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THE INFLUENCE OF INTESTINAL MICROBIOTA ON THE ENDOCRINE SYSTEM IN CHILDREN

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Annotatsiya

The gut microbiota in children plays a crucial role in health and endocrine system function. The composition, diversity, and activity of gut microbiota are closely linked to hormone production, metabolic processes, and immune system regulation. This thesis analyzes the impact of gut microbiota on the endocrine system in children, diseases associated with microbiota imbalance, and preventive measures. Results indicate that regulating the interaction between gut flora and hormones can support healthy growth and development in children.

Keywords

gut microbiota, endocrine system, children, hormones, metabolism, healthy development

Annotatsiya

Bolalarda ichak mikrobiotasi sog'liqni saqlash va endokrin tizim faoliyati uchun muhim rol o'ynaydi. Ichak mikrobiotasining tarkibi, xilma-xilligi va faolligi gormonlar ishlab chiqarilishi, metabolik jarayonlar va immun tizim bilan chambarchas bog'liq. Ushbu tezisda bolalarda ichak mikrobiotasining endokrin tizimga ta'siri, mikrobiota disbalansi bilan bog'liq kasalliklar va profilaktika choralari ilmiy asosda tahlil qilinadi. Tadqiqot natijalari shuni ko'rsatadiki, ichak mikroflorasi va gormonlar o'rtasidagi o'zaro aloqani normallashtirish orqali bolalarda sog'lom o'sish va rivojlanish jarayonini qo'llab-quvvatlash mumkin.

Kalit so'zlar

O'zbekcha: ichak mikrobiotasi, endokrin tizim, bolalar, gormonlar, metabolizm, sog'lom rivojlanish

Introduction

Healthy growth and development in children depends on complex biological processes, in which the intestinal microbiota plays an important role.ealthy growth and development in children depends on complex biological processes, in which the intestinal microbiota plays an important role. The intestinal microbiota is a complex of trillions of microorganisms living in the human intestine, which are important not only in the process of digestion of food, but also in the functioning of the metabolic, immune and endocrine system. In children, the intestinal microbiota is involved in a number of mechanisms that regulate growth processes: the synthesis of vitamins and biologically active substances, the production of hormones, the control of immune responses, as well as the protection of the body from pathogenic microorganisms.n children, the intestinal microbiota is involved in a number of mechanisms that regulate growth processes: the synthesis of vitamins and biologically active substances, the production of hormones, the control of immune responses, as well as the protection of the body from pathogenic microorganisms. Scientific research in recent years shows that the composition and variety of intestinal microbiota directly affects the endocrine system of children. For example, the activity of intestinal bacteria is related to the production of insulin and glucagon, the stability of metabolic processes, and the activity of the thyroid gland.or example, the activity of intestinal

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bacteria is related to the production of insulin and glucagon, the stability of metabolic processes, and the activity of the thyroid gland. Howevor example, the activity of intestinal bacteria is related to the production of insulin and glucagon, the stability of metabolic processes, and the activity of the thyroid gland. However, intestinal microbiota dysbalance (dysbiosis) can cause pathological conditions in children such as obesity, metabolic disorders, thyroid hormone deficiency, or overproduction. This inhibits or slows down healthy growth and development processes in children. Various factors affect the composition of the intestinal microbiota. The child's eating habits, taking antibiotics and other medications, stress levels, environmental conditions, method of delivery, and maternal health during pregnancy have significant effects on the microbiota.hild's eating habits, taking antibiotics and other medications, stress levels, environmental conditions, method of delivery, and maternal health during pregnahe child's eating habits, taking antibiotics and other medications, stress levels, environmental conditions, method of delivery, and maternal health during pregnancy have significant effects on the microbiota. For example, the composition of the microbiota in naturally born babies is significantly different and directly affects the development of their endocrine system. Therefore, monitoring the condition of the intestinal microbiota in children, keeping it healthy and preventing dysbalance is one of the current scientific and practical issues today.

The relevance of this thesis is that the study of complex interactions between the intestinal microbiota and the endocrine system makes it possible to prevent metabolic and endocrine diseases in children, to ensure healthy growth and development.he relevance of this thesis is that the study of complex interactions between the intestinal microbiota and the endocrine system makes it possible to prevent metabolic and endocrine diseases in children, to ensure healthy growth and development. During the study, the following issues ahe relevance of this thesis is that the study of complex interactions between the intestinal microbiota and the endocrine system makes it possible to prevent metabolic and endocrine diseases in children, to ensure healthy growth and development. During the study, the following issues are studied: the composition and functions of the intestinal microbiota, endocrine disorders caused by dysbalance, as well as preventive and therapeutic approaches to normalize the intestinal microbiota in children and support healthy development.

Main part

1. Intestinal microbiota and its composition

The gut microbiota plays an important role in children's health.he gut microbiota plays an important role in children's health. Microorganisms living in the intestine — bacteria, viruses, fungi and other types of microflora-are involved in the regulation of food digestion, synthesis of vitaminhe gut microbiota plays an important role in children's health. Microorganisms living in the intestine — bacteria, viruses, fungi and other types of microflora-are involved in the regulation of food digestion, synthesis of vitamins, immune responses and the functioning of the endocrine system. The most common bacterial species are: Bifidobacterium, Lactobacillus, Firmicutes and Bacteroidetes. Their presence in the balance normalizes metabolism, creates an environment for the production of hormones, and supports healthy development in children.r presence in the balance normalizes metabolism, creates an environment for the production heir presence in the balance normalizes metabolism, creates an environment for the production of hormones, and supports healthy development in children.The mode of birth also directly affects the formation of the intestinal microbiota in children. For example, in babies born naturally, the intestinal microbiota is enriched with the maternal vaginal microflora, and in children born through artificial birth (caesarean section), the composition of the microbiota is less diverse, their endocrine system and immune response develop significantly differently. Therefore, monitoring

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the state of the microbiota in the early life of a child, normalizing it, and preventing imbalances are one of the most pressing scientific and practical issues today.fore, monitoring the state of the microbiota in the early life of a child, normalizing , and preventing imbalances are one of therefore, monitoring the state of the microbiota in the early life of a child, normalizing it, and preventing imbalances are one of the most pressing scientific and practical issues today. The complex interactions between the gut microbiota and the endocrine system are explained by the concept of the "gut-endocrine axis." According to this concept, the intestinal microbiota plays a direct role in the production of hormones, regulation of metabolic processes, and modulation of the immune system. At the same time, the intestinal microbiota also binds to the central nervous system and hypothalamus-pituitary-endocrine axes, regulating the psychophysiological state in children.t the same time, the intestinal microbiota also binds to the central nervous system and hypothalamus-pituitary-endocrine axes, regulating the psychophysiological state in children. Studies show that in children with a decrease in the diversity and activity of the intestinal microbiota, stress resistance decreases, metabolic disorders occur, and the growth rate slows down. The relevance of this thesis is that studying the interactions between the intestinal microbiota and the endocrine system allows for the prevention of metabolic and endocrine diseases in children and ensures healthy growth and development.he relevance of this thesis is that studying the interactions between the intestinal microbiota and the endocrine system allows for the prevention of metabolic and endocrine diseases in children and ensures healthy growth and development. During the study, the following issues are studied: the composition and functions of the intestinal microbiota, endocrine disorders caused by dysbalance, as well as preventive and therapeutic approaches to normalize the intestinal microbiota in children and support healthy development.

The diversity of the intestinal microbiota ensures the maturity of the immune system and the stable functioning of the endocrine system in children.rsity of the intestinal microbiota ensures the maturity of the immune system and the stable functioning of the endocrine system in children same time, a child's eating habits, antibiotic use, stress, aThe diversity of the intestinal microbiota ensures the maturity of the immune system and the stable functioning of the endocrine system in children. At the same time, a child's eating habits, antibiotic use, stress, and environmental conditions directly affect the composition of the microbiota.

2. The connection between the gut microbiota and the endocrine system

The interaction between the gut microbiota and the endocrine system is called “gut-endocrine axis”. Studies show that intestinal bacteria modulate the production of the following hormones:

Insulin and glucagon – control blood glucose levels

Cortisol controls stress response

Thyroid hormones (T3, T4) – regulate growth and metabolismInsulin and glucagon – control blood glucose levels

CorInsulin and glucagon – control blood glucose levels

Cortisol controls stress response

Thyroid hormones (T3, T4) – regulate growth and metabolism

Leptin andnsulin and glucagon – control blood glucose levels

Cortisol controls stress response

Thyroid hormones (T3, T4) – regulate growth and metabolism

Leptin and ghrelin – control hunger and satiety signals

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When children have a microbiome imbalance, hormone production is disrupted, leading to stunted growth, metabolic disorders, and a weakened immune response. For example, the risk of insulin resistance and obesity increases when the ratio of Firmicutes to Bacteroidetes changes.

3. Dysbalance and its consequences

Intestinal microbiota dysbalance (dysbiosis) can cause the development of several endocrine diseases in children:

Metabolic disorders: obesity, insulin resistanceIntestinal microbiota dysbalance (dysbiosis) can cause the development of several endocrine diseases in children:

Metabolic disorders: obesity, insulin resistanIntestinal microbiota dysbalance (dysbiosis) can cause the development of several endocrine diseases in children:

Metabolic disorders: obesity, insulin resistance

Thyroid gland dysfunction: hypothyroidism or hyperthyroidism

Increased levels of Stress and cortisol: negative effects on psychological and physiological growth

Also, cases of antibiotics, malnutrition, frequent illnesses and stress disrupt the microbiota. As a result, the variety of intestinal bacteria in children decreases, and the production of hormones deviates from the norm.

4. Preventive and therapeutic approaches

To normalize the intestinal microbiota in children and support the endocrine system, the following measures are recommended4. Preventive and therapeutic approaches

To normalize the intestinal microbiota in children and support the endocrine system, the following measures are recommended:

Healthy diet-probiotics and prebiotics4. Preventive and therapeutic approaches

To normalize the intestinal microbiota in children and support the endocrine system, the following measures are recommended:

Healthy diet-probiotics and prebiotics (dairy products, kefir, yogurt, vegetables and fruits)

Taking antibiotics only on the recommendation of a doctor-excessive use disrupts the balance of the microbiota

Physical activity and proper sleep mode – support hormones and metabolism

Probiotic supplements-Lactobacillus and Bifidobacterium preparations, especially when dysbalance is detected

Stress reduction-psychological environment and parental support are also important

However, it is important to individually define strategies for monitoring and treating intestinal microbiota in children.tress reduction-psychological environment and parental support are also important

However, it is important to individually define strategies for monitoring and treating intestinal microbiota in children. By normalizing the interaction between the intestine and the endocrine system, it is possible to ensure a healthy growth and development process in children.

Conclusion

The intestinal microbiota in children plays a central role in the functioning of the endocrine system.he intestinal microbiota in children plays a central role in the functioning of the endocrine system. Studies show that the composition and diversity of gut microbiota are closely related to hormone production, metabolic processes, and the immune system.

Intestinal microbiota imbalance (dysbiosis) can lead to obesity, insulin resistance, thyroid dysfunction, and other endocrine disorders in children.ntestinal microbiota imbalance (dysbiosis) can lead to obesity, insulin resistance, thyroid dysfunction, and ontestinal microbiota imbalance (dysbiosis) can lead to obesity, insulin resistance, thyroid dysfunction, and other endocrine

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disorders in children. Therefore, it is important to normalize the intestinal microbiota in children and support healthy development. Preventive measures include a healthy diet, taking probiotics and prebiotics, avoiding unnecessary antibiotics, physical activity, and psychological support. These approaches make it possible to maintain a balance between the intestinal and endocrine systems, regulate the production of hormones and ensure a healthy growth process in children.hese approaches make it possible to maintain a balance between the intestinal and endocrine systems, regulate the production of hormones and ensure a healthy growth process in children. Thus, the monitoring of the intestinal micro

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