BLOOD SUPPLY OF THE HEART

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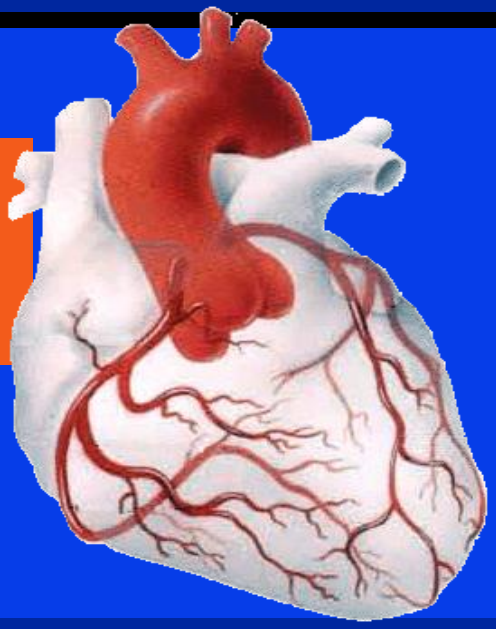
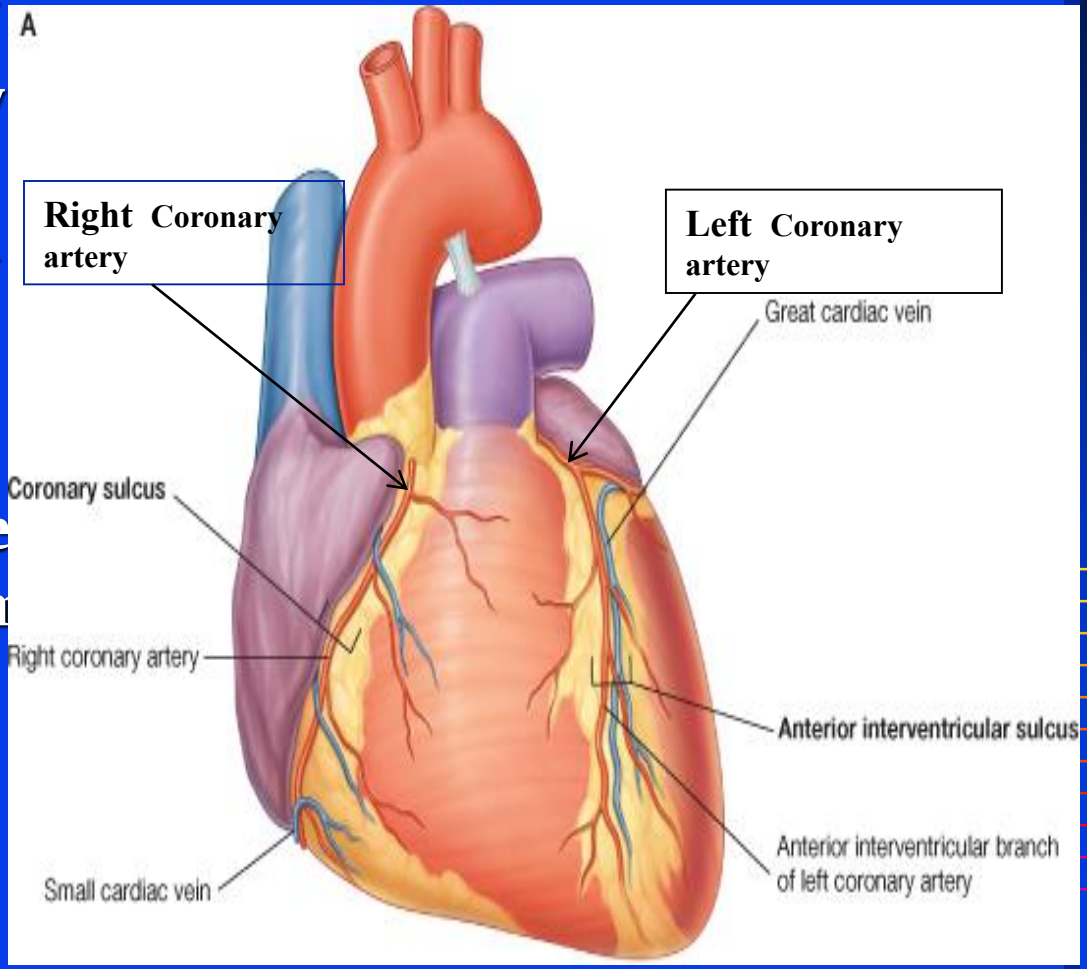


Objectives

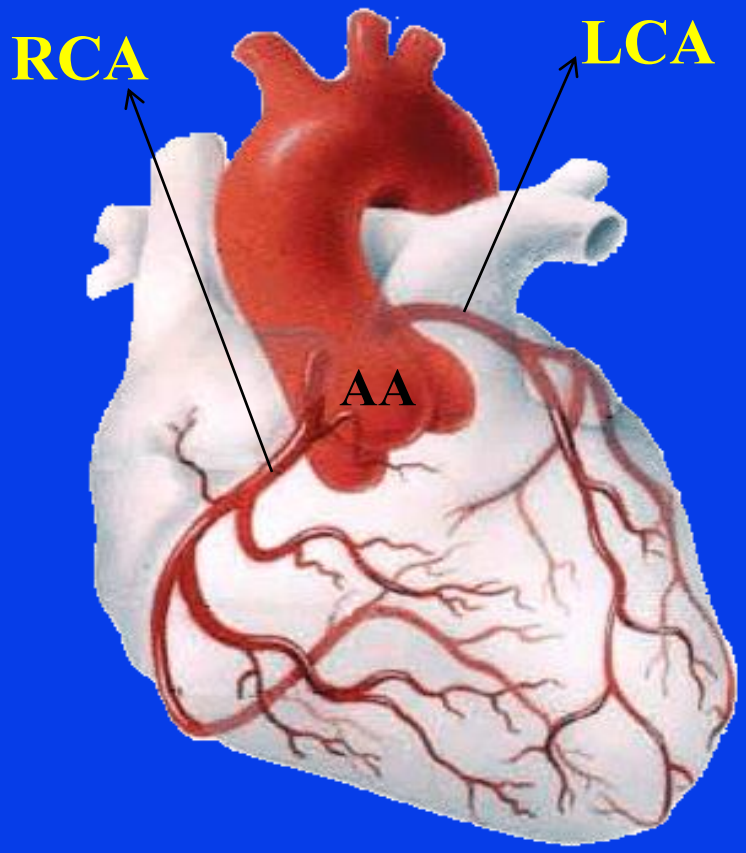
- At the end of the lecture the student should be able to know about;
- The arterial supply of the cardiac muscle regarding (origin, course, distribution and branches).
- The coronary anastmosis.
- The arterial supply to the conducting system of the heart.
- The venous drainage of the heart regarding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



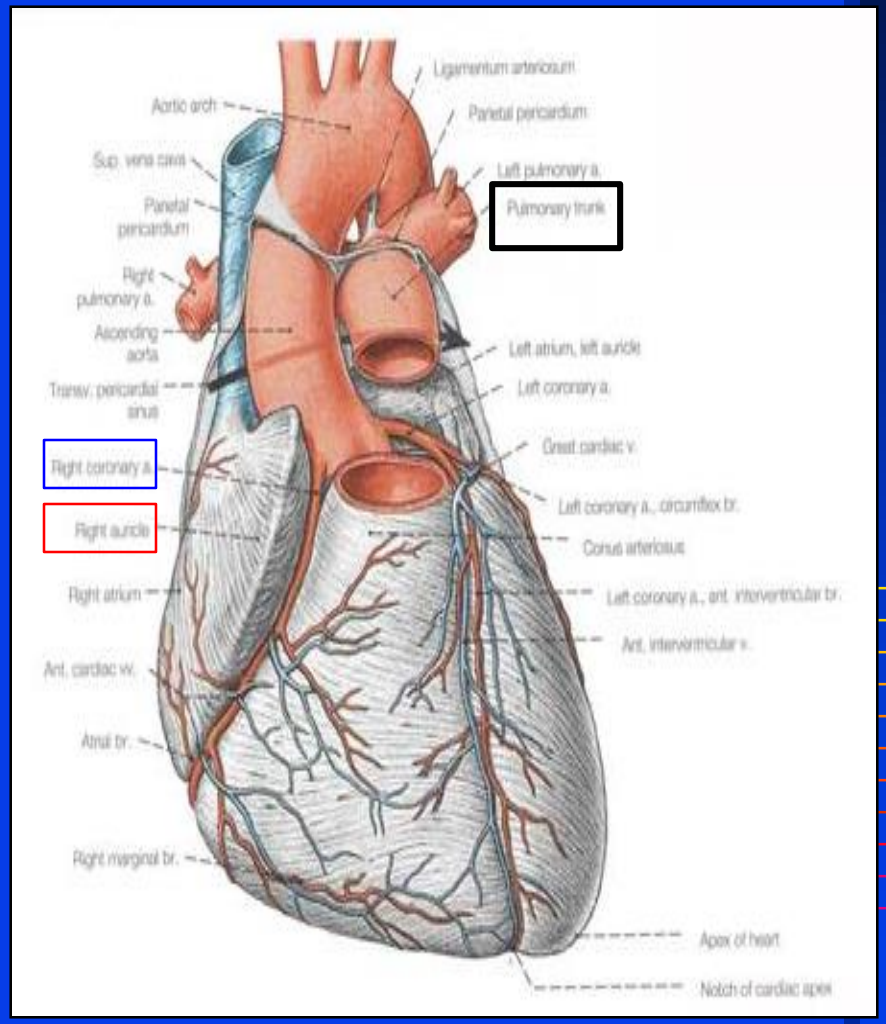
Origin of Coronary Arteries

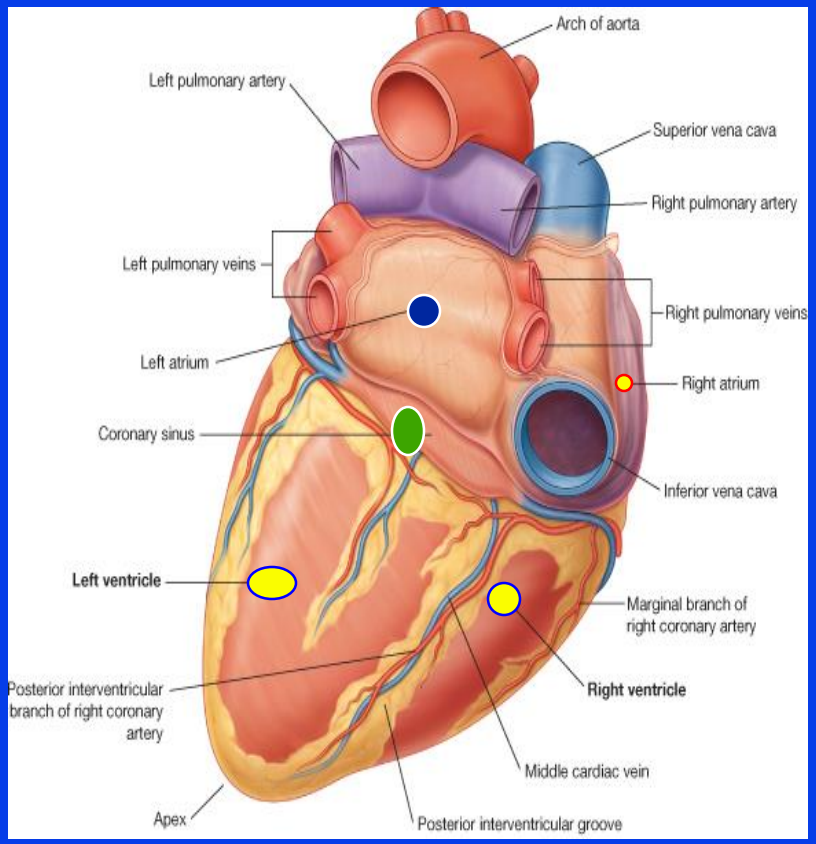


- ***From*** the initial part of the ***Ascending Aorta.*** (Immediately above the aortic valve).

Right Coronary Artery

- Arises from the anterior aortic sinus of the ascending aorta.
- Runs forward between pulmonary trunk and right auricle.
- Descends in the right atrioventricular groove *between the Right Auricle and the Pulmonary trunk.*
- At the inferior border of the heart it is continuous posteriorly along the atrioventricular groove to anastomose with the left coronary artery in the posterior interventricular groove .



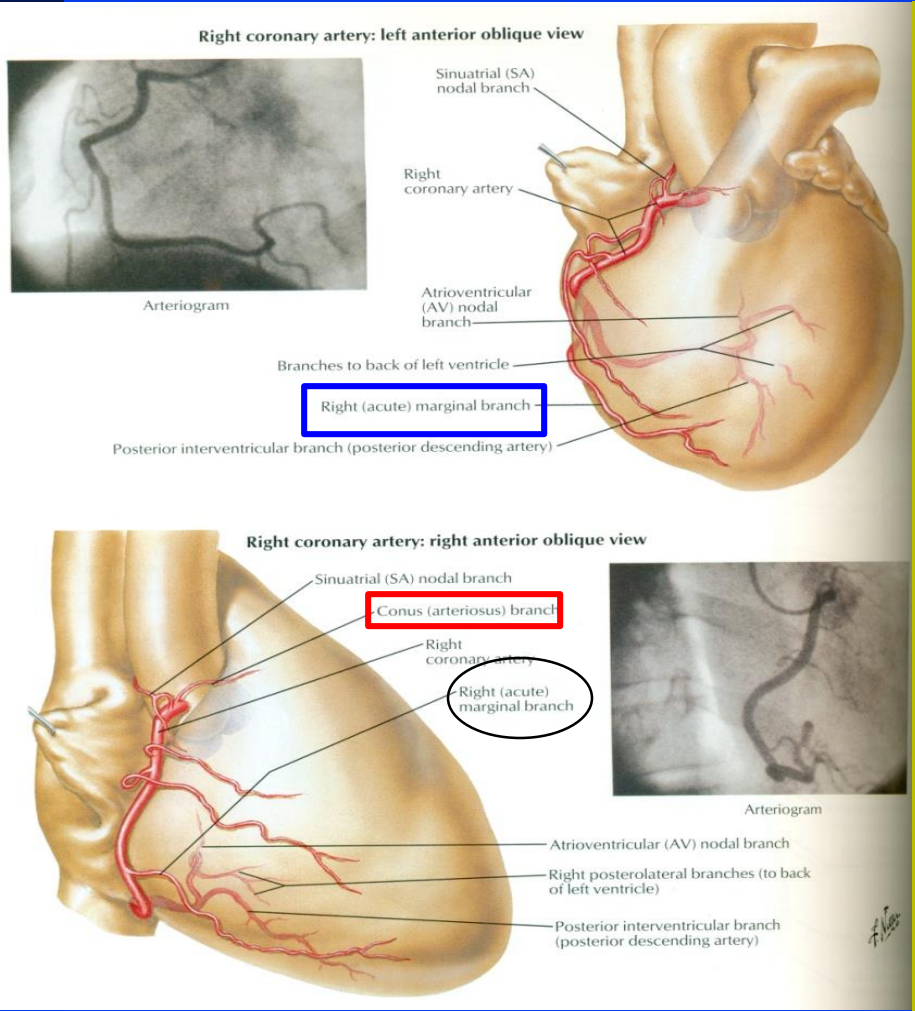


Right Coronary Artery

Supplies:

- **Right atrium,**
- **Right ventricle,**
- **part of Left Atrium,**
- **Left ventricle & Atrioventricular septum.**

Branches



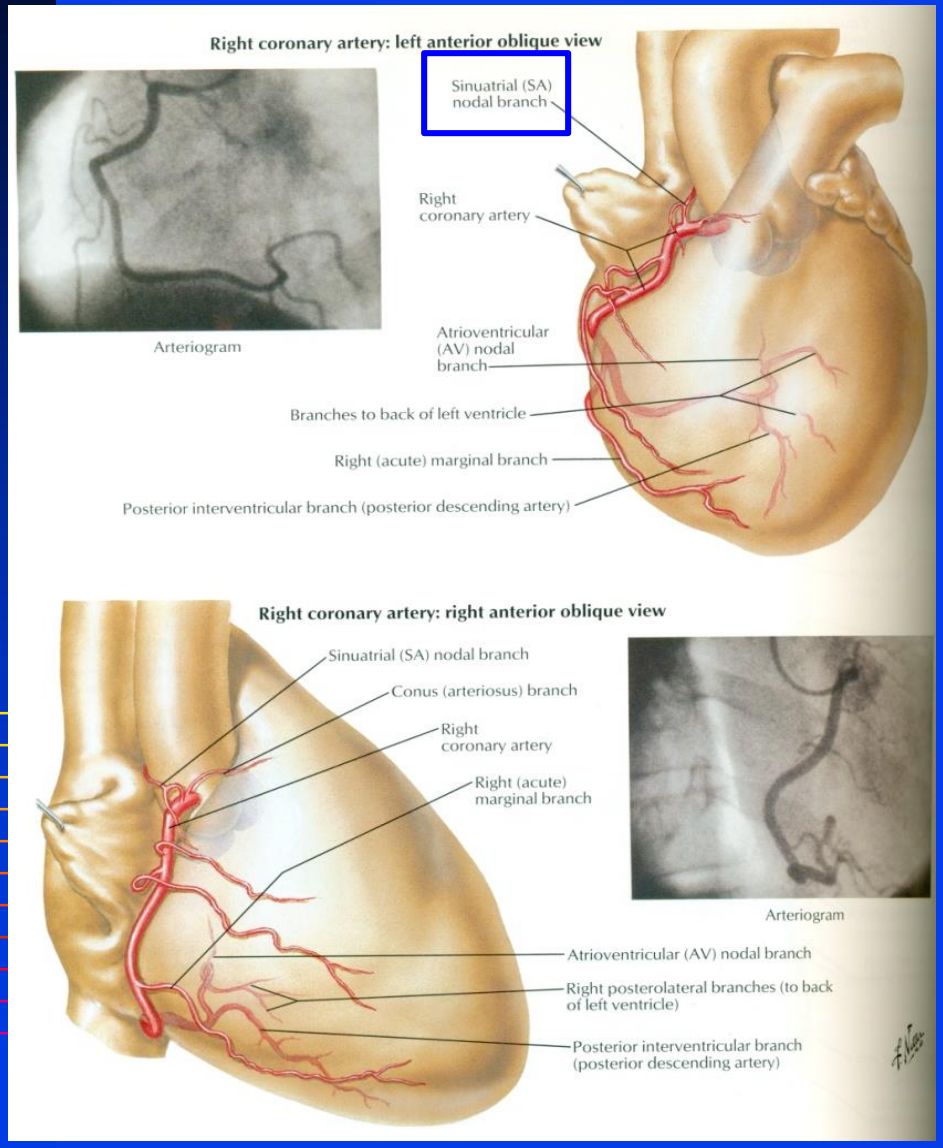
(1) Right Conus artery:

- To the infundibulum and the upper part of the anterior wall of the right ventricle.

(2) Anterior Ventricular arteries; (2 or 3 branches)

- To the anterior surface of the right ventricle.

(3) Marginal artery; is the largest branch, runs along the inferior margin toward the apex.



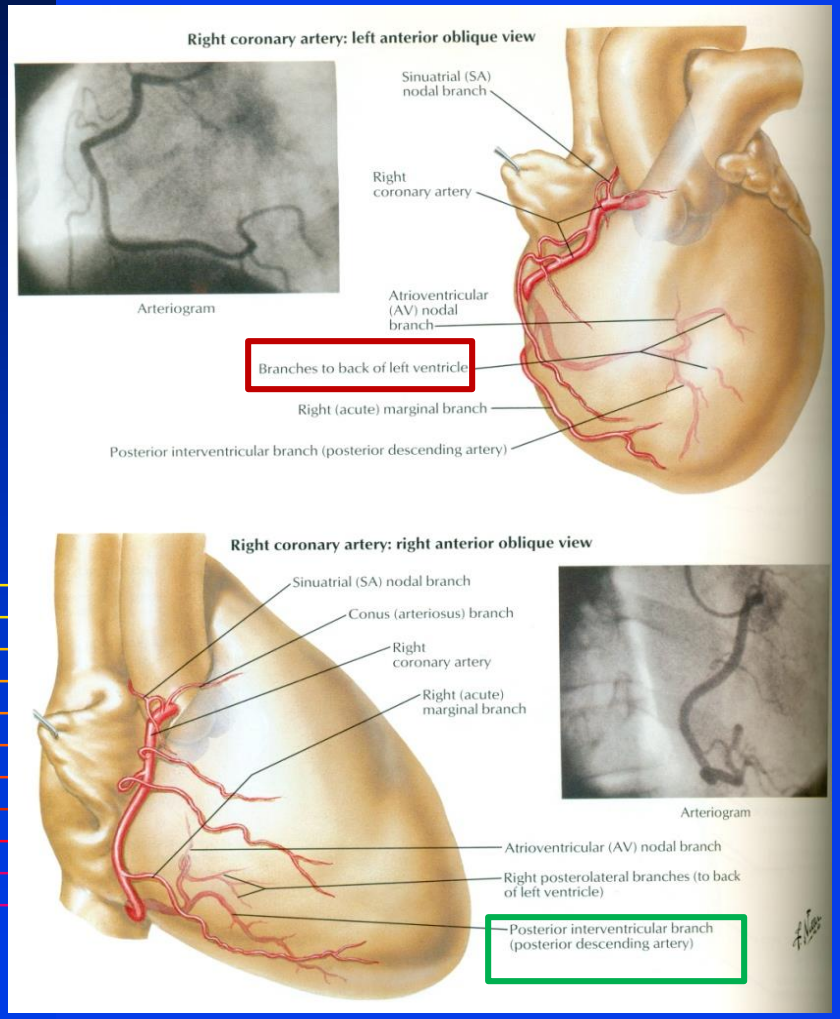
(4) Posterior ventricular arteries; (2 branches)

- **To the diaphragmatic surface of the right ventricle.**

(5) Atrial branches:

- ***To the right atrium; anterior and lateral surfaces.***
- ***Posterior surface of both atria***

(6)The Artery of the SAN, also supplies both atria.

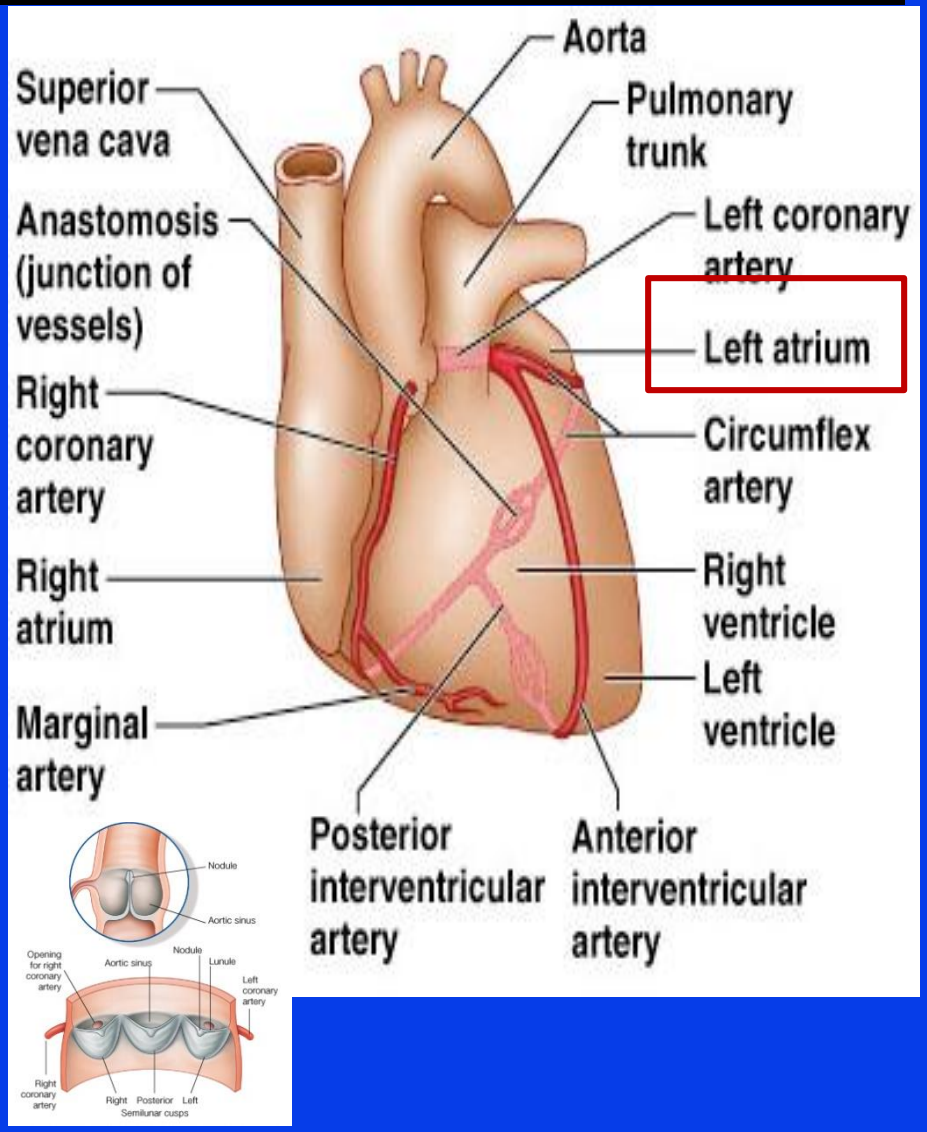


(7) Posterior interventricular *arteries* ;

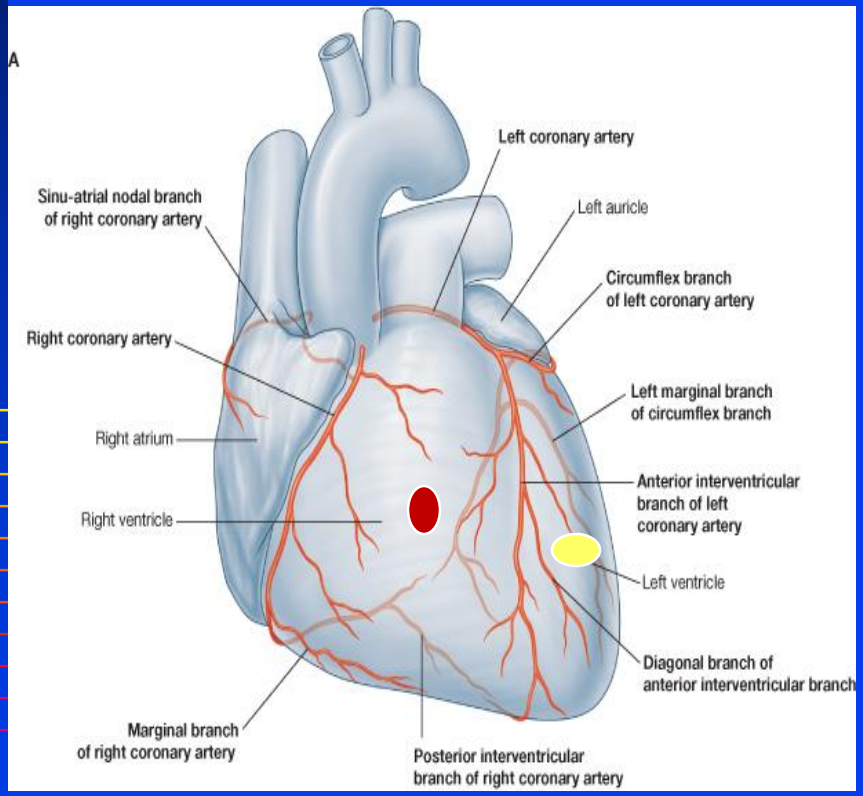
- ***Runs toward the apex, to supplies:***
- a. Diaphragmatic surface of the R & L Ventricles.
- b. Posterior part of the IVS excluding its **Apex.**
- C. Septal branch to the AVN.
- (N.b) in 10% it is replaced by a branch from the left coronary

Left Coronary Artery

- The Larger of the two coronaries.
- Arises from the **left posterior aortic sinus** of the ascending aorta.
- **Passes forward** between the pulmonary trunk and the left auricle.
- **Enters** the atrioventricular groove **and divides into**
  - *Anterior interventricular artery &*
  - *Circumflex artery*

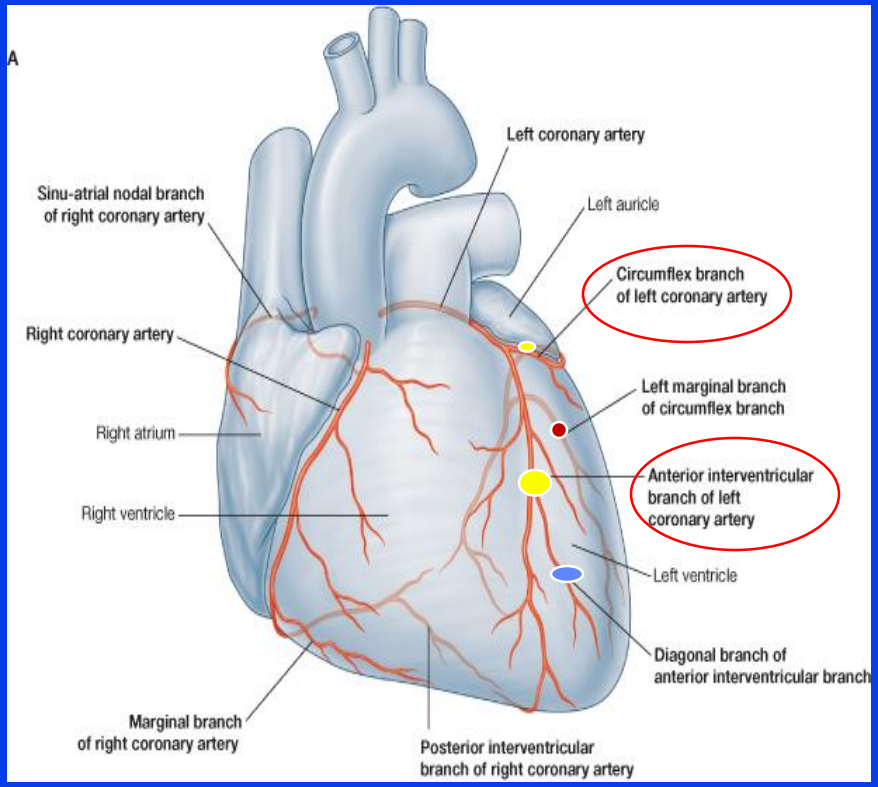


Anterior interventricular artery



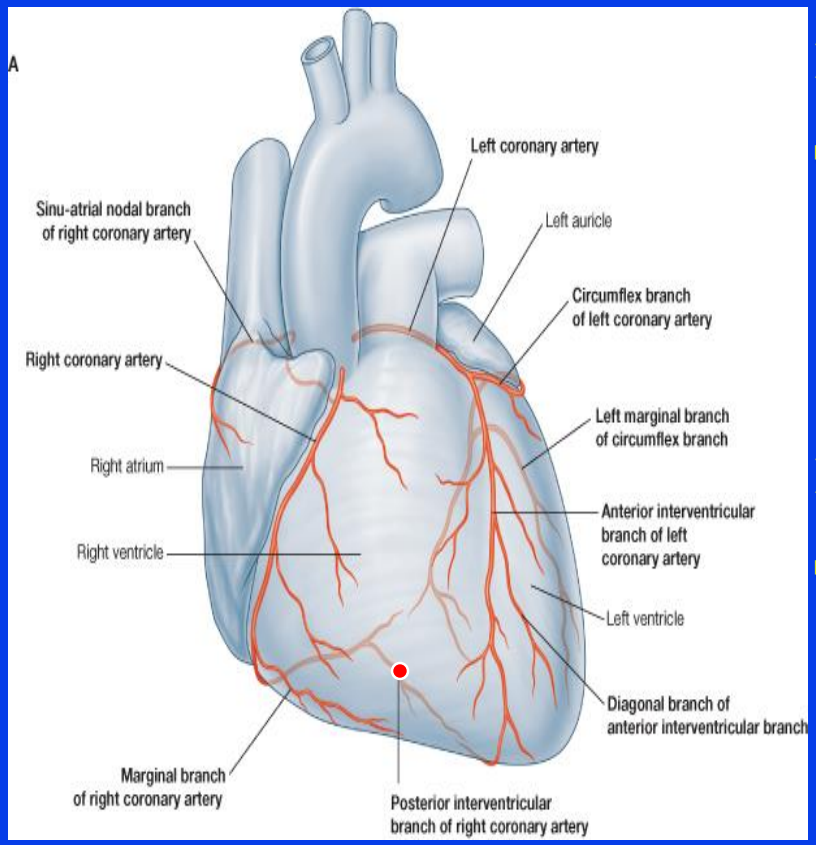
- Descends in the anterior interventricular groove toward the apex of the heart , (in most individuals it passes around the apex and anastomoses with the right coronary in the posterior IV groove, in one third ends at the apex)
- Supplies major part of the heart including;
- Right and left ventricles
- Anterior part of Ventricular Septum
- ***Left diagonal artery*** ; one of the Ventricular branches, or may arise from trunk of the left coronary
- ***Left conus artery***

Circumflex artery

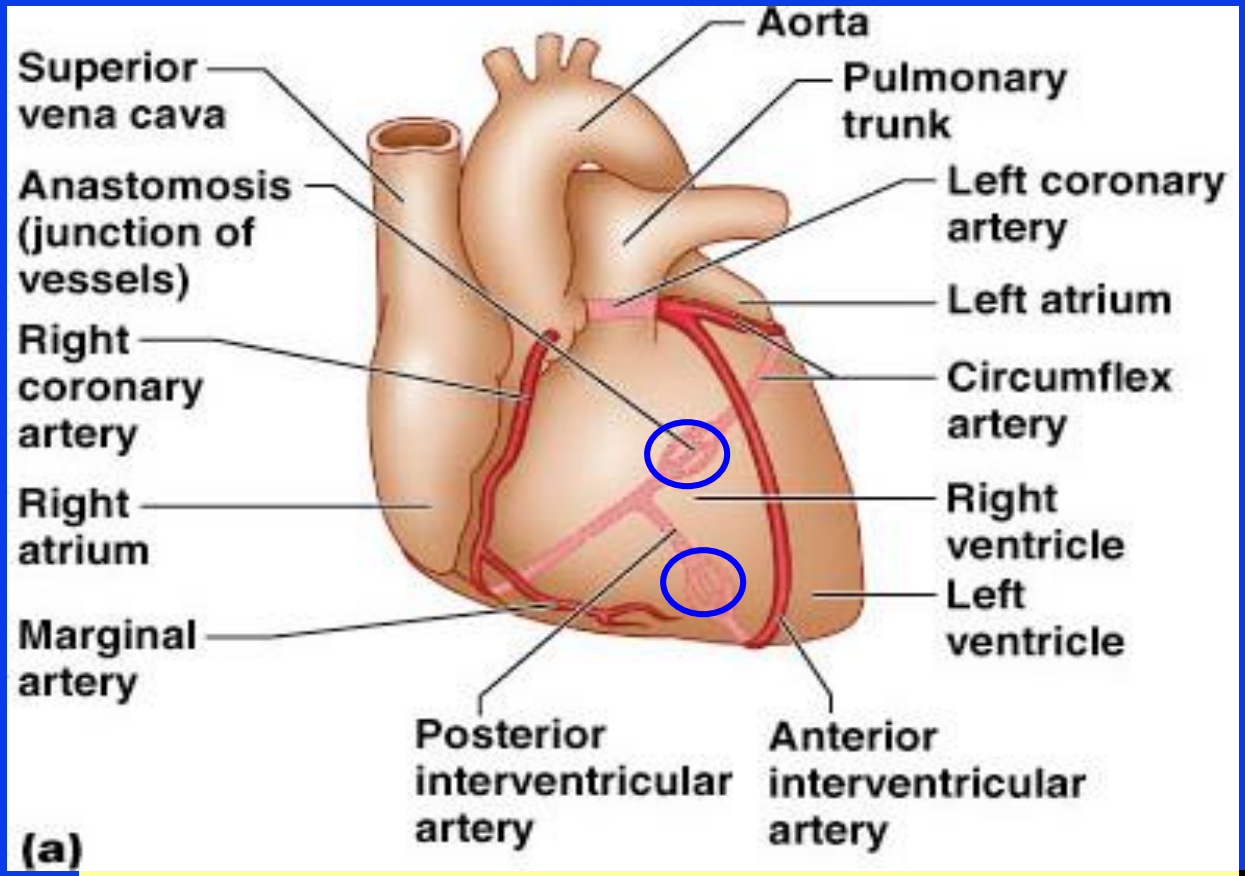


- **Winds around the** left margin of the heart in the atrioventricular groove it gives;
- ***Left Marginal artery*** *to* the left margin of the left ventricle till the apex.
- ***Anterior ventricular*** and ***Posterior ventricular*** branches to the left ventricle
- ***Atrial*** branches to the left atrium.

Variations of the Coronary Arteries



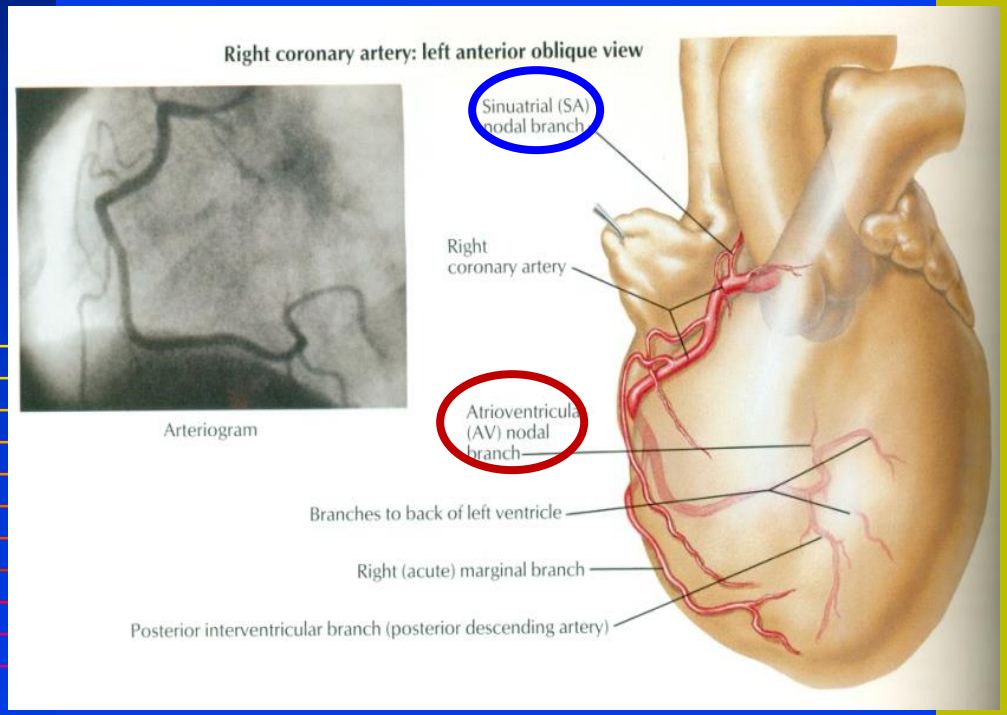
- **Right dominance:**
  - In (90 %) of population, the **Posterior Interventricular** artery is a branch of the Right Coronary.
- **Left dominance:**
  - In the rest (10%), the **Posterior Interventricular artery** arises from the Circumflex branch of the Left Coronary A



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

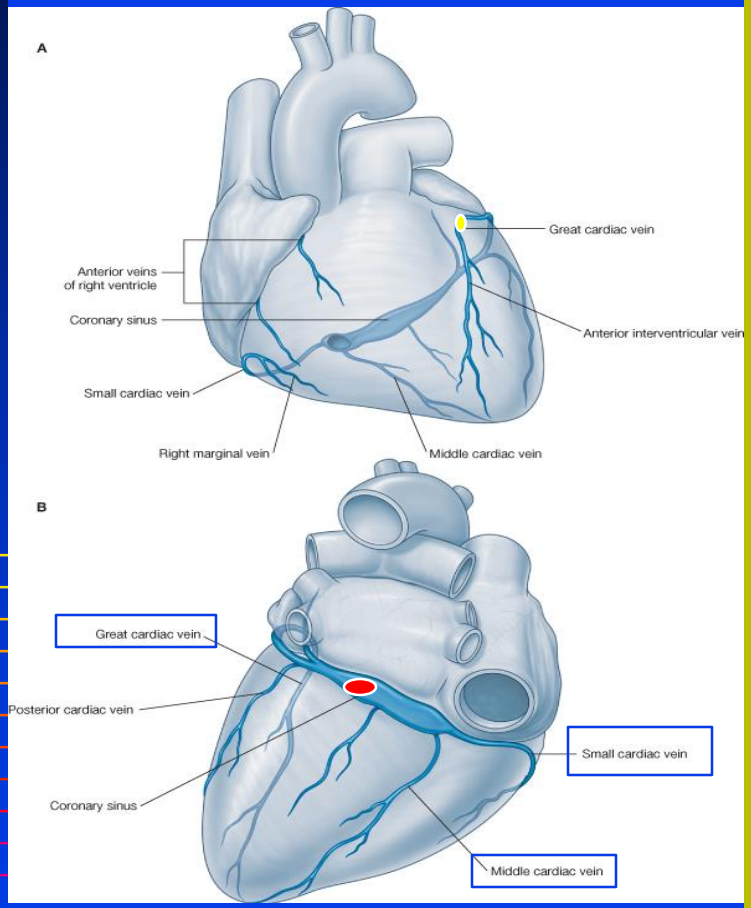


- **Sinuatrial node (SAN), atrioventricular node (AVN) & atrioventricular bundle (AVB)** are usually supplied by Right coronary.
- **Right bundle branch (RBB) of (AVB)** is supplied by Left coronary.
- **Left bundle branch (LBB) of (AVB)** is supplied by both right and left coronaries.

Venous Drainage

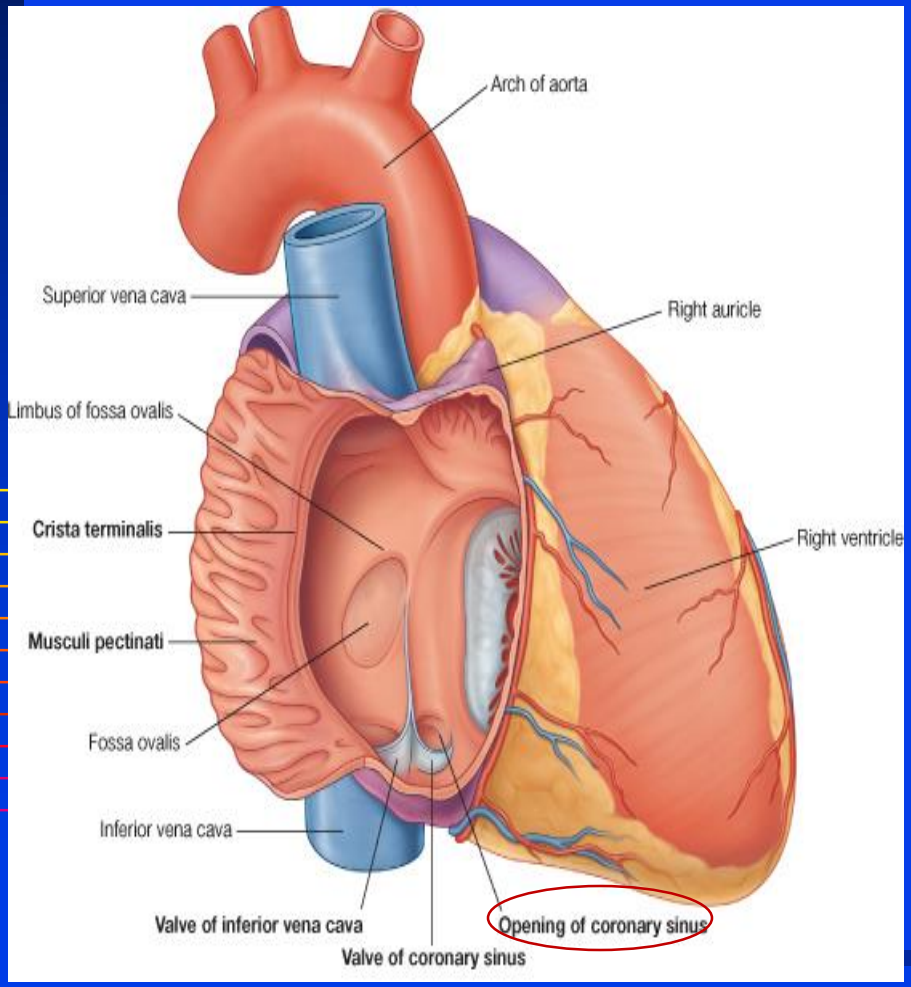
- Blood of the heart is drained into the right atrium through;
- Coronary sinus
- Directly into the right atrium

Coronary Sinus



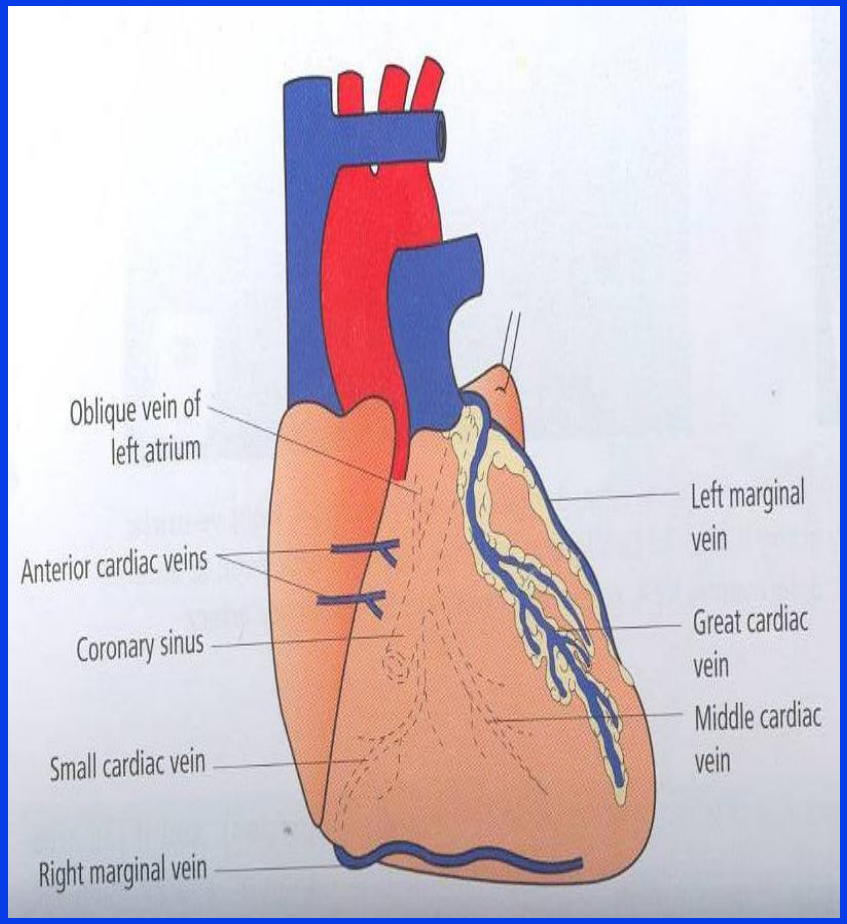
- Drains most of the venous blood of the heart.
- Lies in the posterior part of the AV groove.
- ***Origin :***
- It is the direct continuation of the *Great Cardiac Vein.*
- ***Tributaries:***
- *Great Cardiac Veins:*
- *Middle Cardiac Veins.*
- *Small Cardiac Veins.*
- *Oblique vein of left atrium.*

Coronary Sinus



- It opens into **Right Atrium** to the left of the IVC opening.
- It is guarded by a valve.

Venous Drainage



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

Thank you