

Division of Laboratory Medicine

Biochemistry

TSH

Pseudonyms: Thyroid stimulating hormone, thyrotropin

Measurement of TSH, in combination with free T4 is used to diagnose and monitor thyroid disorders. TSH is a glycoprotein, composed of an α and β subunit, secreted by the pituitary gland. TSH secretion is regulated by negative feedback from thyroid hormones. Very small changes in serum free T4 concentrations induce large changes in serum TSH concentrations which makes TSH a sensitive marker of thyroid function.

General Information

Collection container:

Adults – serum (with gel separator, 4.9mL Sarstedt brown top).

Paediatrics – lithium heparin plasma (1.2mL Sarstedt orange top tube).

Type and volume of sample:

1mL of whole blood

Specimen transport/special precautions:

The tubes should be thoroughly mixed before transport to the lab.

Samples should not be taken from patients receiving therapy with high biotin doses (i.e. > 5 mg/day) until at least 8 hours following the last biotin administration.

Laboratory information

Method principle:

Electrochemiluminescence immunoassay (sandwich)

Biological Reference Range or cut off

<1 month up to 10 mU/L

>1 month 0.2 - 5.0 mU/L

Turnaround time: Same day

Clinical information

Factors known to significantly affect the results: The presence of autoantibodies may lead to formation of high molecular weight complexes (macro-TSH) which can cause unexpected high values of TSH. The presence of heterophilic antibodies may also interfere.

Clinical decision points: In primary hypothyroidism free T4 is low and TSH is elevated (>10 mU/L).

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A TSH concentration of 5-10 mU/L with a normal free T4 indicates compensated (subclinical) hypothyroidism. A repeat after 3 months is recommended. If the repeat TSH is >10 mU/L then treatment is indicated. If the repeat TSH <10 mU/L then retest annually.

A low free T4 in conjunction with a normal-low TSH may indicate hypopituitarism (or non-thyroidal illness). Appropriate additional pituitary hormone testing may be indicated. Thyroxine treatment should not be initiated until adequate cortisol production is established.

Patients with hyperthyroidism have high free T4 concentrations and suppressed TSH (<0.1 mU/L).

When monitoring levothyroxine treatment, serum TSH is only accurate once a steady-state is reached, which takes four to six weeks after starting or adjusting the dose. The treatment target is for TSH concentrations in the lower half of reference range and free T4 within the reference range.