Circulatory System

The Circulatory System in Humans

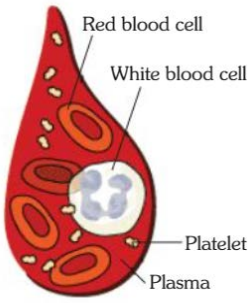
The circulatory system carries the blood from the heart to different parts of the body and brings it back to the heart.

The circulatory system in humans consists of the

- Blood
- Blood vessels
- Heart

Blood

- Blood is a liquid connective tissue. It is circulated throughout the body by the pumping action of heart.
- Blood is essentially an aqueous solution containing electrolytes, organic molecules, having suspended particles.



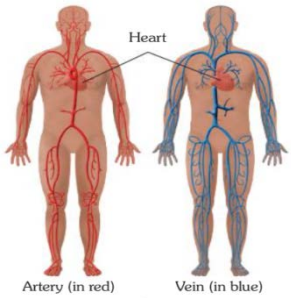
A drop of blood

Blood Vessels

There are three types of blood vessels in our body.

1. Veins

- Veins are wide, thick walled, blood vessels.
- Veins make the venous system and carries blood back to the heart.
- Small veins are called venules.



Human circulatory system

- Veins contain valves to stop blood flowing backwards due to gravity and are formed of merging venules.

Circulatory System

- The blood in the veins leading from the digestive system and liver also carries dissolved food. This is transferred to the arteries in the heart.

2. Arteries

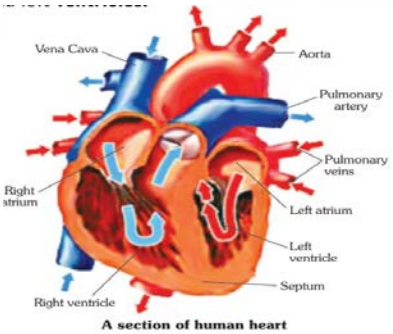
- Arteries are thick walled blood vessels, making up the arterial system and carrying blood away from the heart.
- Smaller arteries are called arterioles.
- Arterioles are branched off from arteries.
- Except in the pulmonary arteries, the blood contains oxygen.
- In all arteries, blood carries dissolved food and waste, brought into the heart by veins and is then transferred to arteries.
- Arteries carry the food to the cells and waste to the kidneys.

3. Capillaries

- Narrow, thin walled blood vessels branching off arterioles to form a complex network is called capillaries.
- Dissolved food and oxygen pass out through the walls of capillaries to the body cells and carbon dioxide and waste pass in.
- The capillaries of the digestive organs and liver also pick up food.
- Finally, capillaries join up to form small veins called venules.

Circulatory System

Heart



A section of human heart

- The heart is a fist-sized muscular organ found in the chest cavity towards the left lungs. It pumps blood to all parts of the body. It beats 60-80 times a minute throughout our life.
- The heart is made up of four chambers. The Upper two chambers are called right atrium and left atrium. The two lower chambers are called right ventricle and left ventricle.
- A muscular wall called septum separates the right and left side of the heart, preventing the mixing of oxygenated blood with the deoxygenated blood and have valves. Valves allow the blood to flow in only one direction.
- The blood rich in carbon dioxide flows through the right side of the heart, while the blood rich in oxygen flows through the left side of the heart.

The arteries and veins in the heart connect to other parts of the body. The blood vessels that enter or leave the heart are:

Vena cava: It is a large vein that collects blood rich in carbon dioxide from all parts of the body through smaller veins and empties the blood from the right atrium.

Pulmonary artery: It carries blood rich in carbon dioxide from the right ventricle of the heart to the lungs.

Pulmonary vein: It brings oxygenated blood from the lungs to the left atrium of the heart.

Aorta: It is the largest artery which receives blood rich in oxygen from the left ventricle. The oxygenated blood is then circulated to different parts of the body.

Circulatory System

Working of heart:

- The heart functions as a double pump. Impure (deoxygenated) blood from the veins flows into the right Atrium of the heart.
- From here, the blood enters the right ventricle through an opening.
- The impure blood is transported from the right ventricle to the lungs by the Pulmonary artery.
- Gaseous exchange takes place in the lungs.The blood gives off carbon dioxide and takes in oxygen.
- Oxygen-rich blood is carried to the left Atrium by the Pulmonary vein. From here, the blood flows through an opening into the left ventricle.
- The left ventricle pumps oxygen rich blood to every part of the body through the aorta.
- The oxygen is then used by the cells and the cell produces carbon dioxide.
- The blood takes in carbon dioxide and returns to the right ventricle of the heart.

Heartbeat and Pulse:

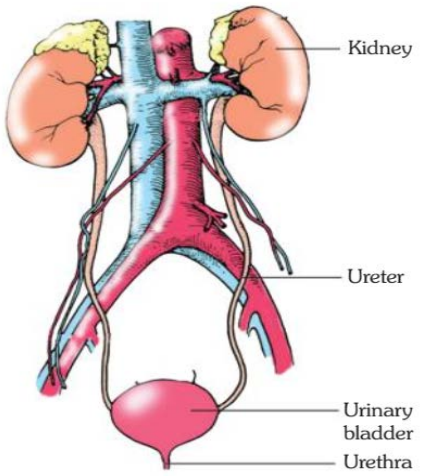
- The heart works by contracting and relaxing its muscles. The contraction and relaxation follows a rhythm called heartbeat.
- Pulse is the throbbing sensation of an artery at each beat of the heart. A Doctor uses an instrument called the Stethoscope to listen to your heartbeat. The number of beats per minute is called the pulse rate.

Circulatory System

Excretion in Humans

In humans, the excretory system consists of a pair of kidneys, a pair of ureters, urinary bladder and urethra.

- Kidneys are two bean shaped organs lying at the back of the abdomen, one on either side of the vertebral column. Waste products from the blood and urine are removed by the kidney.
- A Nephron is the basic filtration unit of the kidney. It is a cluster of thin walled blood capillaries.
- The urine produced by filtering the blood is transported to the urinary bladder. This is done by a pair of ureters. Ureters are long muscular tubes.
- Urinary bladder is a muscular bag like structure which can hold urine. The urinary bladder is under the control of nerves. When the bladder is full one get urge to urinate.
- This urine is thrown out of the body through urethra.
- Apart from the kidney, the skin and lungs are also helpful in the excretion.



The urinary system in humans

Circulatory System

Circulatory System in Animals

Transport of Materials in Animals

- In animals too, transport of materials takes place in the body.
- The materials transported in the body are water, digested food, chemical substances, respiratory gases (oxygen and carbon dioxide) and wastes.
- This is done by the circulatory system. The distribution/transportation of above materials in dissolved state by circulatory system is called circulation.

Animals have two types of circulatory system:

1. Open circulatory system

- This type of circulatory system is found in cockroaches, prawns, insects, etc.

2. Close circulatory system

- This type of circulatory system is found in man, frog, dog, cat, rat, etc.
- It is a system in which the blood remains within the blood vessels.
- Blood is always kept circulating throughout the body.