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THE ROLE OF IMMUNITY IN DISEASE PREVENTION

Hamroyeva Bonu Baxtiyor qizi

Samarqand davlat tibbiyot instituti Farmatsiya fakulteti 109-gruh talabasi

Scientific supervisor: Asatullayev Rustam Bakhtiyarovich

**ARTICLE
INFORMATION**

ABSTRACT:

ARTICLE HISTORY:

Received:03.04.2026

Revised: 04.04.2026

Accepted:05.04.2026

KEYWORDS:

*Immunity, antigen,
antibody, T-lymphocyte,
B-lymphocyte, cytokine,
phagocytosis,
vaccination, microbiota,
immune response.*

Immunity is a complex biological defense system that protects the human body against bacteria, viruses, fungi, and other pathogenic agents. This article analyzes the anatomical and functional basis of the immune system, the mechanisms of innate and adaptive immunity, cellular and humoral immune responses, and the role of immunity in the prevention of diseases. Based on modern immunological studies, the effects of vaccination, gut microbiota, vitamins, and lifestyle factors on immune function are discussed. The article highlights preventive strategies for infectious and chronic diseases through strengthening the immune system.

Introduction

The immune system is one of the most important biological defense mechanisms of the human body, responsible for protecting against external pathogens and internal abnormal cells. According to the World Health Organization (WHO), infectious diseases still represent a major cause of global mortality. Every year, millions of people suffer from infectious diseases due to weakened or impaired immune function. Therefore, studying the immune system and strengthening it is a highly important issue in medicine and pharmacy. The immune system not only protects against infections but also plays a crucial role in eliminating tumor cells, regulating inflammation, and maintaining tissue homeostasis.

Main body

1. Concept, Origin, and Meaning of Immunity

The term “immunity” originates from the Latin word “immunitas”, which means “freedom from” or “protection from”.

Immunity is a complex biological defense system that protects the body against genetically foreign agents such as bacteria, viruses, fungi, parasites, and toxins.

Immunity is formed through the interaction of:

cells (leukocytes),

tissues (lymphoid organs),

biological molecules (antibodies, cytokines).

2. Characteristics of the Immune System

The immune system has several key characteristics:

Specificity – ability to recognize each antigen precisely

Memory – faster response upon re-exposure to the same pathogen

Self/non-self recognition – distinguishes body cells from foreign agents

Adaptability – ability to respond to new pathogens

Multi-layered defense – multiple mechanisms work together

3. Most Common Diseases Related to Immunity

The most frequently occurring immunity-related diseases in clinical practice include:

1. Infectious diseases

Influenza (flu)

COVID-19

Pneumonia

Tuberculosis (TB)

Acute respiratory infections and tonsillitis

These diseases occur more often when the immune system is weakened.

2. Allergic diseases

Allergic rhinitis

Bronchial asthma

Atopic dermatitis

These occur due to an overreaction of the immune system to harmless substances.

3. Autoimmune diseases

Rheumatoid arthritis

Systemic lupus erythematosus (SLE)

Type 1 diabetes mellitus

The immune system mistakenly attacks the body's own tissues.

4. Causes of Frequent Infectious Diseases

The most common causes include:

Weak immune system

Chronic stress

Sleep deprivation

Poor nutrition

Vitamin deficiencies (Vitamin D, C, Zinc)

Poor hygiene practices

5. Disease Prevention (Prophylaxis)

Disease prevention is mainly based on strengthening the immune system:

1. Vaccination

Induces immunological memory

Protects against severe infections

Reduces epidemic spread

2. Healthy nutrition

Vitamin C enhances immune cell function

Vitamin D supports T-cell activation

Zinc and selenium are essential for immune enzymes

3. Lifestyle factors

7–9 hours of sleep

Regular physical activity

Stress reduction

4. Hygiene

Regular hand washing

Clean drinking water

Avoiding sources of infection

6. Consequences of Not Preventing Diseases

If diseases are not prevented and the immune system remains weak:

Frequent recurrent infections occur

Diseases become more severe

Chronic inflammation develops

Organ dysfunction may occur

Autoimmune disorders may worsen
Mortality risk increases in severe infections

7. Role of Immunity in the Human Body

The immune system not only protects against diseases but also:

Fights tumor cells

Removes damaged or abnormal cells

Supports tissue repair

Maintains internal homeostasis

Conclusion

The immune system is one of the most important biological defense mechanisms of the human body, playing a central role in protecting the organism against various infectious, allergic, and autoimmune diseases. This system functions through the coordinated interaction of cellular and humoral mechanisms, ensuring internal homeostasis and a stable response to pathogenic agents. The phenomenon of immunological memory enables the body to develop a faster and more effective protective response upon re-exposure to the same pathogens. Modern medical and immunological evidence confirms that the development and progression of many common infectious diseases are directly associated with the functional status of the immune system. Immune suppression is closely linked to factors such as chronic stress, improper nutrition, deficiencies of vitamins and micronutrients, and disturbances in sleep patterns. In contrast, vaccination, balanced nutrition, regular physical activity, adequate rest, and adherence to hygienic standards are considered essential preventive measures that support optimal immune function.

References

1. Abbas, A. K., Lichtman, A. H., & Pillai, S. (2021). Cellular and Molecular Immunology. Elsevier.
2. Murphy, K., Weaver, C. (2022). Janeway's Immunobiology (10th Edition). Garland Science.
3. Parham, P. (2021). The Immune System (5th Edition). Garland Science.
4. World Health Organization (WHO). (2023). Immunization Agenda 2030: A Global Strategy. Geneva. <https://www.who.int> □
5. National Institutes of Health (NIH). (2024). Immune System Overview & Research Updates. <https://www.nih.gov> □

6. Medzhitov, R. (2007). "Recognition of microorganisms and activation of the immune response." *Nature*, 449, 819–826. <https://doi.org/10.1038/nature06246> □

7. Janeway, C. A. et al. (2005). *Immunobiology: The Immune System in Health and Disease*. Garland Science.

8. Abbas, A. K., & Lichtman, A. H. (2018). *Basic Immunology: Functions and Disorders of the Immune System*. Elsevier.

