Class 7th

Chapter- 7

Transportation in Animals and Plants

All organisms need food, water and oxygen for survival. They need to transport all these to various parts of their body. They function to transport substances and together form the circulatory system.

CIRCULATORY SYSTEM

Blood

Blood is the fluid that flows in blood vessels. It transports substances like digested food from the small intestine to the other parts of the body. It carries oxygen from the lungs to the cells of the body. It also transports waste for removal from the body.

- **Blood is composed of a fluid, called plasma in which different types of cells are suspended.**
- **One type of cells are the red blood cells (RBC) which contain a red pigment called haemoglobin. Haemoglobin binds with oxygen and transports it to all the parts of the body and ultimately to all the cells. It will be difficult to provide oxygen efficiently to all the cells of the body without haemoglobin. The presence of haemoglobin makes blood appear red.**
- **The blood also has white blood cells (WBC) which fight against germs that may enter our body.**
- **The clot is formed because of the presence of another type of cells in the blood, called platelets. Platelets prevents the loss of blood due to bleeding.**

Blood vessels

There are different types of blood vessels in the body that carry blood throughout the body. There are three major types of blood vessels in the body, i.e., Arteries, Veins and Capillaries.

Also, the blood picks up the waste materials including carbon dioxide from the cells. This blood has to go back to the heart for transport to the lungs for removal of carbon dioxide.

Arteries

Arteries carry oxygen-rich or oxygenated blood from the heart to all parts of the body. Since the blood flow is rapid and at a high pressure, the arteries have thick elastic walls.

Pulse

Place the middle and index finger of your right hand on your left wrist. You will feel the throbbing movement at this place. This throbbing is called the pulse and it is due to the blood flowing in the arteries.

Pulse Rate

The number of beats per minute is called the pulse rate. A resting person, usually has a pulse rate between 72 and 80 beats per minute.

Veins

Veins are the vessels which carry carbon dioxide-rich blood from all parts of the body back to the heart. The veins have thin walls and blood flow at low pressure through veins. There are valves present in veins allow blood to flow only towards the heart i.e., only in one direction and prevent back flow of blood.

Capillaries

Capillaries are thin blood vessels that connect the arteries to veins. It play the most important task of circulatory system i.e., exchange of material between blood and body cells. The exchange of substances like food, 0_2, $C0_2$, etc., between the blood and the body cells take place through the capillaries.

Oxygenated and Deoxygenated Blood

The blood that carry oxygen in it is called oxygenated blood, i.e. it is rich in oxygen. The oxygenated blood comes from the lungs, where oxygen gets mixed into blood and is carried towards the heart.

The blood that is rich is carbon dioxide, i.e. all oxygen has been used by tissues and organs is called deoxygenated blood.

HEART

The heart is an organ which beats continuously to act as a pump for the transport of blood, which carries other substances with it.

The heart is located in the chest cavity with its lower tip slightly tilted towards the left. Your heart is roughly the size of your fist.

The heart has four chambers. The two upper chambers are called the atria (singular: atrium) and the two lower chambers are called the ventricles. The right side of the heart carries deoxygenated blood while the left side of the heart carries oxygenated blood. The partition between the chambers is called septum which helps to avoid mixing up of blood rich in oxygen with the blood rich in carbon dioxide.

Heartbeat

The walls of the chambers of the heart are made up of muscles. These muscles contract and relax rhythmically. This rhythmic contraction followed by its relaxation constitute a heartbeat. The average heartbeat of an adult person is 72-80 beats per minute

The heartbeats continue every moment of our life. If you place your hand on the left side of your chest, you can feel your heartbeat. The doctor feels your heartbeats with the help of an instrument called a stethoscope.

A doctor uses the stethoscope as a device to amplify the sound of the heart. It consists of a chest piece that carries a sensitive diaphragm, two ear pieces and a tube joining the parts. Doctors can get clues about the condition of your heart by listening through a stethoscope.

Each heart beat generates one pulse in the arteries and the pulse rate per minute indicates the rate of heart beat. The rhythmic beating of the various chambers of the heart maintain circulation of blood and transport of substances to the different parts of the body.

Animals such as sponges and Hydra do not possess any circulatory system. The water in which they live brings food and oxygen as it enters their bodies. The water carries away waste materials and carbon dioxide as it moves out. Thus, these animals do not need a circulatory fluid like the blood.

EXCRETION

When our cells perform their functions, certain waste products are released. These are toxic and hence need to be removed from the body. The process of removal of wastes produced in the cells of the living organisms is called excretion. The parts involved in excretion form the excretory system.

Excretory system in humans

The waste which is present in the blood has to be removed from the body. A mechanism to filter the blood is required. This is done by the blood capillaries in the kidneys. Kidneys act as filters of our bodies.

When the blood reaches the two kidneys, it contains both useful and harmful substances. The useful substances are absorbed back into the blood. The wastes dissolved in water are removed as urine. From the

kidneys, the urine goes into the urinary bladder through tube-like ureters. It is stored in the bladder and is passed out through the urinary opening at the end of a muscular tube called urethra.

The kidneys, ureters, bladder and urethra form the excretory system. An adult human being normally passes about 1–1.8 L of urine in 24 hours. The urine consists of 95% water, 2.5% urea and 2.5% other waste products.

Sometimes a person's kidneys may stop working due to infection or injury. As a result of kidney failure, waste products start accumulating in the blood. Such persons cannot survive unless their blood is filtered periodically through an artificial kidney. This process is called dialysis.

EXCRETION IN OTHER ANIMALS

Like humans, animals also excrete waste products from their body. The way in which waste materials are removed from the body of the animal depends upon the availability of water.

The way in which waste chemicals are removed from the body of the animal depends on the availability of water. Aquatic animals like fishes, excrete cell waste as ammonia which directly dissolves in water. Some land animals like birds, lizards, snakes excrete a semi-solid, white coloured compound (uric acid). The major excretory product in humans is urea.

TRANSPORT OF SUBSTANCES IN PLANTS

Plants take water and mineral nutrients from the soil through the roots and transport it to the leaves. The leaves prepare food for the plant, using water and carbon dioxide during photosynthesis. Food is the source of energy and every cell of an organism gets energy by the breakdown of glucose. The cells use this energy to carry out vital

activities of life. Therefore food must be made available to every cell of an organism.

Transport of water and minerals

Plants absorb water and minerals by the roots. The roots have root hair. The root hair increase the surface area of the root for the absorption of water and mineral nutrients dissolved in water. The root hair is in contact with the water present between the soil particles

Plants have pipe-like vessels to transport water and nutrients from the soil. The vessels are made of special cells, forming the vascular tissue. A tissue is a group of cells that perform specialised function in an organism. The vascular tissue for the transport of water and nutrients in the plant is called the xylem.

The xylem forms a continuous network of channels that connects roots to the leaves through the stem and branches and thus transports water to the entire plant leaves synthesise food. The food has to be transported to all parts of the plant. This is done by the vascular tissue called the phloem.

Thus, xylem and phloem transport substances in plants.

Transpiration

Plants release a lot of water by the process of transpiration. Plants absorb mineral nutrients and water from the soil. Not all the water absorbed is utilised by the plant. The water evaporates through the stomata present on the surface of the leaves by the process of transpiration. The evaporation of water from leaves generates a suction pull which can pull water to great heights in the tall trees. Transpiration also cools the plant.