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ВЛИЯНИЕ ИССЛЕДОВАНИЙ МИКРОБИОМА НА ЗДОРОВЬЕ ЧЕЛОВЕКА: РАСКРЫТИЕ РОЛИ МИКРОФЛОРЫ КИШЕЧНИКА В РАЗВИТИИ БОЛЕЗНЕЙ И БЛАГОПОЛУЧИЯ

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Микробы, обитающие в кишечнике человека, играют важную роль в его здоровье. Исследования показывают, что бактерии, вирусы и другие организмы взаимодействуют между собой и с иммунной системой, влияя на развитие заболеваний. Понимание этих взаимодействий и их динамики со временем необходимо для прогнозирования и лечения заболеваний, связанных с дисбалансом микробиоты.

Ключевые слова: значение микробиота, роль микробиота, микрофлора кишечника, микробиом кишечника, микробиота кишечника, развитие патологий, влияние микробиота.

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THE IMPACT OF MICROBIOME RESEARCH ON HUMAN HEALTH: UNVEILING THE ROLE OF GUT FLORA IN DISEASE AND WELLBEING

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Microbes living in the human gut play an important role in human health. Research shows that bacteria, viruses and other organisms interact with each other and with the immune system to influence the development of disease. Understanding these interactions and their dynamics over time is essential for predicting and treating diseases associated with microbiota imbalances.

Key words: Importance of microbiota, role of microbiota, gut microflora, gut microbiome, gut microbiota, development of pathologies, influence of microbiota.

Understanding the impact of the microbiome on human health is relevant to medical research because it opens up potential avenues for therapeutic interventions. For example, the development of probiotics and prebiotics. This has the potential to act positively on the human body, as well as preventing and treating diseases.

The aim

- 1) Become familiar with the beneficial effects of microorganisms on the human body.
- 2) Study the role of microorganisms in the pathogenesis of various diseases.
- 3) Conclude on the value of a health professional's knowledge of microbiology
- 4) learn about modern methods of therapy of dysbacteriosis.

Task: Explore the role of applying knowledge of human intestinal microflora in medical practice.

Normoflora or eubiosis is a qualitative and quantitative ratio of different populations of microorganisms of individual organs, supporting biochemistry and metabolism of the organism, as well as immunological balance, necessary to maintain the health of the body. An important function

of flora is its participation in the formation of resistance of the organism to various diseases and the prevention of colonization of the human body by pathogenic bacteria.

The gastrointestinal tract is one of the most complex microecological environments, with a total mucosal area of about 500 m² having a high and diverse density of microbial contamination, in which the interaction between the protective systems of the macroorganism and microbial systems is balanced. Bacteria make up 30 to 50% of the volume of human colon contents, and their combined mass in the GI tract approaches 2 kg. But bacteria are unevenly distributed, for example in the stomach the density of microbial colonization is low and is only about 10³-10⁴ CFU/ml, and in the small intestine - 10⁷-10⁸ CFU/ml, then already in the region of the ileocecal valve in the large intestine the density of bacteria reaches 10¹²-10¹³ CFU/ml. Despite the wide variety of bacterial species inhabiting the GI tract, many can only be diagnosed genetically. The intestinal biome is a complex ecosystem. In humans, there are at least 18 families of bacteria, 50 genera, 500 species and an innumerable number of subspecies. Microorganisms of the small and large intestines are divided into permanent (microbes that are obligately present in the normal flora and play a huge role in metabolism and immunity) and non-permanent (microbes that are often found in a healthy person, but are opportunistic; they can cause infections in the absence of body resistance). The dominant representatives of obligate microflora are bifidobacteria. Due to the anaerobic conditions of the flora in the intestine, about 96% of facultative anaerobic bacteria predominate: especially *Bacteroides fragilis*, anaerobic lactic acid bacteria of the genus *Bifidumbacterium* and *Streptococcus*, the species *Clostridium perfringens*, fusobacteria, eubacteria. A small number of microflora are Gram-stained negatively, coliform species (*E.Coli*), and the genus *Enterococcus*. In small quantities: the genus *Staphilococcus*, *Pseudomonas*, fungi of the genus *Candida*, species of spirochetes, mycobacteria, mycoplasmas, protozoa and viruses

One of the functions of the intestinal microflora is to participate in the decomposition of food residues. Enzymes of intestinal bacteria are involved in hydrolysis. Water and electrolytes are absorbed, cellulose is broken down, and feces is formed. Based on this, in dysbacteriosis will be observed lack of fluid in the human body, violation of mineral metabolism, diarrhea.

Microflora plays a major role in peristalsis, excretion, absorption of the intestine. It is involved in the degradation of proteins and BAS. Flora provides colonization resistance - inhibiting pathogens and preventing infection. Microbes synthesize naphthoquinone (an essential element of hemostasis) and B vitamins. For example: B1 conducts the decarboxylation reaction of keto acids,

B2 electron transport with NADH, B3 electron transfer to oxygen, B5 Co-A precursor, B6 NH₂- carrier, B12 participate in DNA and RNA synthesis, essential amino acids. With the participation of microorganisms in the body is the metabolism of proteins, triglycerides, polysaccharides, disaccharides, monosaccharides, bile acids, cholesterol, deactivated carcinogens.

The role of flora is particularly important for humans, which is why its disruption leads to metabolic and immune related diseases. For example, in dysbacteriosis can develop hemophilia, type 1 and type 2 diabetes, as bacteria can increase the sensitivity of enterocytes to insulin, as well as regulate the level of glucose in the blood. With lipid metabolism disorders, the appearance of excess weight and even the development of obesity cannot be ruled out. By affecting cholesterol metabolism, bacterial imbalance can lead to cholecystitis, atherosclerosis, which increases the risk of myocardial infarction. Some of the serious diseases are also rheumatoid arthritis and multiple sclerosis, which are a consequence of dysbacteriosis. Mental health is also jeopardized by gut microbes interacting with the brain via the vagus innervating the gut. Disturbances in the microbiome lead to mood disorders, anxiety and depression. Skin diseases: microorganisms protect against other pathogenic and opportunistic bacteria thereby affecting the epidermis, preventing acne and eczema. The normal flora of the gastrointestinal tract plays a major role in the life of newborns and children. Through the production of lysozyme, H_2O_2 , lactate, ethanoic and butanoic acid and others and metabolites that lower the pH of the environment, this is how the microflora bacteria actively fight pathogens. In this competition for survival, substances such as bacteriocins occupy an important place.

The evolution of humans and bacteria has been very close, resulting in the formation of relationships between macro- and microorganisms. The influence of gastrointestinal microflora on the maintenance of human health, its biochemical, metabolic and immune balance is undoubted and proved by a large number of experimental works and clinical observations. Its role in the genesis of many diseases continues to be actively studied (atherosclerosis, obesity, irritable bowel syndrome, nonspecific inflammatory bowel diseases, colorectal cancer, etc.). Therefore, the problem of correction of microflora disorders, in fact, is the problem of preserving human health, the formation of a healthy lifestyle. Probiotic preparations and probiotic products provide restoration of normal intestinal microflora, increase nonspecific resistance of the body.

Conclusion

Knowledge in the field of microbiology is needed by all medical workers for the effective treatment of patients, as well as their prevention. This knowledge provides the basis for understanding infectious processes, their diagnosis, and control. Physicians with knowledge in this area can provide optimal patient care, protect healthy populations, and contribute to the development of new treatments and prevention of bacterial and other types of infections.

Ongoing education and training in the fields of microbiology, hygiene, and epidemiology are critical for both students and practicing doctors. This ensures that they can provide high quality care to patients and make a meaningful contribution to healthcare as a whole.

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