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GENERAL CONCEPTS OF MICROBIOLOGICAL TRANSFORMATION. MICROBIOLOGICAL TRANSFORMATION OF STEROIDS

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Annotatsiya
Recently, products of microbiological metabolism of simpler organic matter than steroids have also been proven to have practical implications. There are data on types of enzyme microbial exchange for the main classes of organic matter. Many microbiological transformation processes result in changes in the substrate molecule by single or multiple enzymes that are not so complex. But there are also microbiological processes that fundamentally change the structure of a compound that faces transformation.

Keywords: Microorganisms, synthetic, antibiotics, enzymes, vitamins, sterins, amino acids, transformation, medicinal, chemical.

Introduction.

The use of microorganisms for synthetic reactions can be conditionally divided into two directions:

- Fully implement biosynthesis of essential biologically active substances and products (antibiotics, enzymes, vitamins, sterins, amino acids, etc.) by cells of microorganisms in a nutritional environment made up of certain components;

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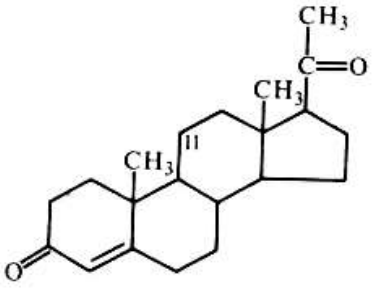
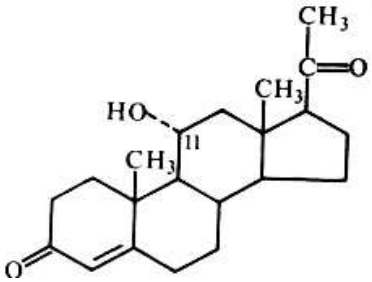
- To distinguish work aimed at microbiological transformation, namely, the synthesis of substances needed for medicinal and other public administrations, by purposefully synthesizing them through chemical and microbiological stages.

Since microorganisms have polyferment systems, exogenous organic matter can be converted into a variety of beneficial products and physiologically active substances. If this process involves 20 stages when performed in a chemical style, a microbiological phase itself will be enough. Additionally, if this synthesis reaction can be very easily transmitted in a microbiological style, it will be very difficult to conduct chemically, costly, or impossible to conduct at all.

Currently, the importance of biological catalysts in the conversion of steroid compounds is evident. By the 19th century, it was known that the bacterial flora of the intestine converts cholesterol into coprosterin, cholesterol acid into deoxychole acid. By the 1930's, after the structure of the main steroid hormones became known, the use of the transformative ability of microorganisms to isolate these compounds began. In 1948, the introduction of a hydroxyl group into the steroid molecule by microbiological means was achieved. Only after 11 alpha-hydroxyprogesterones were separated from the progesterone by fermentation microbiological transformation of the Rhizopus nigricans production increased the focus on steroids:



Progesteron



11-alfa-gidroksiprogesteron

A particular transformation clearly demonstrated the advantage of microbiological style over a chemical method, since when a certain part of a steroid molecule (C-11) gagina oxide grouping requires a lot of reactions when carried out in a chemical style, in a microbiological style, this can be done using a phase-by-stage enzymatic reaction. The identification of therapeutic significance of cortizon has attracted the attention of microbiologists, chemists and medical professionals more often than microbiological hydroxylization. The introduction of the extraction of steroids by microbiological synthesis has made a turning point in the pharmaceutical industry.

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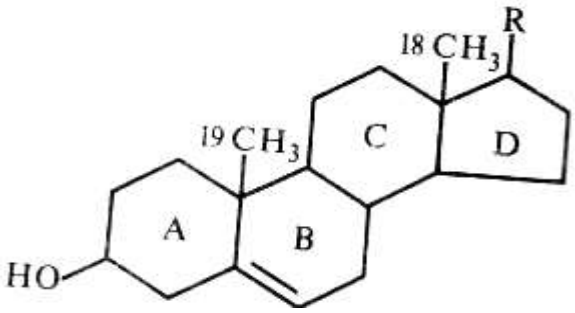
Results of the Study

Natural sterns are valuable ingredients for the extraction of medicinal substances. The molecule of the steroid class consists of a group of substances that hold the cyclopentanpergidrofenantren people.

Sterene (sterols) include steroids that hold the hydroxyl group in place of the C-3 of cyclopentanpergidrofenantren.

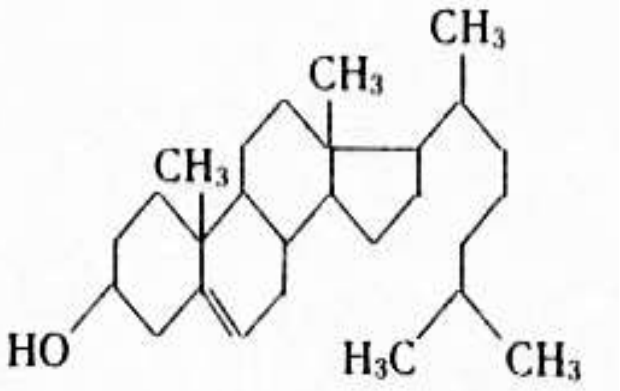
The most important and well-studied sterns include cholesterol (class of zoosterins), the total formula for which is $C_{27}H_{46}O$, and the structural formula is:



is made up of.

This substance is found in all tissues and organs of humans and animals. Cholesterol participates in physiological jars that occur in the living organism, and without its participation, the growing organism does not develop. The head and spine of large-horned animals can act as a raw material in the extraction of cholesterol. In the years that followed, it was discovered that sterines were also contained in plants and red algs, which are still used as raw materials. Other sterines found in nature differ from cholesterol depending on the length of the side chain or the degree of saturation. The plant is used as a raw material for the extraction of expensive steroid preparations from sterins (phytosterines).

Ergosterin. Its formula was determined in 1934 and differs from cholesterol in C-24 with one methyl group and C-7 in the nation, and carbon atoms 22 and 23 in the side chain with additional bonds.



xolesterin

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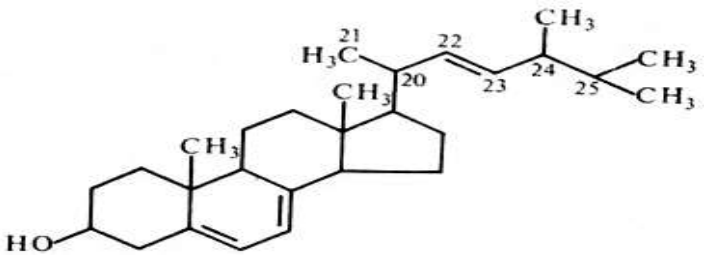
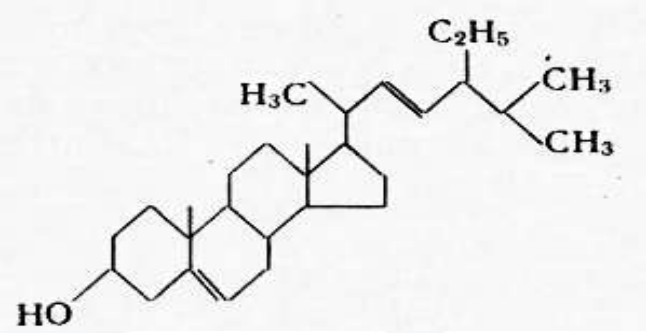
Ergosterin is found in the plant world by a number of representatives, as well as in the organisms of fungi, microorganisms.

Ergosterin is especially abundant in achitqi microorganisms. In the industrial extraction of ergosterin, hammock fungi are used.



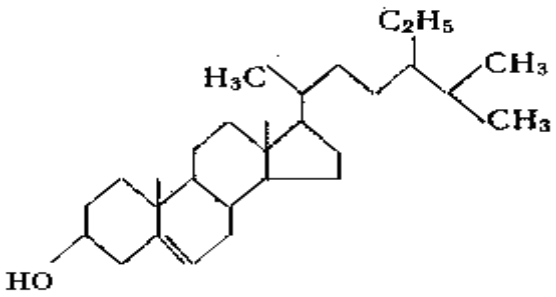
Ergosterin

Stigmasterin. Formula $C_{29}H_{48}O$. This substance includes phytostherines, which are common in nature, and are abundant in soybean oil and sugar cane. What distinguishes its structure from cholesterol is the presence of an additional bond between carbon atoms located at 22nd and 23rd place, and the 24th carbon atom catches the ethyl group.



Stigmosterin

One of the most common representatives in plant sterns is beta-cytosterine-$C_{29}H_{50}O$, whose structural structure is similar to stigmasterin, from which it differs from the absence of an additional garden in the side chain:



Sitosterin

Cytostherines are found in cotton oil, wheat grass, and natural rubber and sugar cane. Cotton oil and sugar cane are used as raw materials to obtain it on an industrial scale. Sterines are involved in the physiological and biochemical processes that take place in the body. They are involved in the formation of membranes of cellular and subcontractoral elements as the main substance in biochemical reactions associated with overcoming the toxic effects of many natural compounds.

Summary

The separation of the aforementioned valuable medicinal products on an industrial scale was linked to the development of microbiological chemistry, especially microbiological transformation styles. The extraction of the cited medicinal substances is served by plant products-diosgenin, stigmasterin, and subsequent beta-si tosterins as raw materials. Table 1 lists some hormones that are produced on an industrial scale as a result of the transformation of steroids.

Table 1 Microbiological transformation of steroids of industrial importance

Reaction	Substrate	Product	Transformer-microorganisms
11-alpha-hydroxylization	Progesterone	11-alpha-hydroxyprogesterone	Rhizopus nigricans
11-beta-hydroxition	In S Mode	Hydrocortison	Curvularia lunata
16-beta-hydroxillation	9-alpha-ftorkortizol	9-alpha-ftor-16-alpha-hydroxycortisol	Streptomyces roseochromogenus
1.2-dehydrocysis	hydrocortison	prednizolon	Arthrbacter simplex
Fragmentation of Side Chains	Beta-cytostre	Androstadien or androstendion	Mycobacterium sp.

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