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# Use of Probiotics in Treating Pediatric Gastrointestinal Disorders

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**Abstract:** In this article is discussed the current understanding and application of probiotics in modern medicine, with an emphasis on pediatric gastroenterology. It highlights the therapeutic potential of probiotics—live microorganisms that support gut health—by restoring the balance between harmful and beneficial intestinal flora, especially during and after antibiotic treatment. Probiotics play a vital role in preventing and managing conditions such as antibiotic-associated diarrhea, acute intestinal infections, and other gastrointestinal and immune-related disorders in children.

**Keywords:** probiotics, medicine, gastrointestinal diseases, antibiotic, disease, diarrhea, gastrointestinal tract, treat.

In modern medicine, numerous treatments and preventive measures derived from microbial activity are used. These include vitamins, enzymes, genetically engineered hormones, antibacterial agents, and probiotics. The latter have a positive effect on both mental and physical health by normalizing the composition of the gut microbiome, which is now recognized as a fully functioning endocrine organ influencing all systems of the body.

One of the most valuable properties of probiotics is their ability to maintain a balance between harmful and beneficial gut microorganisms. Probiotic strains inhibit the proliferation of pathogens in the gastrointestinal tract that cause dangerous diseases. Probiotics are widely used in pediatric gastroenterology. In particular, they are part of the "initial" therapy for treating acute intestinal infections, which affect up to 70% of children in their early years.

Probiotics are biologically active medications that contain live bacteria—representatives of the normal intestinal flora.

Antibiotics, frequently used in pediatric practice and killers of beneficial microflora are antibiotics, which are often used in pediatric practice. Antibiotic-associated syndrome often occurs against the background of antibacterial therapy, which can affect the intestinal mucosa, oral cavity, and genitals. In 39% of children, antimicrobial therapy provokes antibiotic-associated diarrhea. It can be avoided by taking probiotics. Probiotics act on intestinal microbes, influencing the immune mechanisms in the intestinal mucosa, promoting the production of useful metabolic products, interacting with beneficial and harmful bacteria. All this leads to the suppression of pathogenic (harmful) microbiota, increased growth of beneficial bacteria, reduced inflammation in the intestinal wall, and strengthening the gastrointestinal barrier. These mechanisms and effects help to reduce the frequency and severity of diarrhea, which is the most common reason for prescribing probiotics in children.

Probiotics are usually produced by manufacturers as dietary supplements, food additives or over-the-counter drugs, the effectiveness of many of them has not been studied in clinical trials, and production standards have not been established. To this day, there are extremely contradictory points of view regarding the effectiveness and safety of probiotics, the appropriateness of their use during antibiotic therapy, survival in the acidic environment of the stomach, the ability to colonize the gastrointestinal tract of the host organism, the possibility of integrating probiotic strains with the obligate microflora of the large intestine. The number of studies and publications devoted to the problem of using probiotics in various diseases is steadily growing. To date, the results of many meta-analyses and systematic reviews have been published assessing the effectiveness of probiotic strains from the standpoint of evidence-based medicine in diseases and conditions associated with metabolic disorders (diabetes mellitus, dyslipidemia, obesity), gastrointestinal diseases (inflammatory bowel disease, constipation, antibiotic-associated diarrhea, Clostridium difficile-associated disease, irritable bowel syndrome), atopic diseases (food allergies, rhinitis), liver diseases (cirrhosis, non-alcoholic fatty liver disease, hepatic encephalopathy), pancreatic diseases (acute pancreatitis), etc. Thus, from the standpoint of evidence-based medicine, today it is justified to use probiotics for the treatment and prevention of the following nosologies: antibiotic-associated diarrhea in adults and children, diarrhea associated with Clostridium difficile, acute infectious diarrhea in children and adults, eradication therapy, ulcerative colitis, irritable bowel syndrome. The choice of a probiotic product should be based on the nosology, in this regard, it should include strains with proven efficacy in this disease. It is necessary to choose the optimal form of release of the drug (lyophilisate, capsules with an enteric coating).

In addition, it is necessary to take into account the correct design of the packaging, which must necessarily contain information about the genus, species, strain of bacteria included in the probiotic, adequate dosage.

The gastrointestinal tract is an important organ of immunity and from this point of view is of particular interest. In the immune system of the gastrointestinal tract, two zones can be distinguished - inductive and effector. The inductive zone consists of Peyer's patches, appendix, regional lymph nodes and ensures recognition, presentation of antigen and the formation of a population of antigen-specific T and B lymphocytes. The effector zone consists of its own plate (Lamina propria) and epithelial cells of the intestinal mucosa and ensures the synthesis of immunoglobulins by B lymphocytes, cytokines by monocytes / macrophages, T and NK lymphocytes, that is, the performance of their effector functions. Probiotics are prescribed to children when it is necessary to restore the balance of microorganisms or maintain healthy microflora in the gastrointestinal tract. Here are some common indications when probiotics may be prescribed to children:

***After taking antibiotics.*** Antibiotics destroy both harmful and beneficial bacteria in the gastrointestinal tract, which causes dysbiosis. Probiotics help restore normal bacterial balance after a course of antibiotics.

***For gastrointestinal problems.*** Children with problems such as irritable bowel syndrome or constipation may be prescribed probiotics to improve digestion.

***For allergies.*** Studies show that probiotics can reduce the risk of allergic reactions in children.

***For diarrhea.*** Probiotics help reduce the duration and severity of diarrhea in children, especially diarrhea caused by infection or antibiotics.

***Strengthening the immune system.*** Probiotics support the health of the immune system in children and reduce the likelihood of acute respiratory viral infections.

***For colic (flatulence) in infants.*** Often, probiotics reduce the symptoms of colic (painful intestinal spasms) in infants.

Probiotics and their dosage should be prescribed exclusively by a doctor, taking into account the child's condition and individual characteristics.

In the modern pediatric approach, probiotics are taking an increasingly important place in both the treatment and prevention of various gastrointestinal disorders in children. Being products of microbial origin, they perform important physiological functions, maintaining a balance between beneficial and pathogenic microflora, modulating immune mechanisms and strengthening the barrier properties of the intestinal mucosa. Their importance is especially increasing against the background of the widespread use of antibiotics, which often cause dysbacteriosis and antibiotic-associated diarrhea. According to modern scientific data, some probiotic strains have proven efficacy in conditions such as acute infectious diarrhea, Clostridium difficile-associated diarrhea, irritable bowel syndrome and others. However, the use of probiotics should be strictly justified and strain-specific - the choice of drugs with a confirmed clinical effect, a safe profile and sufficient dosage remains important.

The gastrointestinal tract, being an important link in the immune system, makes the effect of probiotics not only local, but also systemic. Their ability to participate in the formation of an immune response, to influence the psycho-emotional state and metabolism of the child confirms the advisability of their inclusion in complex therapy.

Nevertheless, despite the rapid development of research in the field of probiotics, there are still issues that require further study: standardization of production, bioavailability, stability, survival in the gastric environment and resistance to gastrointestinal transit. Therefore, it is important not only to continue fundamental and clinical research, but also to raise awareness among doctors and parents about the correct use of probiotics.

Thus, probiotics are a promising and safe addition to the treatment of a number of diseases in children. Their competent use, taking into account the clinical situation, strain specificity and evidence base, can significantly improve the quality of life of young patients and reduce the risk of complications in the treatment of gastrointestinal diseases.

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