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Perspective

Hormone Replacement Therapy and Its Significance

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DESCRIPTION

The Goal of treating hypothyroidism with thyroid hormone replacement remains to "give relief of the patient's symptoms and hypothyroid indicators," as well as to normalize the biochemical abnormalities of the hypothyroid condition and to avoid under or overtreatment. Thyroid hormone replacement has long been known for its amazing ability to reverse the signs and symptoms of hypothyroidism. The ancient Chinese are credited with treating thyroid disorders by consuming seaweeds and animal thyroids. In the 1890s, thyroid grafting and injection of thyroid gland extracts were described in French and English literature. Thyroid extracts were administered orally as part of the treatment plan. Beadles collected a list of 100 examples of patients with "myxedema and cretinism" in 1893, and reported 28 similar cases in 1895.

According to their respective descriptions, "This treatment is invariably followed by an improvement, by a rapid change in the appearance of the patient, the patient has so far recovered from the disease that it is impossible to recognize the case as one of myxedema" and "The effects produced in cases of myxedema by a relatively minute quantity of thyroid extract, the rapidity with which all the characteristic symptoms disappear under the influence of the thyroid treatment, the rapidity with which all the characteristic symptoms disappear under Desiccated Thyroid Extract (DTE) became the standard treatment for hypothyroidism before giving way to synthetic Levothyroxine (LT4) in the 1980s. Despite its success, the difficulties of restoring the thyroid state in people who have suffered thyroid hormone shortage may not have been mastered for all patients. Endocrinologists' goal continues to optimize therapy for all hypothyroid patients. It is likely to advance from the early days of "organ therapy" to the ability to "treat" hypothyroidism through autoimmune damage prevention or regeneration of functioning thyroid follicles.

Hypothalamic-Pituitary-Thyroid Axis

The hypothalamic-pituitary-thyroid axis is a classic negative feedback loop in which four hormones are involved. TRH (hypothalamic thyrotrophic-releasing hormone) promotes pituitary thyrotrophic hormone (TSH) release.

TSH helps the thyroid gland's synthetic machinery and induces the resumption of thyroglobulin from the lumen of thyroid follicles. Thyroxin (T4) and 3,5,3′ -Triiodothyronine (T3) are then released into the bloodstream in a 14:1 ratio from the thyroid gland. The blood concentrations of TSH and free T4 (FT4) have a reciprocal relationship, thus when the concentration of FT4 increases or drops, the response is an exponential decrease or increase in TSH concentration.

Thyroid Physiology

Iodine from food is absorbed in the gastrointestinal system and dispersed in the extracellular fluid as iodide or iodate. The sodium-iodide symporter situated within the basolateral membrane of the Thymocyte actively transports circulating iodide into the cell.

The reactive iodine ion intermediate generated is subsequently covalently linked to thyroglobulin tyro's residues to produce monoiodotyrosine and diiodotyrosine residues *via* a process known as organification. Thyroid peroxidase also catalyses the conjugation of mono-iodotyrosine and di-iodotyrosine residues in thyroglobulin, which is released into the follicular lumen.

Thyroglobulin is then pinocytosis at the apical membrane as needed, and T4 and T3 are secreted into the blood following thyroglobulin proteolysis. Thyroid hormones are required for the development and metabolic equilibrium of all of the body's tissues and organ systems.

According to estimates, the intact thyroid gland generates 85 to 100 mcg T4 per day and 5 to 6.5 mcg T3 per day. By outer ring deionization, type 1 and 2 deiodinases and converts the prohormone T4 to T3, the active form of thyroid hormone, creating an additional 26.5 mcg of T3 daily. T4 and T3 are converted into their inactive forms of reverse T3 and 3,3′ -diiodothyronine by type 3 deiodinase *via* inner ring deionization.

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