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HISTOLOGICAL STRUCTURE AND FUNCTIONAL SIGNIFICANCE OF THE BLOOD AND IMMUNE SYSTEM

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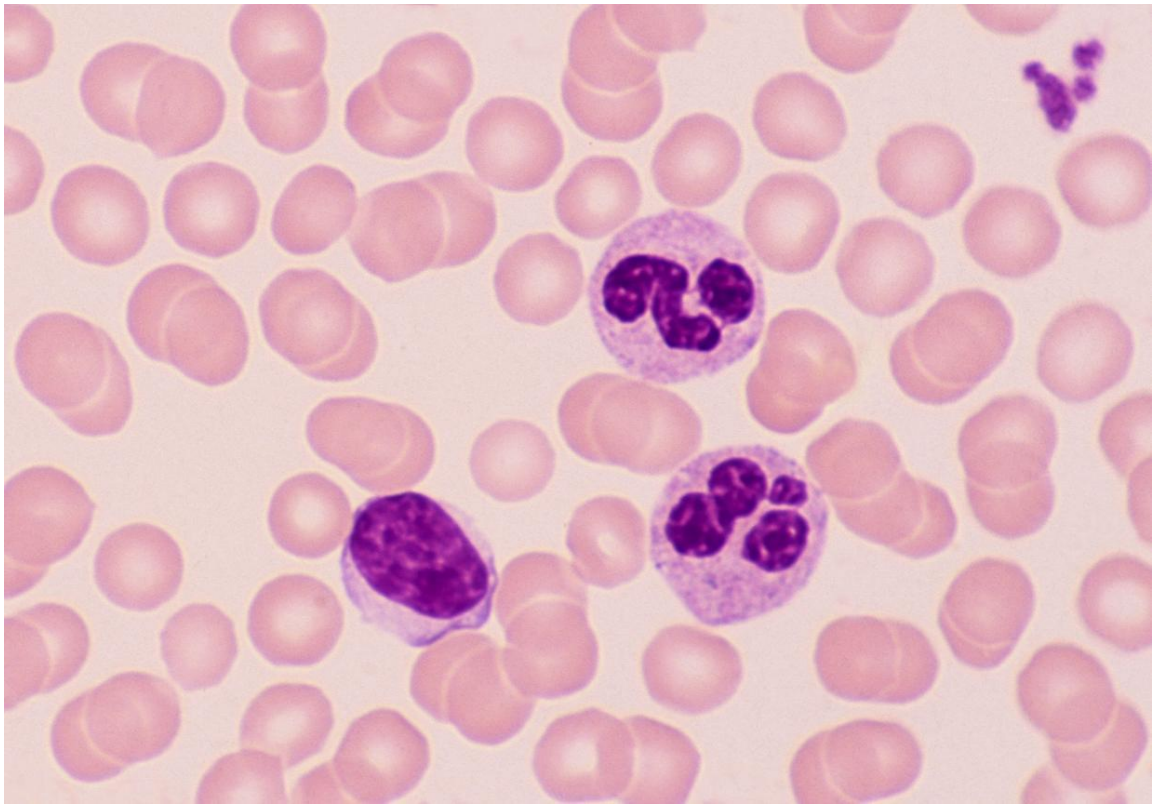
Abstract

This article examines the histological structure of the blood and immune system, their main components, and their functional significance in the human body. Blood cells, immune system organs, and their interrelationships are analyzed. The results show that the blood and immune system play a crucial role in protection, transport, and maintenance of homeostasis.

Keywords: blood, immune system, histology, erythrocytes, leukocytes, lymph nodes, spleen, bone marrow

INTRODUCTION



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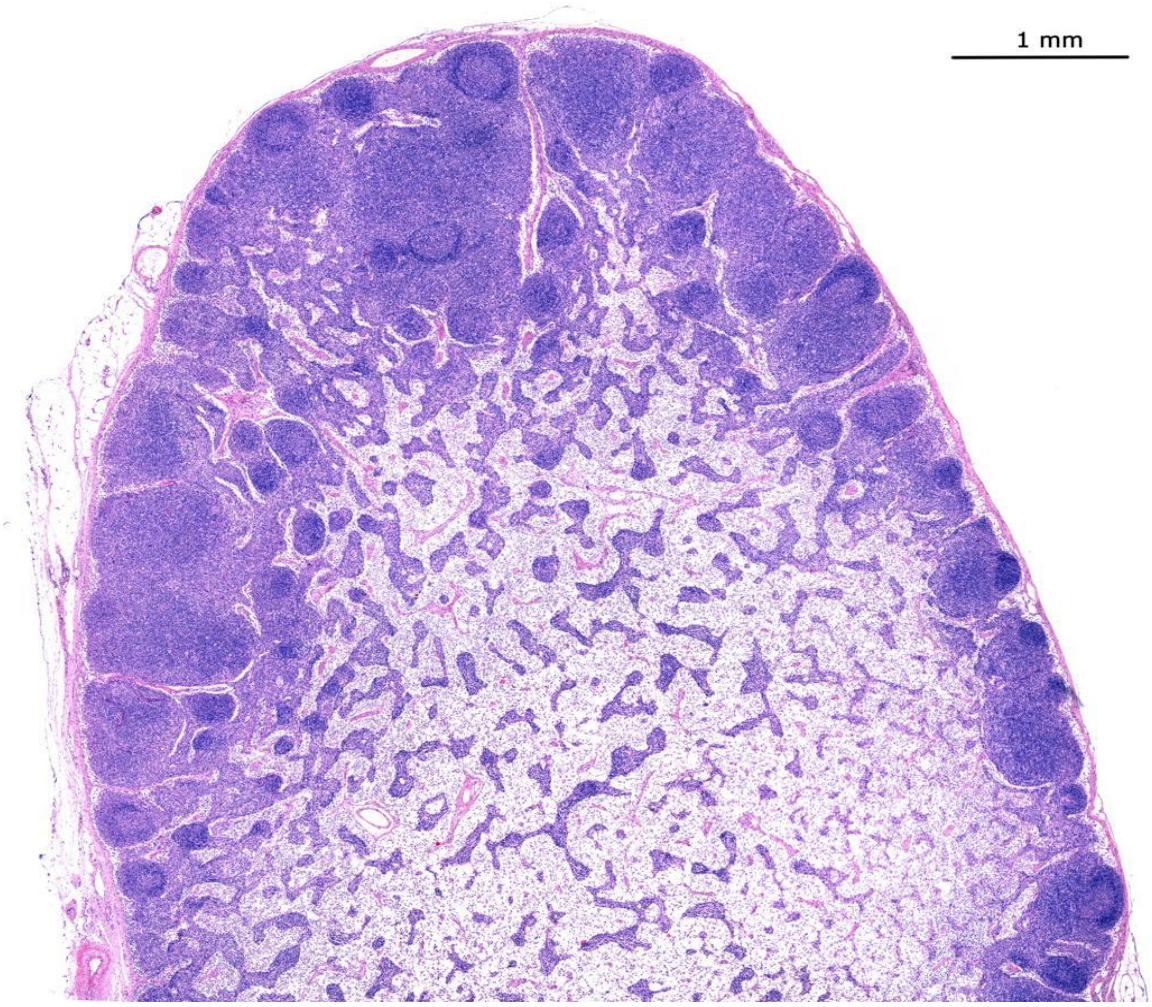

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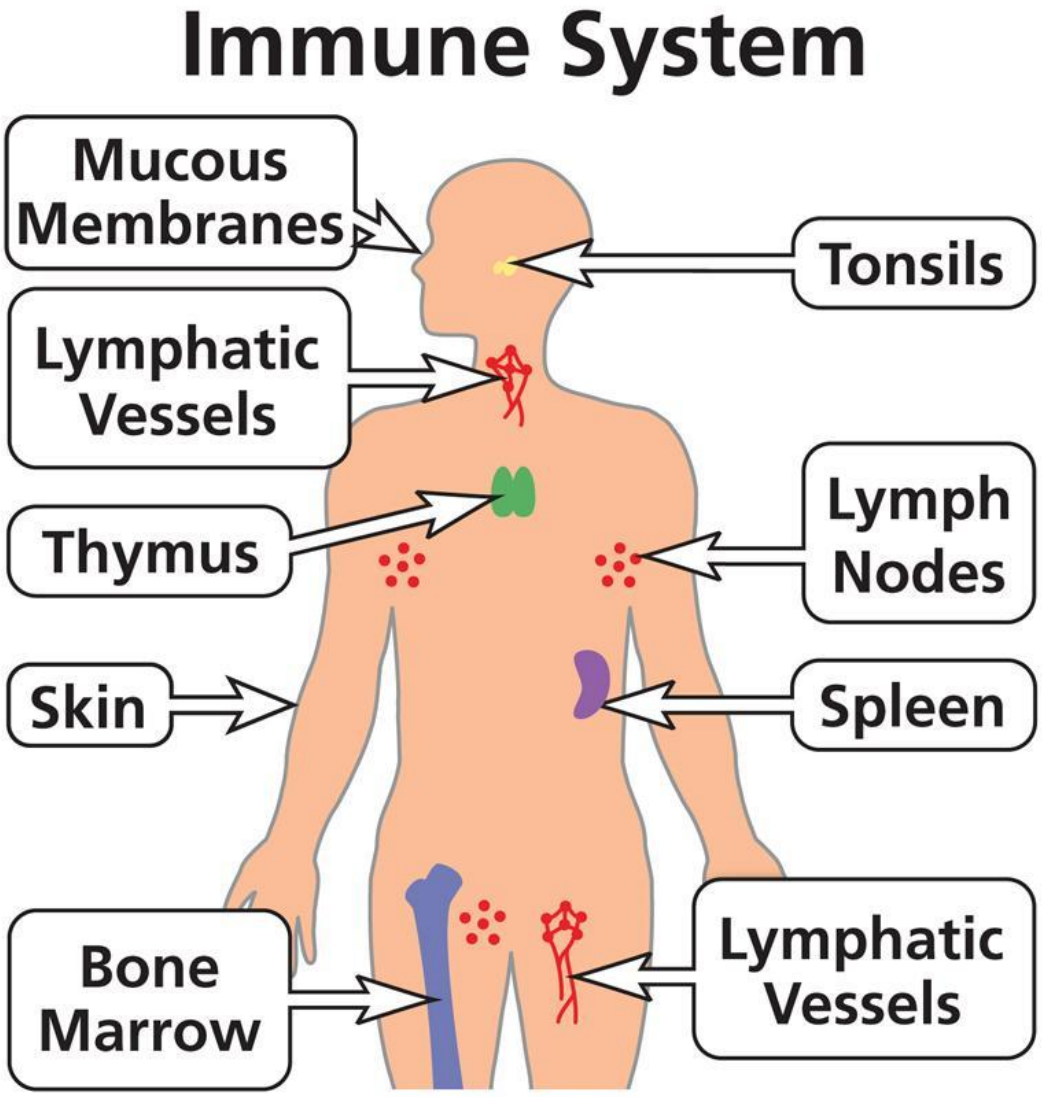

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The blood and immune system are among the most vital systems of the human body. Blood tissue is responsible for transporting oxygen, nutrients, and metabolic products throughout the body. The immune system, in turn, protects the body from pathogens and harmful agents.

From a histological perspective, blood is a fluid connective tissue composed of plasma and formed elements. The immune system consists of lymphoid organs such as bone marrow, thymus, lymph nodes, and spleen.

The interaction between the blood and immune system ensures effective defense mechanisms. Therefore, studying these systems in detail is of great importance in medical science.

MATERIALS AND METHODS

This study was conducted based on the analysis of scientific and pedagogical literature. The following methods were used:

- Microscopic examination of histological specimens
- Analysis of blood smears
- Study of the structure of lymphoid organs

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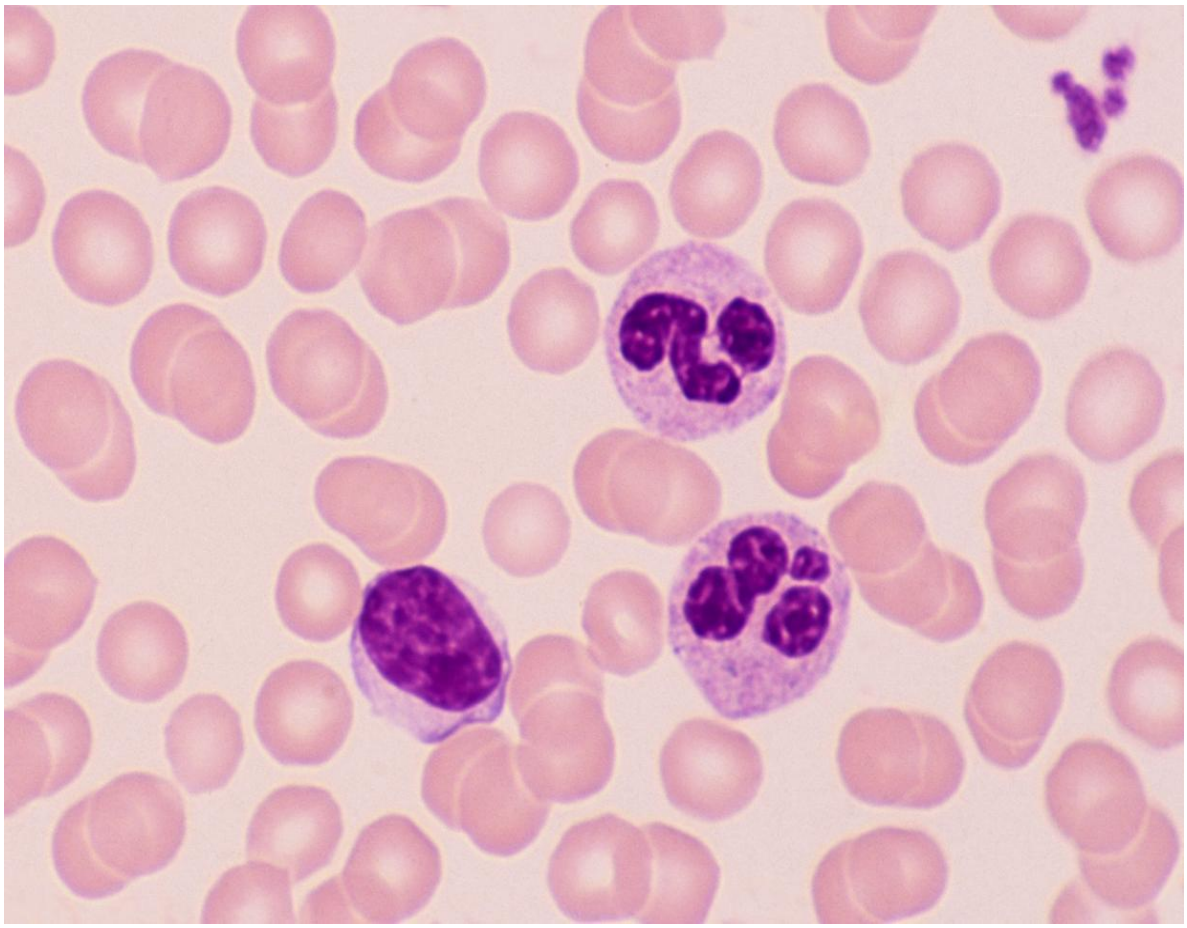
- Comparative analysis of scientific sources

The objects of the study were human blood tissue and immune system organs.

RESULTS



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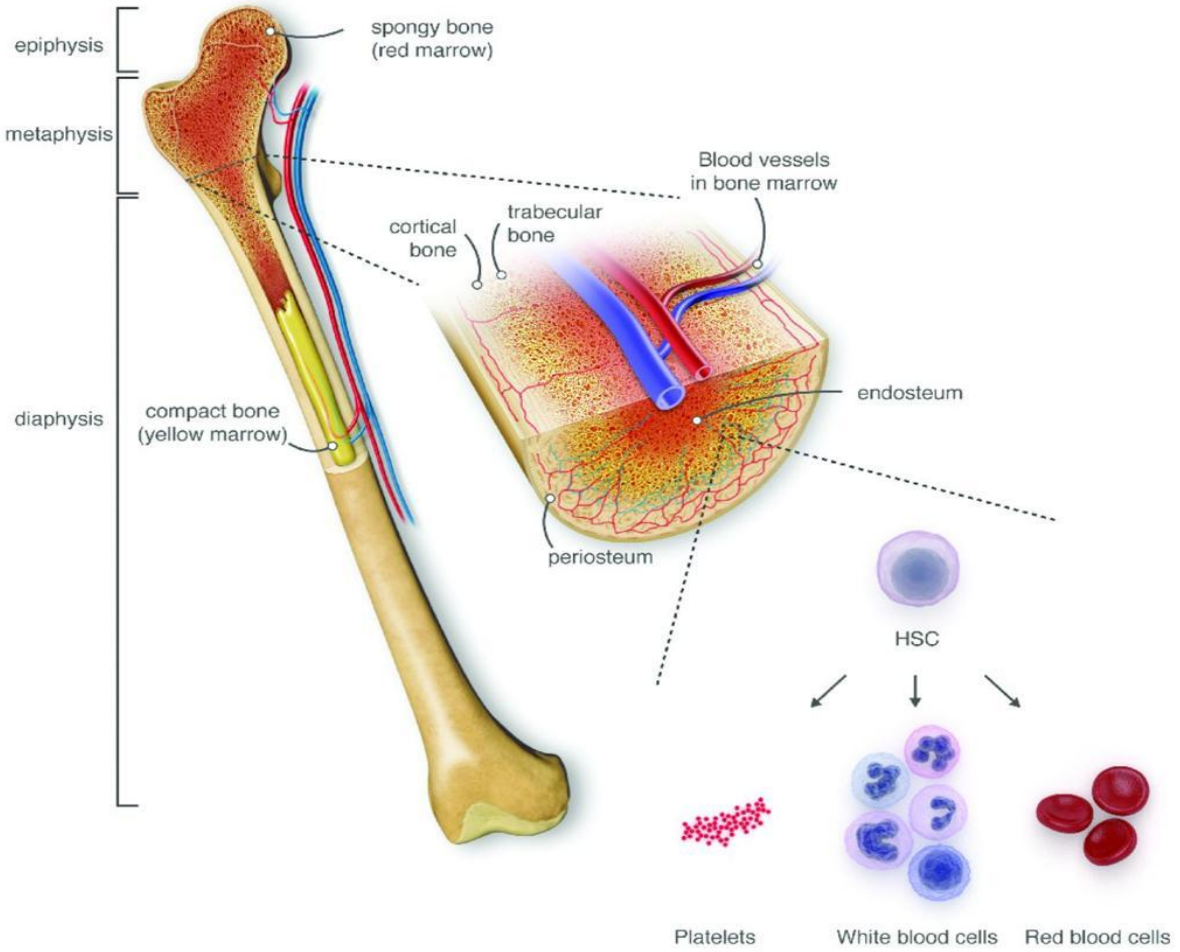

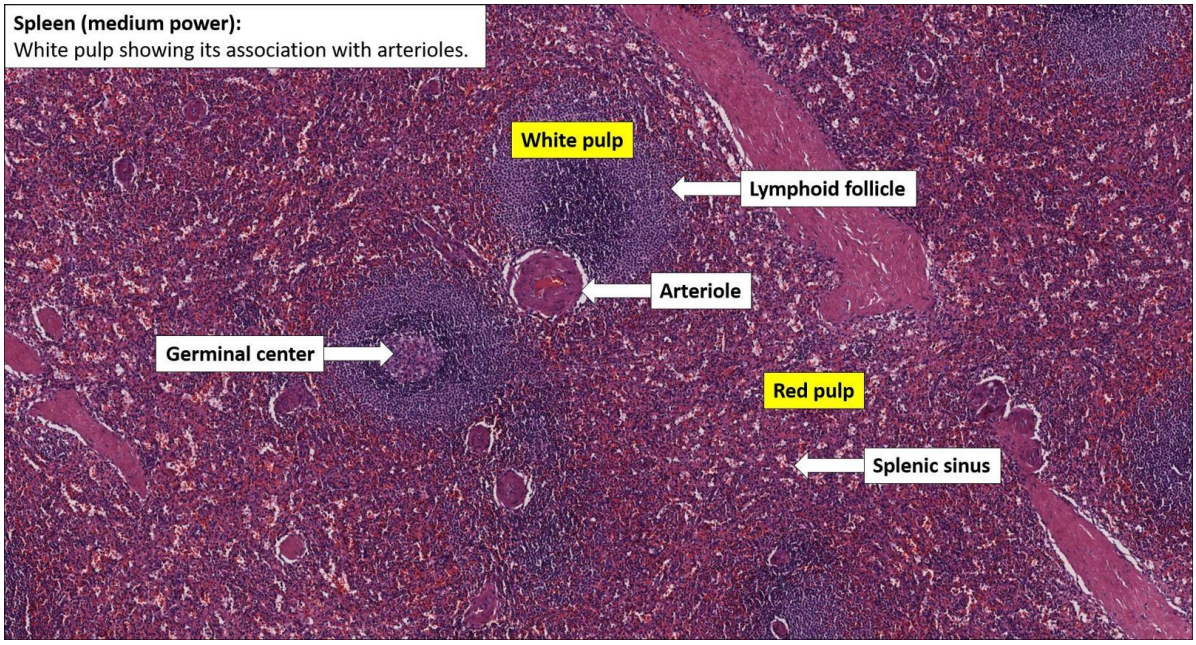

The results of the study revealed the following histological characteristics:

- **Erythrocytes** – responsible for oxygen transport

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- **Leukocytes** – perform immune defense functions (neutrophils, lymphocytes, monocytes)
- **Platelets** – involved in blood clotting

Main immune system organs:

- **Bone marrow** – the primary site of blood cell formation (hematopoiesis)
- **Lymph nodes** – filter lymph and initiate immune responses
- **Spleen** – removes aged erythrocytes and performs immune surveillance

Additionally, lymphoid organs contain a high number of lymphocytes, confirming their central role in immune responses.

DISCUSSION

The histological structure of the blood and immune system is closely related to their functional roles. Blood cells play an essential role in both transport and protection.

The immune system protects the body from bacteria, viruses, and other pathogens. Lymphoid organs function in coordination to ensure effective immune responses.

Various pathological conditions can disrupt these systems:

- A decrease in leukocyte count leads to weakened immunity
- Bone marrow dysfunction causes blood disorders
- Inflammation of lymph nodes indicates infection

Modern histological methods enable early detection of such changes.

CONCLUSION

The blood and immune system are essential systems responsible for protection and transport functions in the body. Studying their histological structure is crucial in medical science.

The normal functioning of blood cells and immune organs ensures overall health. Therefore, in-depth study and the use of modern diagnostic methods are highly important.

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