

INTESTINAL DYSBIOSIS: ETIOLOGY, PATHOGENESIS AND MODERN TREATMENT METHODS

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Abstract

Dysbiosis is a condition characterized by an imbalance of the normal microflora in the human body, often manifested by qualitative and quantitative changes in the intestinal microbiota. Normal microflora plays a crucial role in maintaining immune defense, digestive processes, and metabolic functions. Various factors, including the improper use of antibiotics, poor nutrition, environmental factors, and infectious diseases, can lead to a disruption in the microflora's composition. Dysbiosis results in diarrhea, flatulence, abdominal pain, allergic reactions, and weakened immunity. This article analyzes the etiology, pathogenesis, clinical signs, and modern methods of treatment and prevention of dysbiosis based on scientific literature.

Keywords

dysbiosis, intestinal microbiota, microflora, probiotics, antibiotics, immunity.

There are specific groups of bacteria in the human body. For each distinct area, whether it be the oral cavity, intestine, throat, or vagina, this collection of microorganisms is different. Moreover, these combinations of bacteria are often unique to each individual. Doctors call this optimal set of bacteria "eubiosis" – and sometimes the intestinal biocenosis – while a disturbance in its composition, quantity, or properties is called "dysbacteriosis" (or dysbiosis). Depending on its severity, this condition or disease (the latter concept is still a subject of debate) is accompanied by standard symptoms, and the causes of intestinal dysbiosis can vary radically. A simple change in diet, a change in the chemical composition of water (due to moving to a different location), a change in climate, stress, or diet can lead to changes in the opportunistic microflora of the intestine and manifest as symptoms of dysbiosis. At the same time, dysbiosis can also be caused by [food poisoning](#), the use of antibiotics, or diseases of the gastrointestinal tract. Most importantly, to get rid of the symptoms of an intestinal microflora imbalance, it is first necessary to address the factors causing such a condition [1,5,12,14,17,28,40]. Furthermore, in cases of intestinal dysbiosis, special attention is given to the nature

of the intestinal pathology, which is easily determined by the color, type, and consistency of the stool. A yellowish stool indicates a large amount of undigested food and excess starch. To rectify this situation, protein-rich foods (boiled meat, eggs, cheese) are recommended instead of raw vegetables, carbohydrates, and milk. A very dark-colored and foul-smelling stool indicates an alkaline reaction in the intestine, as well as the presence of undigested fiber. In this case, one should temporarily eliminate meat and fats from the diet and consume more boiled vegetables and dairy products. Intestinal dysbiosis accompanied by diarrhea should be managed with a diet based on "soft" foods. The food in the diet should not be hot or cold; it should be boiled and, if possible, mashed. If dysbiosis manifests as constipation, the diet should include more fiber-rich products such as apples, cabbage, carrots, and apricots. If dysbiosis is diagnosed, treatment is primarily aimed at eliminating the cause of the condition: completing the course of antibiotics, treating the underlying disease, or returning to the previous diet. However, in most cases, treatment is aimed not only at eliminating the symptoms of the imbalanced microflora but also at restoring it [2,4,7,15,22,25,26,34].

To address these issues, modern medicine offers three types of treatment. The microbiota, a community of microorganisms living in the human body, especially the intestinal microbiota, is crucial for maintaining the body's normal physiological functions. In a healthy person's intestine, trillions of bacteria actively participate in digestion, vitamin synthesis, and immune system support. A quantitative and qualitative imbalance in their composition leads to the development of dysbiosis, which is a significant factor in the development of many gastroenterological diseases. Recent scientific research indicates that dysbiosis is linked not only to intestinal diseases but also to metabolic syndrome, allergies, and immunodeficiency. The human body is a complex biological system in which various microorganisms play an important role [8,24,39,41,43].

The normal microflora functions in balance with the human body, supporting its protective, metabolic, and immune functions. When the intestinal microflora is disrupted, proper nutrition, especially in the early stages, can completely resolve the problem of dysbiosis. The diet for a person with dysbiosis should be as balanced as possible. The food consumed must contain sufficient amounts of proteins, fats, carbohydrates, and fluids. Doctors recommend drinking a glass of warm water half an hour before meals. Furthermore, the dietary regimen should include five small meals a day and reduce the load on the intestines before bedtime. When dysbiosis develops, it is also important that the diet includes the following: fermented milk products and natural full-fat milk, as they are rich in bifidobacteria and lactobacilli; and foods containing pectins and fiber, which are found in

sufficient quantities in cabbage, carrots, beets, and seaweed [3, 10, 19, 30, 32, 42]. The amino acids glutamine and arginine are also important, with their sources being chicken, beef, dairy products, fish, parsley, spinach, walnuts, pumpkin seeds, wheat flour, and peas. Prebiotic and probiotic preparations are also used in the treatment of dysbiosis, and they are said to be effective in cases of intestinal microflora imbalance. Despite their similar names, prebiotics and probiotics are fundamentally different preparations, and it is worthwhile to understand their definitions in more detail [6, 13, 23, 27, 34, 44].

Prebiotics are substances that positively affect the growth and activity of existing beneficial microflora. Prebiotics are not digested in the gastrointestinal tract; simply put, they are food for this beneficial microflora. Among the pharmacological forms of prebiotics, Lactulose, Lactitol, and Hilak Forte are most frequently prescribed. These are the primary names of the drugs, and they have dozens of trade names. In addition, there are also natural products that are prebiotics. These include dairy products, onions and garlic, and grains. In severe cases, intestinal dysbiosis is treated with more complex pharmacological preparations, which are divided into three conventional groups. The first of these is antibacterial drugs. They act on specific types of microorganisms, stopping their growth and proliferation. Antibacterial drugs (intestinal antiseptics) are prescribed depending on the type of microorganism that caused the microfloral imbalance. Bacteriophages have a similar effect to antibacterial agents. They contain special viruses designed to destroy specific microorganisms. Like antibacterial drugs, bacteriophages are grouped according to the type of bacteria they target: against pseudomonas, staphylococcus, and others. Immunomodulators are drugs that enhance the body's protective properties; taking such drugs when the intestinal microflora is imbalanced accelerates the recovery process [9, 29, 33].

Immunomodulators should only be used under a doctor's supervision, with preference given to plant-based preparations. Antihistamines are primarily used to prevent allergic reactions, which may develop as a result of intestinal dysbiosis. Antispasmodics are often prescribed for dysbiosis accompanied by diarrhea. The most popular antispasmodic drug is No-Shpa, while Loperamide is recommended specifically to stop diarrhea. If a disruption of the intestinal microflora is accompanied by constipation, special suppositories are used to remedy the situation. Probiotics are a complex of microorganisms that the body needs; when they reach the intestine in sufficient quantities, they have a positive effect on the microflora. However, their use is a highly controversial issue. The direct introduction of microorganisms in the form of probiotics is subject to many conditions. Some microorganisms are needed in such large quantities that they are

not easy to obtain from external sources, while others are very difficult to introduce in a live form. And there is not much laboratory evidence regarding the actual benefits of using probiotics. Among the probiotics with proven beneficial effects that can be found in pharmacies are Lactobacilli and Bifidobacteria (Linex, Bifiform, Bifidumbacterin, Lactobacterin), Saccharomyces boulardii, and Enterococci [18,38,46].

Analyzing the provided list, one can conclude that a diet for dysbiosis is not about restrictions, but rather about eating delicious and healthy food. The most important thing is to avoid consuming too many "heavy" foods, not to overeat, and to abstain from fried, spicy, salty, and other unhealthy dishes. The intestinal microbiota is the largest system of microorganisms in the human body. It is mainly composed of bacteria such as Bifidobacterium, Lactobacillus, and Escherichia coli, and it supports the digestive process, synthesizes vitamins, and provides protection against pathogenic microorganisms. The composition of intestinal microflora: Normal intestinal microflora is a complex biological system made up of various microorganisms. These microorganisms are beneficial to the body, as they limit the growth of pathogenic microbes and ensure the protective function of the intestine.

The main causes of dysbacteriosis are as follows:

- prolonged and uncontrolled use of antibiotics, poor nutrition, stressful situations, environmental factors, infectious diseases, and a weakened immune system [16,35].

Clinically, dysbacteriosis can manifest with a variety of symptoms. The most common symptoms include:

- diarrhea or constipation, flatulence, abdominal pain, loss of appetite, allergic reactions, and general weakness.

A disruption of the intestinal microbiota affects not only the digestive system but also the functioning of the entire organism. Research indicates that dysbiosis can lead to a weakened immune system and the development of metabolic disorders, allergies, and even autoimmune diseases. Treating dysbiosis requires a comprehensive approach. The main principles of treatment are as follows:

- restoring the intestinal microflora, using probiotics and prebiotics, maintaining a proper diet, and ensuring the rational use of antibiotics. In modern medicine, research related to the microbiota is continuously advancing. In the future, the potential for treating and preventing various diseases through individualized microbiome therapy is expected to expand. Dysbiosis is considered a separate disease only in CIS countries. Western medicine defines this condition as one caused by specific factors. The diagnosis of "dysbiosis" is not included in the International Classification of Diseases (an official document of the World Health

Organization). The closest diagnosis to this condition is small intestinal bacterial overgrowth (SIBO) syndrome. This diagnosis is made when more than 10^5 microorganisms are detected per milliliter of aspirate from the small intestine [21,37].

Western medicine is highly skeptical of analyzing fecal samples to study the intestinal microflora. The concept of "normal intestinal microflora" is quite vague and individual to each person, which prevents doctors from drawing clear conclusions. Many doctors argue that using probiotics and bacteriophages is ineffective when the intestinal microflora is disrupted. According to them, there is virtually no chance for external microorganisms to survive in the intestine, while bacteriophages break down in the stomach and provide no relevant benefits [45,47].

Thus, dysbiosis is one of the significant clinical conditions that arises from an imbalance of microflora in the human body. A healthy intestinal microbiota plays a crucial role in the body's immune system, digestive processes, and metabolic activity. To prevent dysbiosis, proper nutrition, adherence to hygiene rules, and the rational use of antibiotics are essential.

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