



CLASS X SUBJECT - BIOLOGY

CHAPTER- LIFE PROCESSES

TOPIC- TRANSPORTATION

Guidelines:

Dear Students,

- Refer to the following content of the chapter.
- These notes will help you understand the concept of the lesson and complete the assignment that follows which will be graded on submission.
- Do the assignment in the Biology notebook.
- Link for the textbook: http://ncertbooks.prashanthellina.com/10_Science.html

Transportation:

It is a life process involving the movement of essential materials throughout the body as well as of metabolic waste products so that they can be eliminated from the body.

- ❖ In **lower organisms**, it occurs by the process of diffusion. Example - *Amoeba and Paramecium*.
- ❖ In **multicellular organisms**, nutrients are delivered to the cells by water vascular system. Example - *Hydra and Jellyfish*.
- ❖ In **Human beings**, there are various tissues and organs associated with the circulatory system such as Blood, Blood vessels, capillaries, lung and heart.

Blood:

Blood is an important fluid connective tissue. It is mainly composed of plasma and blood cells. Blood is composed of:

- **Plasma** – the fluid part of the blood and is composed of 90% of water and it constitutes 55% of the volume of blood.
- **Cellular component** - Red blood cells, white blood cells and platelets constitute the solid part of blood.
- ❖ The human body consists of three types of blood cells, namely:

- **Red blood cells (RBC) / Erythrocytes**

Red blood cells are mainly involved in transporting oxygen to various parts of the body as they possess the red coloured pigment –**Haemoglobin**.

- **White blood cells (WBC) / Leukocytes**

White blood cells are specialized cells which function as a body's defence mechanism. They provide immunity by fighting off pathogens (harmful microorganisms).

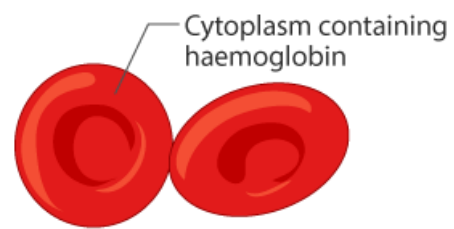
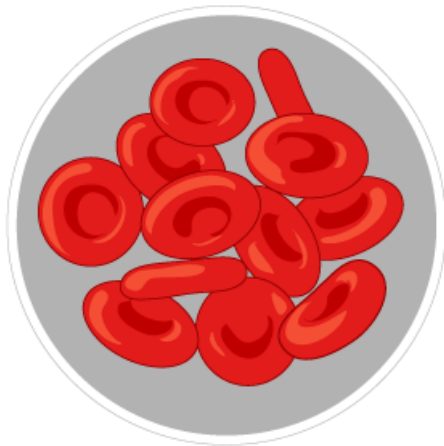
- **Platelets / Thrombocytes**

Platelets are cells that help to form clots and stop bleeding. They act on the site of an injury or a wound.

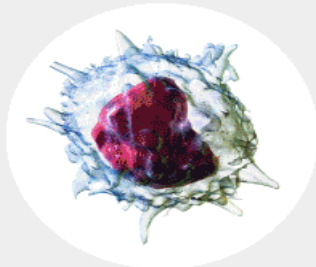
- ❖ **Plasma**

It is the fluid medium that transports carbon dioxide in the dissolved state, hormones, enzymes, metabolic wastes, etc.

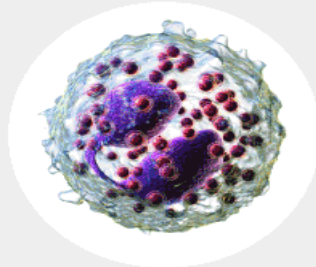
RED BLOOD CELLS (RBC)



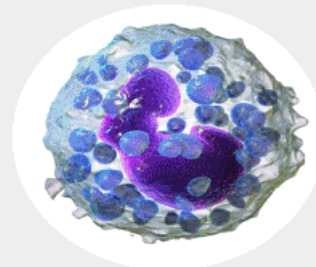
WHITE BLOOD CELLS



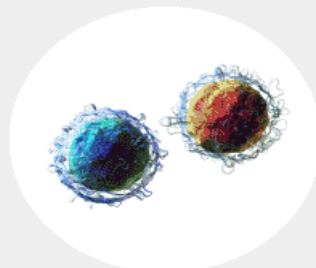
Monocyte



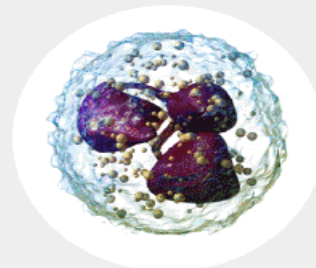
Eosinophil



Basophil



Lymphocytes



Neutrophil

Kindly refer to the link shared for better understanding of the concept- blood and its components. It will enable you to experience the process visually.

<https://www.youtube.com/watch?v=VSVYgivfs9c>

Function of Blood- Blood is responsible for the following body functions:-

- **Fluid Connective Tissue**

Blood is a fluid connective tissue composed of 55% plasma and 45% formed elements including WBCs, RBCs, and platelets. Since these living cells are suspended in plasma, blood is known as a fluid connective tissue and not just fluid.

- **Provides Oxygen to Cells**

Blood absorbs oxygen from the lungs and transports it to different cells of the body. The waste carbon dioxide moves from the lungs to the blood and is exhaled.

- **Transports Hormone and Nutrients**

The digested nutrients such as glucose, vitamins, minerals, and proteins are absorbed into blood through the capillaries in the villi, lining the small intestine.

The hormones secreted by the endocrine glands are also transported by the blood to different organs and tissues.

- **Temperature Regulation**

Blood helps to maintain the body temperature by absorbing or releasing heat. When the blood vessels react to outside organisms and changes in internal temperature, they expand and contract.

- **Blood Clotting at the Site of Injury**

The platelets help in the clotting of blood at the site of injury. The platelets form a clump at the damaged area. Fibrins are formed to complete the clot.

- **Transportation of Waste to Kidney and Liver**

Blood enters the kidney where it is filtered to remove nitrogenous waste out of the blood plasma. The toxins from the blood are also removed by the liver.

- **Protection of Body against Pathogens**

The White Blood Cells fight against infections. They multiply during infections.

Blood Vessels:

Arteries and **veins** are the main blood vessels. These are interconnected by a network of smaller vessels called **capillaries**.

Kindly refer to the link shared below for better understanding of blood vessels and lymph. It will enable you to experience the process visually.

<https://www.youtube.com/watch?v=E-YOyz0bejM>

ARTERIES	VEINS
1. They are deeply placed in the skin and have thick elastic walls.	1. They are superficial in location and have thinner walls as compared to arteries.
2. They carry blood from heart to body parts.	2. They carry blood from body parts to heart.
3. The blood carried is oxygenated except that in Pulmonary artery.	3. The blood carried is deoxygenated except that in Pulmonary vein.
4. They do not have valves as blood moves forward with high pressure exerted by the heart.	4. They are lined by valves internally to prevent the backflow of blood into the organs.

Lymph:

Some amount of plasma, proteins and blood cells escape through the pores present in the walls of capillaries into intercellular spaces in the tissues and form the tissue fluid known as **lymph**.

Though lymph is similar to the plasma of blood, but it is colourless and contains less protein. An important function of lymph is to transport digested and absorbed fat from intestine and it also drains excess fluid from extra cellular space back into circulation.

SUMMARY:-

Comparison between Blood and Lymph

Blood is the only fluid connective tissue present in our body and plays a significant role in transporting a wide variety of substances to different parts of the body. The main components of blood include RBC – red blood cells, white blood cells, blood platelets

and the plasma. Blood is the main component of the human circulatory system. The main functions of blood include:

1. Regulates body temperature
2. Regulates the water content of the cells
3. Protects against excess loss of blood through clotting
4. Regulates the pH by interacting with acids and bases
5. Involved in the transportation of gases, enzymes, nutrition, hormones and other molecules to the respective parts of the body

Lymph is a clear white coloured fluids tissue which is composed of lymphocytes, white blood cells. Lymph is generally found in the lymphatic vessels and in the various cavities of the body. It is the part of the lymphatic system, which functions by transporting the white blood cells between the lymph nodes and bones, removal of interstitial fluid from tissues and fights against the disease-causing and infectious bacteria invading the blood cells. The main functions of lymph include:

1. Supplies nutrients to the body
2. Removes metabolic wastes from the tissue cells
3. Maintains the composition of tissue fluid
4. It helps in invading the entry of **pathogenic infections** caused by microbes
5. Absorbs fat-soluble vitamins and other digested fat molecules from the small intestine through lymphatic vessels



Some facts:

- Approximately 8% of an adult's body weight is made up of blood.
- Females have around 4-5 litres, while males have around 5-6 litres blood. This difference is mainly due to the differences in body size between men and women.
- Its mean temperature is 37 degrees Celsius.
- It has a pH of 7.35-7.45, making it slightly basic (less than 7 is considered acidic).
- Whole blood is about 4.5-5.5 times as viscous as water, indicating that it is more resistant to flow than water. This viscosity is vital to the function of blood because if blood flows too easily or with too much resistance, it can strain the heart and lead to severe cardiovascular problems.
- Blood in the arteries is a **brighter red** than blood in the veins because of the higher levels of oxygen found in the arteries.

Key words:

Transportation	Blood	RBC	WBC	Plasma
Lymph	Pathogens	Arteries	Veins	Capillaries

ASSIGNMENT-

Q1. Name the component present in blood which helps in clotting of blood.

Q2. Discuss the importance of blood in humans.

Q3. Differentiate between the following: (at least two points)

a) Arteries and Veins b) Blood and Lymph

Q4. What will be the consequences of deficiency of haemoglobin in human body?

Q5. Complete the following sentences with respect to RBC and WBC with suitable words:

Red blood cells (RBC)	<ul style="list-style-type: none">• They pick up _____ from your lungs and transport it to your cells• Oxygen binds to a _____ pigment called _____• They have no _____ to make more room for haemoglobin• They have a _____ shape to give them a _____ surface area
White blood cells (WBC)	<ul style="list-style-type: none">• They are much _____ than RBC, and unlike these cells they also have a _____• They form part of the body's _____• Some form Y-shaped _____ which bind to microorganisms• Others WBC's engulf and digest bacteria and viruses, these cells are called _____