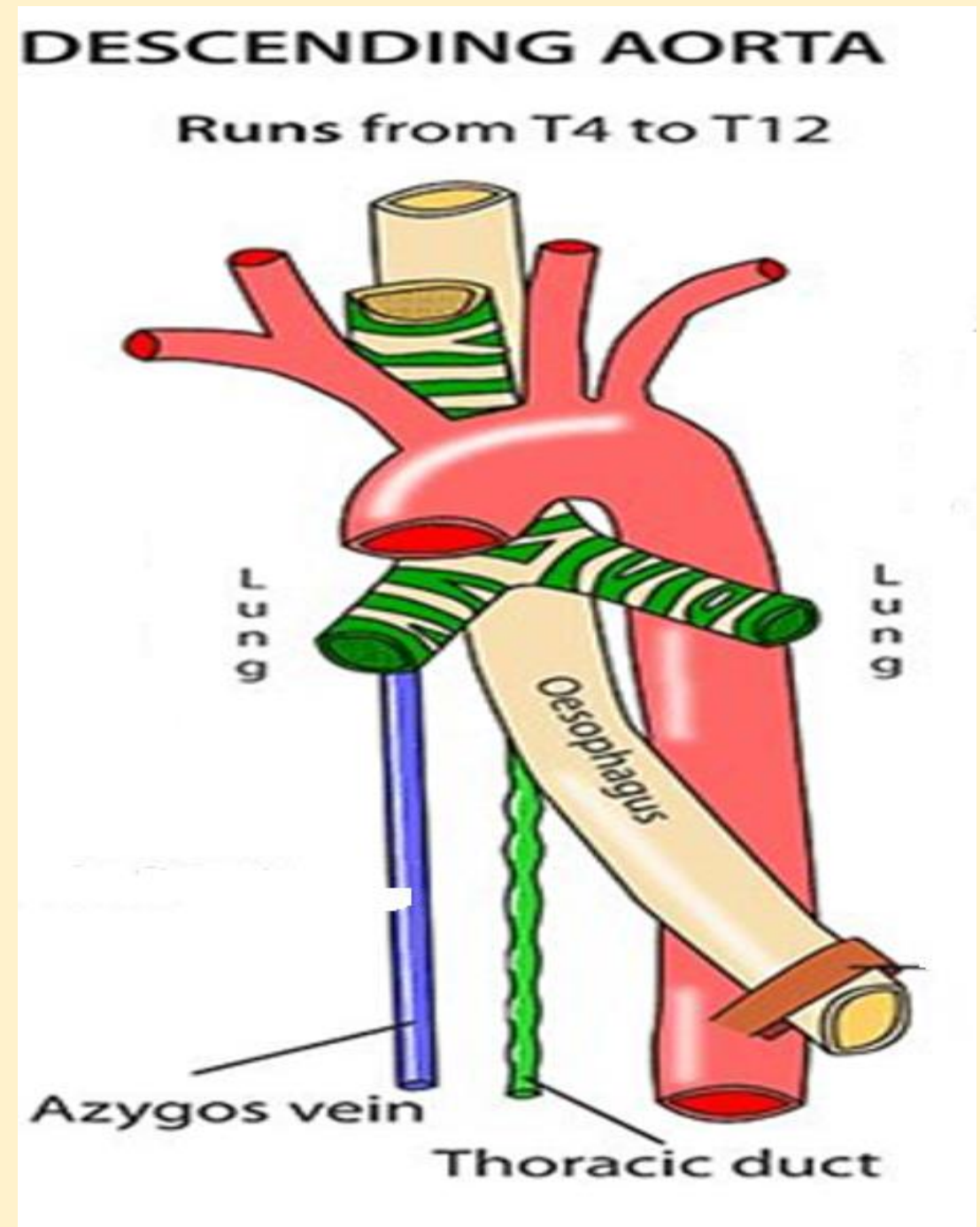


a. On its right side: from above downwards, it is related to the followings:

- Oesophagus (before crossing in front of aorta at T₇ vertebra).
- Azygos vein on right side of lower part of aorta.
- The thoracic duct between azygos vein and lower part of aorta.

a. On its left side: from above downwards, it is related to the followings:

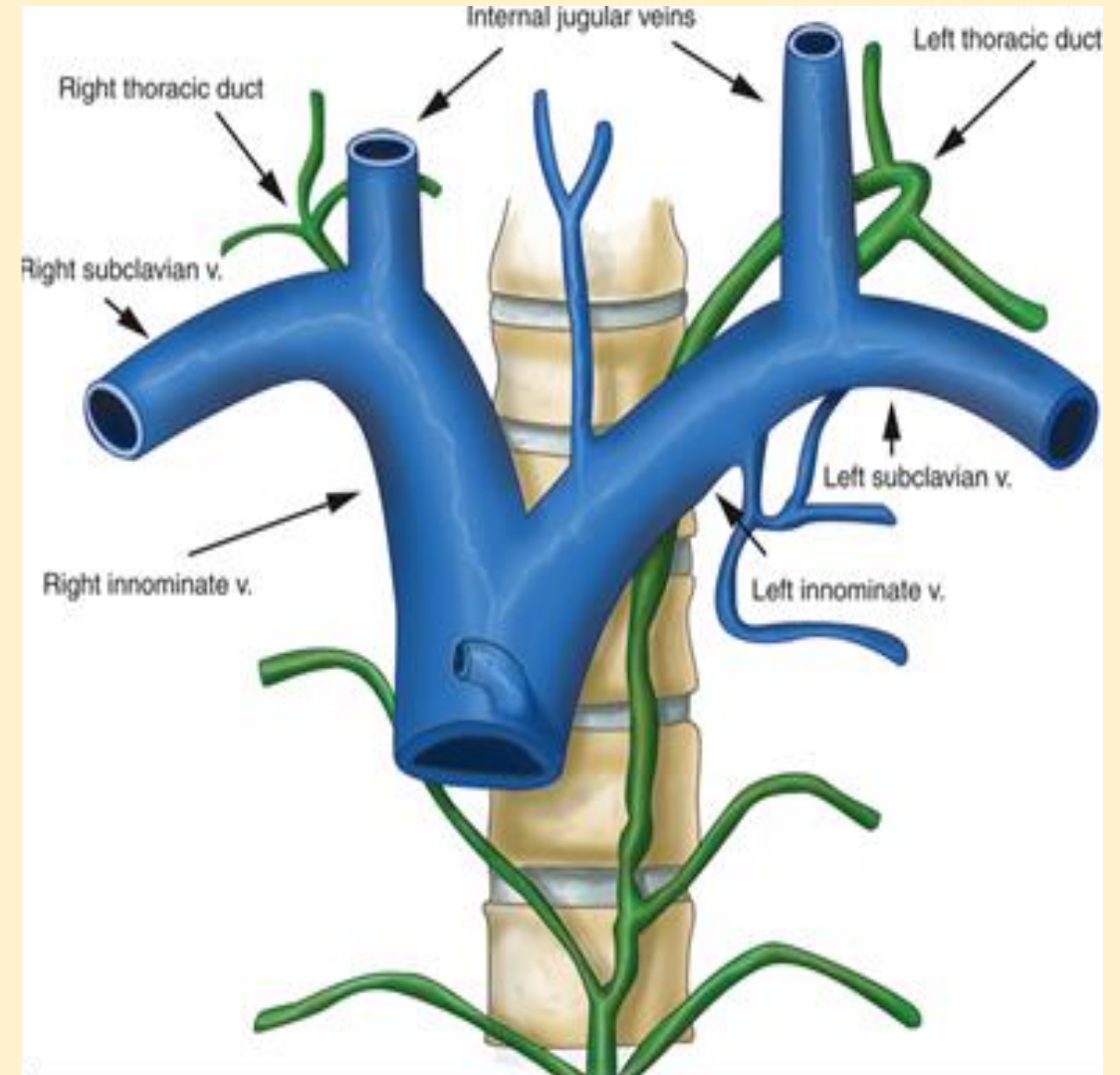
- Its upper part is related to the left pleura and lung
- Its lower end is related to the oesophagus.



Large Veins of the Thorax

brachiocephalic veins

- ★ The 2 brachiocephalic veins (right and left) drain the upper limbs (brachium) as well as the head and neck (cephalic).
- ★ They also drain the anterior wall of the thorax, the upper part of the posterior wall of the thorax as well as lymph from the whole body.
- ★ Each vein begins behind the medial end of the corresponding clavicle.
- ★ The 2 veins end behind the lower border of **the 1st right** costal cartilage close to sternum by uniting together to form the **S.V.C.**



- **Tributaries of left brachiocephalic vein**

1. Left **internal thoracic** vein.
2. Left **inferior thyroid** vein.
3. Left **vertebral** vein.
4. Left **first posterior intercostal** vein.
5. Left **superior intercostal** vein.
6. Thoracic duct.

- **Tributaries of right brachiocephalic vein**

1. Right **internal thoracic** vein.
2. Right **inferior thyroid** vein.
3. Right **vertebral** vein.
4. Right first **posterior intercostal** vein
5. Right lymphatic duct.

❑ **N.B; Right superior intercostal vein ends in the arch of azygos vein.**

2) Superior Vena Cava (S.V.C.)

A large vein which drains venous blood from upper $\frac{1}{2}$ of the body.

It measures about 2 inches long.

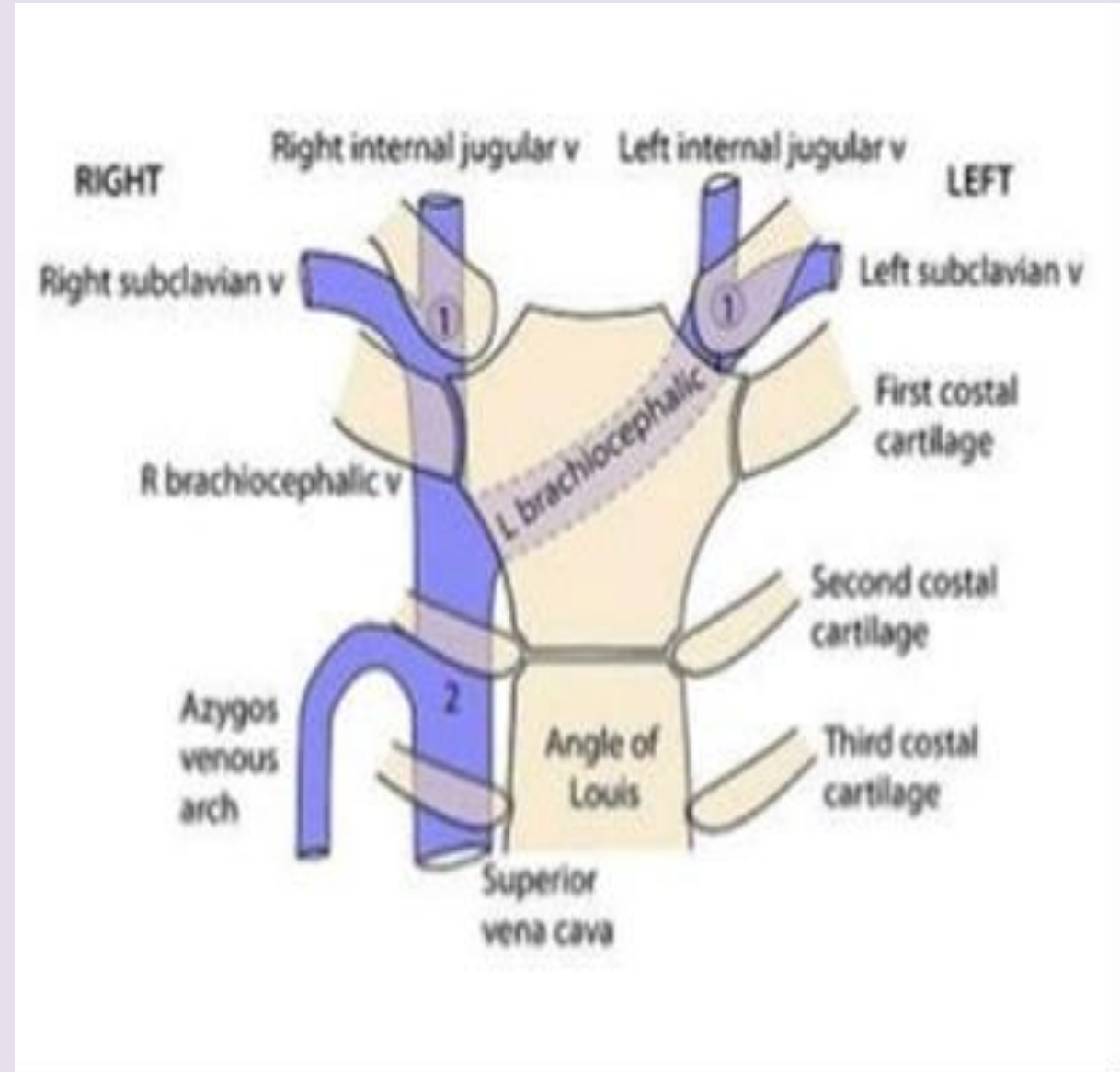
Its upper $\frac{1}{2}$ lies in the superior mediastinum while its lower $\frac{1}{2}$, lies inside the fibrous pericardium, in the middle mediastinum.

It is formed by the union of the 2 brachiocephalic veins behind the lower border of the **1st right costal cartilage** close to sternum.

It descends vertically to pierce the pericardium at the level of the 2nd right costal cartilage.

It ends by opening into the right atrium behind the **3rd right costal cartilage**, close to the sternum

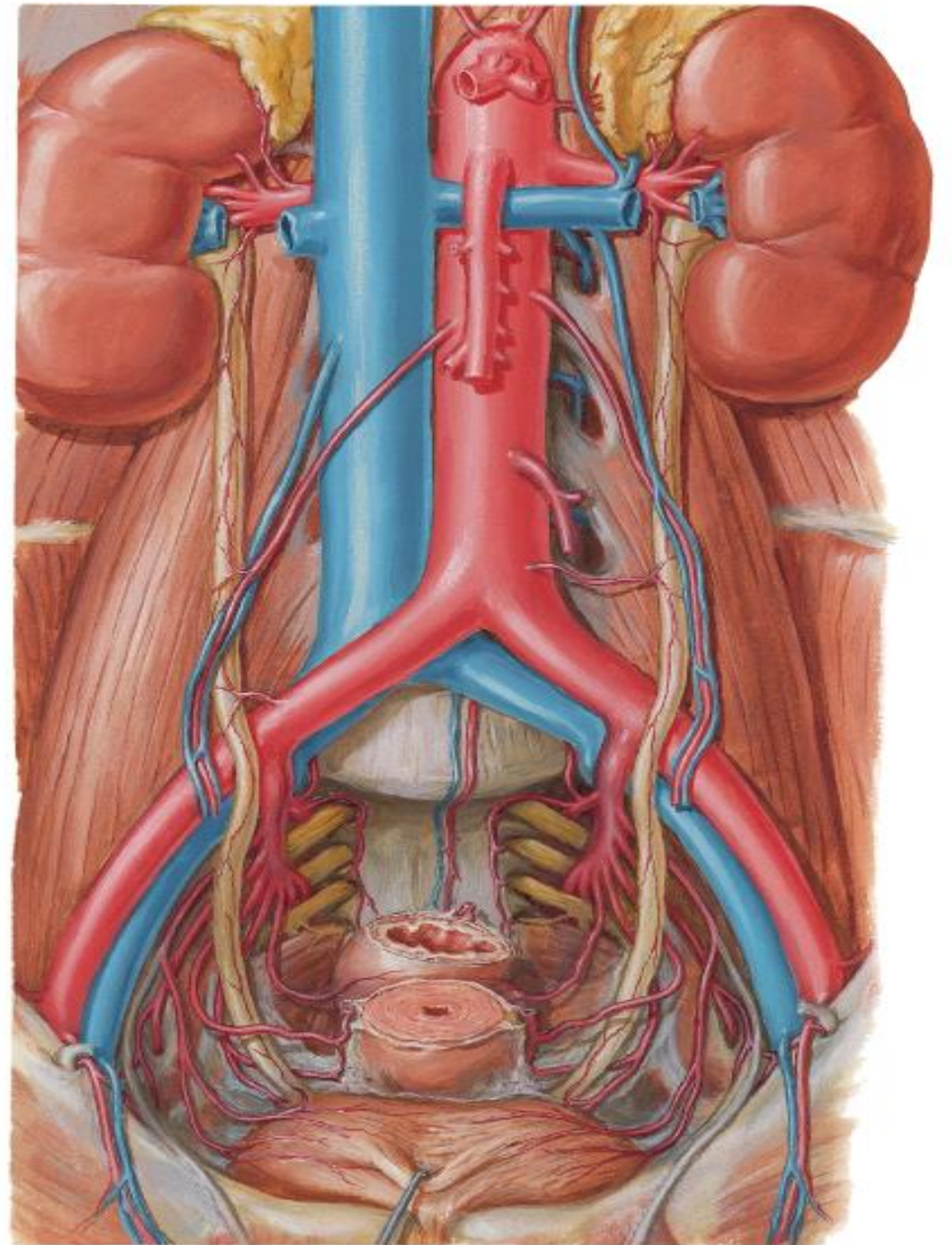
Tributaries: The S.V.C. has only one tributary, the azygos vein, which enters it from behind, at the level of the 2nd right costal cartilage just before it pierces the pericardium.



Abdominal aorta

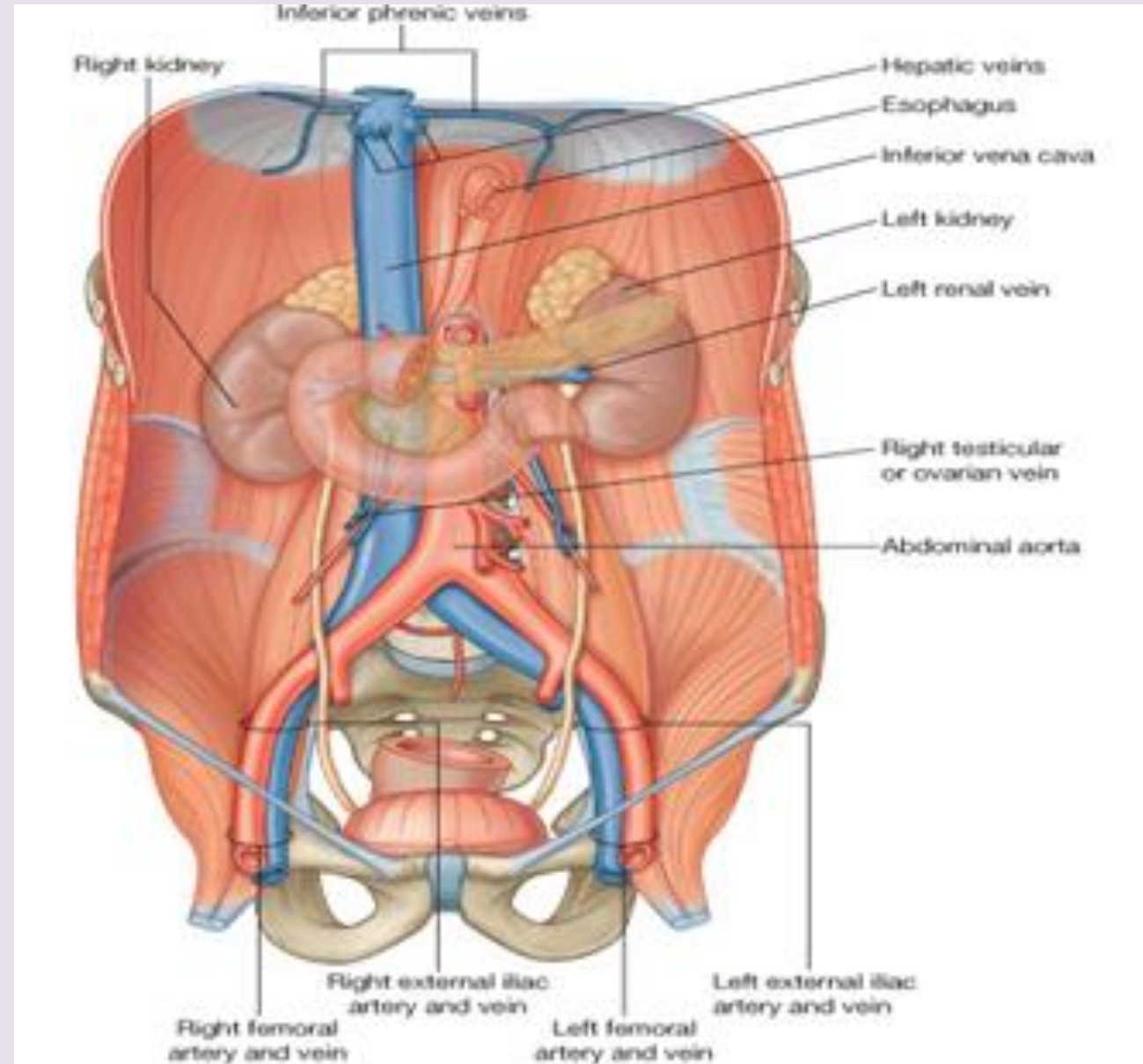
Beginning: It enters the abdomen opposite 12th thoracic vertebra through aortic opening of the diaphragm.

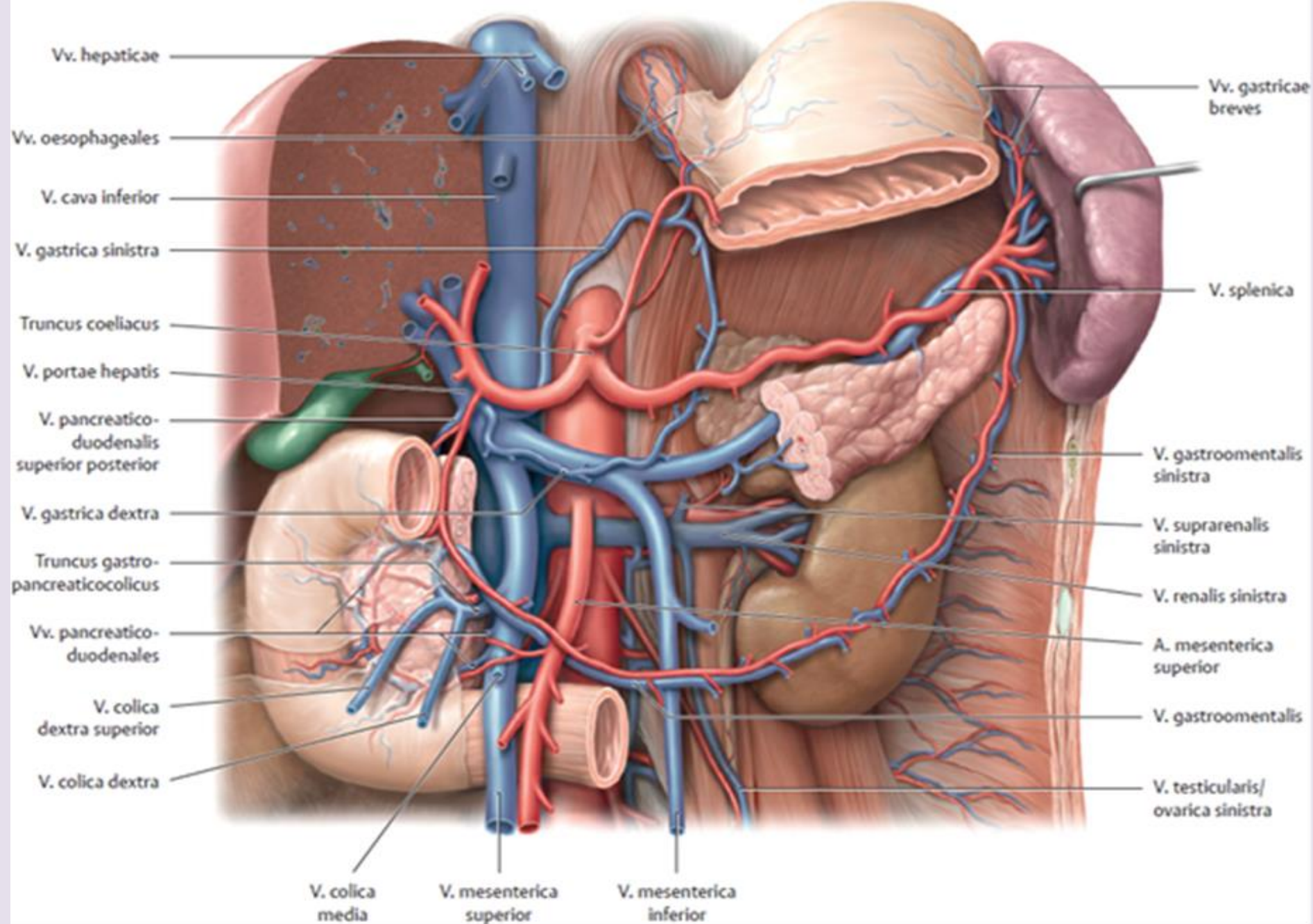
Termination: It ends by dividing into 2 common iliac arteries opposite the 4th lumbar vertebra.



Anterior relations from superior to inferior:

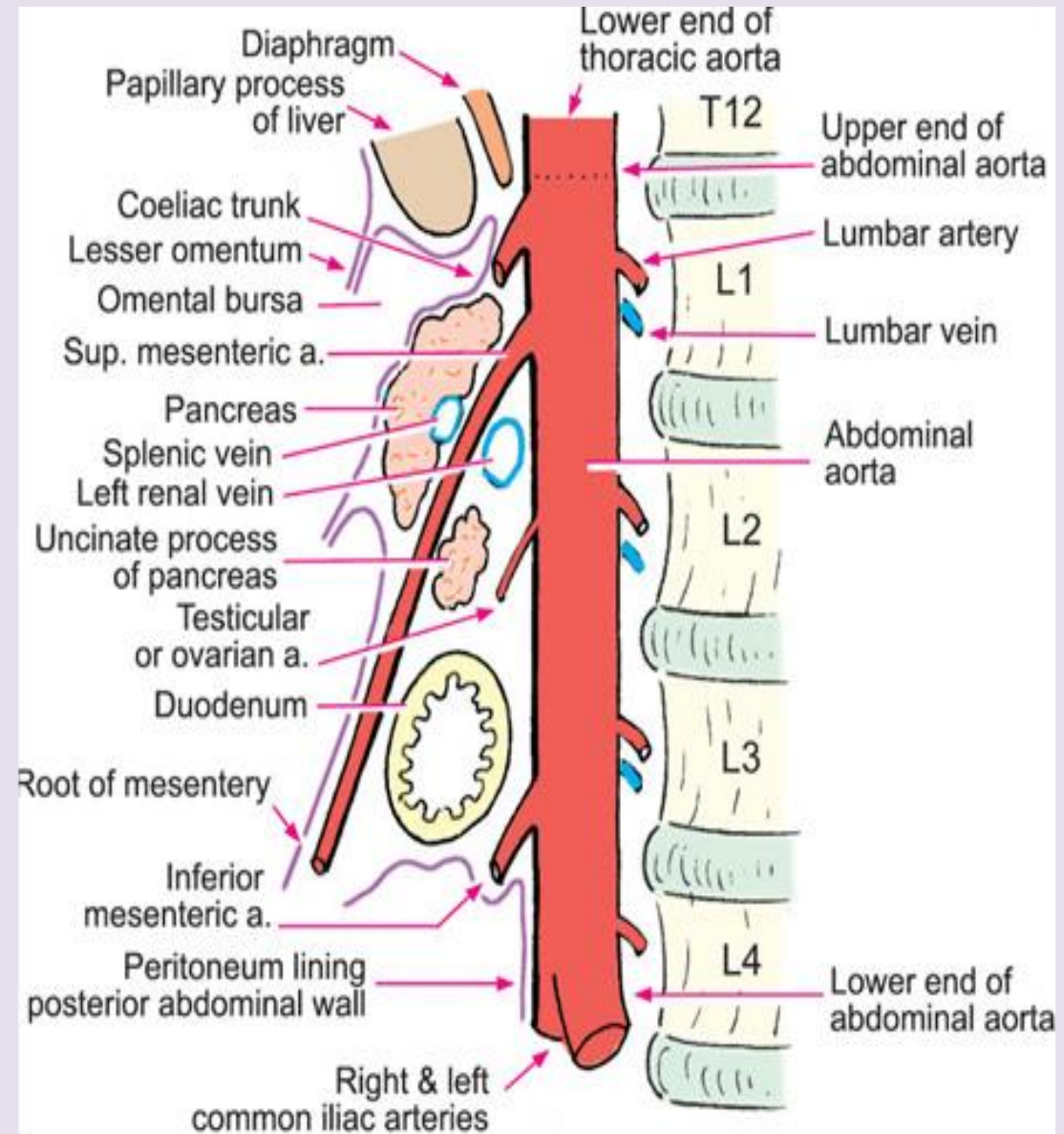
1. Celiac trunk ,ganglia and plexus.
2. Body of the pancreas.
3. Splenic and left renal veins.
4. (3rd part) of the duodenum.
5. Superior mesenteric vessels and root of mesentery.
6. coils of small intestine.





Posterior relations:

1. Lumbar vertebrae (1-4) and intervertebral discs.
2. Anterior longitudinal ligament.
3. The left 3rd and 4th lumbar veins which cross behind the aorta to end in the inferior vena cava.

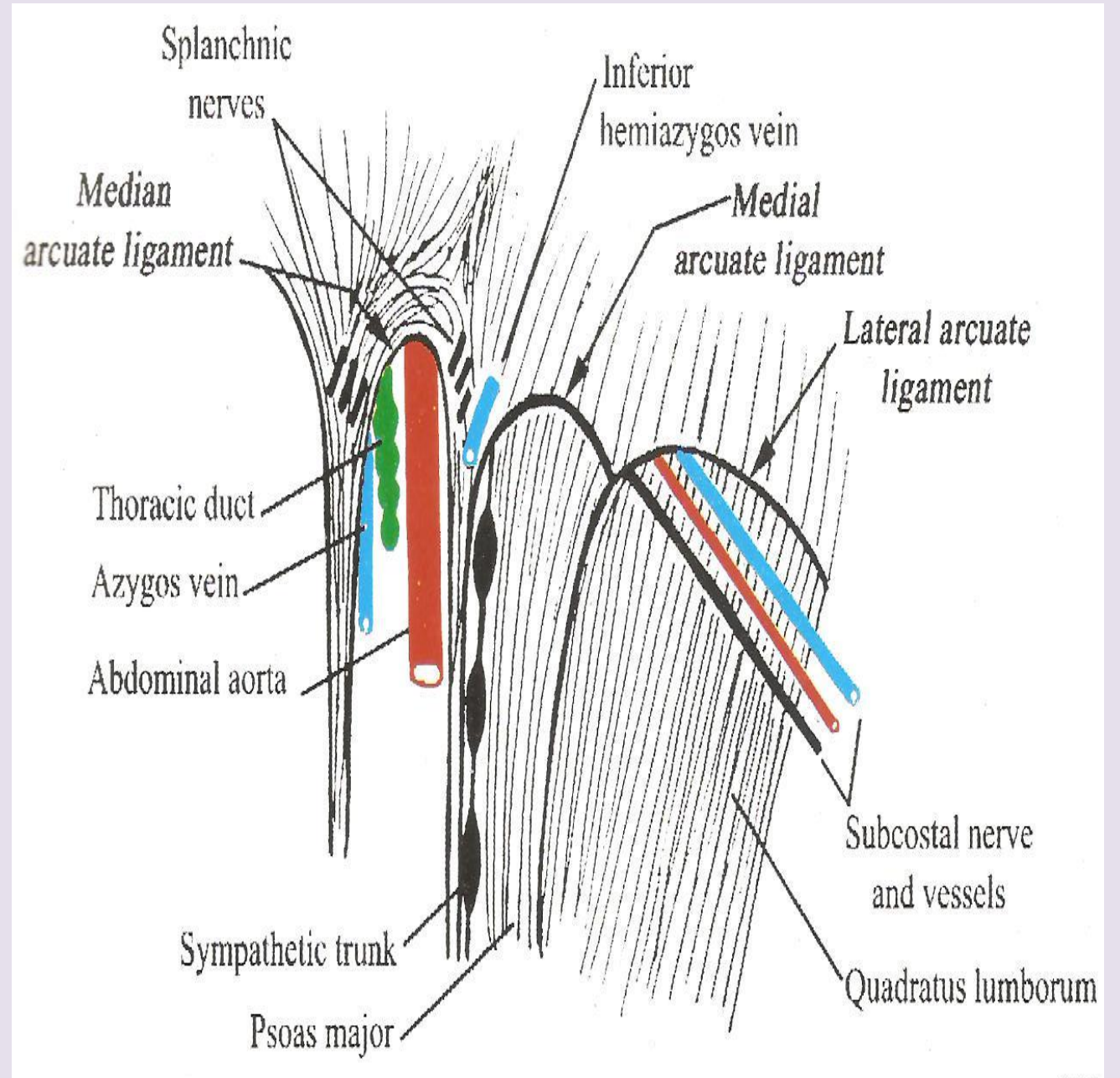


On the right:

- 1) Azygos vein.
- 2) Cisterna chili and thoracic duct.
- 3) Right crus of the diaphragm.
- 4) Inferior vena cava.

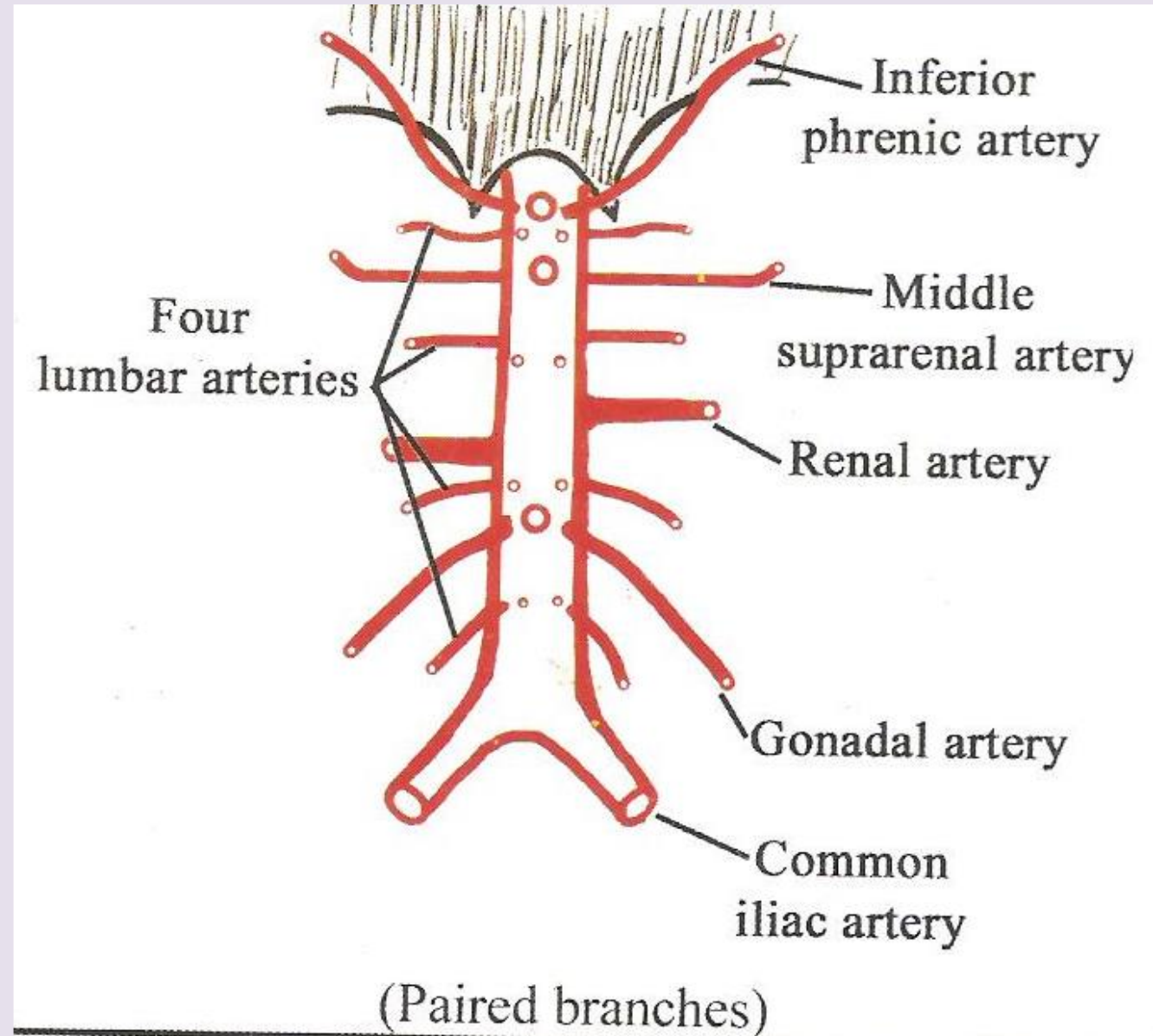
On the left:

1. Left crus of the diaphragm.
2. Duodeno- jejunal junction.
3. Left Sympathetic trunk.



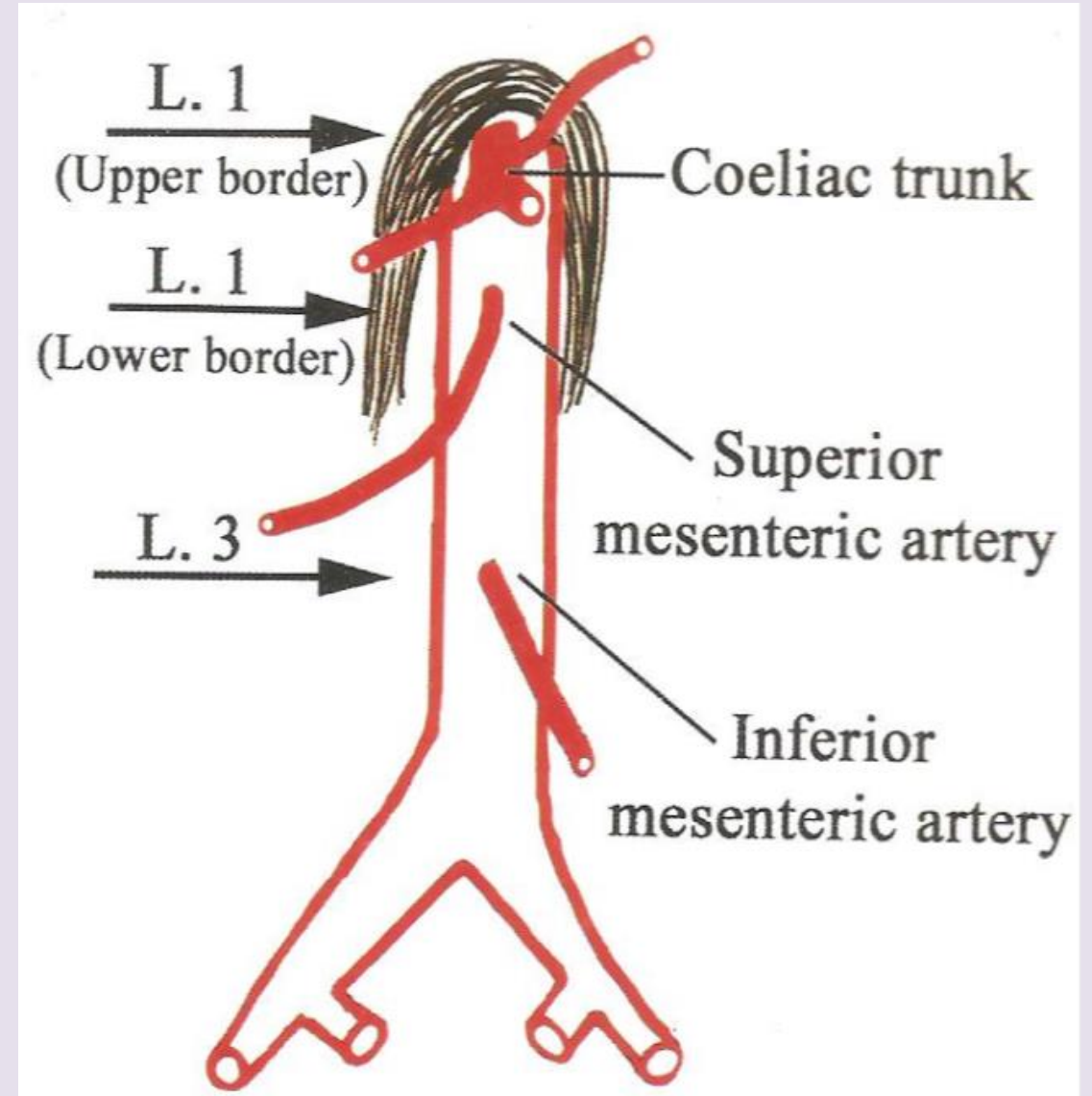
Paired branches of abdominal aorta

Branch	Vertebral level
Inferior phrenic	L1 (upper border)
Middle suprarenal	L1 (lower border)
renal	L2
gonadal	L3
four lumbar	L1-L4
Common iliac	L4



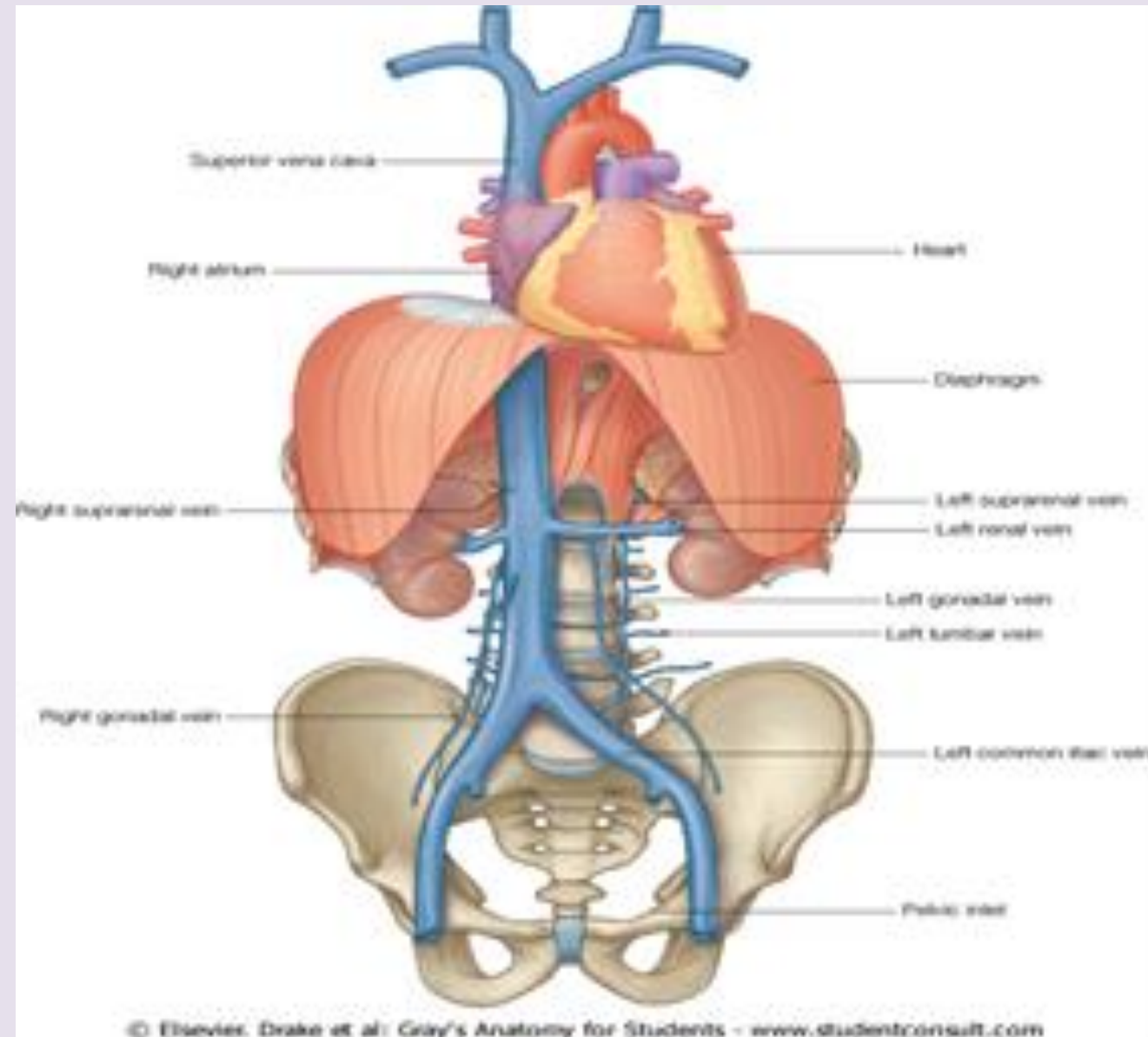
Single branches of abdominal aorta

Branch	Vertebral level
<u>coeliac trunk</u>	L1 (upper border)
<u>superior mesenteric artery</u>	L1 (lower border)
<u>inferior mesenteric artery</u>	L3
<u>median sacral artery</u>	L4



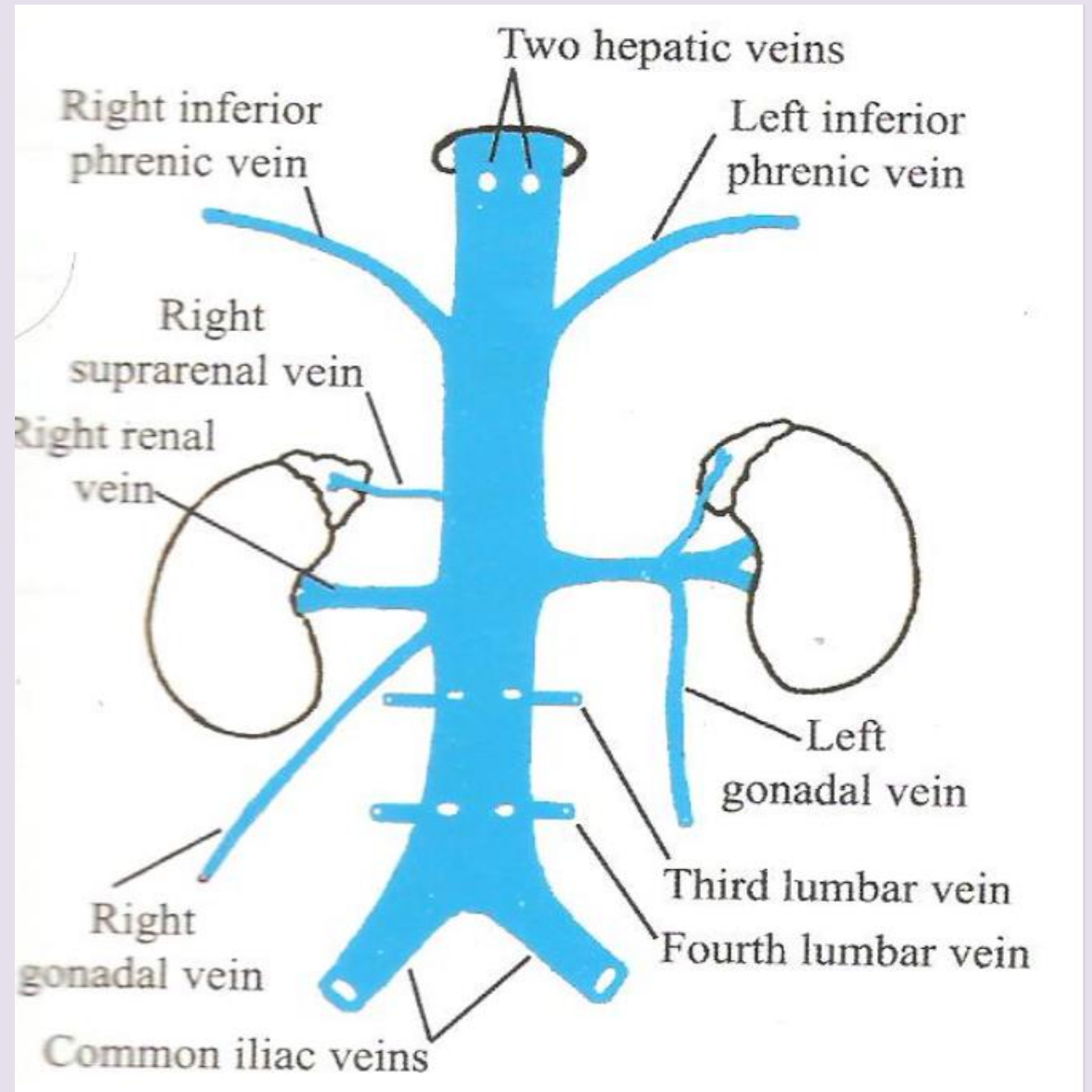
Inferior vena cava (IVC)

- It is the largest vein in the body. It is formed by union of **two common iliac veins at 5th lumbar vertebra**.
- It ascends on the right side of aorta, passes through the caval opening of diaphragm by piercing its central tendon **opposite T8** and drains into the **right atrium**.



Tributaries of I.V.C:-

1. Two common iliac veins: - they unite together forming I.V.C.
2. Two pairs of lumbar veins: 3rd, 4th.
3. Right gonadal vein.
4. Two renal veins (Rt. & Lt.).
5. Right supra renal vein.
6. Two inferior phrenic veins.
7. hepatic veins.



THANK YOU