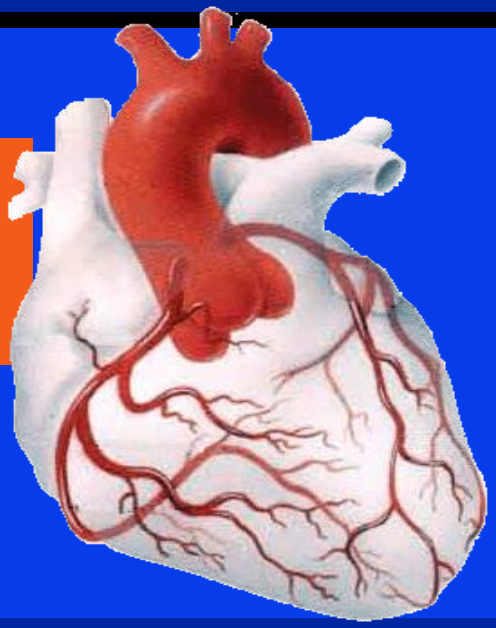
BLOOD SUPPLY OF THE HEART

Dr Jamila EL medany

Dr Essam Salama

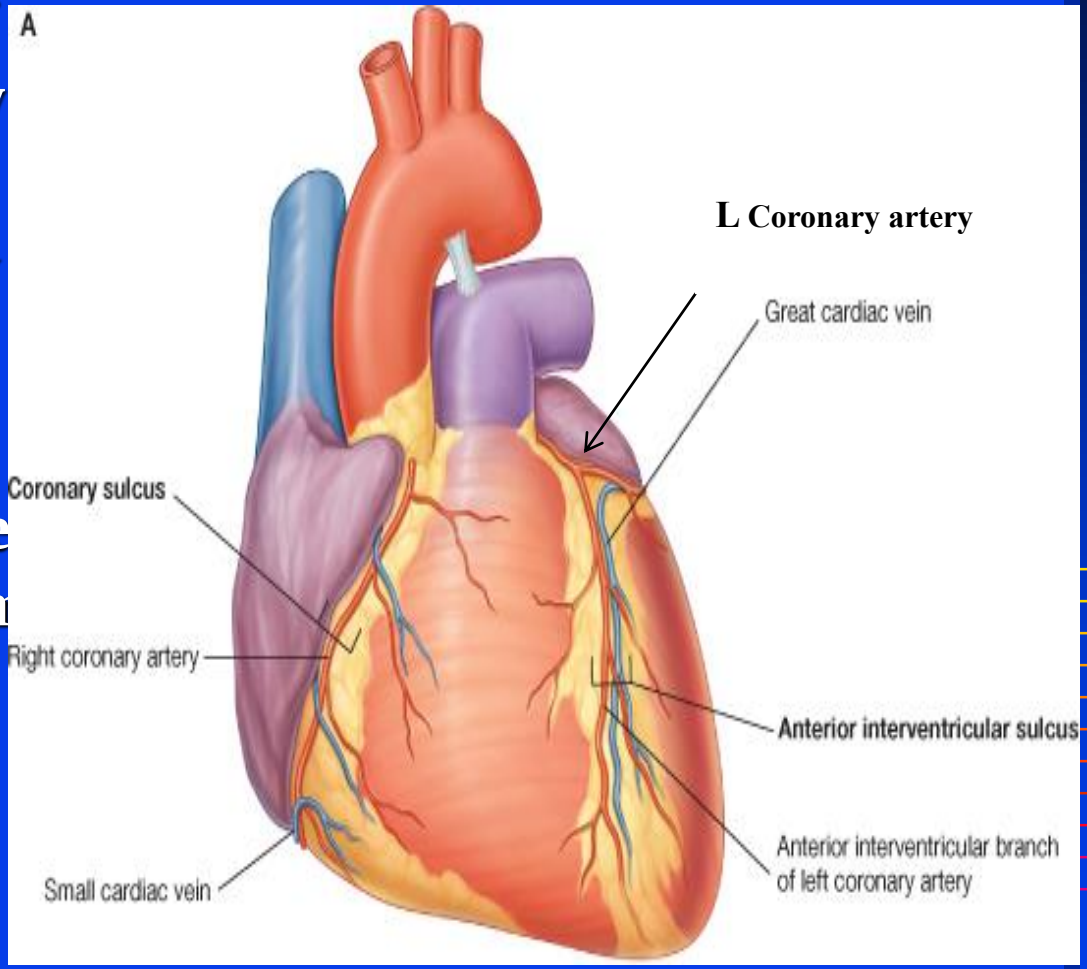


Objectives

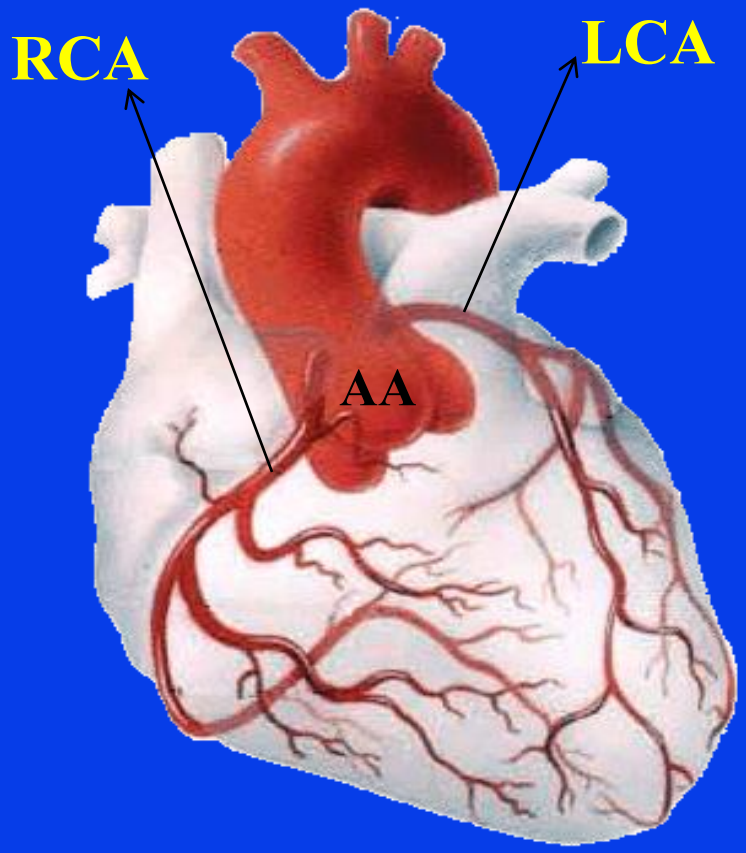
- At the end of the lecture the student should be able to know about;
- The arterial supply of the cardiac muscle regarding (origin, course, distribution and branches).
- The coronary anastmosis.
- The arterial supply to the conducting system of the heart.
- The venous drainage of the heart regarding (origin, tributaries and termination).

Arterial Supply

- The arterial supply of the heart is provided by **Coronary Arteries :**
  - **Right Coronary artery**
  - **Left Coronary artery**
  - **They are distributed over the cardiac surface within the subepicadium connective tissue.**



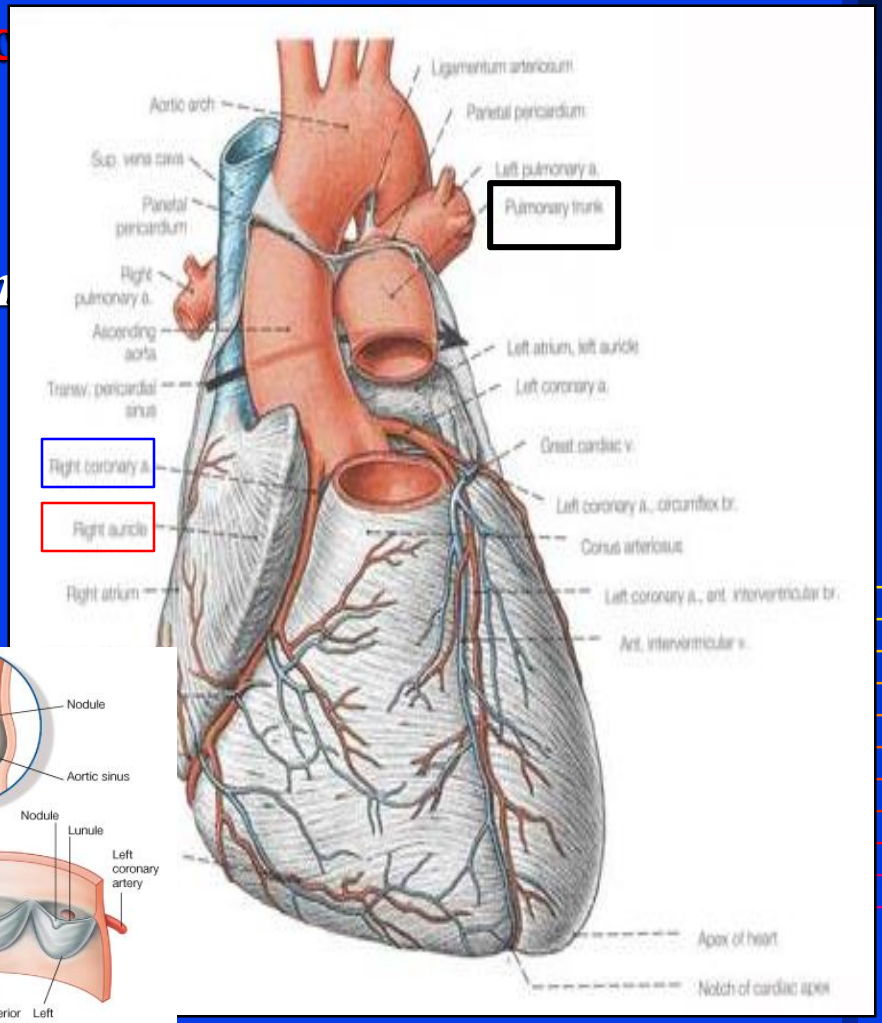
Origin of Coronary Arteries

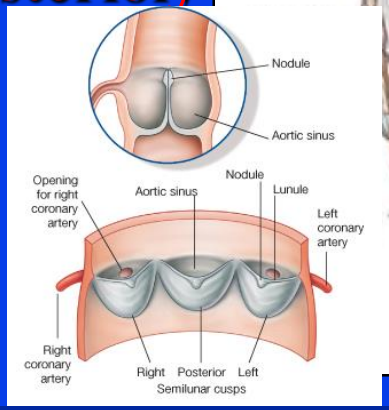


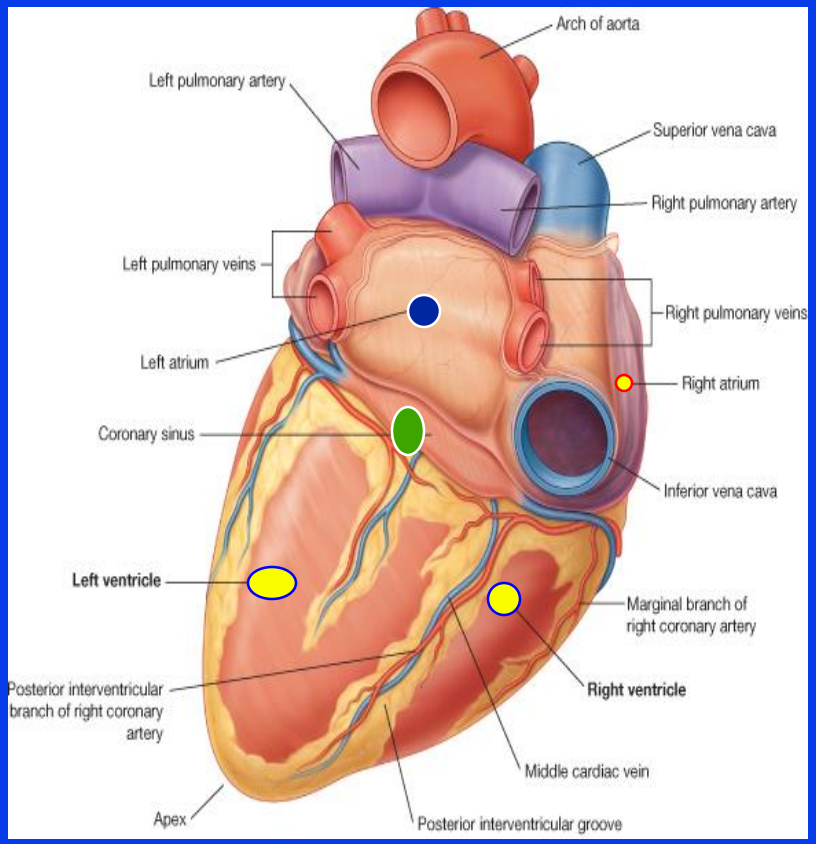
- ***From*** **the initial part of the *Ascending Aorta.* (Immediately above the aortic valve).**

Right Coronary Artery

- Arises from the **anterior aortic sinus** of the ascending aorta.
- Descends in the right **atrioventricular groove** *between the Right Auricle and the Pulmonary trunk.*
- At the inferior border of the heart it is **continuous posterioly** to anastomose with the left coronary.

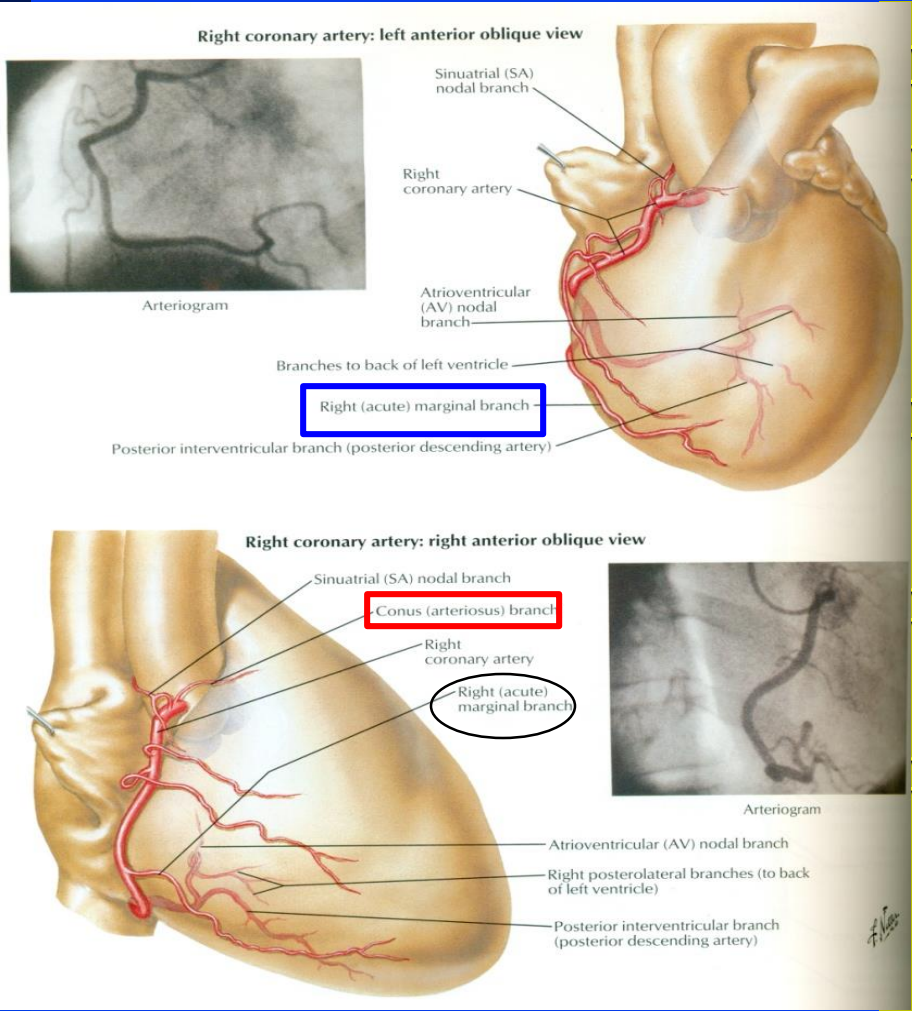




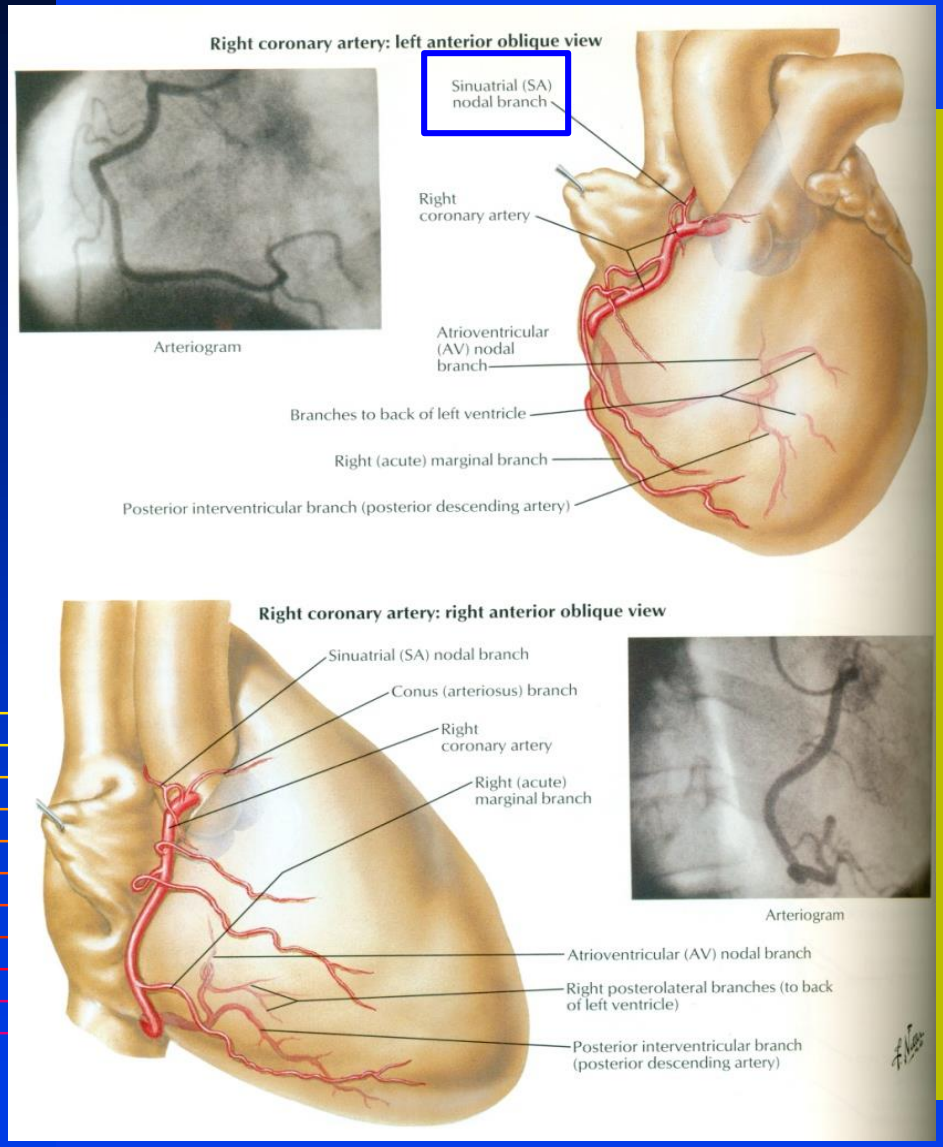


- **(RCA) Supplies:**
- **Right atrium,**
- **Right ventricle,**
- **part of Left Atrium,**
- **Left ventricle & Atrioventricular septum.**

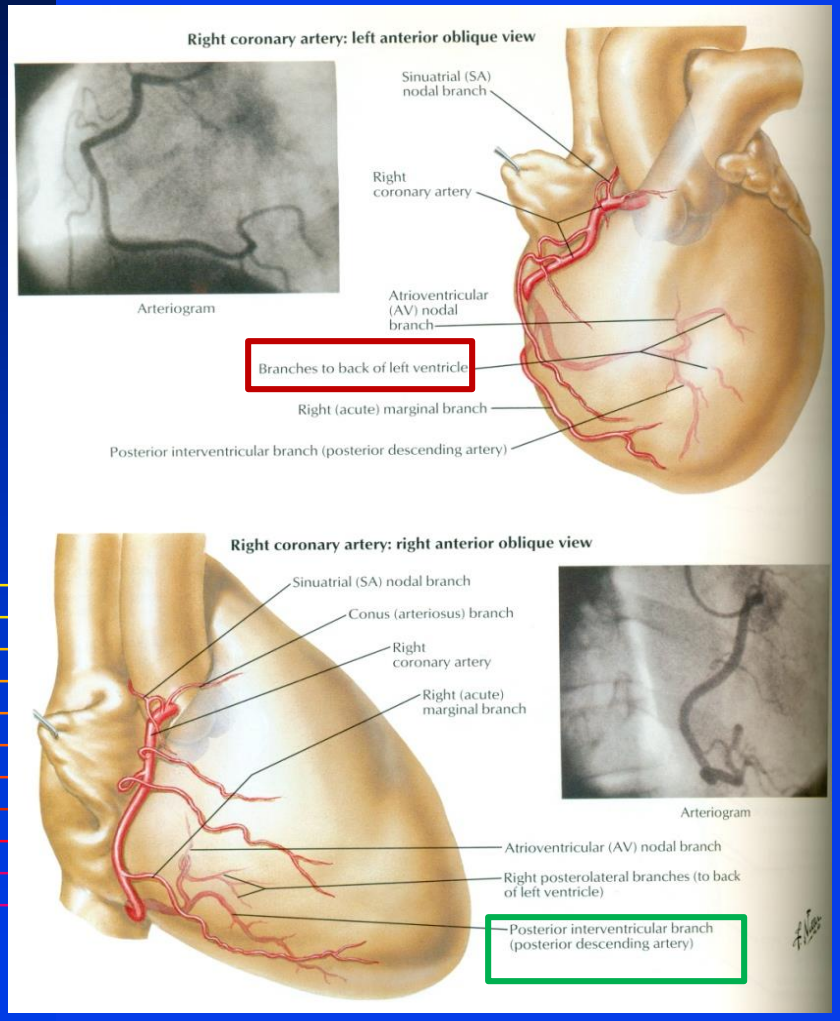
Branches



- ***(1) Right Conus artery:***
- To the infundibulum and the upper part of the anterior wall of the right ventricle.
- ***(2) Anterior Ventricular arteries***
- To the anterior surface of the right ventricle.
- The ***Marginal artery*** is the largest branch.



- ***(3) Posterior ventricular arteries:***
- **To the diaphragmatic surface of the right ventricle.**
- ***(4) Atrial branches:***
- ***To the right atrium .***
- ***The Artery of the SAN.***

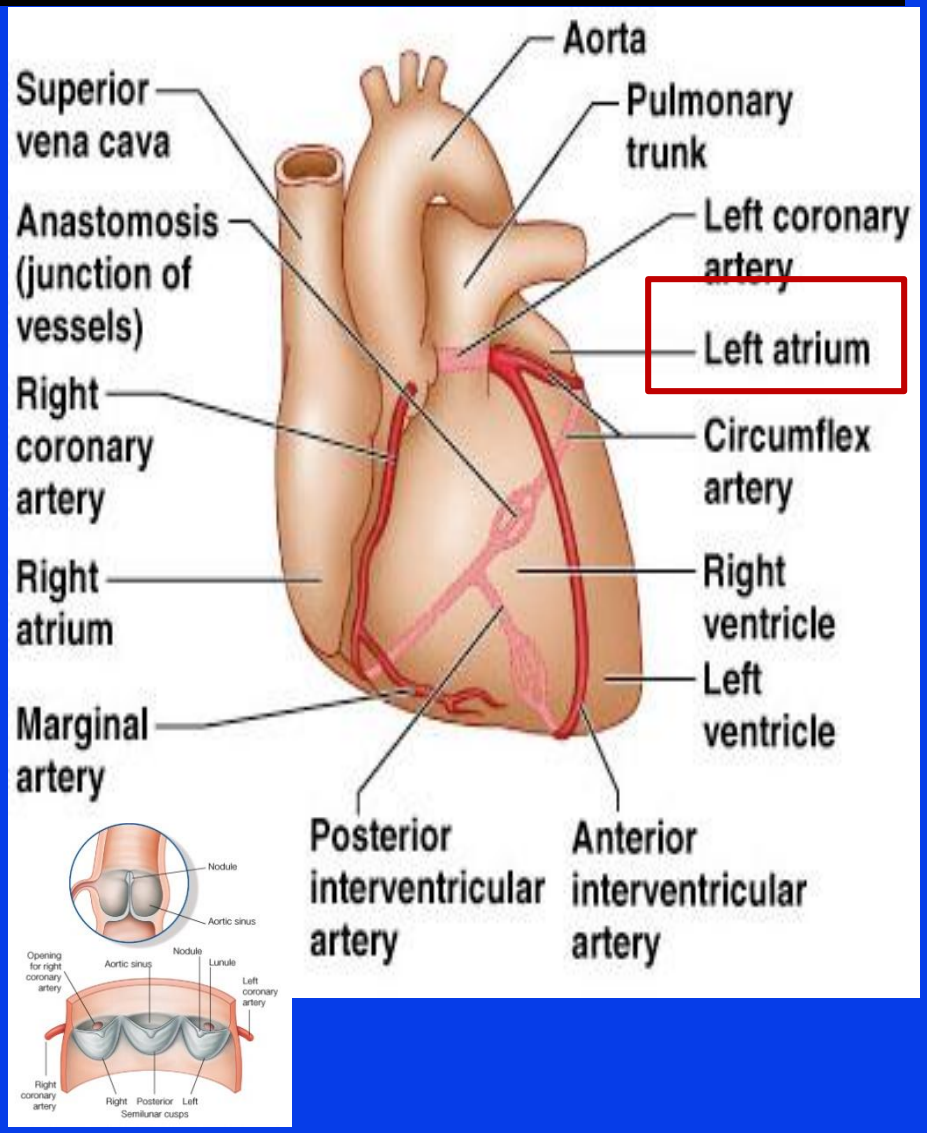


- **(5) Posterior Interventricular A:**
- ***Supplies:***
- a. Diaphragmatic surface of the R & L Ventricles.
- b. Posterior part of the IVS Excluding its **Apex.**
- C. Septal branch to the AVN.

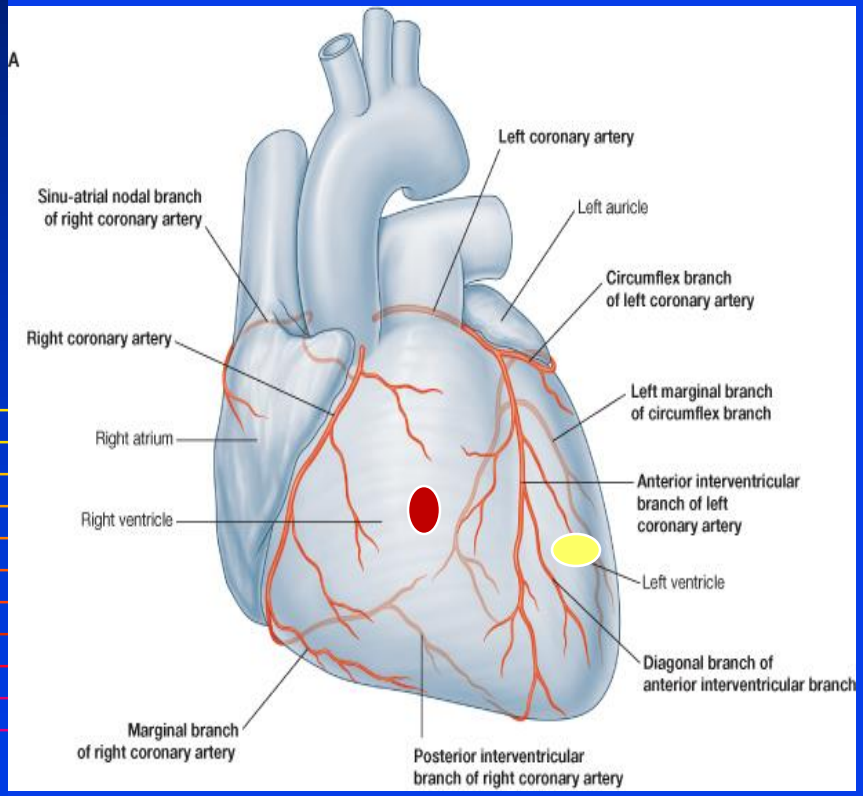
Left Coronary Artery

- The Larger of the two coronaries.
- Arises from the **left posterior aortic sinus** of the ascending aorta.
- **Descends;**
- Between the pulmonary trunk and the left auricle.
- In the **IV groove** to the apex of the heart.

Divides into two branches: (***Anterior IV & Circumflex***)

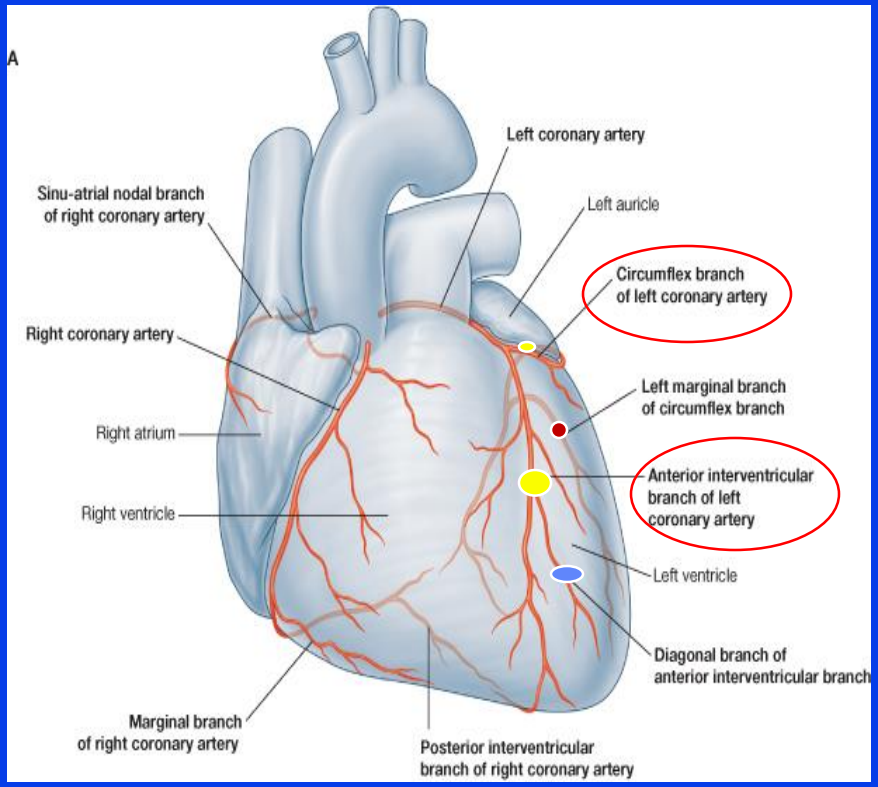


Left Coronary Artery



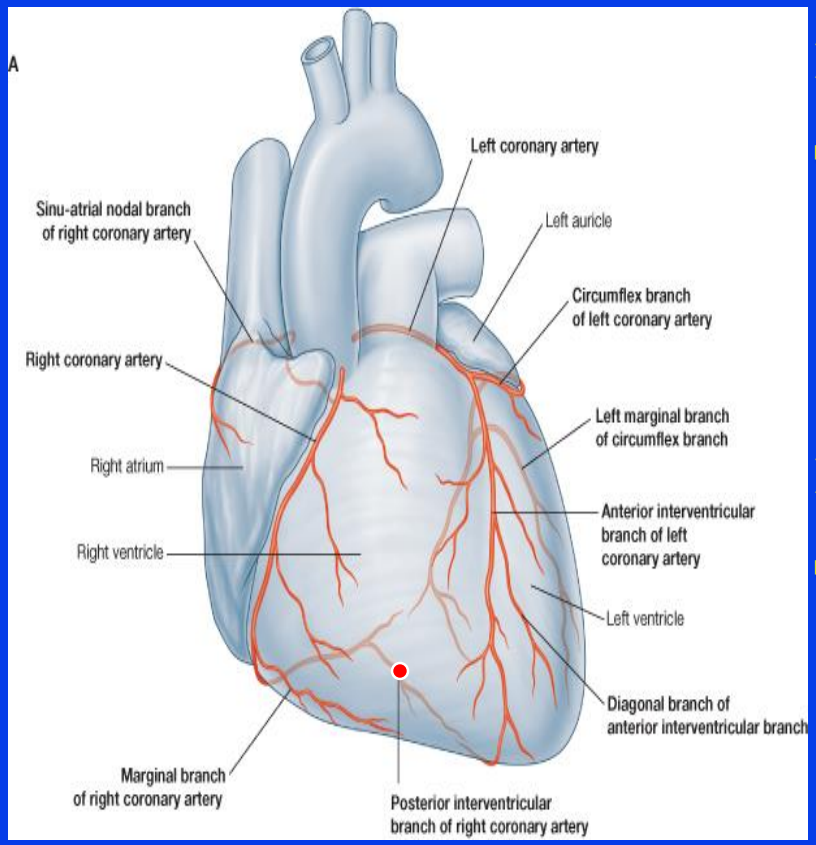
- It anastomoses with the right coronary in the posterior IV groove (*in 2/3 of people)*
- **It Supplies:**
- Greater part of Left Atrium,
- Left Ventricle and Ventricular Septum

Branches

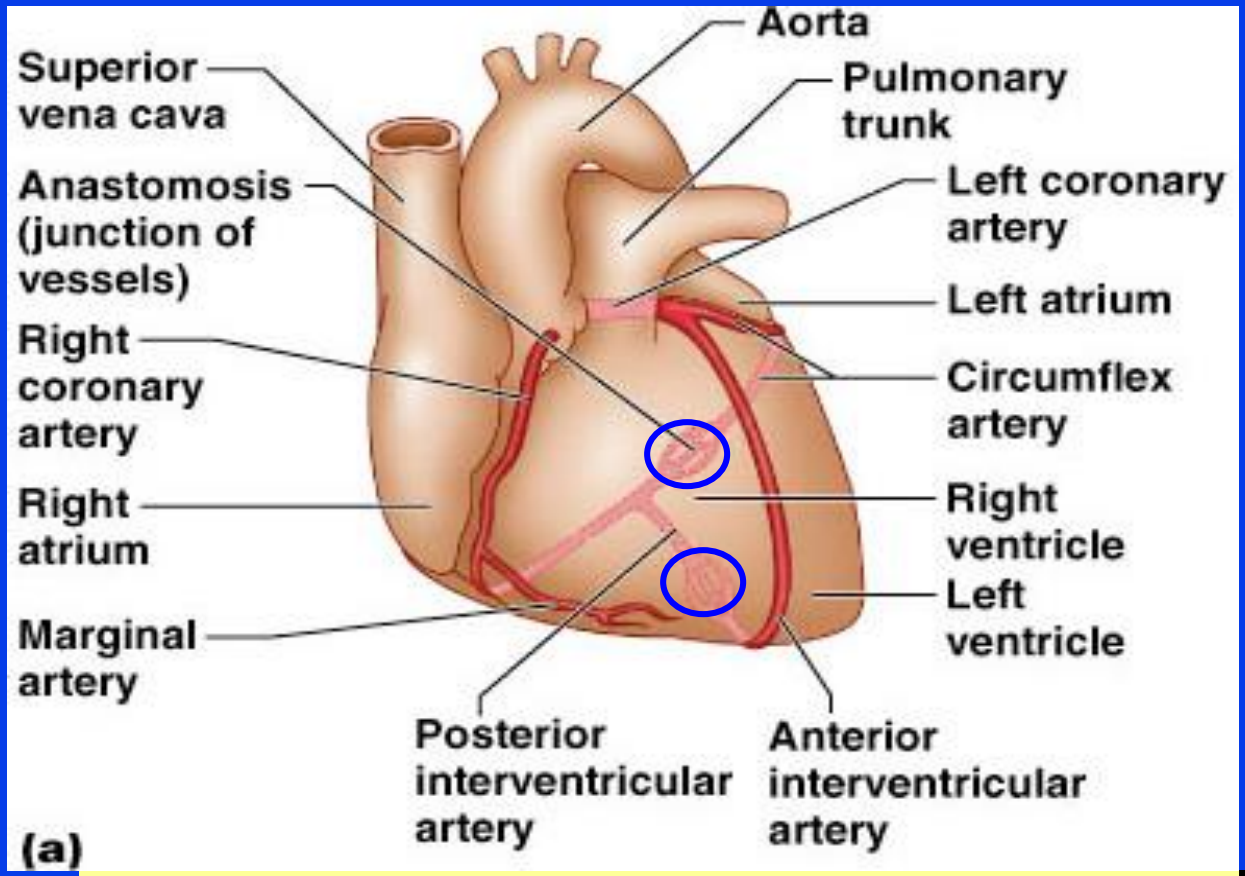


- Ventricular branches to both ventricles and the IV septum.
- **Circumflex artery gives :**
  - ***Left Marginal to*** **the left margin of the LV till the apex.**
- **Anterior Interventricular A gives:**
  - ***Left (Lateral) diagonal***
  - ***Anterior &***
  - ***Posterior ventricular to (LV)***
  - ***Atrial to (LA)***

Variations of the Coronary Arteries



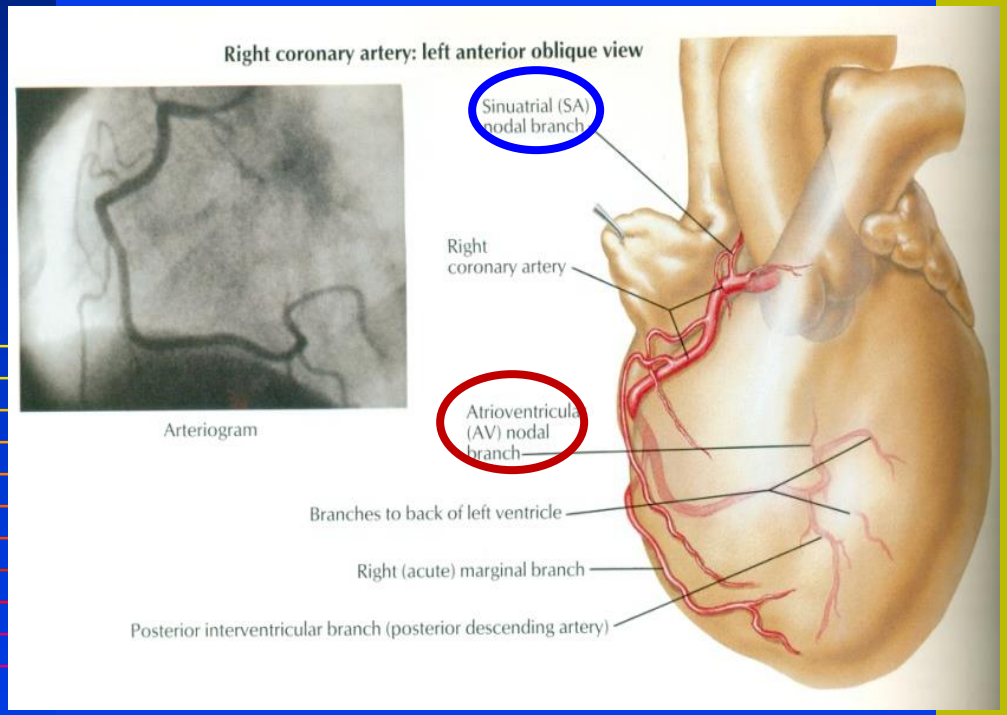
- **Right dominance:**
  - In (90 %) of population, the Posterior Interventricular artery is a branch of the Right Coronary.
- **Left dominance:**
  - In the rest (10%), the Posterior Interventricular artery arises from the Circumflex branch of the Left Coronary A



Coronary Anastomosis

Anastomoses between terminal branches of the right and left coronaries exist but **not large enough** to provide adequate blood supply.

Arterial Supply of Conducting System

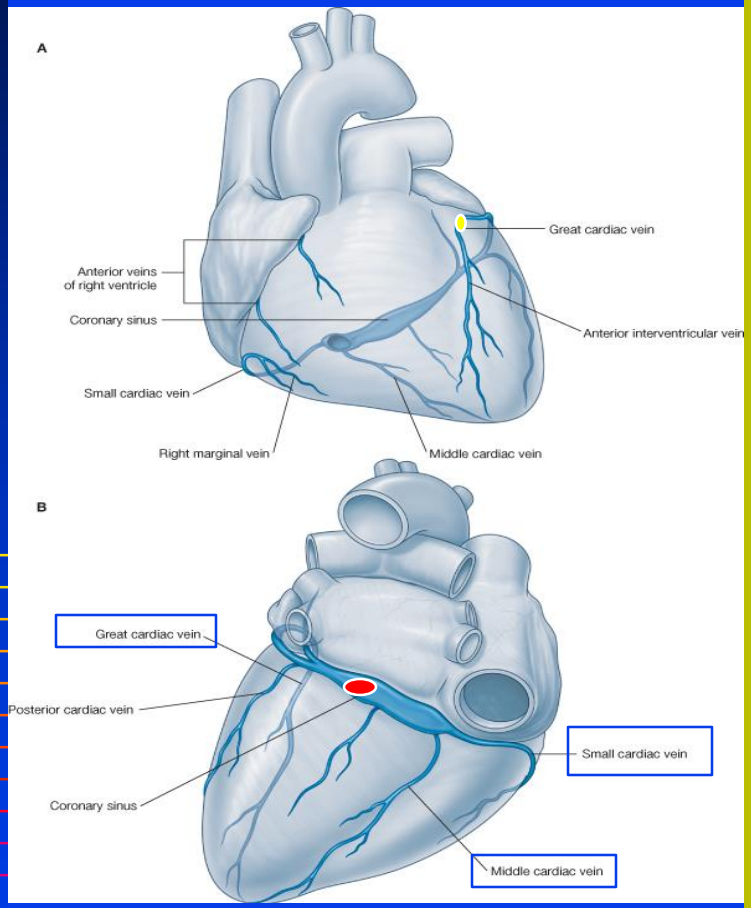


- **Sinuatrial node (SAN), atrioventricular node (AVN) & atrioventricular bundle (AVB)** are usually supplied by Right coronary.
- **Right bundle branch (RBB) of (AVB)** is supplied by Left coronary.
- **Left bundle branch (LBB) of (AVB)** is supplied by both right and left coronaries.

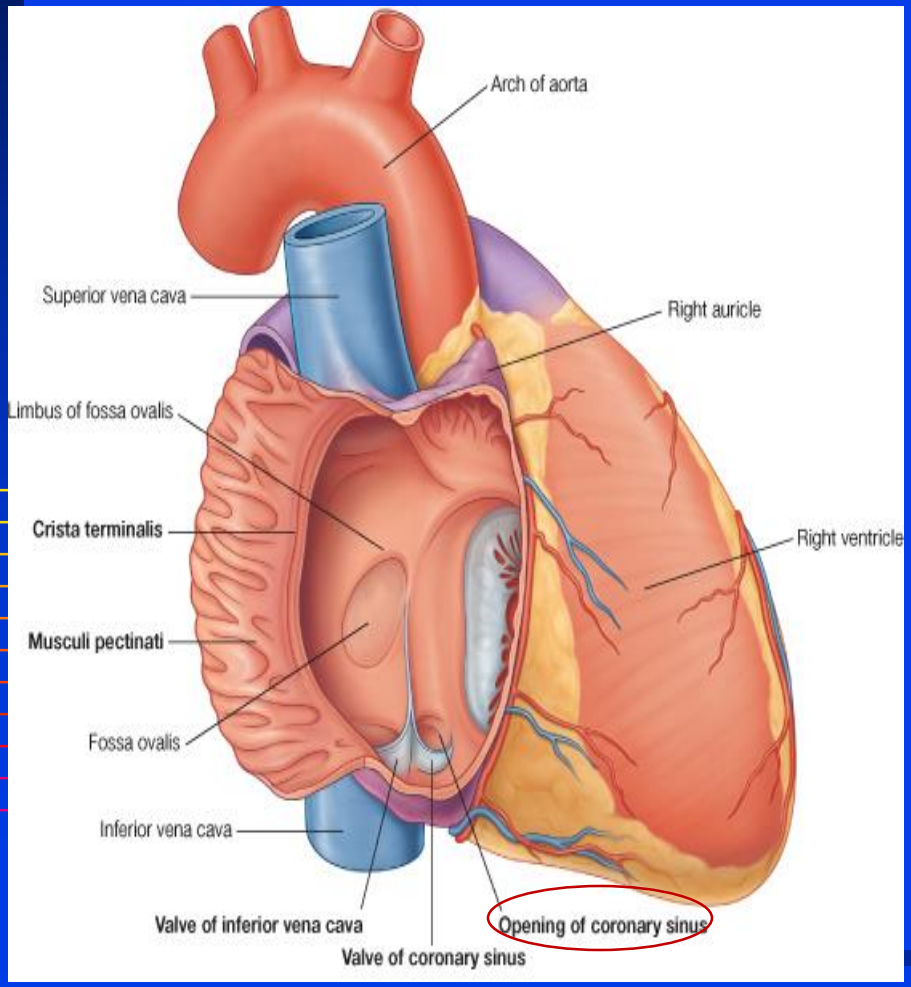
Venous Drainage

- Blood of the heart is drained into the right atrium through;
- Coronary sinus
- Directly into the right atrium

Coronary Sinus

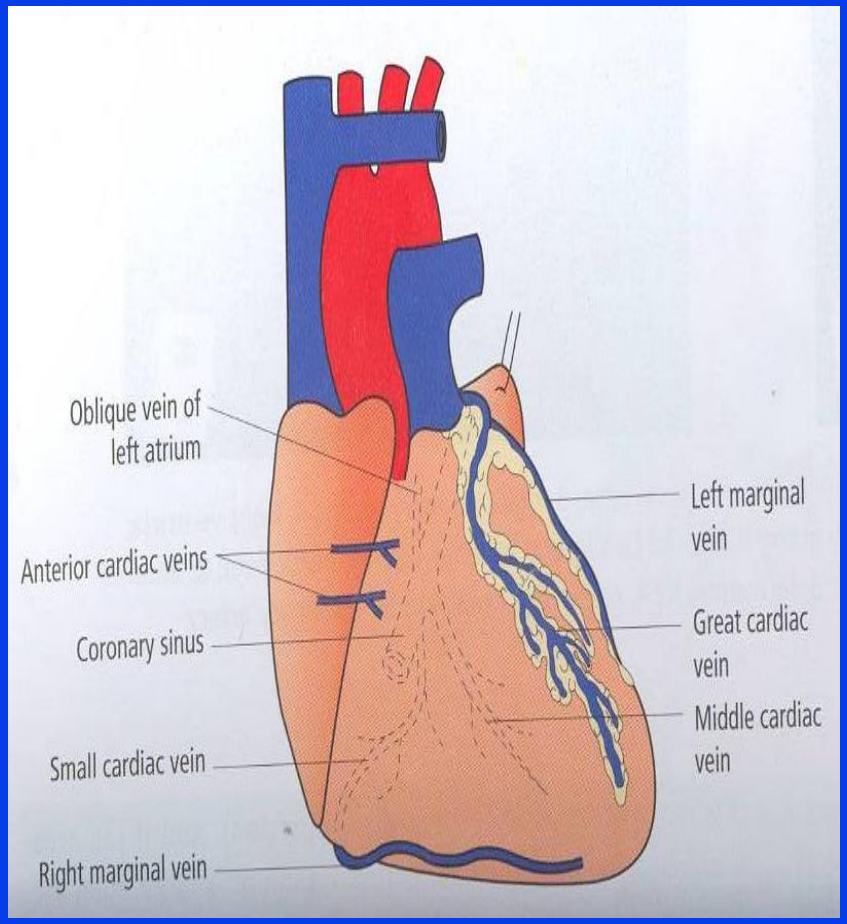


- Drains most of the venous blood of the heart.
- Lies in the posterior part of the AV groove.
- ***Origin :***
- It is the direct continuation of the ***Great Cardiac Vein.***
- ***Tributaries:***
- ***Great Cardiac Veins:***
- ***Middle Cardiac Veins.***
- ***Small Cardiac Veins.***
- ***Oblique vein of left atrium.***



- ***It empties into Right Atrium.***
- **Its opening is inferior & to the left of the IVC opening.**
- **It is guarded by a valve.**

Venous Drainage



- ***Veins open directly into the Right Atrium.***
- ***1. Anterior cardiac veins:***
- ***2. Venae Cordis minime***

Thank you