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MORPHO-FUNCTIONAL CHARACTERISTICS OF AGRANULOCYTES AND THEIR ROLE IN THE PATHOGENESIS OF VARIOUS DISEASES

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Abstract: This article comprehensively analyzes the morphological and functional characteristics of agranulocytes (lymphocytes and monocytes) and their role in the pathogenesis of various diseases. The T and B types of lymphocytes, their role in the immune response, as well as the phagocytic activity of monocytes, are highlighted. The importance of changes in the number and functional state of agranulocytes in the development of infectious and inflammatory diseases such as tuberculosis, AIDS, pneumonia, and sepsis is shown. Also, the importance of laboratory-diagnostic methods, in particular general blood analysis, morphological and immunological examinations, is based on the identification of pathologies associated with these cells. The results of the study show that maintaining the balance of agranulocytes is an important factor in the body's immune defense
Keywords: lymphocytes, monocytes, T and B lymphocytes, lymphocytosis, lymphocytopenia, monocytosis, monocytopenia, tuberculosis, AIDS.

Relevance: In recent years, pathological conditions associated with agranulocytes have been considered a particularly urgent medical and biological problem in the healthcare system of the world and Uzbekistan. Agranulocytes (lymphocytes and monocytes) are an important component of the immune system, providing the body's defense against infectious agents. Their quantitative and qualitative changes lead to a breakdown of the immune response, resulting in the development of severe infectious and somatic diseases. An increase in the number of agranulocytes or a change in their functional activity leads to increased inflammatory processes in the body, which can lead to the development of life-threatening diseases such as sepsis, severe pneumonia, and toxic hepatitis. In particular, in cases with immune system imbalance, an effective response to infection does not form, which increases the severity of the disease and the risk of complications.

Lymphocytes primarily provide immunity against viruses, and their reduction (lymphocytopenia) creates the basis for the development of diseases such as human immunodeficiency virus (HIV) infection. Monocytes, as the main link of the phagocytic system, participate in the fight against bacteria; their decrease (monocytopenia) increases susceptibility to infectious diseases such as tuberculosis. In this regard, the imbalance of agranulocytes is of great importance in the epidemiology of infectious diseases. According to statistics, the annual incidence of agranulocytosis-related diseases worldwide ranges from 5.4 to 15.4 cases per million population. These figures indicate the widespread prevalence of these pathologies globally and the need for their early detection and the development of effective preventive measures. Blood system diseases, including leukemias, are also prevalent to a certain extent in the Republic of Uzbekistan. Specifically, there were 4–5 cases per 100,000

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children, and 0.62 cases per 100,000 adults. The mortality rate is 1.82 per 100,000 population. These figures confirm the high medical and social significance of these diseases.

Introduction: Agranulocytes make up 25–40% of the human peripheral blood. Their main types are lymphocytes and monocytes. T and B lymphocytes differ in their location and development. T lymphocytes make up 60–80% of total lymphocytes, while B lymphocytes make up 10–20%. A decrease in the number of T lymphocytes leads to the development of autoimmune diseases such as diabetes, cancer, immunodeficiency diseases, and HIV/AIDS. Excessive activation of B lymphocytes can cause diseases such as chronic lymphocytic leukemia, allergic diseases, and rheumatoid arthritis. Since lymphocytes are the main defenders of the immune system, their decrease makes the body susceptible to infections. An increase in lymphocytes is called lymphocytosis. Lymphocytopenia can be associated with AIDS. Monocytes are the largest of the leukocyte cells. Their increase leads to chronic inflammation. An increase in monocytes is called monocytosis and is observed in diseases such as tuberculosis, malaria, and rheumatoid arthritis (1).

Main part: One of the important etiological factors of agranulocytosis-related changes is adverse drug reactions. In particular, uncontrolled or improper use of antibiotics, cytostatics, immunosuppressants, and some anti-inflammatory drugs can have a negative effect on the hematopoietic system, leading to a sharp change in the number of agranulocytes. Modern studies show that a large part of the world's population is experiencing immune system disorders due to improper use of medications.

Since lymphocytes play a central role in the body's immune defense system, any changes in their number and functional state directly affect the health of the entire organism. The increase in such pathologies today makes the in-depth study of the function of lymphocytes a pressing issue. Disorders of the immune system cause the onset and severe course of many diseases among these pathalogies, tuberculosis (tuberculosis) and AIDS (Acquired Immunodeficiency Syndrome) are among the most common among the world's population in the Saras of patients. Tuberculosis is a chronic disease caused by bacteria . Transmission routes are mainly through the airways .Sil affects the lungs in 90% of cases, but can also affect the kidneys, bones, joints, and lymph nodes. Symptoms of the disease include a cough that lasts for more than 3-4 weeks, a body temperature of 37-38 °C, sweating during sleep, and in severe cases, coughing up bloody sputum. Mainly vaccine vaccination to prevent tuberculosis, the vaccination process mainly starts from 4-5 days of the baby's life. The medical examination uses methods such as sputum analysis ,flyurography. These methods help prevent and control the spread of diseases. AIDS is caused by a breakdown of T lymphocytes and its development involves 4 stages. Incubation period: from 2 weeks to 3-6 months after contracting the virus . In doing so, the virus will be in the body but will not come out in examinations. During the acute infection period, the virus rapidly multiplies, causing fever, body aches, and flu-like symptoms. Letent this period is a latent period that secretly eliminates T - lymphocytes it lasts 5-10 years. During the AIDS period, immunity drops sharply, leaving it unable to fight germs and prone to tumors. To prevent AIDS, a blood test in which a strictly controlled blood test of the blood donor is necessary. Medical sterility, medical personnel must ensure that disposable syringes and needles are used once, and that the instruments used by dentists are sterile. And most importantly, it is necessary to pay attention to personal hygiene and not use other people's toothbrushes or manicure tools.In 2024-2025, tuberculosis and AIDS are making up a large percentage of the world.

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Tuberculosis is about 5.8 percent. In 2024, 150,000 of the 2024 deaths from tuberculosis were HIV-positive patients (2).

In addition, agranulocytes are also important in clinical medicine.There will be no granules in the ULA,but the specification will do the protection vaizfa.T-lymphocytes provide cellular immunity and prevent viral diseases .B - produces antibodies, increasing humoral immunity. These processes further increase the body's ability to fight infections.Monocytes, on the other hand, destroy microbes through phagocytosis and participate in the inflammatory process by transforming into macrophages. These cells play an important role in tumor processes and in the diagnosis of hematological diseases.

Since agranulocytes are the main cells of the imum system, the number and function are considered important in clinical medicine ,in lymphocytes ,as well as in monocytes, in emerging pathalogies, attention should first be paid to general blood analysis, through the method of morphological microscopy, changes in the nucleus and cytoplasm are examined, immunological tests this method is mainly used in The main goal of treatment is to eliminate viruses, bacteria, or tumor processes and prevent their further development. To prevent such diseases, it is necessary to observe personal hygiene, as even a simple germ can cause a serious infection.

Conclusion: Based on the above, a comprehensive study of pathologies associated with agranulocytes, the identification of their etiopathogenetic mechanisms, and the practical implementation of modern diagnostic methods with high sensitivity are of significant scientific and practical importance. Early diagnosis and improved preventive strategies can reduce the severity of diseases and improve clinical prognosis. At the same time, the use of immunomodulatory therapy and other innovative treatment approaches allows for effective control of these pathologies.

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