Thyrostim™

Thyroid Function

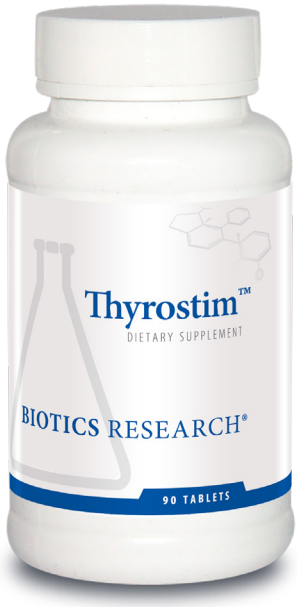
The thyroid gland is actually a collection of individual glands (follicles). Here, newly synthesized hormone is secreted into a central lumen prior to release into the bloodstream. In general, thyroid hormones refer to T3 (triiodothyronine) and T4 (thyroxine). Though T4 is the main product, T3 is 3 to 4 times more active. T4 (with 4 atoms of iodine) is converted to T3 (with 3 atoms of iodine) via peripheral tissues, especially the liver and lung.

Parafollicular thyroid cells secrete calcitonin, a hormone employed in calcium and phosphate homeostasis. Calcitonin inhibits bone breakdown and accelerates bone calcium and phosphate uptake. Blood calcium levels control the secretion of calcitonin by a pathway independent of the pituitary gland. Thyroid hormones regulate metabolism and energy balance, as well as growth, development and activity of the nervous system.[1] Thyroid hormones stimulate carbohydrate and fat breakdown, increase protein synthesis, and increase the basal metabolic rate.

Several factors, including low metabolic rate, falling blood pressure, and conditions that increase the need for energy such as a cold environment, hypoglycemia, pregnancy or high altitude, stimulate the secretion of thyroid hormones. Thyroid hormones regulate their production via feedback mechanisms on the hypothalamus/pituitary axis. Thyroxine completes a negative feedback loop by blocking the release of the trophic hormone thyrotropin releasing hormone (TRH). High blood levels of estrogens and androgens decrease TRH production and thus thyroid function. Aging generally decreases glandular processes, including thyroid function.

Thyroid Hormone Synthesis

An individual consumes up to 500 mcg of iodine per day. Fully, one third is absorbed by the thyroid, where the synthesis of thyroid hormone begins, and the remainder is excreted. Iodine is oxidized by the thyroid to organic iodine via iodoperoxidase, an enzyme requiring hydrogen peroxide. The addition of iodine occurs at the 2, 5 positions of tyrosine residues of thyroglobulin. Two di-iodotyrosine residues are coupled to form a thyroxine precursor on thyroglobulin. Secretion of thyroid hormones is initiated by the lysosomal degradation of thyroglobulin to release T3 and T4.



In the bloodstream, T3 and T4 are carried by thyroxine-binding globulin, thyroxine binding prealbumin and serum albumin. It is the concentration of free (unbound) hormone that is important. T4 is converted to T3 and is taken up by appropriate target cells. Thyroid hormone is transported to the nucleus where it activates transcription. The actual thyroid hormone receptor is a chromosomal protein locked into the nucleus. Hormone binding activates the receptor as a transcription factor, resulting in the synthesis of multiple enzymes affecting metabolism. Thyroid hormone receptors also occur in mitochondria, so that thyroid hormones regulate oxygen consumption and ATP production directly. Brown fat-induced reactions to hypothermia are triggered by thyroid hormones.

Abnormal Levels of Thyroid Hormones

Varying degrees of hypothyroid function are routinely detected by laboratory tests and other measures.[2] Hypothyroidism is characterized by obesity, cold, dry skin and fatigue, while hyperthyroidism has opposite effects. Goiter and thyroid hyperplasia are consequences of abnormally low dietary iodine.

Nutritional Support

Iodine. The common form of iodine in foods is iodide. This is the reduced form of iodine. In thyroid tissue, follicles normally concentrate iodide 40-fold greater than blood concentrations. At maximal activity, the thyroid can contain up to 300 fold greater concentration of iodide than blood levels. Cells oxidize iodide to organically bound iodine, which is then chemically combined with tyrosine. Kelp is a natural source of iodine.

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Tyrosine. This amino acid is a protein building block. In particular, many of the tyrosine residues of thyroglobulin are iodinated. Each molecule of thyroid hormone contains the equivalent of two tyrosine molecules. The uptake of tyrosine decreases with age.[3]

Biotics Research Bovine Neonatal Pituitary/ Hypothalamic Glandular

Cytozyme-PT/HPT™ represents neonatal glandular tissue **Cytozyme-PT/HPT ™**, as in all of Biotics Research Corporation's Cytozyme glandulars, represents a tissue concentrate, including peptides, proteins, nucleic acids and other nutrient factors. Biotics Research Corporation selected neonatal tissues for several reasons. Neonatal glands and tissues possess very high anabolic activity. Factors associated with rapid growth are more likely to be present in neonatal glands than in adult glands. Histologic examination of adult (2 – 5 years) bovine glands and neonatal newborn bovine glands dramatically illustrates the differences between the two due to aging and environmental exposure.[5,10] These factors contribute to a loss of organ function, accumulation of lipofuscin and increased fat accumulation in many organs with aging. In addition, neonatal tissues have not been subjected to long exposure to pollutants and environmental stressors. For example, independent evaluation of common pesticides in neonatal glandulars has indicated that levels are below the limits of detection. In addition, all glandular supplements produced by Biotics Research Corporation are obtained from domestic, USDA approved animals.

Minerals

Selenium. This trace mineral in the form of selenocysteine is required by a family of antioxidant enzymes, the glutathione peroxidases. These enzymes reduce peroxidized fatty acids in membranes to safe byproducts. On the other hand, selenium is also required for iodothyronine deiodinase, the enzyme located in peripheral tissues that is required to convert T4 to T3. Selenium deficiency decreases the iodothyronine de-iodinase activity. High iodine intake, when selenium intake is low, can lead to thyroid damage because thyroid glutathione peroxidase activity is reduced.[4]

Magnesium. Thyroid hormone is intimately associated with regulation of energy production and mitochondrial function. Indeed, mitochondria possess thyroid hormone receptors. Enzyme utilization of ATP generated by mitochondria requires complex formation with magnesium, generally in a 1:1 ratio. Magnesium is essential for protein synthesis, cell replication and activation of the sodium-potassium pump, as well as regulation of calcitonin and parathyroid hormone.

Copper. Copper is a cofactor for the antioxidant enzyme, superoxide dismutase, and it is implicated in thyroid gland metabolism. Animal studies suggest that copper deficiency decreased hepatic mono-deiodinase,[5] and that condition is associated with a reduction in T4 levels. Hormone reduction could be due to decreased T4 synthesis or to impaired T4 release[6]

Manganese. This trace element can be considered an antioxidant because it is a cofactor for mitochondrial superoxide dismutase. Manganese complexes with ATP in certain energy requiring steps associated with carbohydrate metabolism. Very low manganese intake in lab animals retarded growth and thyroid hormone metabolism.[7]

Rubidium. A variety of anecdotal reports and case studies suggest that rubidium promotes thyroid metabolism. The mechanism is unknown.

Tyrosinase. This is a copper-containing enzyme and belongs to the family of monophenol oxidases. Tyrosinase is implicated in tyrosine pathways.

Vitamin A. Vitamin A is required for the normal development and maintenance of epithelial tissues. Both Vitamin A and thyroid hormone regulate gene expression, depending upon the organ.[8] Furthermore, vitamin A supports the expression of receptors for thyroid and other hormones.[9]

Thyrostim™ is available in 90-count (#3500) and 270-count (#3501) bottles.

Product Adjuncts: **GTA®**

References

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