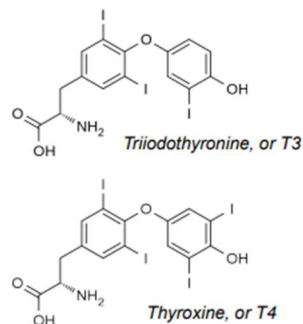


Thyroid hormones



What are the thyroid hormones?

The thyroid hormones are produced by the thyroid gland (located at the front of the neck, beneath the "Adam's apple")¹. The two main thyroid hormones are classified by the number of iodine atoms present in each molecule. With three iodine atoms is triiodothyronine (also known as T3, or liothyronine), and with four iodine atoms is thyroxine (also known as T4, or levothyroxine). T3 is about four times as potent as T4.



The thyroid hormones are essential for the proper development and function of all cells of the human body. They regulate the body's metabolism, acting on nearly every cell in the body to affect how they use energetic compounds such as protein, fats, carbohydrates, and vitamins. Thyroid hormones also regulate the generation of body heat

What can go wrong?

Hypothyroidism, also known as "under-active" or "low" thyroid, is a disorder in which the thyroid gland produces insufficient thyroid hormones¹. Hypothyroidism affects about 5% of people, and it is more common in women and in people over 60 years old.

Worldwide, insufficient dietary iodine is the most common cause of hypothyroidism^{2,3}. In the Western world, the most common cause of hypothyroidism is Hashimoto's thyroiditis, a disease where the thyroid gland is attacked by the body's own immune system^{1,3}. The lack of thyroid hormones in hypothyroidism causes many bodily functions to slow down. As a result, symptoms can include poor tolerance to cold, fatigue, constipation, depression, dry skin and hair, reduced heart rate, and weight gain¹. Occasionally, people with hypothyroidism may develop a swelling on the lower front part of the neck called a goitre.

Increasing thyroid hormone levels

Most people with hypothyroidism and confirmed thyroxine deficiency are treated successfully by taking synthetic T4^{2,3}. However, a minority of hypothyroid patients treated with T4 may still not feel completely well. Observations suggest that in some of these patients, the conversion of T4 to T3 in the liver and kidney may be impaired, with a low T3 possibly accounting for the persistence of their symptoms. Such patients may receive benefit from taking combinations of T4 and T3, although a higher risk of side effects should be considered (due to the more potent, but shorter-acting T3).

Another avenue being explored is supplementation of T3 alone, which has shown some promise³. T3 is metabolised quickly by the body, so it must be taken either three times daily, or less often as a slow-release preparation²

“Alternative” thyroid therapies

Some people believe that periods of stress can lead to apparent hypothyroidism symptoms without measurable thyroid hormone deficiency, through a change in how T4 is converted into T3. Instead of T3, the body produces the inactive and not-usually-measured “reverse T3” (rT3). This is thought to result in low metabolism and low body temperature, known as “Wilson’s Temperature Syndrome”. There is little medical evidence to support this condition or its treatment, but some people receive benefit from treatment with low-dose, slow-release T3 preparations⁴.

Natural desiccated thyroid (NDT), also known as “Armour thyroid”, is an old treatment for hypothyroidism that pre-dates humanity’s ability to synthesise thyroid hormones. As it is a powder derived from the dried thyroid glands of pigs, it is sometimes thought of as a “natural” therapy. NDT contains a mixture of thyroid hormones in the proportions present in pig thyroids: approximately 80% T4 and 20% T3 (along with traces of other hormones).

Many doctors will not prescribe these preparations because:

- The 4:1 ratio of T4:T3 in pigs is markedly different to the 14:1 ratio found in humans³, and there are risks associated with overdosage of the more potent T3.
- As an animal product it has batch-to-batch variability, while synthetic hormones do not.
- No clinical evidence—good or bad—is available to support their use over T4^{2,3}

How to take thyroid hormones

Always take thyroid hormones as directed by your doctor.

Usually, thyroid hormones are taken on an empty stomach at least half an hour before breakfast, as food may slow or inhibit its absorption³. Some people who have problems taking them in this way have had success with taking it at bedtime instead (2 hours or more after dinner).

Possible side effects

When thyroid hormones are taken appropriately, they are safe for almost all patients taking them. If you suspect that your therapy may be giving you an under- or over-dosage, consult with your doctor or pharmacist for advice. Overdosage of thyroid hormones may cause bulging eyes, weight loss, increased appetite, nervousness, diarrhoea, abdominal cramps, sweating, palpitations, high blood pressure, cardiac arrhythmias, angina, tremors, insomnia, heat intolerance, and menstrual problems.

References

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