

## Hypothyroidism

Surrounding the windpipe just beneath the voice box, the thyroid gland is a small organ with a powerful influence on the body. The thyroid secretes hormones that affect virtually every organ. Thyroid hormones are required for growth and development in children. In adults, the thyroid's main assignment is to regulate the production of metabolic energy.<sup>(1 &#fn106181>)</sup>

The thyroid governs our "basal metabolism," which turns calories into useable heat energy. When thyroid hormone output is low, people are often tired, cold, and sluggish. They may also be overweight. Without enough thyroid hormone to keep metabolism humming along as it should, we simply do not function very well, physically or mentally. Hypothyroidism is a complex condition that manifests as a constellation of signs and symptoms caused by low thyroid hormone levels in the body.

The thyroid gland's hormone-producing activity is controlled by the hypothalamus and pituitary glands in the brain. These glands can sense when the amount of thyroid hormone in the blood is low or high and give feedback to the thyroid accordingly. When thyroid hormone levels drop, the pituitary gland, upon a signal from the hypothalamus, tells the thyroid to make more. The pituitary does this by secreting a hormone of its own called TSH, or "thyroid-stimulating hormone." As the thyroid hormone level rises, the pituitary gland tells the thyroid gland to shut production down. This circle of communication between glands, called a "feedback loop," is designed to keep the amount of thyroid hormone circulating in the blood within a fairly narrow range, so we never have too much or too little. In hypothyroidism, TSH levels are generally higher than normal because the pituitary pumps out more TSH in response to low thyroid hormone levels.

Using iodine and the amino acid tyrosine as building material, the thyroid makes two hormones: thyroxine (T4), which has four iodine molecules in its chemical structure, and triiodothyronine (T3), containing three.

Hypothyroidism occurs in 1.5 to 2 percent of women and just 0.2 percent of men. The elderly are more prone to it.<sup>(2 &#fn106182>, 3 &#fn106283>, 4 &#fn106184>)</sup> The vast majority of hypothyroid people have primary hypothyroidism, where the problem lies in the thyroid's inability to manufacture enough thyroxine to meet the body's needs. Sometimes the pituitary fails to secrete sufficient TSH; this is secondary hypothyroidism.<sup>(5 &#fn106185>)</sup> The body may resist the influence of thyroid hormones, although this is rare.

Hypothyroidism makes one feel like an engine missing a spark plug. The mind and body are sluggish. Digestion is poor, cardiovascular function and mental activity slow down, and muscles weaken.<sup>(5 &#fn106185>)</sup> Low basal metabolism causes low body temperature, leaving the hypothyroid individual feeling chilly, with cold hand and feet, most of the time.

The old saying, "My get up and go got up and went," aptly describes the person with hypothyroidism.

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<sup>^1</sup> DiPiro JT, et al. *Pharmacotherapy A Pathophysiologic Approach*. fourth edition. Stamford, Connecticut: Appleton & Lange; 1999:1244.

<sup>^2</sup> Wang C, Crapo LM. The epidemiology of thyroid disease and implications for screening. *Endocrinol Metab Clin North Am*. 1997;26:189-218. [View Abstract view-abs.asp?fnid=106182&absid=104661>](#)

<sup>^3</sup> Kirjavainen PV, Gibson GR. Healthy gut microflora and allergy: factors influencing the development of the microbiota. *Ann Med*. Aug 1999;31(4):288-92. [View Abstract view-abs.asp?fnid=106283&absid=105097>](#)

<sup>^4</sup> Massoudi MS, Meilahn EN, Orchard TJ, et al. Prevalence of thyroid antibodies among healthy middle-aged women. Findings from the thyroid study in healthy women. *Ann epidemiol*. 1995;5:229-233. [View Abstract view-abs.asp?fnid=106184&absid=104662>](#)

<sup>^5</sup> Lindsay RS, Toft AD. Hypothyroidism. *Lancet*. 1997;349:413-417.

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