



PROBIOTICS AND DYSBACTERIOSIS: CAUSES, CONSEQUENCES, AND TREATMENT APPROACHES

Dilmurodov Doston Dilshod o'g'li

Toshkent davlat tibbiyot universiteti 1-son
davolash fakulteti 2-kurs talabasi

Maxmedov Suxrobjon Vahobjon o'g'li

Toshkent davlat tibbiyot universiteti 1-son
davolash fakulteti 2-kurs talabasi

Yuldoshov Jasurbek Davron o'g'li

Toshkent davlat tibbiyot universiteti 1-son
davolash fakulteti 2-kurs talabasi

Shavkatov Otabek To'lqinbek o'g'li

Toshkent davlat tibbiyot universiteti 1-son
davolash fakulteti 2-kurs talabasi

Hoshimov Muhammad Asror o'g'li

Toshkent davlat tibbiyot universiteti 1-son
davolash fakulteti 2-kurs talabasi

Boltayev Farxod Ro'zimovich

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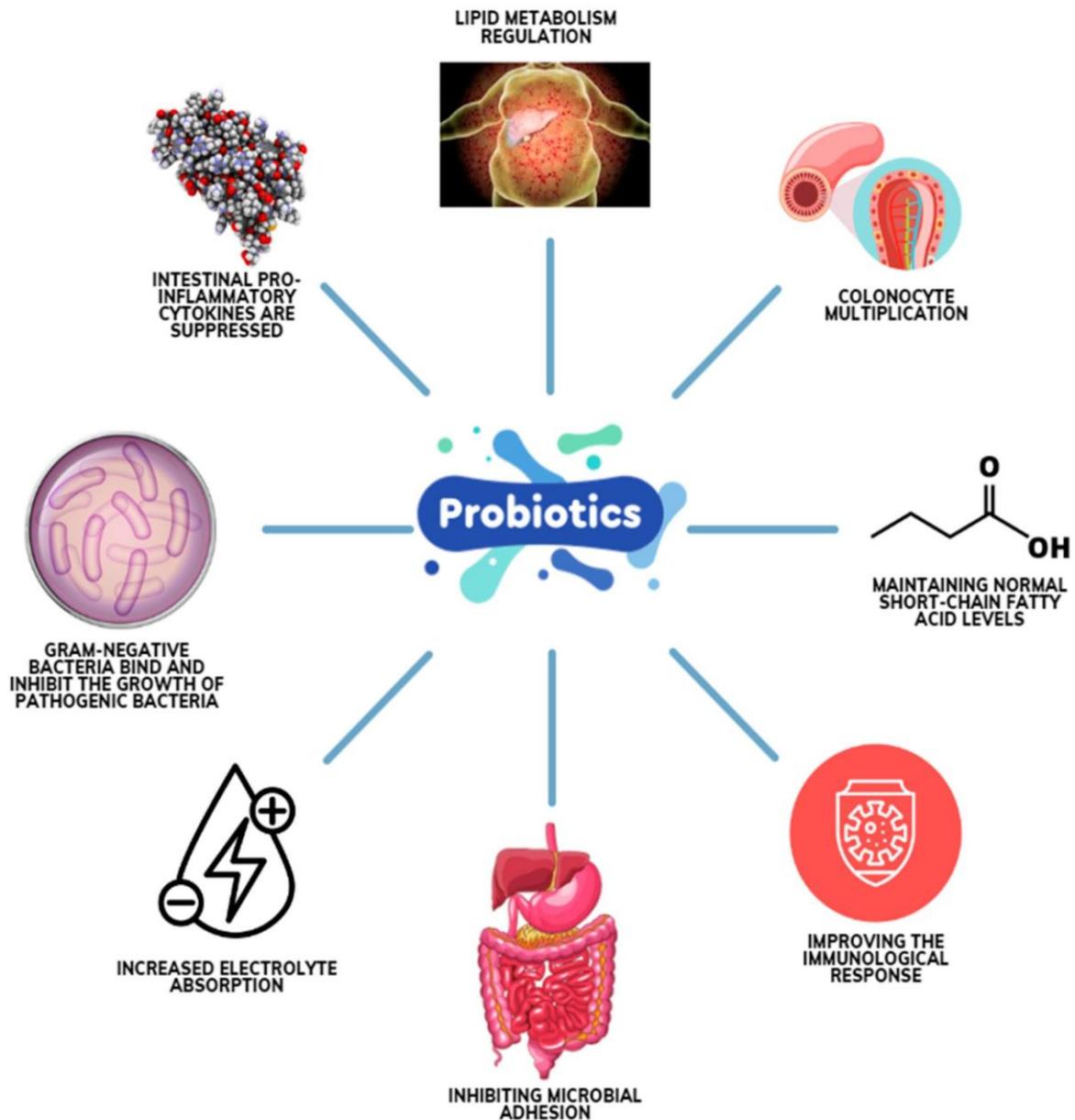
Abstract: Dysbacteriosis, or intestinal dysbiosis, refers to a qualitative and quantitative imbalance in the gut microbiota, often resulting from antibiotic use, chronic stress, or metabolic disorders. This imbalance may lead to gastrointestinal infections, inflammatory bowel diseases, and even systemic effects on the immune, nervous, and endocrine systems. Probiotics—live microorganisms beneficial to the host—play a critical role in restoring microbial balance and preventing dysbiosis-related disorders. Recent therapeutic advancements such as fecal microbiota transplantation (FMT), synbiotics, and dietary modulation have shown promising results in clinical trials. This review summarizes current knowledge about the pathophysiology, clinical manifestations, and modern treatment strategies for dysbacteriosis, emphasizing the scientific evidence supporting probiotic interventions.

Keywords: probiotics, dysbacteriosis, microbiota, intestinal health, fecal microbiota transplantation (FMT), prebiotics, gut-brain axis, immune modulation

Introduction

Dysbacteriosis is a disruption of the normal intestinal microflora, representing both quantitative and qualitative alterations. For example, the use of antibiotics, exposure to toxins, chronic stress, or underlying diseases can reduce beneficial bacterial populations and promote the overgrowth of pathogenic microbes. As a result, infections such as *Helicobacter pylori* or *Clostridium difficile*, inflammatory bowel diseases (IBD) including cholecystitis and Crohn's disease, small intestinal bacterial overgrowth (SIBO), as well as common issues such as diarrhea, constipation, and bloating may develop.

Moreover, the intestinal microbiota is closely connected with the immune, nervous, and endocrine systems; its imbalance has been linked to metabolic syndrome, obesity, dyslipidemia, and even mood and cognitive disorders.



What Are Probiotics and How Do They Work?

Probiotics are “live microorganisms” that, when administered in adequate amounts, confer health benefits on the host. They help maintain the equilibrium of intestinal microflora by supporting immune defenses, strengthening the mucosal barrier, and inhibiting pathogenic bacteria.

Their mechanisms include the production of antimicrobial substances, modification of luminal pH, reduction of antibiotic-associated diarrhea, and generation of short-chain fatty acids through fermentation.

Common strains such as *Lactobacillus* and *Bifidobacterium* species have been widely studied for alleviating gastrointestinal symptoms including gas, inflammation, and diarrhea.





Modern Approaches to Treating Dysbacteriosis

Contemporary medicine employs several strategies to treat dysbacteriosis. One of the most advanced techniques is Fecal Microbiota Transplantation (FMT), where stool from a healthy donor is introduced into the patient's gut to restore microbial balance. Studies report up to 80–90% success rates for certain conditions, especially *C. difficile* infection.

Preventive and supportive therapies include prebiotics (non-digestible fibers promoting beneficial bacteria), synbiotics (probiotic + prebiotic combinations), and specialized dietary programs. In some cases, physicians prescribe probiotics following antibiotic therapy to accelerate microbiota recovery.

Recent research also indicates that fermented foods (yogurt, kefir, sauerkraut, kimchi) and fiber-rich diets reduce dysbacteriosis risk and support gut health.

Probiotic Products and Their Efficacy

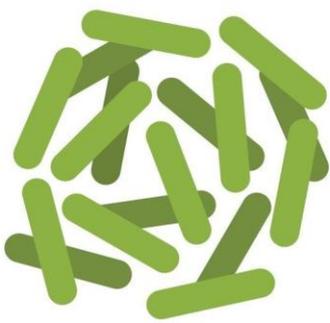
The market offers a wide range of probiotic products, including yogurts, kefir, fermented cheeses, and capsule formulations containing specific bacterial strains. Their effectiveness depends on the strain type, dosage, and product quality.



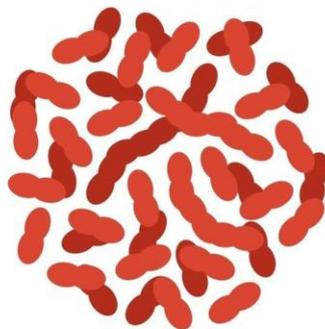
According to NIH data, many commercial probiotic supplements remain insufficiently studied, highlighting the need for clinically validated formulations.

For instance, *Lactobacillus rhamnosus* GG (LGG) at a daily dose of $1-2 \times 10^{10}$ CFU for 10 days significantly reduced antibiotic-associated diarrhea (from 22.4% to 12.3%). Similarly, *Saccharomyces boulardii* has demonstrated efficacy in reducing diarrhea in both adults and children. Nonetheless, strain-specific clinical evidence is required to provide standardized therapeutic recommendations.

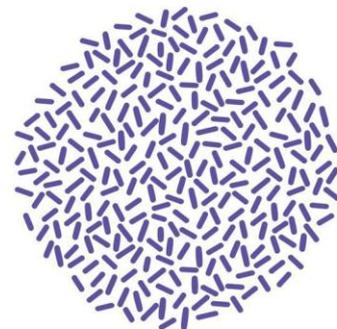
PROBIOTICS



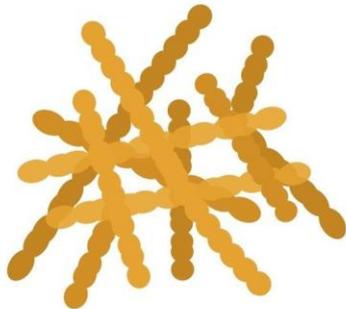
LACTOBACILLUS



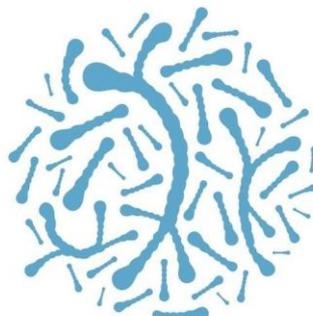
LACTOCOCCUS



PROPIONIBACTERIUM



STREPTOCOCCUS
THERMOPHILUS



BIFIDOBACTERIUM



BULGARICUS

Clinical Research and Scientific Evidence

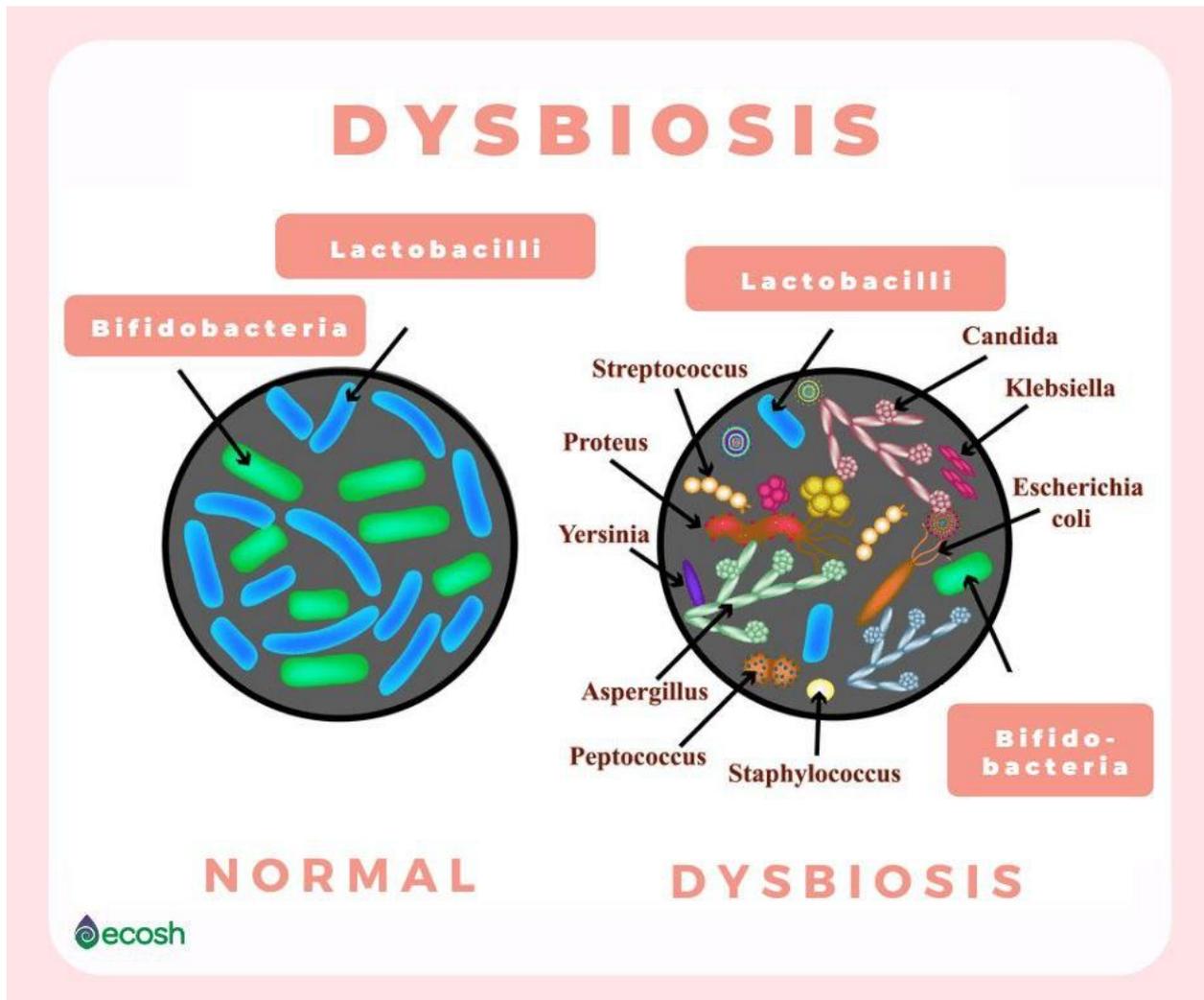
Numerous clinical trials and meta-analyses have evaluated probiotic efficacy. For example, Hempel et al. (JAMA Network, 2012) found that probiotic supplementation significantly reduced the incidence of antibiotic-associated diarrhea.

Other studies suggest probiotics may exert beneficial effects beyond the gastrointestinal tract. *Saccharomyces boulardii*, for instance, reduced inflammatory markers and improved quality of life in patients with multiple sclerosis (MS).

Overall, while evidence supports probiotics' positive influence on inflammation and immune regulation, results remain heterogeneous—some trials show strong effects, others modest or none. Further disease-specific, large-scale studies are essential for definitive



recommendations.



Preventive Measures

Preventing dysbacteriosis relies primarily on a balanced diet and healthy lifestyle. Medical sources emphasize the importance of diverse plant-based foods, whole grains, fruits, and fermented products for maintaining microbial diversity and resilience.

Dietary fibers act as “fuel” for beneficial bacteria, promoting the growth of protective species. Reducing the intake of high-fat, high-sugar, and processed foods, combined with regular physical activity and stress management, contributes to microbial balance.

Additionally, cautious use of antibiotics and periodic consumption of clinically tested probiotic or prebiotic supplements are recommended for long-term intestinal health.

References:

1. Explanatory Dictionary of Human Physiology (2011) – Definition of dysbacteriosis.
2. Cleveland Clinic Health Library – Causes and consequences of intestinal dysbiosis.
3. NIH Office of Dietary Supplements – Mechanisms and definitions of probiotics.
4. Gut Microbiota for Health resources – Infographics on microbiota diversity and diet.
5. Karimi et al., *Frontiers in Immunology* (2024) – Review on fecal microbiota transplantation and modern therapy.
6. Asghari et al., *Scientific Reports* (2023) – Clinical effects of probiotics on inflammatory markers.

7. Hempel et al., JAMA Network (2012) – Meta-analysis on probiotics for antibiotic-associated diarrhea.
8. Cleveland Clinic Lifestyle Section – Dietary and preventive recommendations for microbiota health.

