

## DRUGS AND PHARMACOLOGY.

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**Abstract.** *This article considers the importance of drugs and pharmacology, their history, development and effects. Modern approaches to ensuring the safety of drugs, side effects and the process of clinical trials are also discussed. The article highlights new trends in the field of medicine and highlights the role of drugs in human health.*

**Keywords:** *drugs, pharmacology, development process, safety, side effects.*

## INTRODUCTION.

Our President Sh.M. Mirziyoyev signed the Law of the Republic of Uzbekistan “On Medicines and Pharmaceutical Activities” and the Decree of the President of the Republic of Uzbekistan No. PF-137 dated August 19, 2025 “On Additional Measures to Regulate the Circulation of Medicines and Medical Devices”.

In accordance with the Regulation on the Procedure for Implementing Pharmacological Control of Medicines and Monitoring the Safety of Medical Devices

The Regulation establishes the procedure for implementing pharmacological control of medicines and monitoring the safety of medical devices.

The requirements of this Regulation apply to treatment and prevention institutions, pharmacies, as well as manufacturers of medicines and medical devices, holders of state registration certificates for medicines and medical devices, organizations that sell, use and store medicines and medical devices.

Medicines and pharmacology are the most important components in the field of medicine.

They are a necessary tool in the treatment and prevention of diseases. This article reviews the history of drug development, mechanisms of action, and current issues related to ensuring safety.

### 1. History of Drugs.

The history of drugs spans thousands of years, beginning with herbal preparations in ancient cultures. Herbal medicines were widely used in Egyptian, Chinese, and Indian medicine.

Medicines made from plants and minerals have long helped treat diseases. The history of modern drugs began with chemical research in the 19th century. However, today the development of drugs is a complex scientific process that includes pharmacology and clinical trials.

### 2. Drug Development Process.

Drug development consists of the following stages:

#### 2.1. Scientific Research.

The first stage of drug development is scientific research. This process involves studying the biological effects of a new drug substance and testing it on diseases.

**2.2. Preclinical Trials.** Preclinical trials are conducted in laboratory conditions and are aimed at determining the safety and effectiveness of a new drug. This process involves animal studies.

**2.3. Clinical Trials.** Clinical trials are conducted in three phases:

- Phase 1: A new drug is usually tested on healthy volunteers to determine its safety.
- Phase 2: Tested on patients to determine the effectiveness of the drug and determine the dosage.

- Phase 3: Tested on a larger group of patients to confirm the effectiveness of the drug.

**2.4. Regulatory Approval.**

Drugs must be approved by national and international health authorities. This process involves reviewing all available data on the safety and effectiveness of the drug.

**3. Pharmacological Action.**

Pharmacology studies the effects of drugs on the body. Drugs work through various mechanisms:

**3.1. Agonists and Antagonists**

- Agonists: These drugs bind to receptors and increase their activity. For example, morphine acts on pain receptors to reduce pain.

- Antagonists: They bind to receptors and decrease their activity. For example, naloxone blocks the effects of morphine.

**3.2. Mechanisms of Action of Drugs**

Drugs act in the body through several mechanisms, including:

- Chemical action: Drugs interact chemically with cells or systems.

- Molecular action: Drugs bind to receptors and alter biological processes within cells.

. Drug Safety.

Ensuring the safety of drugs is very important in medicine. This includes the following aspects:

**4.1. Caution in Use.**

When taking drugs, it is necessary to take them in the correct dosage and according to the instructions. Each drug has its own dosage and instructions for use.

**4.2. Side Effects.**

Drugs can have side effects, which can pose a risk to patients. Therefore, it is important to warn patients and take precautions when taking the drug. A list of side effects is developed for each drug.

**4.3. Monitoring and Reporting.**

It is important to monitor and report side effects that occur during the use of drugs. This helps to ensure patient safety.

The main types of drugs are.

**Synthetic drugs:** Drugs produced through chemical reactions. They are often widely used in the pharmaceutical industry.

*Biological drugs:* Drugs derived from biological sources (plants, animals, microorganisms). They are produced using genetic engineering, enzymes, and antibodies.

*Herbal and natural drugs:* Drugs derived from plants that are widely used in traditional medicine.

*Pharmacology.* Effects and Types of Drugs

Pharmacology studies the effects of drugs on the body, including absorption, distribution, metabolism, and excretion. Pharmacology includes the following main areas.

*Pharmacokinetics.* The action of drugs in the body. This process includes the stages of drug entry into the body after administration, distribution through the bloodstream, metabolism, and excretion.

*Pharmacodynamics.* The effects of drugs on the body, that is, how drug substances cause changes. It studies their effectiveness in treating diseases and their therapeutic effects.

*Toxicology.* The study of the harmful effects of drugs. Each drug can have its own side effects, which are studied separately in the field of pharmacology.

*Benefits of modern drugs* Modern drugs play an effective and important role in the treatment of many diseases. Their benefits include:

*Effective treatment of diseases:* Modern drugs help treat many diseases, including infections, oncological diseases, heart diseases, and diseases of the nervous system. For example, antibiotics, chemotherapy drugs, and antidepressants are effective.

*Safe and rapid treatment.* New drugs have a more specific and effective effect, which speeds up the treatment process and reduces discomfort for patients.

*Personalized treatment:* With the help of genetic and biomarker-based medicine, drugs can be designed according to the genetic characteristics of the patient. This method makes treatment much more effective.

*Saving lives.* Many modern drugs allow you to save lives in the treatment of serious diseases. For example, drugs used to treat HIV or chemotherapy used to treat cancer

*Harmful effects of modern drugs.*

Although modern drugs are effective, they can have some negative effects. The following harmful effects are the most common problems with drugs.

*Side effects:* Many drugs, especially chemical and synthetic substances, can cause side effects. For example, antibiotics can disrupt the intestinal microflora, and heart drugs can reduce blood pressure too much.

*Addiction and harmful habits.* Some drugs, especially painkillers and some psychotropic substances, can cause addiction. This can seriously worsen the patient's life and health.

*Medium and long-term effects.* Some drugs can cause harmful effects when used for a long time or when taken in the wrong dosage. For example, some painkillers and anti-inflammatory drugs can damage kidney or liver function when used long-term.

*Antibiotics and microbial resistance.* Overuse or misuse of antibiotics increases microbial resistance to antibiotics, which reduces the effectiveness of treatment and necessitates the development of new drugs.

*Problems with cheap and quality drugs.* Sometimes, as drugs become cheaper, there is a risk that their quality will decrease. This, in turn, can lead to a decrease in beneficial effects.

*The Future of Pharmacology:*

Every year, advances in modern pharmacology and pharmaceuticals create opportunities to create new drugs and make them more effective for human health. Today, thanks to scientific advances, medicines are becoming more refined and personalized.

The development of drugs based on genomic analysis, biomarkers and genetic data is developing rapidly. In addition, biological drugs, including drugs developed using genetically modified microorganisms, are also playing an important role. These new methods allow for more precise and effective treatment of diseases.

**SUMMARY.**

Drugs and pharmacology play an important role in maintaining human health and treating diseases. Scientific research and new approaches are necessary to ensure the effectiveness and safety of drugs. Innovations in this area are creating new opportunities for humanity, which will lead to the development of new treatment methods in the future.

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