

Free T4 Test Information

Thyroid hormones are essential for thyroid function and its regulation. The thyroid gland produces ~85% thyroxine (T4) and ~15% of thyronine (T3), both of which are highly bound to plasma proteins (>99%), mainly thyroxine binding globulin (TBG). T4 can be converted to T3 on a tissue-specific need, and free T3 (fT3) is the metabolically-active thyroid hormone. Thyroid hormone levels have an inverse correlation with the thyroid stimulating hormone (TSH), which is secreted by the pituitary gland. Because the total thyroid hormone (free + protein bound) concentrations are affected by the highly variable TBG concentrations, especially in patients with abnormal thyroid functions, fT4 and fT3 better reflect thyroid function.

Different thyroid abnormalities can be diagnosed by combined evaluations of TSH and fT4. For example, high levels of TSH with low levels of fT4 is indicative of hypothyroidism. In contrast, low levels of TSH with high levels of fT4 suggests hyperthyroidism.

The fT4 and fT3 measurements in human serum is analytically challenging. Currently, two major analytical methodologies are used: radioimmunoassay (RIA) and liquid chromatography-tandem mass spectrometry (LC-MS/MS). Due to its superior specificity, reproducibility, and sensitivity, LC-MS/MS has been chosen as the reference method for fT4 and fT3 measurement. Our lab provides an isotope dilution LC-MS/MS assay combined with equilibrium dialysis (ED) for serum free T4 level quantification. For more information, call the lab at 513-636-4203.

Sample Type:

Serum (Red, No Gel)

Volume:

1.5 mL

0.5 mL (minimum)

Specimen Preparation:

Spin/pour off, refrigerate.

Unacceptable Specimens:

Gel separator tubes or gel. Red cells when pouring off sample.

Stability:

Ambient: 4 days

Refrigerated: 2 weeks

Frozen: 1 month

Methodology:

Equilibrium dialysis (ED) coupled with liquid chromatography-tandem mass spectrometry (LC-MS/MS)

Reporting Units:

Quantitative: ng/mL

Reference Interval:

1.0 – 3.0 ng/dL (0.1 – 1 yr old)

1.0 – 2.8 ng/dL (1 – 150 yr old)

LC-MS/MS Calibration Range:

0.4 – 10 ng/dL

Shipping Conditions:

Refrigerated (cold pack), next day.

Testing Schedule:

Mon-Sun, 1st Shift. **Turnaround time:** 2 – 4 days.

CPT Code:

84439

Contact Information:

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Shipping Address:

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References:

1. Yue B. et al. Free thyroid hormones in serum by direct equilibrium dialysis and online solid-phase extraction-liquid chromatography/tandem mass spectrometry. Clin. Chem. 2008 (54) 642-651.
2. Gu. J. et al. Simultaneous quantification of free triiodothyronine and free thyroxine by isotope dilution tandem mass spectrometry. Clin. Biochem. 2007 (40) 1386-1391.