

# Heart & Human Circulatory System

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Circulatory systems are of two types Open Circulatory system and Close Circulatory System. Human being posses Close circulatory system where blood flows through a closed nexus of blood vessels in contrary to open circulatory system where blood flows in open spaces.

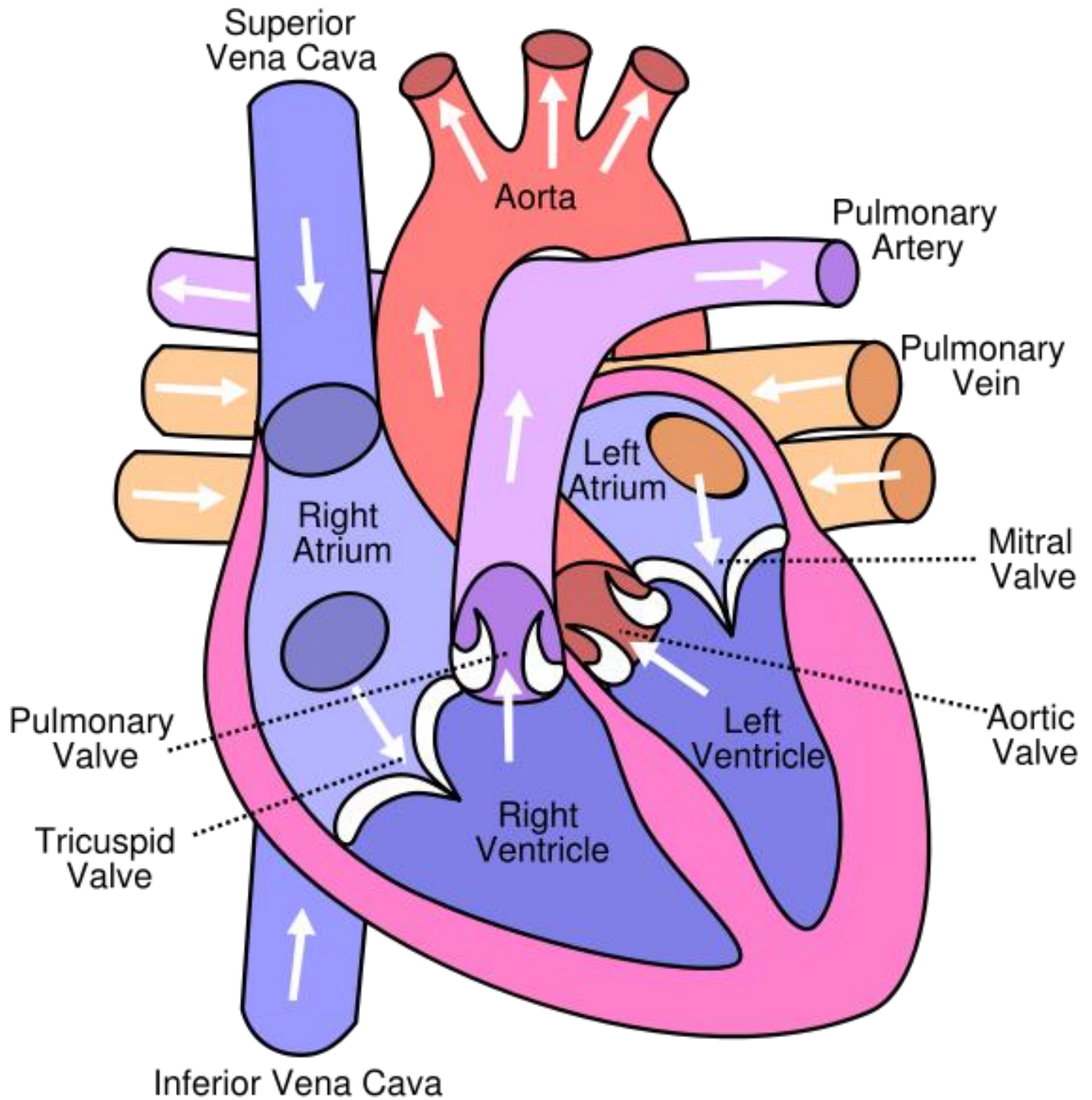
It contains four parts:

- (i) Heart
- (ii) Arteries
- (iii) Veins
- (iv) Blood.

The discovery of blood circulation system was done by *William Harvey*.

Points to remember:

- Biological term of the heart is 'Cardio'.
- It remains safe in the **pericardial membrane**.
- Its weight is approximately **300 grams for male and 250 gms for female**.
- The human heart is a **four chamber heart**.
- In one cycle heart pumps 70ml blood.
- The major function of the heart is Pumping of blood/circulation of blood.
- The heartbeat of a normal human being is 72 beats/minute.
- The heartbeat of the shrew is maximum in shrew ie 800 beats per minute.
- It contains the **right atrium and a left atrium** in the anterior part.
- there is a **tricuspid valve** between the right atrium and the right ventricle.
- there is a bicuspid valve between the left atrium and left ventricle.
- **It contains right ventricle and a left ventricle persists** in the posterior side.
- It is a **pumping organ** works in a rhythmic cyclic manner with **systole**(shrinkage for .3sec) and **diastole** (expansion for .5 sec).



A heartbeat lasts for **0.8 seconds and** consists of both of these.

**The vein** is the vessels which carry the blood from the body towards the heart.

The vein contains **impure blood** i.e. carbon dioxide mixed blood.

**Pulmonary vein** is the exception which always carries pureblood.

Pulmonary vein carries the blood from the lungs to the left atrium.

**The artery** is the vessel which carries the blood from the heart towards the body.

Artery contains **pure blood** i.e. oxygen mixed blood.

But **Pulmonary arteries** are the exception which always carries the impure blood or deoxygenated blood.

The pulmonary artery carries the blood from the right ventricle to the lungs.

In the **right part** of the heart, there remains impure blood i.e. carbon dioxide mixed blood and in the **left part** of the heart there remains pure blood i.e. oxygen mixed blood.

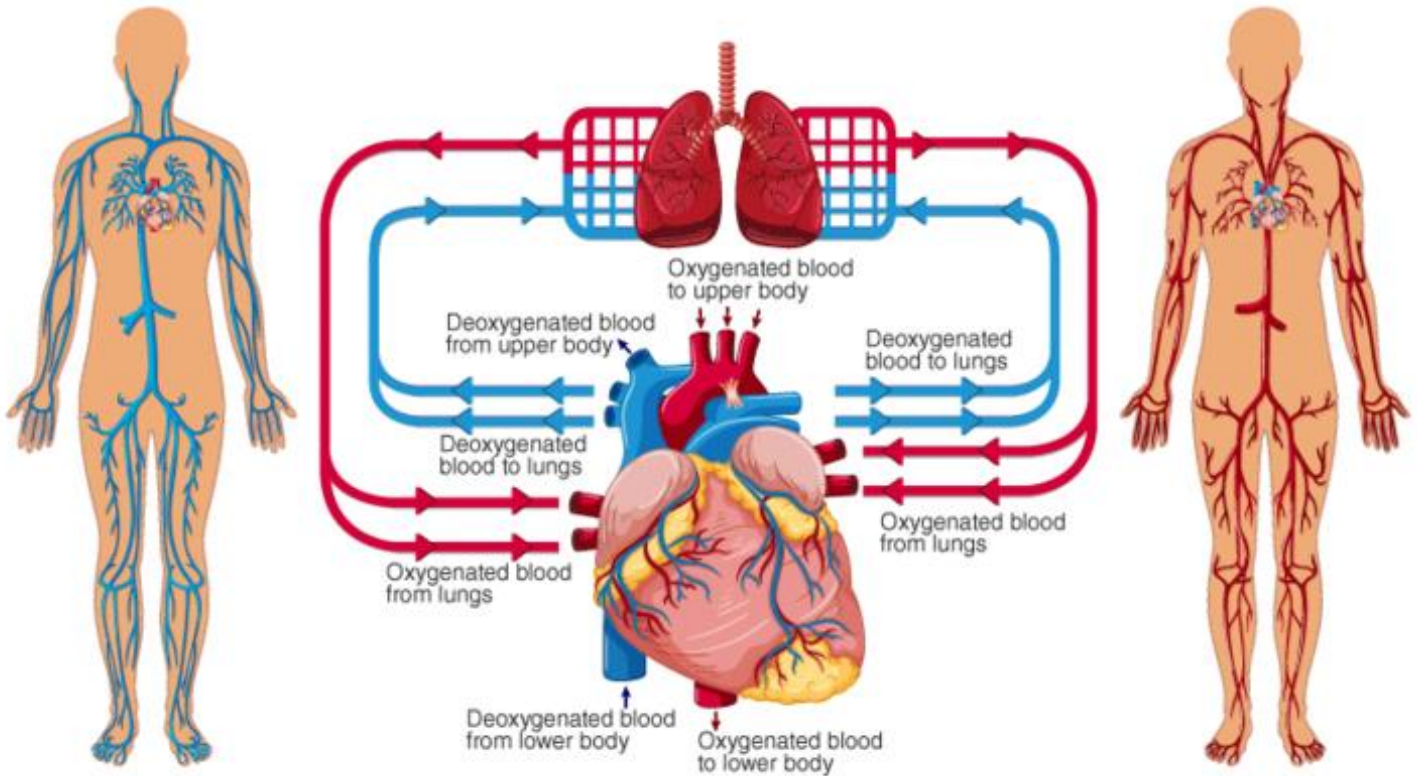
The artery carrying blood to the muscles of the heart is called **coronary arteries**. Any type of hindrance in it causes a heart attack.

Covering of heart is called as **Pericardium**.

The course of circulation:

Along with a closed circulatory system, Mammals have **double** circulation. which means blood has to cross two times from heart before circulating throughout the body.

The right atrium receives impure blood from the body which goes into the right ventricle. From here the blood went into pulmonary artery which sends it to the lung for purification. After purification, it is collected by a pulmonary vein which brings it back to the heart in the left atrium. From the atrium, it vents into the left ventricle. Now, this purified blood goes into the aorta for different organ of the body. This circulation is done is a cardiac cycle.



### Cardiac cycle:

The cardiac cycle is controlled by two pacemakers in the heart:

The sino-atrial node (**SA node**) located in the top wall of the right atrium, also known as the heart of the heart.

The atrioventricular node (**AV node**) located in between the right atrium and ventricle.

Both pacemakers are types of **nervous tissue**.

### Blood Pressure:

The force per unit area which is exerted on the walls of the blood carrying tube by blood called blood pressure.

Normal rating of blood pressure in a healthy person is **120/80 mm Hg**.

Blood pressure is high in tubes which carry blood to the body parts (**systolic pressure**) and low in tubes which carry blood to the heart (**diastolic pressure**).

### Wireless Artificial Pacemaker:

When the SA node becomes defective or damaged the cardiac impulses do not generate.

For this, we use wireless pacemaker that regulates the heart by wireless pulses of ultrasound from outside the organ.

It is beneficial over conventional pacemaker as the leads can fail and requiring the additional surgery to replace them.

Cardiovascular Diseases:


### Arteriosclerosis:

It is thickening, hardening or loss of elasticity of the arteries due to the formation of plaques and calcification in their walls. It is caused by the buildup of fatty plaques, cholesterol, and some other substances in and on the artery walls.

### Atherosclerosis:


Deposition of cholesterol in the walls of arteries due which they become narrow and hinder the blood flow to them.

**Heart Attack:** A heart attack occurs when one or more of your coronary arteries become blocked. Over time, a coronary artery can narrow from the buildup of various substances, including cholesterol (**atherosclerosis**).




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