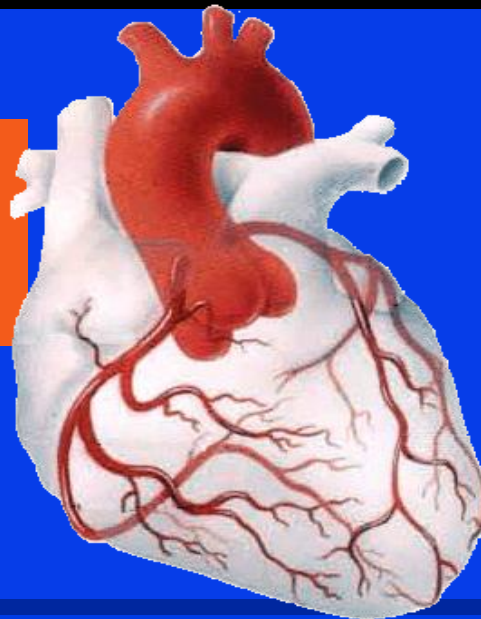


BLOOD SUPPLY OF THE HEART

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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

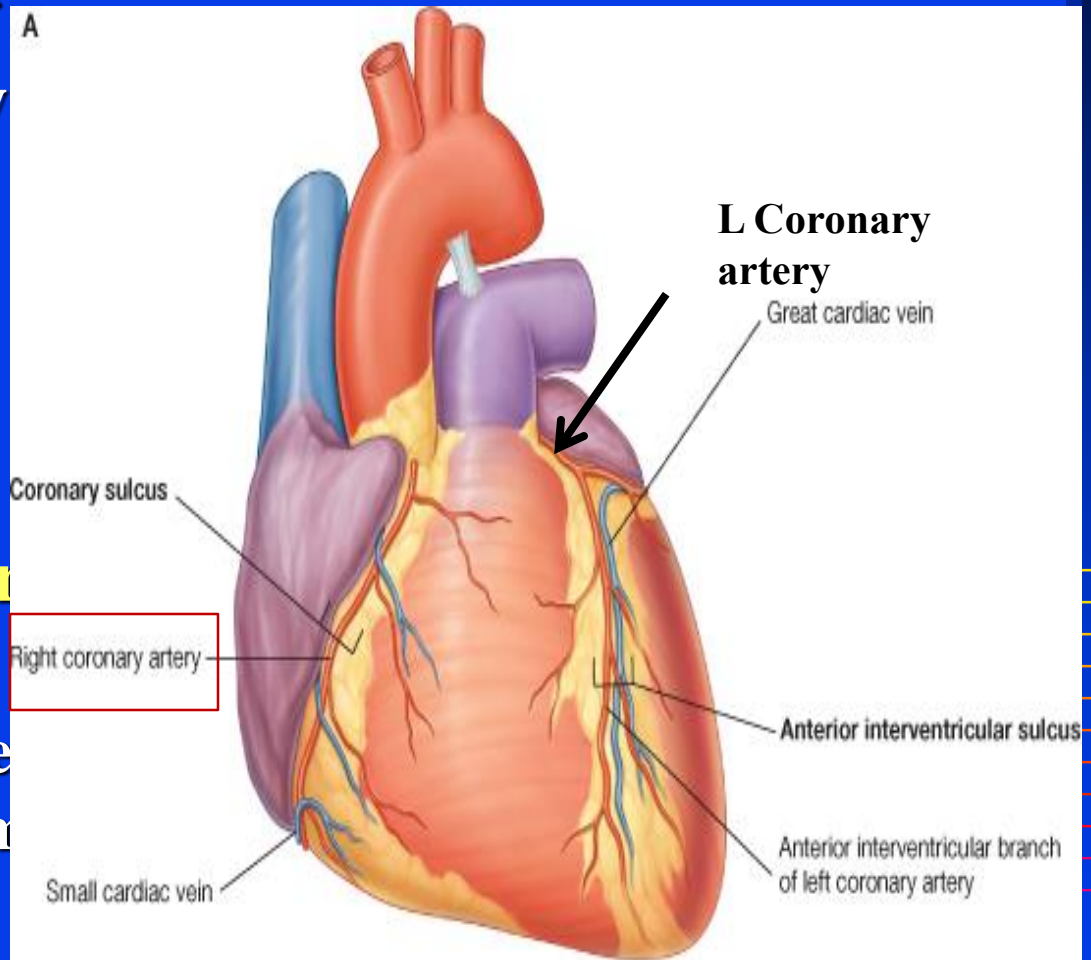
□ The arterial supply of the heart is provided by

Two Coronary Arteries :

▪ **Right Coronary artery &**

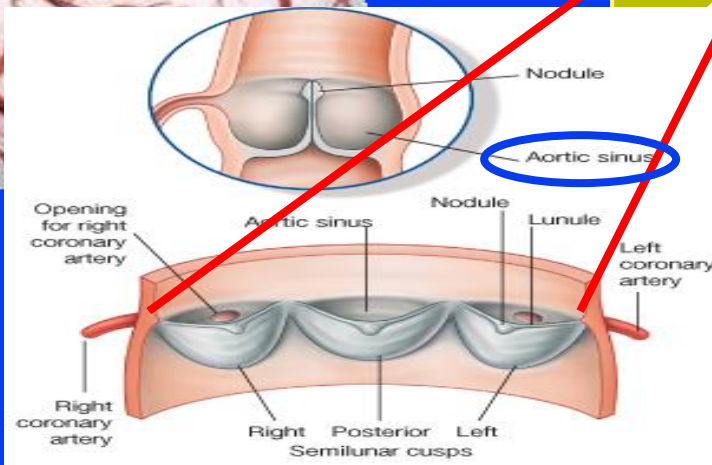
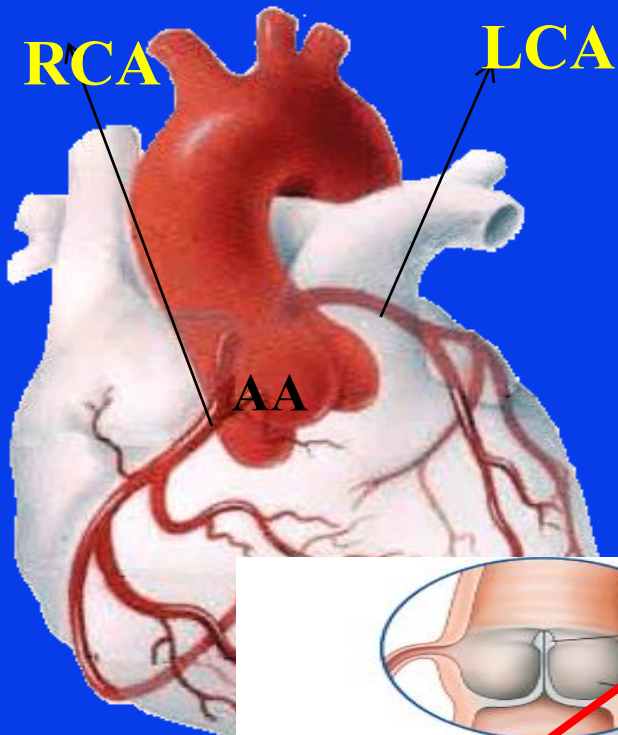
▪ **Left Coronary artery**

▪ They are distributed over the cardiac surface within the subepicardium connective tissue.



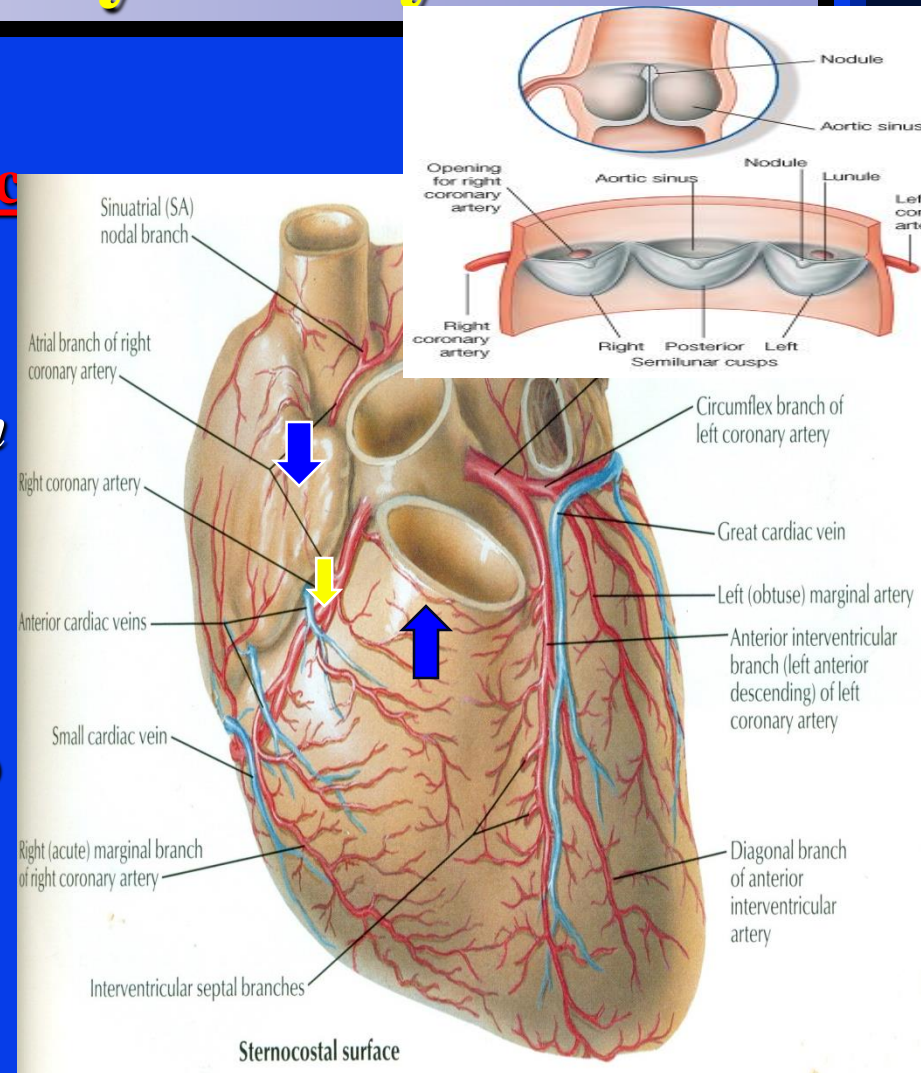
Origin of Coronary Arteries

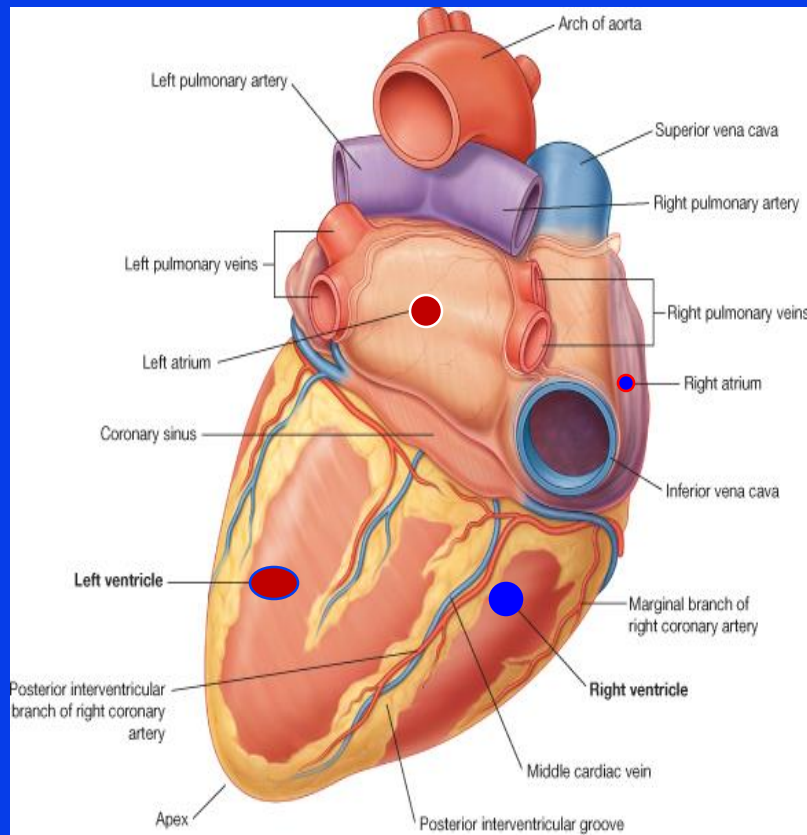
- *They arise from the initial part of the Ascending Aorta (Aortic Sinuses), immediately above the aortic valve.*



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 **continues posteriorly** to anastomose with the left coronary.





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

Branches

Right Conus;

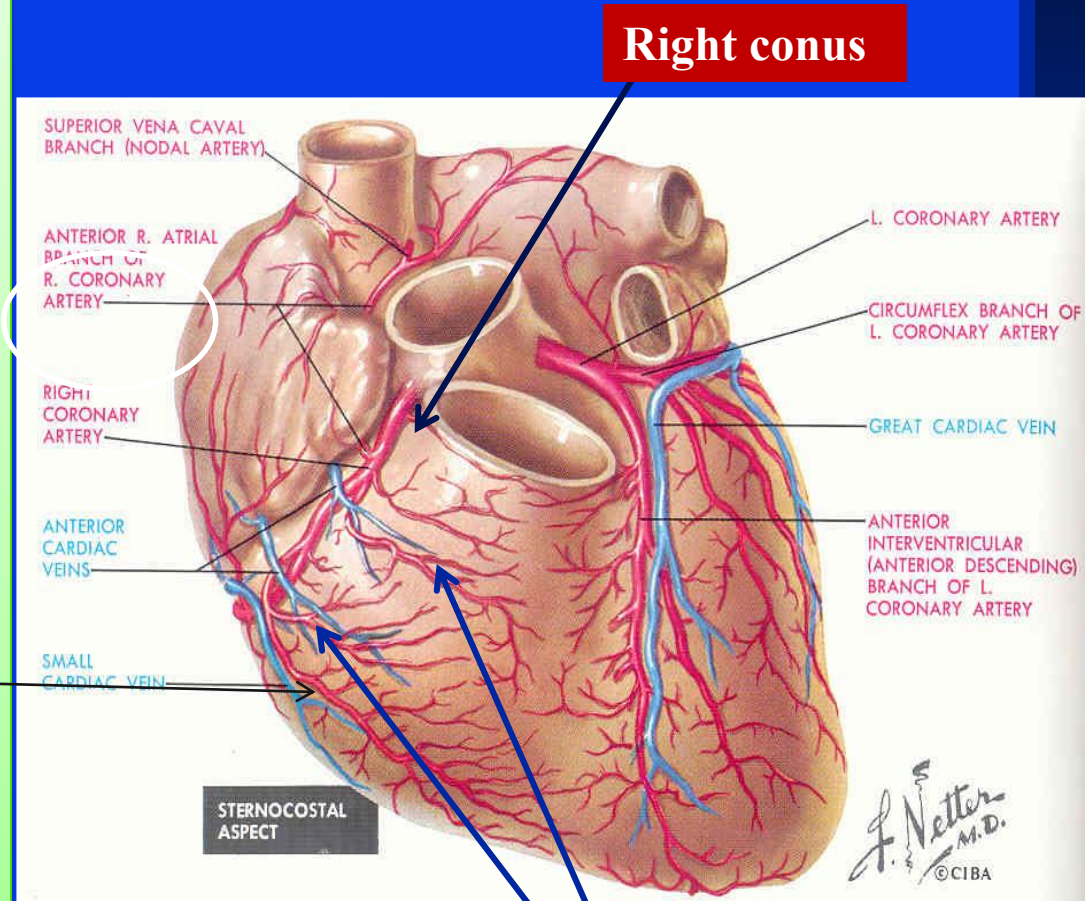
For infundibulum and upper part of anterior wall of the right ventricle.

Anterior ventricular branches;

2-3 branches supply anterior surface of the right ventricle.

Marginal artery is the largest branch, runs along the lower margin of the sternocostal surface.

It is accompanied by the Small Cardiac vein.



Atrial branches;

Supply anterior and lateral surfaces of the right atrium

One branch supplies posterior surface of both atria

Artery of the Sinuatrial Node

Supplies the SAN and both atria

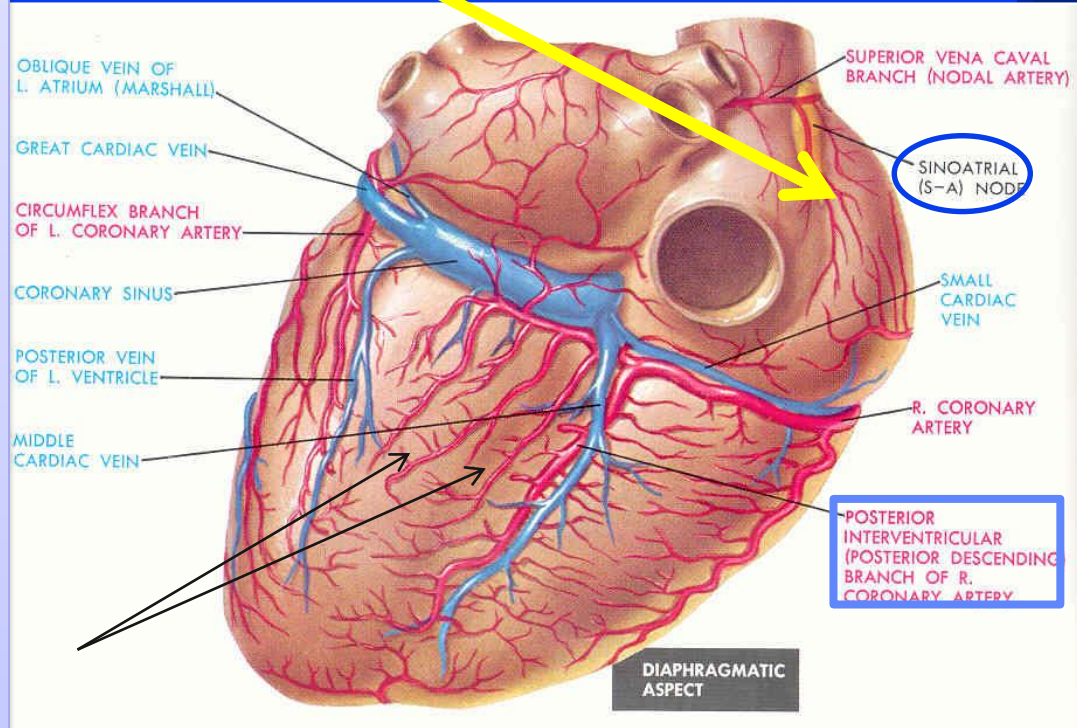
In 35% it arises from the left coronary.

Posterior ventricular branches;

About 2 supply the diaphragmatic surface of the right ventricle.

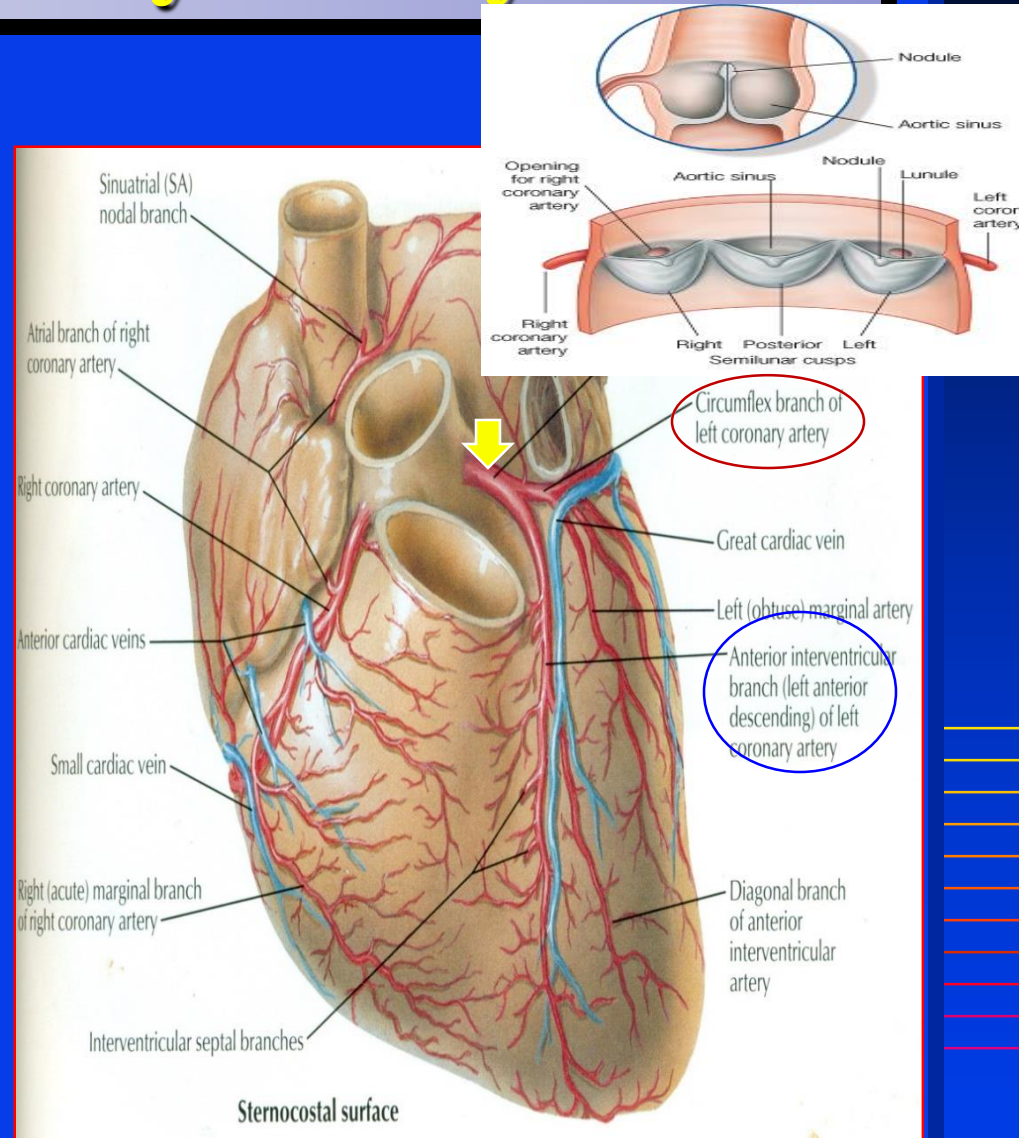
Posterior Interventricular artery; (accompanied by Middle Cardiac vein)

Lies in the posterior interventricular groove, it supplies the Right and Left Ventricles, including their inferior wall, posterior part of ventricular septum, **Not the Apical part,**



Left Coronary Artery

- ❑ The Larger of the two coronaries.
 - ❑ Arises from the left posterior aortic sinus of the ascending aorta.
 - ❑ Descends:
 - ❑ 1. Between the pulmonary trunk and the left auricle.
 - ❑ 2. In the **IV groove** to the apex of the heart.
- Divides into two terminal branches:**
- Anterior Interventricular & Circumflex arteries.***



Branches

(A) Anterior Interventricular

Descends in the anterior interventricular groove to the apex of the heart (accompanied by the Great cardiac vein)

in most individuals it passes around the apex to anastomose with terminal branches of the right coronary, in 1/3 it ends at the apex) It supplies the right and left ventricles and anterior part of ventricular septum

It gives:

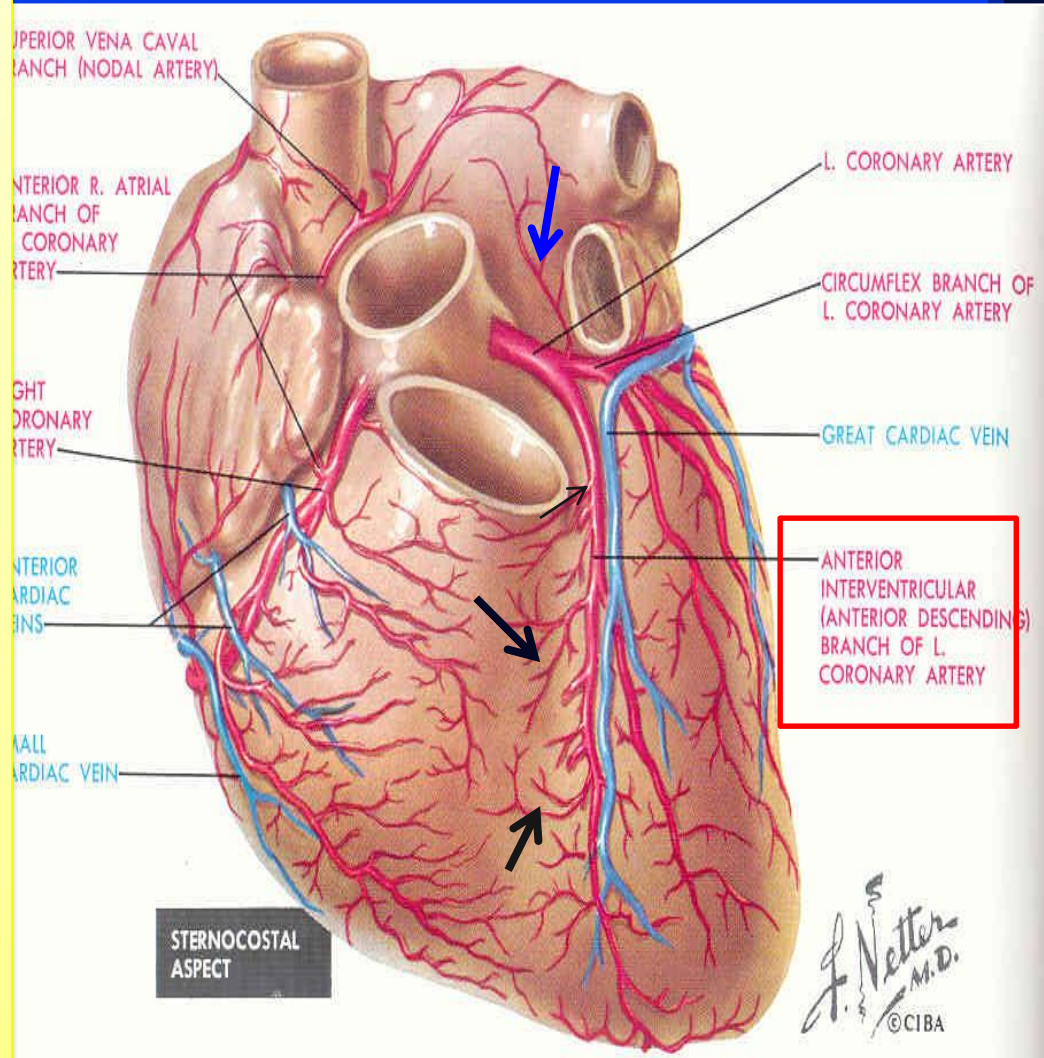
1. Left conus artery for pulmonary conus.

2. Anterior ventricular and Posterior ventricular ;

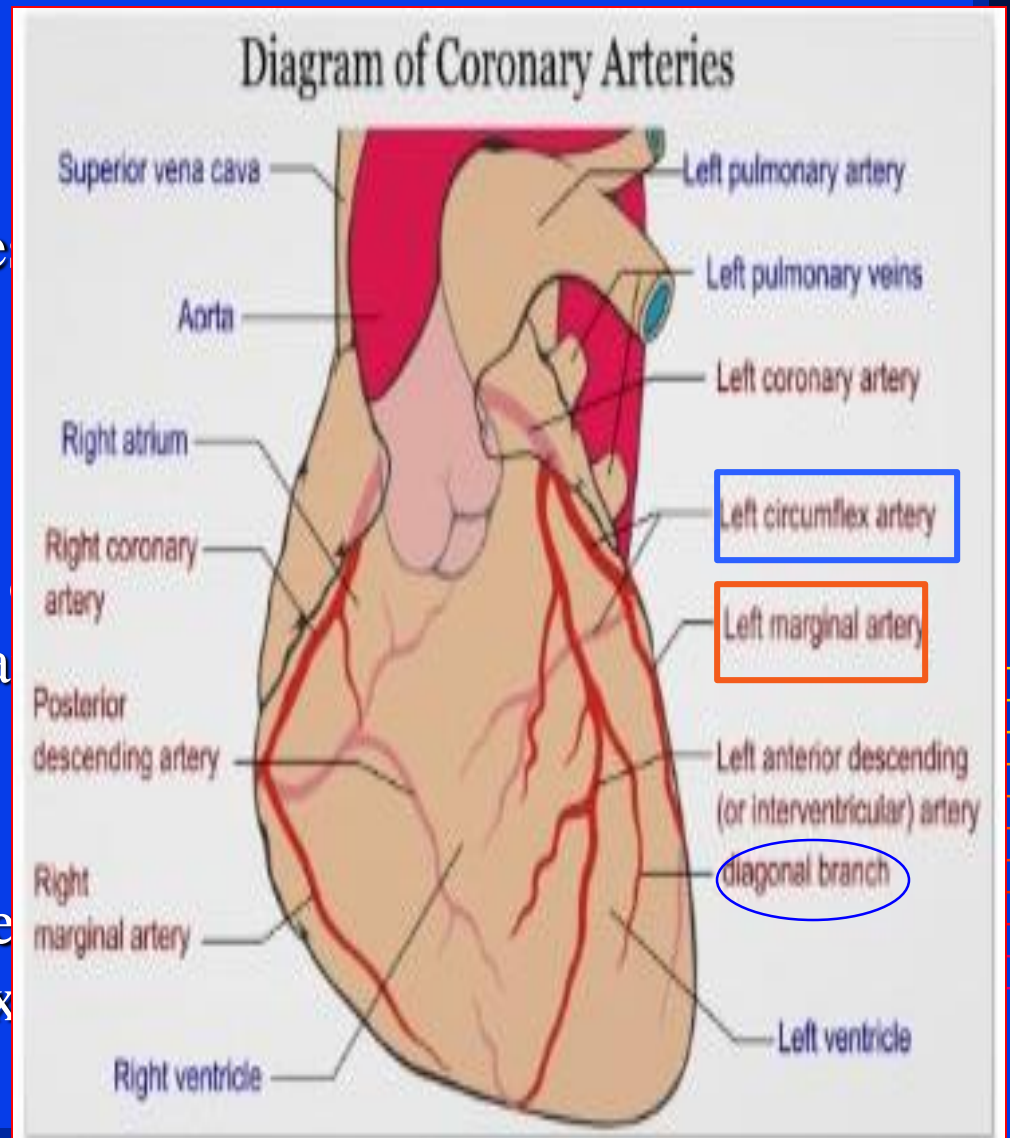
Supply left ventricle

3. Atrial branches ;

Supply greater part of left atrium

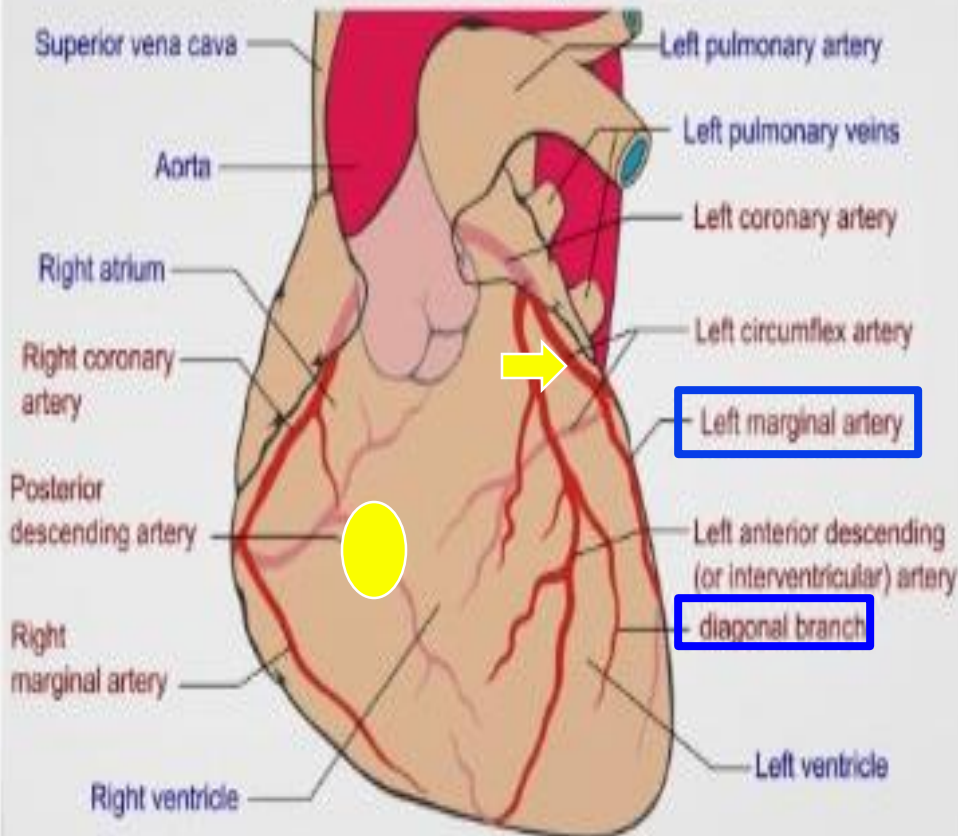


- **4. Left diagonal artery**
- one of the ventricular branches or may arise from left coronary,
- **(B) Circumflex Artery;**
- Winds around the left margin of the heart in the atrioventricular groove
- **C. Left Marginal artery ;**
- Supplies the left margin of the left ventricle down to the apex



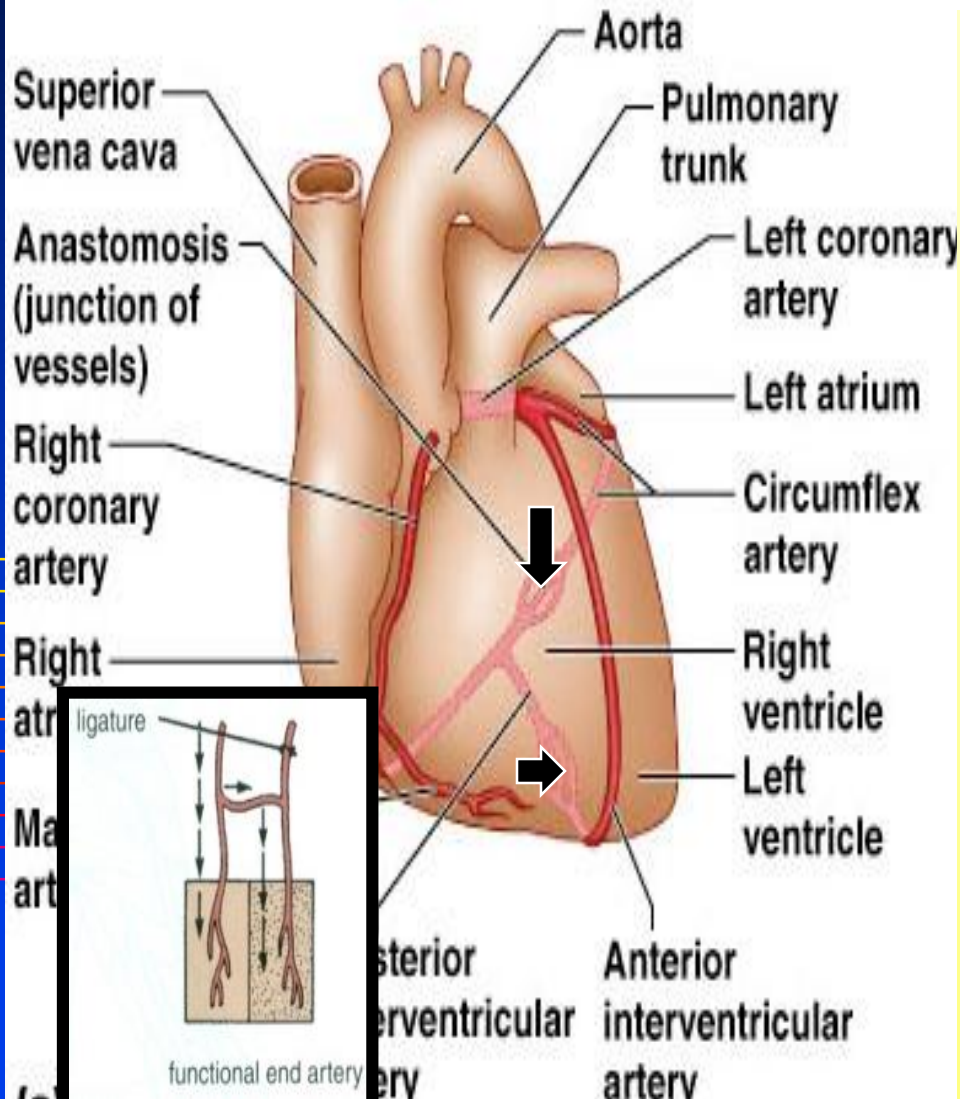
Variations of the Coronary Arteries

Diagram of Coronary Arteries



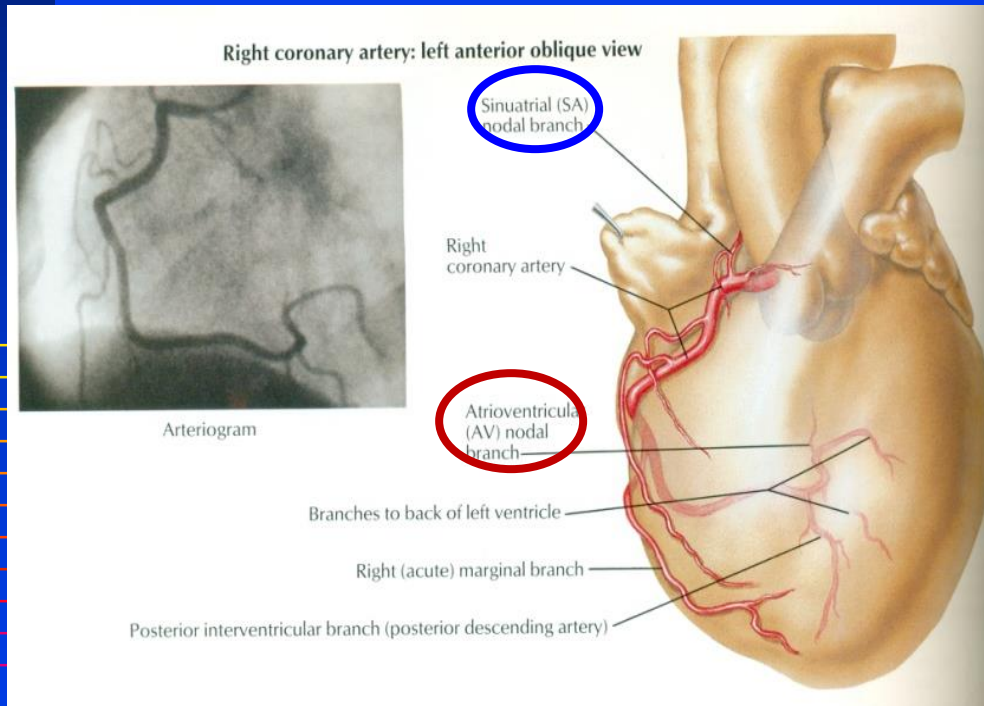
- **Right Dominance:**
- **In (90 %) of population, the Posterior Interventricular artery is a branch of the Right Coronary.**
- **Left Dominance:**
- **In the rest (10%), the Posterior Interventricular artery arises from the Circumflex branch of the Left Coronary A**

Coronary Anastomosis



- ***In MOST of people, the terminal branches of the right and left coronaries anastomose in the posterior part of the IV groove***
- **However this anastomoses is not large enough to provide adequate blood supply in case of coronary occlusion, (**Functional End arteries**)**

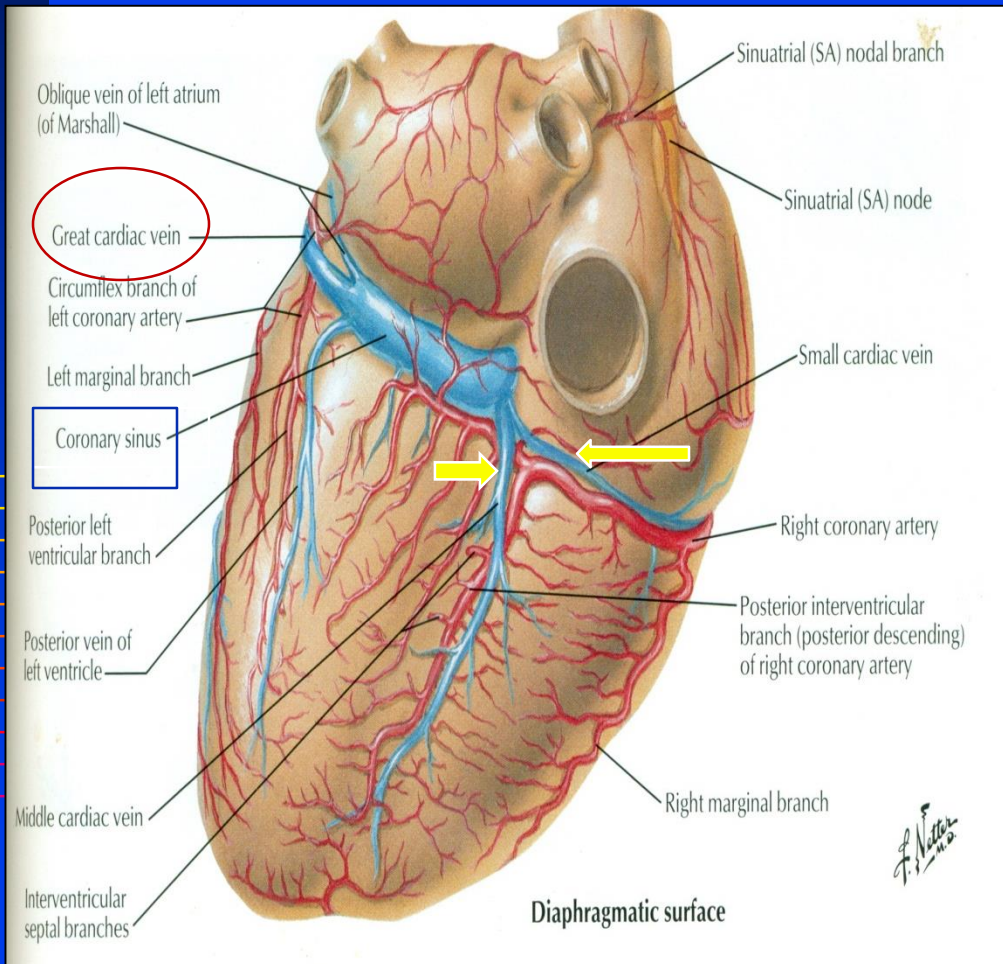
Arterial Supply of Conducting System



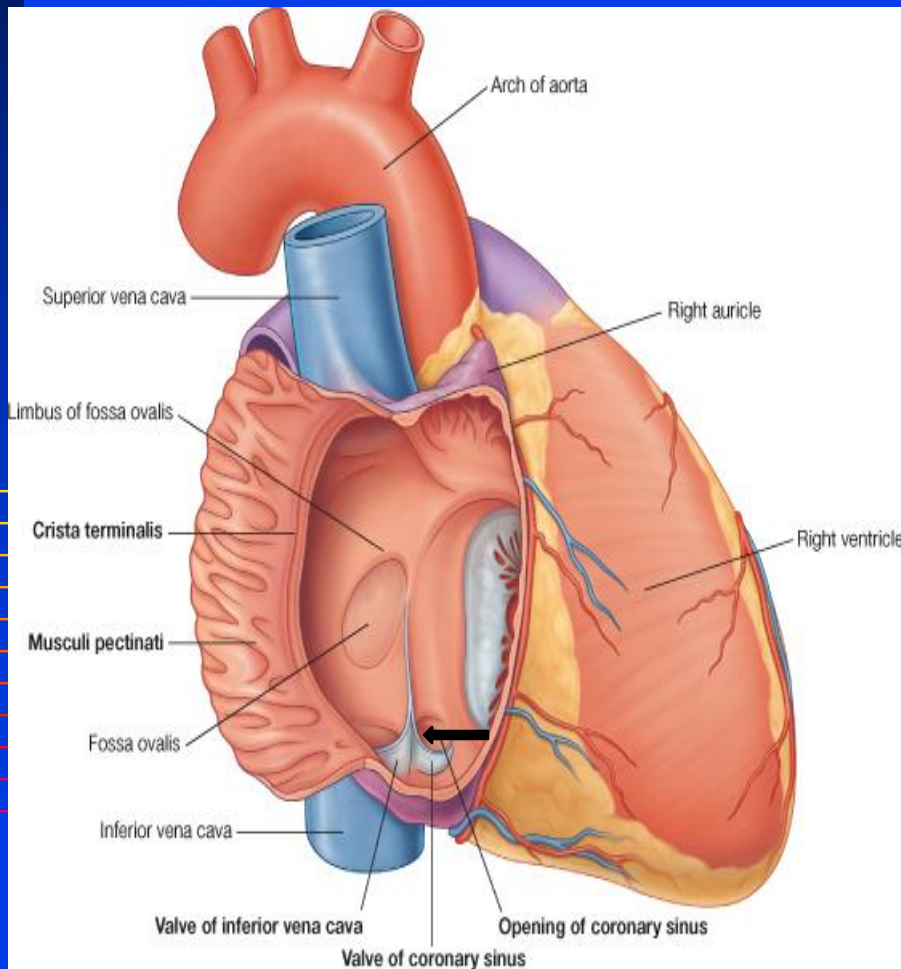
- **SAN, AVN & AVB are usually supplied by Right coronary.**
- **Right Bundle Branch (RBB) of (AVB) is supplied by Left coronary**
- **LBB of (AVB) is supplied by both Right and Left coronaries**



Coronary Sinus

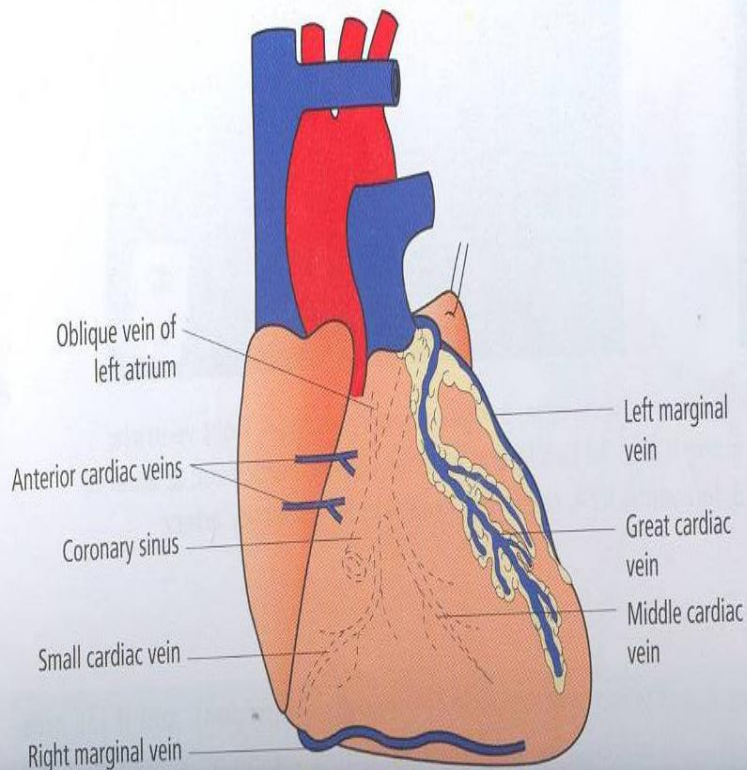


- ❑ **Drains most of the Venous Blood of the heart.**
- ❑ **It lies in the Posterior part of the AV groove.**
- ❑ **Origin :**
- ❑ **It is the direct continuation of the Great Cardiac Vein.**
- ❑ **Tributaries:**
- ❑ **(3) Cardiac Veins:**
- ❑ **A. Great.**
- ❑ **B. Middle.**
- ❑ **C. Small.**
- ❑ ***Oblique vein of left atrium (vein of Marshall).***



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

Veins Draining outside Coronary Sinus



- **1. Anterior cardiac veins:**
- **Open directly into the Right Atrium.**
- **2. Venae Cordis minime (small cardiac veins):**
- **Open into the heart chambers.**

Thank You