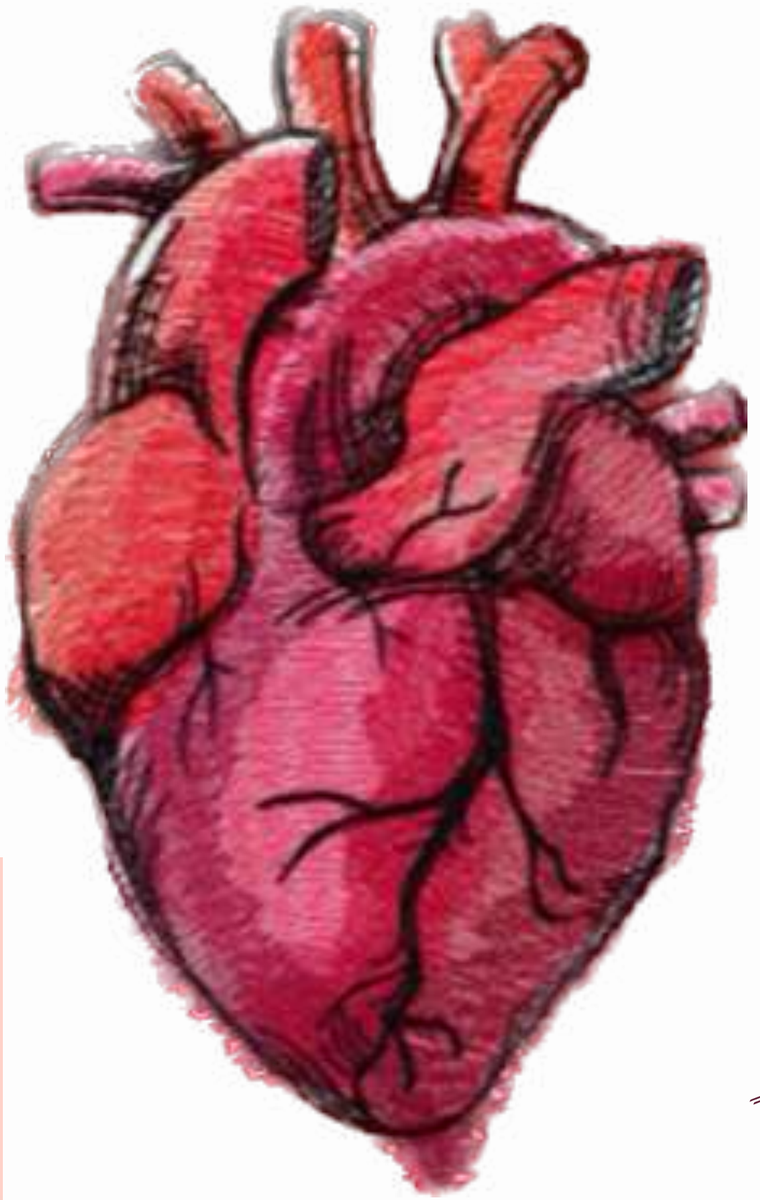


CARDIOVASCULAR SYSTEM

SUBJECT : Anatomy of Pericardium & Heart

LEC NO. : "1"

DONE BY : Rama Alwraikat

وَقُل رَّبِّ زِدْنِي عِلْمًا

SCAN ME!

ILOs ⟶ Anatomy of Pericardium & Heart

- Describe the outline and normal position of the heart.
- Describe the general organization, surface landmarks & external features of the heart. List relations of different parts of the heart.
- Define the pericardium, describe its component & its attachment to the diaphragm and the root of the great vessels.
- Discuss the pericardial space, sinuses & the pericardial fluid in normal condition.
- Describe blood supply& innervations of the pericardium.
- Describe the internal features of each chamber of the heart

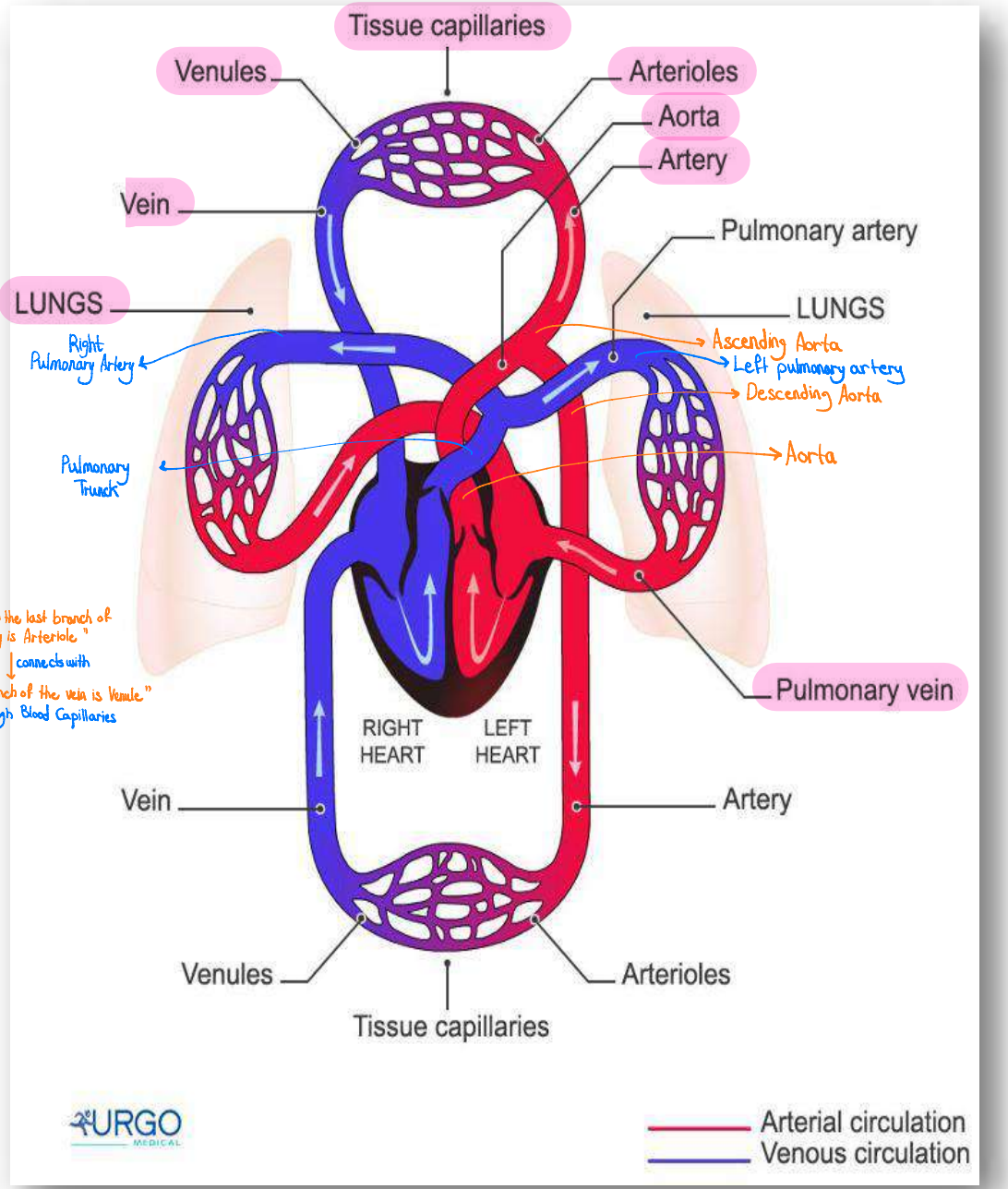
Two

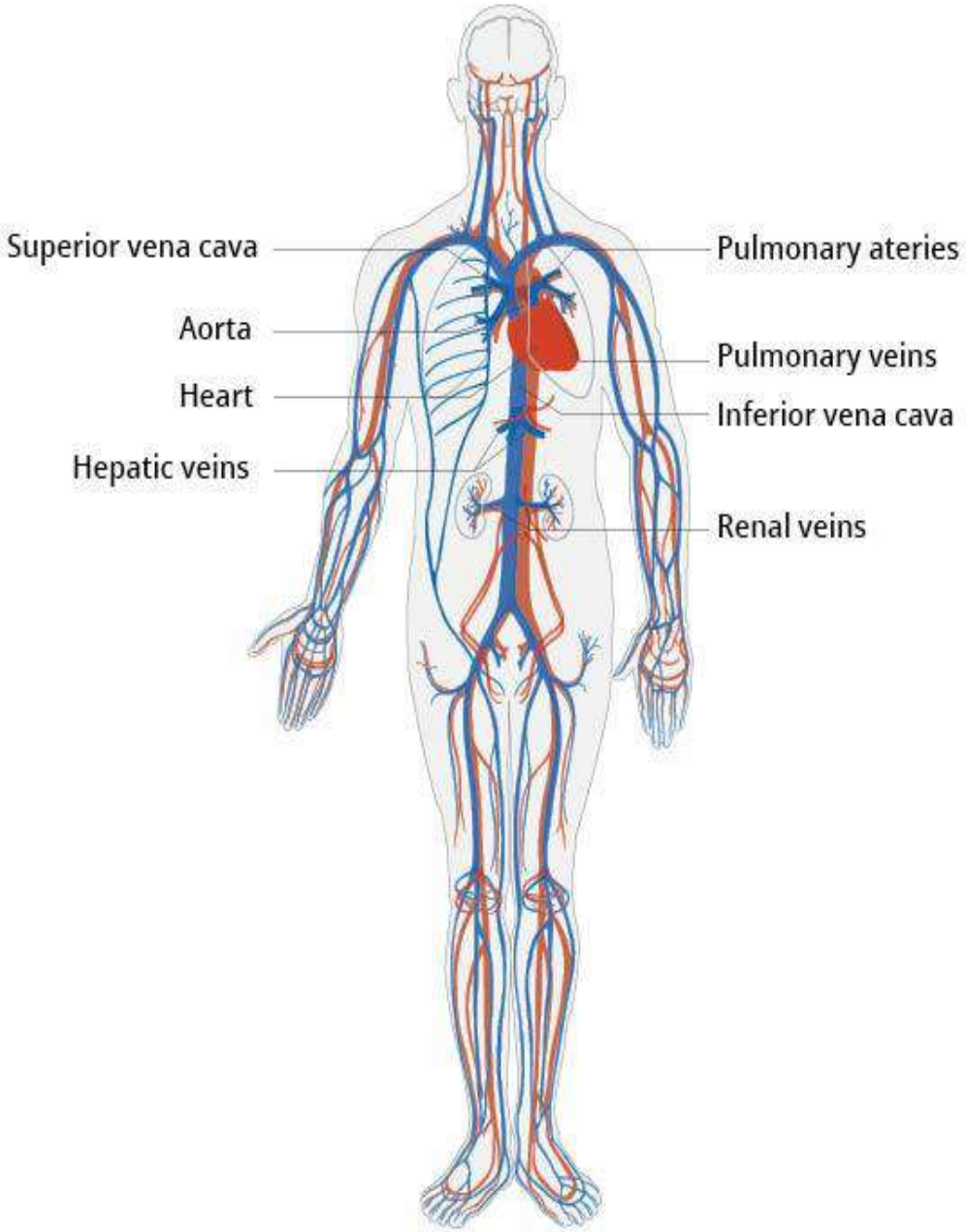
Components of the cardiovascular system

- **The heart:** A muscular pump (or organ) that forces blood around the body.

- **A closed system of blood vessels:** (Or Vascular System) These vessels include: 3 Parts
  - **Arteries:** Vessels that carry blood away from the heart.
    - Carry Oxygenated blood except pulmonary arteries & All arteries branch into small branches to reach each tissue in the body
    - rise from the heart two arteries → Aorta → pumps blood to the whole body except lungs (Ascending / Descending)
    - Pulmonary Artery → pumps blood to the lungs
  - **Veins:** Vessels that bring blood back to the heart.
    - Carry Deoxygenated Blood except pulmonary veins
    - Main Difference? → direction of the flow of the blood? but they differ in the blood that is carried in: Oxygenated / Deoxygenated
  - **Capillaries:** Tiny vessels that connect the arterial system to the venous system. The exchange of oxygen, nutrients, and the waste ($\& CO_2$) between blood and tissues also happens through the capillaries.

"the smallest & the last branch of the Artery is Arteriole" → connects with → "the first branch of the vein is Venule" through Blood Capillaries




Superior vena cava
Aorta
Heart
Hepatic veins
Pulmonary ateries
Pulmonary veins
Inferior vena cava
Renal veins

Heart

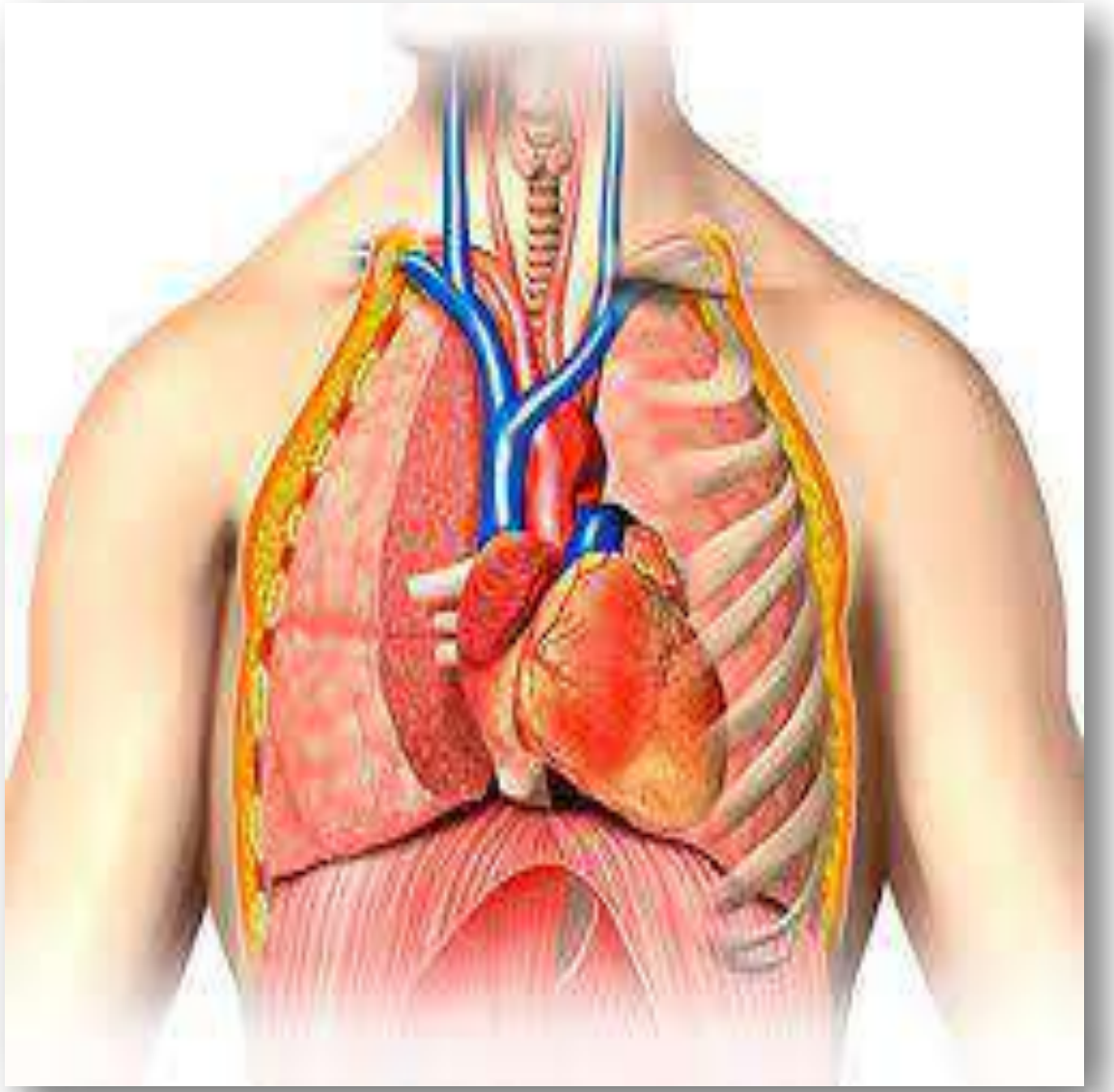
Definition:

- The heart is a hollow muscular organ, completely invested by the pericardium.

الأرقام حفظ

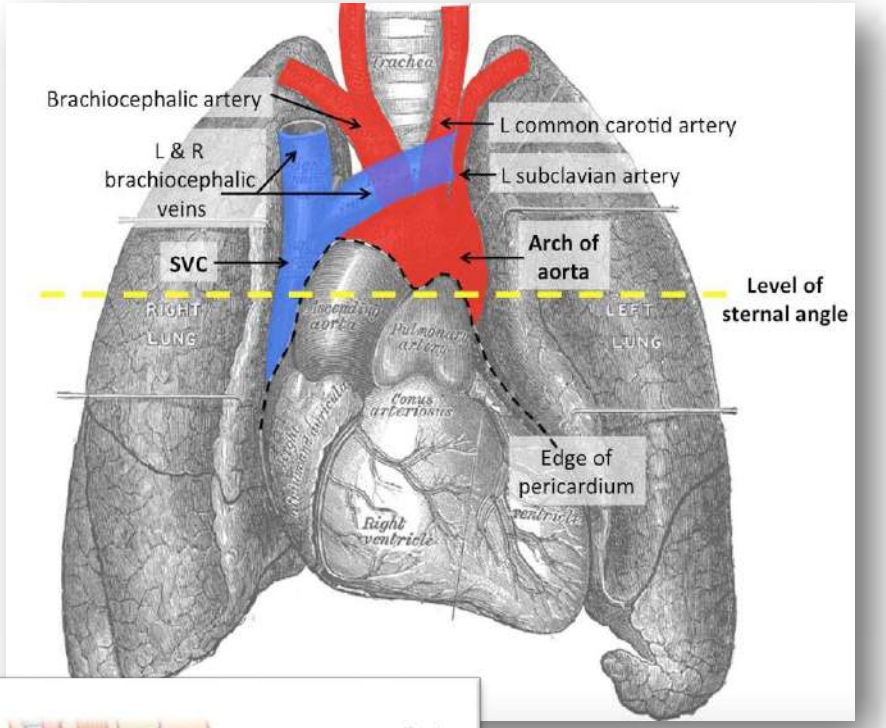
- **Size:** Size of a closed fist, an average adult heart is (12 cm) from base to apex, (8–9) cm at its broadest transverse diameter and (6 cm) at its anteroposterior diameter.

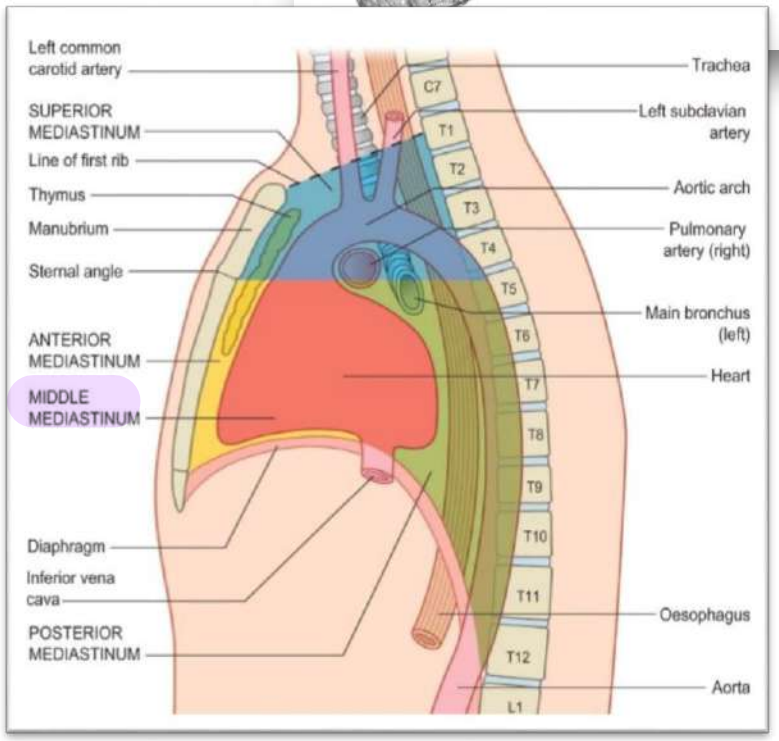
- **Weight:** average (300 g) in males &(250 g) in females.



Site of the heart:

- The position of the heart within the thoracic cavity or thorax between the two lungs. & Pleura
- It lies in the middle mediastinum. → surrounded by it's Pericardium
- Within the mediastinum, the heart lies in its own space (pericardial cavity).

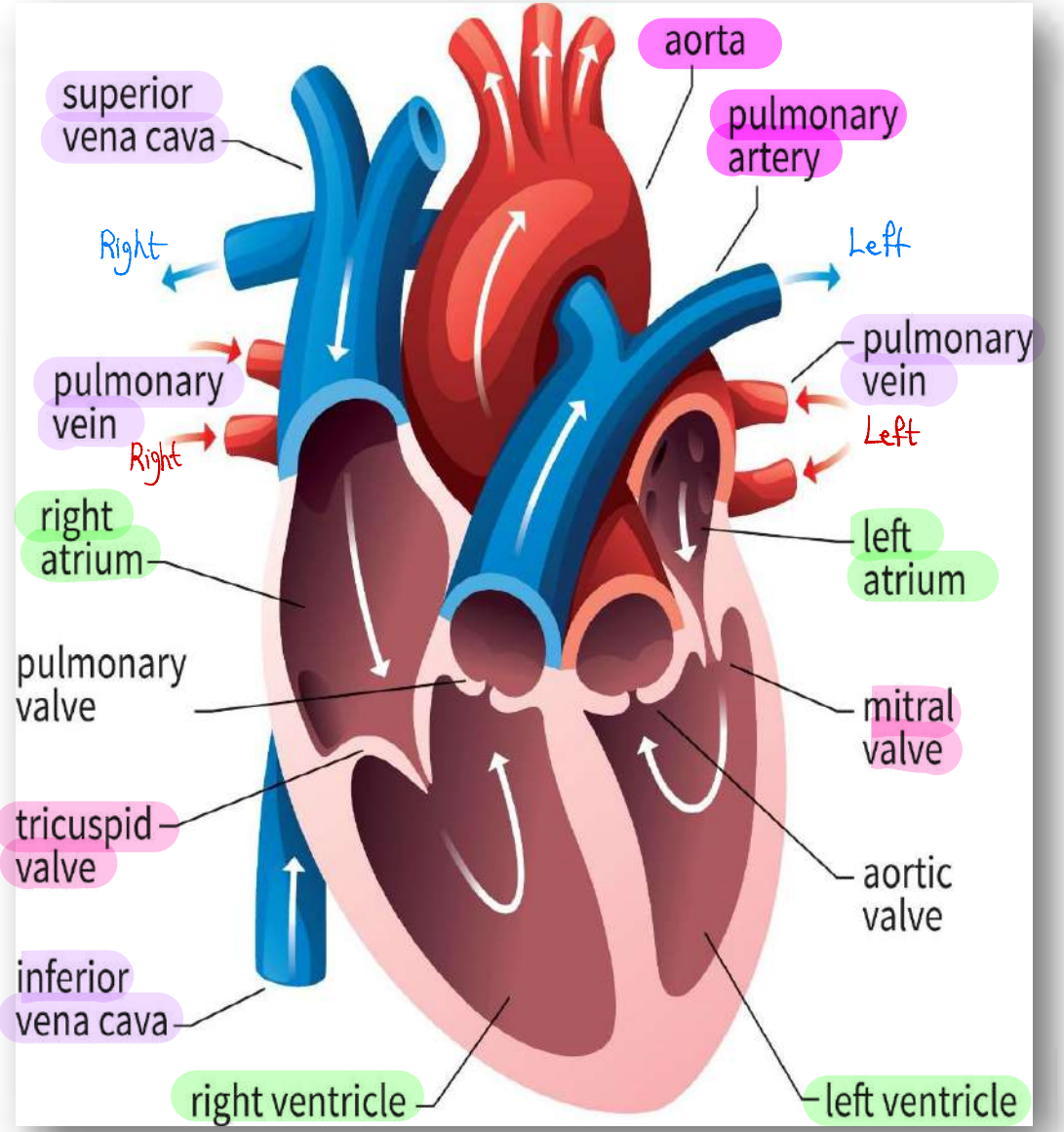




between each atrium & ventricle there is orifice
between right atrium & right ventricle ⟶ Tricuspid Orifice surrounded by a Tricuspid Valve
between left atrium & left ventricle ⟶ Bicuspid or Mitral Orifice surrounded by a Mitral Valve

The heart consists of four distinct chambers:

- Two upper chambers called "atria".
- Two lower chambers called "ventricles".
- Interatrial septum (↓ between the two atria) & Interventricular septum (↓ between the two ventricles) → why? عشان Atria عبارة عن فجوات والـ Ventricles عبارة عن فجوات
- Valves control the flow of blood within the different chambers.
- The large arteries and veins directly connected with the heart are termed the great vessels, consisting of the inferior vena cava, superior vena cava, pulmonary arteries, pulmonary veins, and ascending aorta.



Blood follows the following path through the heart:

As shown in this figure. ⟶ Superior Vena Cava & Inferior Vena Cava carry deoxygenated (venous) blood from the whole body except Lungs into right atrium
(Superior Vena Cava: from upper part of the body; Inferior Vena Cava: from Lower part of the body)

then this blood goes from right atrium into right ventricle through Tricuspid Valve then the right ventricle pumps deoxygenated blood into Pulmonary Trunk which branches into right & left pulmonary artery & each one goes through the corresponding Lung then Blood exchange occurs between the arteries & alveoli.

Now, each lung has two pulmonary veins which bring oxygenated blood to the Left Atrium then to Left Ventricle through Mitral (Bicuspid) Valve, then this blood will be pumped through the Aorta to the whole body.

To outline the heart:

The heart is conical in shape, having;

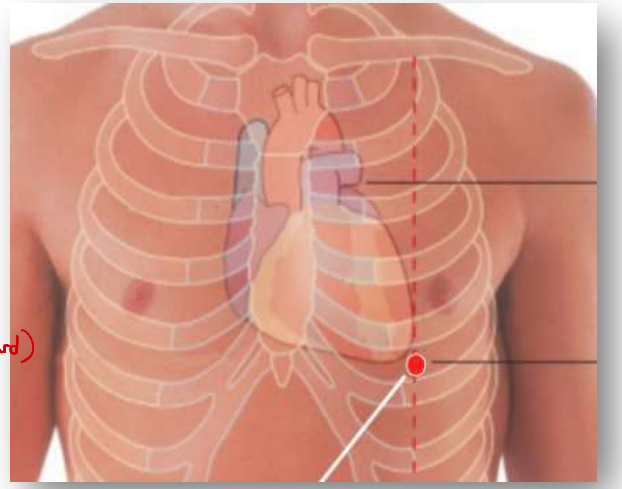
- Apex & Base.
- Four surfaces (Sternocostal, Diaphragmatic, Right and Left surfaces).
- Four borders (upper, lower, right and left).

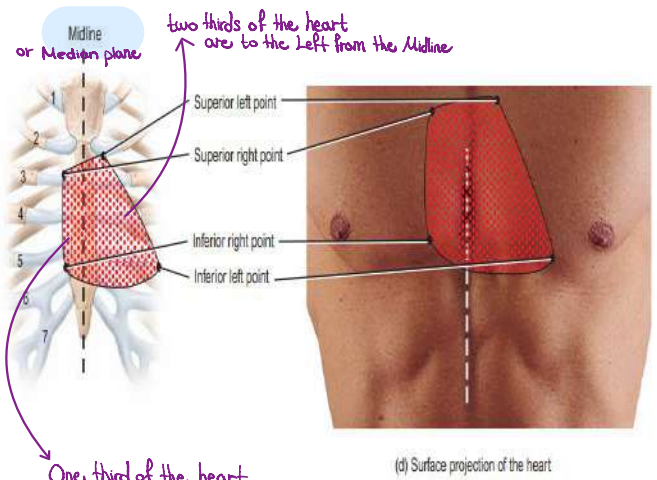
It has an oblique position;

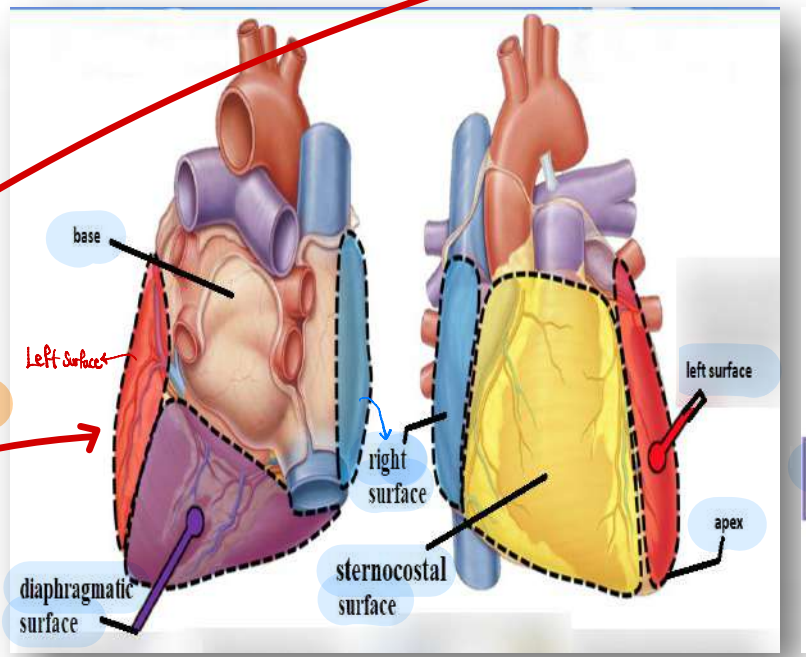
Its long axis directed downwards, forwards & to left. So

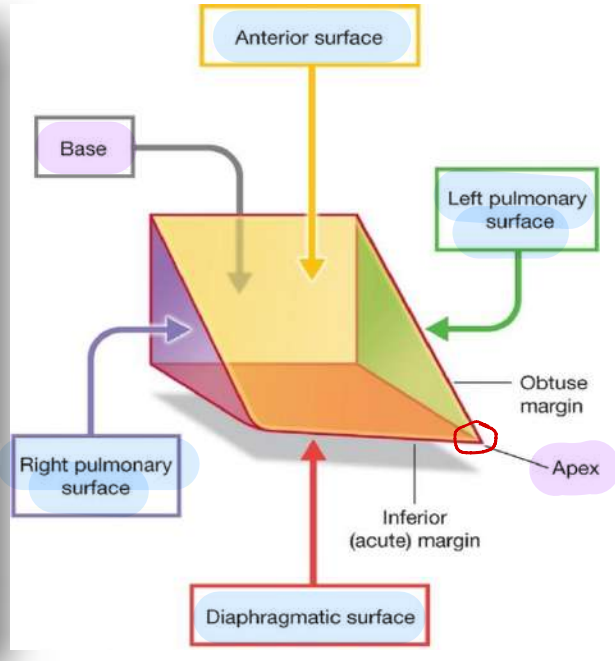
1- 1/3 of heart lies on right side & 2/3 on left side of the median plane.

2-Right side heart lies anterior to left side heart.









Apex of the heart

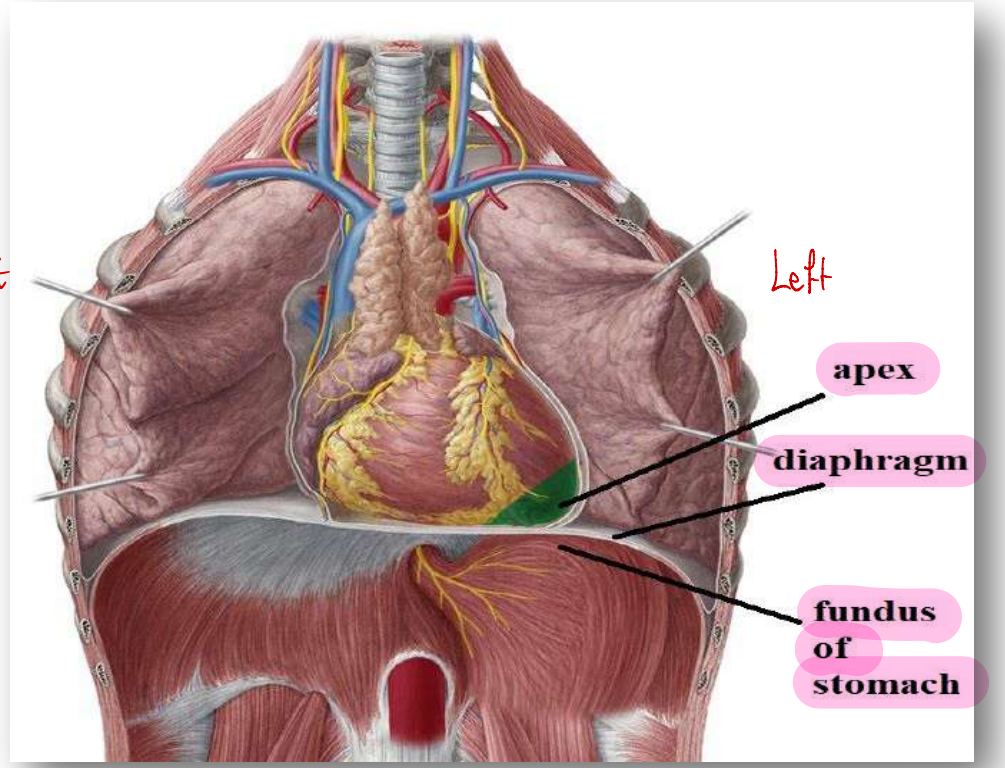
Formed by: Lt. ventricle.

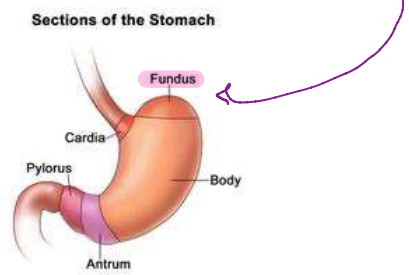
Directed:

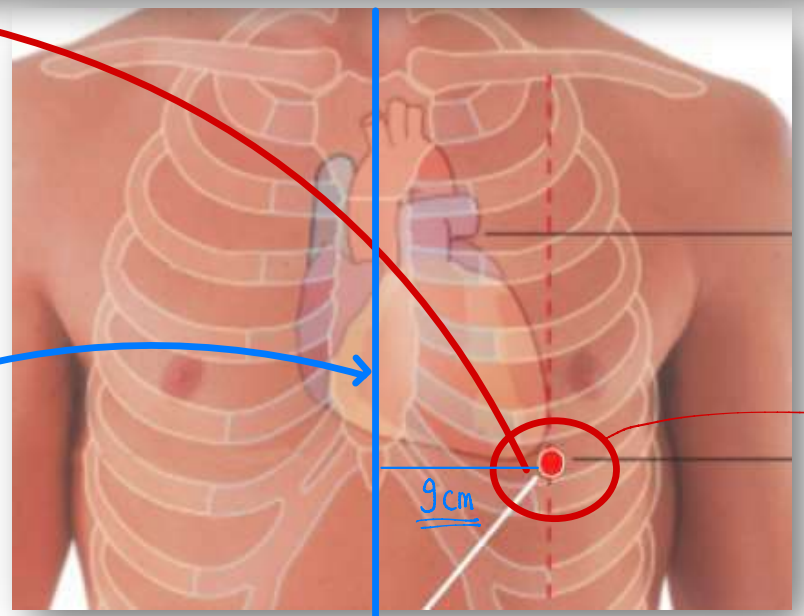
- Downward, forward & to Lt. → Left
- **It lies** opposite (مقابل) left 5th intercostal space, 3.5 inches (9cm) to the left from median plane. → A Point which is the surface Anatomy of the apex of the Heart

Relation:

- Left lung & pleura.
- The pericardium and diaphragm (↓ related inferiorly to) separate the apex of heart from the fundus of the stomach.







Base (Posterior Surface):

Formed by:

- Left atrium (mainly), part of right atrium & posterior inter atrial groove.
  → a groove between the Left & Right atrium

Direction:

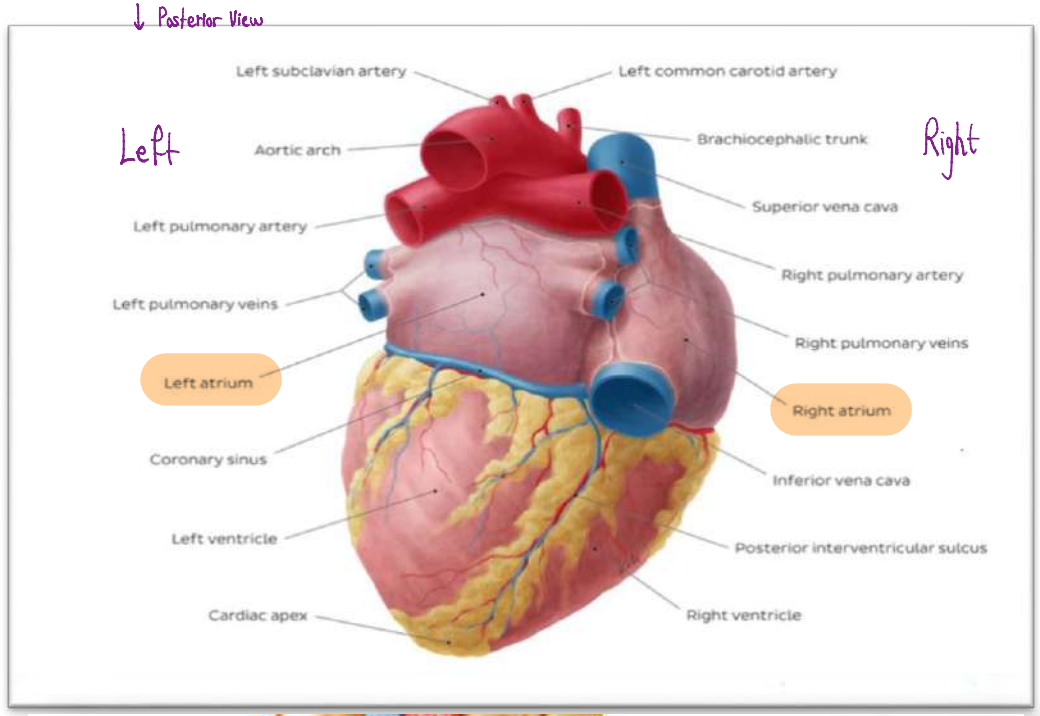
- It is directed, upward backwards and slightly to the right. → opposite to the Apex
- It lies opposite the middle 4 thoracic vertebrae (5, 6, 7 and 8).

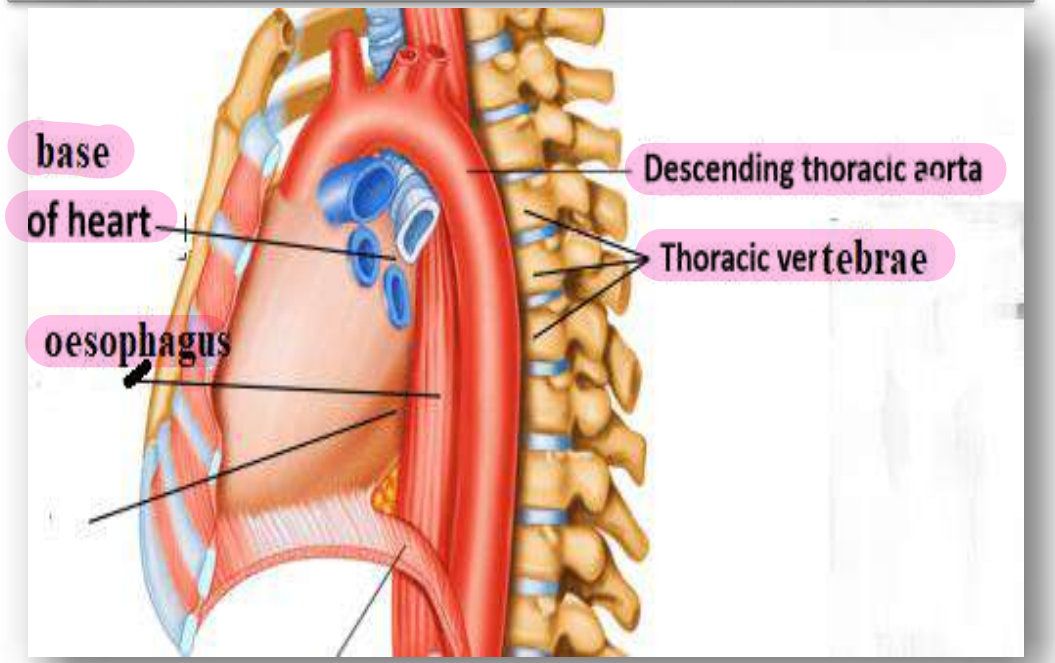
Relations:

- It is quadrilateral in shape, **bounded inferiorly** by the coronary (atrio-ventricular) groove.
- It is separated from the vertebral column by the descending aorta, oesophagus, Azygos vein& oblique sinus of the pericardium,

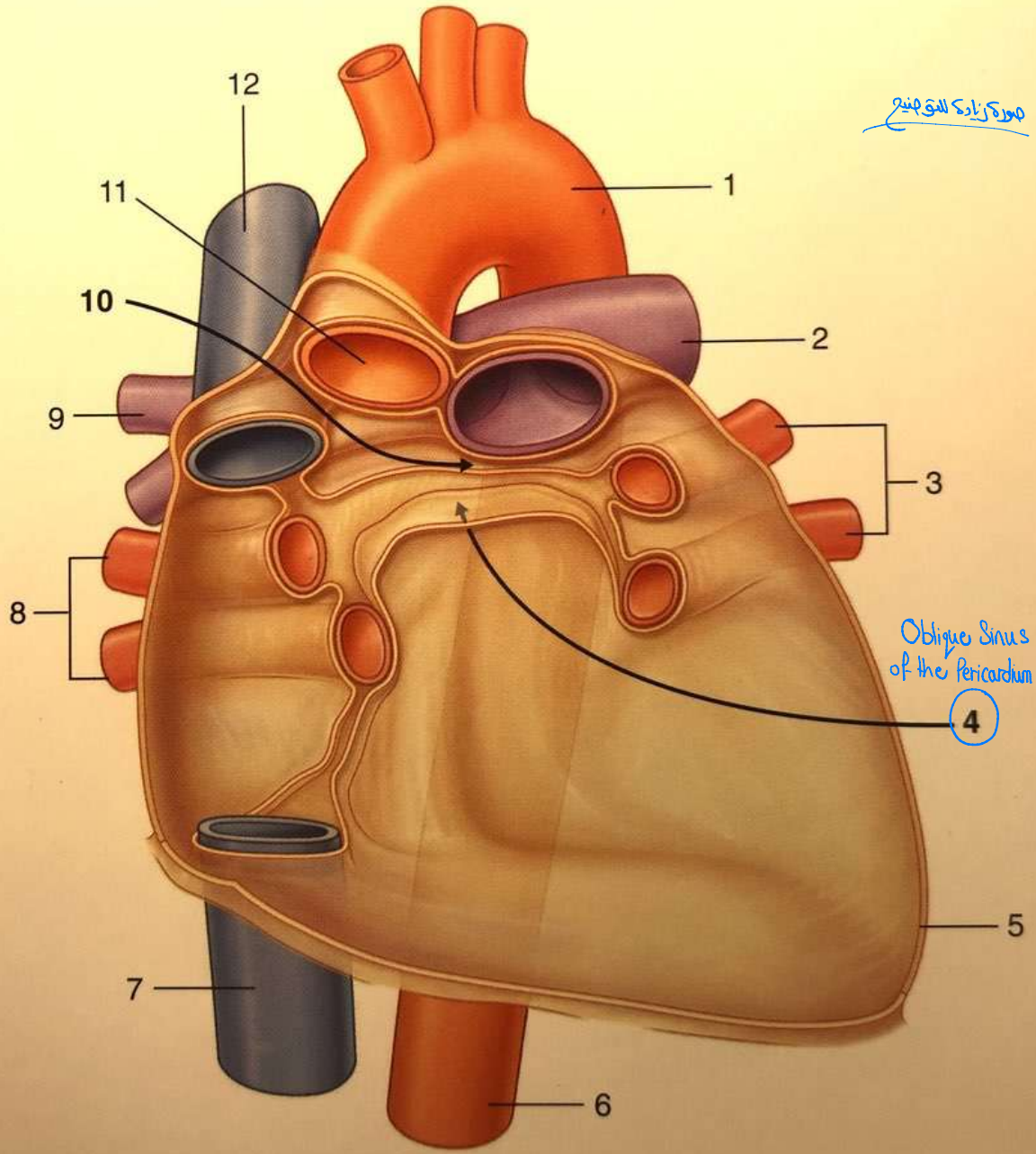
Components of the Posterior Mediastinum

↓ Posterior View





Identify the indicated pericardial sinuses and associated structures.



Anterior (sternocostal) surface:

All chambers share in this surface

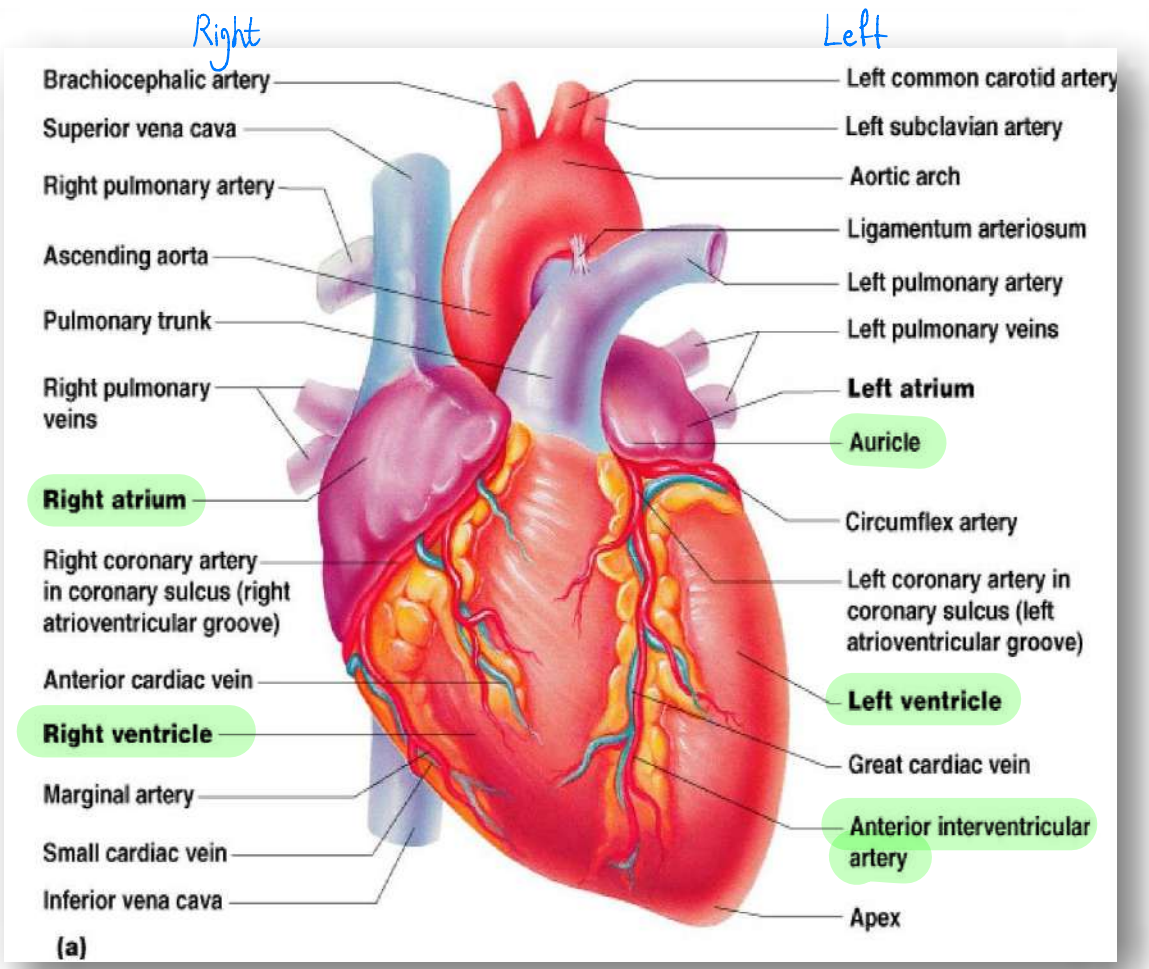
It's divided by Atrio-ventricular groove into 2 portions:

Atrial part: Formed by

- Right atrium& its auricle.
- Left auricle. → NOT the left Ventricle

Ventricular part: يشارك بنسبة أكبر

- Right 2/3 of this part formed by the right ventricle.
- Left 1/3 formed by the left ventricle.
- Anterior interventricular groove &its contents.
  - between Right & Left Ventricle
  - Pass in it → Anterior Interventricular Artery
  - Pass in it → Great Cardiac Vein



Inferior (diaphragmatic) surface

because it rests on the Diaphragm

Formed by: the two ventricles, as;

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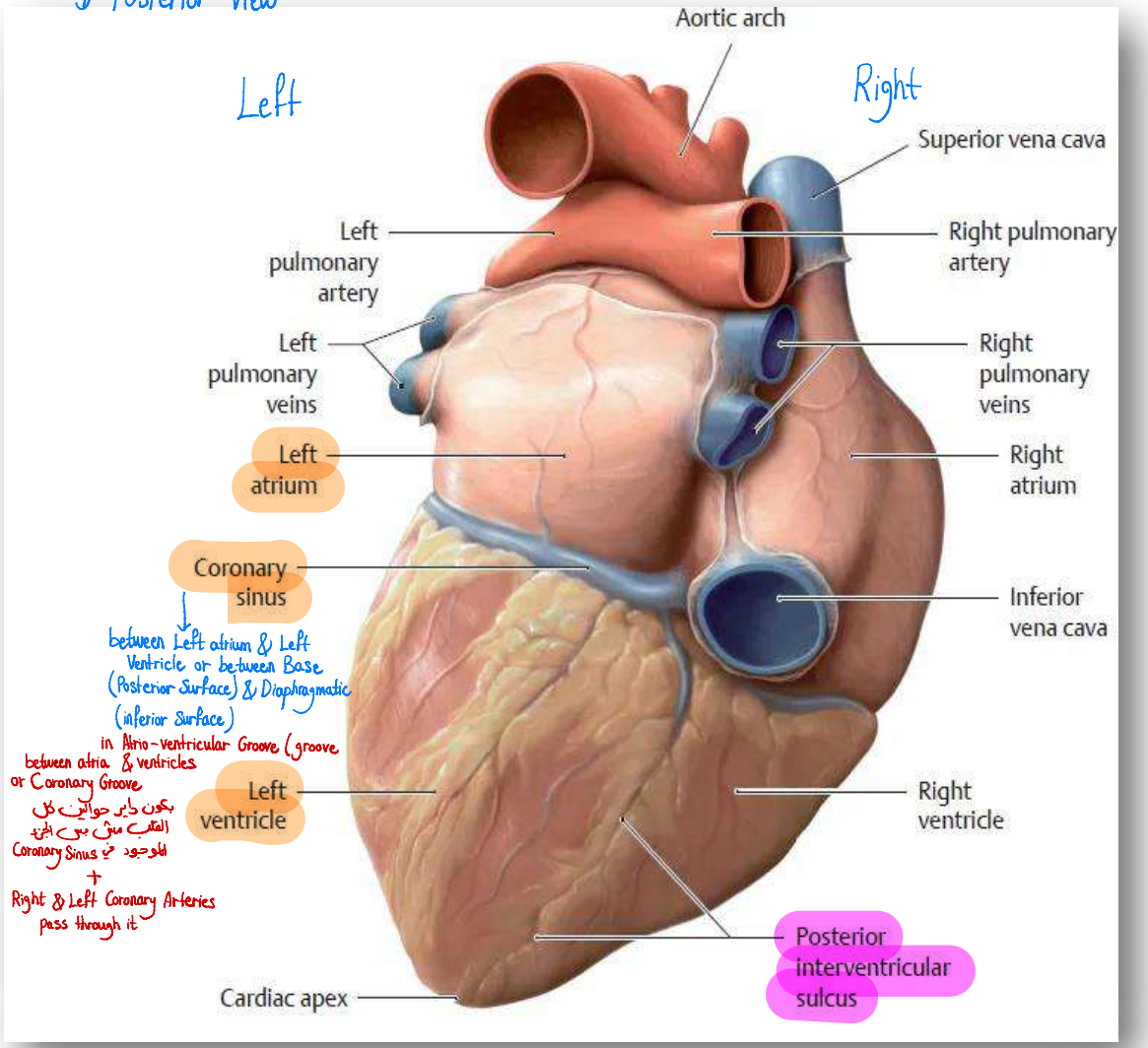
- Its left 2/3 are formed by the **left ventricle.**
- Its right 1/3 is formed by the **right ventricle**.
- **Posterior interventricular groove** &its contents in between.

Relations:

- It rests on the diaphragm

Why?
there is rotation of the heart which make the right side of the heart (Right Atrium + Right Ventricle) is anterior to the left side of the heart
so
The Anterior (Sternocostal) Surface formed mainly of Right Ventricle
but the Inferior (Diaphragmatic) Surface formed mainly of Left Ventricle

↓ Posterior View

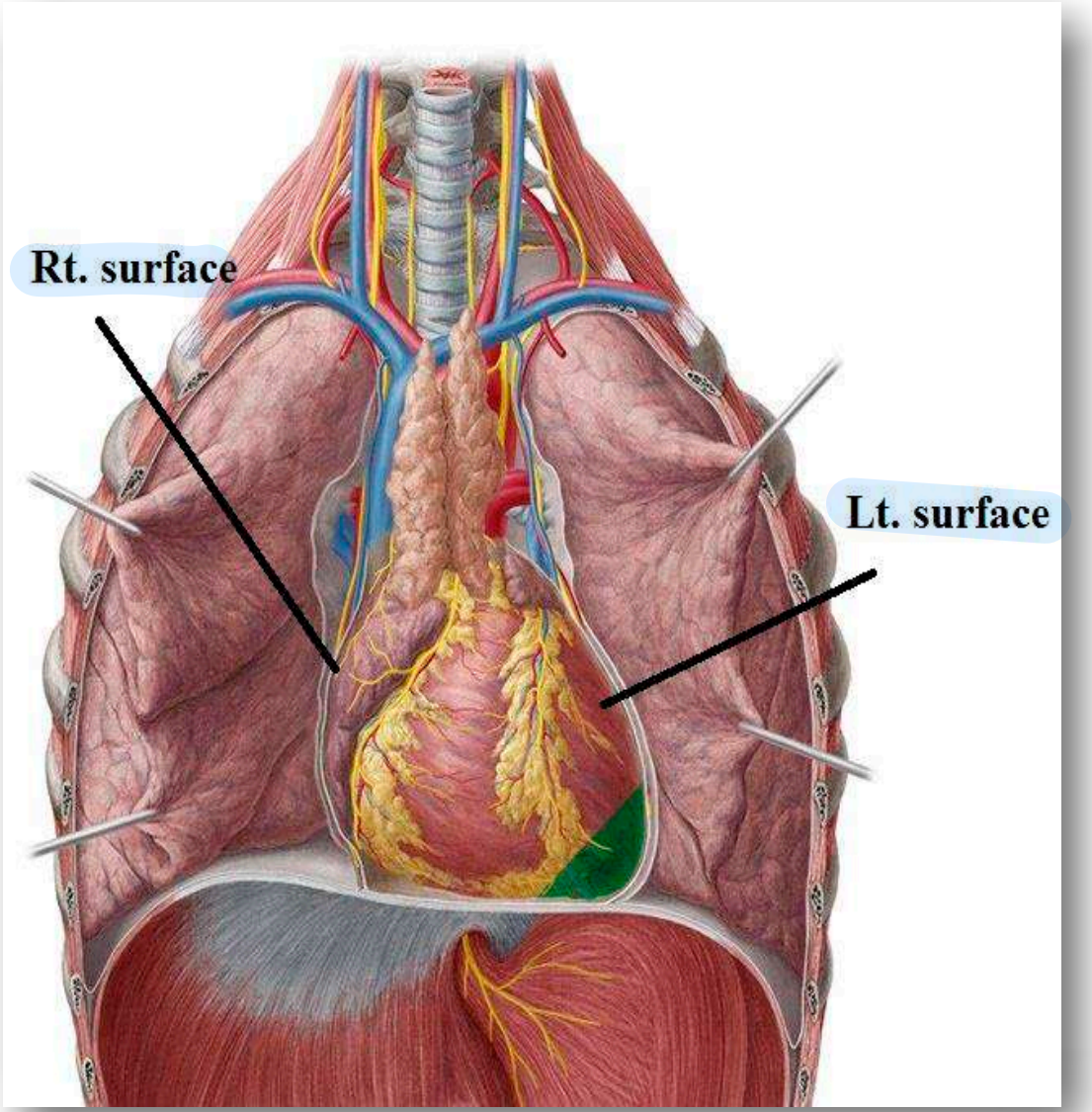


Right surface:

- Formed mainly by **right atrium**.
- Related laterally to right (lung, pleura, phrenic n.)

Left surface:

- Formed mainly by **left ventricle & left atrium**.
- Related laterally to left (lung, pleura, phrenic n.)



Borders of heart:

Upper border: or Superior

- Formed by the two atria.
- It is hidden behind the ascending aorta and pulmonary trunk.

Right border:

- Formed only by the right atrium. It is convex to the right.
- It extends from the opening of SVC to the opening of IVC.

Left border:

- Formed by the left ventricle and the left auricle.

Lower border: or inferior

- Formed by the right ventricle (mainly) and the left ventricle.
- It separates the sternocostal surface from the diaphragmatic surface.