Pericardium & HEART

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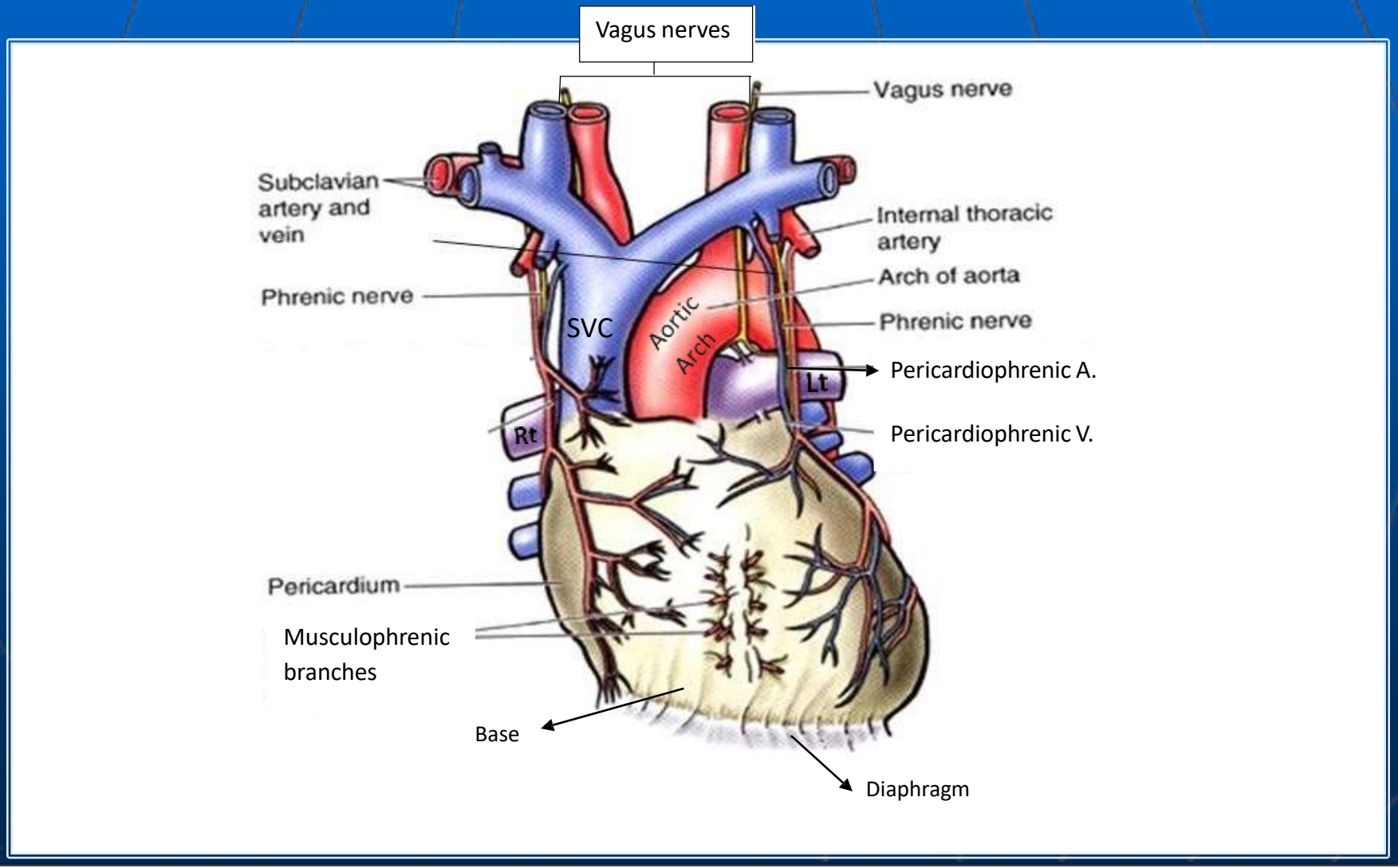
Pericardium

A double-walled **fibroserous** conical-shaped sac, inside middle mediastinum.

Enclose the heart and roots of its large vessels.



Pericardium – Sagittal section

Parts:

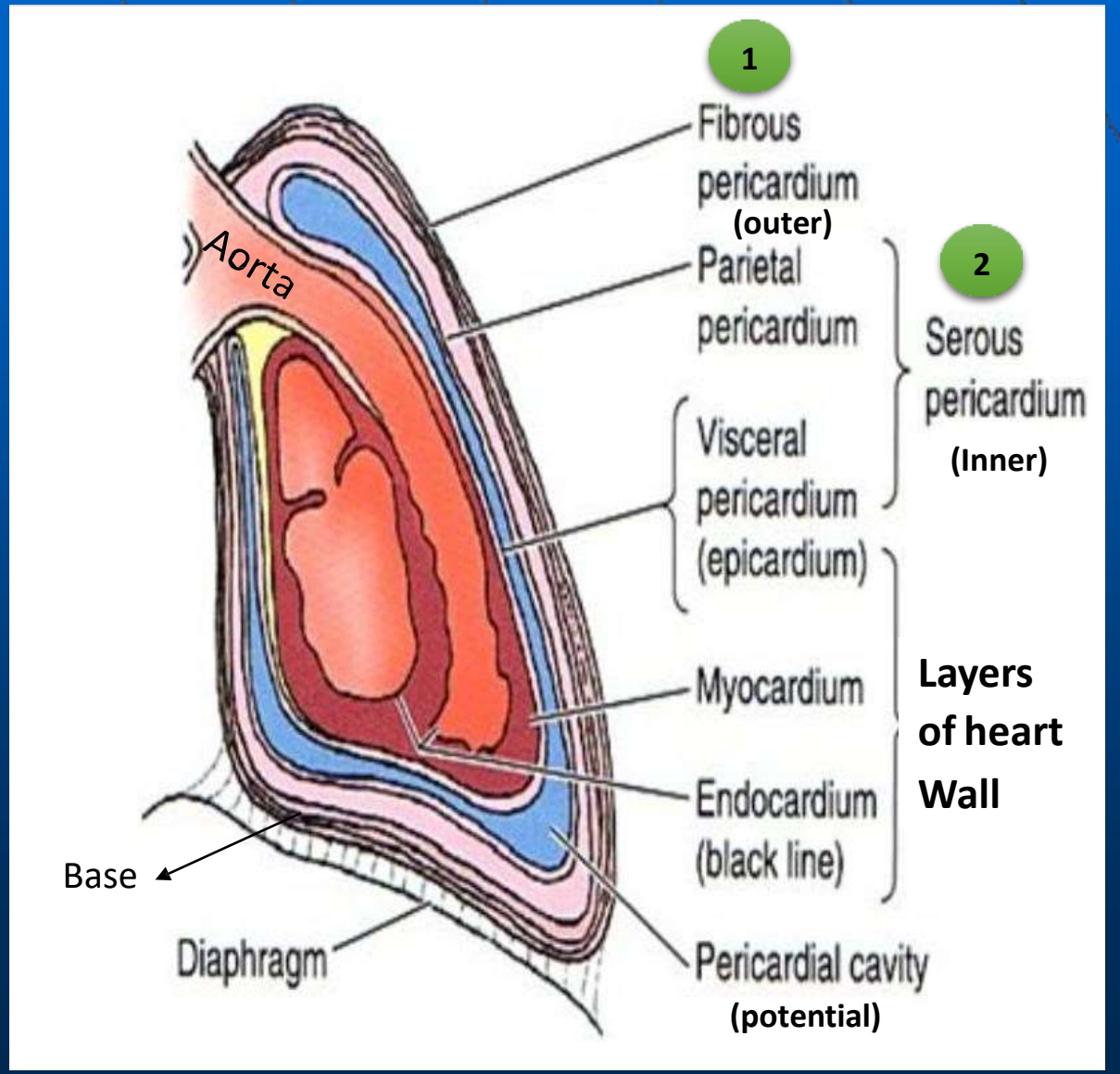
1. Fibrous pericardium.
2. Serous pericardium.

Fibrous pericardium

Conical-shaped fibrous sac.

- **Base: Attached to central tendon of diaphragm.**
- **Apex: Attached to roots of large vessels.**

➢ **Prevent overextension of the heart.**

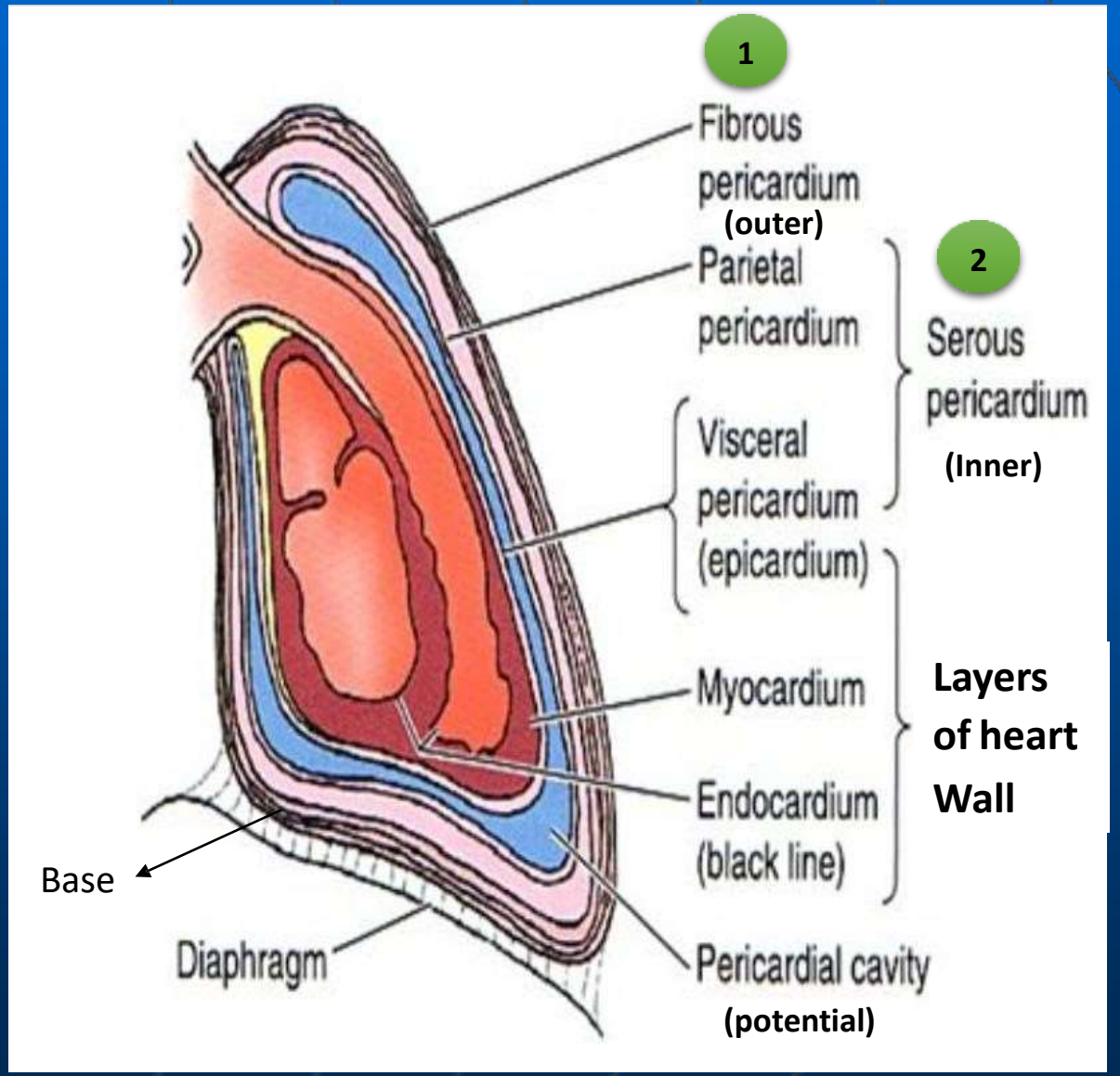


Serous pericardium

Complete serous sac invaginated by the heart. Like pleura by the lung.

- **2 layers:**
  - Parietal layer ➡ lines fibrous pericardium.
  - Visceral layer ➡ covers the heart as (Epicardium).
- **Pericardial cavity:**

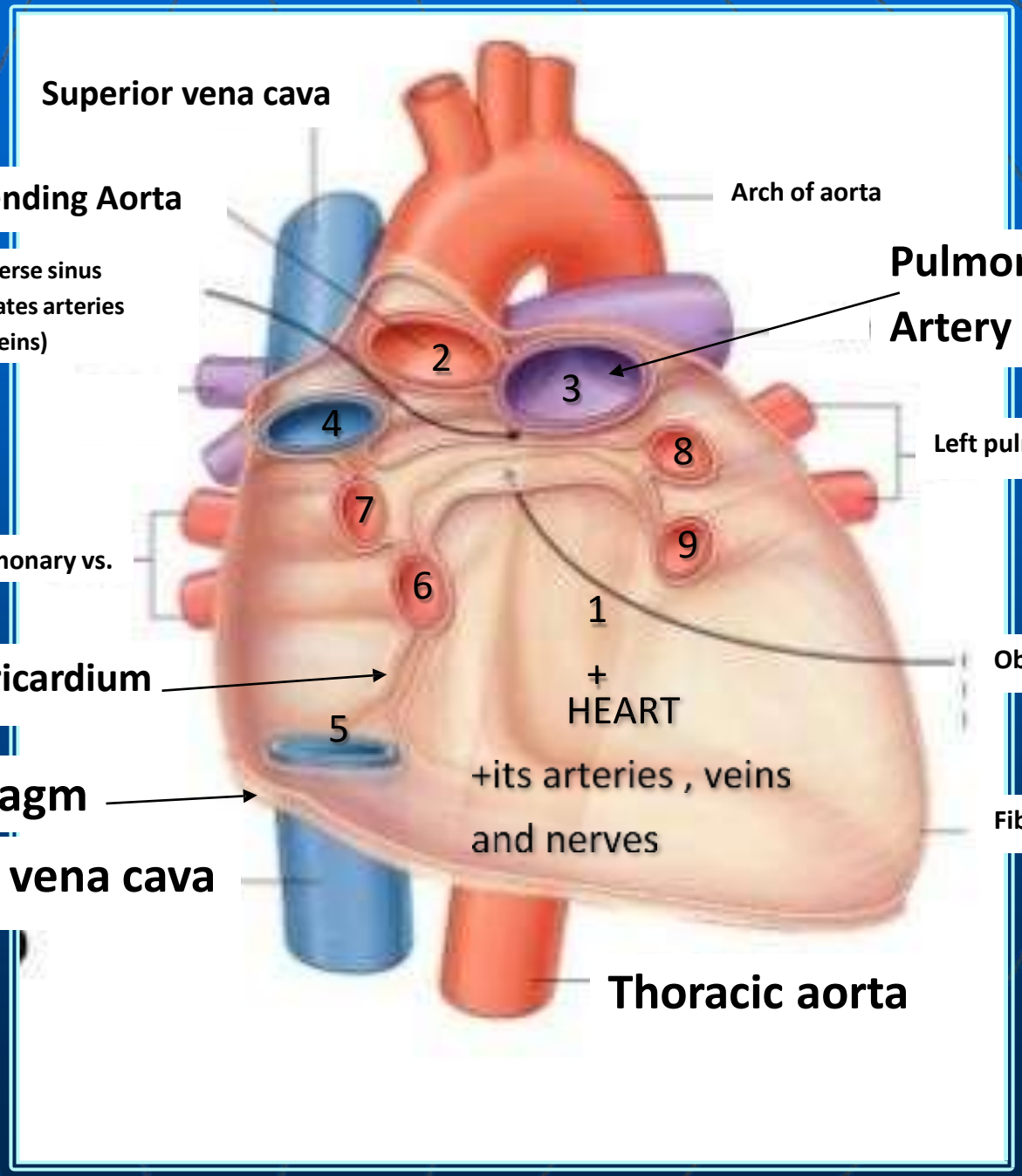
A potential space between 2 serous layers.



Contents of pericardium:

Contents:

1. Heart and all arteries, veins and nerves.
2. All Ascending aorta.
3. All Pulmonary Artery.
4. Last 2cm of SVC.
5. Last 2cm of IVC.
6. First part of the 4 pulmonary veins.
7. Transverse sinus.
8. Oblique sinus.



Heart

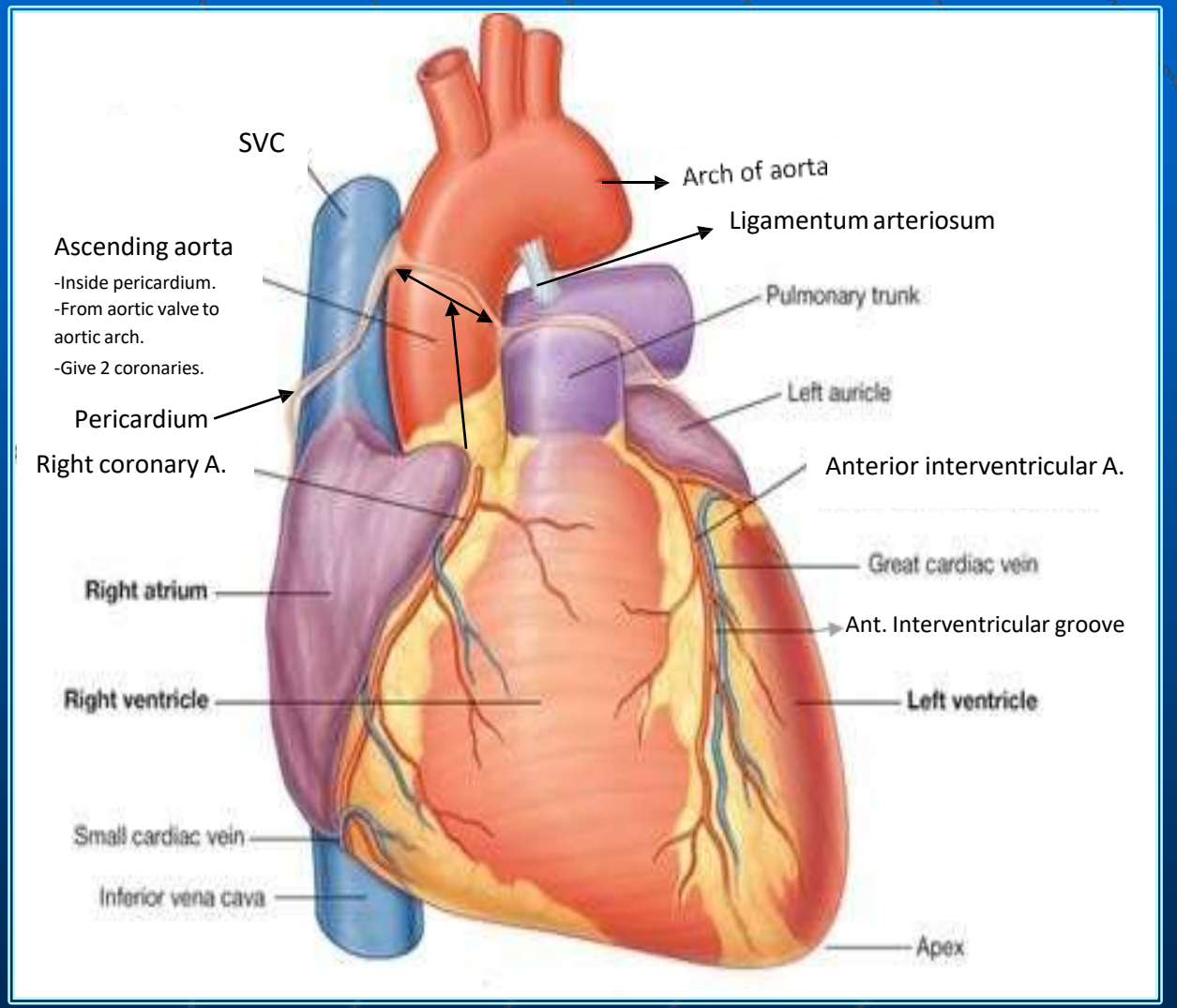
- Pyramidal-shaped muscular organ.
- About the size of the person's own fist.

Apex:

- Directed downward , forward and to the left. Located at the left 5th intercostal space about 9cm from midline.
- Form by the **left ventricle.**

Base:

- Directed posteriorly , form by left atrium.



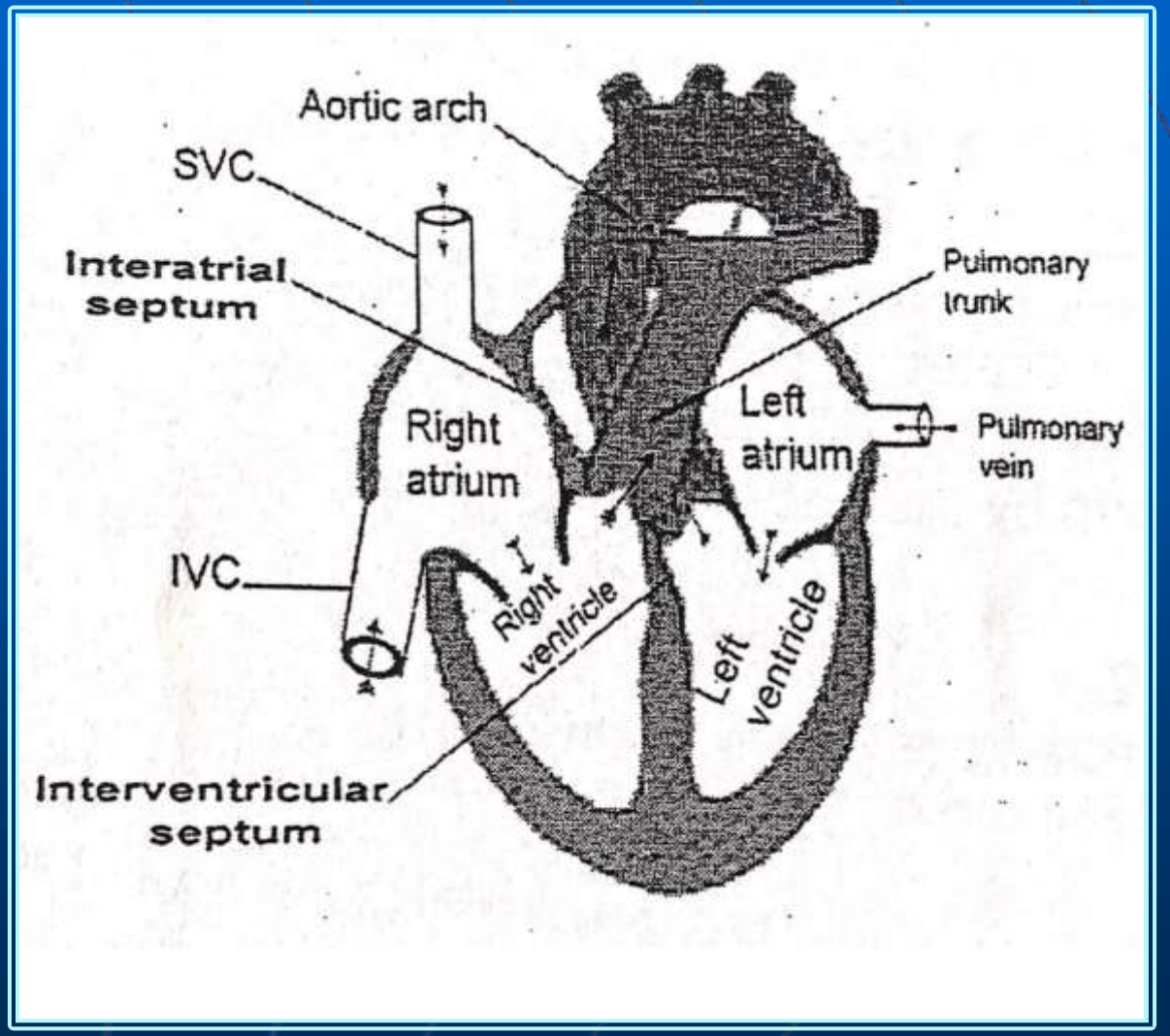
Chambers of heart

Form of 4 chambers:

- 2 atriums above.
- 2 ventricles below.

- Atriums separated from inside by the interatrial septum.

- Ventricles separated from inside by the interventricular septum.

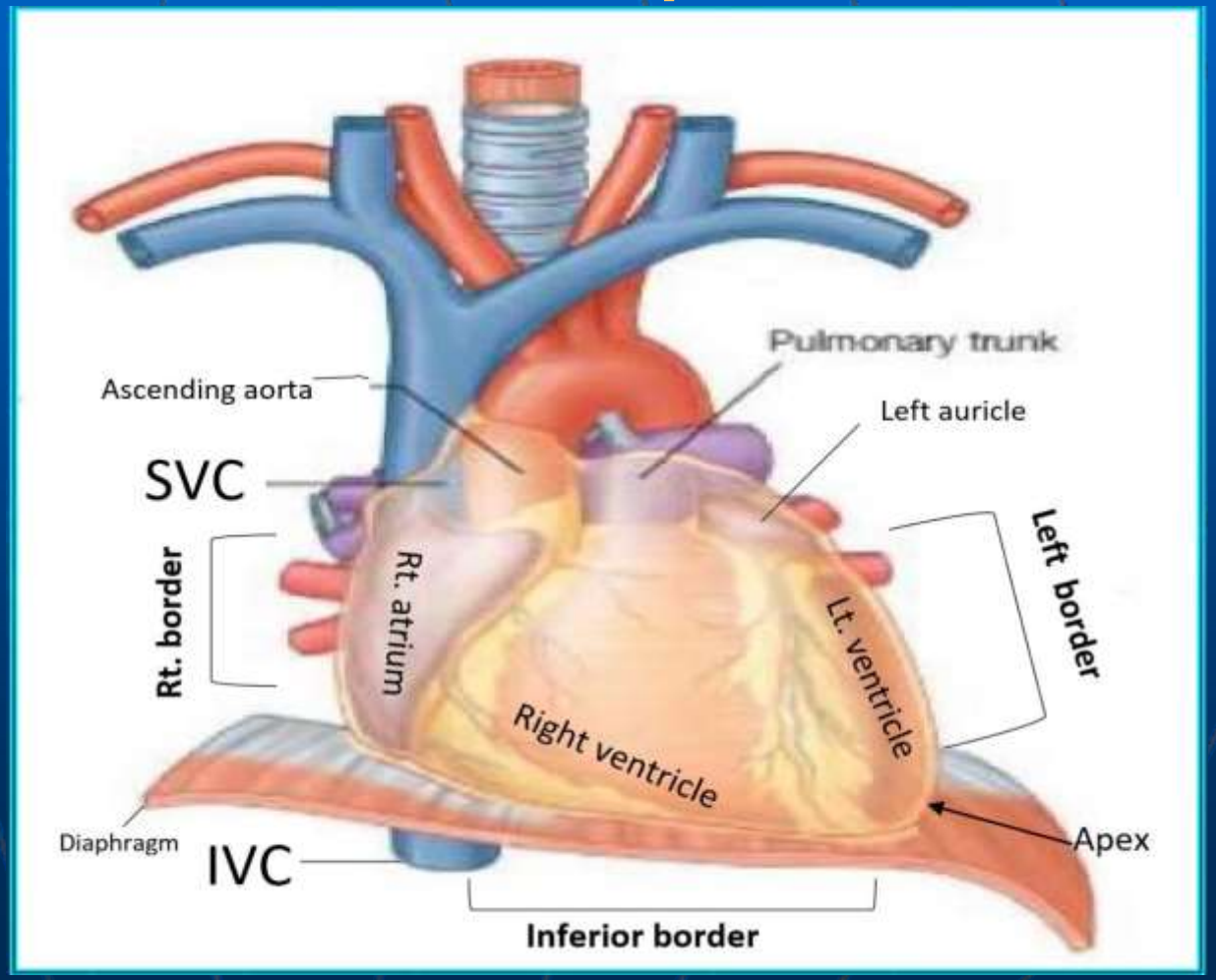


Borders of the Heart

Due to the rotation of the heart 45° to the left, the right side becomes anterior and the left side becomes posterior.

Has 3 borders:

- Right: Right atrium.
- Left: left ventricle.
- Inferior: Right ventricle.



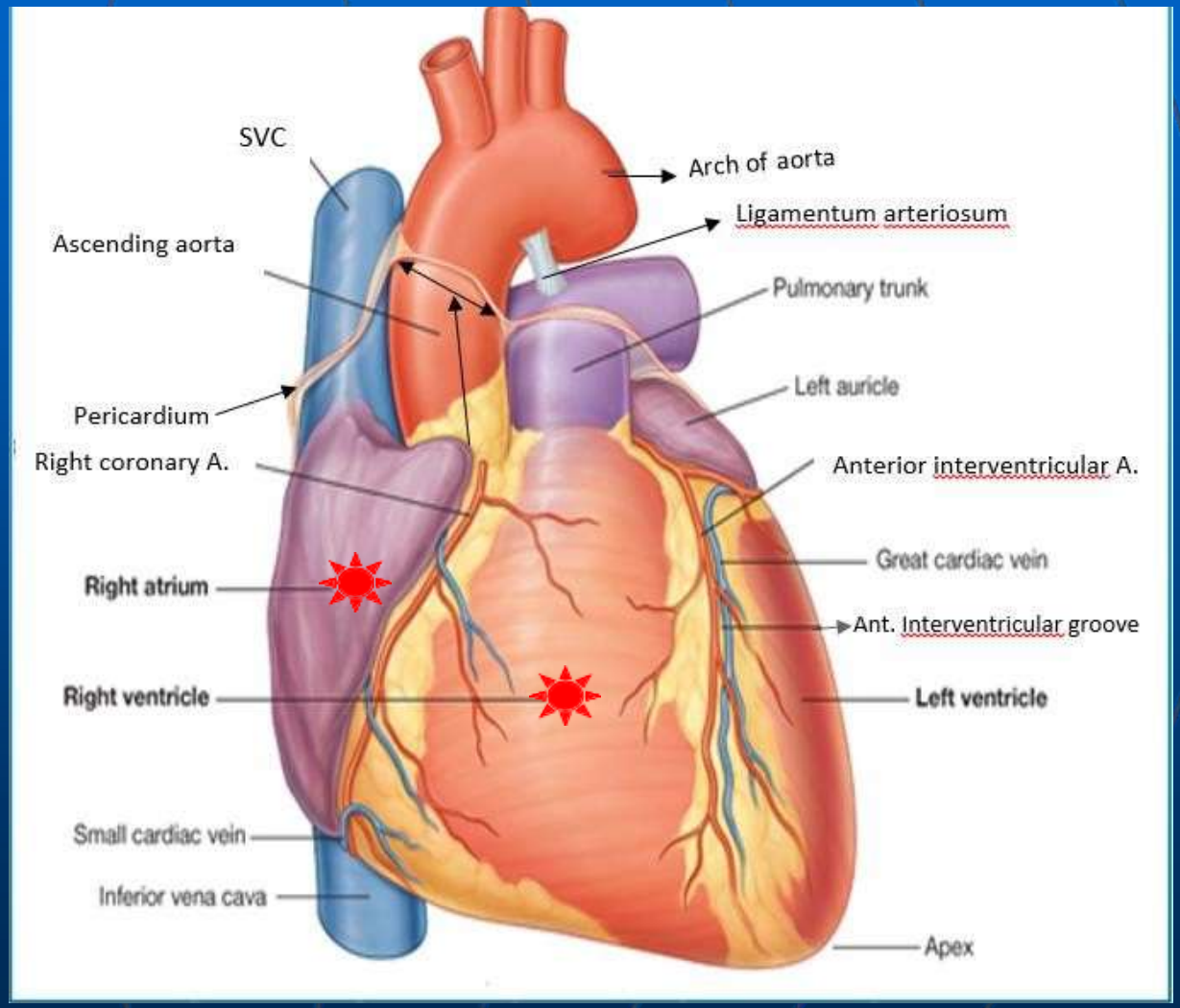
Surfaces of the heart

1. Anterior surface.
2. Inferior surface.
3. Base.

Anterior (Sternocostal)

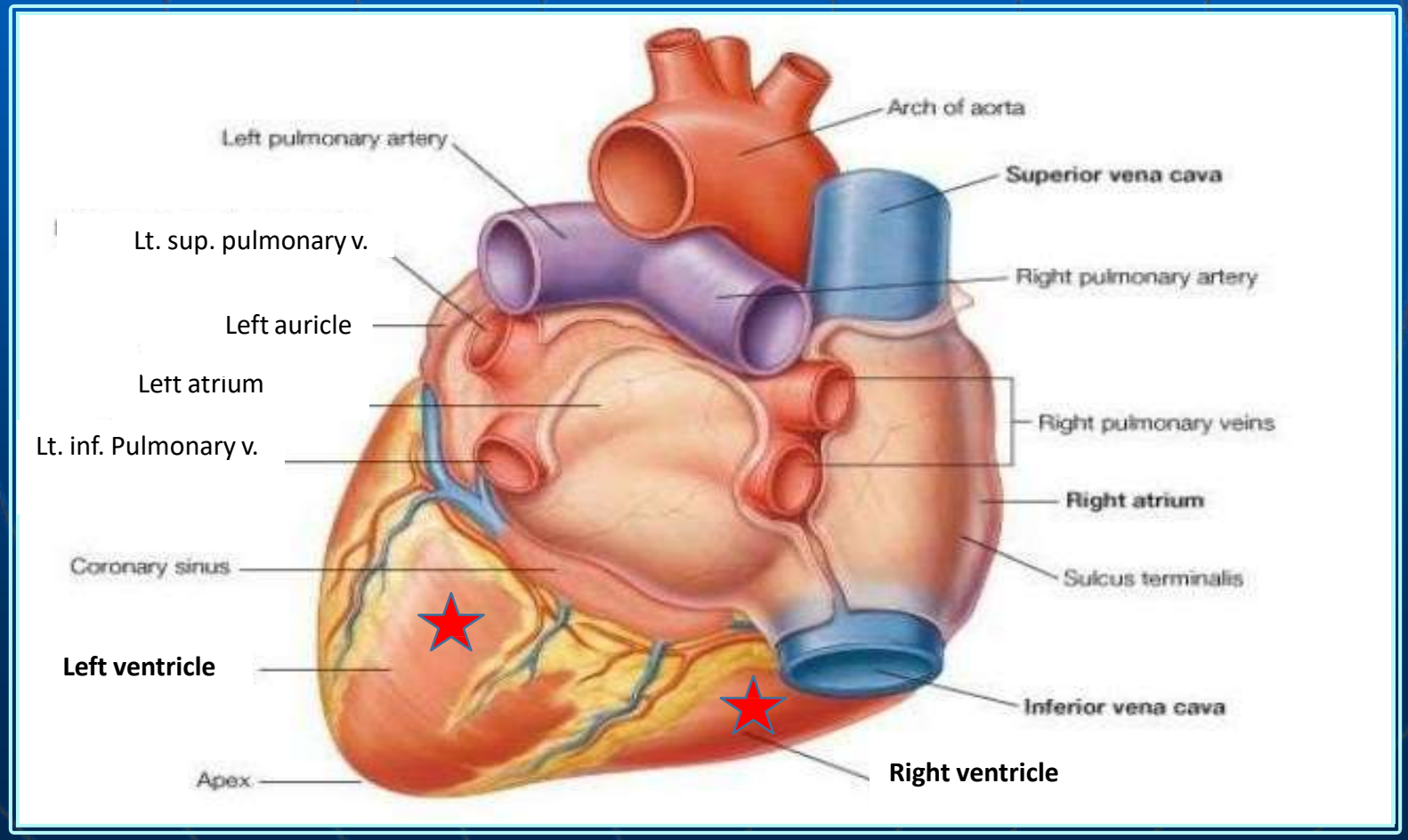
Form by

- Right ventricle.
- Right atrium.



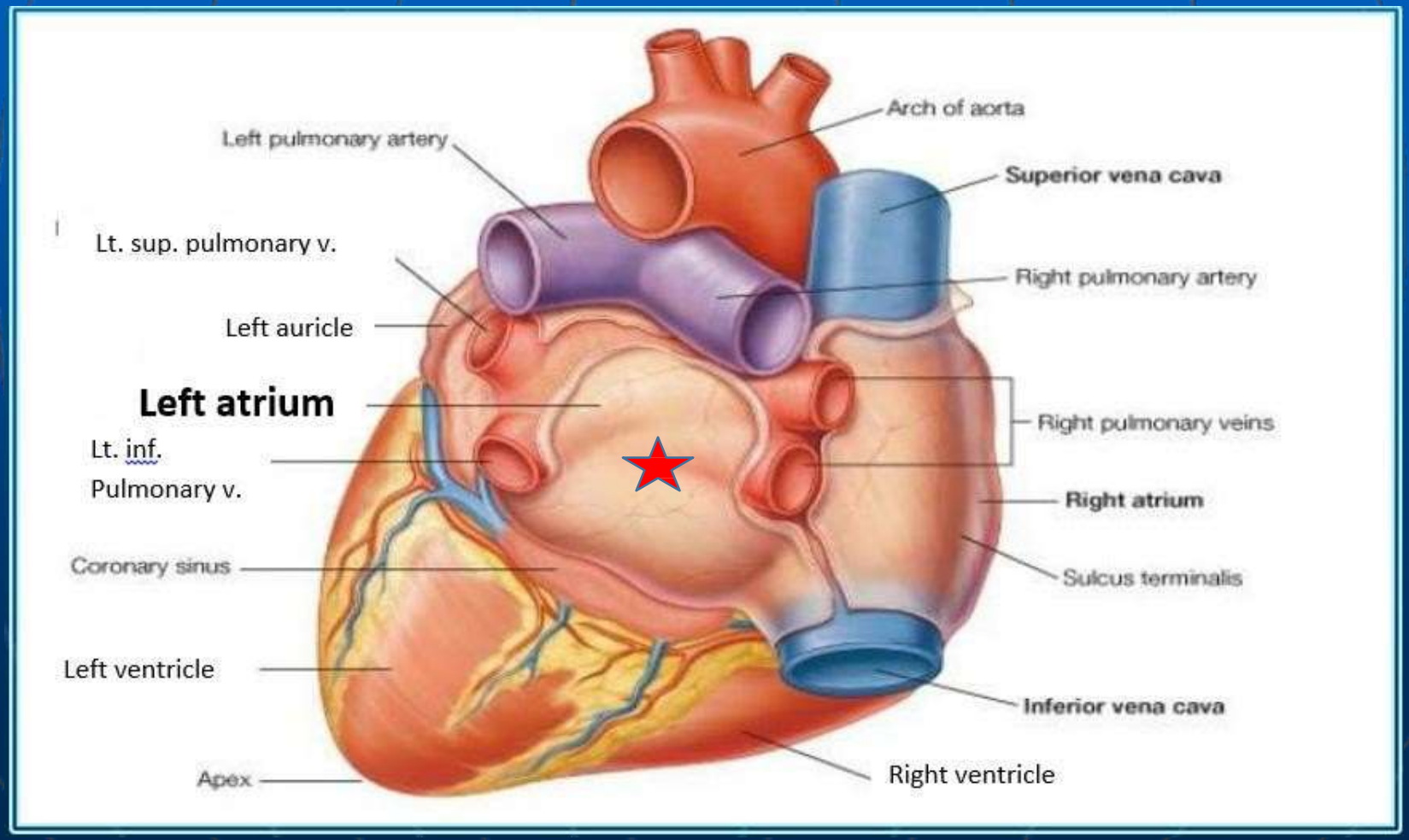
Inferior surface of the heart
(Diaphragmatic surface)

- Form mainly by left ventricle and right ventricle.



Base of the heart

- Directed posterior , opposite the apex.
- Form by **left atrium.**

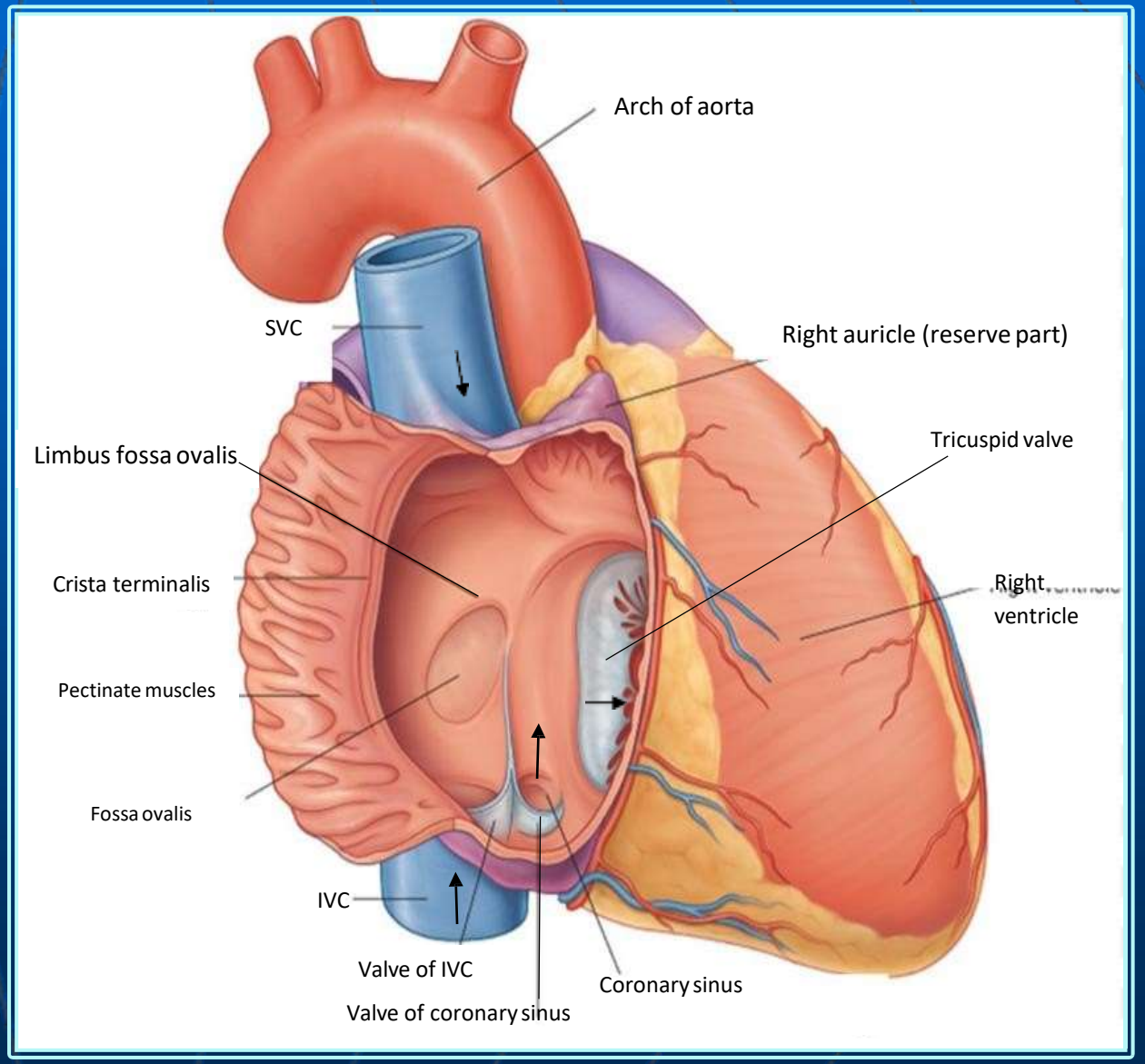


Interior of right Atrium

- Receives venous blood from the whole body by:
  1. SVC from upper ½
  2. IVC from lower ½
  3. Coronary sinus (coronary vein) from the heart itself.
- Send blood to right ventricle by Tricuspid valve.

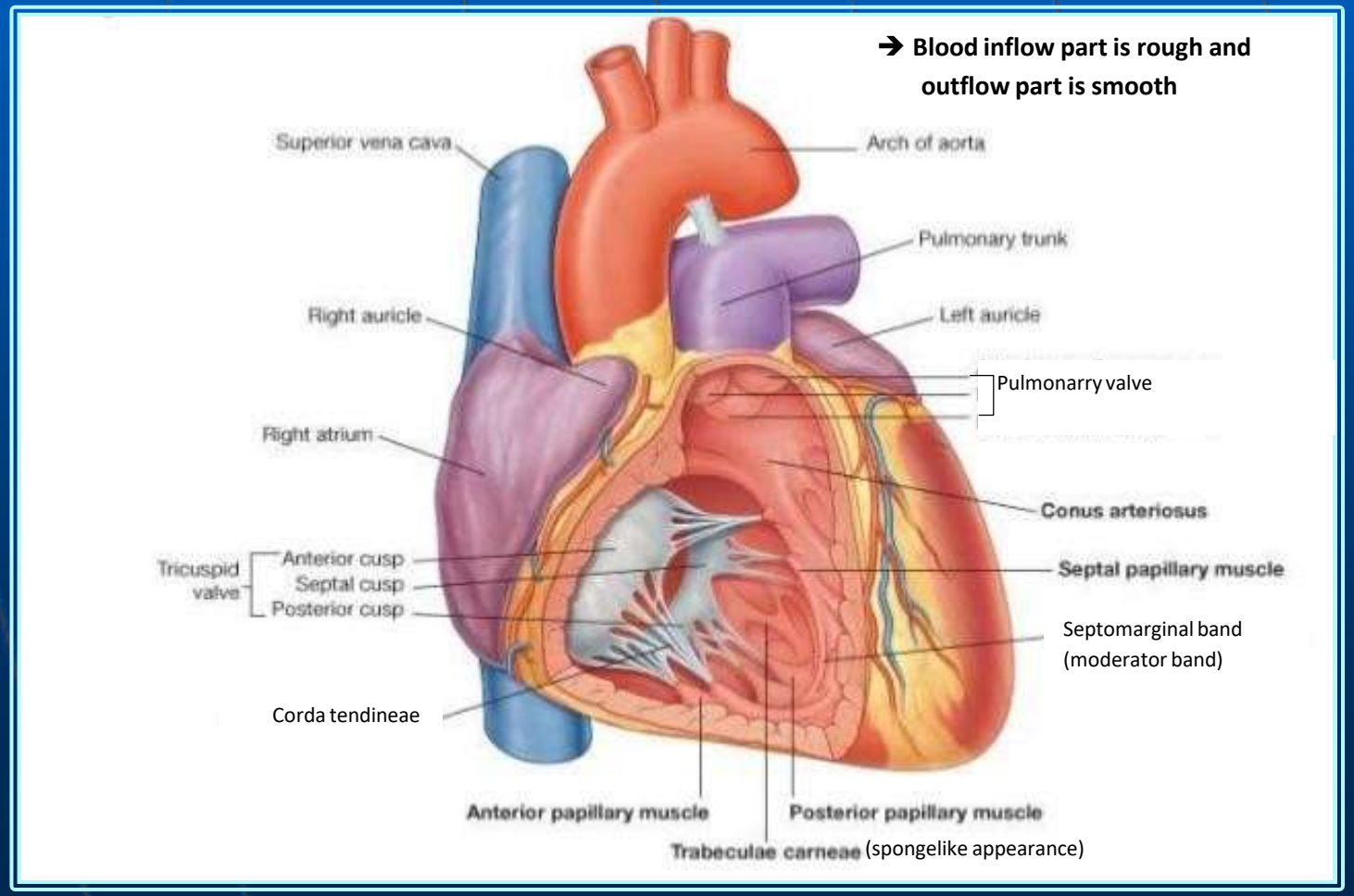
<u>Has 2 walls:</u>

- Anterior wall, rough.
  - Pectinate muscles
  - Crista terminalis
- Posterior wall , smooth
  - -Fossa ovalis
  - -SA Node



Interior of right Ventricle -1

- Receives blood by **T**ricupsid valve.
- Send blood to both lungs via **P**ulmonary valve.
- Wall thicker than right atrium.



Interior of right Ventricle -2

Has 2 walls:

- Anterior wall (inflow part).

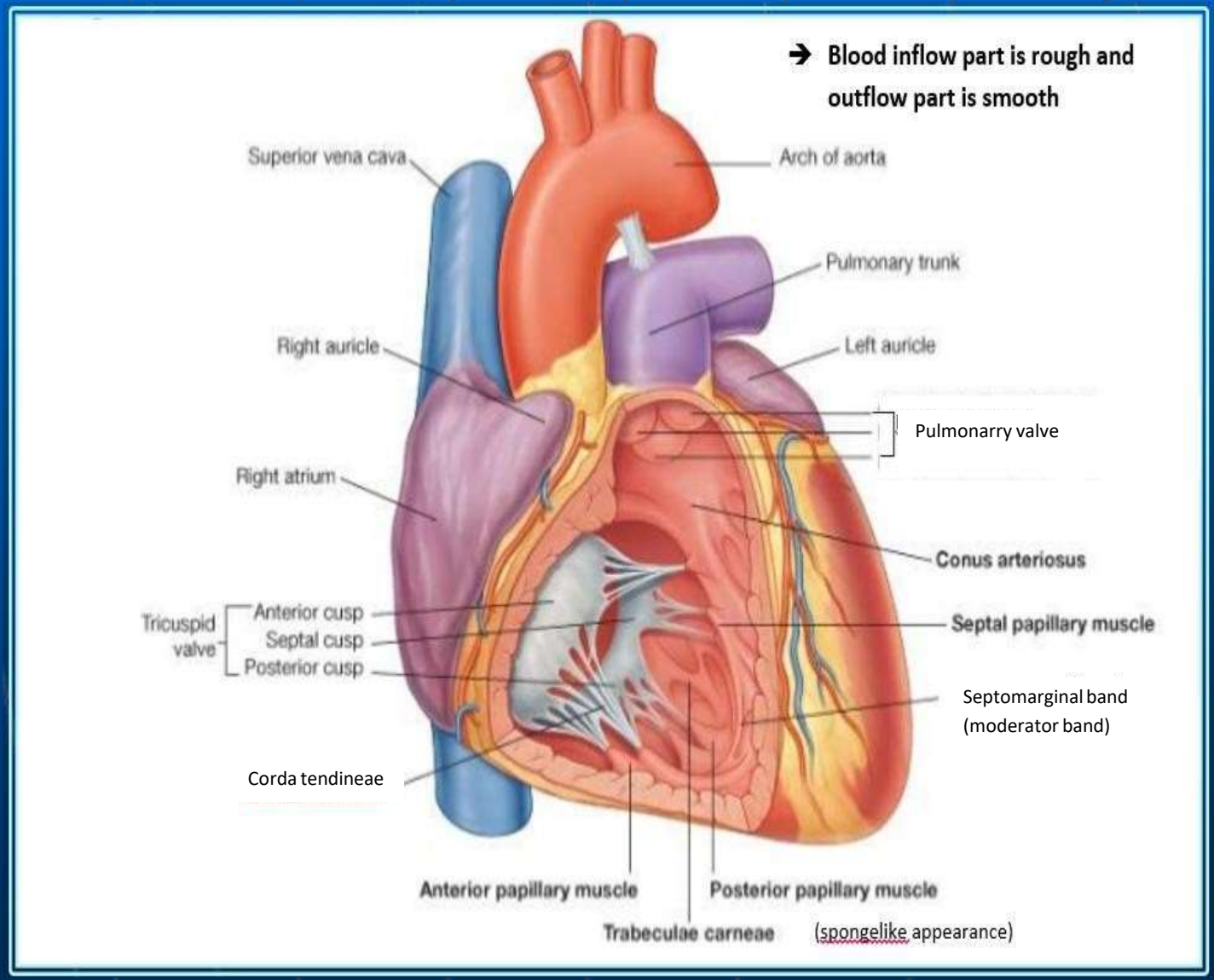
Rough with a network of projecting cardiac muscle bundles. E.g.

- Trabeculae carnea.
- Septomarginal band.
- Papillary muscles.

- Posterior wall, (outflow part).

Smooth in part. E.g.

- Infundibulum of pulmonary artery.

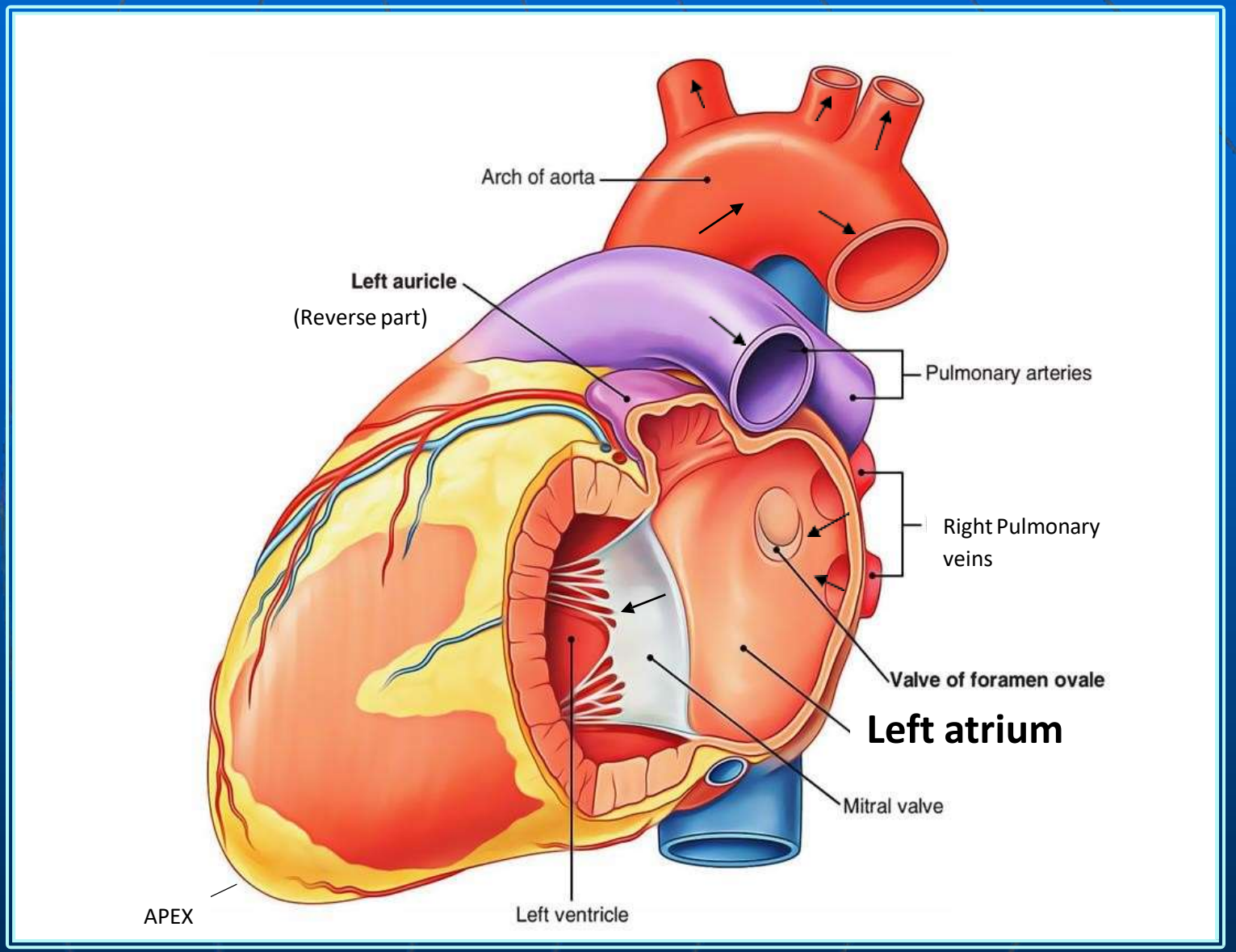


Left Atrium

- Form base of the heart.
- <u>Receive blood by:</u>
  4 pulmonary veins.
- <u>Send blood by</u> : **B**icuspid valve to the left ventricle.

- **<u>Ant. Wall:</u>** Rough, especially its auricle.

- **<u>Post. Wall:</u>** Smooth.



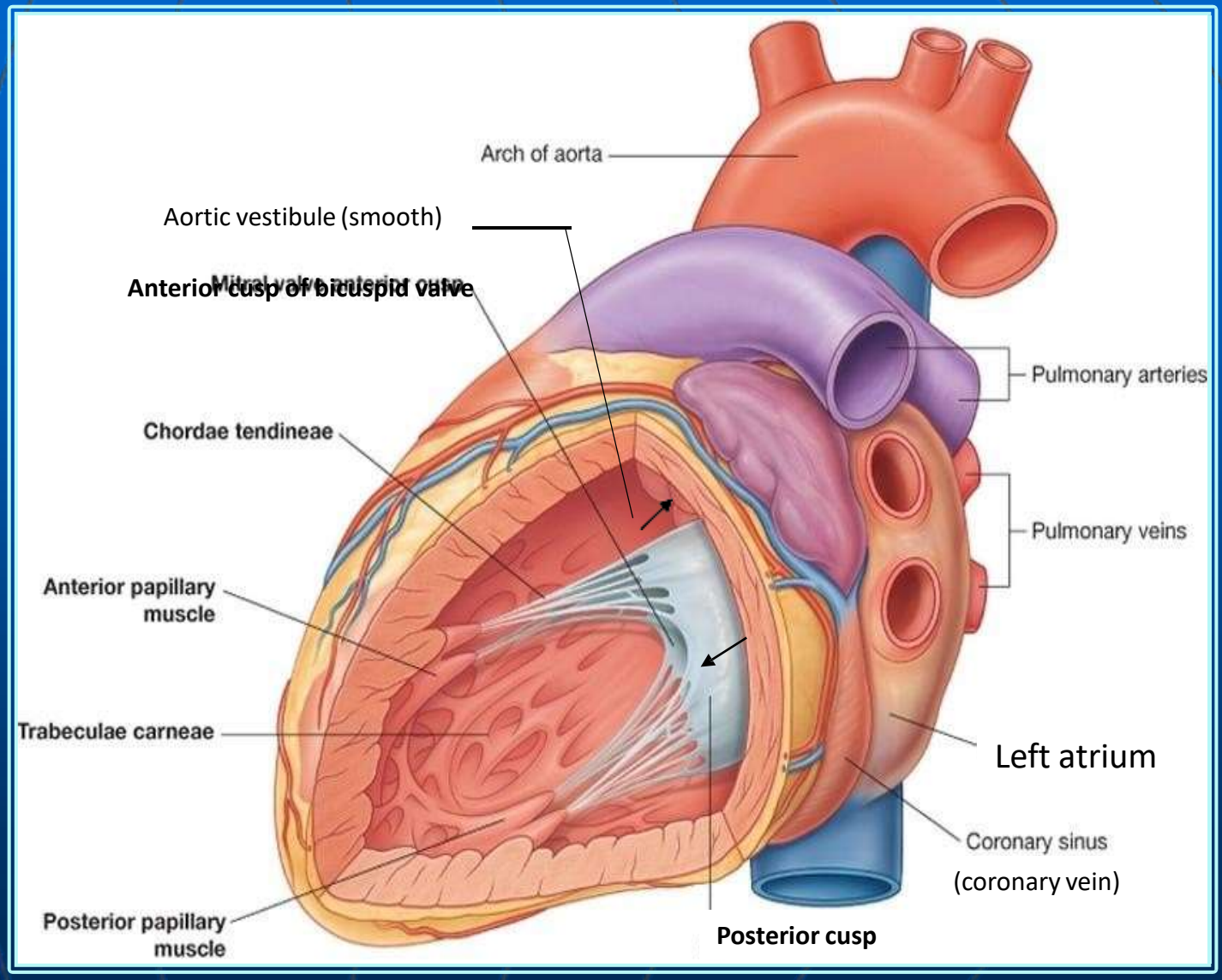
Left Ventricle

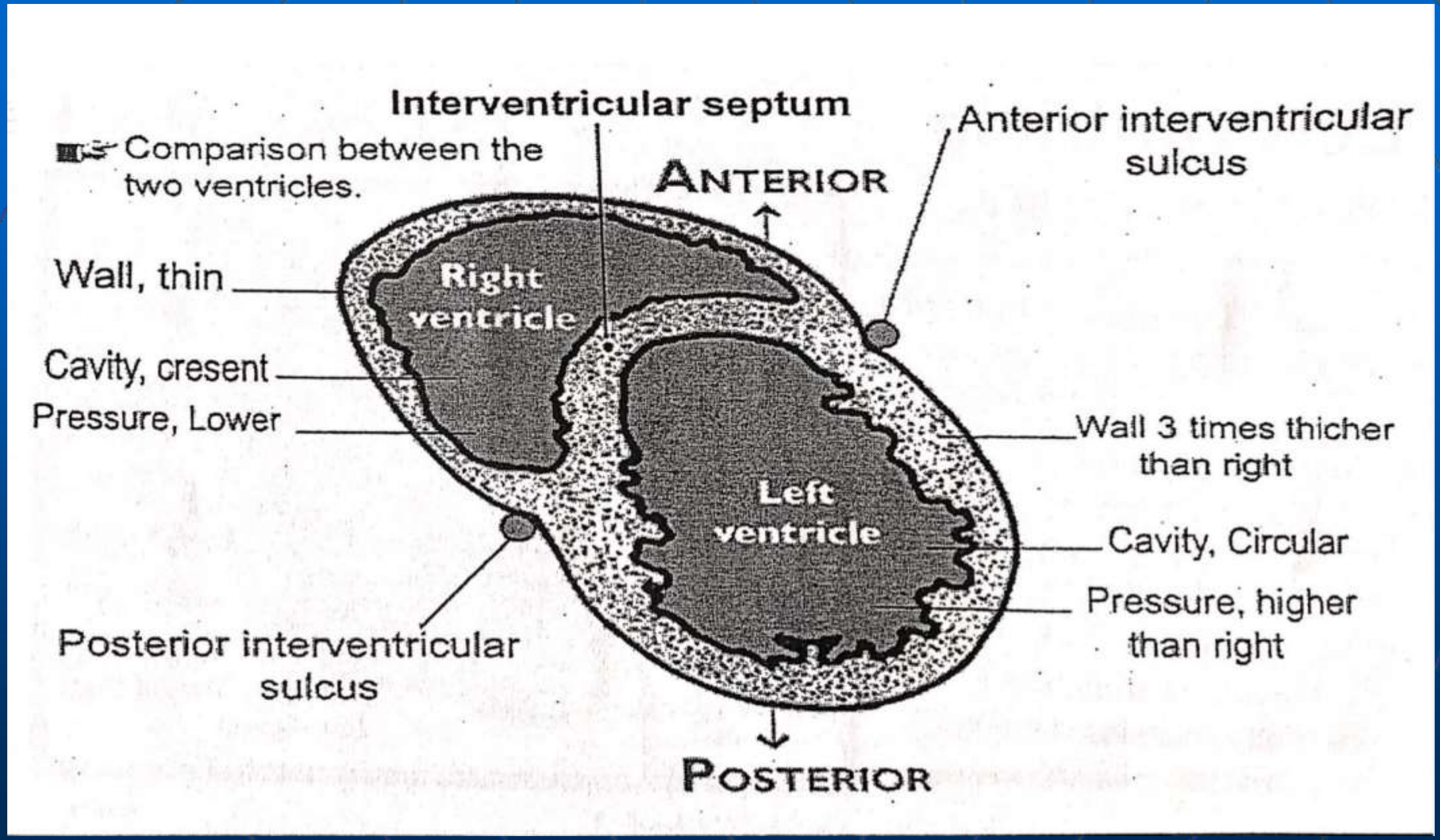
- Main chamber of the heart.
- Form apex of the heart.
  - Receive blood by: Bicupsid valve.
  - Send blood by : Aortic valve.

- Has thicker wall.

- **Ant. Wall** (I.V septum) : Smooth in part.
  -Aortic vestibule.

- **Post. Wall:** Rough.
  -Trabeculae carnae.
  -Papillary muscles.



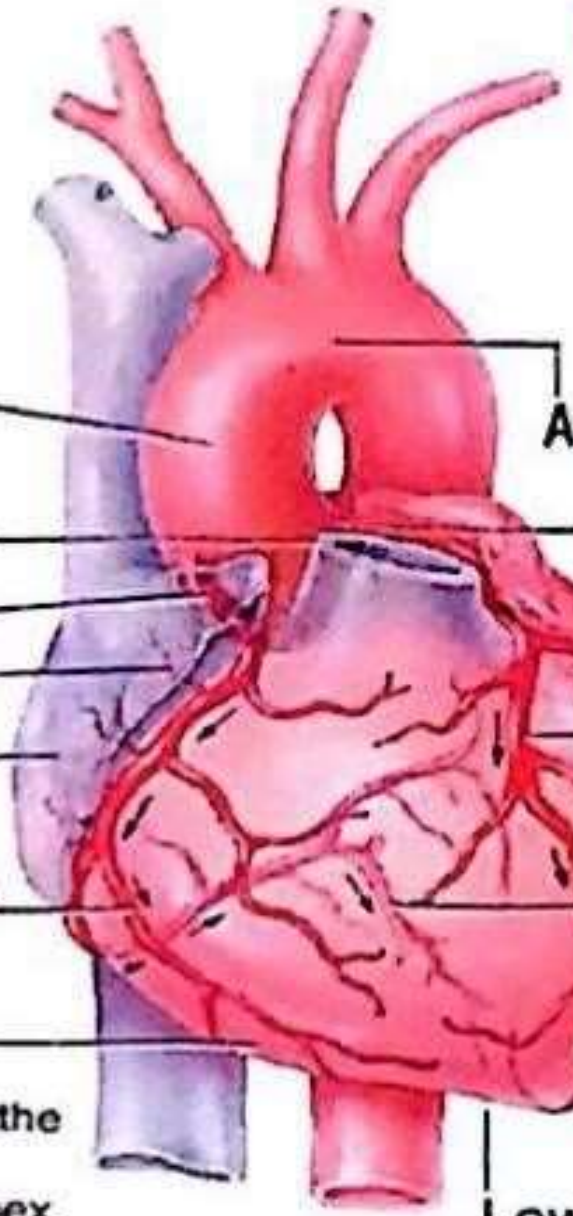

Comparison between the two ventricles.
Interventricular septum
ANTERIOR
Anterior interventricular sulcus
Wall, thin
Right ventricle
Cavity, cresent
Pressure, Lower
Wall 3 times thicher than right
Left ventricle
Cavity, Circular
Pressure, higher than right
Posterior interventricular sulcus
POSTERIOR

Rt. coronary:

- From ascending aorta.
- Smaller than the Left
- Pass in coronary sulcus between PT and Rt auricle.
- Pass at inferior surface.
- Branches 1- 4
  number 2 in 60% of people

Left coronary:

- From ascending aorta
- Larger than the right
- Pass in coronary sulcus between pulmonary trunk and left auricle.
- Pass at inferior surface.
- Branches 1- 3.
  Number 2, main artery to left ventricle



Ascending aorta

Arch of aorta

Pulmonary trunk

Left coronary A. 1

Left auricle

1 Right coronary A.

2 SA nodal artery

Circumflex branch 2

Right atrium

Ant. interventricular branch 3

3 Marginal branch

Post. interventricular branch 4

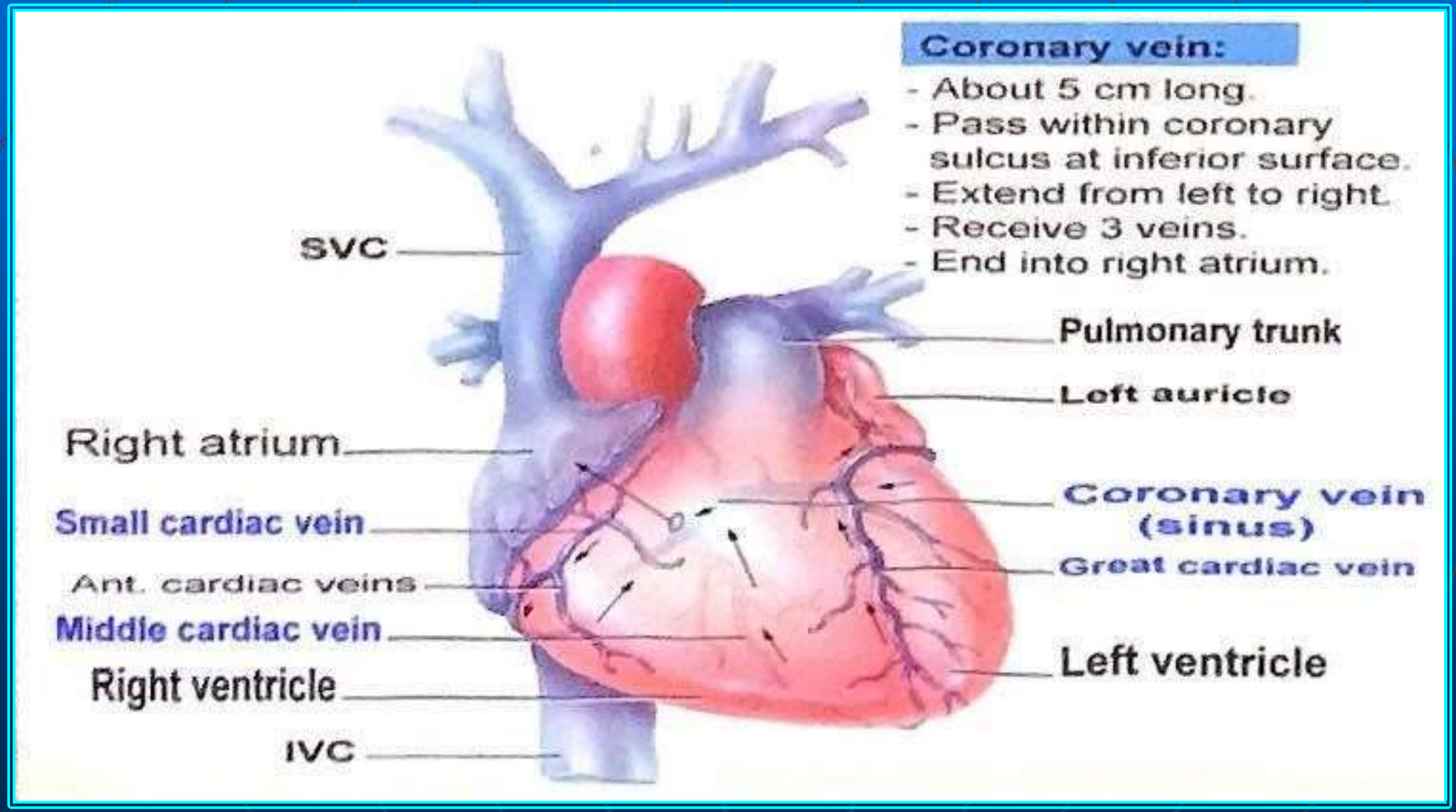
Right ventricle

Left ventricle

APEX

Lower border

- Both anastomose freely in the heart.
- Both anastomose at the apex.


Coronary vein:
- About 5 cm long.
- Pass within coronary sulcus at inferior surface.
- Extend from left to right.
- Receive 3 veins.
- End into right atrium.
SVC
Pulmonary trunk
Left auricle
Right atrium
Coronary vein (sinus)
Small cardiac vein
Great cardiac vein
Ant. cardiac veins
Middle cardiac vein
Left ventricle
Right ventricle
IVC

Cardiac conduction System

- A network of a modified cardiac muscle fibers specialized in conduction only.
- It is **autorhythmic** , it constantly initiates and coordinates atrial and ventricular muscle contraction.
- Insulated from myocardium by a sheath of connective tissue
- Establishes a **unidirectional** pathway of excitation signals and contraction.

- <u>Organized into **4** basic components:</u>