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CORPUSCULAR ELEMENTS OF BLOOD

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Abstract: The formed elements of blood are vital components of the human body. They consist of erythrocytes, leukocytes and thrombocytes. Erythrocytes or red blood cells are responsible for transporting oxygen to the tissues and carrying carbon dioxide back to the lungs. They contain a substance called hemoglobin, which gives blood its red color. Leukocytes or white blood cells, protect the body from microbes, viruses and other foreign substances. They play a key role in the immune system by participating in phagocytosis, antibody formation and inflammatory processes. Thrombocytes or platelets are crucial in blood clotting. When a blood vessel is damaged they gather at the site of injury and help stop bleeding. All the formed elements of blood are produced in the bone marrow. Their number, shape and function are essential indicators of a healthy organism. An imbalance in these elements can signal various diseases. For example, a decrease in erythrocytes causes anemia, a low number of leukocytes weakens the immune system and a shortage of thrombocytes leads to impaired blood clotting. The formed elements work together to maintain homeostasis or the stability of the internal environment. Therefore, studying the formed elements of blood is very important for assessing human health.

Keywords: formed elements, erythrocytes, thrombocytes, leukocytes, anemia, platelets, neutrophils, eosinophils, basophils, lymphocytes, monocytes , hematopoiesis, homeostasis, red bone marrow.

Introduction.

Blood is one of the most important tissues in the human body. It serves as the main medium for transporting oxygen, nutrients, hormones and waste products, as well as maintaining the internal balance of the body. Blood consists of two main components: plasma and formed elements. The formed elements include **erythrocytes** (red blood cells), **leukocytes** (white blood cells) and **thrombocytes** (platelets). Each of these elements performs specific and vital functions necessary for the body's survival. Blood cells are formed in the spongy substance of bones – the red bone marrow. In adults this substance reaches about 1500 grams. The formed elements of blood are also produced in the lymph nodes and the tonsils.

Erythrocytes or red blood cells are the most numerous of the formed elements. They are biconcave disc-shaped cells that lack a nucleus and are filled with hemoglobin- a red pigment that binds oxygen and gives blood its color. The main function of erythrocytes is to transport oxygen from the lungs to tissues and carry carbon dioxide back to the lungs for exhalation. Each erythrocyte lives for about 120 days and is then destroyed in the liver and spleen. The formation of red blood cells takes place in the bone marrow, under the control of the hormone **erythropoietin**, which is secreted by the kidneys. The red color of blood is due to hemoglobin in red blood cells. Hemoglobin carries oxygen to the tissues. Hemoglobin consists of two parts. Its protein part is called globin and the iron-containing part is called heme. In the lung capillaries, hemoglobin combines with oxygen to form oxyhemoglobin. Blood rich in oxygen is

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light red and is cells. After giving oxygen to the cells, the blood becomes rich in carbon dioxide and turns dark red it is called venous blood. A decrease in erythrocyte count can cause **anemia**, a condition characterized by fatigue, dizziness and weakness. Severe blood loss, poor nutrition and some infectious diseases can cause anemia. The treatment of anemia is related to restoring the normal level of hemoglobin in the blood. For this, it is necessary to eat well, get enough rest, and spend more time walking in fresh air.

Leukocytes or white blood cells are responsible for protecting the body from infections and foreign substances. Unlike erythrocytes, they contain a nucleus and are less numerous. There are 6-8 thousand leukocytes in 1 mm^3 of blood. Leukocytes protect the body from various microbes and toxic substances. Some types of leukocytes can pass through the walls of blood vessels into tissues and have the ability to capture and digest foreign particles there. Leukocytes are divided into two major categories: **granulocytes** and **agranulocytes** . Granulocytes include **neutrophils, eosinophils** and **basophils** . Neutrophils destroy bacteria and to damaged tissue; eosinophils help fight parasites and control allergic reactions; basophils release histamine, which increases blood flow to infected areas. Agranulocytes include **lymphocytes** and **monocytes.** Lymphocytes are essential for producing antibodies and supporting the immune system, while monocytes become macrophages that digest bacteria and dead cells. Leukocytes, while destroying harmful microorganisms and dead cells, also die in large numbers themselves. The pus that accumulates in inflamed tissues consists of dead leukocytes. They usually live for 2-5 days and then end their activity.

Thrombocytes or platelets are small fragments of large bone marrow cells called **megakaryocytes.** Platelets are nucleus- free cells. They are round or oval in shape, with a diameter of 3-4 micrometers. They are produced in the bone marrow and spleen and live for 2-5 days. There are 300-400 thousand platelets in 1 mm^3 of blood. They play a crucial role in blood clotting and wound healing. When a blood vessel is injured, platelets gather at the site, adhere to the damaged wall and form a plug to stop bleeding. They also release special chemicals that activate clotting factors and promote tissue repair. If the number of platelets decreases, bleeding may occur even from small injuries- a condition known as **thrombocytopenia.** Blood clotting is associated with the thromboplastin protein contained in platelets rupture, releasing their thromboplastin enzyme into the plasma. This enzyme converts prothrombin in the plasma into thrombin. Under the action of thrombin, the plasma protein fibrinogen is transformed into insoluble fibrin. Fibrin fibers cover the injured area of the blood vessel like a net. Blood cells get trapped among the fibrin fibers, accelerating the formation of a clot. Over 3-4 minutes , the blood clot gradually thickens, sealing the wound and stopping bleeding.

All formed elements are produced in the **red bone marrow** through a process called **hematopoiesis.** The balance between the production and destruction of these cells is vital for maintaining health. Disruption of this balance may lead to various diseases such as **leukemia, anemia,** or **polycythemia.** These disorders can affect the composition and functioning of blood, leading to serious consequences for the entire body.

The study of the formed elements of blood is very important in medicine and biology. By analyzing blood cells under a microscope or through laboratory tests, doctors can detect many diseases in their early stages. For instance, a change in the number or shape of red blood cells can indicate anemia or blood loss; an infection or leukemia; and low platelet levels may point to bleeding disorders.

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Conclusion.

In conclusion, the formed elements of blood- erythrocytes, leukocytes and thrombocytes- play an irreplaceable role in sustaining life. Each type of cell works in harmony with the others to transport vital substances, protect the body and repair damaged tissues. Understanding the structure and function of these elements allows us to appreciate the complexity of the human body and provides valuable insight for diagnosing and treating various diseases. The balance and proper functioning of blood components are essential for maintaining **homeostasis,** the internal stability of the organism.

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