

BIOLOGY

SHORT STUDY NOTES

**CIRCULATORY
SYSTEM**

CLASS 11

BY LEARNINGMANTRAS.COM

Circulatory System

Circulatory system, also known as your cardiovascular system, is made up of your heart and blood vessels. It works to transport oxygen and other nutrients to all the organs and tissues in your body. It also works to remove carbon dioxide and other waste products.

The human circulatory system consists of a network of arteries, veins, and capillaries, with the heart pumping blood through it. Its primary role is to provide essential nutrients, minerals, and hormones to various parts of the body. Alternatively, the circulatory system is also responsible for collecting metabolic waste and toxins from the cells and tissues to be purified or expelled from the body.

Important Facts of Circulatory System:

- There are three types of circulation: Pulmonary Circulation, Systemic Circulation and Coronary Circulation.
- The human circulatory system is a closed system that pumps blood through a network of arteries and veins. This type of circulation is seen in all vertebrates and some invertebrates.
- Double circulation is a system of circulation where the blood flows through the heart twice. This type of circulation is very effective as the body has a constant supply of oxygenated blood.

Functions of Circulatory System

- Transporting oxygen throughout the body.
- It helps your body get rid of waste products.
- It helps in sustaining all the organ systems.
- It transports blood, nutrients, oxygen, carbon dioxide and hormones throughout the body.
- It protects cells from pathogens.
- It acts as an interface for cell-to-cell interaction.
- The substances present in the blood help repair the damaged tissue.

How does the Circulatory System Work?

- The heart's bottom right pumping chamber (right ventricle) sends blood that's low in oxygen (oxygen-poor blood) to the lungs. Blood travels through the pulmonary trunk (the main pulmonary artery).
- Blood cells pick up oxygen in the lungs.
- Pulmonary veins carry the oxygenated blood from the lungs to the heart's left atrium (upper heart chamber).
- The left atrium sends the oxygenated blood into the left ventricle (lower chamber). This muscular part of the heart pumps blood out to the body through the arteries.
- As it moves through your body and organs, blood collects and drops off nutrients, hormones and waste products.
- The veins carry deoxygenated blood and carbon dioxide back to the heart, which sends the blood to the lungs.
- Your lungs get rid of the carbon dioxide when you exhale.

Features of Circulatory System

- The circulatory system consists of blood, heart, blood vessels, and lymph.
- The circulatory system circulates blood through two loops (double circulation) – One for oxygenated blood, another for deoxygenated blood.
- The human heart consists of four chambers – two ventricles and two auricles.
- The circulatory system possesses a body-wide network of blood vessels. These comprise arteries, veins, and capillaries.

Parts of Circulatory System

- **Heart**
 - The heart is a muscular organ located in the chest cavity, right between the lungs.
 - It is positioned slightly towards the left in the thoracic region and is enveloped by the pericardium.
 - **The human heart is separated into four chambers:**
 - two upper chambers called atria.
 - two lower chambers called ventricles.
- **Blood**
 - Blood is a constantly circulating fluid providing the body with nutrition, oxygen, and waste removal.
 - Blood is mostly liquid, with numerous cells and proteins suspended in it, making blood "thicker" than pure water.
 - The average person has about 5 liters (more than a gallon) of blood.
 - A liquid called plasma makes up about half of the content of blood.
 - Plasma contains proteins that help blood to clot, transport substances through the blood, and perform other functions.
 - Blood plasma also contains glucose and other dissolved nutrients.
 - **The human body consists of three types of blood cells:**
 - Red blood cells, which carry oxygen to the tissues.
 - White blood cells, which fight infections.
 - Platelets, smaller cells that help blood to clot.
- **Blood Vessels:**
 - Blood vessels are the channels or conduits through which blood is distributed to body tissues.
 - The vessels make up two closed systems of tubes that begin and end at the heart.
 - The pulmonary vessels transports blood from the right ventricle to the lungs and back to the left atrium.
 - The systemic vessels carry blood from the left ventricle to the tissues in all parts of the body and then return the blood to the right atrium.
 - Blood vessels are classified as:

- **Arteries:** It carries blood away from the heart. Pulmonary arteries transport blood that has a low oxygen content from the right ventricle to the lungs. Systemic arteries transport oxygenated blood from the left ventricle to the body tissues.
 - **Capillaries:** These are the smallest and most numerous of the blood vessels, form the connection between the vessels that carry blood away from the heart (arteries) and the vessels that return blood to the heart (veins). The primary function of capillaries is the exchange of materials between the blood and tissue cells.
 - **Veins:** It carries blood toward the heart. After blood passes through the capillaries, it enters the smallest veins, called venules. From the venules, it flows into progressively larger and larger veins until it reaches the heart.
- **Lymphatic system**
 - The human circulatory system consists of another body fluid called lymph. It is also known as tissue fluid.
 - It is produced by the lymphatic system which comprises a network of interconnected organs, nodes and ducts.
 - Lymph is a colourless fluid consisting of salts, proteins, water, which transport and circulate digested food and absorbed fat to intercellular spaces in the tissues.
 - Unlike the circulatory system, lymph is not pumped; instead, it passively flows through a network of vessels.

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