



## BioThy™

### Recommended Use:

- Thyroid Dysfunction
- Fatigue, exhaustion
- Cold sensitivity
- Hypothyroidism
- Weight gain

BioThy™ is a well-balanced formulation for thyroid support. The combination of an amino acid (L-tyrosine), trace minerals (iodine, selenium and zinc) and protein are clinically identified for treating conditions related to thyroid dysfunction, including chronic fatigue, depression, menstrual dysfunction, recurrent infections, difficulty losing weight, cold sensitivity, and osteoporosis.

The thyroid plays an important role, directly or indirectly, in various functions in the body. Thyroid glands produce two major hormones, triiodothyronine (T3) and thyroxine (T4). Thyroxine represents about 93% of the hormone produced by the thyroid with the balance (7%) being triiodothyronine. The release of T3 and T4 is controlled by the hypothalamus, which stimulates the secretion of thyroid-stimulating hormone (TSH) from the anterior pituitary. T3 and T4 control the metabolic rate of the body, protein synthesis and energy release from carbohydrates. They also regulate the rate of growth in the young and are associated with sexual maturity and early maturation of the



### Medicinal Ingredients:

Each capsule contains:

L-tyrosine.....	200 mg
Iodine (kelp).....	100 µg
Selenium (selenomethionine).....	100 µg
Zinc (citrate).....	10 mg

### Non-medicinal Ingredients:

Microcrystalline cellulose, gelatin (capsule), protein hydrolysate powder (bovine and/or porcine).

**Recommended dose (Adult):** Take one capsule two times a day with food or as directed by a health care practitioner. Take a few hours before or after taking other medications.

**Caution/warnings:** Consult a health care practitioner if you are pregnant or breastfeeding. Consult a health care practitioner prior use if you are following a low protein diet or if you have a history of non-melanoma skin cancer.\* (see statement at end of monograph).

nervous system. T3 is the primary thyroid hormone the body utilizes. Under healthy conditions the body is able to convert all T4 to T3. T4 is comprised of two tyrosine molecules connected to two iodine constituents. T3 is created when the liver enzyme 5-monodeiodinase causes a simple iodine molecule to be removed from the outer tyrosine.

The pituitary gland through its release of TSH plays an important role in regulating thyroid function by increasing the production of TSH when more thyroid hormones are required and suppressing it when too much hormone is present.

Another hormone produced by the thyroid is calcitonin. It is responsible for regulating calcium levels in the blood by inhibiting the rate at which calcium leaves bone tissue.

### Iodine

Iodine is required by the thyroid gland. Sixty percent of the body's iodine intake is stored in the thyroid gland and used to make thyroxine, which regulates metabolism, energy levels and the burning of fat. A 2001 study indicates a correlation between low urinary iodine excretions and enlarged thyroid and/or elevated thyroglobulin

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levels.<sup>1</sup> The main function iodine serves in the body is thyroid hormone production. Yet, the intake of too much iodine can actually impair this function. It is recommended that iodine consumption does not exceed 600 mg per day.

## Selenium

Selenium is a constituent of the enzyme 1 iodothyronine deiodinase (IDI), an enzyme responsible for the peripheral conversion of T4 to T3 in the liver and kidneys. This enzyme is markedly reduced in selenium deficiency. Due to its association with the conversion of T4 to active T3, selenium deficiency can contribute to hypothyroidism.<sup>2</sup> Various studies have pointed out that selenium supplementation is beneficial in normalizing TSH levels and improving the conversion of T4 to active T3. One study on children with congenital hypothyroidism showed that supplementation with using 20-60mg/day of selenium caused a 74% increase in plasma selenium, normalized the levels of TSH and improved the conversion of T4 to active T3.<sup>3</sup> Other studies have yielded similar results.<sup>4</sup>

## Zinc

Zinc is important for healthy thyroid function as it plays a role in stimulating the secretion of TSH. Zinc deficiency can affect the metabolism of thyroid hormones leading to hypothyroidism. A study designed to evaluate zinc metabolism in adults of both sexes with thyroid disease observed that abnormal zinc metabolism occurs commonly in patients with thyroid disease.<sup>5</sup> An animal study revealed that zinc deficiency reduced the concentration of T3 and T4 in serum by approx. 30% and the enzyme IDI by 67% in comparison to zinc-balanced conditions.<sup>6</sup>

## L-tyrosine

L-tyrosine is a direct precursor to thyroxine and is a necessary amino acid in the production of neurotransmitters including epinephrine, norepinephrine, and dopamine. L-tyrosine has been found to assist in optimizing thyroid hormone levels and in increasing concentration and productivity. Supplementation with L-tyrosine can assist a sluggish thyroid and play a role in achieving weight loss.

## Protein hydrolysate

Protein hydrolysate assists to balance plasma thyroxine concentrations, which increase the metabolic rate and lowers the plasma cholesterol concentration.<sup>7,8</sup>

## Ingredient:

L-tyrosine

Iodine (kelp)

Selenium (Selenomethionine)

Protein hydrolysate

Zinc (citrate)

## Mode of Action:

Thyroid hormone precursor and neurotransmitter of dopamine, norepinephrine and epinephrine.

Basic substance of the thyroid gland used to produce thyroxine.

Antioxidant; normalizes TSH levels and T4 and T3 conversion.

Balances plasma thyroxine concentration.

Required for T4 to T3 conversion; immune system stimulant.

## \*Selenium (BioThy) Statement for Risk or History of Non-Melanoma Skin Cancer

The BioThy label has a statement: "Consult a health care practitioner prior to use if you have a history of non-melanoma skin cancer".

This statement is required on the label by the NHPD because BioThy contains a maximum daily dosage of 200 microgram of selenium. There are studies that connect high dosage of Selenium with increased risk of non-melanoma skin cancer. Therefore, we have to put the warning on our label about caution with patients at risk or with a history of non-melanoma skin cancer.

NHPD reference about selenium associated with non-melanoma skin cancer as follows: Duffield-Lillico AJ, Slate EH, Reid ME, Turnbull BW, Wilkins PA, Combs GF Jr, Park HK, Gross EG, Graham GF, Stratton MS, Marshall JR, Clark LC; Nutritional Prevention of Cancer Study Group. Selenium supplementation and secondary prevention of non-melanoma skin cancer in a randomized trial. *Journal of the National Cancer Institute* 2003;95(19):1477-1481.

<http://jnci.oxfordjournals.org/content/95/19/1477.full>

## References:

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