BLOOD COMPOSITION, BIOCHEMISTRY OF PLASMA PROTEINS, LYMPHA-RETICULAR SYSTEM

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Abstract: *Blood is the most important fluid in a living organism, its main function consists of nourishing cells, participating in gas exchange, elimination of toxic substances from the body, direct participation in immune and homeostasis mechanisms. The composition of the blood is quite complex, consisting of both plasma and shaped elements. The bulk of plasma is water, dissolved proteins in it, salts, organic and inorganic substances. Plasma serves as an important means of transporting various metabolites, gases, hormones and other compounds, keeping the internal environment of the body stable. Shaped elements - erythrocytes, leukocytes and platelets - help the body to perform various functions.*

Keywords: *blood composition, plasma proteins, lympha, reticular system, biochemistry, immunity, albumin, globulin, fibrinogen*

Аннотация: *Кровь — самая важная жидкость в живом организме, её основная функция — питать клетки, участвовать в газообмене, удалять токсичные вещества из организма и напрямую участвовать в иммунных и гомеостазных механизмах. Состав крови очень сложен, он состоит из плазмы и образованных элементов. Основная часть плазмы — это вода, белки, соли, органические и неорганические вещества, растворённые в ней. Плазма служит важным средством поддержания стабильной внутренней среды организма и транспортировки различных метаболитов, газов, гормонов и других соединений. Образованные элементы — эритроциты, лейкоциты и тромбоциты — помогают организму выполнять различные функции.*

Ключевые слова: *состав крови, белки плазмы, лимфа, ретикулярная система, биохимия, иммунитет, альбумин, глобулин, фибриноген.*

About 55-60% of the total volume of blood is plasma, making up the bulk of it, that is, 90-92% water. The rest of it is made up of proteins and other substances. The main types of proteins are albumin, globulin and fibrinogens. These proteins perform various biological functions. Albumins maintain osmotic pressure, globulins play an important role in the immune system, and fibrinogens are the main means of blood coagulation. Plasma contains electrolytes, hormones, amino acids, vitamins and other metabolic products. Blood-forming elements - erythrocytes, that is, red blood cells - are involved in supplying oxygen to cells, and at the same time help to transport carbon dioxide. The membrane of erythrocytes is well polished, it contains a complex protein called hemoglobin, which binds gases. And leukocytes are giant cells that make up the immune system. They fight against microorganisms and foreign particles. There are several types of leukocytes: lymphocytes, monocytes, granulocytes. Lymphocytes produce antibodies, providing cellular immunity. Monocytes are actively involved in the process of phagocytosis. Granulocytes, on the other hand, are mainly involved in inflammatory reactions [1].

And platelets, or blood plates, play an important role in the blood coagulation system. When damage occurs in the blood vessels, these cells are activated, stick to each other and blood begins the process of coagulation. This process saves the body from blood loss. Proteins in blood plasma play uninterrupted transport, storage, and signaling services in the blood. Albumins are one of the most common proteins found in plasma, and their main function is to maintain the osmotic pressure normally, transport various substances (for example: hormones, drugs, fatty acids) and serve as a reserve energy reserve. Globulins are divided into alpha, beta and gamma types. Alpha and beta globulins mainly perform transport and inhibitory functions, while gamma globulins are responsible for the immune response as immunoglobulins. Fibrinogen, on the other hand, is involved in blood coagulation processes, as mentioned above, and stops blood flow by forming a network of fibrin at the injured sites. There are also small amounts of other proteins in the blood, which can be found

in the form of enzymes, hormones, or signaling compounds. Some plasma proteins multiply immediately in the state of inflammation and infection – such proteins are referred to as "acute phase" proteins [2].

The normal composition of the blood, its little or less, leads to significant changes in the body. For example, a decrease in the hemoglobin index indicates a state of anemia, and an increase in globulins indicates some infectious diseases. The role of blood in transporting nutrients, gases and metabolites, immune protection and maintaining homeostasis is invaluable. And the lympha-reticular system is one of the most important parts of the immune protection and fluid circulation in the body. By removing excess fluid and substances from the body through the lymph vessels, directing it to the lymph nodes, the intercellular environment is cleaned. Lymph nodes activate the immune response, protecting against damage by germs and foreign particles to the body. The biochemistry of lymph is very similar to the biochemistry of blood plasma, meaning that it contains water, proteins, electrolytes, fat, and other organic matter. Lymph accumulates excess water and small molecules that are excreted from every cell of the body. Its main function is to maintain normal fluid pressure in tissues, to regulate metabolism, to deliver immune cells through lymph to tissues and to purify foreign particles. Proteins transported through the lymph consist mainly of albumins and globulins. Lymph contains an excess of lymphocytes, which fight infection [3].

The reticular system is located in the cerebral cortex, liver, spleen, and bone marrow. The main task of this system is to capture and destroy various microorganisms and foreign substances that come through the blood and lymph. Phagocytic cells - macrophages play a huge role in this process. Macrophages are able to engulf pathogenic microbes, break them down with the help of enzymes. The reticuloendothelial system controls protective mechanisms, utilizes metabolic products (for example, senescent red blood cells). The immune system is made up of different organs and cells that act as a citizen, protecting the body from disease-provoking factors. Lymph nodes, spleen, thymus, bone marrow and lymphocytes are members of this system. One of the important components of the lymphatic system

is lymphocytes. They provide humoral and cellular immunity. Macrophages initiate an immune response by engulfing and breaking down pathogenic microorganisms that have entered from the edge, presenting an antigen on its surface. Also, in the lymphatic-reticular system, lymphocytes are excreted, directing them to foci of inflammation and infection [4].

The blood, lymphatic and reticular system are inextricably linked in the main vital processes of the body, which together keep the internal environment stable, preventing the damage caused by toxic substances and microbes to the body. The transport, protection, homeostasis, and regulatory functions of blood and lymph are of particular importance in medical science and practice. Every heartbeat and every lymph flow plays an important role in a person's health. Together with lymphocytes and other immune cells, they provide the body's defenses. Cells and fluids eventually re-enter the lymph nodes through the lymph vessels and then back into the venous system through the lymphatic passage. In the lymph nodes, an antimicrobial immune response begins. Elements of the reticular system ensure their elimination from the body, capturing pathogenic and foreign particles. Changes in the blood, lack or excess of plasma proteins lead to the occurrence of various diseases. Also, with a decrease in the activity of the lymphatic-reticulary system, the immune response decreases, and the body susceptible more quickly to infections. Specific biochemistry markers of blood and lymph are analyzed, assisting the doctor in determining treatment tactics for patients. Now using modern methods of diagnosis and treatment, the correct assessment of the activity of these systems is possible.

The composition of blood and the biochemistry of plasma proteins are deeply studied in medicine. As a result of the analysis, it turned out that albumins, one of the main substances in blood plasma, maintain osmotic pressure in the body normally. A decrease in this protein can disrupt the fluid balance in different organisms. Globulins also play an important role in plasma, and are actively involved in ensuring the normal functioning of the immune system, fighting infections. Fibrinogen, on the other hand, plays a decisive role in blood coagulation, its deficiency or increase directly affects the blood coagulation process in the body.

Red blood cells are involved in transporting oxygen, leukocytes - in the body's defense and elimination of diseases. Blood is constantly delivering metabolites, nutrients, hormones, and waste products into or out of tissues. Analyzes show that as changes are observed in the composition of the blood, this directly affects the functioning of internal organs and the health of the whole body. Having an adequate amount of plasma proteins in the blood is also necessary for immunity. Analysis of the lymphaticular system reveals what role it plays in the circulation of fluids and in supporting the immune defense system. Lymphocytes and other cells contained in the lymph cleanse the body's internal environment, cleanse it from foreign substances, effectively fight infections. When the nodes and reticular tissues that make up this system work properly, then human health becomes stable. Lymph will maintain a vital balance, allow the body to avoid unforeseen threats. The results showed that changes in the composition of blood and lymph can be manifested as the first sign of diseases. Changes in the proportion of albumin and globulins in blood plasma indicate the presence of any disease or inflammatory process. An increase or decrease in the amount of elements of the lymphatic-reticular system, in turn, means a decrease in immunity or an increase in inflammatory activity. And changes in the composition of lymph discharge from the tissues serve as a sign of disturbances in the internal environment. Based on the results of the analysis, it can be said that the composition of blood and lymph, as well as the biochemistry of these systems, coordinate all vital processes in the body, ensuring the stability of human health. In any chronic, infectious, or inflammatory diseases, these systems are the first to change, and proceeding, it will be important to recognize diseases at an early stage. Timely analysis of the blood and lympha-reticular system based on these results is the basis for a healthy functioning of the body.

Conclusion:

In conclusion, the composition of blood, plasma proteins and the biochemistry of the lympha-reticular system are of great importance for a living organism. The composition of blood plasma and the proteins contained in it provide stability of the internal environment of the body, increased gas exchange, nutrition

and a number of important biological functions. And the lympha-reticular system removes excess fluid and matter from tissues, providing immune protection and the body's ability to fight infections. Disruption of these systems, or changes in them, has serious health effects. This knowledge has an incomparable value in medicine and is important in studying the biochemistry of blood and lympha, detecting and treating diseases.

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