

Triiodothyronine, Total (T3)

MDL Test Number: 615

Methodology: Immunoassay

CPT Codes: 84480 x 1



Specimen Collection Platform:

Serum in Serum Separator Tube (SST)

Turnaround Time:

24 - 72 hours

Stability:

Room temperature

Test Additions*:

30 days to add tests

Specimen Collection:



1. Immediately after blood collection, invert the tube(s) gently 5 times to ensure mixing of clot activator.



2. Allow the tube to rest upright for at least 30 minutes after collection to ensure proper clotting.



3. Centrifuge for at least 15 minutes at 2200-2500 RPM within one hour of collection.



4. Do not remove the stopper or pour off serum.



What is Total T3?

Triiodothyronine, almost always shortened to T3, is the more active of the two thyroid hormones. Only a small share of it is made by the thyroid gland in the front of the neck. Most is produced elsewhere in the body, where tissues convert the other thyroid hormone, thyroxine (T4), into T3 as they need it. T3 circulates at far lower levels than thyroxine, but it acts more strongly and turns over faster. It is what actually sets the pace at which cells use energy. That reach is why thyroid problems affect heart rate, body temperature, digestion, mood, menstrual cycles, and the ability to conceive and carry a pregnancy.

Almost all of the T3 in blood is carried by transport proteins, chiefly one called thyroxine-binding globulin, and this test measures the total: the carried portion and the free portion added together. Total T3 does not rise and fall through the day, and it does not change across the menstrual cycle, which is why one adult range covers women and men at every age. What does move it is how much transport protein is available, so a total T3 has to be read alongside anything that changes that supply.

Why test for Total T3?

A healthcare provider may order a total T3 test to measure the amount of triiodothyronine circulating in the blood. Common reasons include:

- **Confirming an overactive thyroid** and judging its severity after a thyroid-stimulating hormone (TSH) result comes back below the expected range
- **Identifying a form of overactive thyroid in which T3 rises while thyroxine stays normal**, sometimes called T3 toxicosis. It would be missed by a test that measured thyroxine alone
- **Sorting out symptoms that overlap heavily with gynecological ones.** Irregular, absent, or heavy periods, difficulty conceiving, recurrent pregnancy loss, fatigue, and weight change come from thyroid disease as readily as from a problem of the ovaries or uterus
- **Monitoring a patient taking liothyronine**, the synthetic form of T3, alone or with thyroid hormone replacement, to judge whether the current dose is holding levels where they should be
- **Investigating an overactive thyroid**, whether from Graves' disease, far more common in women, and often first appearing during the reproductive years, or from a nodule or goiter producing hormone on its own
- **Assessing thyroid status before or during pregnancy**, and in women being evaluated for infertility, because the demand placed on the thyroid rises sharply in early pregnancy



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Special Instructions:

- **Estrogen, pregnancy, and hormonal contraceptives:** Estrogen raises the amount of thyroxine-binding globulin in the blood. A total T3 measured during pregnancy, on estrogen therapy, or while taking a combined contraceptive pill, patch, or ring is therefore often above the usual range even when the thyroid is entirely healthy. Patients should tell the ordering provider whether any of these apply, so the result is read against the right expectation.
- **Thyroid medication timing:** Liothyronine is absorbed and cleared quickly, so a sample drawn in the hours after a dose can read considerably higher than the level the patient sits at for most of the day. Patients taking liothyronine, either alone or with thyroid hormone replacement, should tell the laboratory when they last took it and keep that timing consistent from one test to the next.
- **Medicines that can change the result:** Phenytoin and large doses of aspirin or other salicylates compete with thyroid hormone for room on its transport proteins. Androgens and anabolic steroids reduce the amount of transport protein itself. Either can lower a total T3 in someone whose thyroid is working normally. Patients should give the ordering provider a complete list of what they take, including over-the-counter products.
- **Biotin supplements:** Biotin, sold on its own as vitamin B7 and included in many hair, skin, and nail products, interferes with this test above the manufacturer's stated threshold of 1500 nanograms per milliliter. No stop-taking interval has been established, so patients should tell the ordering provider about any biotin they take and follow their advice on timing.
- **Comparing results over time:** Triiodothyronine methods differ from one another, and the same sample can give different numbers on different systems. When results are tracked over time, use the same test at the same laboratory so the comparison is meaningful.

Limitations:

Every laboratory test has limits. For total T3, the main ones are:

- Because this test measures the carried and free portions together, anything that changes the amount of transport protein in the blood moves the result without the thyroid having changed at all. Pregnancy, estrogen therapy, and combined contraceptives raise it; kidney disease that loses protein into the urine, chronic liver disease, serious undernutrition, androgen therapy, and an uncommon inherited shortage of the transport protein lower it. A measurement of only the free, unbound portion is not affected in the same way.
- Total T3 separates an overactive thyroid from a healthy one clearly. It separates an underactive thyroid from a healthy one far less well, so a result inside the expected range does not rule that out. Low readings are also common for reasons unrelated to the thyroid: more than 20 percent of patients critically ill from another condition have a low total T3. Thyroid results drawn during an acute illness are difficult to interpret.
- Thyroxine (T4) and reverse T3, an inactive form the body also produces, are close enough in structure that very small amounts of each are measured by this test. The amounts are far too small to change the result in ordinary circumstances.
- A sample containing broken-down red blood cells (hemolysis) may have been mishandled between the draw and the laboratory, so results from such a sample are interpreted with caution. A heavily fatty sample needs additional processing before it can be measured reliably.
- A small number of patients carry natural antibodies in their blood that can interfere with the test. They are most often people who work closely with animals, or who have received certain antibody-based treatments.
- A total T3 result is one piece of a larger picture. It is meant to be read together with the patient's symptoms, medical history, and other test results, never on its own.

Reference Range(s):

Total T3 is measured in nanograms per deciliter (ng/dL). It carries a single adult interval. The same range applies to women and to men, and it does not shift with age, because the thyroid is not governed by sex hormones or by the reproductive cycle. The interval below is specific to serum, which is the sample type this laboratory reports:

- **Adults (serum): 84–172 ng/dL (1.3–2.6 nmol/L)**

A result outside these ranges is not automatically a problem, and a result inside them does not rule one out. Only the ordering provider can interpret what a given number means for a given patient. Patients should always go by the reference range printed on their own laboratory report.

Analyte	Disorder	Expected Value*
Total T3	Hyperthyroidism (Graves' disease)	↑↑
Total T3	T3 toxicosis	↑
Total T3	Normal early pregnancy	↑
Total T3	Underactive thyroid (Hashimoto)	V
Total T3	Severe non-thyroidal illness	↓

*V – Variable, ↓ – Decreased, ↑ – Increased, ↑↑ – Markedly Increased.

What are some references that discuss the medical necessity of testing Total T3?

1. Ross DS, et al. 2016 American Thyroid Association guidelines for diagnosis and management of hyperthyroidism and other causes of thyrotoxicosis. *Thyroid*, **26**, 1343–1421 (2016).
2. Chaker L, et al. Hypothyroidism. *Nat Rev Dis Primers*, **8**, 30 (2022).
3. Jonklaas J, et al. Evidence-based use of levothyroxine/liothyronine combinations in treating hypothyroidism: a consensus document. *Thyroid*, **31**, 156–182 (2021).
4. Fliers E, Boelen A. An update on non-thyroidal illness syndrome. *J Endocrinol Invest*, **44**, 1597–1607 (2021).
5. Korevaar T, et al. American Thyroid Association 2026 guidelines for thyroid disease in preconception, pregnancy, and postpartum. *Thyroid*, **36**, 481–544 (2026).
6. Krassas GE, et al. Thyroid function and human reproductive health. *Endocr Rev*, **31**, 702–755 (2010).



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