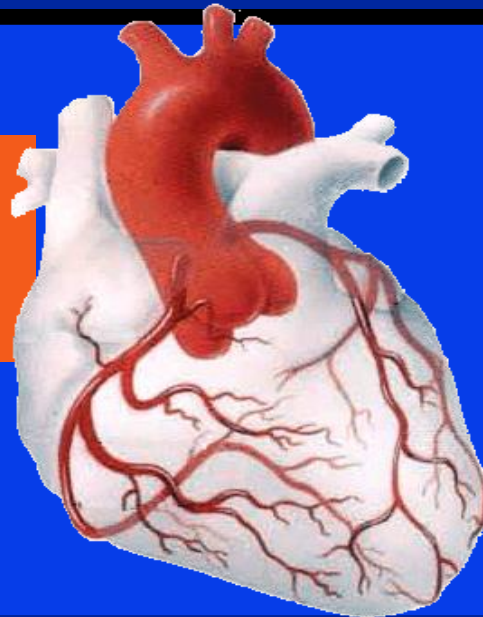


BLOOD SUPPLY OF THE HEART

***Dr Jamila EL
medany***



***Dr Essam
Salama***

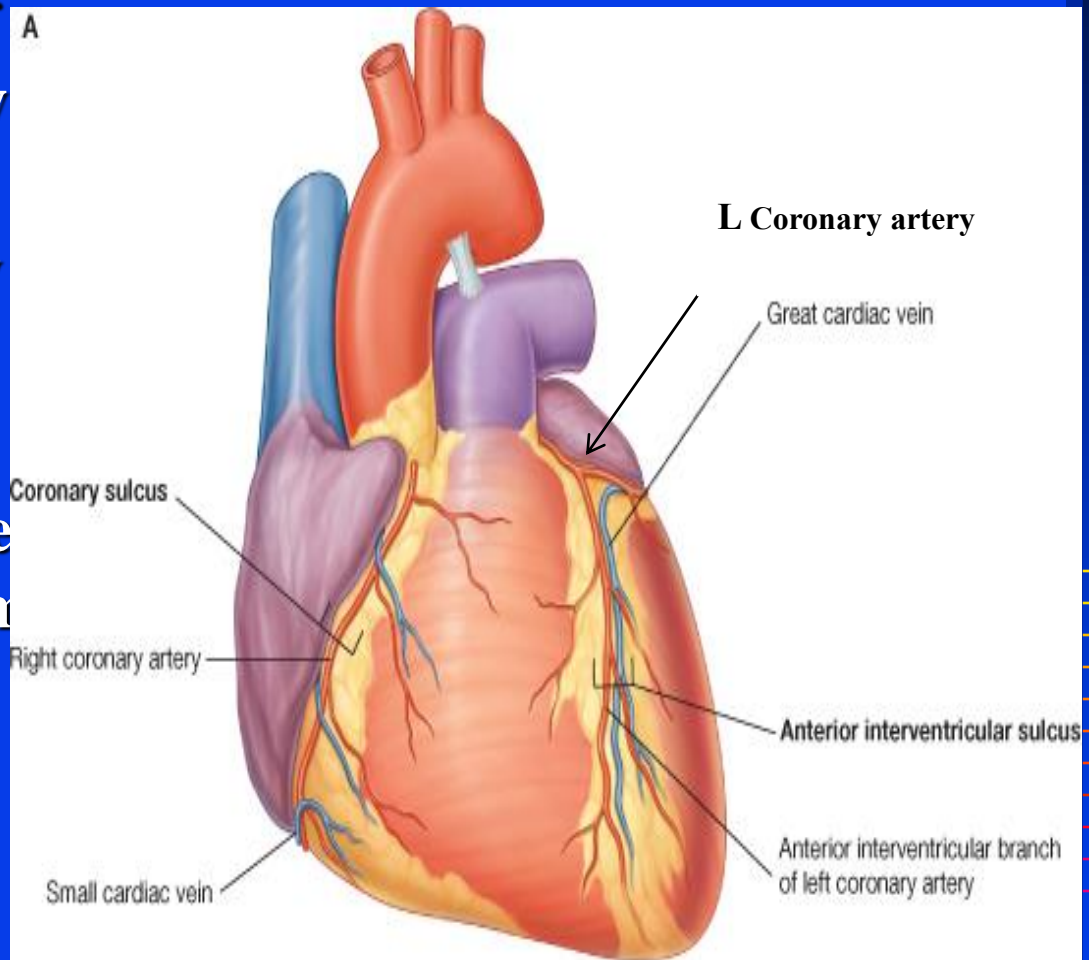
Objectives

- 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).

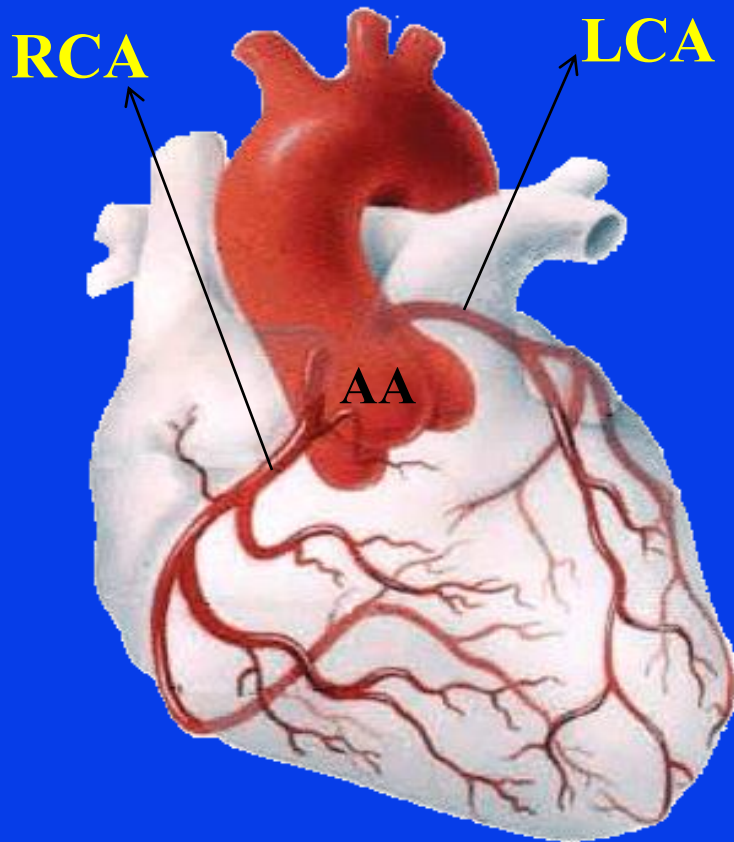
Arterial Supply

❑ 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 subepicardium connective tissue.



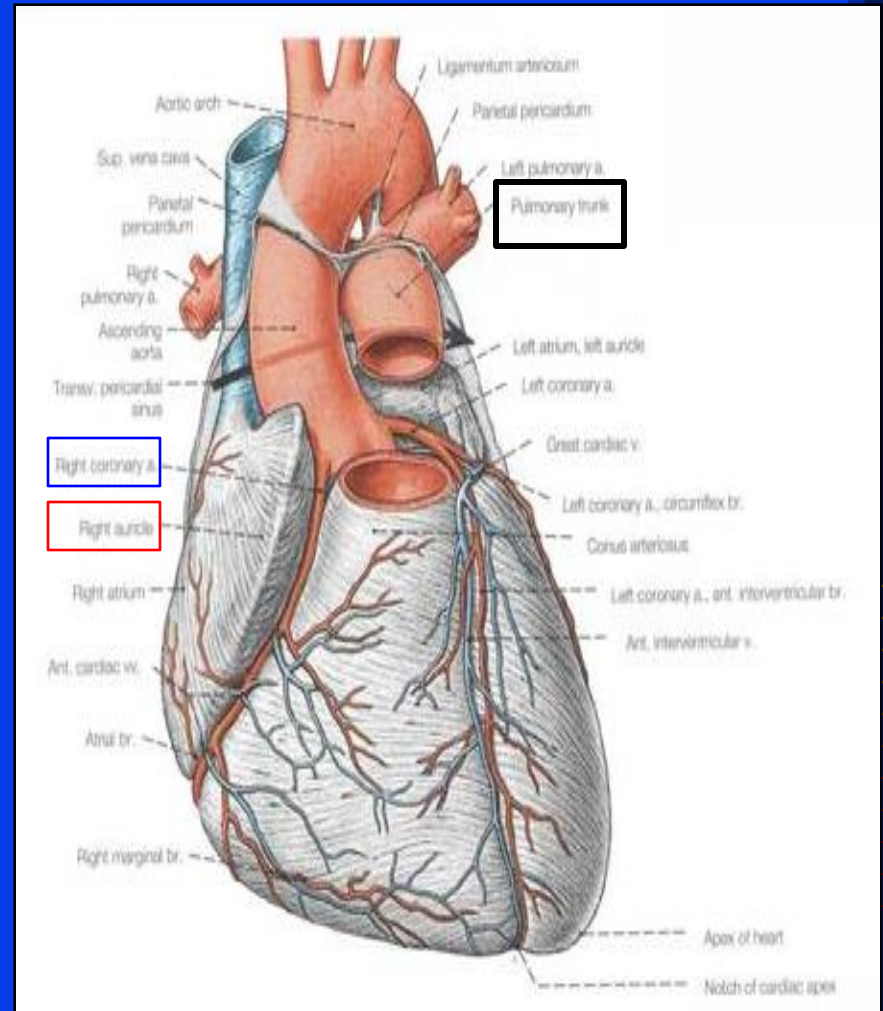
Origin of Coronary Arteries

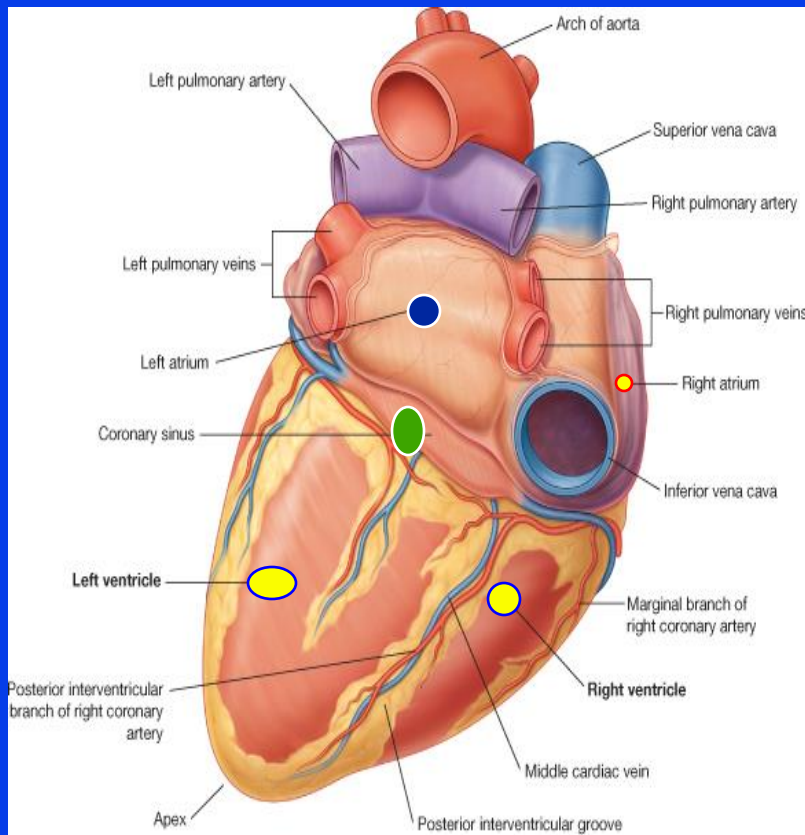


- *From the initial part of the **Ascending Aorta**. (Immediately above the aortic valve).*

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:

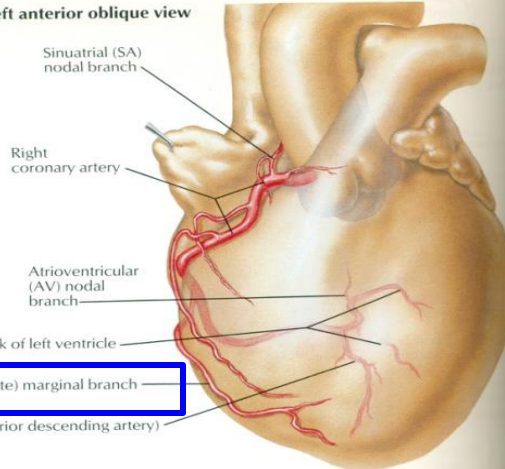
- Right atrium,
- Right ventricle,
- part of Left Atrium,
- Left ventricle & Atrioventricular septum.

Branches

Right coronary artery: left anterior oblique view



Arteriogram

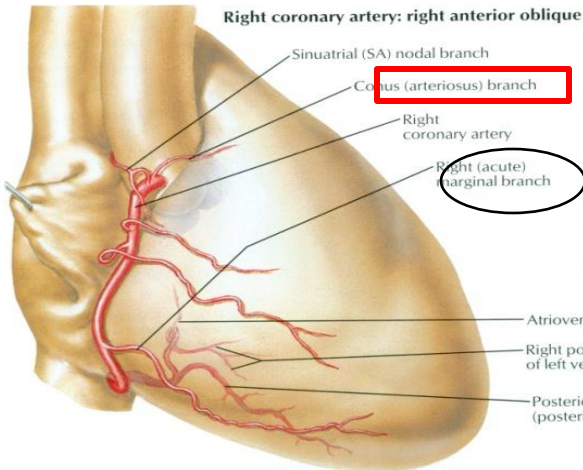


Posterior interventricular branch (posterior descending artery)

Right coronary artery: right anterior oblique view



Arteriogram



(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.

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

Right coronary artery: left anterior oblique view



Arteriogram

Sinuatrial (SA) nodal branch

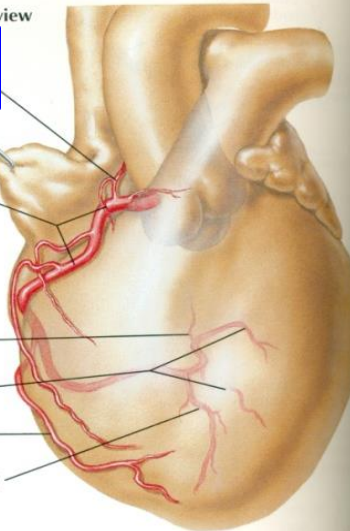
Right coronary artery

Atrioventricular (AV) nodal branch

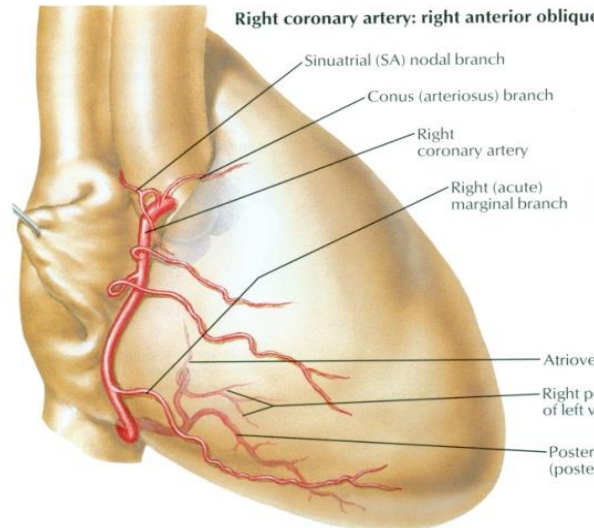
Branches to back of left ventricle

Right (acute) marginal branch

Posterior interventricular branch (posterior descending artery)



Right coronary artery: right anterior oblique view



Sinuatrial (SA) nodal branch

Conus (arteriosus) branch

Right coronary artery

Right (acute) marginal branch

Atrioventricular (AV) nodal branch

Right posterolateral branches (to back of left ventricle)

Posterior interventricular branch (posterior descending artery)



Arteriogram

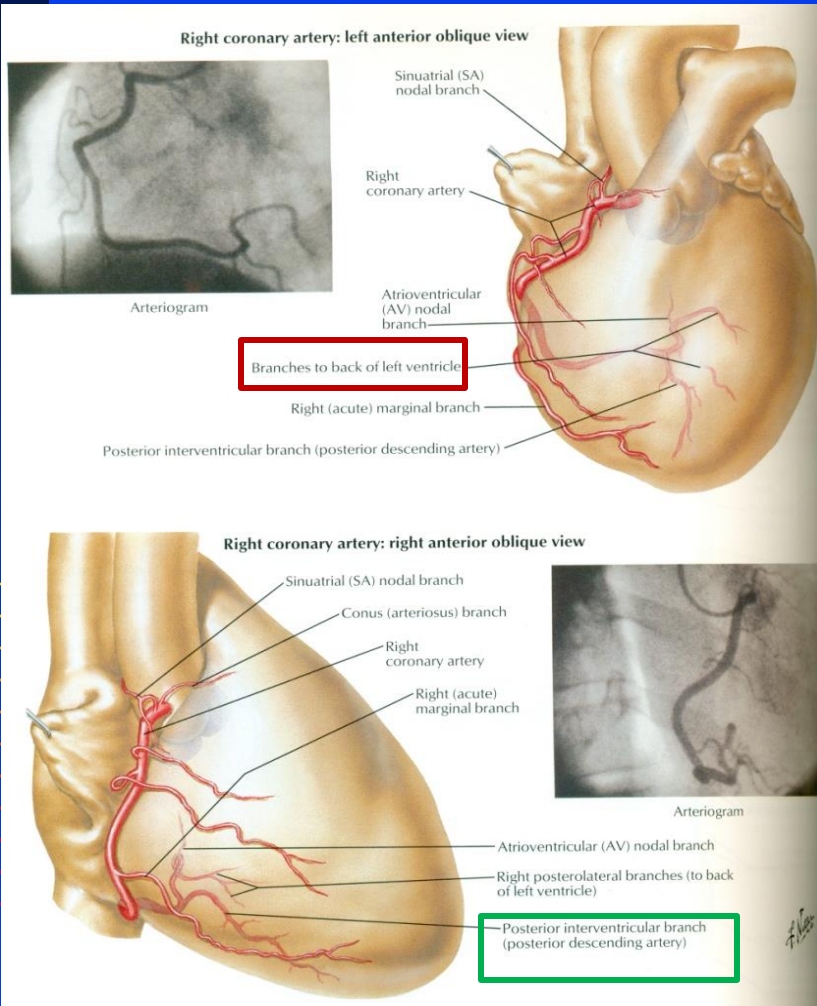
(4) Posterior ventricular arteries; (2 branches)

- 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.

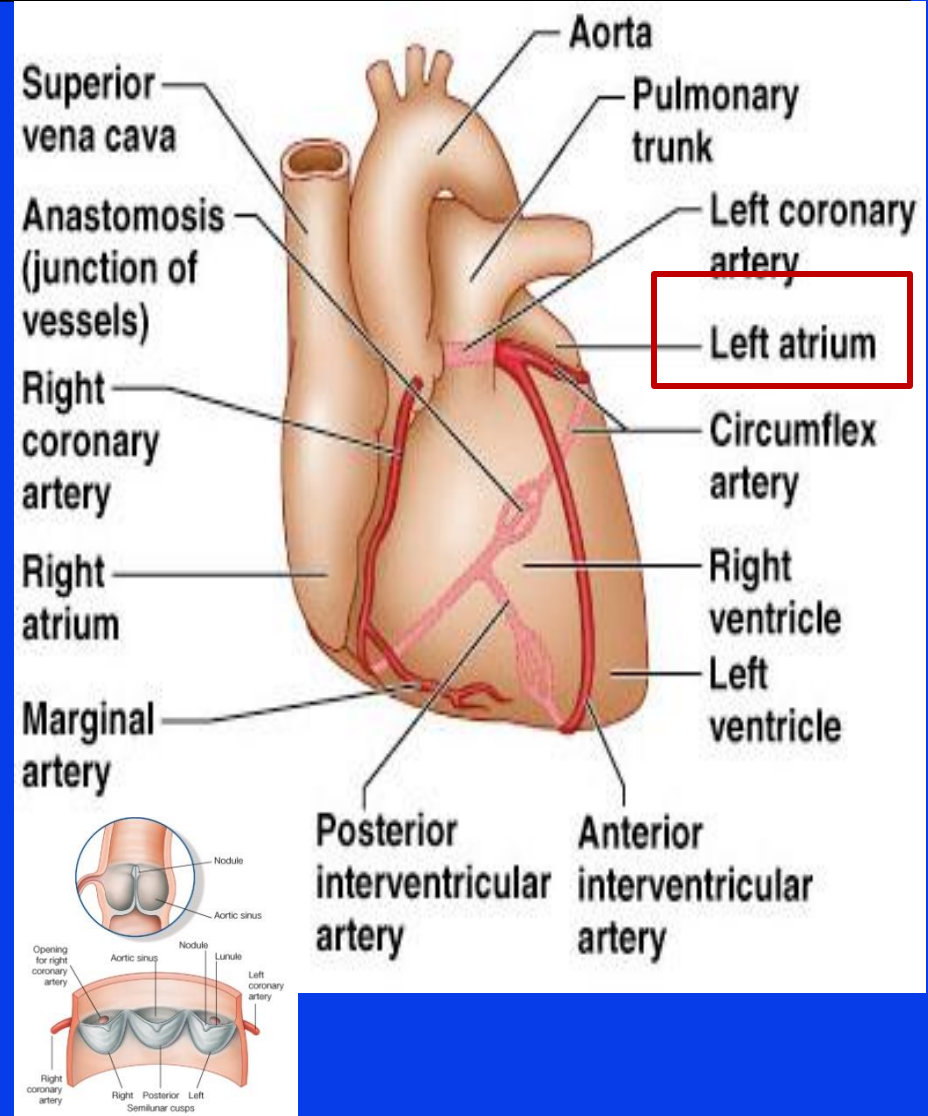


(7) Posterior interventricular arteries ;

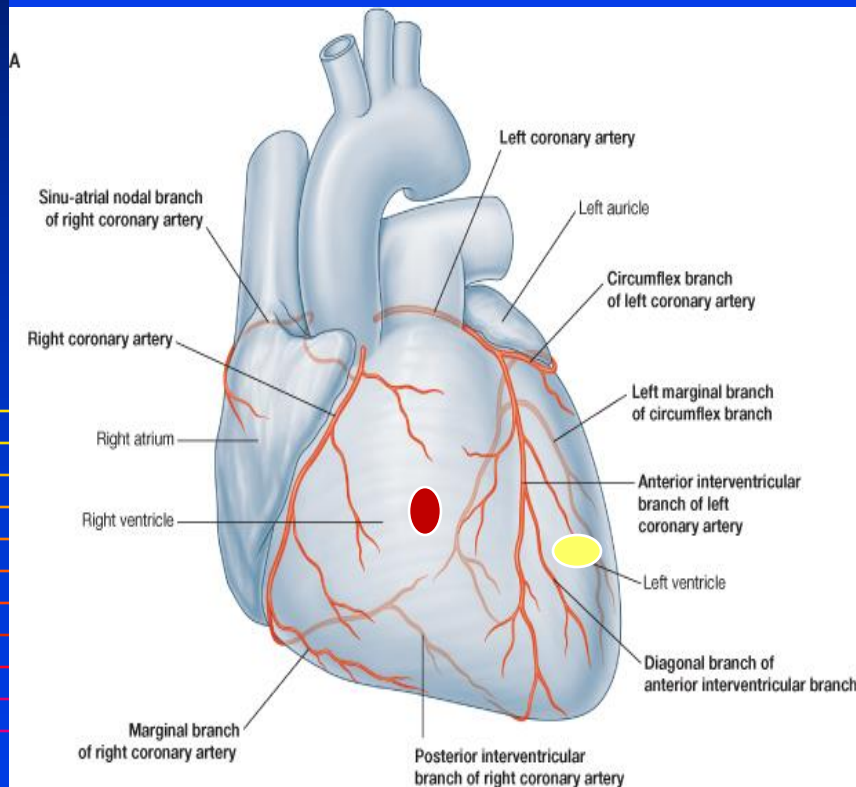
- Runs toward the apex, to supplies:
- a. Diaphragmatic surface of the R & L Ventricles.
- b. Posterior part of the IVS excluding its **Apex**.
- C. Septal branch to the AVN.
- (N.b) in 10% it is replaced by a branch from the left coronary

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**

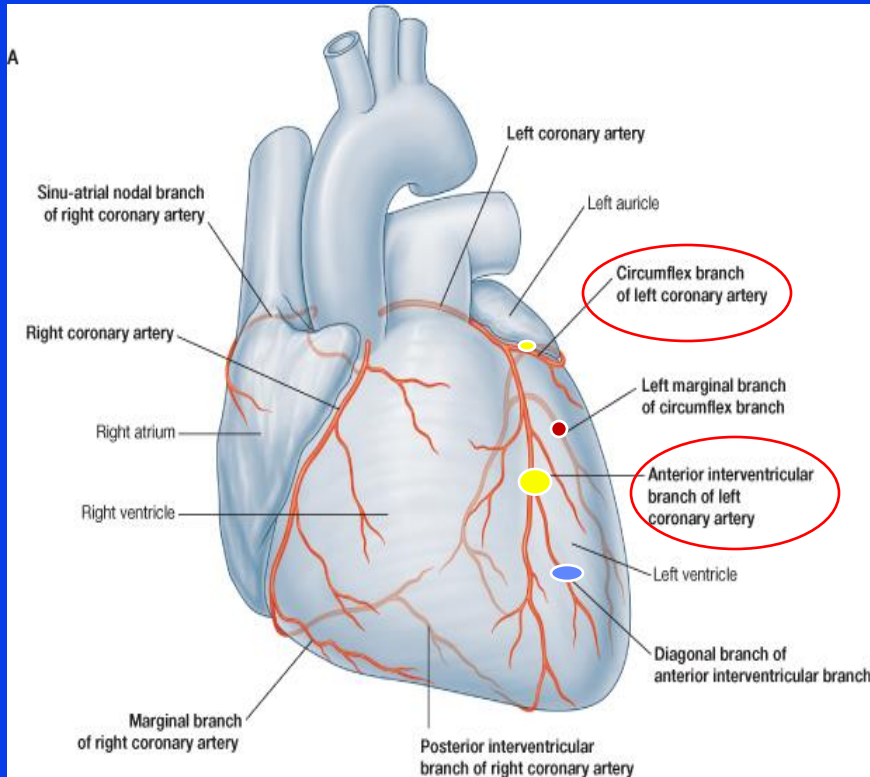


Anterior interventricular artery



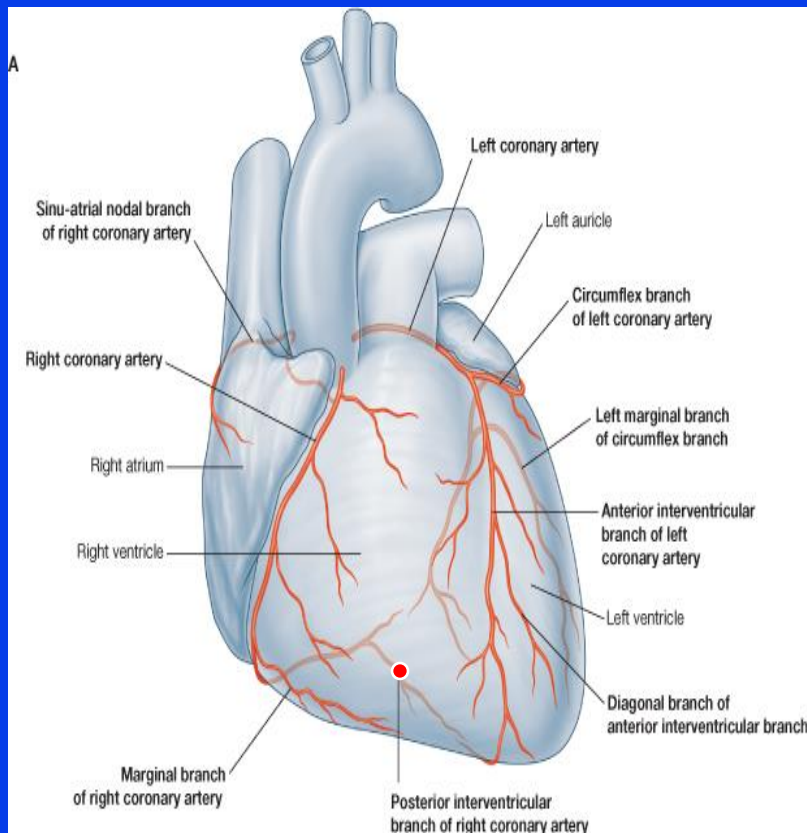
- Descends in the anterior interventricular groove toward the apex of the heart , (in most individuals it passes around the apex and anastomoses with the right coronary in the posterior IV groove, in one third ends at the apex)
- Supplies major part of the heart including;
- Right and left ventricles
- 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

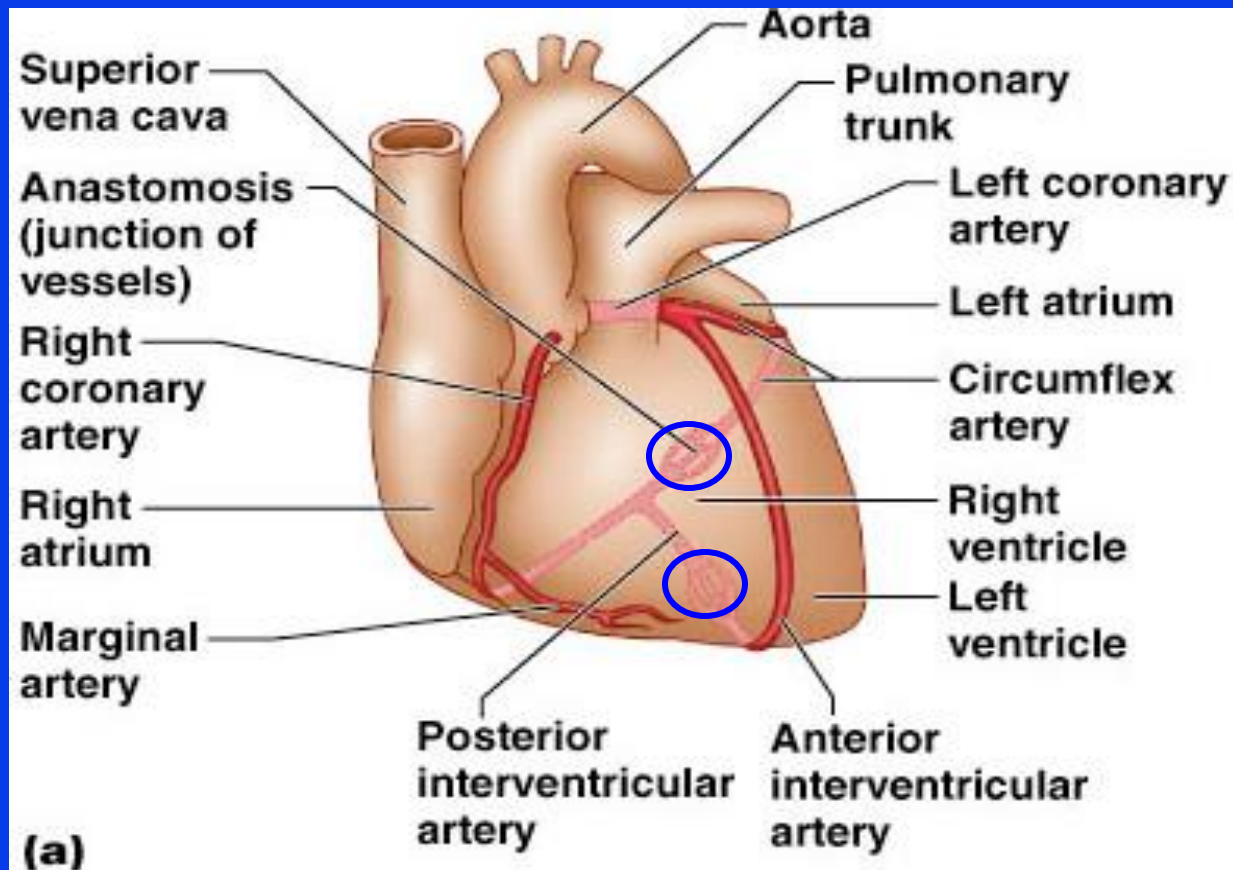


- ❖ **Winds around the left margin of the heart in the atrioventricular groove it gives;**
 - ***Left Marginal artery*** to the left margin of the left ventricle till the apex.
 - ***Anterior ventricular*** and ***Posterior ventricular*** branches to the left ventricle
 - ***Atrial*** branches to the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

Variations of the Coronary Arteries



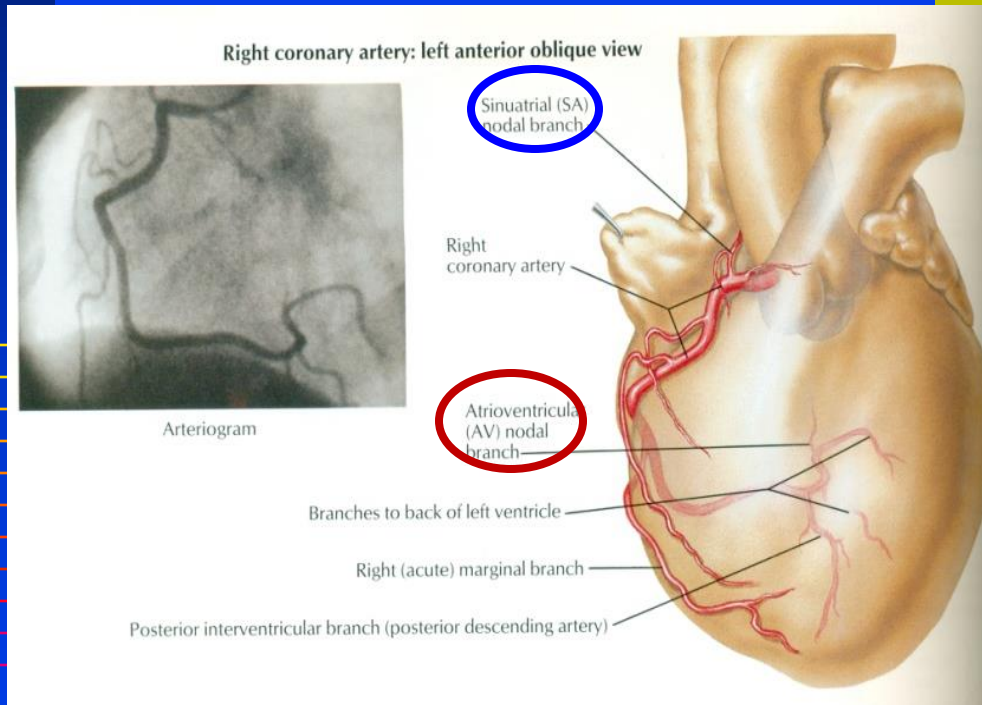
- **Right dominance:**
 - In (90 %) of population, the **Posterior Interventricular** artery is a branch of the Right Coronary.
- **Left dominance:**
 - In the rest (10%), the **Posterior Interventricular artery** arises from the Circumflex branch of the Left Coronary A



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.

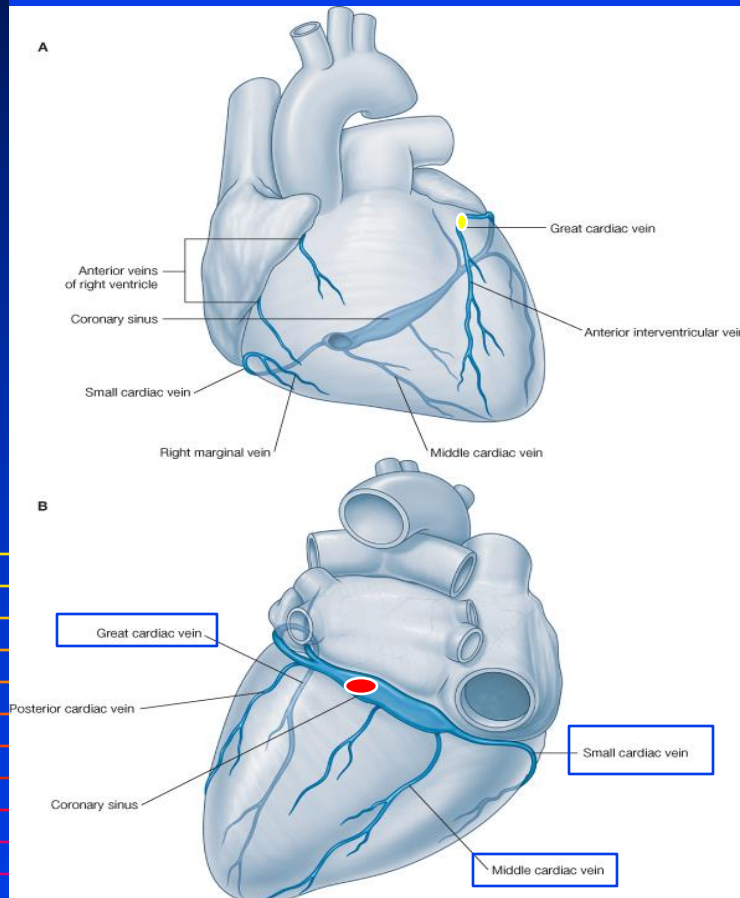
Left bundle branch (LBB) of (AVB) is supplied by both right and left coronaries.

Venous Drainage

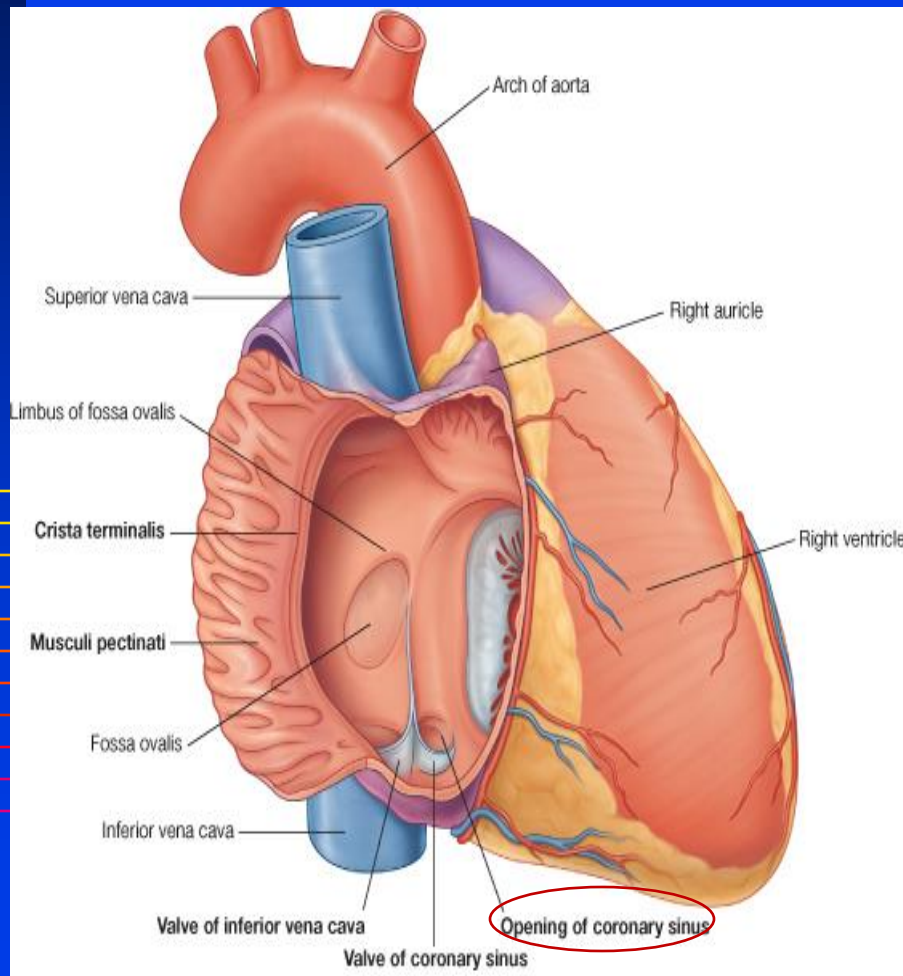
- Blood of the heart is drained into the right atrium through;
- Coronary sinus
- Directly into the right atrium

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.**

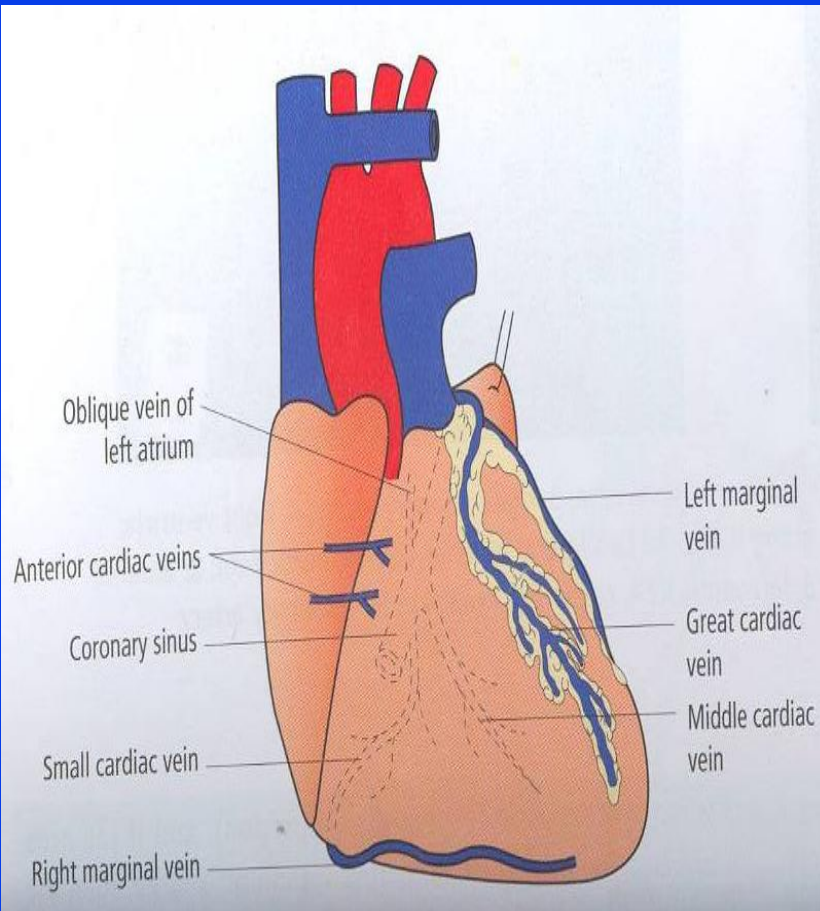


Coronary Sinus



- 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 chambers*

Thank you