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MICROBIOLOGY AND THE IMMUNE SYSTEM OF THE BODY

Bakaeva Shoira Bakhshillaevna
Teacher Bukhara State Pedagogical Institute
bakaevashoira@gmail.com

Abstract
This article is dedicated to the study of the immune system and its role in protecting the body from infections. It examines the key mechanisms of innate and adaptive immunity, as well as the historical development of methods for the prevention and treatment of infectious diseases since the early 20th century.

Keywords: Innate and acquired immunity, childhood viral and bacterial infections, acute bacterial intestinal infections.

Introduction

As far as we know, in the 20th century, after the announcement of the fundamental works of Louis Pasteur (1822-1895), he proved that microbes cause diseases, created the first vaccines and developed the pasteurization method. All these discoveries became the basis for the development of medicine, vaccines and methods of treating infections, which was followed by a new series of discoveries in microbiology. Several decades later, more than 40 new types of pathogenic bacteria and viruses invaded and were identified in the human population, a number of which acquired a pandemic spread.

We are forced to definitely establish an unprecedented multidirectionality of trends in the dynamics of large groups of infectious diseases. On the one hand, outstanding progress continues in the fight against infections controlled by vaccine prophylaxis and sanitary and hygienic measures (childhood viral and bacterial infections, acute intestinal infections of bacterial origin).

Childhood viral and bacterial infections are diseases that often occur in children. Viruses such as influenza, measles, chickenpox, and rotavirus are spread through the air or by contact with contaminated surfaces. Symptoms may include fever, cough, rash, headache, and vomiting and diarrhea. Treatment is usually supportive, including fever reducers, anti-itch medications, and rehydration (in the case of

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rotavirus). Without treatment, complications such as dehydration or pneumonia may develop in some cases, which can be fatal, especially in infants and weakened children.

RESULTS AND DISCUSSION

Bacterial infections such as pneumococcal infection, strep throat, and meningitis can also affect children and are spread through the air. Symptoms of these infections include cough, sore throat, fever, and, in the case of meningitis, headache and vomiting. Treatment includes antibiotics, and the earlier it is started, the lower the risk of complications. Vaccination against pneumococcus has significantly reduced the number of deaths from this infection.

HIV remains a major global public health problem: to date, this virus has claimed 40.4 million (32.9–51.3 million) human lives and transmission continues throughout the world, with some countries reporting increasing trends in the number of new infections, while this figure was previously declining.

There is no complete cure for HIV infection. However, with increasing access to effective means of prevention, diagnosis, treatment and care for HIV and opportunistic infections, HIV infection has become a manageable chronic disease, and HIV-infected people can live long and healthy lives.

This circumstance, as well as the lifelong or persistent chronic nature of the course of new infections, indicate the failure or weakness of immune defense mechanisms, the exact causes of which are currently unclear. But in fact, specialists are developing and bringing clear facts in the fundamental principles of the functioning of the immune system, but also this process has been going on for a long time, the development of injections, serums and vaccines restores the body from the previously mentioned diseases. And also, the process of studying the mechanisms of innate immunity, methods of its stimulation, searching for new approaches to the formation of acquired immunity continues. Among the urgent tasks of their study today are the genetics of the emergence of new pathogens, the mechanisms and conditions for overcoming the interspecies barrier, biodiversity and variability, dominant genotypes and the geography of their distribution, the conditions for the formation of epidemic clones and lines, the mechanisms and frequency of the formation of antibiotic- and chemoresistant strains, the coevolution of humans and pathogens of mass infectious diseases. The main task in this regard is the analysis

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and identification of patterns of pathogen variability in conditions of selective pressure of mass vaccination, monitoring the relevance and effectiveness of vaccines.

CONCLUSIONS

Currently, the development of injection methods aimed at improving the immune system is actively continuing. One of the key areas is the creation of vaccines, including new technologies such as mRNA vaccines, which have proven effective in the fight against diseases such as COVID-19. Monoclonal antibodies and immunomodulators are also being developed to enhance the immune response or correct autoimmune diseases. Modern advances in genetic engineering and therapy open up new horizons for personalized treatment and prevention of infections, as well as for improving the overall health of the immune system.

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