

Calcitonin

MDL Test Number: 628

Methodology: Immunoassay

CPT Codes: 82308 x 1



Specimen Collection Platform:

Serum in Serum Separator Tube (SST)

Turnaround Time:

24 - 72 hours

Stability:

Refrigerate. Ship with a cold pack.

Test Additions*:

30 days to add tests



What is Calcitonin?

Calcitonin is a small protein hormone made in the thyroid gland. It comes from a separate population of cells called parafollicular cells, or C cells, which sit between the cells that make thyroid hormone. Calcitonin lowers the level of calcium and phosphorus

in the blood by a modest amount, and it is released in response to rising calcium. Unlike thyroid hormone, calcitonin is not essential for health: people who have had the thyroid removed do well without it.

In healthy adults, calcitonin sits at a very low level, and men run higher than women because men carry more C-cell tissue. That is why the expected ranges below are listed separately for each sex. The hormone does not follow a daily or monthly cycle, so the time of the month does not matter. What does matter is how quickly the sample is handled: calcitonin breaks down within minutes of the blood being drawn, so the sample has to be separated and frozen promptly, or the result will read falsely low. In practice, calcitonin is ordered to look for a level that is too high, not too low.

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.

Why test for Calcitonin?

A healthcare provider may order a calcitonin test when there is a question about the C cells of the thyroid. Common reasons include:

- **Evaluating a thyroid nodule (a lump in the thyroid) when medullary thyroid carcinoma is a concern.** This is an uncommon cancer of the C cells, and calcitonin is the single most reliable blood test for detecting it. Thyroid nodules are far more common in women than in men, so most patients tested are women.
- **Following a patient after surgery for medullary thyroid carcinoma,** to look for cancer that was left behind or that has come back. Calcitonin usually falls to a very low level once the tumor is removed, so a rising value is an early signal.
- **Testing relatives of a patient with the inherited form of medullary thyroid carcinoma,** which runs in families as part of a condition called multiple endocrine neoplasia type 2 (MEN2).
- **Assessing C-cell hyperplasia,** an increase in the number of C cells that can come before medullary thyroid carcinoma in some patients.
- **Working up a calcitonin result that came back high for reasons that are not yet clear,** since kidney disease, overactive parathyroid glands, and several common medications can all raise the level.



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Special Instructions:

- **Fasting morning sample:** Draw the sample in the morning with the patient fasting. The expected ranges were established under those conditions, so a sample drawn later in the day or after a meal is harder to compare against them.
- **Getting the sample refrigerated quickly:** Calcitonin is fragile and begins breaking down in the tube, so the sample must be separated and refrigerated soon after collection. A sample left at room temperature can read falsely low — which matters most when the test is being used to rule a problem out.
- **Acid-reducing medications:** Proton pump inhibitors (PPIs), and, to a lesser extent, H2 blockers, raise the level of a stomach hormone called gastrin. Gastrin stimulates the C cells, so these medications can push calcitonin above the expected range in a patient with no thyroid disease at all. Ask every patient about them, including over-the-counter versions, and note them on the requisition.
- **Tube type:** Collect in a plain or serum-separator tube. Do not collect in EDTA: the manufacturer found that EDTA lowers the measured result substantially, and it is not a suitable sample type for this test.
- **Biotin supplements:** Biotin (vitamin B7) is found in many over-the-counter hair, skin, and nail supplements, and at high enough levels it can interfere with this test. The manufacturer has not published how long a patient should stop it before the draw, so patients should disclose biotin use and let the ordering provider decide on timing.
- **When very low levels are expected:** This test is designed to detect levels above the healthy range. Its lowest reportable value is 2 pg/mL; results below that point are reported as less than 2 pg/mL. Levels in healthy women and in patients whose thyroid has been fully removed often fall below this point.
- **Comparing results over time:** Different laboratories and instruments can produce somewhat different calcitonin numbers from the same sample, so serial monitoring should use the same test at the same laboratory throughout. The same applies to a set of samples drawn during a stimulation test; record the draw time for each one.

Limitations:

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

- This test is an immunoassay, and its lowest reportable value is 2 pg/mL. Calcitonin levels in healthy women and in patients whose thyroid has been fully removed are often below this point, so those results are reported as less than 2 pg/mL rather than as an exact number.
- A high result does not by itself mean cancer. Kidney disease, overactive parathyroid glands, long-term inflammation, certain blood disorders, and smoking can all raise calcitonin, and a small number of otherwise healthy people simply run high. A raised value needs to be interpreted alongside the rest of the workup rather than acted on alone.
- Calcitonin circulates in several different forms, ranging widely in size. Samples can therefore behave differently from one another in the test, and a diluted sample may not give a result that scales the way it should.
- A small number of patients carry natural antibodies in their blood — often people who work closely with animals or who have received certain antibody-based treatments — that can interfere with the test and produce an unexpected result.
- Tumors outside the thyroid, such as some lung and breast tumors, can also release calcitonin. The test is not used to find or diagnose those tumors, and a raised result in that setting does not point to the thyroid.
- A calcitonin 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):

Calcitonin is measured in picograms per milliliter (pg/mL). Because healthy men carry more C-cell tissue than healthy women, results are compared against a different upper limit for each sex:

- **Adult female** (upper limit of the healthy range): **≤5.0 pg/mL**
- **Adult male** (upper limit of the healthy range): **≤8.4 pg/mL**

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*
Calcitonin	Medullary thyroid carcinoma	↑↑
Calcitonin	C-cell hyperplasia	↑
Calcitonin	Chronic kidney disease	↑
Calcitonin	Primary hyperparathyroidism	↑
Calcitonin	Hypergastrinemia (PPI use)	↑

*↑ – Increased, ↑↑ – Markedly Increased.

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

1. Wells SA, Jr., et al. Revised American Thyroid Association guidelines for the management of medullary thyroid carcinoma. *Thyroid*, **25**, 567–610 (2015).
2. Haugen BR, et al. 2015 American Thyroid Association management guidelines for adult patients with thyroid nodules and differentiated thyroid cancer. *Thyroid*, **26**, 1–133 (2016).
3. Elisei R, et al. Impact of routine measurement of serum calcitonin on the diagnosis and outcome of medullary thyroid cancer: experience in 10,864 patients with nodular thyroid disorders. *J Clin Endocrinol Metab*, **89**, 163–168 (2004).
4. Costante G, et al. Predictive value of serum calcitonin levels for preoperative diagnosis of medullary thyroid carcinoma in a cohort of 5817 consecutive patients with thyroid nodules. *J Clin Endocrinol Metab*, **92**, 450–455 (2007).
5. Kiriakopoulos A, et al. Calcitonin: current concepts and differential diagnosis. *Ther Adv Endocrinol Metab*, **13**, 20420188221099344 (2022).
6. Guesgen C, et al. Investigation of factors potentially influencing calcitonin levels in the screening and follow-up for medullary thyroid carcinoma: a cautionary note. *BMC Clin Pathol*, **13**, 27 (2013).



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