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Report on the topic :"Chemistry and medicinal substances"

Since ancient times, mankind has learned to use various laws of chemistry to synthesize a large number of drugs. One of the most notable achievements of synthetic organic chemistry of the 20th century is the production of new medicines. As a result, it became possible to cure many diseases that were previously considered fatal. And the widespread use of antiseptics made it possible to prevent infectious complications as a result of surgical operations and combat wounds. Everyone knows that diseases and epidemics have killed many people all over the world. In the 6th century, half of the population of the Byzantine Empire died from the plague, and in the 14th century.only in three years – from 1347 to 1350 – in Europe, 25 million people died from the plague. In the second half of the 19th century, synthetic organic chemistry began to develop rapidly. She gave people dyes, perfumes, and medicines. However, as early as the early 20th century, the number of individual chemical compounds used as medicines was calculated in units.

As a result, it became possible to cure many diseases that were previously considered fatal. And the widespread use of antiseptic agents prevented infectious complications as a result of surgical operations and military injuries.

According to statistics, scientists must synthesize and thoroughly test up to 10,000 different chemical compounds in order to finally select a single drug that is effective and safe at the same time.

There are two large groups of drugs:

1. On the basis of organic matter,

2. Based on Inorganics.

Both the first and second are made synthetically and from natural raw materials. For the production of drugs of the inorganic group, rocks, gases, ores, sea and lake water, and the remains of chemical production are used. In the synthesis of organic medicines, natural gas, coal, oil, wood and shale are taken. Oil and gas are the most valuable sources of hydrocarbons, which, in turn, are intermediates, and are used for the manufacture of medicines and organic compounds. Medical practice uses vaseline, paraffin and vaseline oil synthesized from petroleum.

There are a huge number of medicines. At the same time, this industry is constantly developing, and there is still a lot of work to be done by scientists creating new drug formulas.

In each country, there is legislation on pharmaceutical products, published in a separate book, which is called the Pharmacopoeia.

Pharmacopoeia is a collection of national standards and regulations that normalize the quality of medicines. The standards and mandatory norms set out in the Pharmacopoeia for medicines, raw materials and preparations are applied in the manufacture of dosage forms and are mandatory for pharmacists, doctors, organizations and institutions that manufacture and use medicines. According to the Pharmacopoeia, medicines are analyzed to check their quality.

The creation of medicines takes place in several stages. At the initial stage, there is a search for biologically active compounds that have the desired positive effect on the human body. This search is performed in several ways, but the most common is empirical, because it does not require knowledge about the structure of the substance itself, or its mechanism of action. Such directions can be random discoveries or the method of "sifting". An example of an accidental discovery is the purgative effect of Purgen or the hallucination effect of many drugs. The second method is based on a conscious series of experiments on a group of chemical compounds to identify an unknown biologically active substance.

It is also quite common to use the direction of "directed synthesis", when scientists work with an already known substance, changing and modifying it to get a new formula. Sometimes the most insignificant changes at first glance are enough to completely reduce the biological activity of the drug. Experiments are performed mainly on animals, observing their behavior. An example of this modification is the morphine molecule. It is known to have the property of relieving pain. When 1 atom of hydrogen was replaced with a methyl group, a molecule of the drug codeine was obtained, the characteristic property of which was not an analgesic effect at all. Codeine is a great cough medicine. When the replacement of 2 atoms was performed, thebain was obtained, which has neither the properties of the first substance nor the second. Thebain can provoke convulsions.

Medicinal substances are divided into two classifications:

1. Pharmacological

2. Chemical

The first classification is more convenient for medical practice. According to this classification, medicinal substances are divided into groups depending on their action on systems and organs. For example:

- Sleeping pills and sedatives);
- Cardiovascular diseases;
- Analgesic (painkillers), antipyretic and anti-inflammatory;
- Antimicrobial (antibiotics, sulfonamides, etc.);
- Local anesthetic;
- Antiseptic;
- Diuretic;
- Hormones;
- Vitamins

The chemical classification is based on the chemical structure and properties of substances and in each chemical group there may be substances with different physiological activity.

According to this classification, medicinal substances are divided into inorganic and organic. Inorganic substances are considered by groups of elements of the periodic system of D. I. Mendeleev and the main classes of inorganic substances (oxides, acids, bases, salts). Organic compounds are divided into derivatives of the aliphatic, alicyclic, aromatic and heterocyclic series. Chemical classification is more convenient for chemists working in the field of drug synthesis.

Experimental data, as the basis of chemical typing, describe the morphology and properties of substances, but in each chemical group there are substances with different physiological activity.Based on this typification, medicines are divided, as is the farm itself. chemistry, on organic and inorganic substances. Of course, any types of medicinal products can not be permanent. With the creation of new medicines, they are subject to revision and improvement.

Chemistry has close links with medicine. This is mostly manifested in the use of chemical compounds for the treatment of diseases, as well as in pharmaceuticals – the science of medicines. In addition, medicine widely uses polymers, which are an integral part of medical devices and equipment.

An experienced specialist chemist, looking at the structural formula, will tell with high confidence what action should be expected from this compound - a vasodilator or anesthetic. It is also known which groups and radicals enhance the effect, which ones weaken.