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THE EFFECT OF ANTIBIOTICS ON MICROORGANISMS

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Abstract: *The article analyzes the problem of antibiotic-resistant microorganisms as the most urgent threat to the global health system. The process of resistance formation among bacteria as a result of the improper use of antibiotics, its causes and consequences are scientifically explained. In addition, information is provided on the measures necessary to maintain the effectiveness of antibiotics - rational use, the development of alternative drugs, vaccination and the "One Health" initiative.*

Keywords: *Antibiotics, microorganisms, resistance, global problem, infection, health, antimicrobial strategies, bacteria, drugs.*

In the last decades, antibiotics have been recognized as one of the greatest achievements of humanity in the field of medicine. Antibiotics are of great importance in the treatment of infectious diseases, the prevention of complications in surgical procedures, and the strengthening of the health care system. However, as a result of the incorrect and excessive use of these drugs, microorganisms have begun to develop resistance to them. This has become a serious global problem in medicine.

The decline in the effectiveness of antibiotics not only complicates the treatment of infectious diseases, but also threatens the health care system, agriculture, the economy and human safety. Therefore, the problem of antibiotic-resistant microorganisms is considered a pressing issue worldwide.

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Antibiotics are chemical substances that act against bacteria and fungi, stop their growth, and kill them. They have been widely used since the beginning of the 20th century.

The first antibiotic, penicillin, was discovered in 1928 by Alexander Fleming, which was a revolutionary event in the history of mankind. Since then, many other types of antibiotics have been developed, such as streptomycin, tetracycline, and erythromycin.

Antibiotics are used not only for treatment, but also for prevention. For example, to prevent infection before surgical procedures, or to reduce the risk of infection in patients with severe immunodeficiency. Microorganisms are naturally adaptable. Overuse and misuse of antibiotics cause bacteria to mutate and become resistant to antibiotics. This process is called antibiotic resistance. The main causes of resistance are:

1. Self-administration of antibiotics-buying antibiotics from pharmacies without a doctor's prescription.

2. Not completing the full course of treatment-the patient stops taking antibiotics early when he feels better.

3. Inappropriate use of antibiotics in agriculture-feeding animals with antibiotics continuously to accelerate their growth.

4. Failure to comply with hygiene rules leads to the spread of microbes.

As a result, infections become more common and difficult to treat. Resistant bacteria pose a threat not only to health, but also to the economy. The duration of treatment is prolonged, the need to use new drugs increases, and medical costs increase. For example, treating antibiotic-resistant tuberculosis (MDR-TB) is 10 times more expensive and takes longer than conventional TB. In addition, the ineffectiveness of antibiotics puts important medical procedures such as surgery, transplantation, and chemotherapy at risk.

Develop a system for the rational use of antibiotics. Special training programs have been developed for doctors and pharmacists, and control mechanisms for the correct use of medicines in medical institutions have been strengthened.

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Strengthening pharmaceutical control. Starting in 2023, it was announced that antibiotics for pain relief will be sold in pharmacies only on prescription. This will help reduce self-medication and the wrong choice of medication.

Developing the laboratory diagnostic network. The possibility of conducting bacterial tests on modern equipment has been expanded in large clinics and regional hospitals of the republic. This allows for an accurate diagnosis and the correct selection of antibiotics for each patient.

Escherichia coli-is resistant to one or more antibiotics in 45–50% of urinary tract infections;

Staphylococcus aureus (MRSA)-is resistant to methicillin in 20–25% of common infections;

Klebsiella pneumoniae-is resistant to carbapenem in 15–20% of respiratory tract infections.

These rates are higher than in European countries and indicate the need to strengthen the surveillance and analysis system in the region.

The fight against antibiotic resistance requires a comprehensive global response. The following measures are considered the most effective:

1. Use antibiotics judiciously-only as prescribed by a doctor, in the right dose and for the right duration.

2. Develop new types of antibiotics - support and encourage scientific research.

3. Expand vaccination - reduces the spread of infectious diseases.

4. Compliance with sanitary and hygienic rules - limits the spread of bacteria.

5. Public awareness - provides a correct understanding of antibiotics.

6. One Health - considers human, animal and environmental health as a whole system.

Antibiotic-resistant microorganisms are one of the most serious global health problems facing humanity. This problem is not only a medical problem, but also a social, economic and ecological threat. Therefore, every citizen, medical worker and

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government organization must act responsibly in this regard. Antibiotics have saved humanity from many diseases, but their misuse is destroying this advantage. If conscious and responsible action is not taken today, future generations will face the risk of losing their lives due to infectious diseases. Therefore, antibiotics are an invaluable resource of medicine, and their rational use is the common duty of humanity.

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