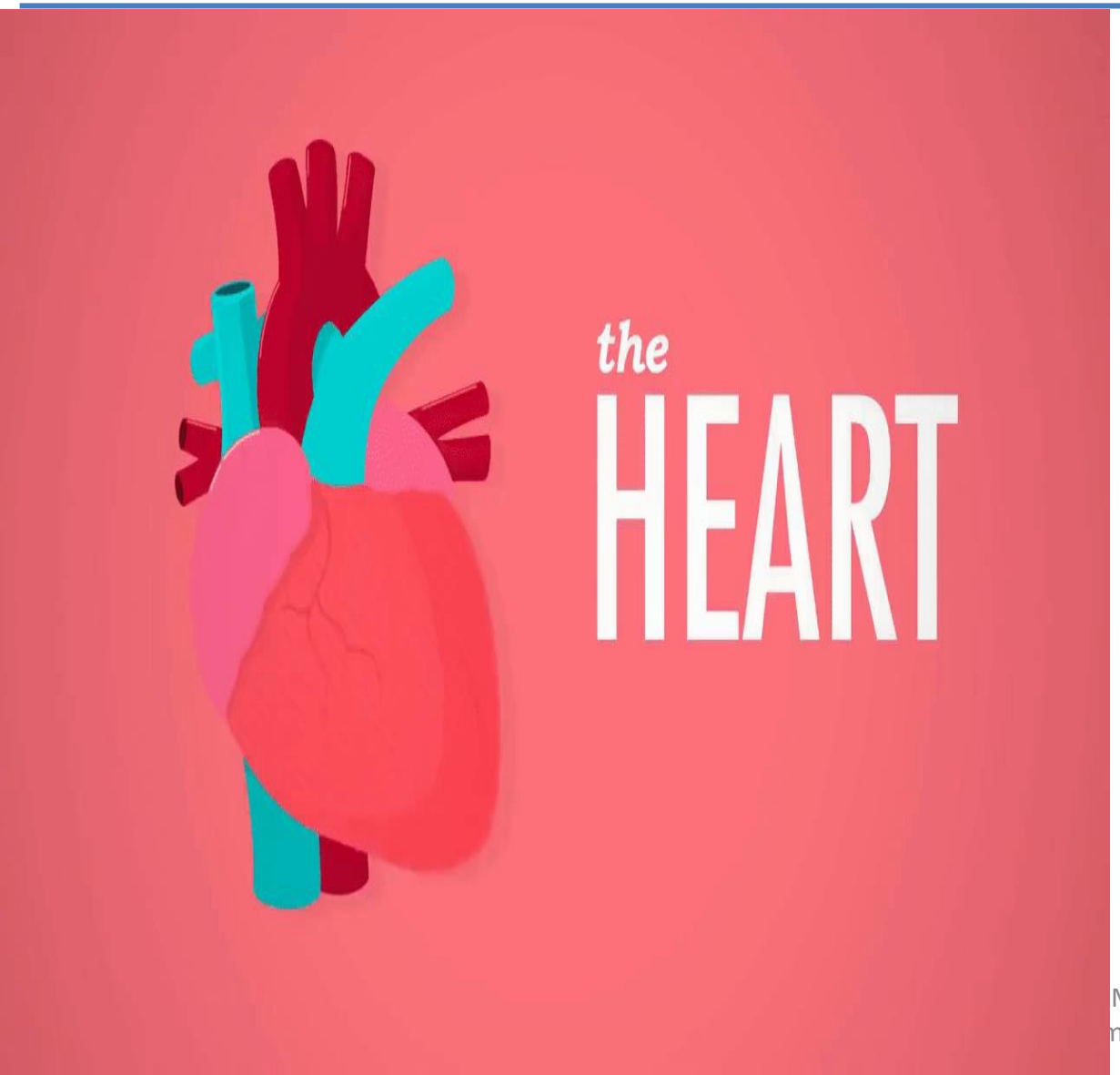
Human Anatomy -1st year
2020-2021



Pericardium And Heart

Lecture (4)

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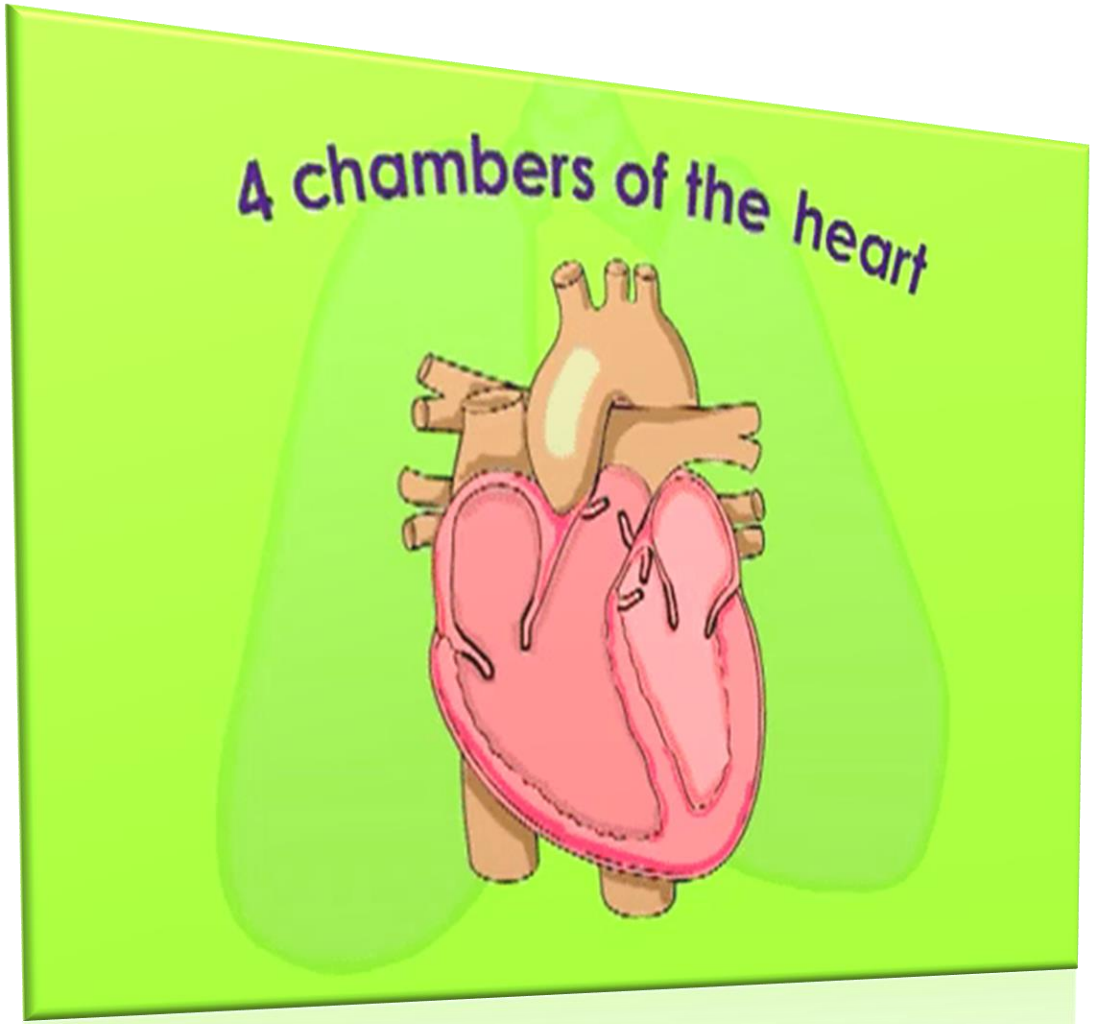
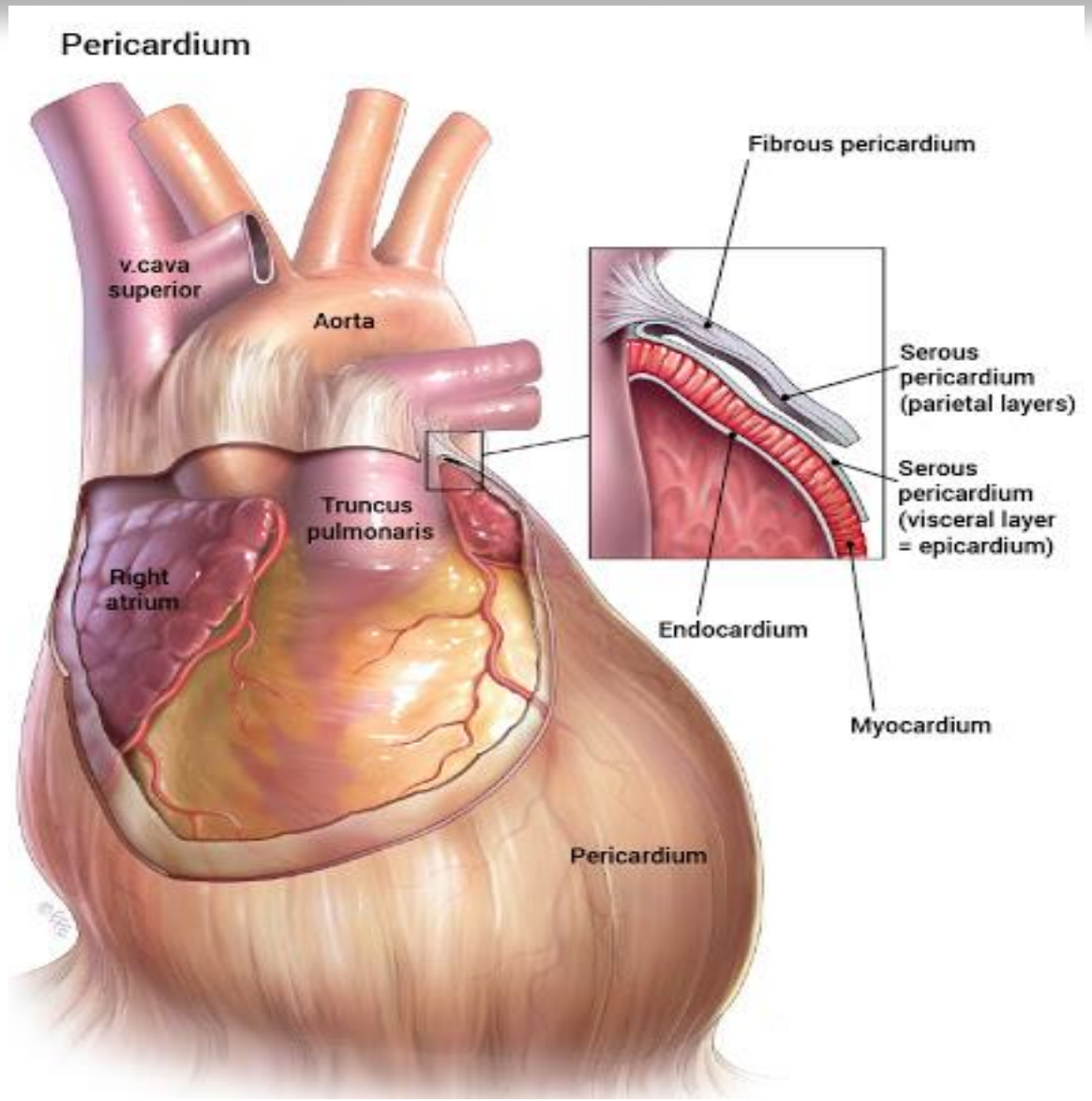
Objective

* Define the pericardium
*list the function of pericardium
* Describe its attachment and sinuses
*Know its blood and nerve supply
*Describe the location of the heart ,its border, surfaces and chambers .
*Describe the Right atrium and ventricle .



Pericardium

- ☠It is a fibro-serous, fluid-filled sac that surrounds heart and the roots of the great blood vessels (aorta, pulmonary artery, pulmonary veins, and the superior and inferior vena cavae).
- ☠ It is made up of two main layers:
- *external layer known as the fibrous pericardium,
- *internal layer known as the serous pericardium



Function of pericardium

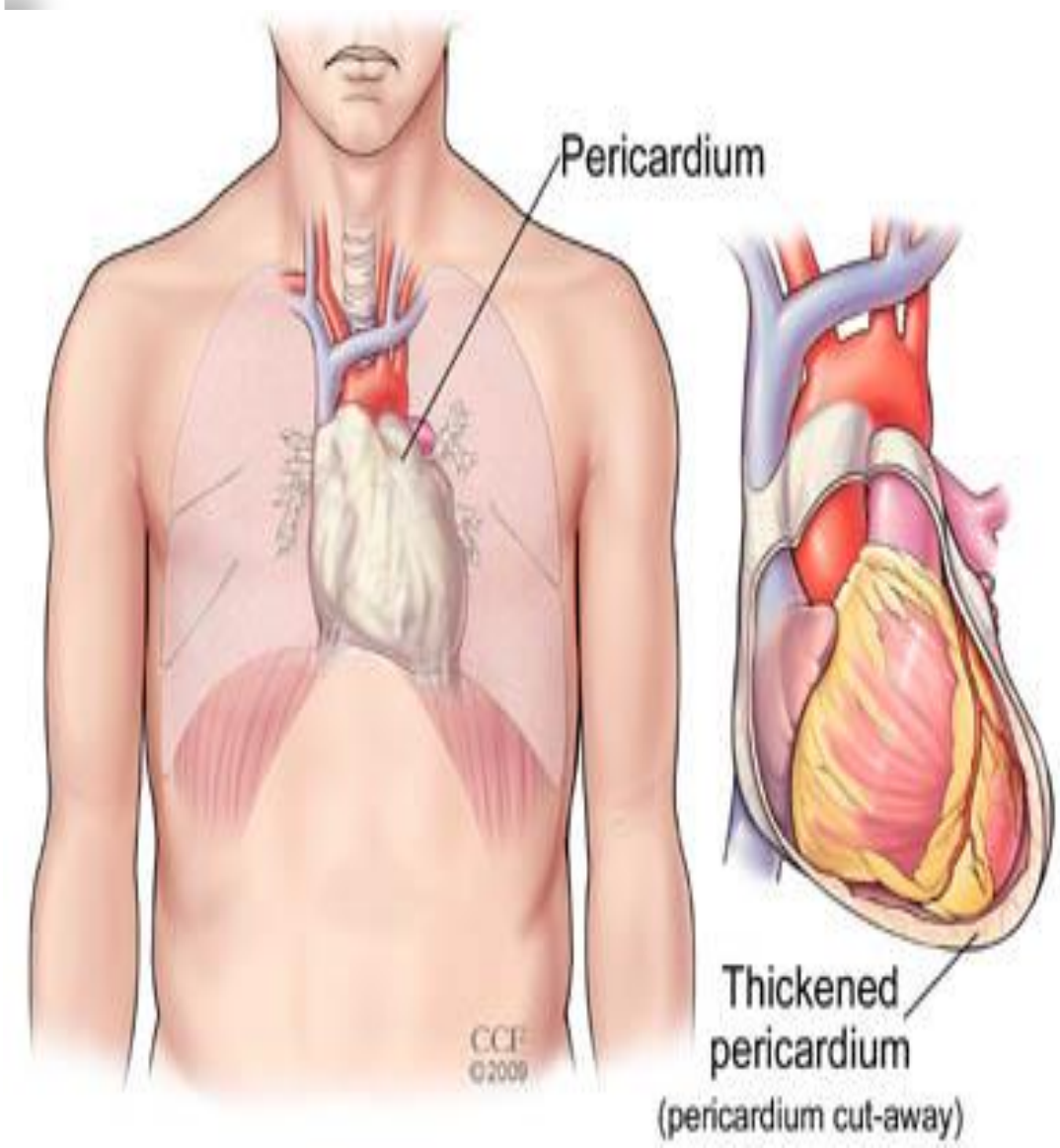
☠. **Fixes** the heart in the mediastinum and limits its motion. It is attached to the diaphragm, the sternum, and the tunica adventitia of the great vessels.

☠. **Lubrication**.

Pericardial fluid reduces the friction generated by the heart as it moves within the thoracic cavity.

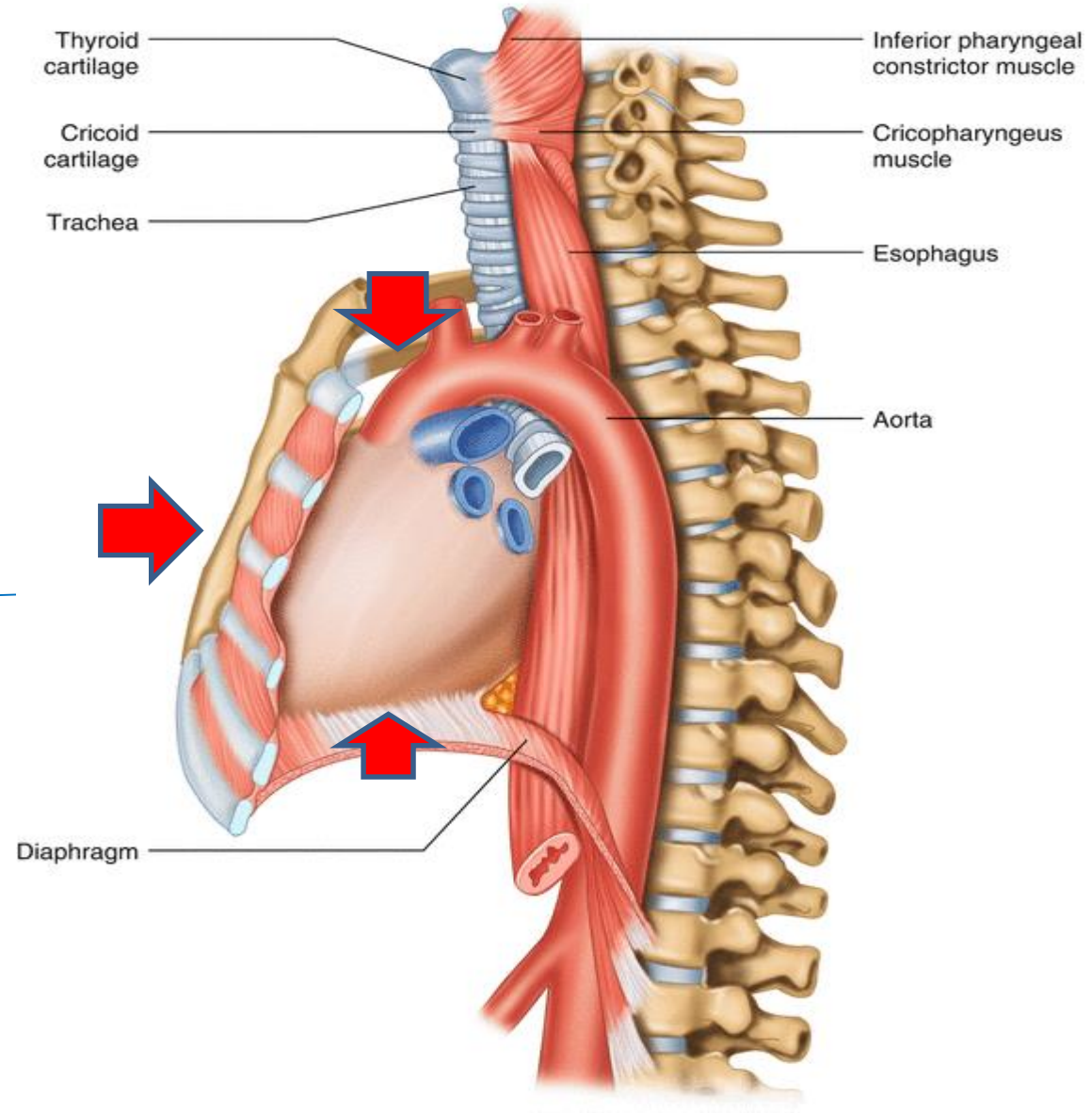
☠**Prevents overfilling of the heart**. It is inextensible fibrous layer of the pericardium prevents the heart from increasing in size too rapidly.

☠**Protection from infection**. The fibrous pericardium serves as a physical barrier prevents transmission of infection from adjacent organs prone to infection, such as the lungs.



1. Fibrous pericardium Attachment

* **Above:** fuses with the outer adventitial layer of the great blood vessels.
* **Below** :attached to the central tendon of the diaphragm.
* **In front** :attached upper & lower ends of the body of the sternum by superior & inferior ligaments.Sterno-pericardial



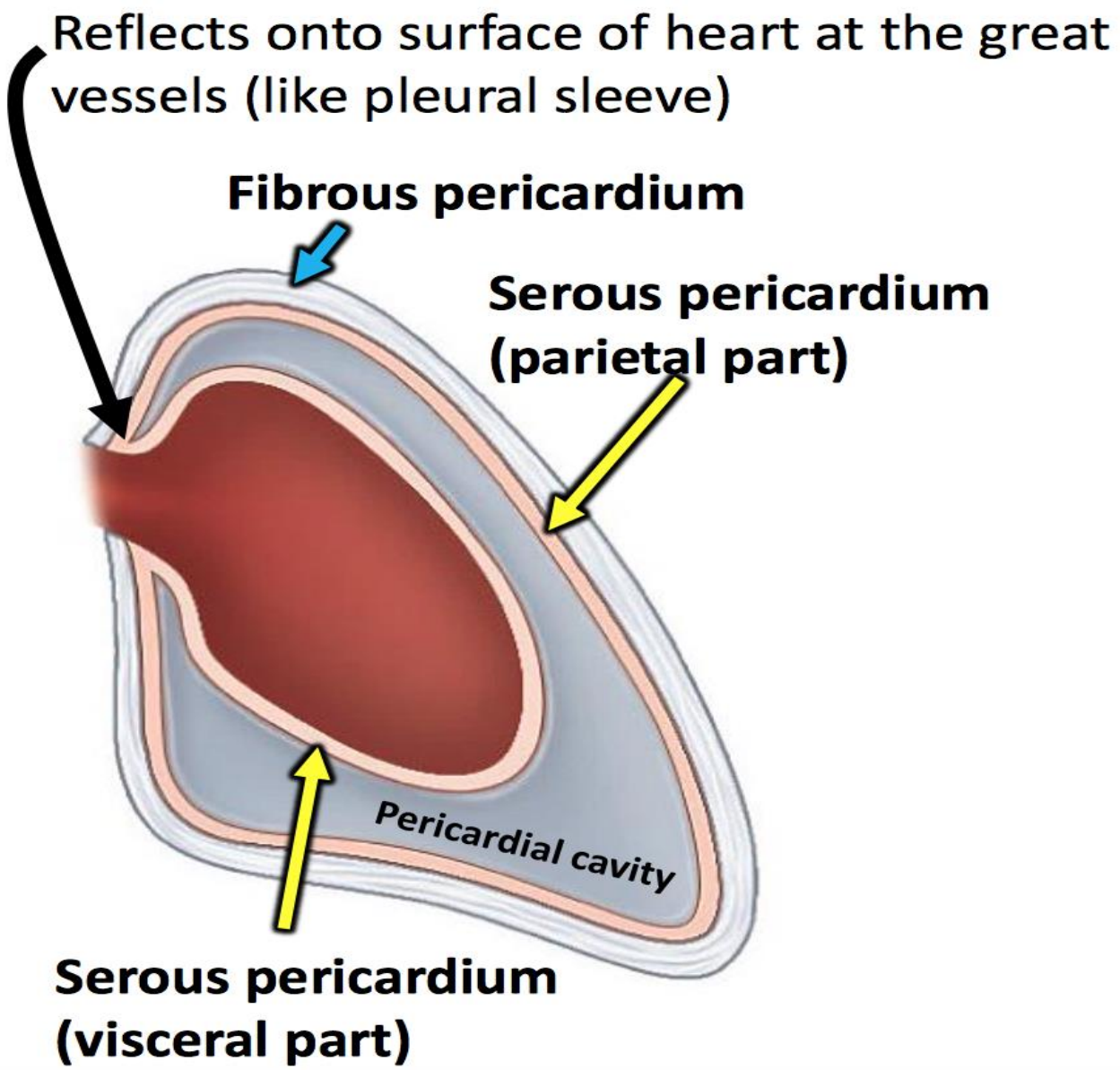
2. Serous pericardium

1. Visceral pericardium: is a thin inner, closely applied to the heart and is often called the **epicardium.**

2.Parietal pericardium :It is the outer layer of serous pericardium that lines the fibrous pericardium and reflected at the root of great blood vessels to be continuous with visceral pericardium.

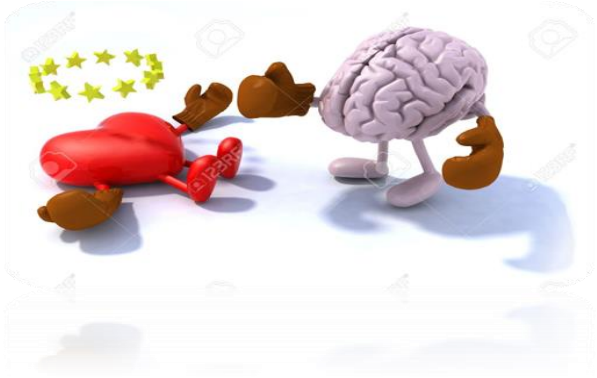
3. Pericardial cavity (Space)

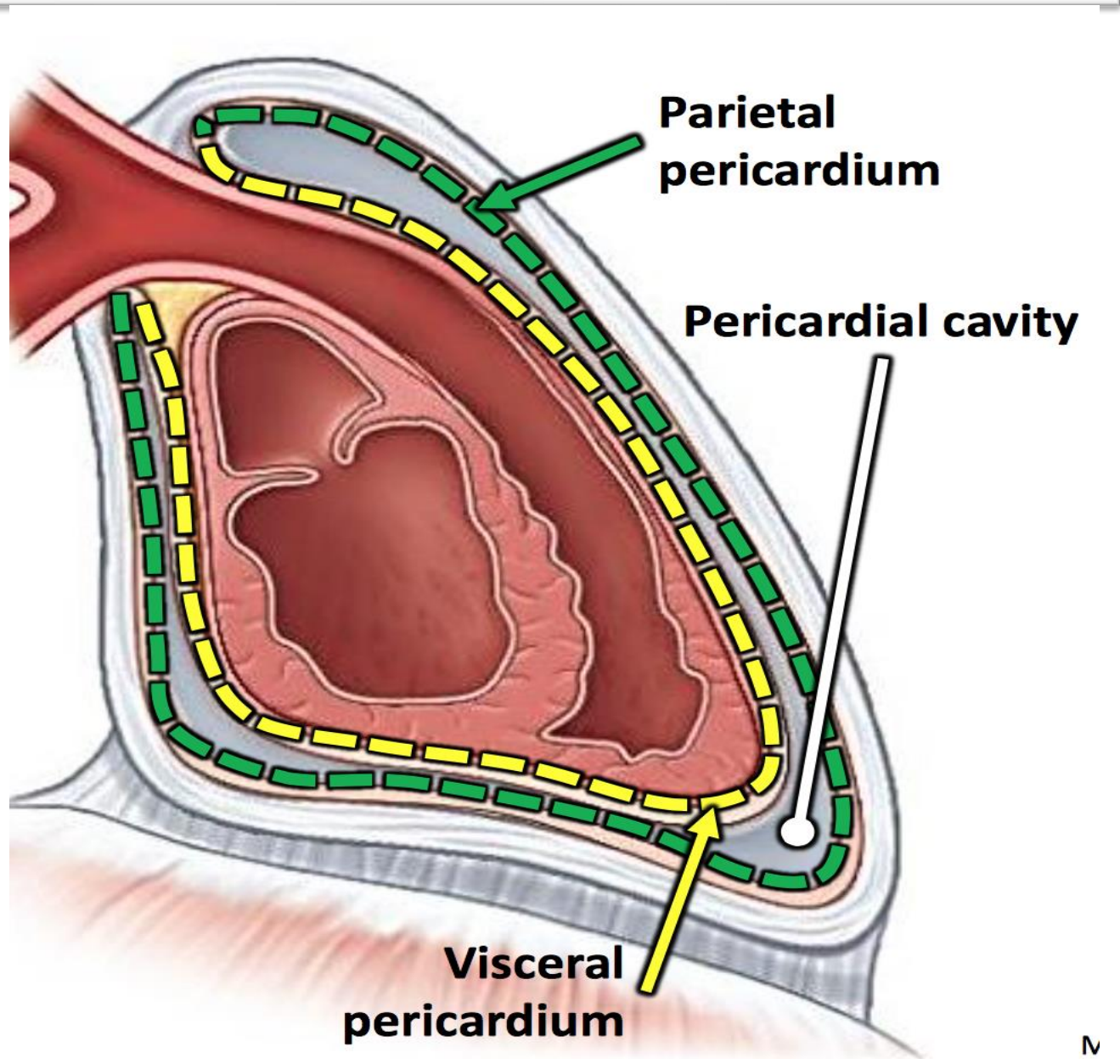
- **The slit like space between the parietal and visceral layers Normally, the cavity contains a small amount of tissue fluid about(50 ml) , the pericardial fluid which acts as a lubricant to facilitate movements of the heart.**



Pericardial sinuses

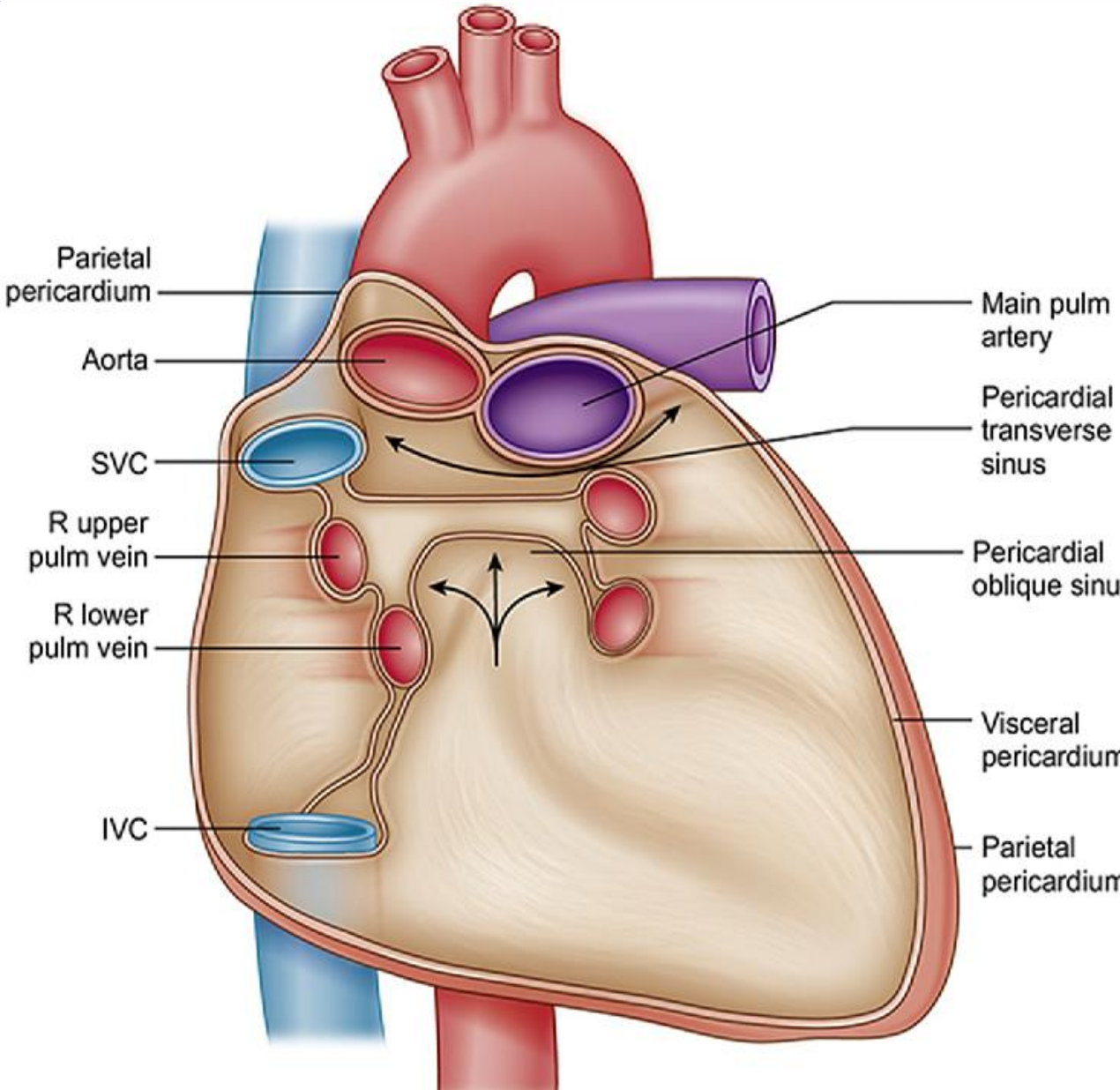
- The reflection of serous pericardium at the root of great blood vessel gives rise to two pericardial sinuses.





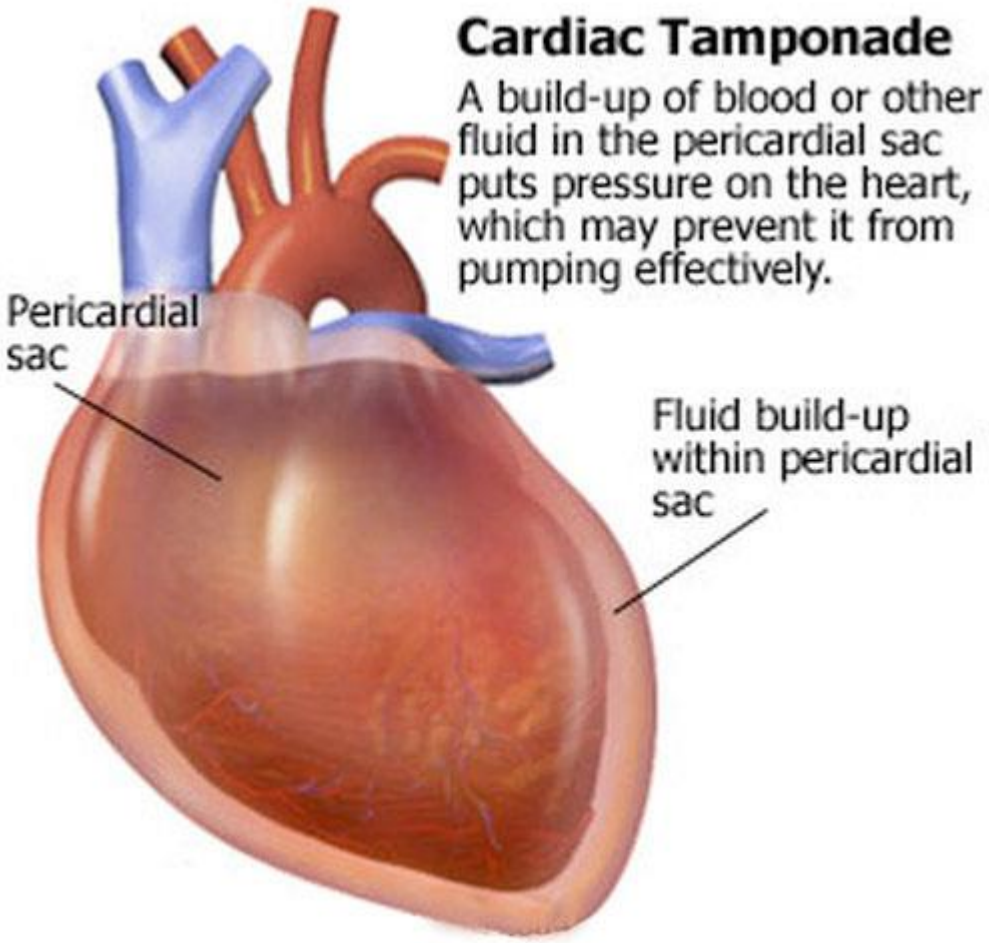
Pericardial sinuses

- **Oblique sinus** Reflection of serous pericardium over the root of the four pulmonary veins of the heart at the posterior of left atrium.
- **Transverse sinus :** reflection of serous pericardium around the aorta and pulmonary trunk and large veins.



Clinical note

- It has very important clinical significant : during surgery in heart the oozing of blood collect in this sinuses in the posterior aspect of the heart and this cause ((localize tumbonadi))



Blood and nerve supply

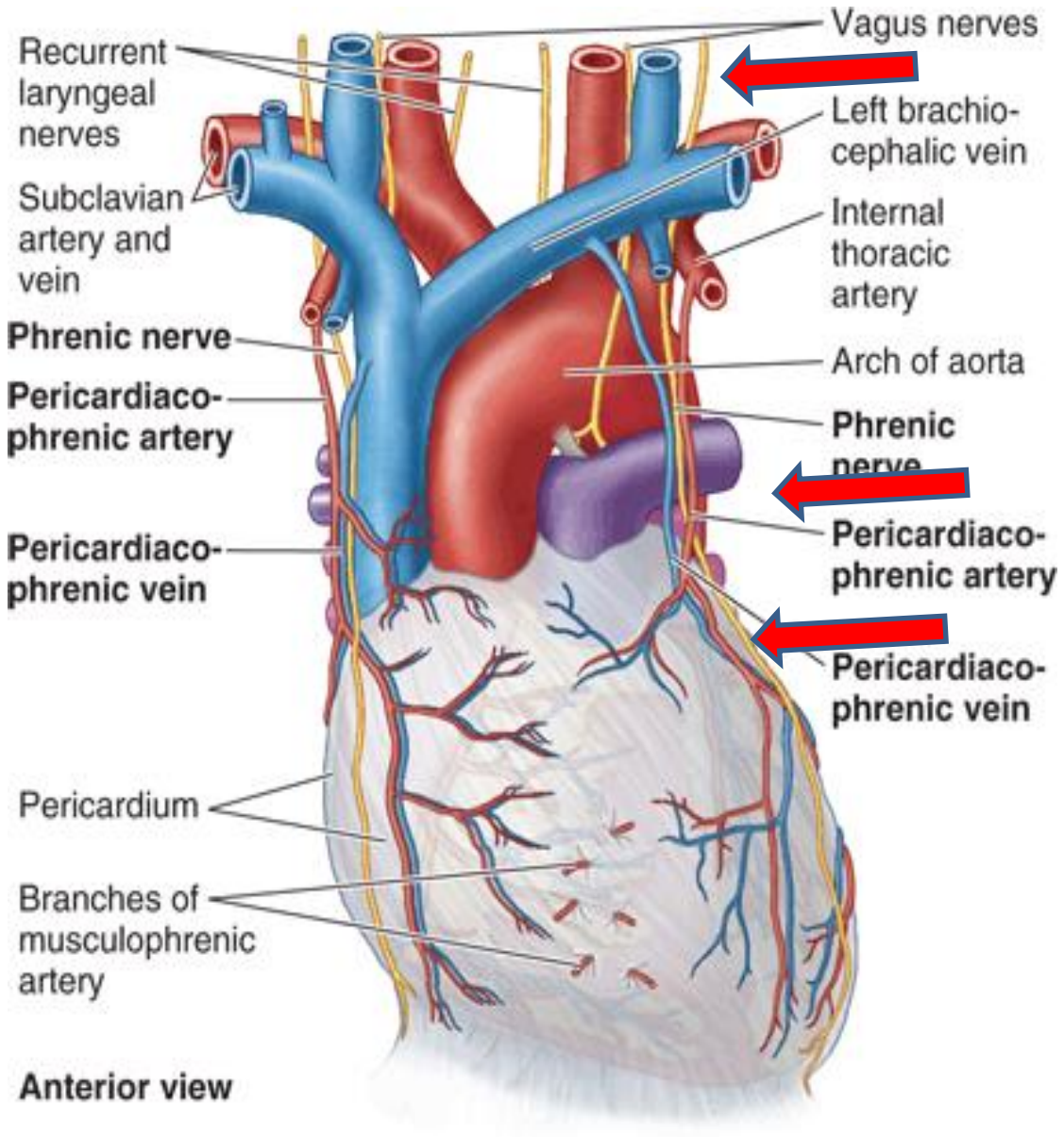
Blood Supply:

Pericardiophrenic branch from internal thoracic artery.

Nerve Supply :

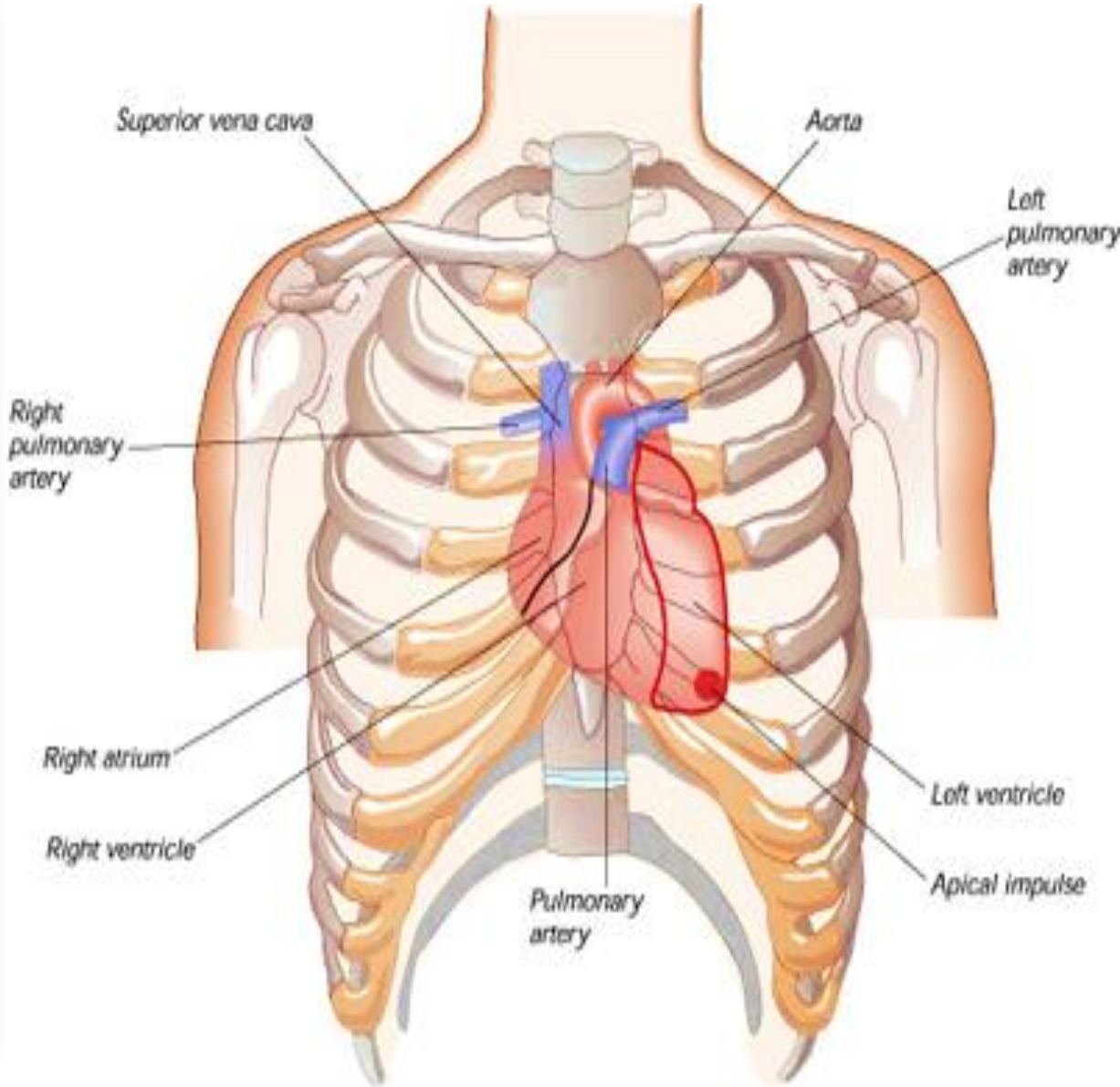
***The fibrous pericardium and the parietal layer of the serous pericardium are supplied by the phrenic nerves.**

***The visceral layer of the serous pericardium is innervated by branches of the sympathetic trunks and the parasympathetic (vagus nerves).**



Location of the heart

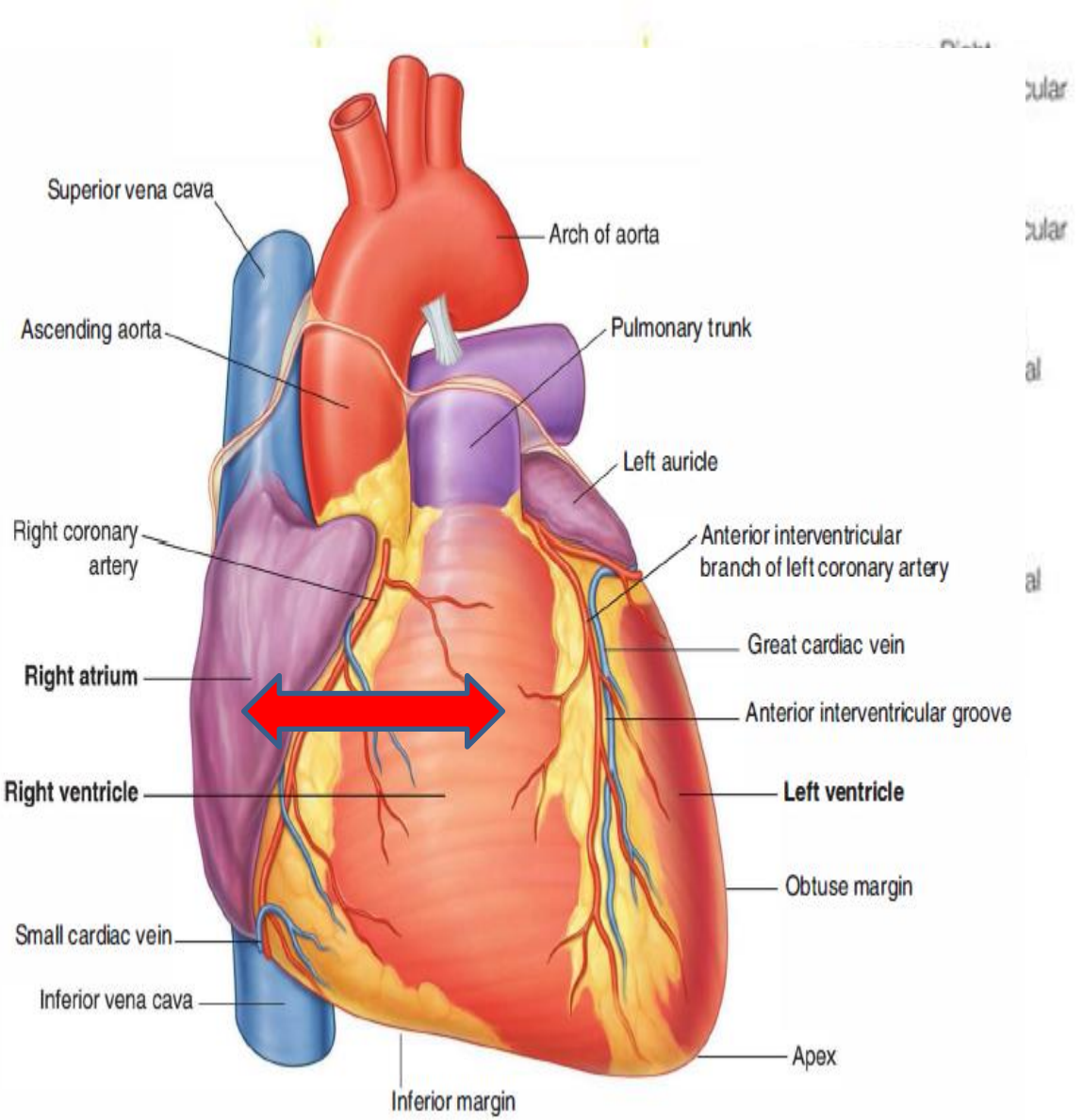
- The heart is a hollow muscular pump, pyramid shaped, about same size as a closed fist .It lies within the pericardium in the inferior middle mediastinum.



Surfaces of the heart

1.Anterior surface

Lies behind body of sternum & 3rd to 6th costal cartilages formed mainly by the . RT(right) atrium and the RT(Right) ventricle, which are separated from each other by the vertical atrioventricular groove.



Surfaces of the heart

2. Diaphragmatic surface

Inferior surface Formed mainly by the right and left ventricles separated by the posterior interventricular groove.

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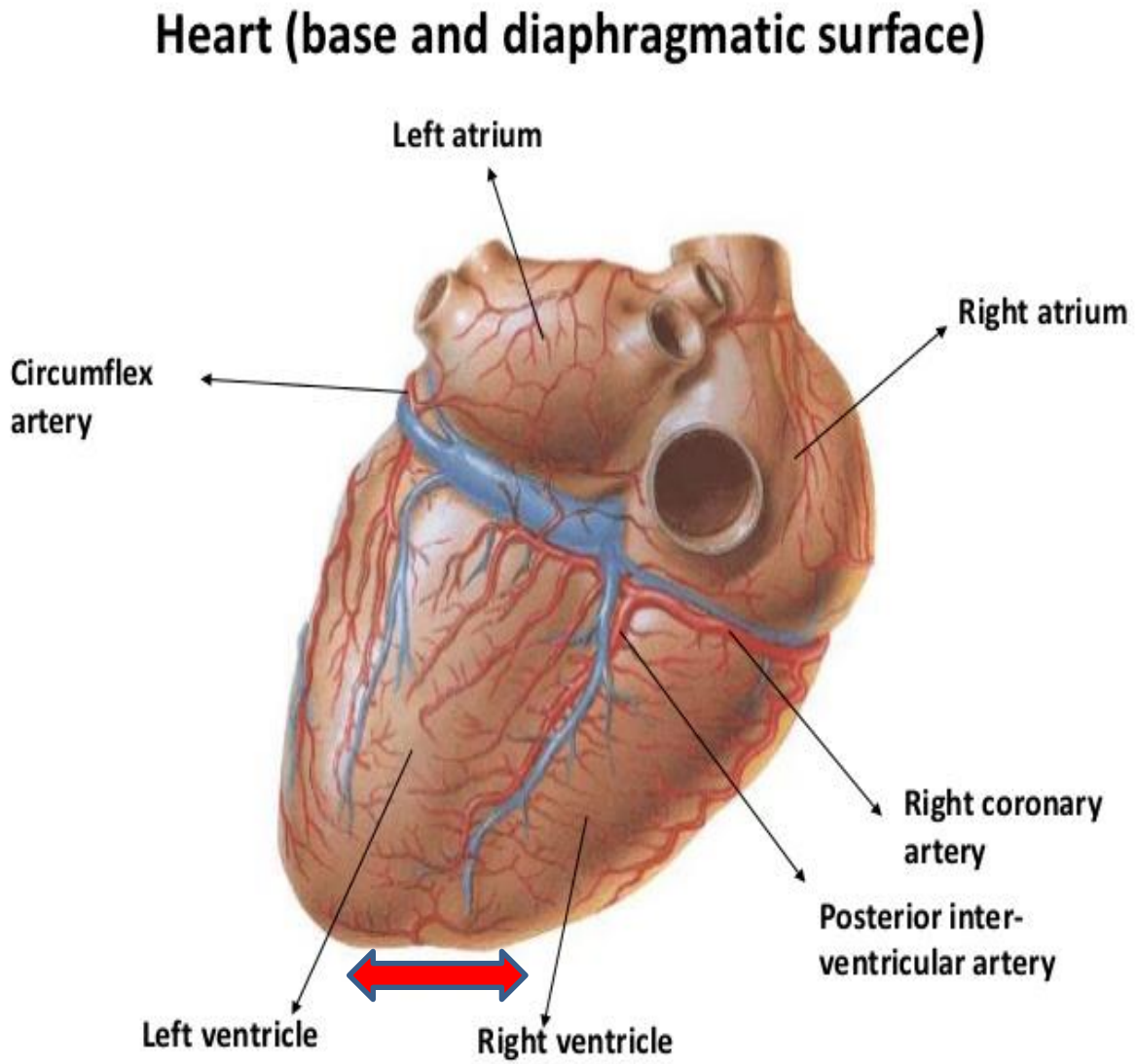
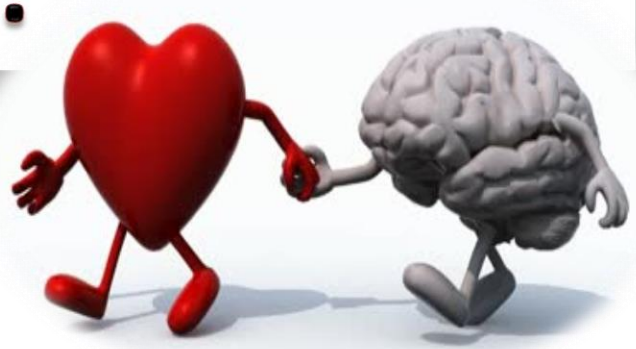
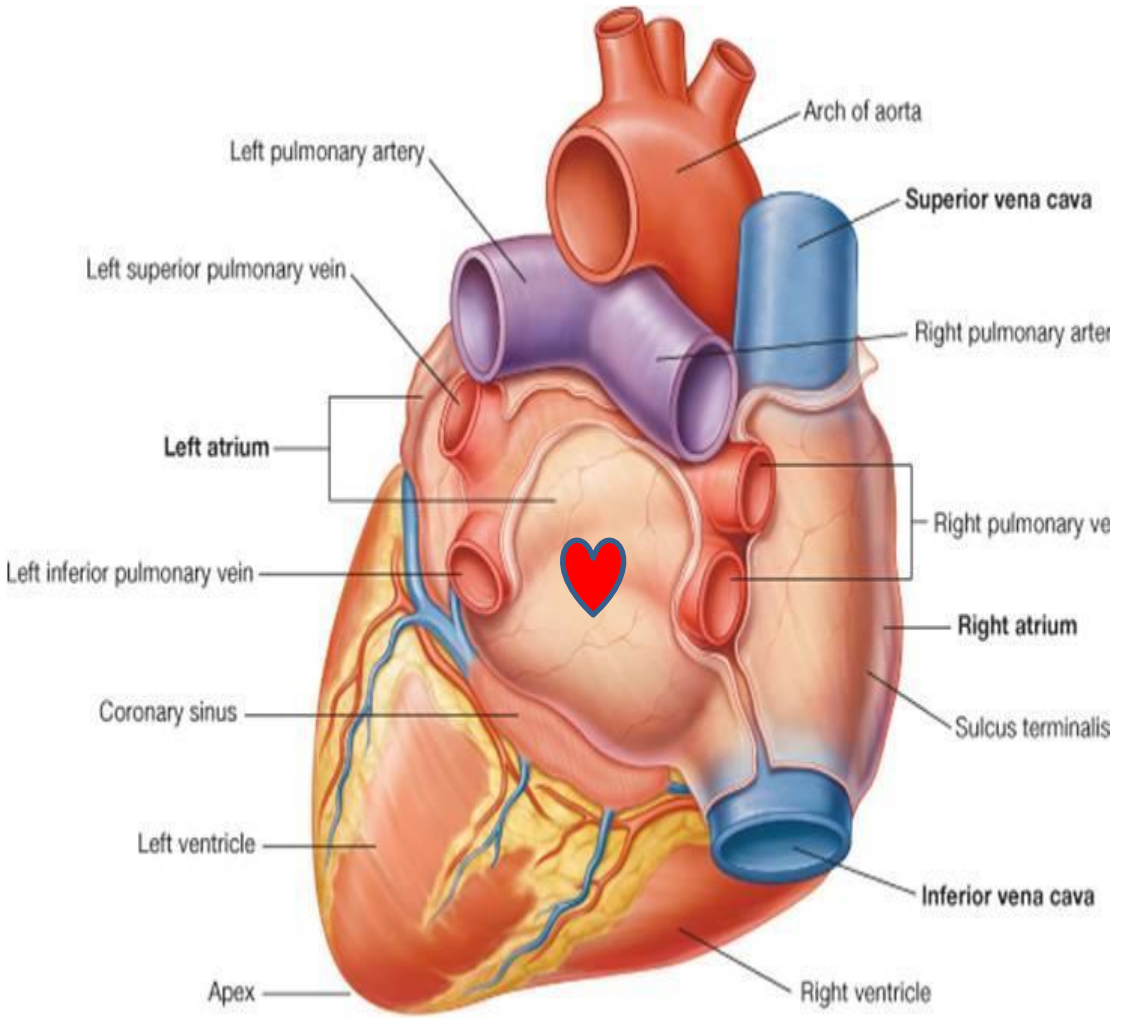


Surfaces of the heart

3.The Base

posterior surface ,directed backwards and slightly to right. Formed by mainly the left atrium.





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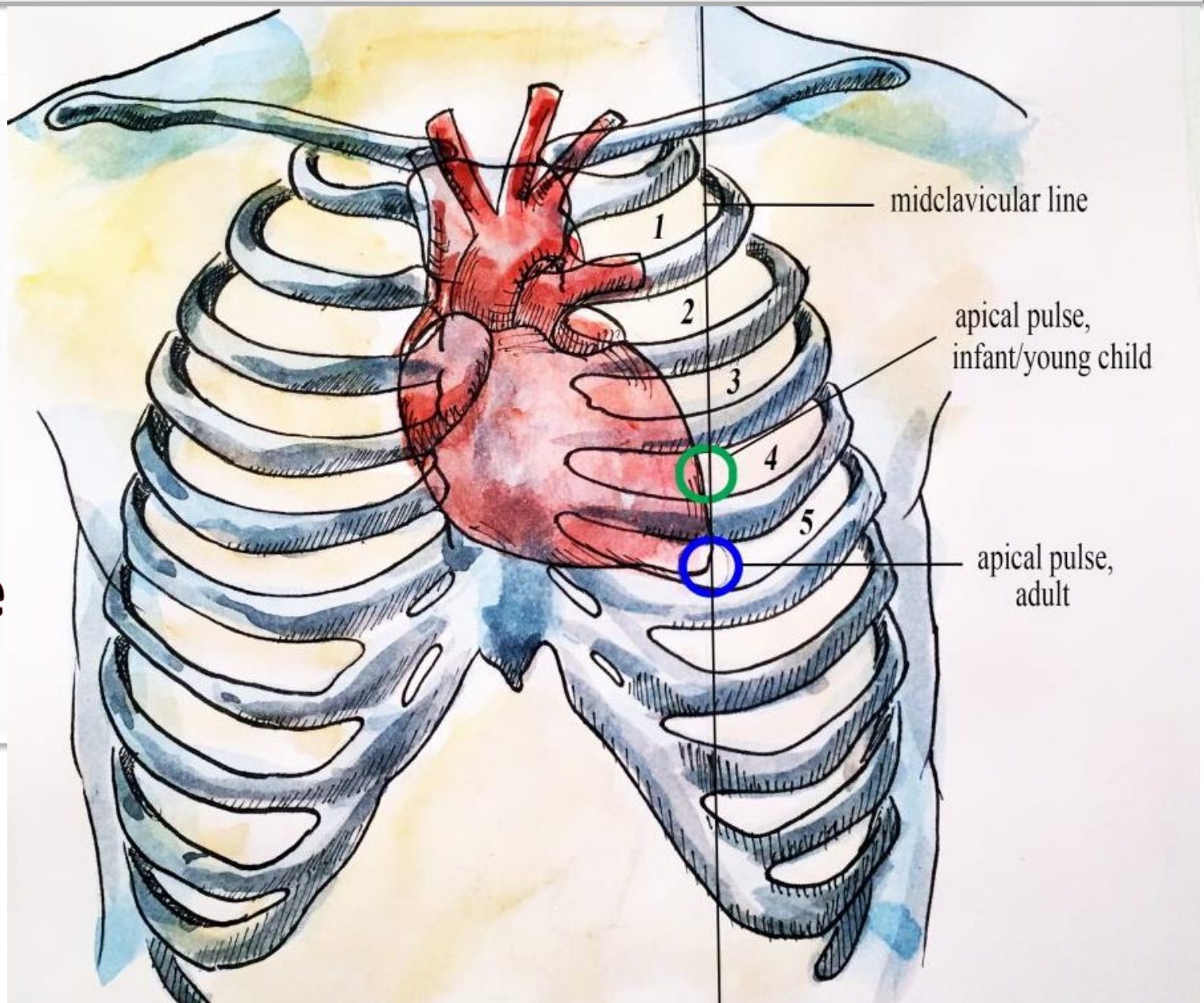
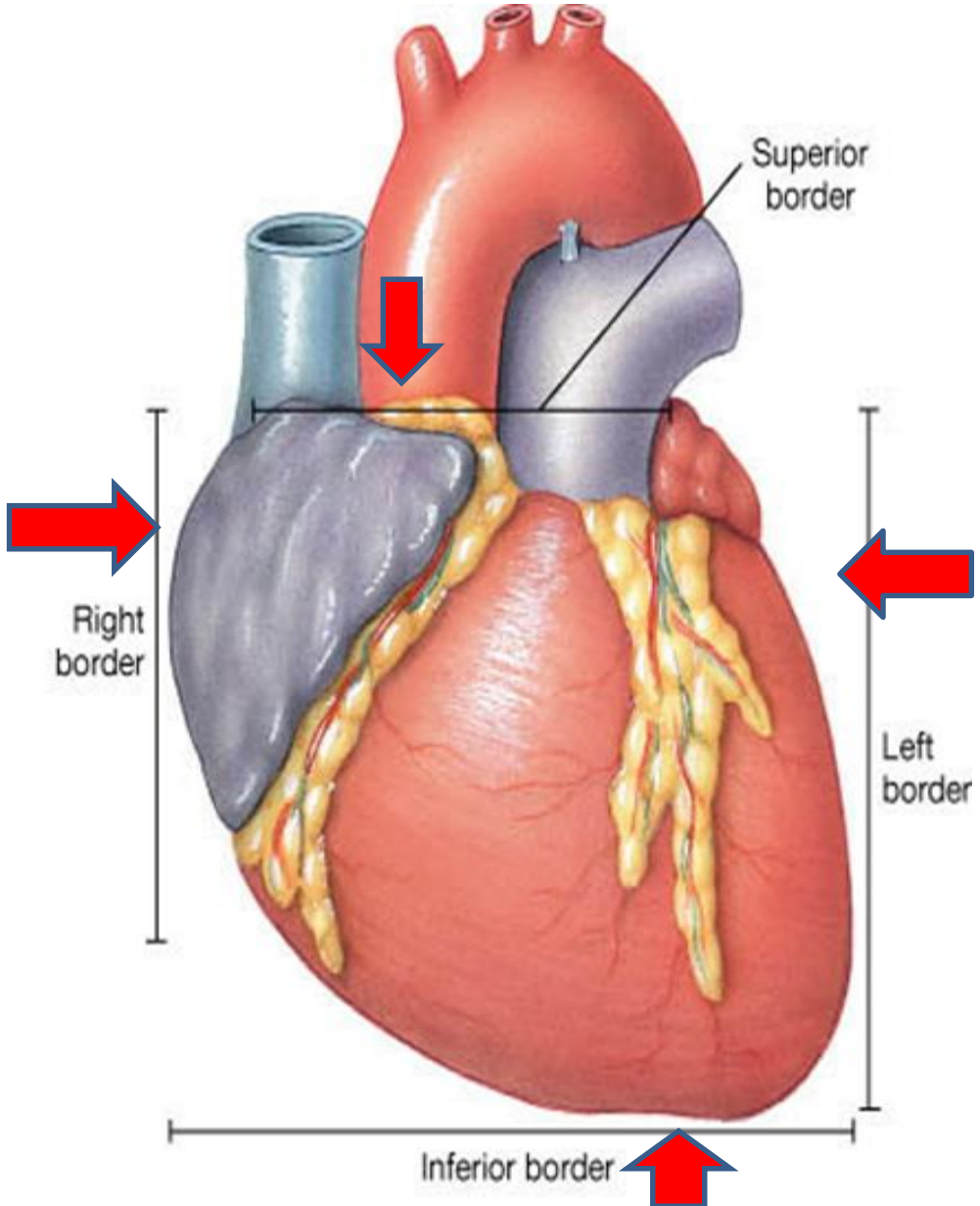
Apex of heart

It is formed by the left ventricle . It is directed downward, forward, and to the left.

It lies at the level of the fifth left intercostal space (9 cm) from the midline.



Borders of the heart



The right border: formed by the right atrium.

The left border

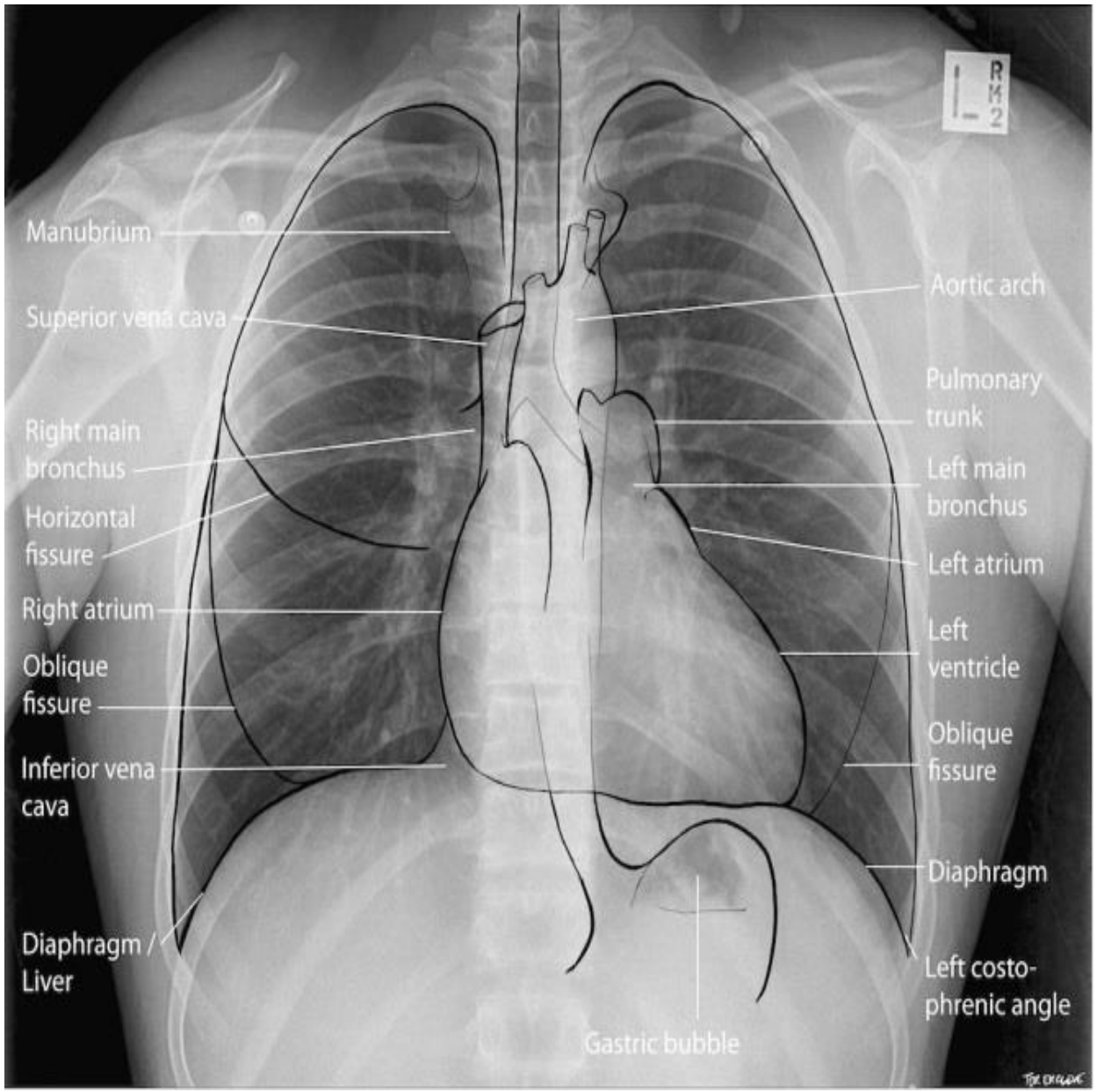
formed by the left ventricle & art of left auricle.

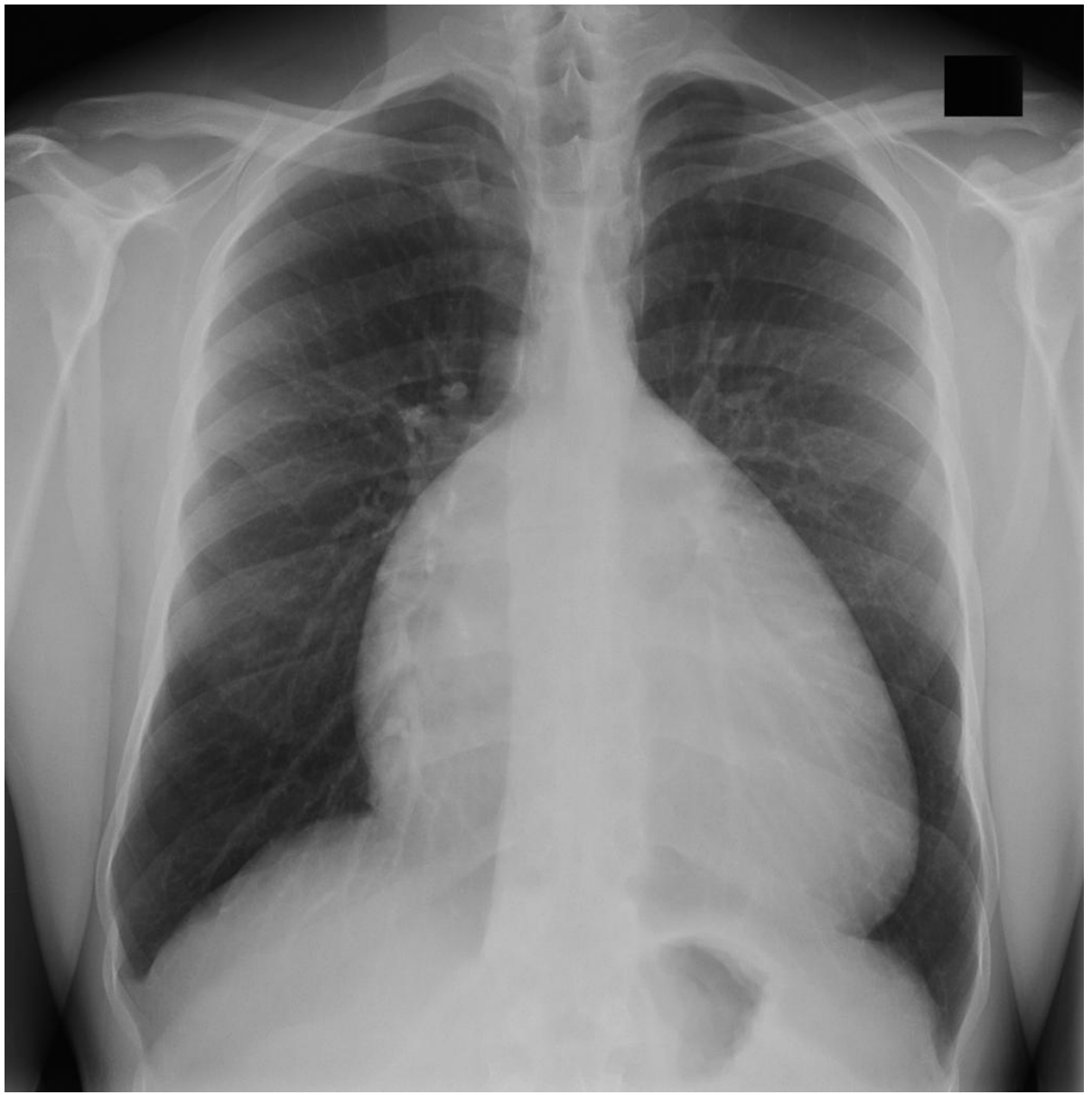
The inferior border,

formed by the right ventricle & apical part of the left ventricle.

The superior border,

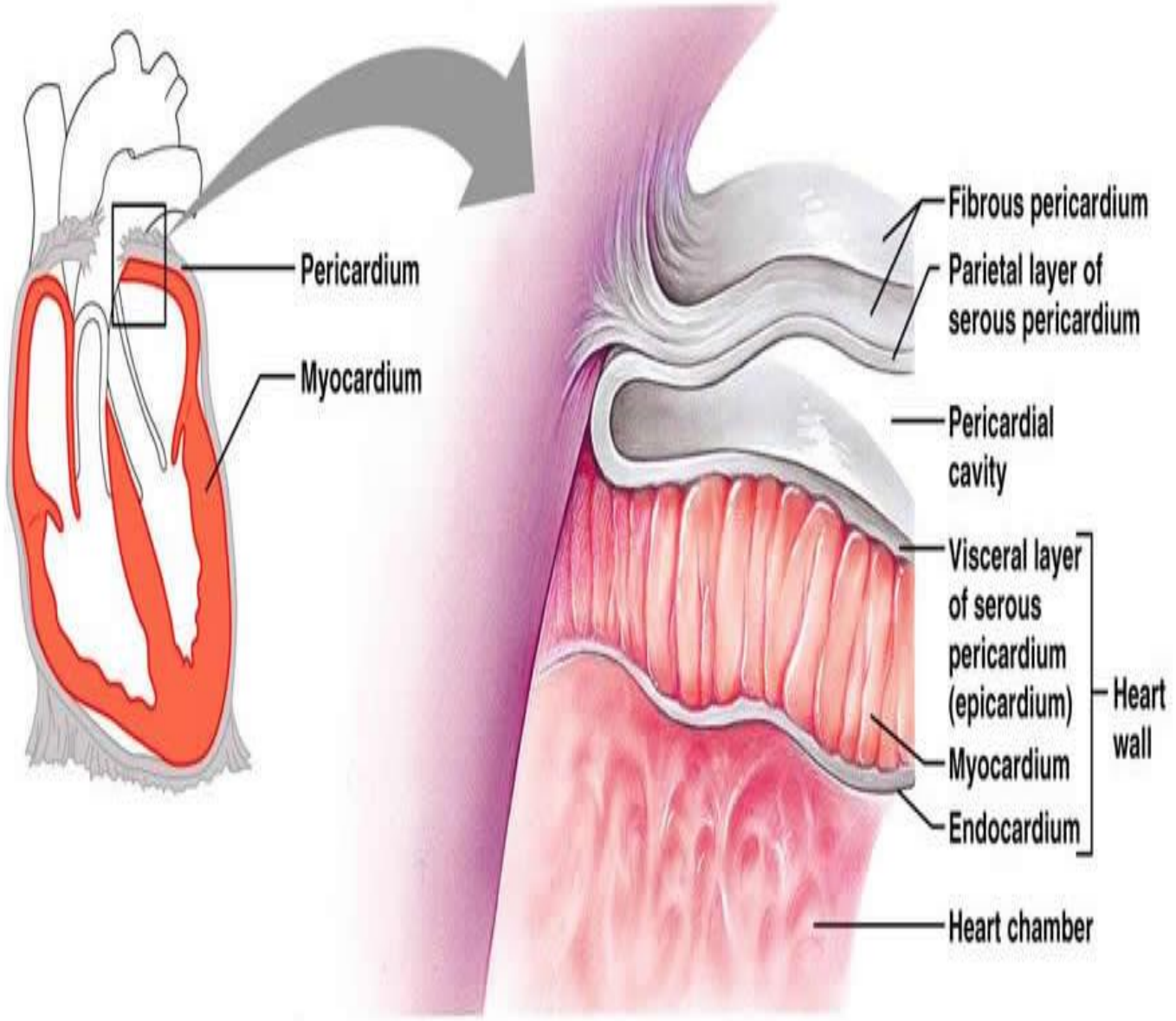
formed by the roots of the great blood vessels.


Manubrium
Superior vena cava
Right main bronchus
Horizontal fissure
Right atrium
Oblique fissure
Inferior vena cava
Diaphragm / Liver
Aortic arch
Pulmonary trunk
Left main bronchus
Left atrium
Left ventricle
Oblique fissure
Diaphragm
Left costo-phrenic angle
Gastric bubble



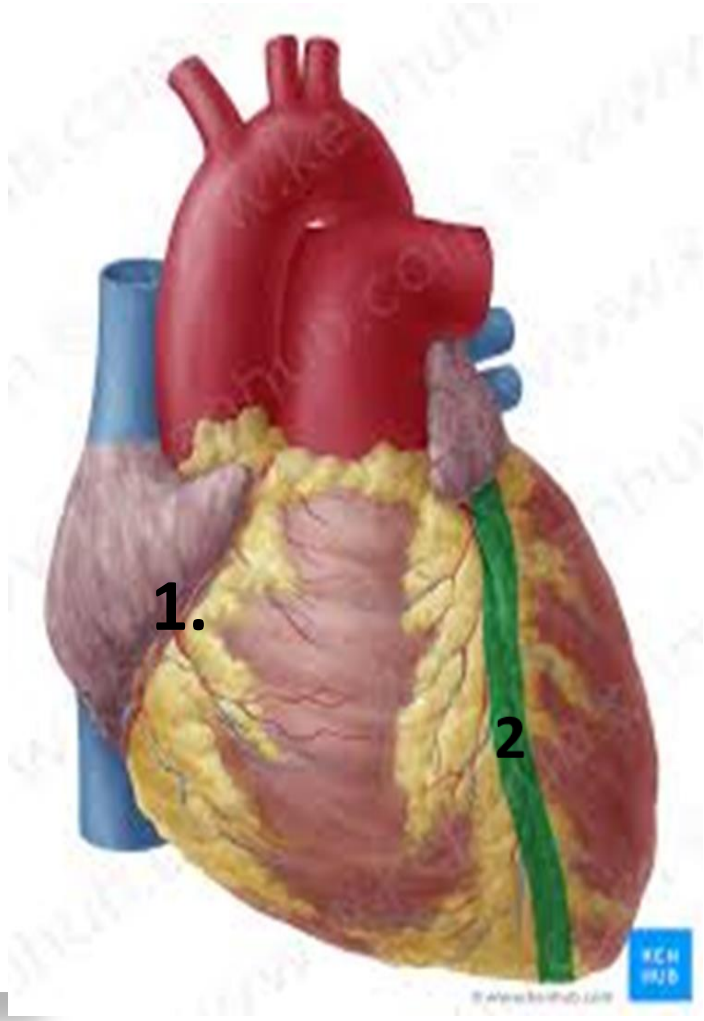
Chambers of the heart

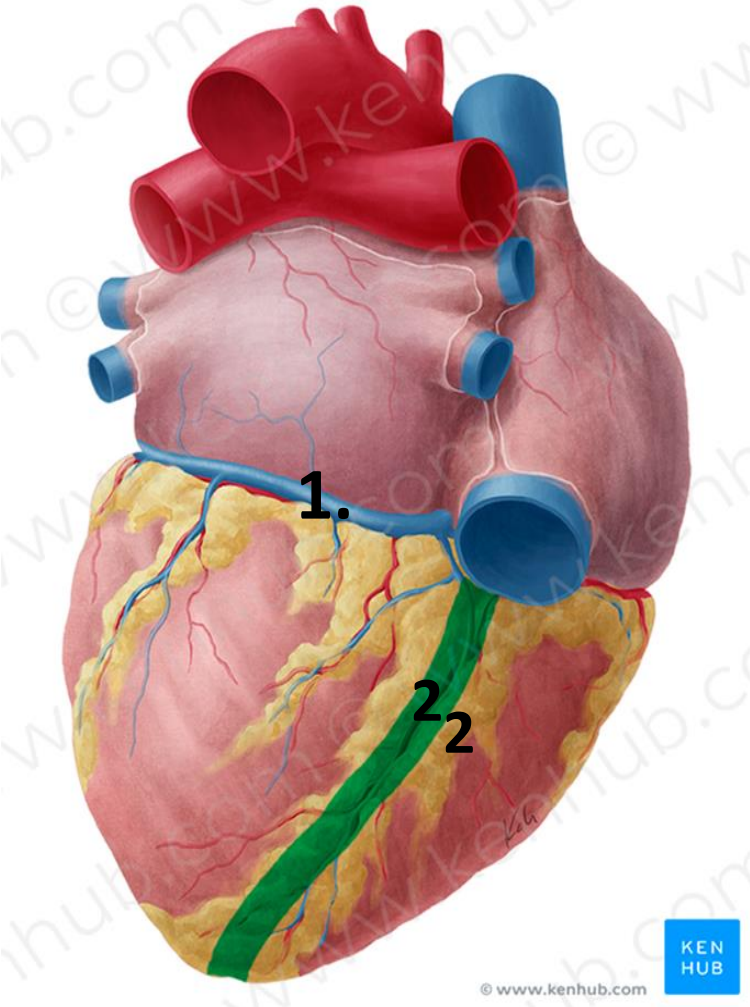
- The heart is divided by vertical septa into four chambers:
- Right and left atria and the right and left ventricles.
- *Right atrium lies anterior to the left atrium.
- Right ventricle lies anterior to the left ventricle.
- The walls of the heart are composed of cardiac the myocardium; covered externally with serous pericardium(epicardium)and lined internally with endocardium



Sulci Of heart

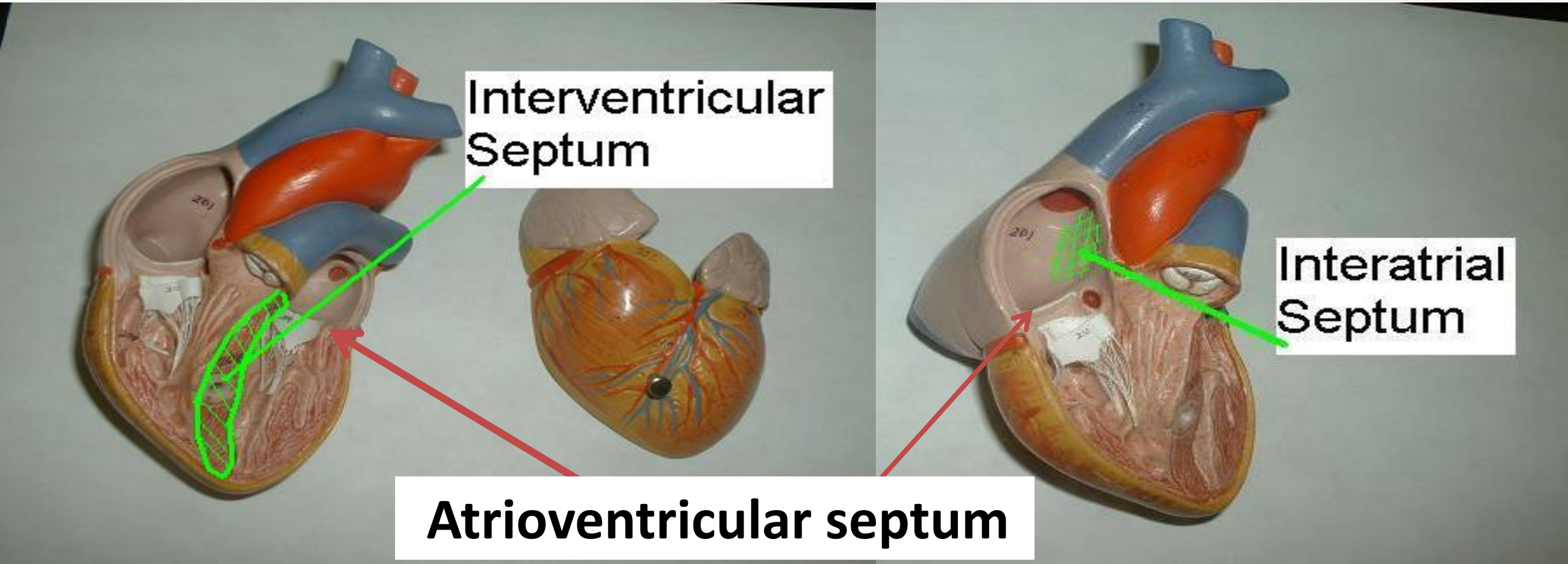
1. Right and left coronary sulci (or atrioventricular groove) – it represents the wall dividing the atria from the ventricles. It contains important vasculature, such as the right coronary artery.
2. The anterior and posterior interventricular sulci running vertically on both sides of the heart. They represent the wall separating the ventricles.





Septa of heart

Interventricular septum : between the ventricles
Interatrial septum between the two atria
Atrioventricular septum (between atria and ventricles)



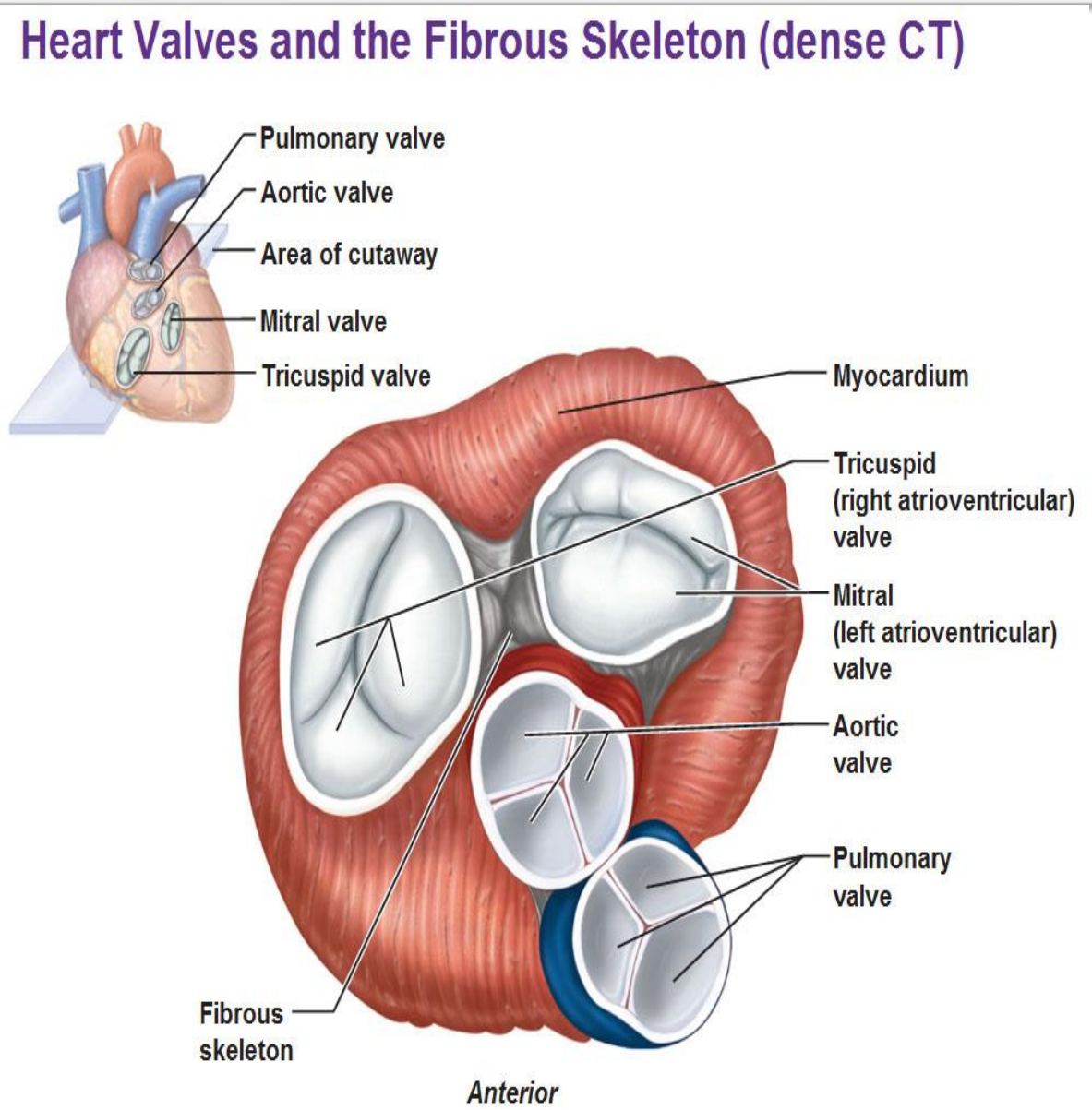
Skeleton of heart

*A dense fibroelastic tissue framework lies at the junction of atria , ventricles with each other and with pulmonary trunk and aorta .

It includes:

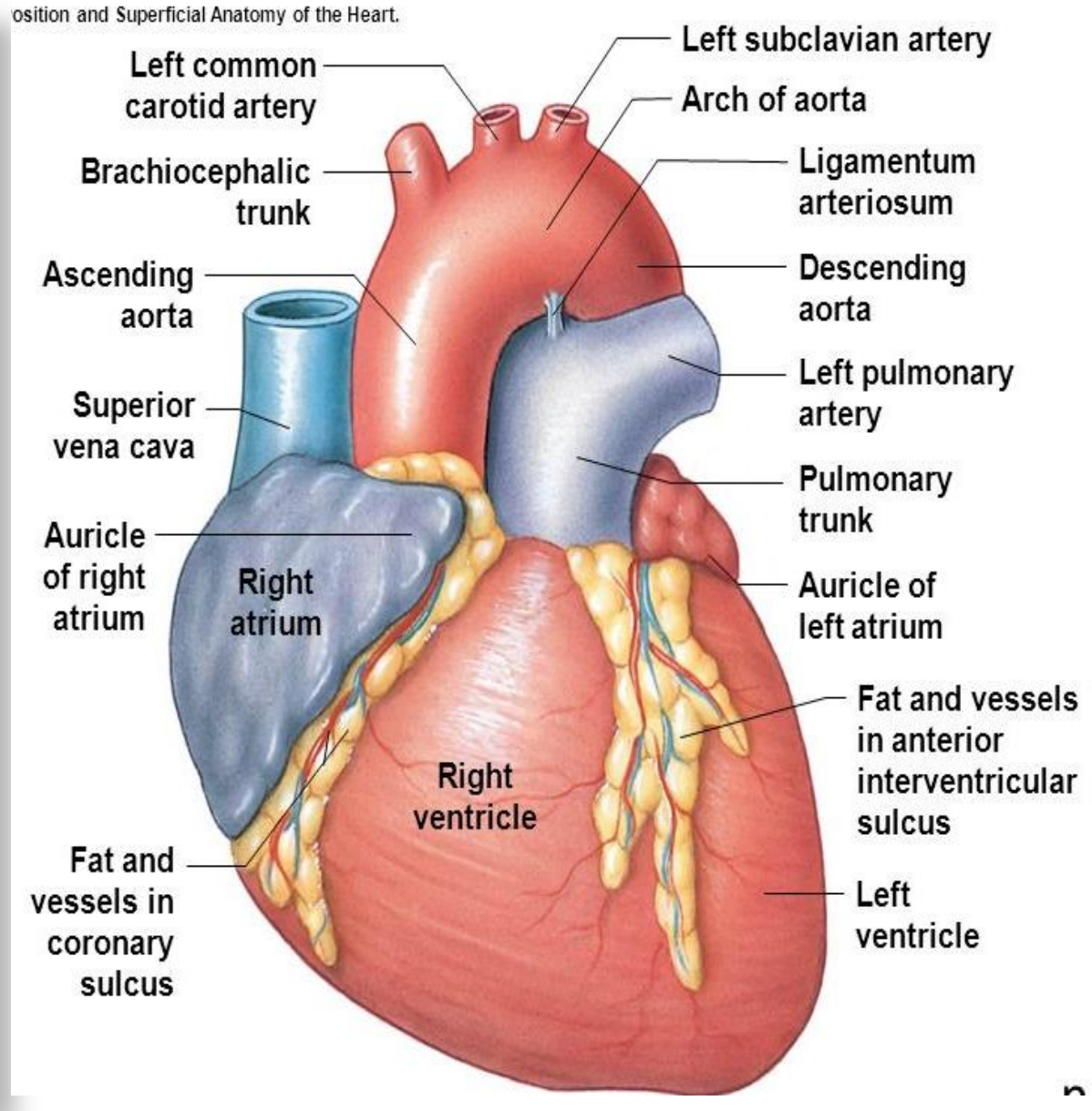
- Tricuspid fibrous annulus
- Mitral fibrous annulus
- Aortic fibrous annulus
- Pulmonary fibrous annulus

*It Provides support for the heart, as well as isolating the these structures from each other.



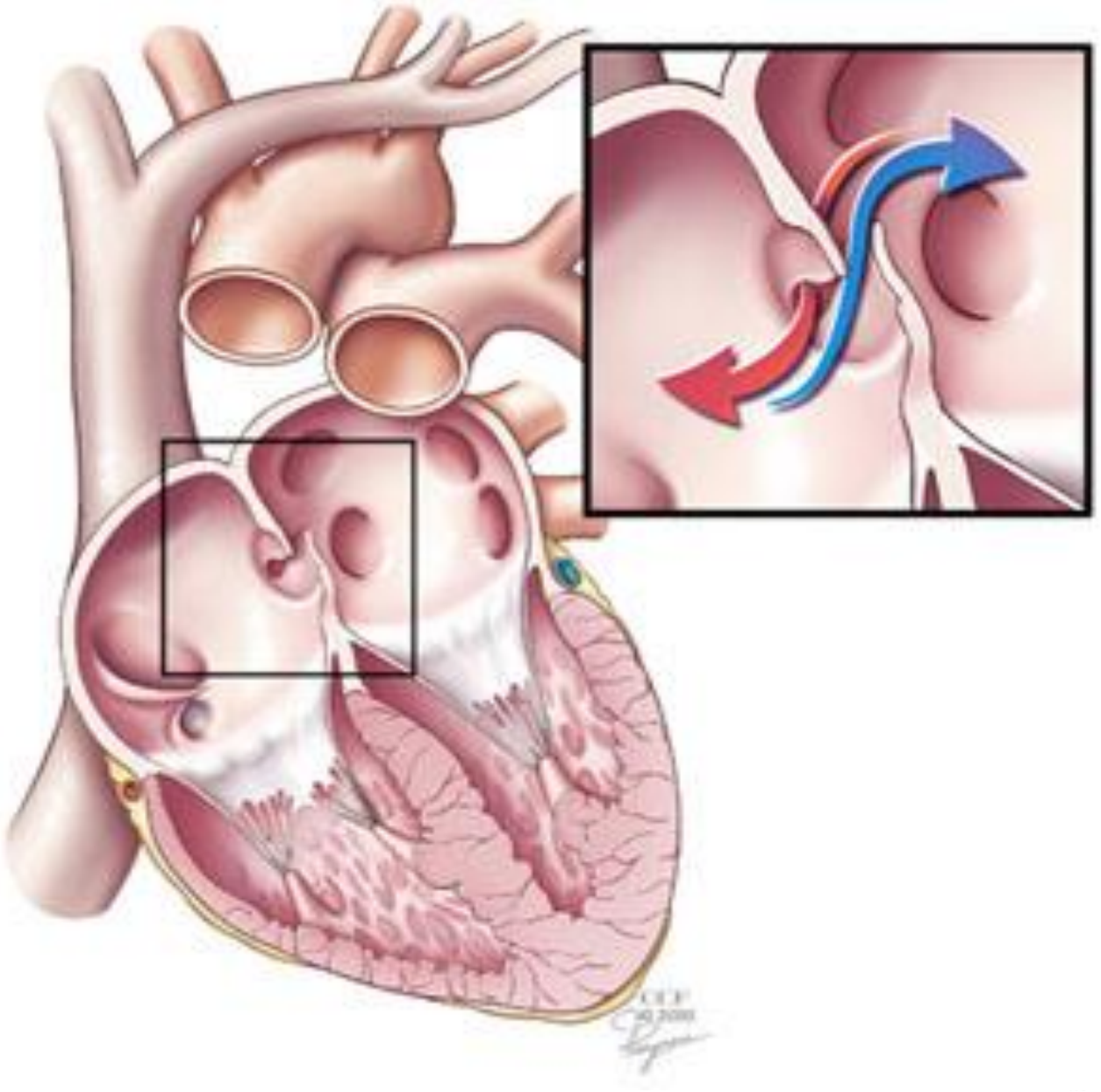
Right Atrium

- An oval shape cavity . Carries deoxygenated blood from the superior and inferior vena cava and coronary sinus .
- It is situated anteriorly and is separated from the left atrium by interatrial septum (atrial septum).
- The septal wall in the right atrium is marked by a small oval-shaped depression called the fossa ovalis.



Clinical note

In fetal life fossa ovalis is opened and called foramen ovale . Foramen ovale is usually closed in 80 % of the normal population. In 20 % of normal population this foramen remains patent so it Is called patent foramen ovale. Communication is still between the Left atrium and the right atrium.



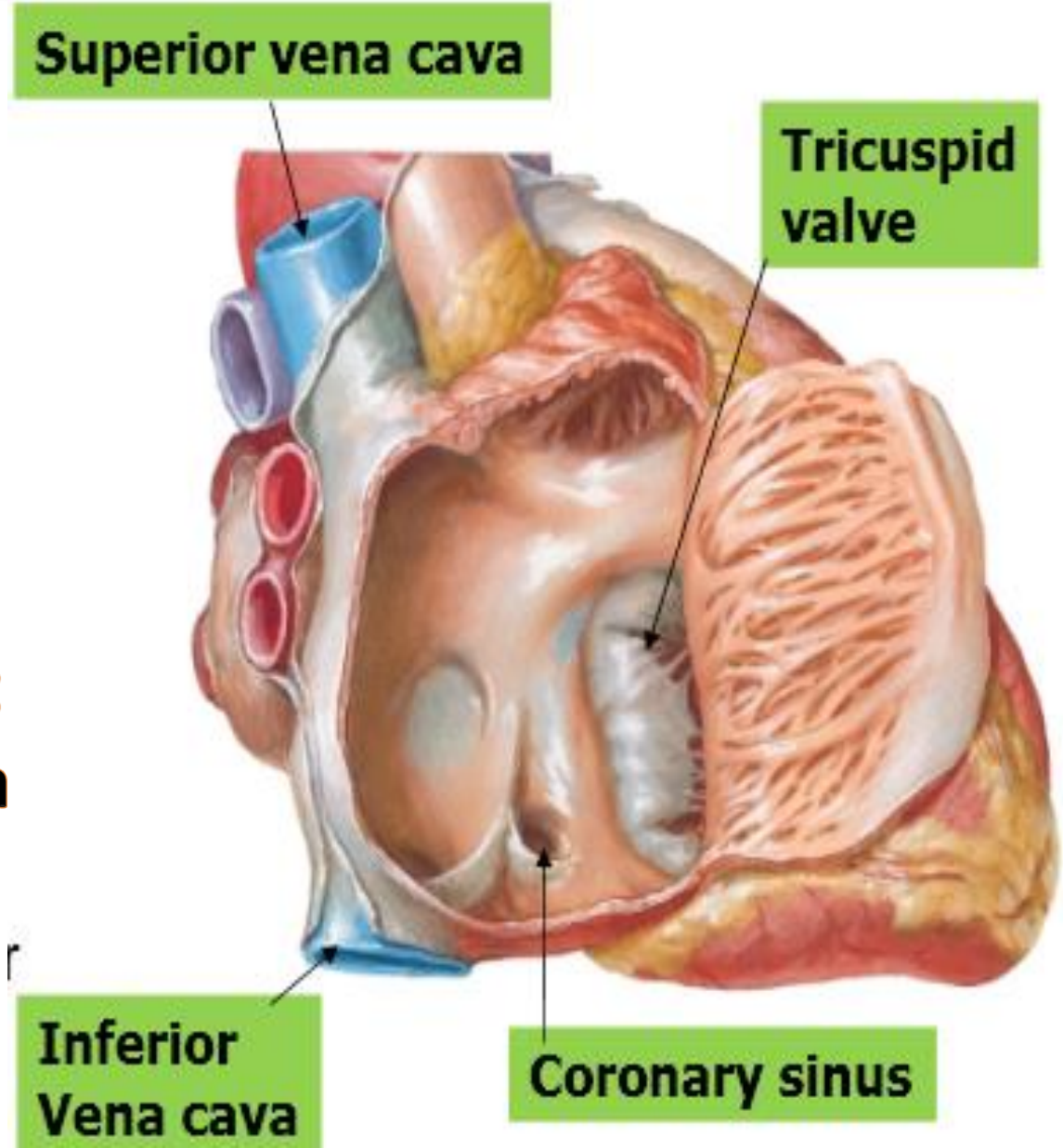
Right Atrium openings

1.Superior vena cava opening which is usually valveless

2.Inferior vena cava opening which contain a rudimentary valve called Eustachian valve .

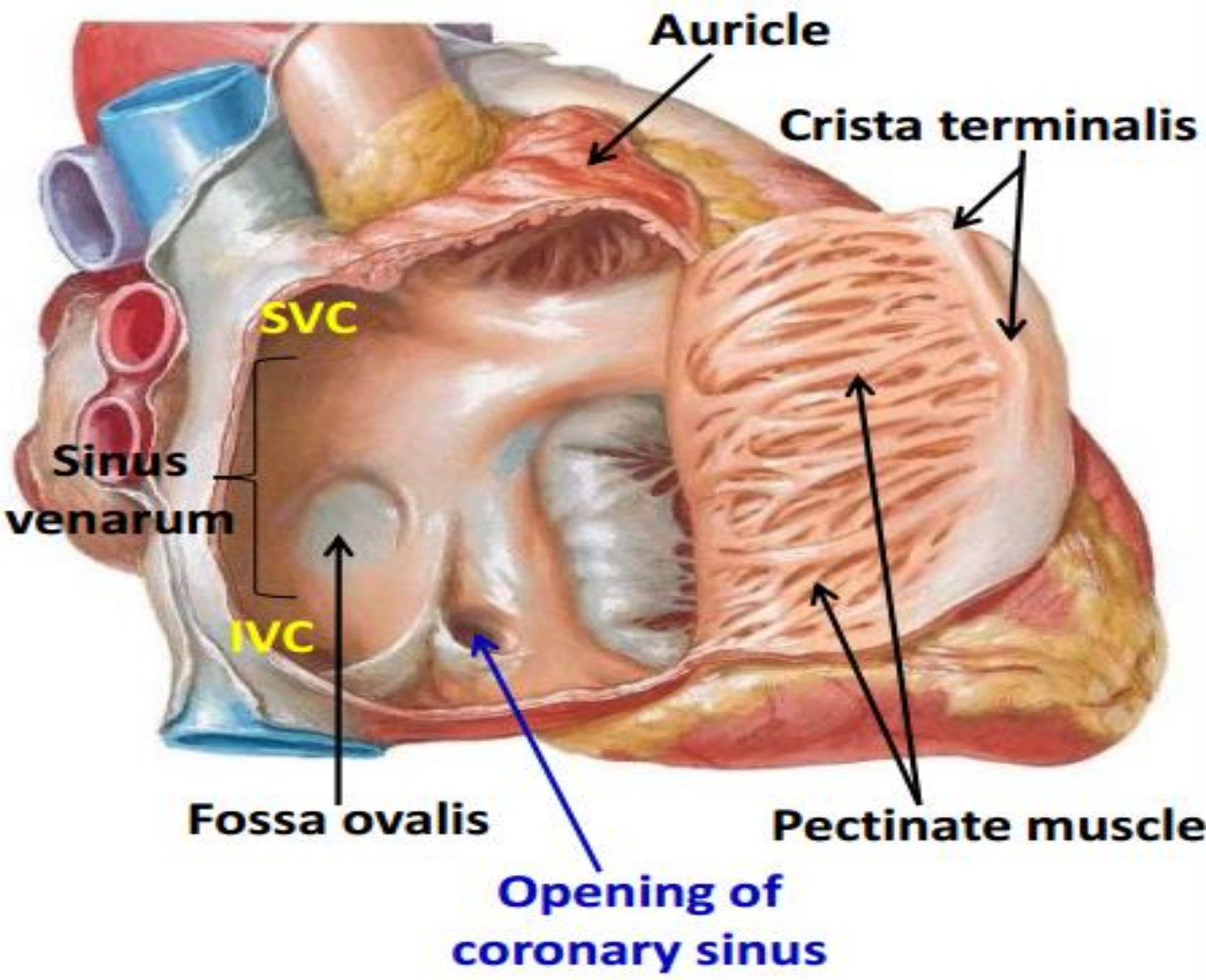
3. Coronary sinus opening through which the venous drainage of the heart is reach to the right. Atrium and it has a rudimentary valve Thebesian valve.

4. Atrioventricular opening has well developed valve called tricuspid valve.



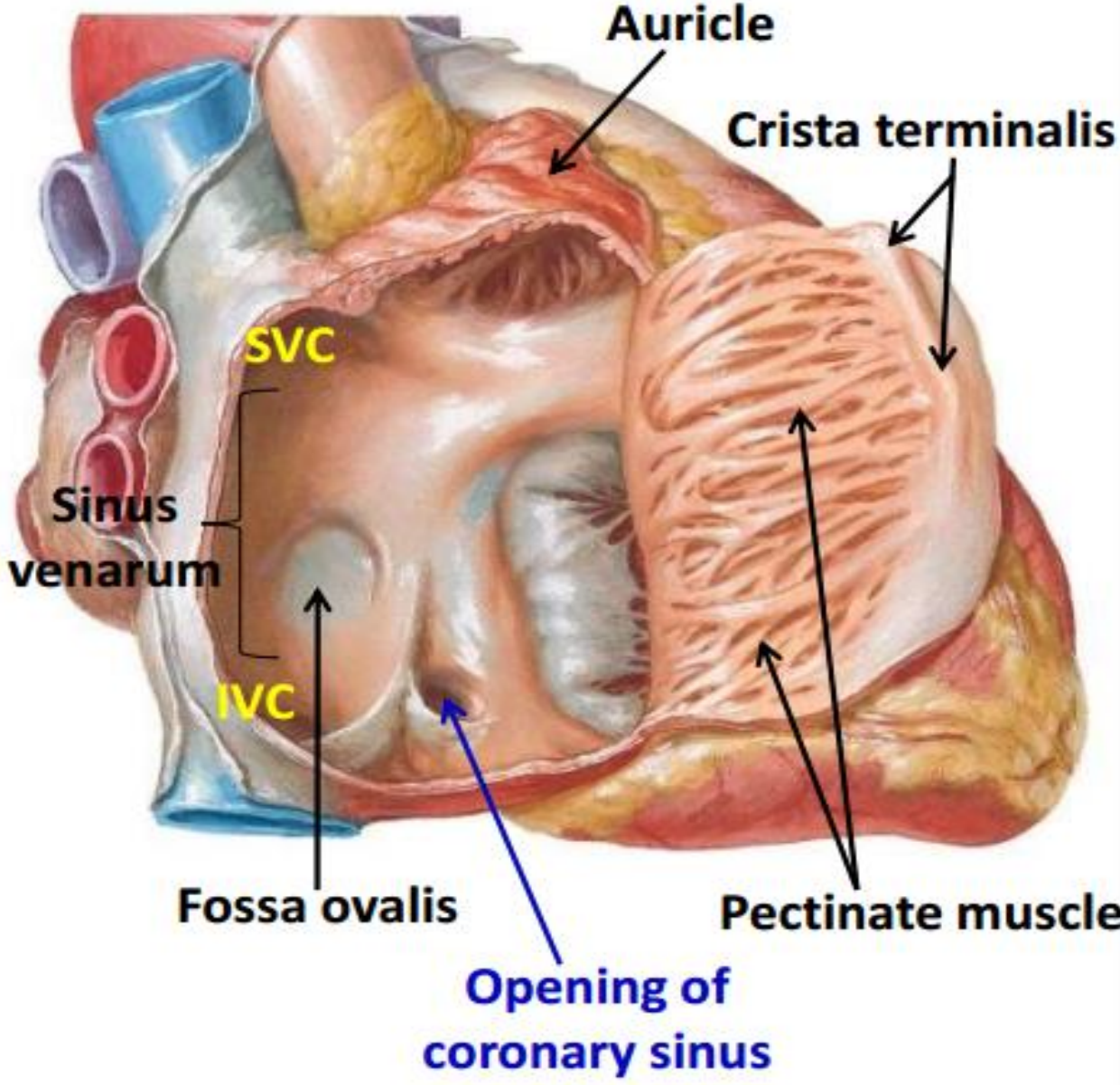
Right Atrium parts

- ✓1. Smooth part lies Posteriorly
- ✓2. Trabeculated part lies anteriorly (muscolipectinati) .
- ✓The land mark separated between the two part is called crista terminalis internally and sulcus terminalis externally



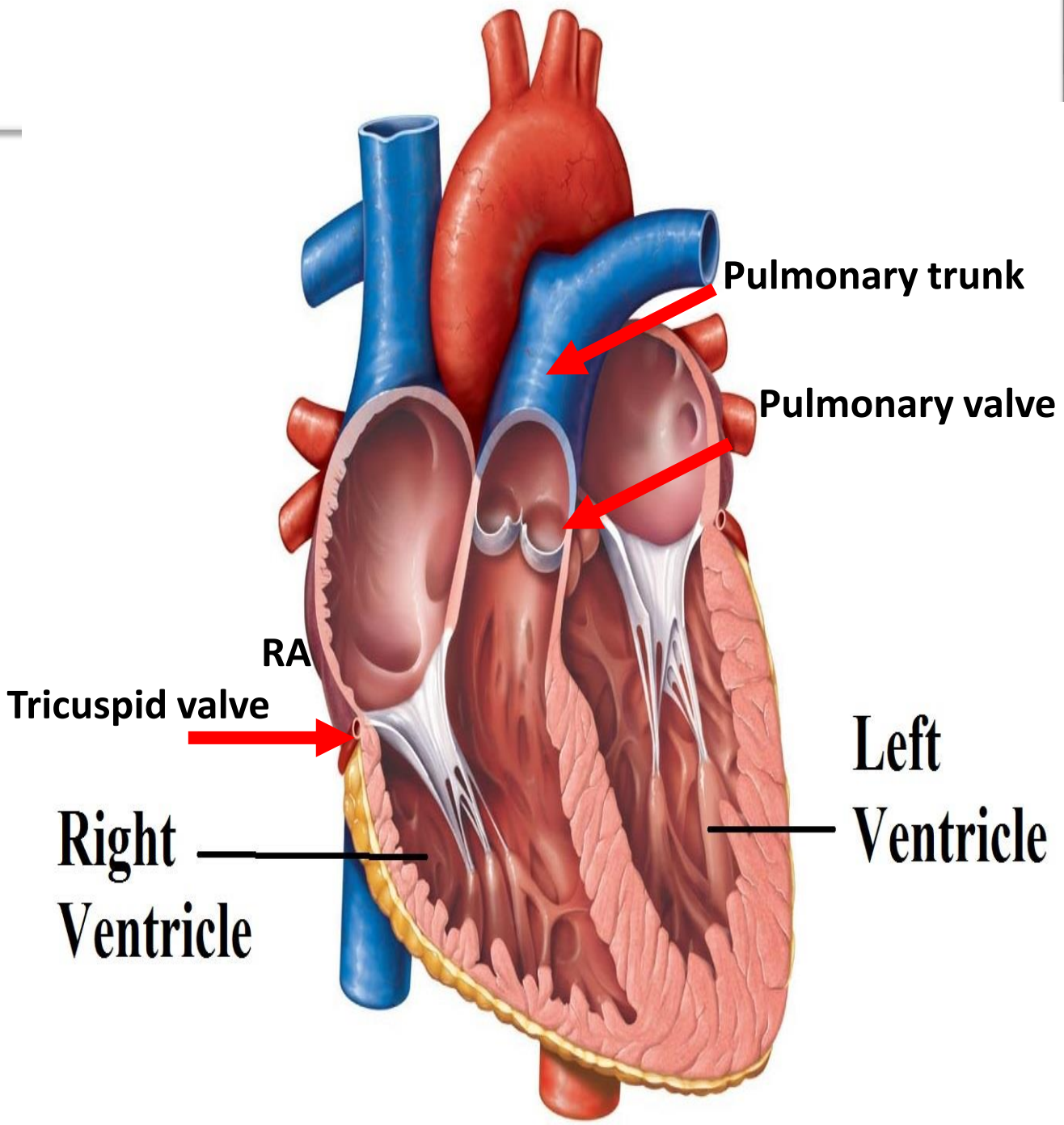
Right Atrial appendages (Auricle)

- (RAA) – It is a small, cone-shaped pouch which comes out from the upper and front part of the atrium and overlaps the root of the aorta. The RAA is very muscular, and is lined with small muscles on its surface.



Right ventricle

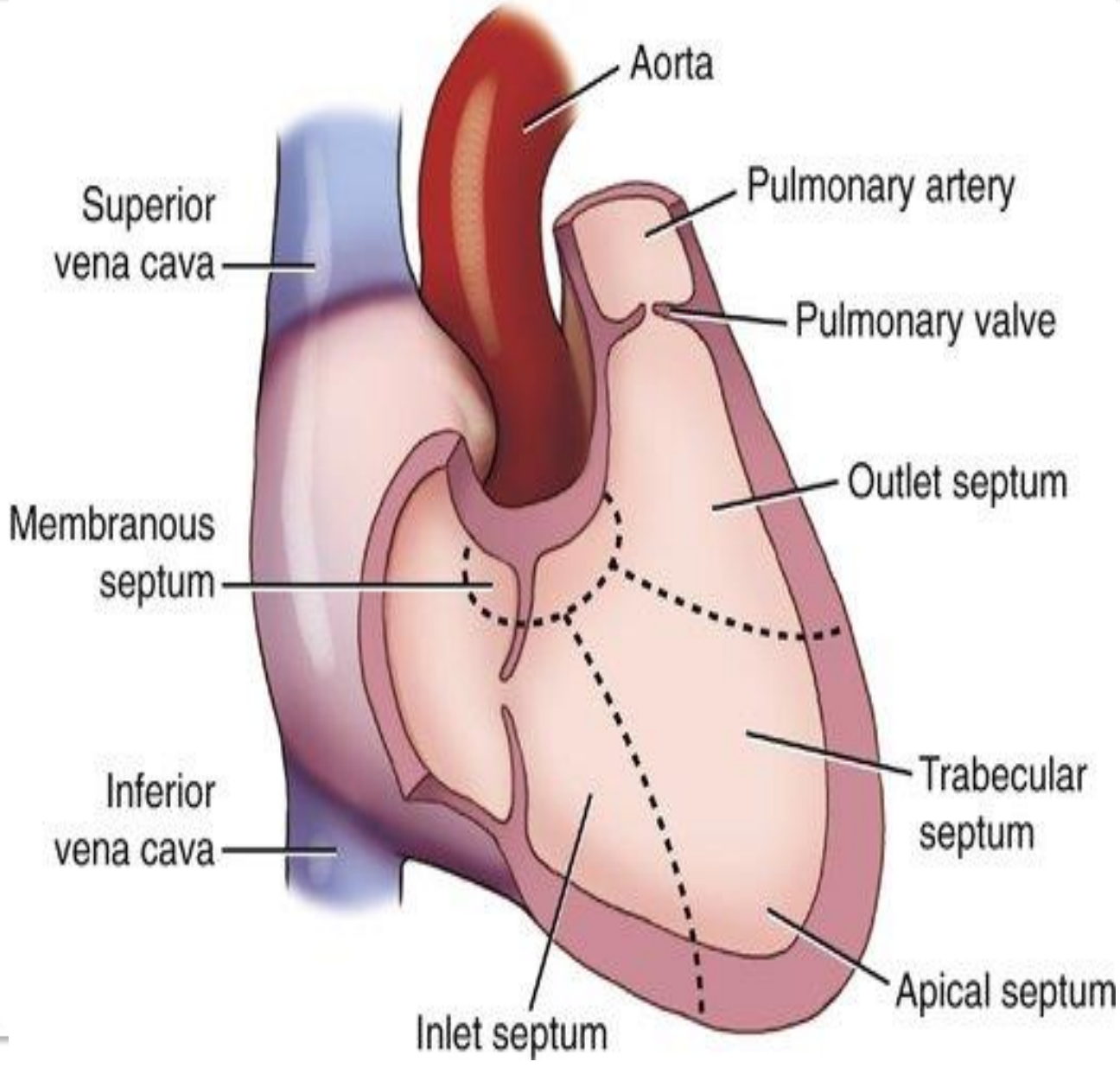
- Is a triangular shape cavity, situated more anteriorly and in cross section of the heart, It looks like a crescent shape.
- Communicated with the right atrium through atrioventrical orifice which is guarded by tricuspid valve which is a well-developed valve.
- Communicated with the pulmonary trunk through pulmonary valve .
- Right ventricle has a thin wall about (1 / 3rd of the thickness of the wall of the left ventricle)



Right ventricle

✓1. Smooth part

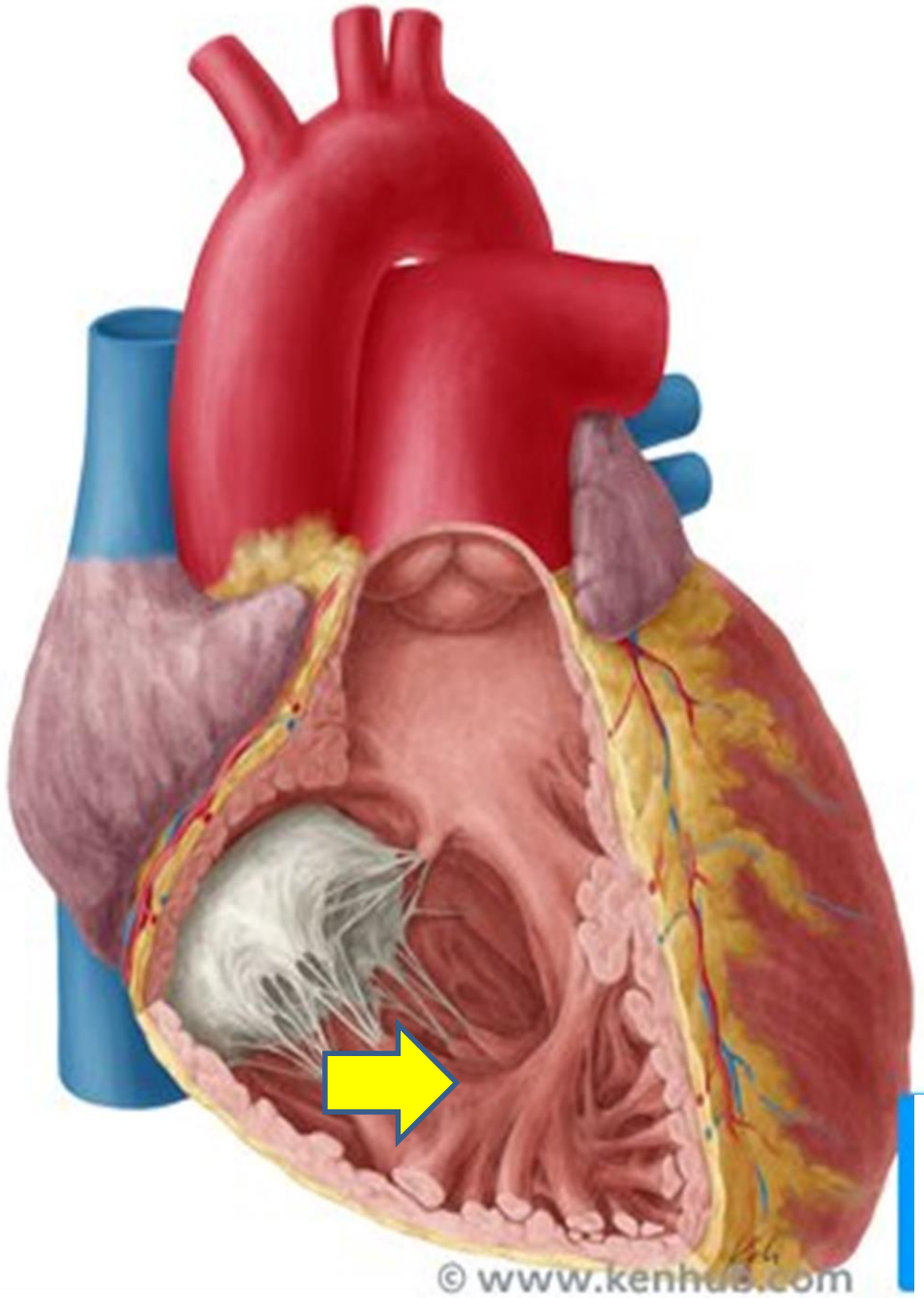
- ✓ basal part which is divided into :
- Right ventricular inlet V shaped carries blood from the Right atrium through tricuspid valve to the cavity of Right ventricle.
- Right ventricular outlet is funnel shape carries blood from right ventricle to pulmonary trunk
- Right ventricular inlet is separated from Right ventricular outlet by membranous infundibulum.



Right ventricle

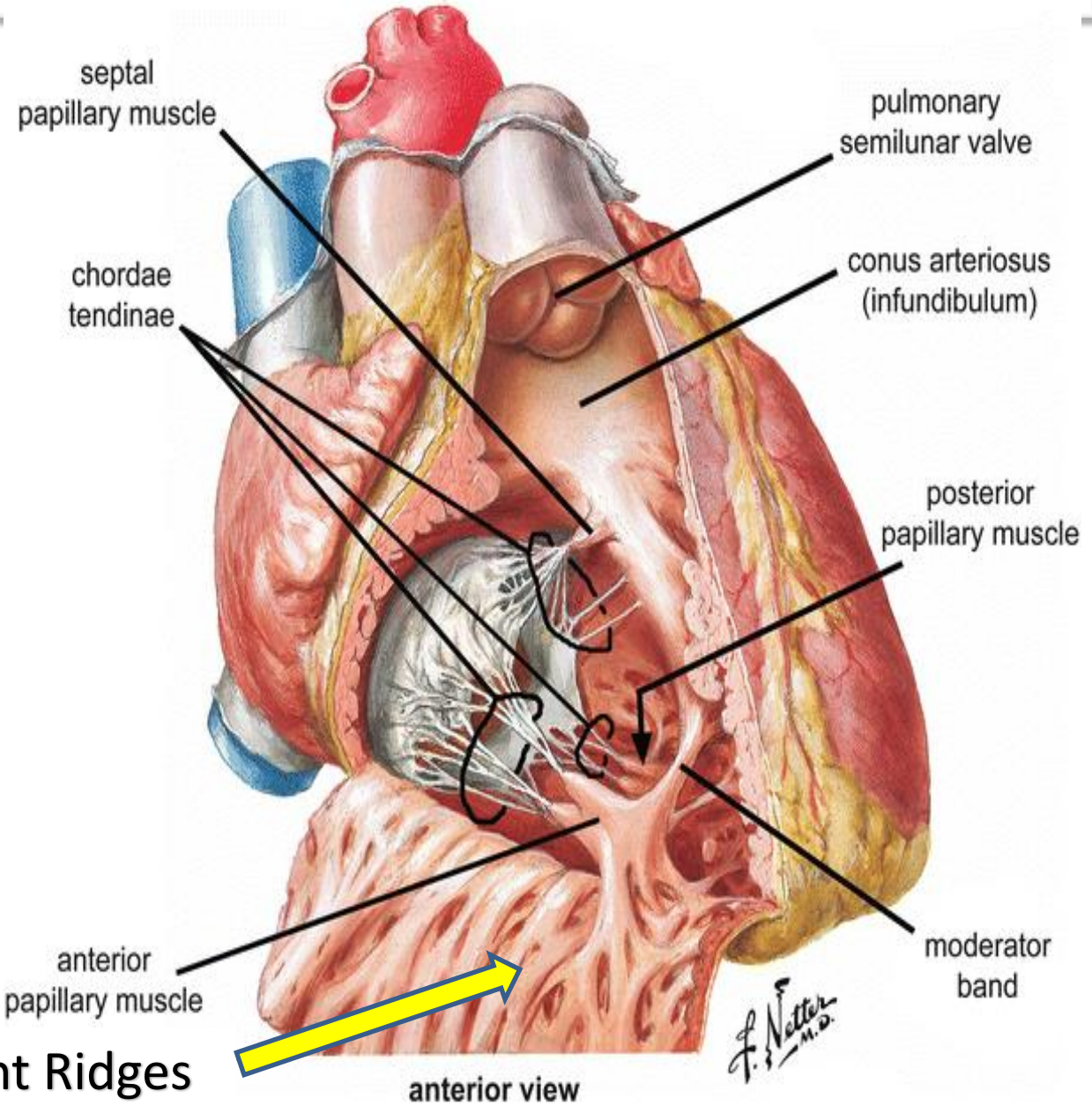
2. Trabeculated part :✓

The trabeculae carneae or ✓ (meaty ridges), are rounded or irregular muscular columns which project from the inner surface of the right and left ventricles .They give the ventricle a ‘sponge-like’ appearance, and can be grouped into 3 main types:



1. Prominent Ridges

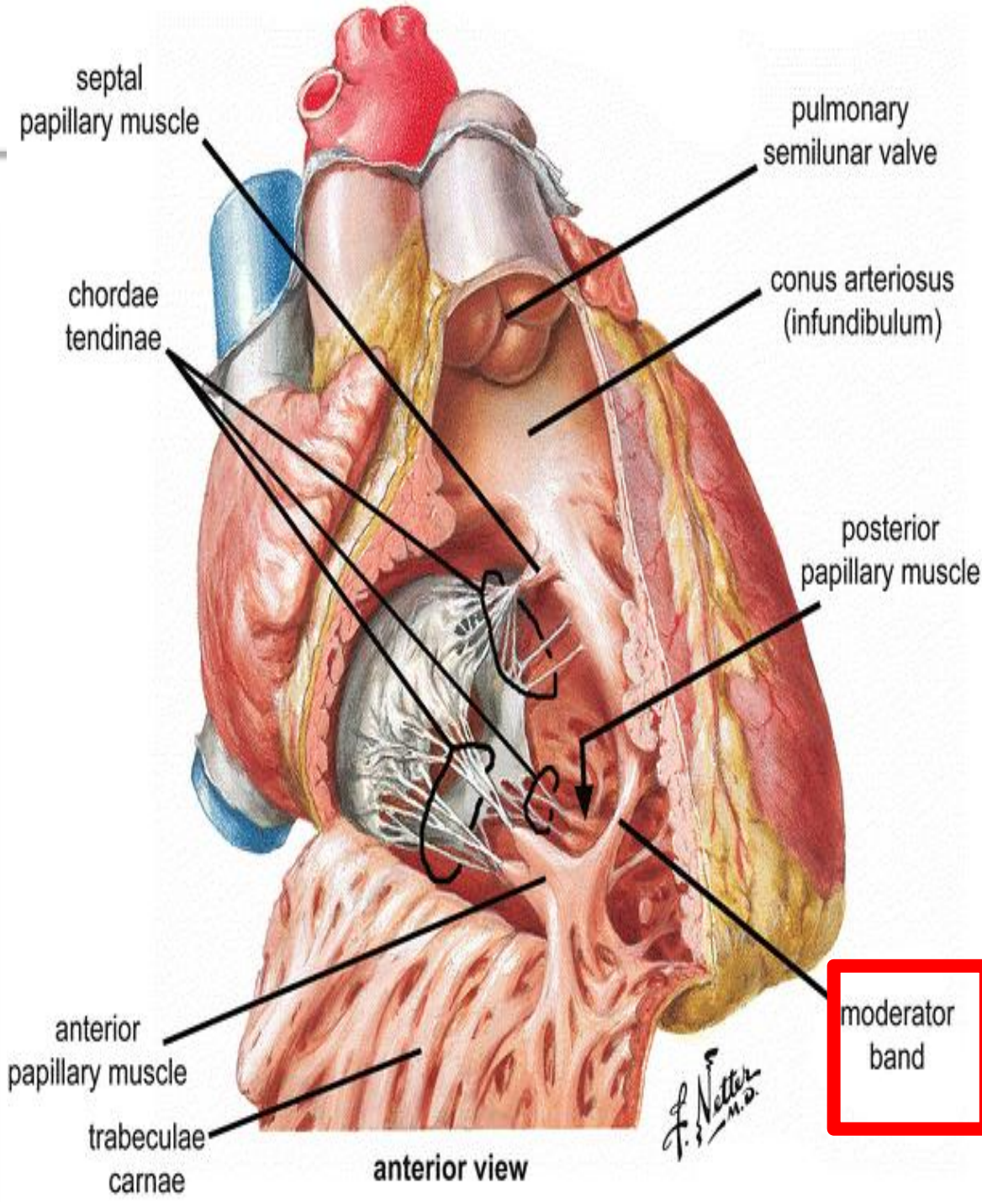
Attached along • their entire length on one side to form ridges along the interior surface of the ventricle.



Prominent Ridges

2. Bridges

- Are attached to the ventricle at both ends, but free in the middle.
- This type of trabeculation is known as (moderator band,) which is transverse muscle spans between the interventricular septum and the anterior wall of the right ventricle.

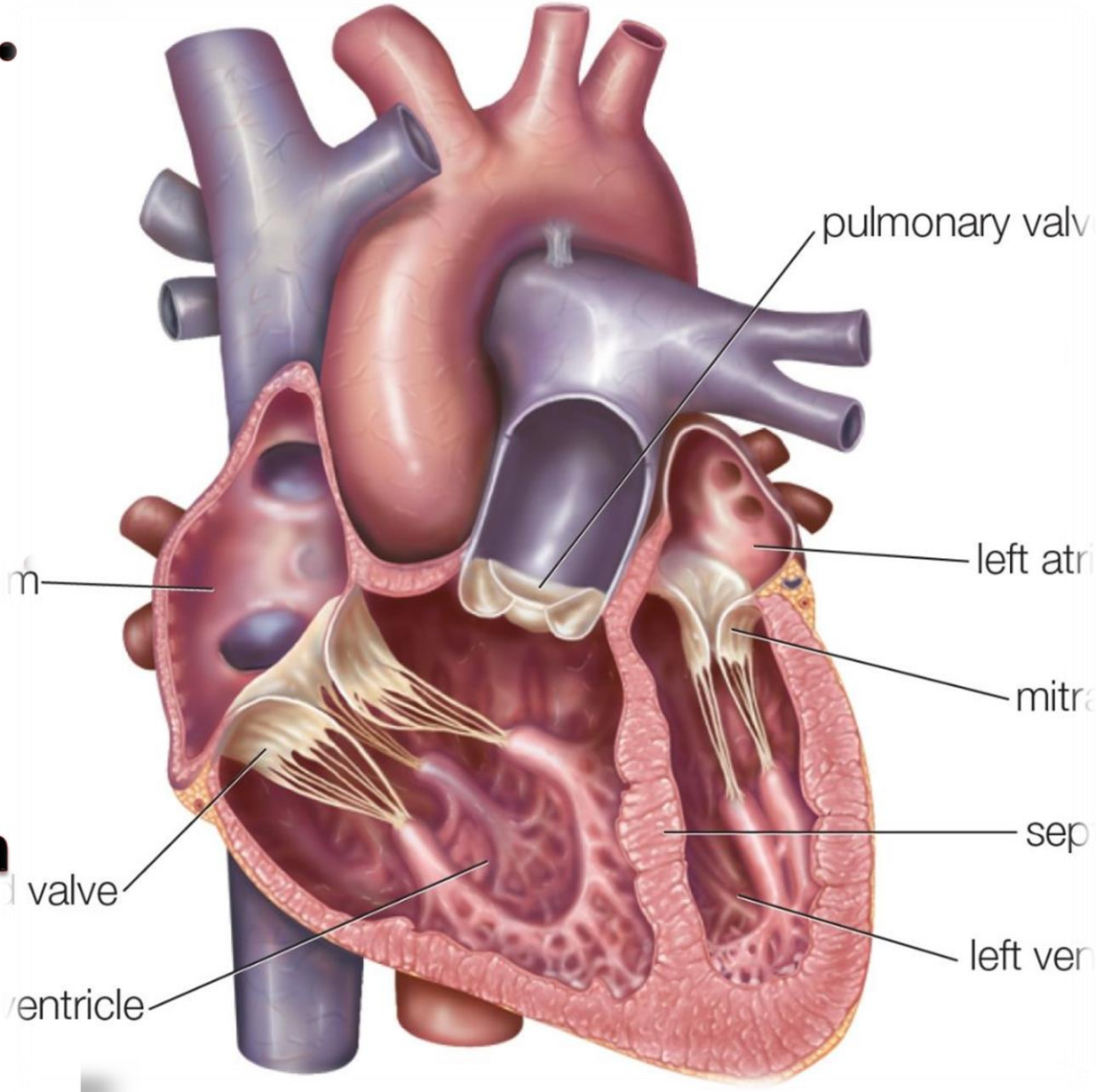


Papillary muscles

- Right ventricle accommodates three types of papillary muscles:
  1. Anterior papillary muscle
  2. Posterior papillary muscle
  3. Septal papillary muscle

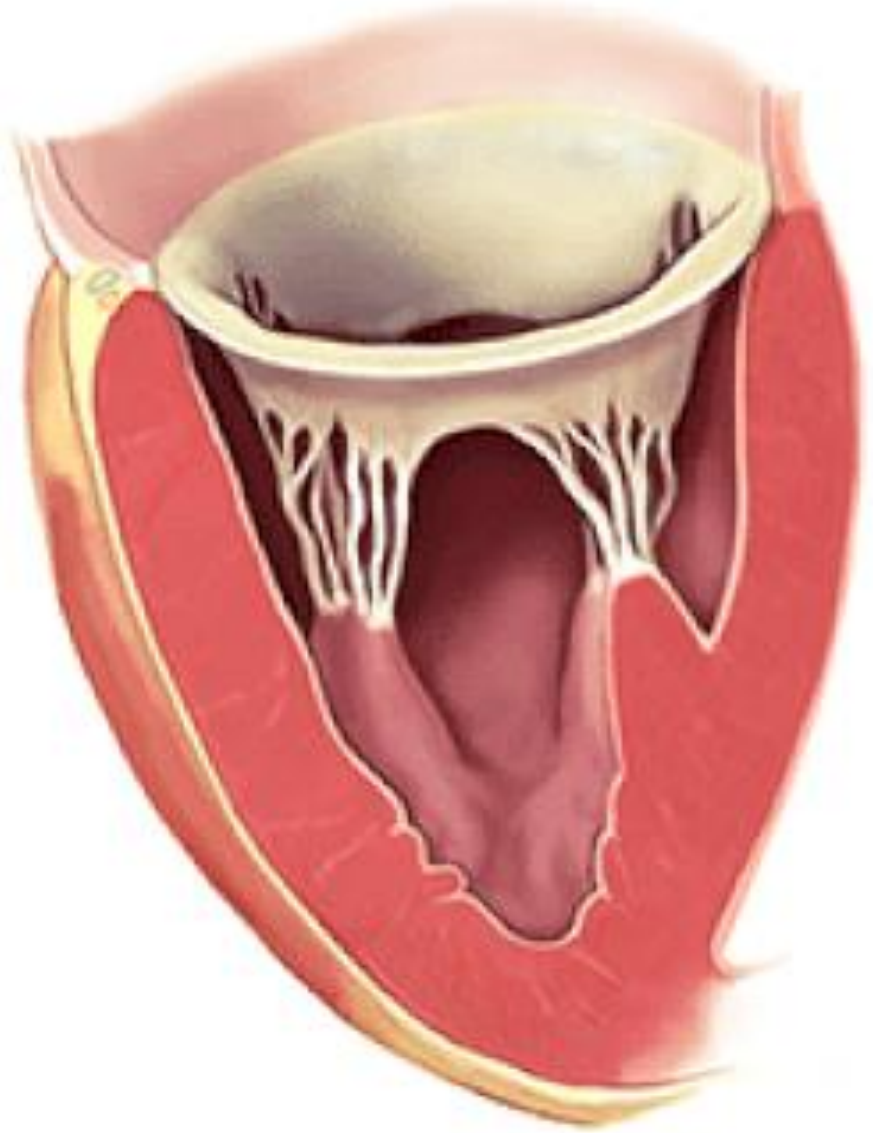
☠ They anchored by their base to the ventricles.

☠The apex attached to fibrous cords (chordae tendineae), which are in turn attached to the three tricuspid valve cusps.



Function Of papillary muscle

- ☠☠☠By contracting, the papillary muscles ‘pull’ on the chordae tendineae to prevent prolapse of valve leaflets during ventricular contraction to right atrium .




Thank you!