INTERNATIONAL JOURNAL OF INTEGRATIVE AND MODERN MEDICINE

PHYSIOLOGY OF THE THYROID HORMONES THYROXINE (T4) AND TRIIODOTHYRONINE (T3)

Alimova Ozoda Bekmurodovna

Samarkand State Medical University

Murodova Farangiz Mahmudovna

103 students of Samarkand State Medical University Faculty of Medicine

Abstract: The thyroid gland produces iodine-containing or thyroid hormones, which are involved in metabolism and affect the growth and development of the human body. Their deficiency leads to the development of hypothyroidism, and their excess leads to the development of hyperthyroidism.

Key words: Thyroid hormone functions, Thyroid hormone synthesis, thyroxine (T4) and triiodothyronine (T3).

Types of thyroid hormones

The thyroid gland produces two hormones: thyroxine (T4) and triiodothyronine (T3). They have common physiological properties, but differ in the number of iodine atoms in the molecule. Both thyroxine and triiodothyronine are derivatives of tyrosine. The production of thyroid hormones is regulated by the hypothalamus-pituitary system.

When we talk about the two main thyroid hormones, we cannot talk about TSH or anterior pituitary thyroid stimulating hormone. It acts on specific receptors located in the epithelium of the thyroid gland and stimulates the synthesis of thyroxine.

Thus, TSH, T3 and T4 are closely related. The higher the concentration of thyroid-stimulating hormone TSH, the lower the production of thyroid hormones - T4 and T3. At the initial stage of endocrine diseases, the results of laboratory diagnostics may not show insufficient or excessive production of thyroid hormones, but the level of TSH may indicate the presence of certain disorders. This allows for a thorough diagnosis to start treatment as soon as possible.

Synthesis of thyroid hormones

The thyroid gland receives iodine from food, which is used for the synthesis of thyroid hormones with the participation of the hypothalamus-pituitary system. The hypothalamus controls the amount of

hormonal substances by sending signals to the pituitary gland. As a result, the thyroid gland reduces or increases the production of T3 or T4. At the same time, the amount of TSH changes.

Functions of thyroid hormones

Thyroid hormones have a great influence on almost all organs and systems of the human body. Their effect mainly depends on the concentration. For example, small amounts of thyroid hormones have an anabolic effect and help increase protein synthesis and inhibit muscle breakdown. A high concentration of thyroid hormones, on the other hand, leads to catabolic breakdown and maintenance of a negative nitrogen balance.

The main functions of thyroid hormones:

stimulation of tissue growth and development;

support of mental and physical health, speed of thought processes;

participation in all types of metabolism;

maintaining optimal blood glucose levels;

effect on glycogen synthesis and muscle tissue;

increased lipolysis, prevention of active fat accumulation in problem areas of the body;

strengthening hematopoietic processes in the bone marrow;

maintaining the optimal level of cholesterol in the blood.

The biological role of T3 is greater than that of T4. Some of the triiodothyronine is produced in the thyroid gland, but most of it is synthesized in the process of taking thyroxine from the environment.

Total T3 stimulates bone growth and the production of certain sex hormones. In children, this substance is responsible for the growth and formation of the central nervous system. Total T3 can affect cholesterol levels and the rate of protein metabolism.

Free T3 controls all types of metabolism, heart, respiratory, reproductive and digestive systems.

General T4 is responsible for obtaining energy and maintaining the tone of the nervous system. The hormone is mainly in a protein-bound state.

Free T4 is the active part of thyroxine. The hormone is in the blood stream in a state that is not bound to proteins. Free T4 regulates metabolic processes, increases oxygen consumption by tissues and generates heat. In addition, it prevents the formation of cholesterol plaques on the walls of blood vessels and helps prevent atherosclerosis. Free T4 controls and increases the functionality of the reproductive system, respiratory organs, is responsible for a calm and even mood, the stability of a person's mental state.

Symptoms of low and high levels of thyroid hormones

If the production of thyroid hormones is low, hypothyroidism develops. The disease can occur for a long time without significant symptoms.

The main manifestations of low thyroid hormone levels:

decreased performance;

emergence of daytime sleepiness and slight inhibition of reactions;

frequent diseases due to weakening of the immune system;

swelling of the feet and hands;

violation of a woman's menstrual cycle;

instability to low temperatures and increased sensitivity to cold;

deterioration of skin and hair condition.

When the concentration of thyroid hormones increases, the following symptoms appear:

Weight loss;

cardiopalmus;

unstable mental state;

trembling of the fingers;

increased sweating;

goitre formation in the neck area;

physical weakness and high fatigue.

List of used literature:

1. Mamatkulov Shekhruz Bahadirovich , R. K. A. qizi, (2024) “Modern Views on the Origin and Treatment of Ozena’s Disease ”, EUROPEAN JOURNAL OF MODERN MEDICINE AND PRACTICE, 4(2), pp. 481–485.
2. Гойибова Н. С., Гарифулина Л. М. Функции почек у детей с ожирением //Вопросы науки и образования. – 2020. – №. 26 (110). – С. 51-57.
3. Abdurashidov Asilbek Abdurashidovich , R. K. A. qizi ,. (2024). MODERN INTERPRETATION OF THE ORIGIN AND TREATMENT OF SYMPTOMS OF LARYNGITIS . International Journal of Integrative and Modern Medicine, 2(3), 49–52.
4. Pirimqulov Jumaniyoz Ravshan o‘g‘li , R. K. A. qizi ,. (2024). Diagnosis of Odontogenic Sinusitis. American Journal of Pediatric Medicine and Health Sciences (2993-2149), 2(4), 152–157.

5. Малявская С. И., Лебедев А. В. Метаболический портрет детей с ожирением //Российский вестник перинатологии и педиатрии. – 2015. – Т. 60. – №. 6. – С. 73-81.
6. Rasulova, K. (2023). TREATMENT AND PREVENTION OF FUNGAL RHINITIS AND ALLERGIC RHINITIS. Science and innovation, 2(D10), 150-154.
7. Maqsud, M. (2024). Significance of Diagnosis of Nystagmus in Miner's Disease. EUROPEAN JOURNAL OF MODERN MEDICINE AND PRACTICE, 4(2), 214-217.
8. Sayfullayeva Asila Abdulla qizi, R. K. A. qizi ,. (2024). Age-Related Characteristics of Vestibular Neurons. International Journal of Integrative and Modern Medicine, 2(4), 53–56. Retrieved from https://medicaljournals.eu/index.php/IJIMM/article/view/239
9. Расулова, К. А., & Насретдинова, М. Т. (2022). ҲАЛҚУМДАГИ ЗАМБУРУҒЛИ ЗАРАРЛАНИШНИНГ САМАРАЛИ ДАВОЛАНИШИНИ БАҲОЛАШ. Биология ва тиббиѐт муаммолари, (2), 135.
10. Ашуров, З. Ш., & Усербаева, Р. К. (2022). Влияние тревожности и депрессии у матерей на эффективность воспитания подростков, основанного на технике повышения осознанности (mindfulness).
11. Гойибова Н. С. и др. Функция почек у недоношенных новорожденных, родившихся от матерей с преэклампсией //Достижения науки и образования. – 2019. – №. 10 (51). – С. 59-63.
12. Rasulova, K.A. (2023). Treatment and Prevention of Otitis or Ear Inflammation. SCHOLASTIC:Journal of Natural and Medical Education,2(10), 322-325.
13. Alimova, O., Karabaev, A., & Kim, O. (2022). CLINICAL AND IMMUNOLOGICAL FEATURES OF ACUTE DIARRHEA IN CHILDREN WITH HEMOCOLITIS SYNDROME. Theoretical aspects in the formation of pedagogical sciences, 1(5), 285-293.
14. Гарифулина Л. М., Ашурова М. Ж., Гойибова Н. С. Состояние здоровья детей с различными типами ожирения //Молодежь и медицинская наука в XXI веке. – 2018. – С. 35-37.
15. Tadjiev, B., Xudayberdieva, C. H., & Alimova, O. (2022). CLINICAL AND IMMUNOLOGICAL FEATURES OF ACUTE DIARRHEA IN CHILDREN WITH HEMOCOLITIS SYNDROME. Science and Innovation, 1(4), 214-217.
16. Исматова, М., Юлдашева, Ф., & Алимова, О. (2021). Влияние гибискуса и оральных препаратов на уровень глюкозы в крови. Общество и инновации, 2(8/S), 333-338.
17. Farrukh S. ORGANIZATION OF DIGITALIZED MEDICINE AND HEALTH ACADEMY AND ITS SIGNIFICANCE IN MEDICINE //Science and innovation. – 2023. – Т. 2. – №. Special Issue 8. – С. 493-499.
18. Bekmurodovna, A. O., O‘G‘Li, N. F. F., & Qizi, R. G. S. (2022). KORONAVIRUS INFEKSIYASINING KLINIK KECHISHIDAGI O’ZGARISHLAR. Science and innovation, 1(D3), 9-12.
19. Ишкабулова Г. Д. и др. Влияние димефосфона на основные функции почек новорожденных, рожденных от матерей с хроническим пиелонефритом с сочетанным ОПГ-гестозом //Вестник науки и образования. – 2018. – №. 14-2 (50). – С. 51-55.