THE SIGNIFICANCE OF IODINE IN THE HUMAN BODY

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ABSTRACT

Iodine is one of the essential trace elements for the human body and is required for the synthesis of thyroid hormones—thyroxine and triiodothyronine. These hormones play a crucial role in regulating metabolism, growth and development, the nervous system, and cognitive function. At present, iodine deficiency–related diseases remain widespread in many regions, particularly among populations living in iodine-deficient areas. These include endemic goiter, hypothyroidism, and impaired intellectual development in children. Therefore, studying the effects of iodine on the human body, preventing iodine deficiency, and providing a scientific basis for preventive measures constitute one of the pressing issues in modern medicine and public health.

Relevance. Iodine is one of the essential trace elements for the human body and is required for the synthesis of thyroid hormones—thyroxine and triiodothyronine. These hormones play a crucial role in regulating metabolism, growth and development, the nervous system, and cognitive function. At present, iodine deficiency–related diseases remain widespread in many regions, particularly among populations living in iodine-deficient areas. These include endemic goiter, hypothyroidism, and impaired intellectual development in children. Therefore, studying the effects of iodine on the human body, preventing iodine deficiency, and providing a scientific basis for preventive measures constitute one of the pressing issues in modern medicine and public health.

Objective. The main objective of this study is to investigate the biological and physiological significance of iodine as a trace element in the human body, to analyze its role in the synthesis of thyroid hormones, and to elucidate health problems associated with both iodine deficiency and excessive intake based on scientific sources.

Materials and Methods. In this study, historical and contemporary scientific literature was analyzed to examine the effects of iodine on the human body and its role in the treatment of goiter. In particular, the scientific observations and clinical experiments conducted by the Swiss physician Jean-François Coindet in the early 19th century were used as primary material. In the 1820s, Coindet administered iodine preparations to patients with goiter and

observed a reduction in thyroid gland size and improvement in clinical condition within a short period. He emphasized the importance of careful dosage when assessing iodine's effects on the body and provided scientific evidence of its direct impact on thyroid function.

Iodine is a vital trace element necessary for normal human physiological activity. It is not synthesized in the body and must therefore be obtained from external sources such as water and food. Approximately 60–80% of iodine is accumulated in the thyroid gland, where it serves as a key structural component of thyroxine (T4) and triiodothyronine (T3). These hormones regulate cell division, protein synthesis, and energy metabolism. Iodine is also essential for the development of the central nervous system. During pregnancy, iodine deficiency can have irreversible negative effects on fetal brain development, including reduced IQ and the risk of cretinism.

Iodine was discovered in 1811 by B. Courtois, while its association with the thyroid gland was established in 1896 by O. Baumann. Research by D. Marine (1917) demonstrated that endemic goiter could be effectively prevented through iodine prophylaxis. Consequences of deficiency include slowed metabolism (hypothyroidism), physical lethargy, memory impairment, and weakened immunity. According to WHO data, approximately 30% of the world's population lives at risk of iodine deficiency.

Thus, iodine is not only essential for the endocrine system but also determines the overall energetic and intellectual potential of the organism. Enriching the diet with iodized salt and seafood represents an important component of socio-medical safety.

Conclusion. The obtained data and analysis indicate that iodine is a key trace element ensuring fundamental physiological functions in the human body. It plays a vital role in the synthesis of thyroid hormones, thereby regulating metabolism, growth, and nervous system activity. Iodine deficiency leads to endemic goiter, hormonal imbalances, and other health problems. Therefore, adequate iodine intake and the inclusion of iodine-rich sources in the diet are essential preventive measures for maintaining human health..

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