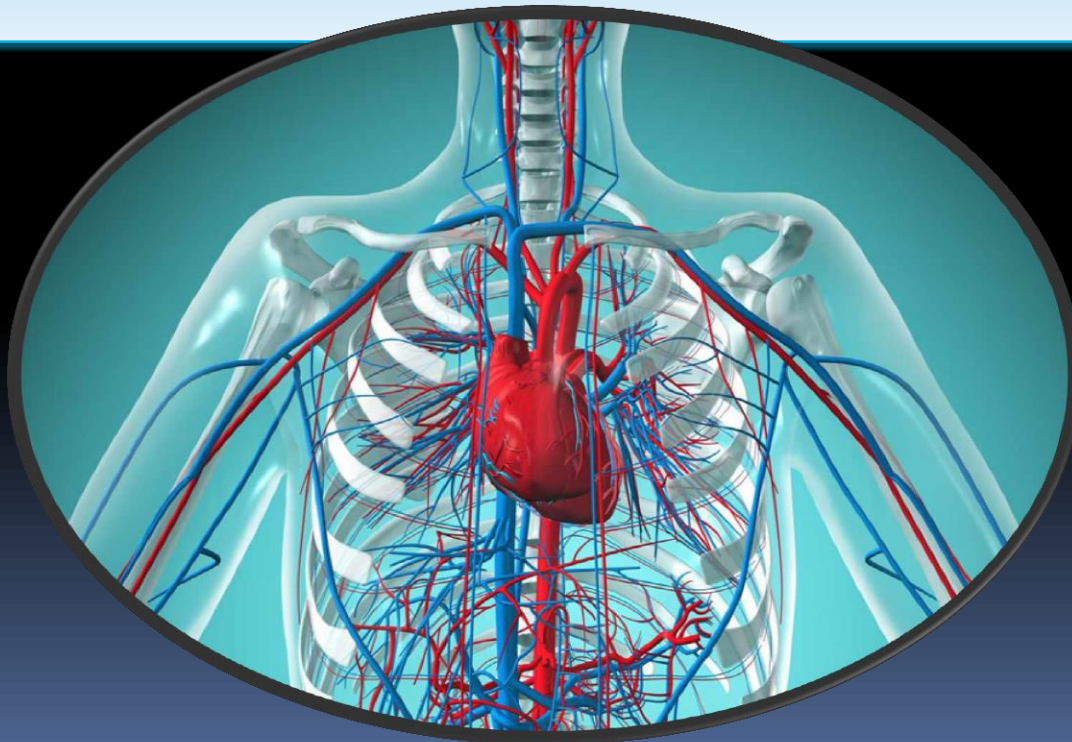


Cardiovascular System

8Th & 9th Lecture



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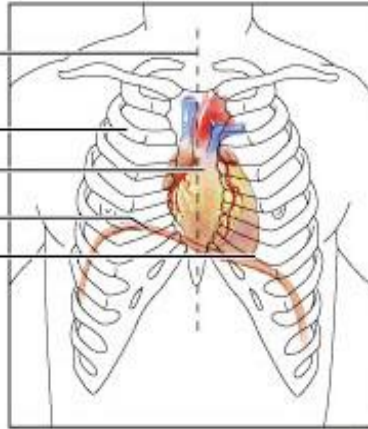
FUNCTIONS OF THE HEART

- **Generating blood pressure**
- **Routing blood**
 - Heart separates pulmonary and systemic circulations**
- **Ensuring one-way blood flow**
 - Heart valves ensure one-way flow**
- **Regulating blood supply**
 - Changes in contraction rate and force match blood delivery to changing metabolic needs**

HEART

- **Heart is a four chambered, hollow muscular organ approximately the size of your fist**
- **Location:**
 - **Superior surface of diaphragm**
 - **Left of the midline**
 - **Anterior to the vertebral column, posterior to the sternum**

Midsternal line
2nd rib
Sternum
Diaphragm
Point of maximal intensity (PMI)



(a)

Right lung
Heart

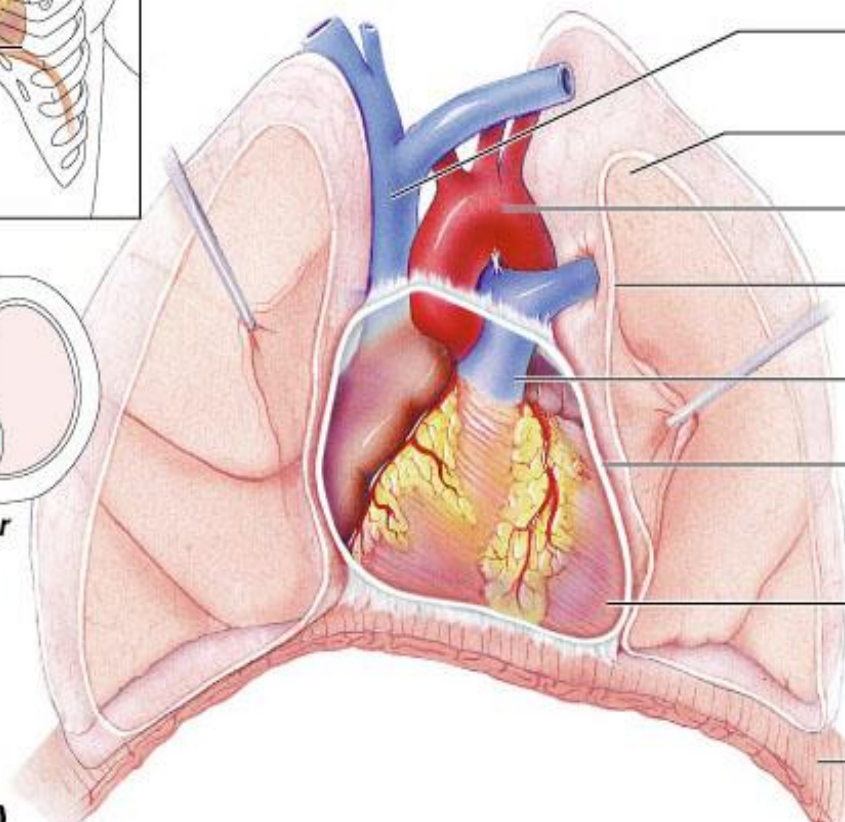


Anterior

(b)

Superior vena cava
Left lung
Aorta
Parietal pleura (cut)
Pulmonary trunk
Parietal pericardium (cut)
Apex of heart
Diaphragm

(c)



The Parts of the Cardiac System

The cardiac system consists of the heart.

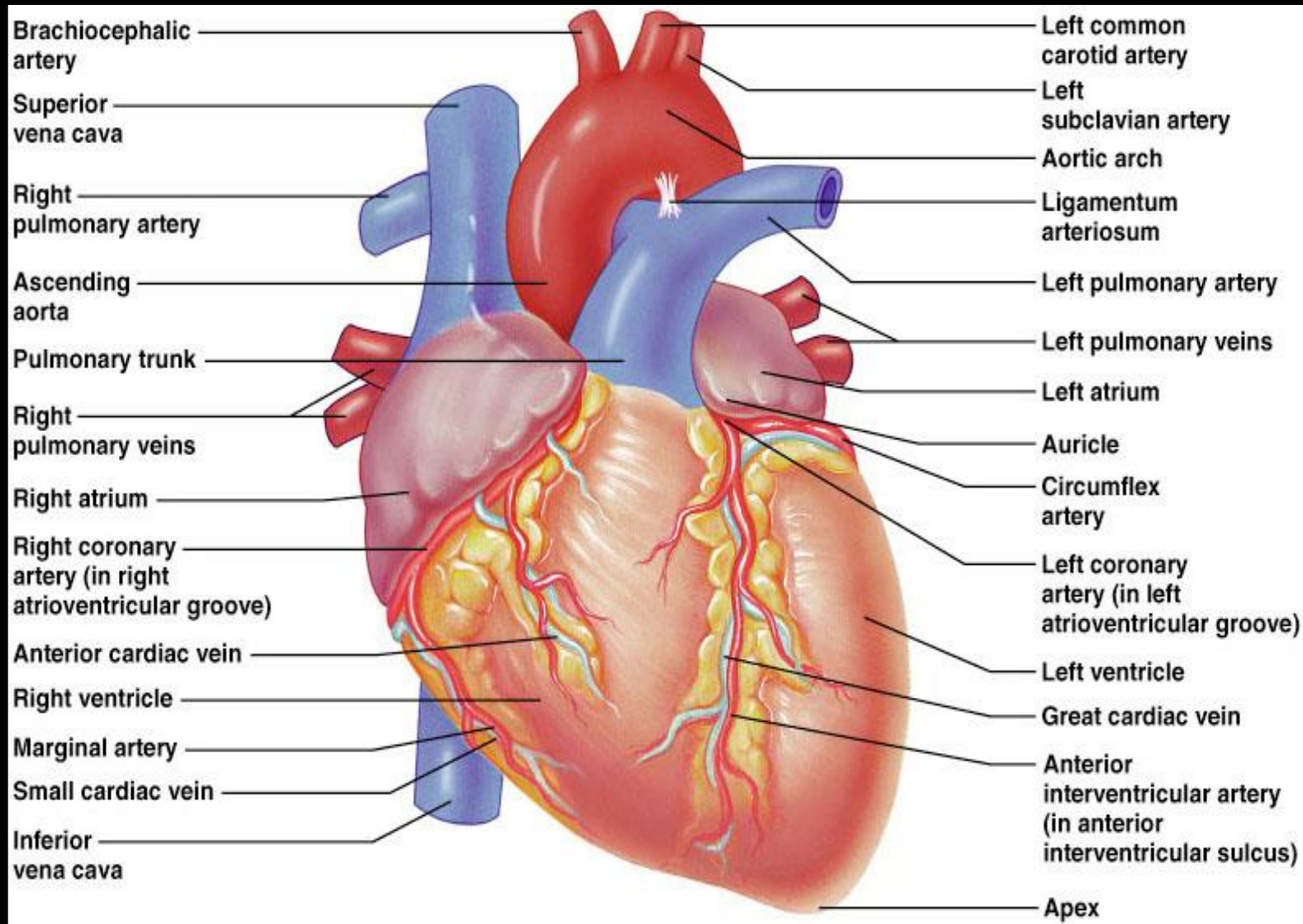
The cardiovascular system consists of the heart and the circulatory system

Vessels returning blood to the heart:

- 1. Right and left pulmonary veins**
- 2. Superior and inferior venae cavae**

Vessels conveying blood away from the heart:

- 1. Aorta**
- 2. Right and left pulmonary arteries**



The Layers of the Heart

- 1. Epicardium**
- 2. Myocardium**
- 3. Endocardium**

Pericardium – a double-walled sac around the heart composed of:

A superficial fibrous pericardium.

A deep two-layer serous pericardium.

The parietal layer lines the internal surface of the fibrous pericardium.

The visceral layer or epicardium lines the surface of the heart.

They are separated by the fluid-filled pericardial cavity.

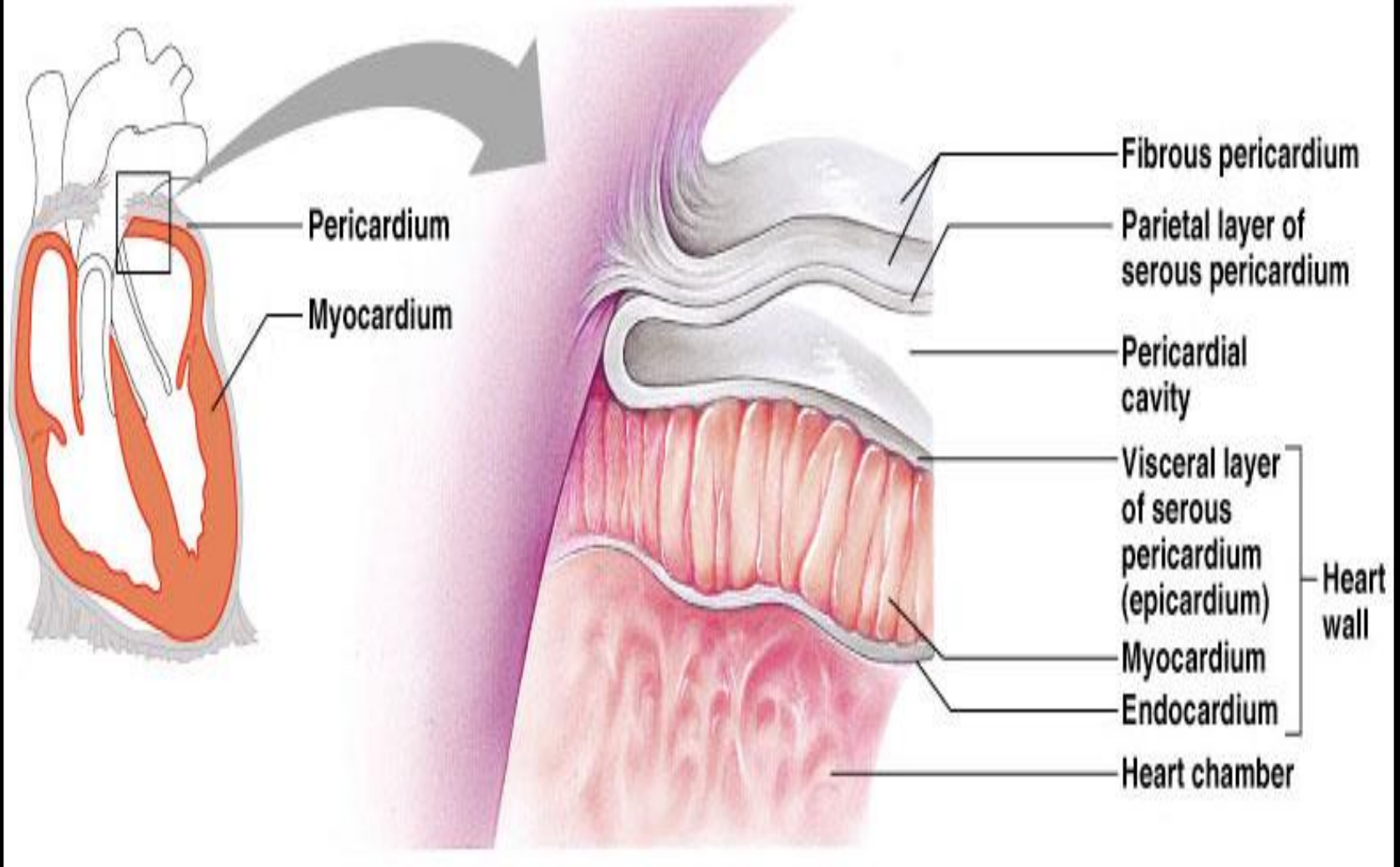
The Function of the Pericardium:

Protects and anchors the heart

Prevents overfilling of the heart with blood

Allows for the heart to work in a relatively friction-free environment

- **Myocardium – cardiac muscle layer forming the bulk of the heart**
- **Endocardium – endothelial layer of the inner myocardial surface**



The Chambers of the Heart:

The four chambers of the heart are the:

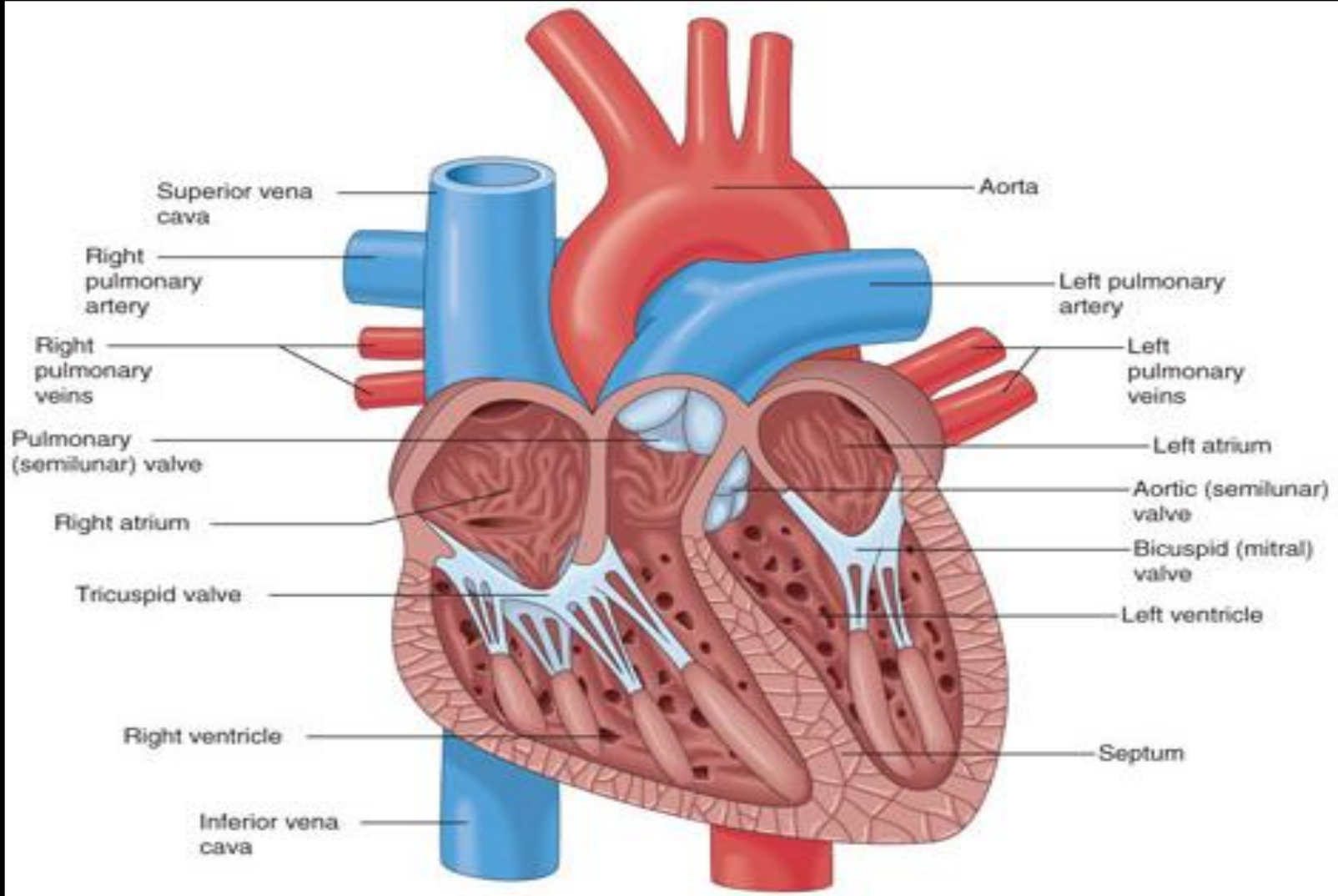
- **Upper chambers: right and left atria**
- **Lower chambers: right and left ventricles**

The atria are smaller in size than the ventricles and the walls of the atria are thinner and less muscular than the ventricles.

The right ventricle is smaller and less muscular than the left ventricle of the heart.

Chambers separated internally by septum

The ventricular septum, as the name suggests, separates the right ventricle from the left ventricle of the heart, and the atrial septum, as the name suggests, separates the right atrium from the left atrium of the heart.



Atrium

The right atrium receives deoxygenated blood from the body and enters the heart by the superior vena cava and the inferior vena cava.

The left atrium holds richly oxygenated blood that flows directly into the left atrium from the right and the left pulmonary veins from the lung.

Ventricle

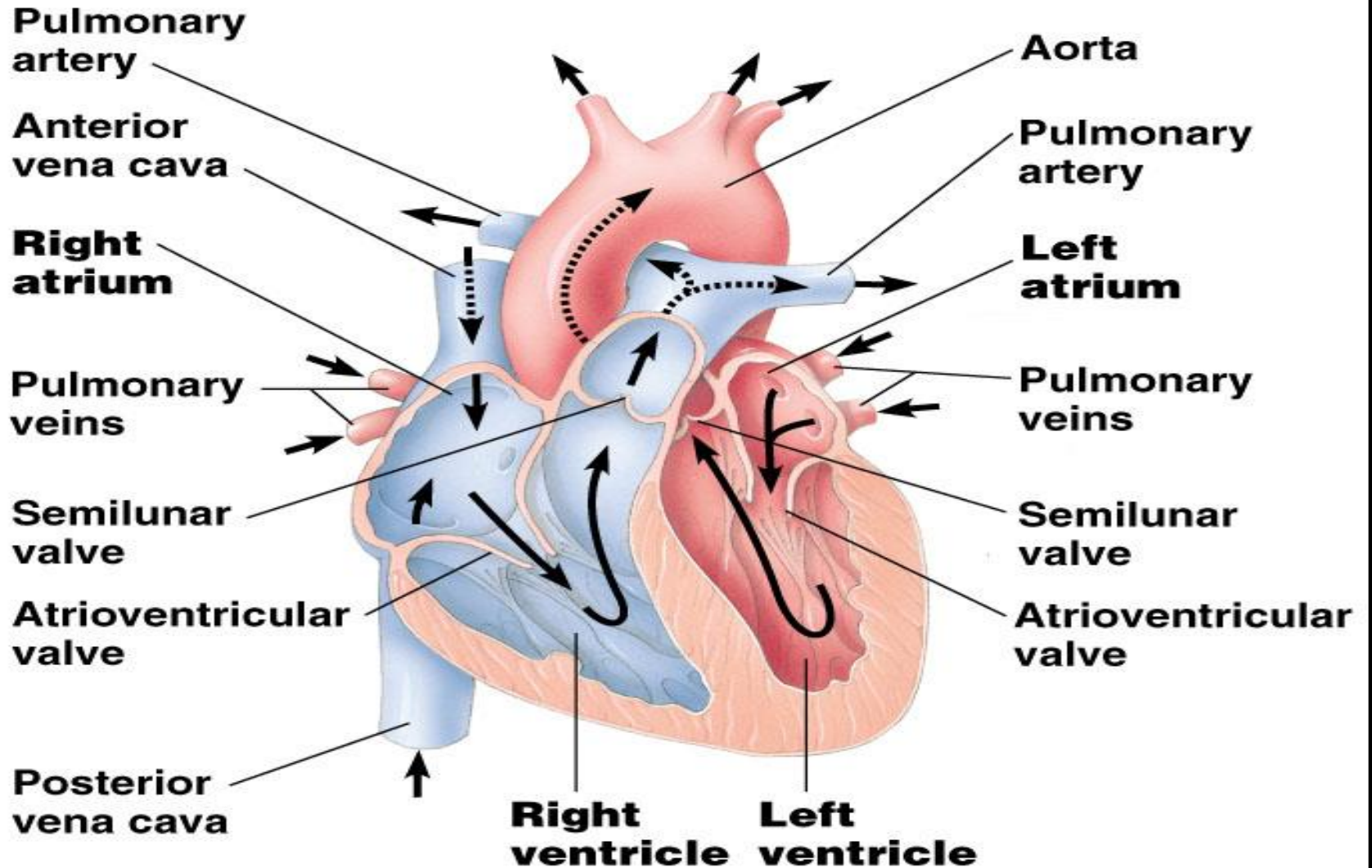
The right ventricle receives deoxygenated blood from the right atria and it then pumps it from the heart to the lungs.

The left ventricle receives oxygenated blood from the left atria and it then pumps it from the heart to the rest of the body through the aorta.

The cardiac cycle:

- 1. Two atria contract while ventricles relax**
- 2. Two ventricles contract while atria relax**
- 3. The cardiac cycle begins again**

The contraction of the heart that is referred to as systole and the relaxation of the heart muscle for rest which is referred to as diastole.



A blood pressure of 120/80 means that systole, is 120; diastole is 80. The normal blood pressure for an adult is 120/80.

When the blood pressure is higher than 120/80, the person has hypertension.

When the blood pressure is lower than 120/80, the person has hypotension.