GENETRACK Diagnostics

Free Triiodothyronine (T_3)

WHAT IS FREE TRIIODOTHYRONINE (T3)?

Triiodothyronine (T3) is a hormone produced by the thyroid gland, an endocrine gland in the lower front of the neck. The major hormone from the thyroid gland is thyroxine (T4), which is converted to the much more active T3 in the liver and other tissues (1). Almost all of the T3 in the blood is bound to protein, while the remainder (only 0.2 – 0.4%) is in the free form (free T3) (2). Free T3 is the biologically active form of the hormone.

Normal serum levels of free T3 are typically between 1.58 and 3.91 pg/mL (3). A feedback system in the body usually maintains stable levels of thyroid hormones in the blood. When thyroid hormones (T4 and T3) are low, the pituitary gland produces and excretes more thyroid stimulating hormone (TSH), which signals the thyroid gland to produce more thyroid hormones. When the pituitary gland senses thyroid hormones are above a certain level, it ceases production of TSH (4).

Thyroid hormone levels may fluctuate due to stress, diet, medications, childbirth, and menopause. In addition, the proportion of bound versus free T3 can change due to levels of transporter proteins, which are influenced by pregnancy and the use of birth control pills (4).

HYPERTHYROIDISM

Hyperthyroidism is the excess production of thyroid hormones. The symptoms can include a fast heart rate, high blood pressure, excess sweating, shaky hands, anxiety, and weight loss. In older people, the signs may be less obvious, with symptoms that include weakness, confusion, and depression. In rare instances, a dangerous thyroid storm can occur, when there is a sudden increase in thyroid hormones usually due to an infection, heart attack, stroke, or extreme stress. Thyroid storms must be promptly treated (1).

The most common causes of hyperthyroidism are Graves' disease (an autoimmune disorder), thyroid inflammation due to viral infections or other diseases, nodules on the thyroid, and certain medications (1). Typically, free T3 is elevated to a greater degree than free T4 in Graves' disease, providing a useful analysis to determine the cause of hyperthyroidism (5).

Medication, radioactive iodine, or surgical removal of the thyroid gland are effective treatments for hyperthyroidism (6).

HYPOTHYROIDISM

Hypothyroidism is the low production of thyroid hormones, slowing down body functions. It is most common in older women. The symptoms can include fatigue, puffy eyes and face, dry hair and skin, constipation, slower heart rate, constantly feeling cold, confusion, and depression (1,7).

The most common cause of hypothyroidism in North America is Hashimoto's thyroiditis (an autoimmune disorder). Other causes include thyroiditis (inflammation of the thyroid gland) due to an infection or pregnancy, complications from thyroid treatments, and congenital hypothyroidism (present from birth) (1).

Treatment options for hypothyroidism include daily medications (e.g. levothyroxine), natural thyroxine hormone extracts, and reduced consumption of substances that affect levothyroxine absorption (e.g. fiber, soy, iron) (6).

TEST PROCEDURE

Correct specimen collection and handling is required for optimal assay performance.

This test requires a blood sample from a finger prick. All supplies for sample collection are provided in this kit. First wash and dry hands. Warm hands aid in blood collection. Clean the finger prick site with the alcohol swab and allow to air dry. Use the provided lancet to puncture the skin in one quick, continuous and deliberate stroke. Wipe away the first drop of blood (as it may be contaminated with tissue fluid or skin debris). Massage finger to increase blood flow at the puncture site and hold in a position that gravity facilitates the collection of blood on the fingertip. Transfer the blood to the blood collection card or blood collection tube (microtainer).

Avoid squeezing or 'milking' the finger excessively. If blood flow stops, perform a second skin puncture on another finger, if more blood is required.

Dispose of all sharps safely and return sample to the laboratory in the provided prepaid return shipping envelope.

Upon receipt at the laboratory, the blood sample is analyzed by the fully automated Alinity i Free T3 chemiluminescent microparticle immunoassay on the Alinity ci series analyzer. This assay measures free T3 levels by binding to anti- T3 coated microparticles. The amount of free T3 in the blood sample is measured in relative light units by a chemiluminescent reaction.

TEST INTERPRETATION

This assay will provide accurate free T3 values for the tested specimen. This value is to be used in conjunction with other clinical and laboratory information for analyses of thyroid function.

DISCLAIMERS/LIMITATIONS

Certain medications (e.g., corticosteroids and birth control pills), stress, food intake, pregnancy, recent X-ray with iodine dye, and recent tests using radioactive materials can affect Free Triiodothyronine (T3) Test results.

These results should be interpreted in conjunction with other laboratory and clinical information.

Additional testing is recommended if free T3 results are inconsistent with clinical evidence.

Correct specimen collection and handling is required for optimal assay performance. The assay is unaffected (≤ 10% interference) by hemoglobin (500 mg/dL), bilirubin (20 mg/dL), triglycerides (2000 mg/dL), and protein (12 g/dL).

REFERENCES

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