

Thyroid Stimulating Hormone (TSH) Information Sheet

What is Thyroid Stimulating Hormone (TSH)?

Human thyroid stimulating hormone (TSH) is a hormone produced in the pituitary gland in both males and females. It signals the thyroid gland to produce another hormone called thyroxine (T4), which is converted to triiodothyronine (T3). T3 is an active hormone that stimulates metabolism (1).

What are normal TSH levels?

Healthy adults typically have TSH levels within a reference range of 0.3 to 5 mIU/L (2, 3), although optimal levels may differ when trying to conceive and during pregnancy. Children normally have higher TSH levels than adults, with reference ranges of 1.3 to 19 mIU/L at birth and gradually decreasing to adult levels throughout childhood (3).

TSH levels may fluctuate due to stress, diet, medications, childbirth, and menopause. There is also evidence that TSH levels can increase slightly during menstruation (4).

What do abnormal TSH levels mean?

TSH variations influence thyroid hormone levels, and are measured as part of thyroid function tests. Elevated TSH in conjunction with elevated T4 can occur due to tumors of the pituitary or thyroid hormone resistance. Low T4 in conjunction with either high TSH or low TSH is primary hypothyroidism or secondary hypothyroidism, respectively. Low TSH + high T4 is diagnostic for primary hyperthyroidism (Graves disease) (1).

What is hyperthyroidism?

Hyperthyroidism is the excess production of thyroid hormones (1). The symptoms can include:

- Fast heart rate
- Excess sweating
- Anxiety
- High blood pressure
- Shaky hands
- Weight loss

Medication, radioactive iodine, or surgical removal of the thyroid gland are effective treatments for hyperthyroidism (5).

What is hypothyroidism?

Hypothyroidism is the low production of thyroid hormones, slowing down body functions (1). The symptoms can include:

- Fatigue
- Dry hair and skin
- Slower heart rate
- Confusion
- Puffy eyes and face
- Constipation
- Constantly feeling cold
- Depression

Treatment options for hypothyroidism include daily medications, natural thyroxine hormone extracts, and reduced consumption of substances that affect levothyroxine absorption (e.g. fiber, soy, iron) (4).

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Thyroid hormones and fertility

Abnormal thyroid function is more common in females than males, but can affect fertility in both genders. Females may have infrequent periods, increased pain during sexual intercourse, lower libido, reduced fertility, and increased risk of miscarriage, premature birth and infant death. Males may have reduced testosterone and libido, erectile dysfunction, and lower sperm counts or reduced sperm quality (7, 8).

Optimal TSH levels for female fertility and pregnancy

The 2017 American Thyroid Association (ATA) pregnancy guidelines suggest the consideration of treatment in women with TSH levels above 2.5 mIU/L (subclinical hypothyroidism) (9). T4 levels should also be taken into consideration for these individuals (10).

What is the link between TSH and metabolic syndrome?

Research has shown that individuals who have TSH levels in the upper normal range (2.5 – 5 mU/L, subclinical hyperthyroidism) have an increased risk of obesity, high triglycerides, and metabolic syndrome (11). Type 2 diabetics with high-normal TSH levels are also at increased risk of diabetic complications (12).

In addition, hypothyroidism also increases the risk of metabolic health complications, illustrating how important it is to maintain thyroid hormones within a healthy range. Research has shown an association between hypothyroidism and BMI, blood pressure, blood sugar, cholesterol, and triglycerides (13).

References:

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