

# CARDIOVASCULAR SYSTEM : ANATOMY & PHYSIOLOGY

## FUNCTION OF CIRCULATION:

Delivers O<sub>2</sub>, nutrients, hormones and antibodies to organs, tissues and cells. Removes the end product of cellular metabolism.

## FUNCTION OF THE HEART

Pumps oxygenated blood into the arterial system to supply capillaries and tissue.  
Pumps oxygen poor blood from the venous system through the lungs to be reoxygenated.

## ANATOMY OF THE HEART

Cone shaped organ located in the mediastinal space.  
The pericardial sac encases the heart and protects it, lubricates and holds 5-20 ml of pericardial fluid. This has two layers.

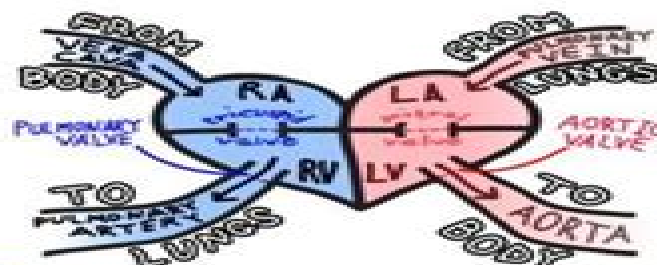
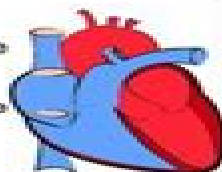
- ❖ the parietal pericardium which is the outer membrane.
- ❖ the visceral pericardium is the inner membrane attached to the heart.

## CONSISTS OF 3 LAYERS

- ❖ **Epicardium** : outermost layer of the heart.
- ❖ **Myocardium**: middle layer of the heart, the contracting muscle.
- ❖ **Endocardium**: innermost layer of the heart, lines the inner chambers and the valves.

## 4 CHAMBERS

- ❖ **Right atrium**: carries deoxygenated blood from the body via superior and inferior vena cava.
- ❖ **Right ventricle**: carries blood from the right atrium and pumps it into the lungs through the pulmonary artery.
- ❖ **Left atrium**: carries oxygenated blood from the pulmonary veins.
- ❖ **Left ventricle**: carries oxygenated blood from the left atrium and pumps it into the systemic circuit through the aorta.



## 4 VALVES

Two atrioventricular valves that close at the beginning of ventricular contraction. They prevent blood from flowing back into the atria.

- ❖ **Tricuspid valve** : on the right side of the heart.
- ❖ **Bicuspid valve**: on the left side of the heart.

Two semilunar valves that prevent blood from flowing back into the ventricles during relaxation.

- ❖ **Pulmonic semilunar valve**: between the right ventricle and pulmonary artery.
- ❖ **Aortic semilunar valve**: between the ventricle and the aorta.

## CORONARY ARTERIES

- ❖ **Right main coronary artery**: supplies the right atrium and ventricle, the inferior left ventricle, posterior septal wall, SA and AV nodes.
- ❖ **Left main coronary artery**: consists of two main branches left anterior descending which supplies blood to the left ventricle and the ventricular septum and circumflex arteries which supply blood to the left atrium and the lateral/posterior aspects of the left ventricle.

## BLOOD FLOW OF THE HEART

1. From the superior and inferior vena cava, oxygen poor blood goes to the right atria through the tricuspid valve.
2. Right ventricle to the pulmonary valve.
3. To the pulmonary trunk and arteries into the lungs CO<sub>2</sub> is lost and O<sub>2</sub> is gained in the pulmonary capillaries.
4. O<sub>2</sub> rich blood enters the pulmonary veins to the left atrium.
5. Blood travels through the bicuspid valve and enters the left ventricle.
6. Blood moves through the aortic valve and travels through the aorta to the systemic circuit.

## ELECTRICAL CONDUCTION:

- ❖ **SA node**: pacemaker of the heart and initiates contraction at 60- 100 BPM.
- ❖ **AV** : receives impulses from the SA node initiates and sustains impulses at 40-60 BPM.
- ❖ **Bundle of His**: continuation of the AV node and branches into the bundle branches which terminate in the purkinje fibers.
- ❖ **Purkinje fibers**: network of conducting strands beneath the ventricular endocardium. They can act as a pacemaker when the SA and AV fail as pace makers. They can sustain at 20-40 BPM.

**CIRCULATION**



# Biology 1heart And Circulation Study Guide

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