

Thoracic cavity & contents

Pericardium & Heart

Lecture 3

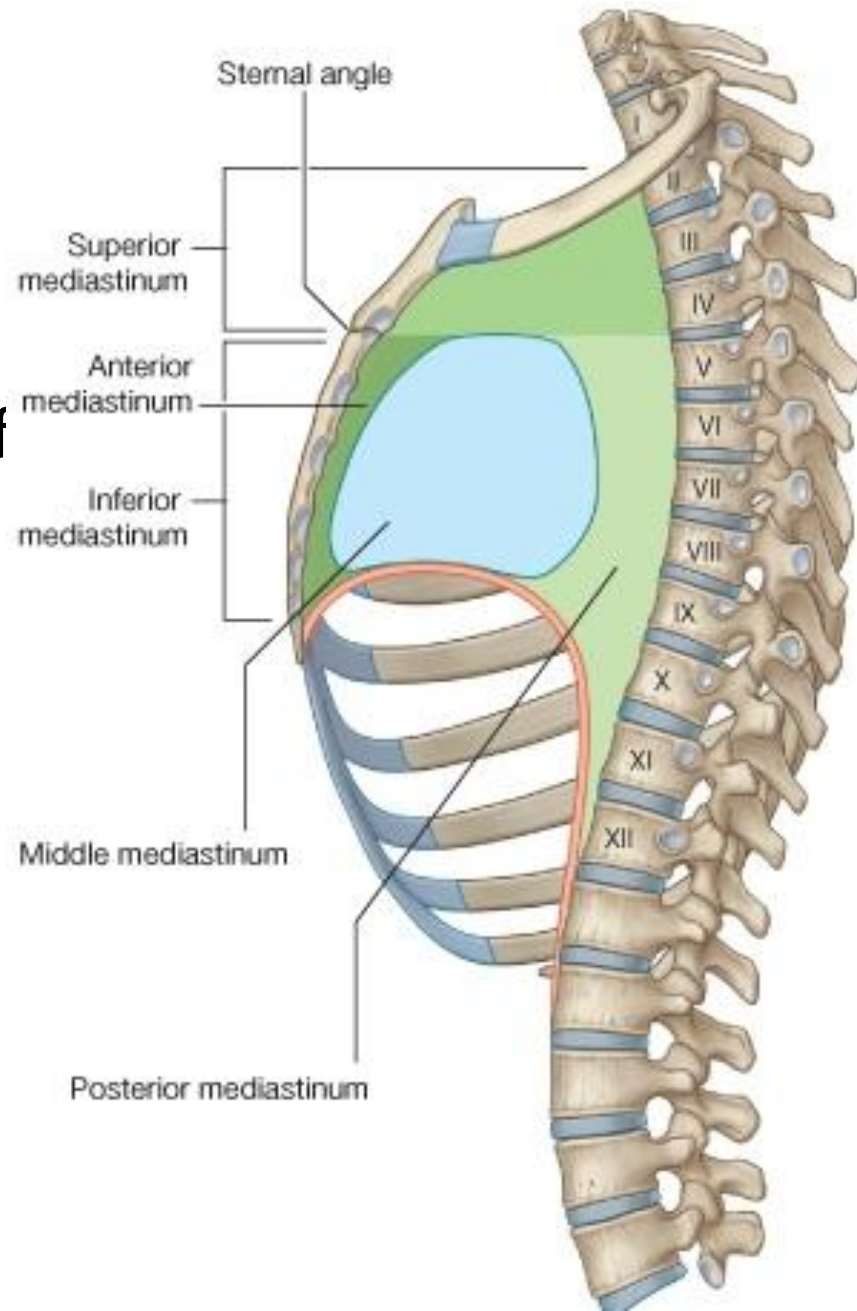
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MSc. Human Anatomy

Pericardium

It is a fibroserous sac enclosing heart and roots of great vessels. Pericardium lies within middle mediastinum, posterior to body of sternum and **2nd - 6th costal cartilages** and anterior to **5th - 8th thoracic vertebrae**.

It is composed of two layers

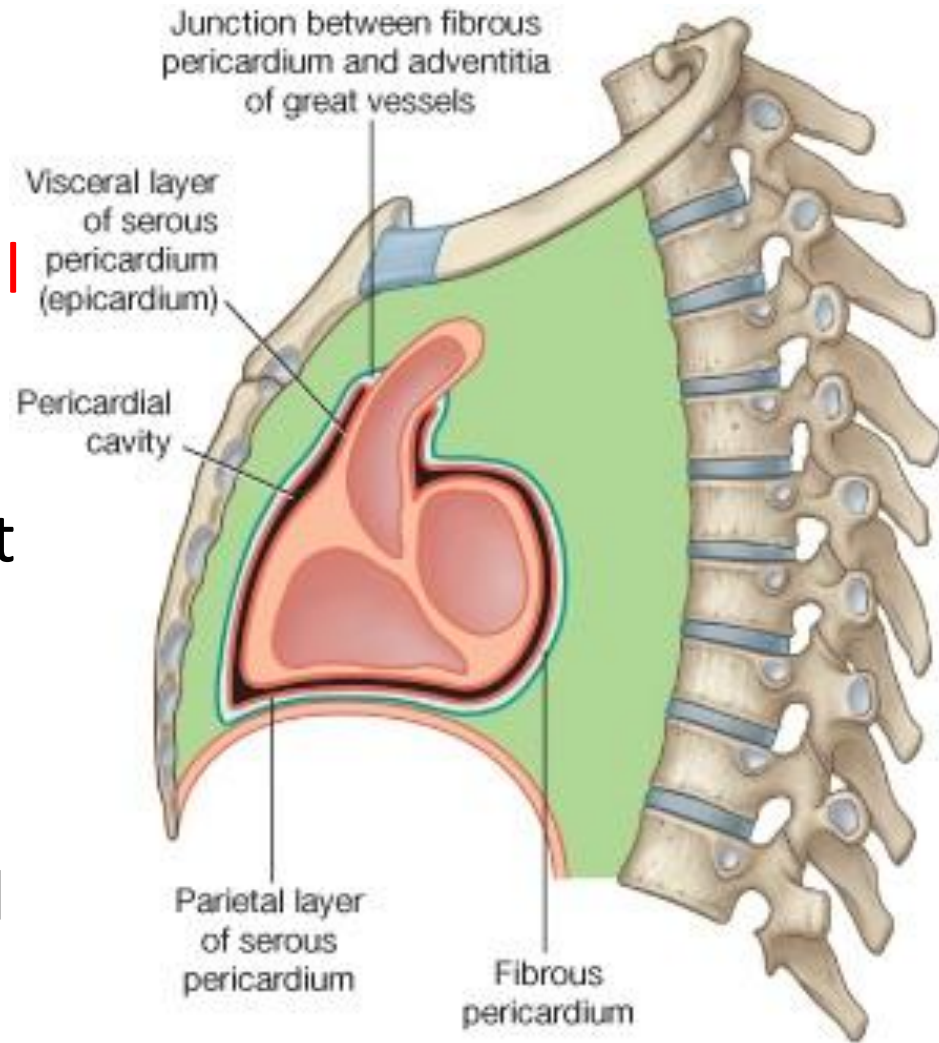
- A. Fibrous Pericardium**
- B. Serous Pericardium**



Pericardium

Fibrous Pericardium

Fibrous pericardium is strong fibrous part of the sac. It is firmly attached below to **central tendon** of the diaphragm. It fuses with outer coats of great blood vessels passing through it (**aorta, pulmonary trunk, superior and inferior venae cavae, and pulmonary veins**). Fibrous pericardium is attached in front to **sternum** by **sternopericardial ligaments**.



Pericardium

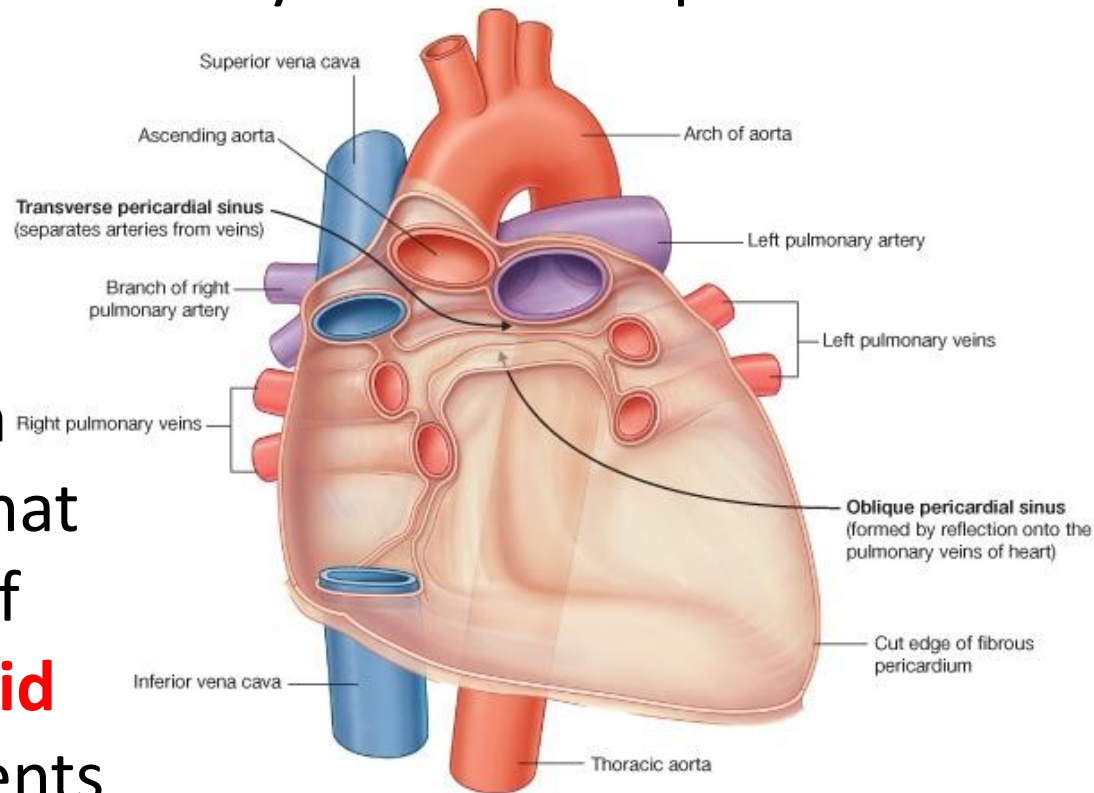
Serous Pericardium

It lines fibrous pericardium and coats heart. It is divided into **parietal & visceral layers**. Parietal layer lines fibrous pericardium & is reflected around roots of great vessels to become continuous with visceral layer of serous pericardium that closely covers heart.

Visceral layer is called **epicardium**.

Pericardial cavity

is a slit-like space between parietal & visceral layers that contains a small amount of tissue fluid, **pericardial fluid**
To facilitate heart movements



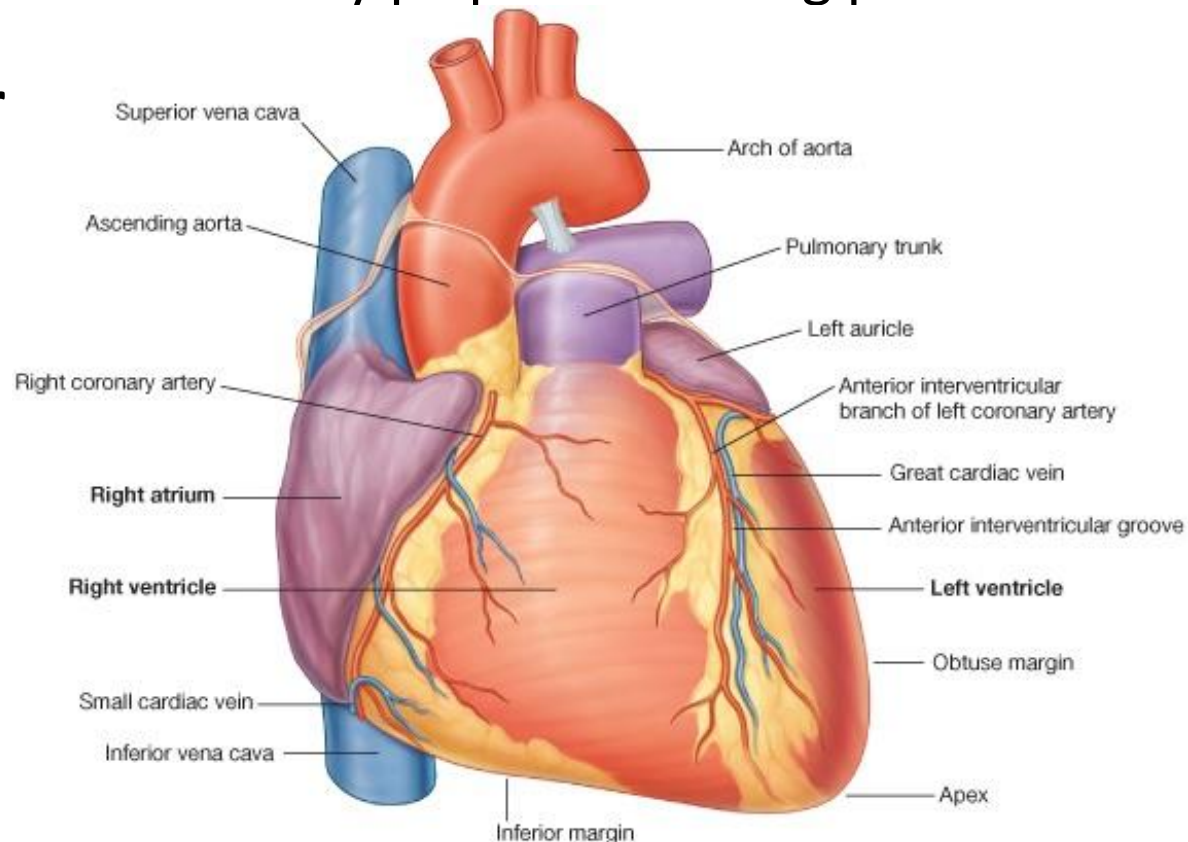
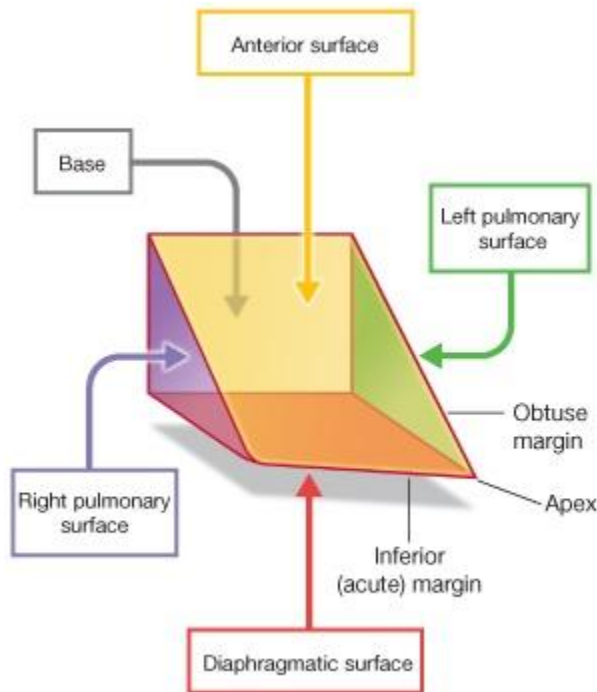
Heart

hollow muscular & pyramid shaped organ that lies freely within pericardium in mediastinum and is connected at its base to great blood vessels.

Heart has **apex** and **3 surfaces**

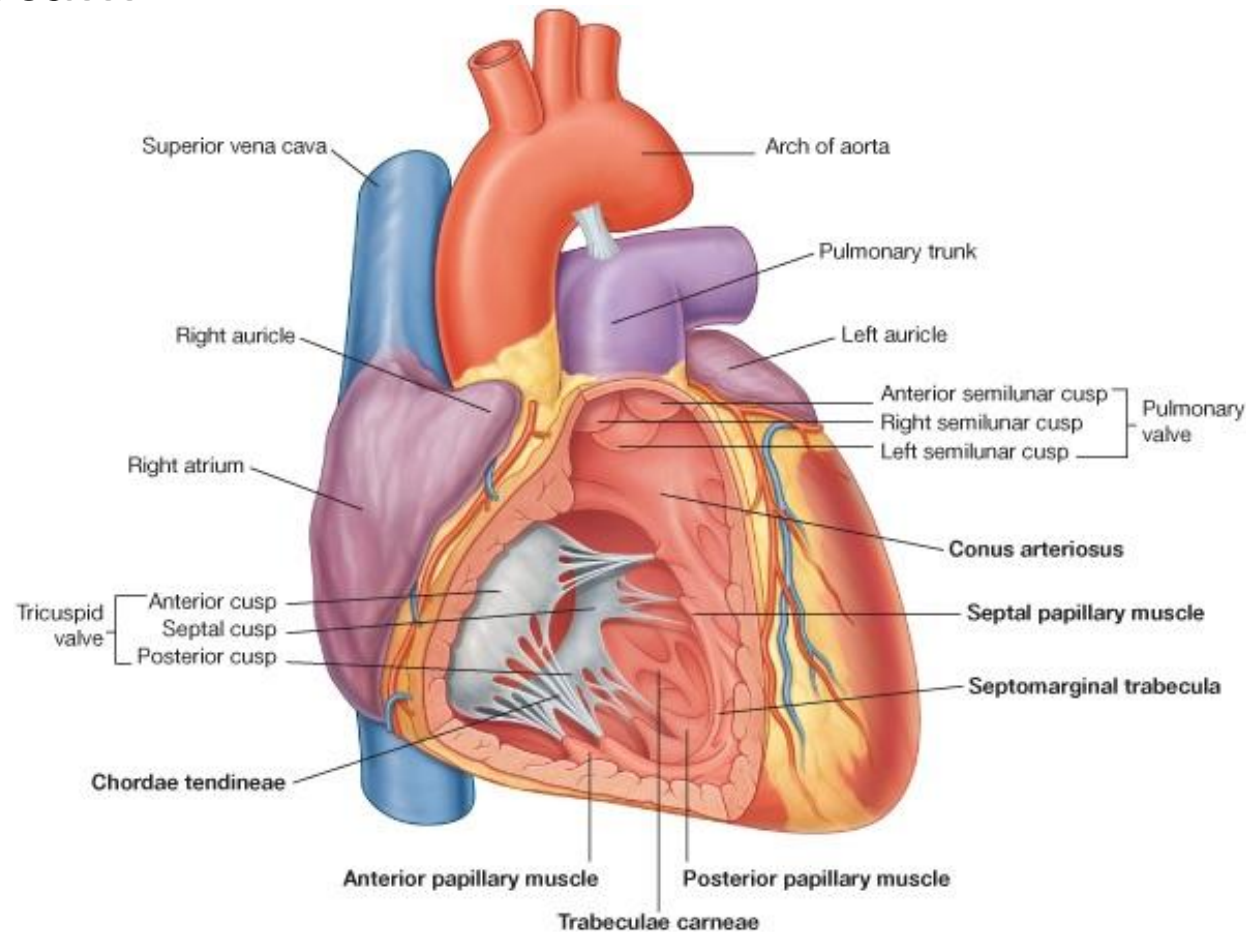
Apex of heart: is formed by left ventricle, **is directed downward, forward, and to the left**. It lies at level of 5th left intercostal space, 9 cm from midline where apex beat can usually palpated in living patient.

Surfaces of the Heart:
Anterior, Inferior, Posterior



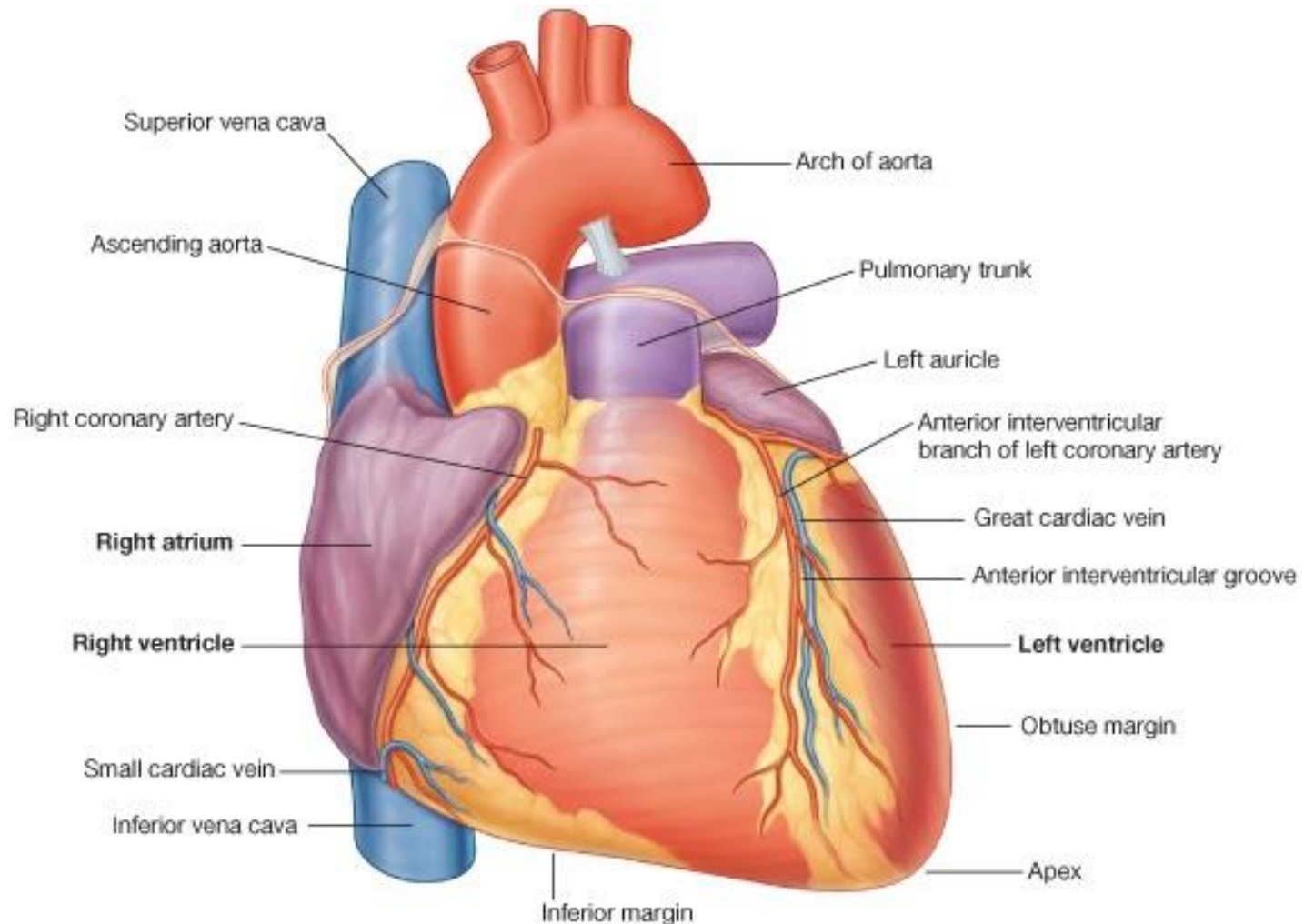
Structure of the Heart

Walls of the heart: are composed of thick layer of cardiac muscle, **myocardium**, covered externally by **epicardium** and lined internally by **endocardium**. Atria are thin-walled and divided by **atrial (interatrial) septum** into right and left atria. Ventricles are thick-walled and divided by **ventricular (interventricular) septum**



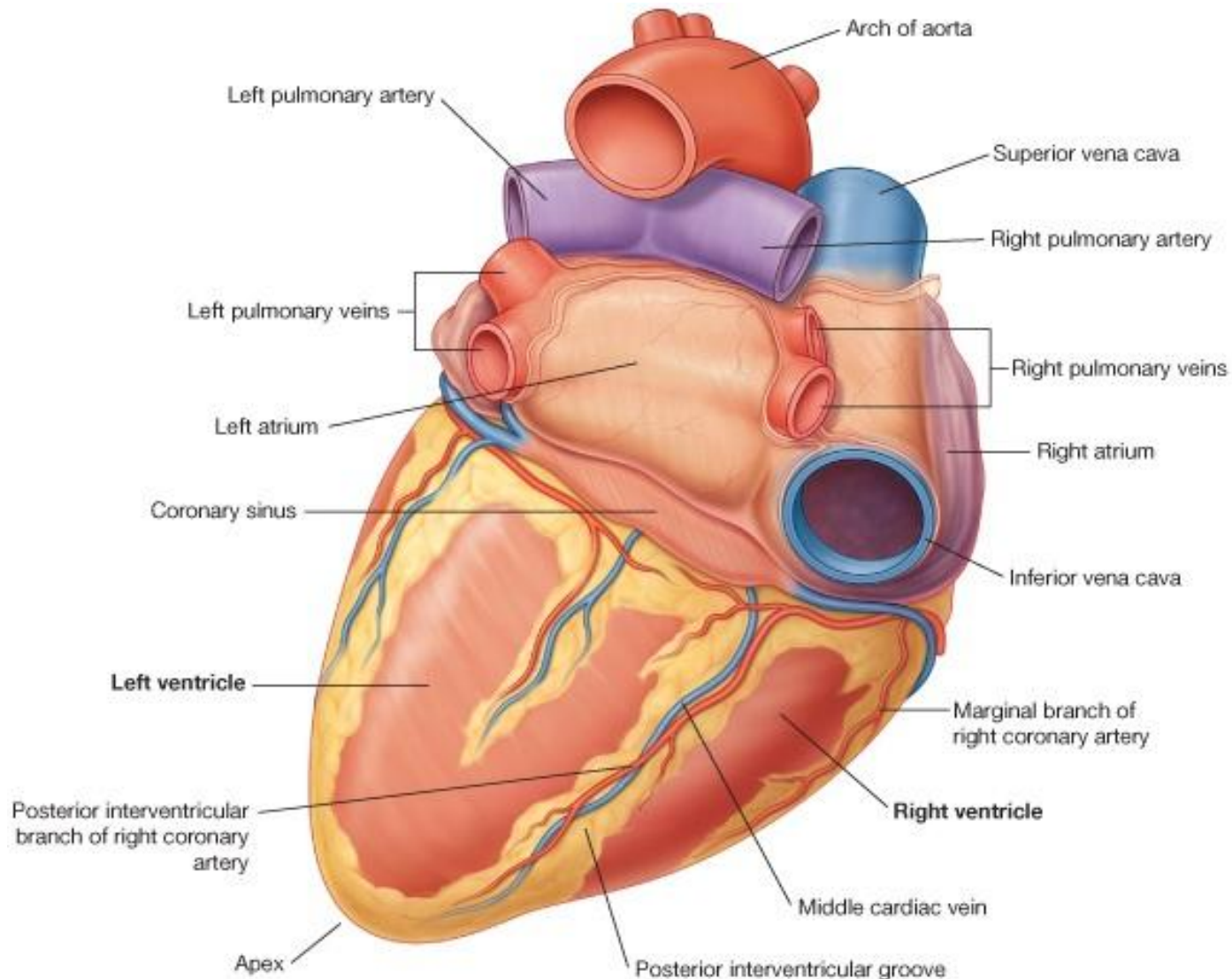
Heart Surfaces

Sternocostal (Anterior) surface: is formed mainly by right atrium and right ventricle, which are separated from each other by vertical atrioventricular groove



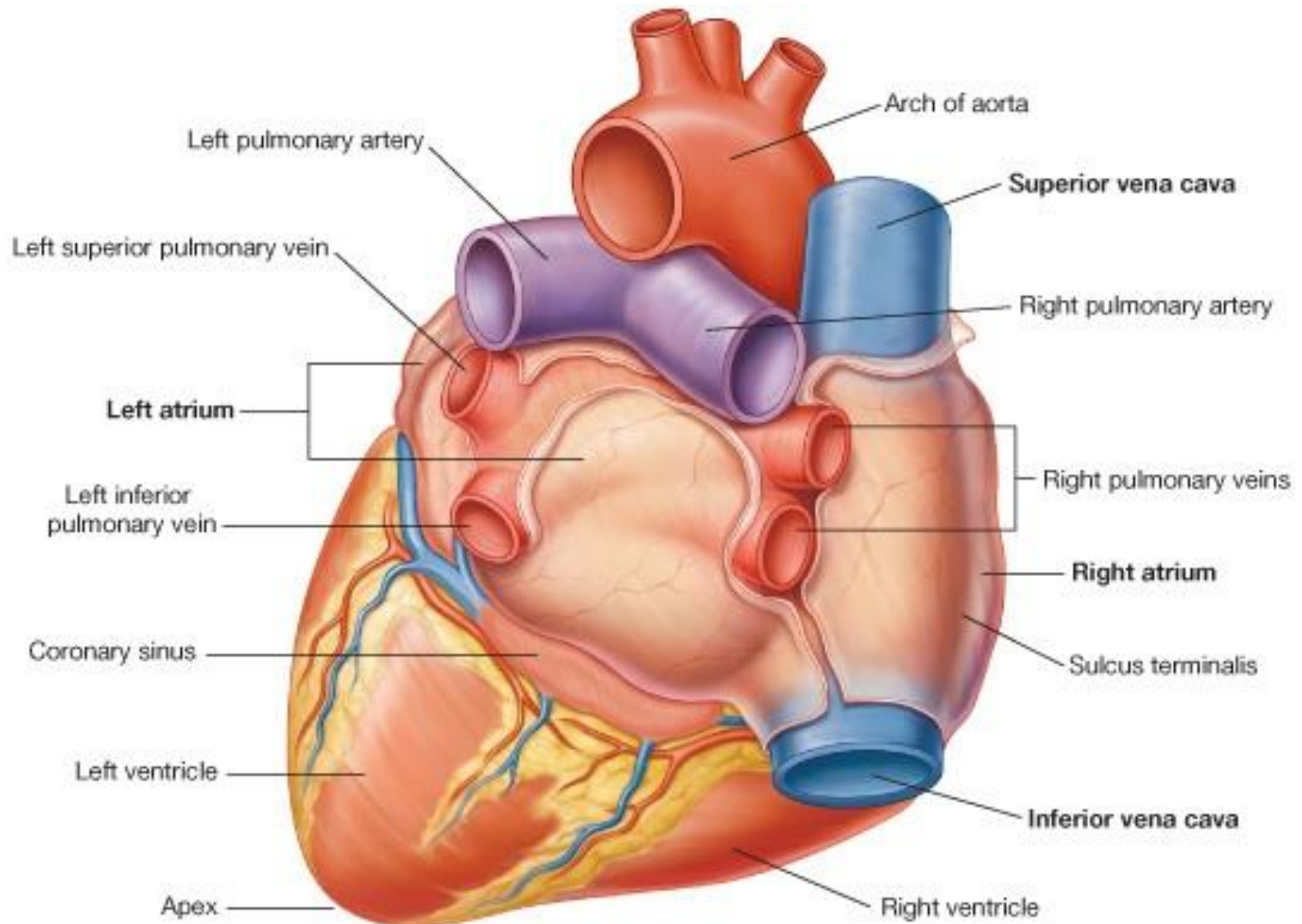
Heart Surfaces

Diaphragmatic (inferior) surface: is formed mainly by right and left ventricles separated by posterior interventricular groove.



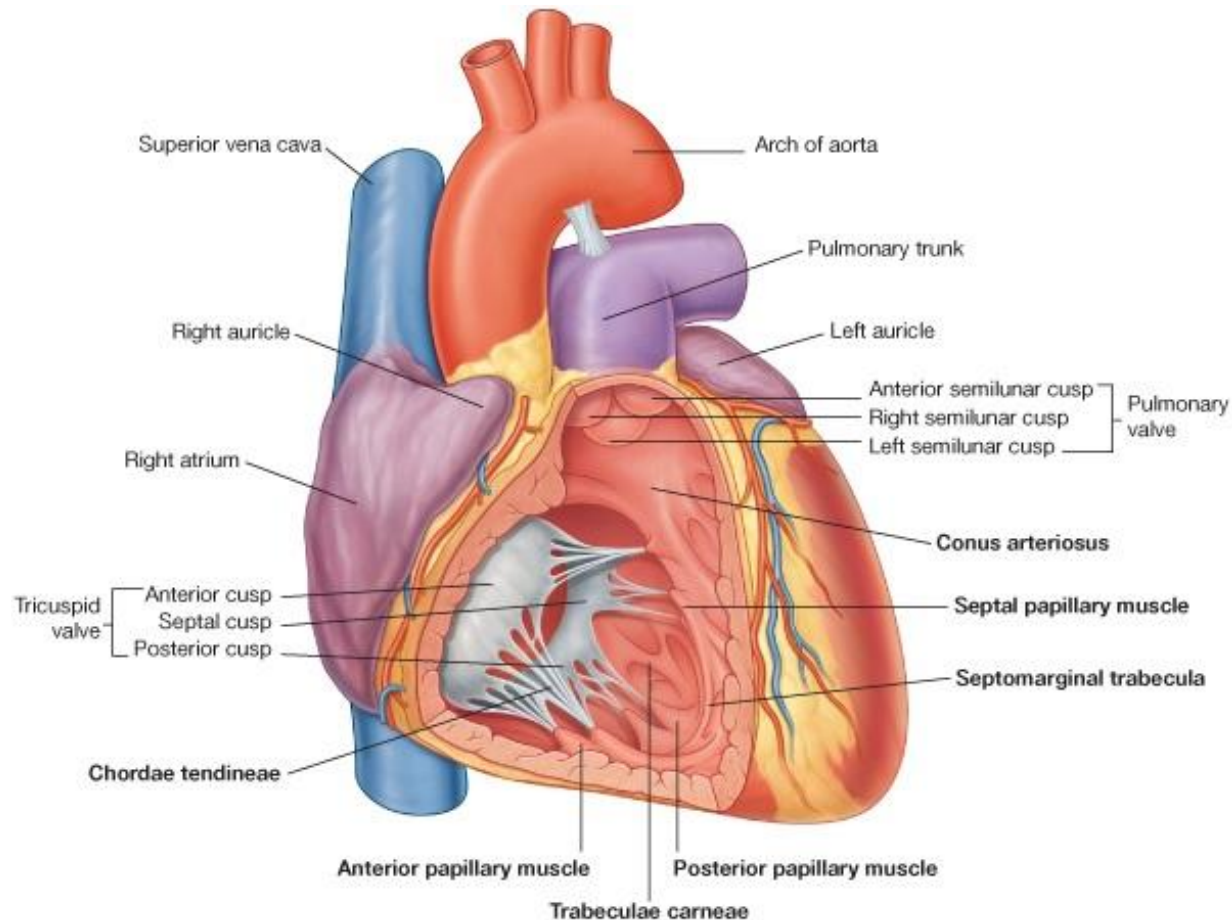
Heart Surfaces

Base of heart, or (posterior surface): is formed mainly by left atrium, into which open four pulmonary veins.



Chambers of the Heart

Heart is divided by vertical septa into four chambers: **right & left atria** and **right & left ventricles**. Right atrium lies anterior to left atrium, and right ventricle lies anterior to left ventricle.



Chambers of the Heart

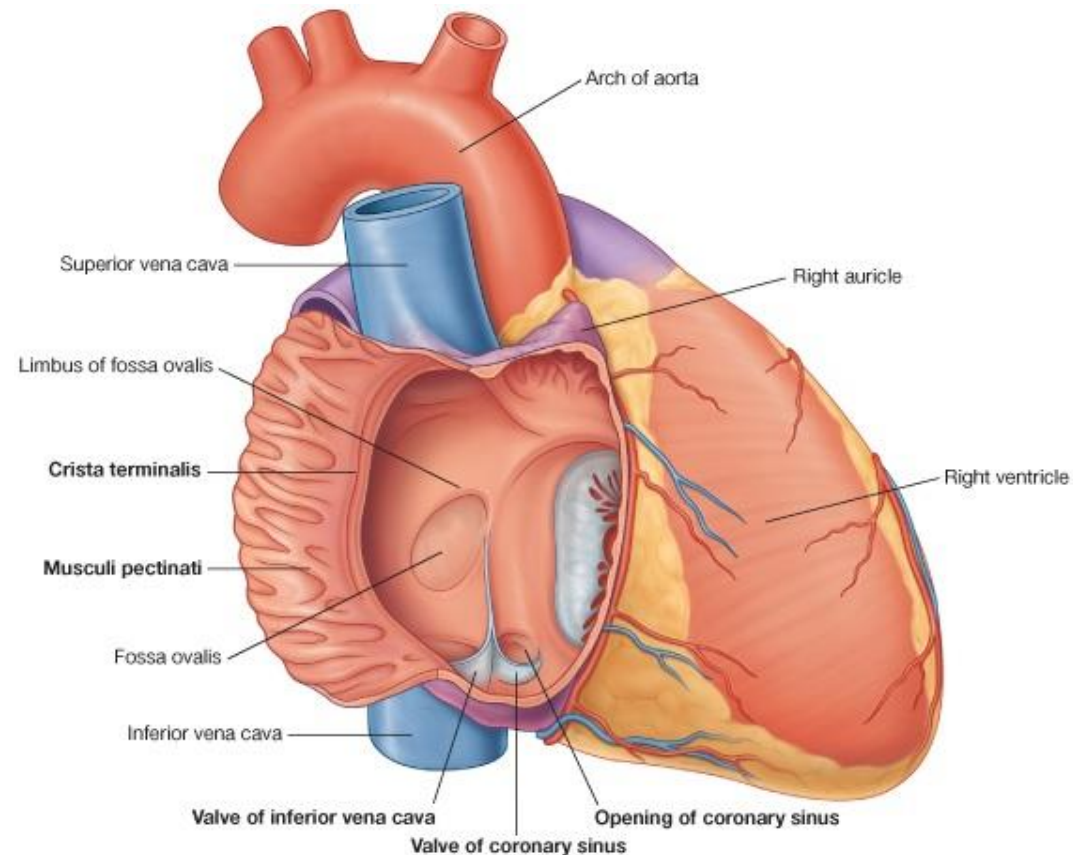
Right Atrium

It consists of a main cavity and a small out-pouching, **auricle**.

Openings into the Right Atrium:

Superior vena cava opens into upper part of right atrium; it has no valve. It returns blood to heart from upper half of body.

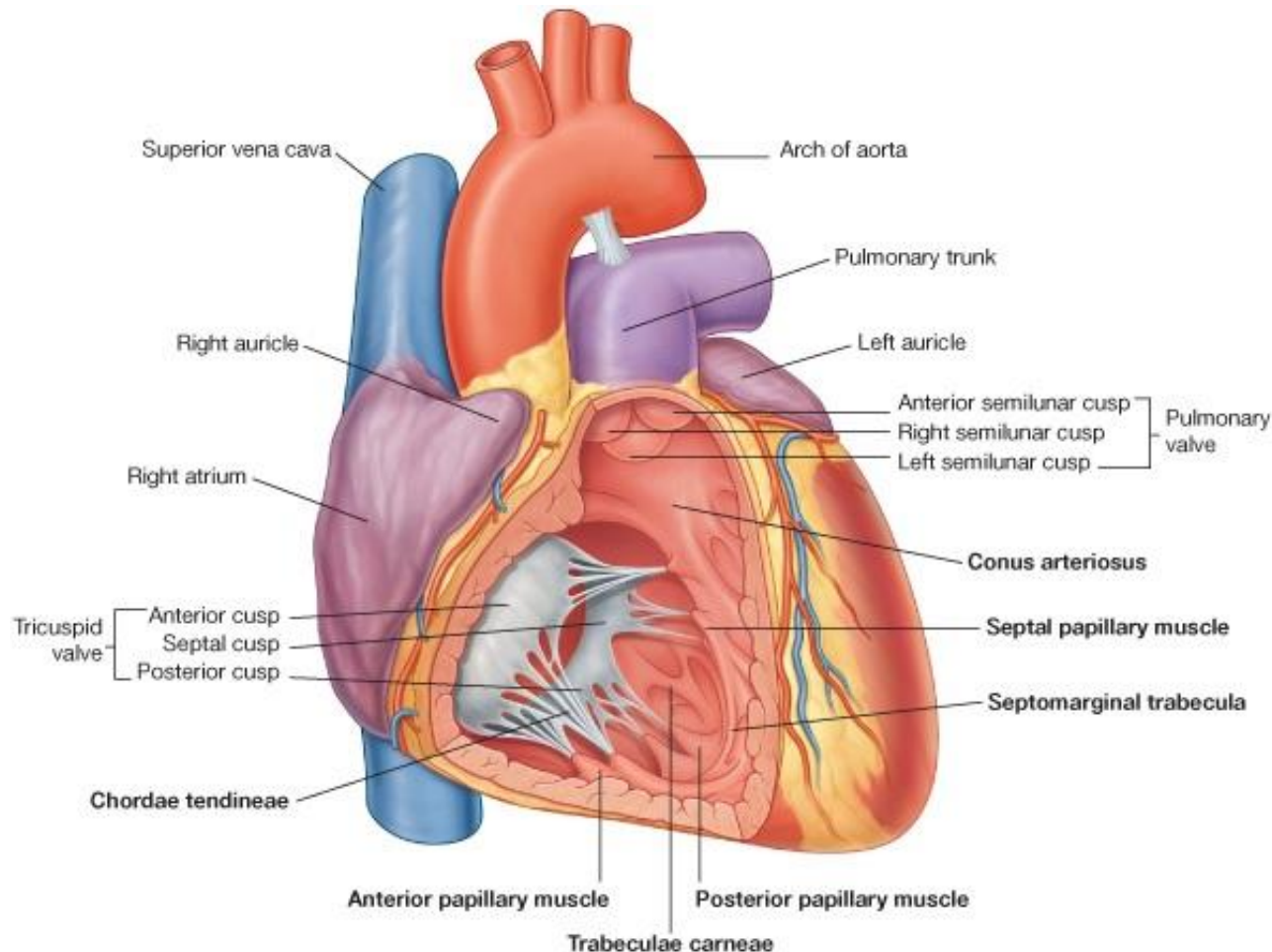
Inferior vena cava opens into lower part of right atrium; it is guarded by a rudimentary, nonfunctioning valve. It returns blood to heart from lower half of the body.



Chambers of the Heart

Right Ventricle

It communicates with right atrium through atrioventricular orifice guards by **Tricuspid valve** consists of 3 cusps formed by a fold of endocardium with some connective tissue enclosed and with pulmonary trunk through pulmonary orifice (pulmonary valve)



Chambers of the Heart

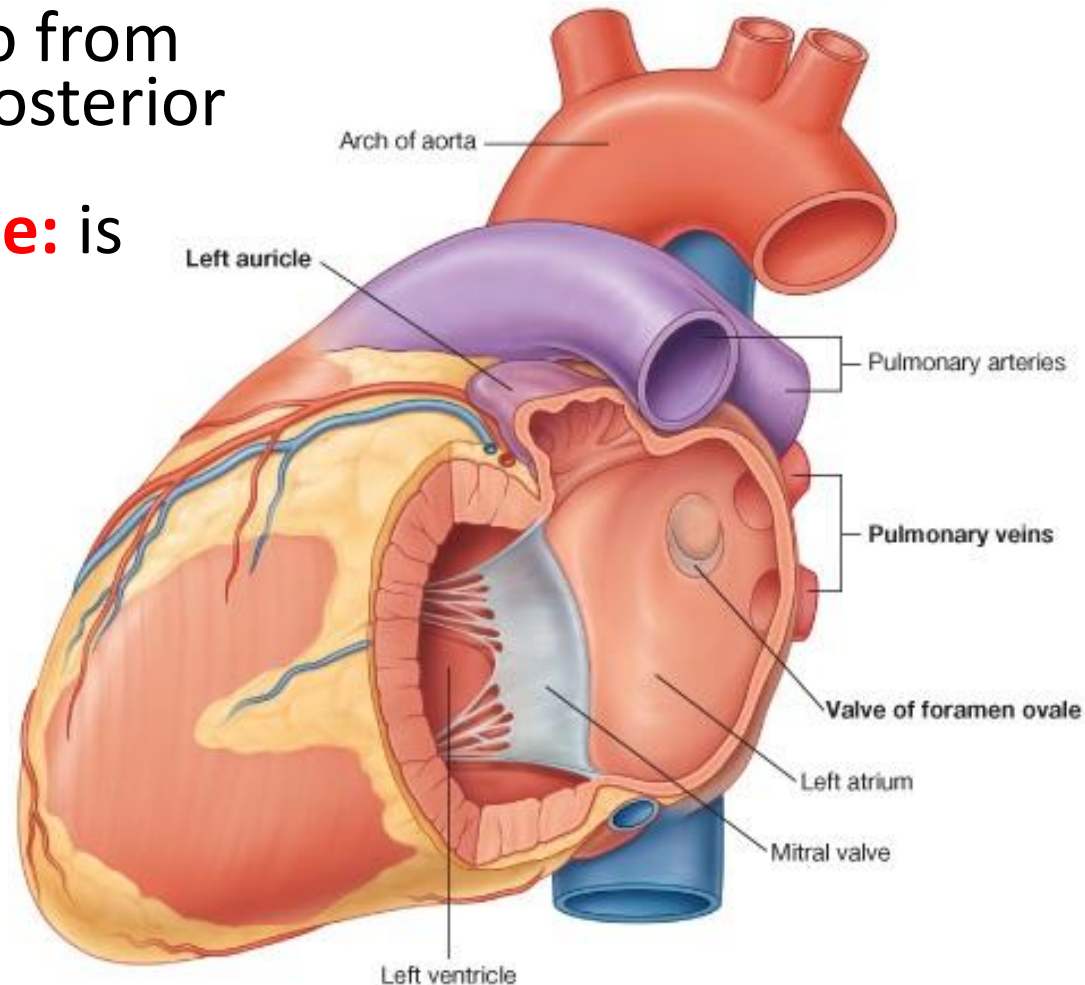
Left Atrium

It consists of a main cavity and a **left auricle**. Left atrium is situated behind right atrium and forms greater part of base (**posterior surface**) of heart.

Openings into the Left Atrium:

Four pulmonary veins: two from each lung, open through posterior wall with no valves

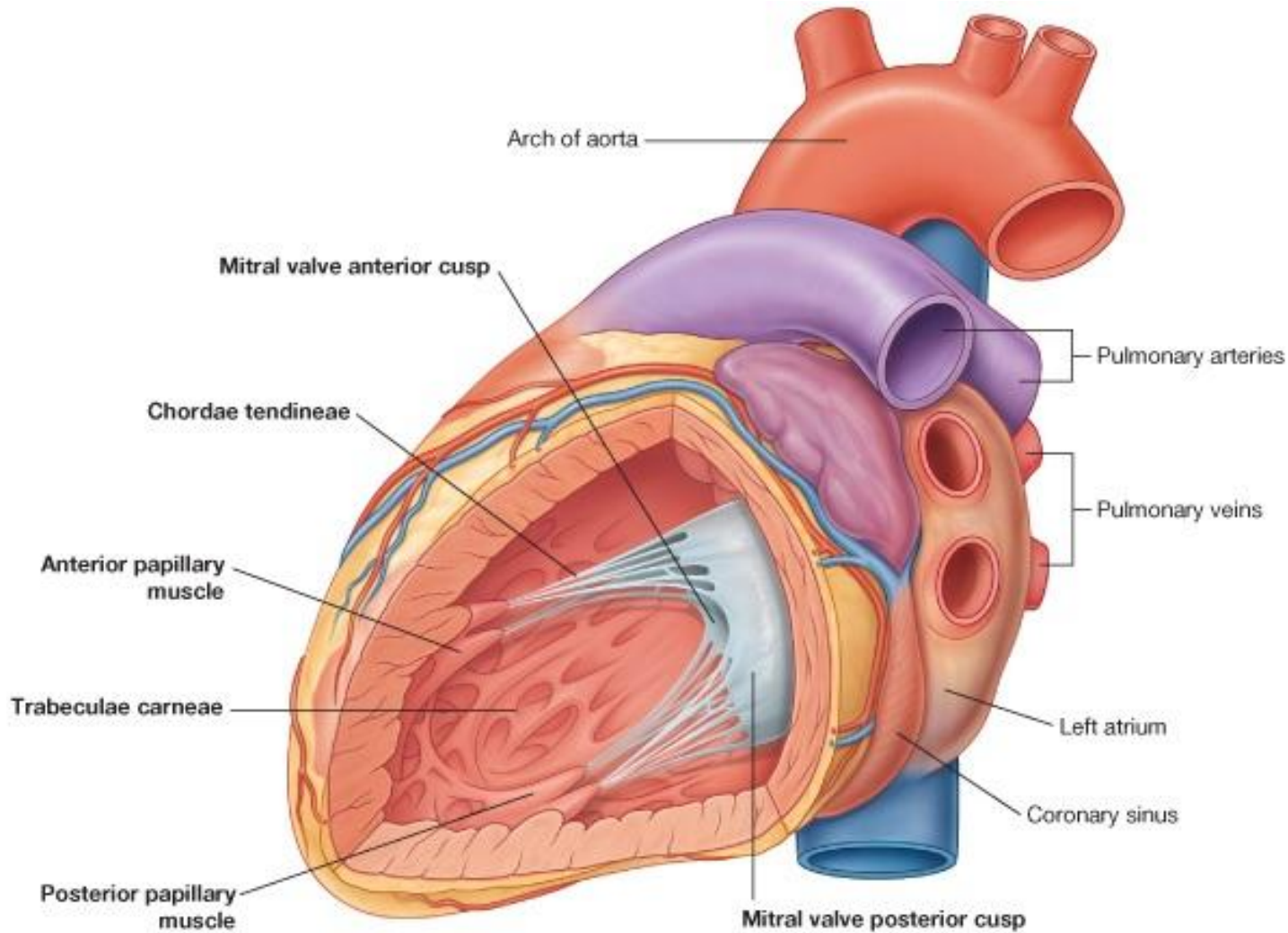
Left Atrioventricular Orifice: is guarded by **mitral valve**.



Chambers of the Heart

Left Ventricle

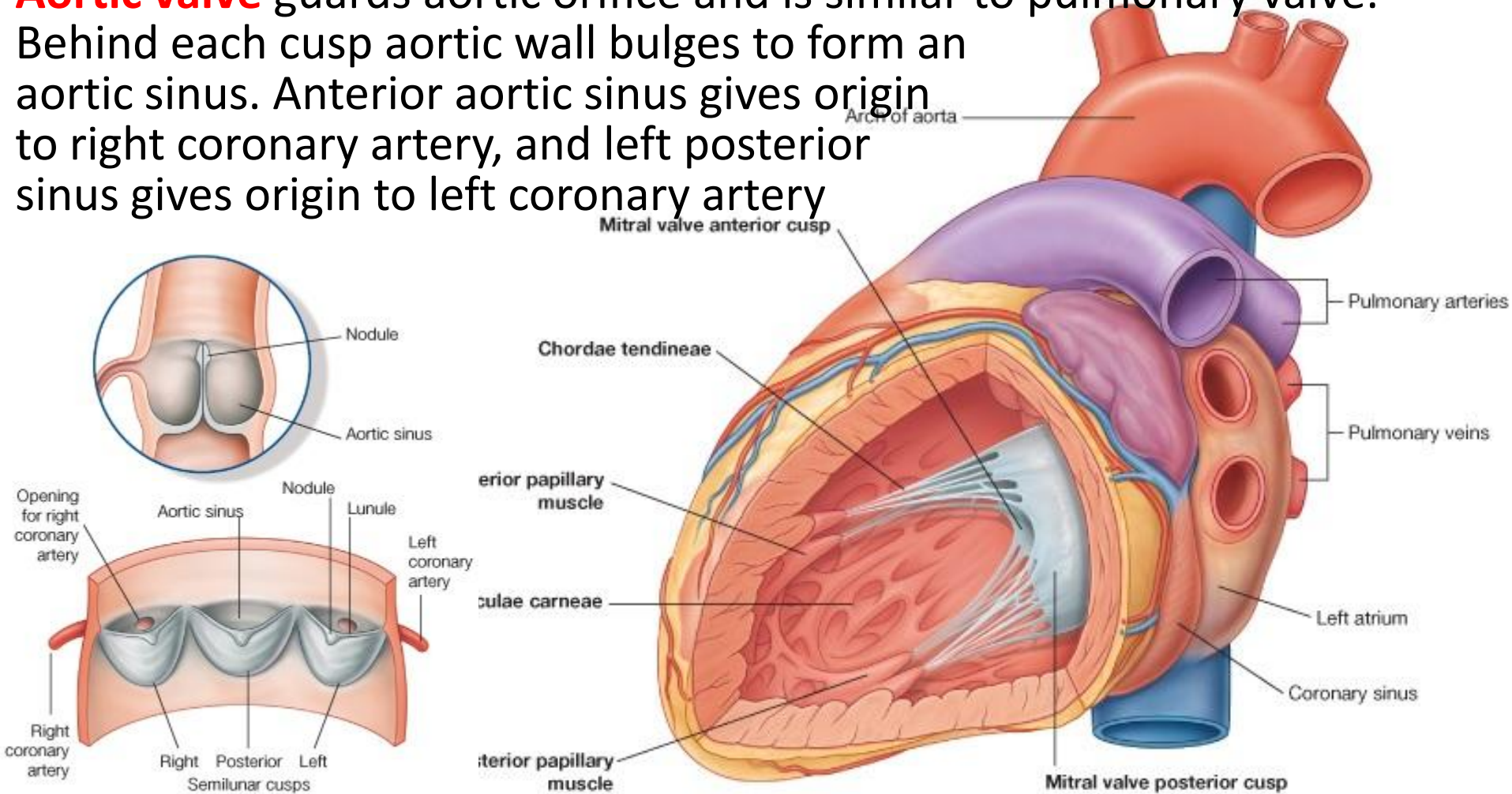
It communicates with left atrium through atrioventricular orifice and with aorta through aortic orifice. Walls of left ventricle are three times thicker than those of right ventricle..



Chambers of the Heart

Mitral valve guards atrioventricular orifice. It consists of two cusps, one anterior and one posterior, which have a structure similar to that of tricuspid valve. Anterior cusp is the larger and intervenes between atrioventricular and aortic orifices.

Aortic valve guards aortic orifice and is similar to pulmonary valve. Behind each cusp aortic wall bulges to form an aortic sinus. Anterior aortic sinus gives origin to right coronary artery, and left posterior sinus gives origin to left coronary artery



Structure of the Heart

Conducting System of the Heart:

Sinuatrial Node: is located in wall of right atrium just to right of opening of superior vena cava.

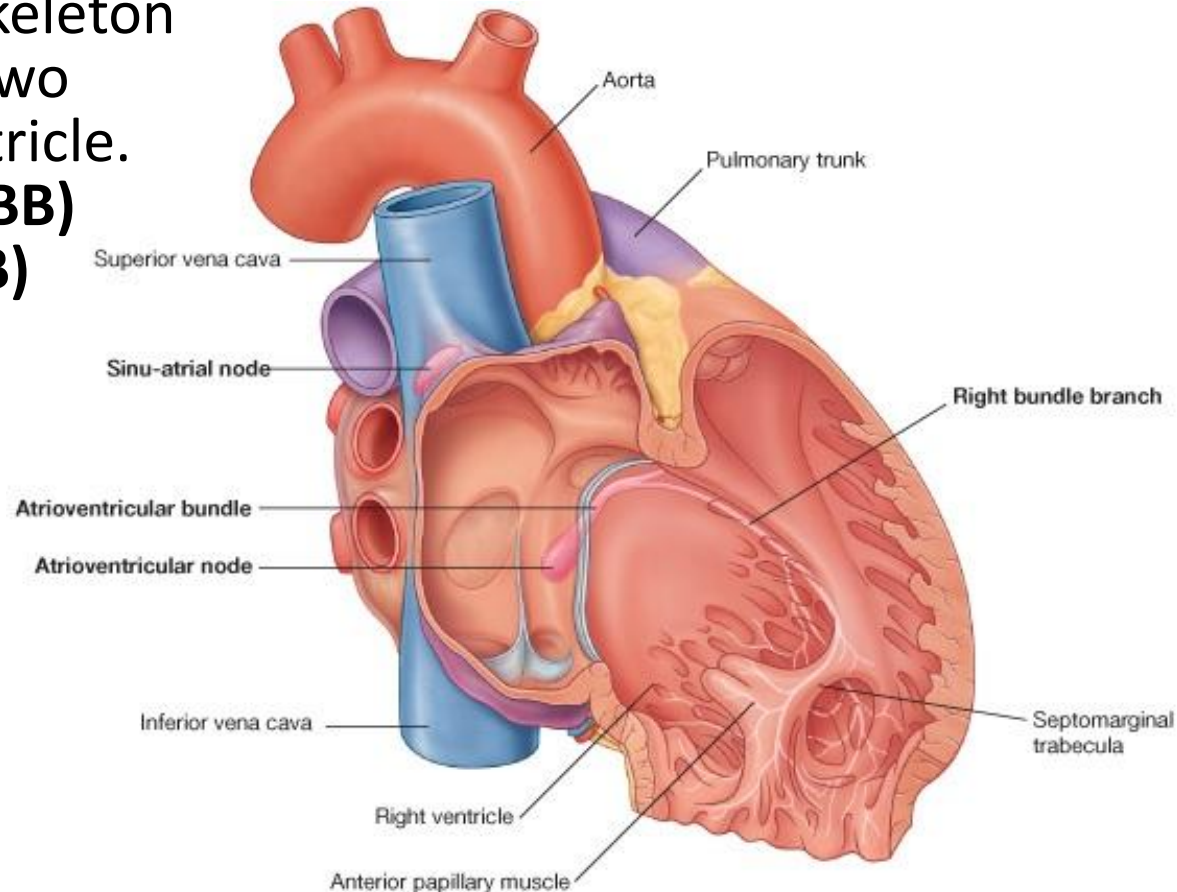
Atrioventricular Node: is strategically placed on lower part of atrial septum .

Atrioventricular Bundle of His: It descends through fibrous skeleton of heart, then divides into two branches, one for each ventricle.

A. Right bundle branch (RBB)

B. Left bundle branch (LBB)

Subendocardial plexus of Purkinje fibers:

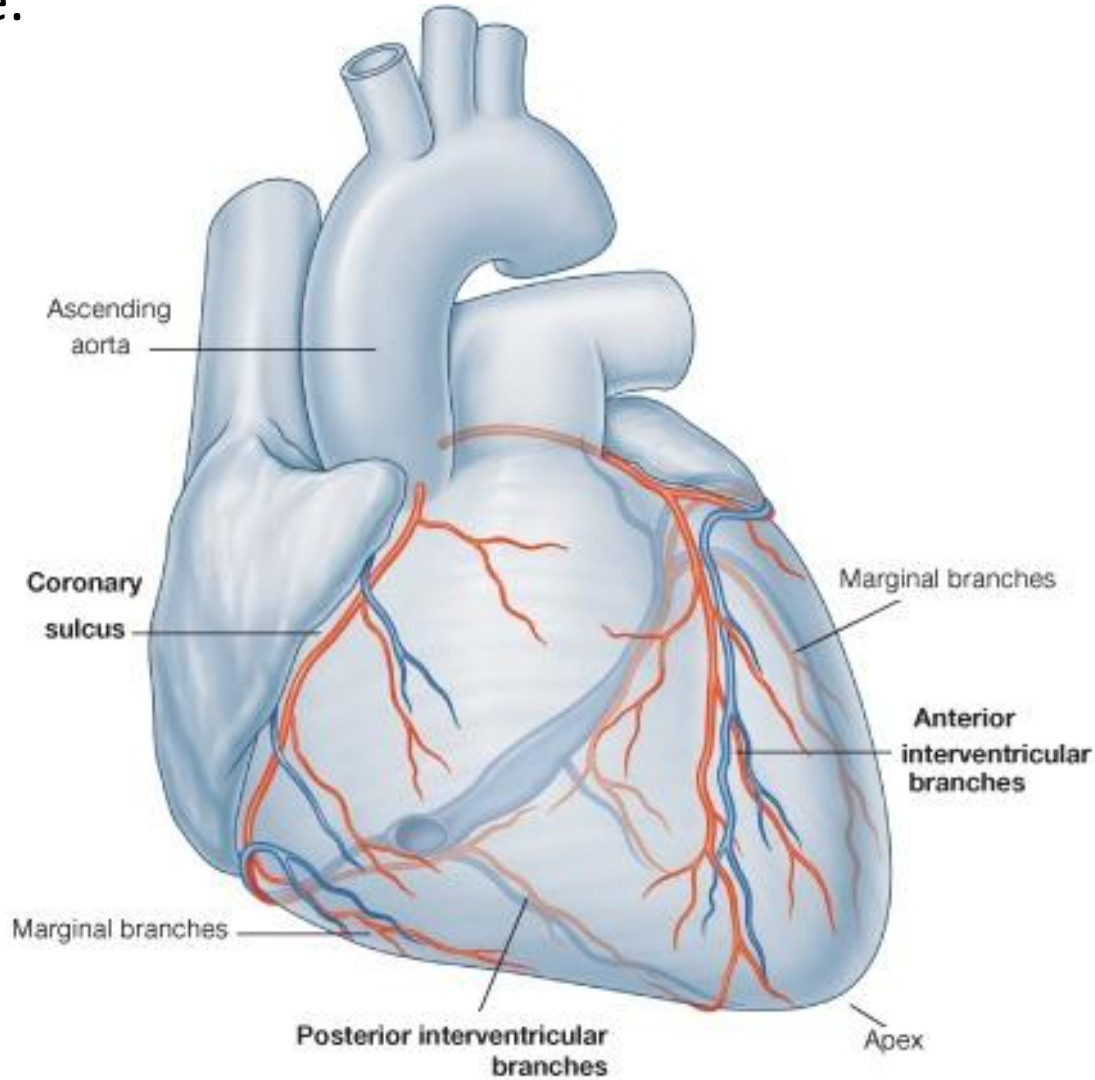


Arterial Supply of Heart

It is provided by **right and left coronary arteries**, which arise from ascending aorta immediately above aortic valve. Coronary arteries and their major branches are distributed over surface of heart, lying within subepicardial connective tissue.

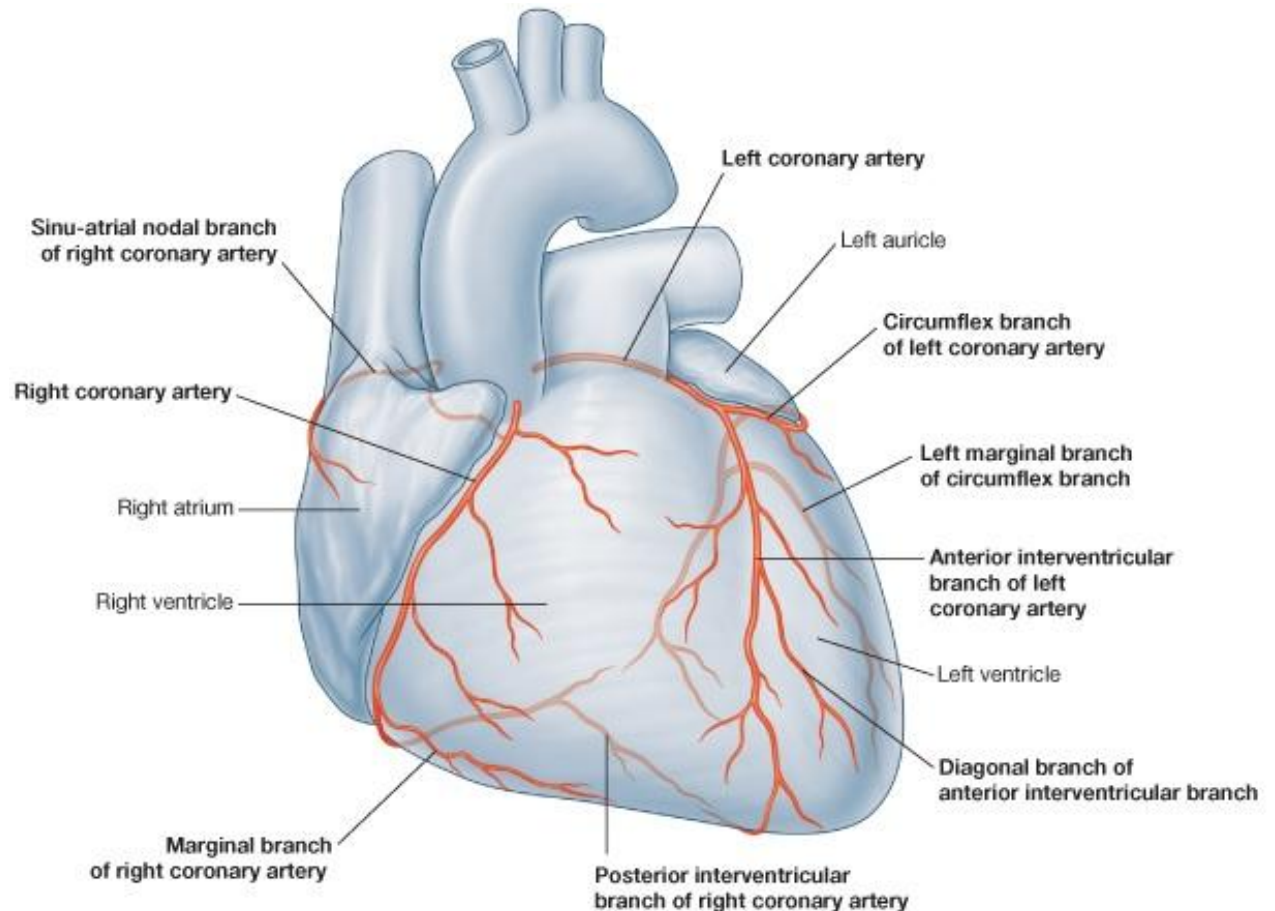
Right coronary artery

It supplies right atrium and right ventricle and parts of left atrium and left ventricle and atrioventricular septum.



Arterial Supply of Heart

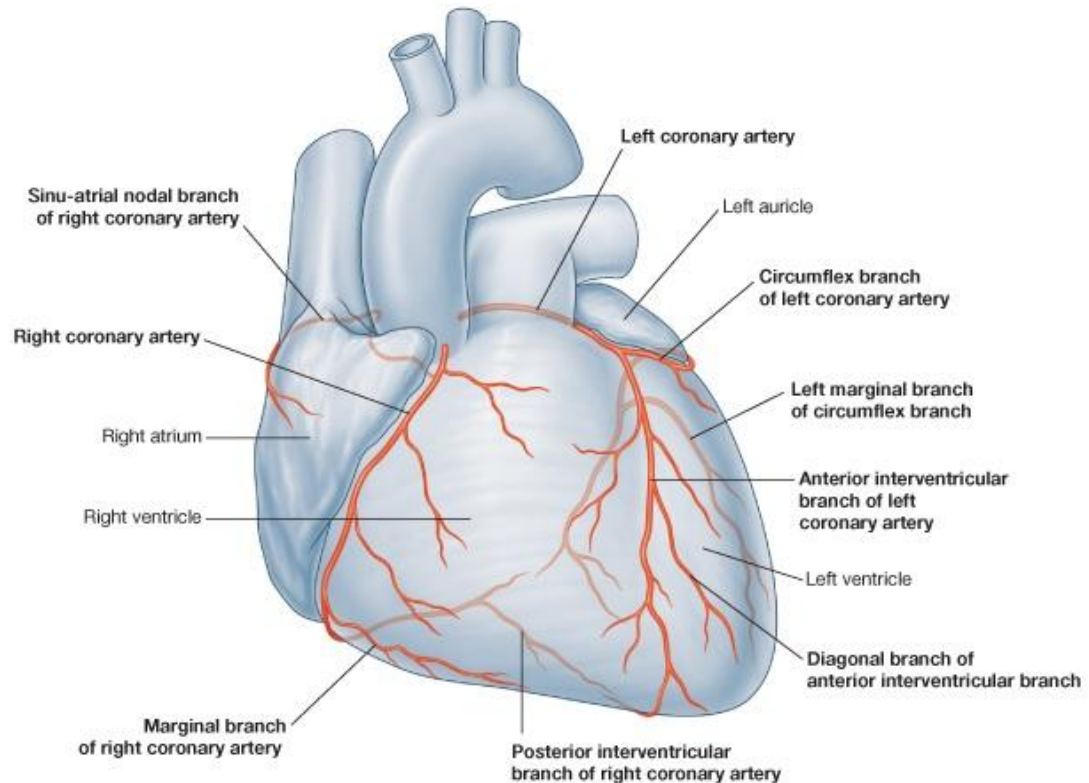
Left coronary artery supplies major part of heart, including greater part of left atrium, left ventricle, and ventricular septum.



Arterial Supply of Heart

Coronary Artery Anastomoses

between terminal branches of right & left coronary arteries exist, but not large to provide an adequate blood supply to cardiac muscle if one of large branches becomes blocked. A sudden block of one of larger branches of either coronary artery usually leads to **myocardial infarction**



**Thank you for your
listening**