

Vitamin B12

MDL Test Number: 655

Methodology: Immunoassay

CPT Codes: 82607



Specimen Collection Platform:

Serum in Serum Separator Tube (SST)

Turnaround Time:

24 - 72 hours

Stability:

Room temperature

Test Additions*:

30 days to add tests



What is Vitamin B12?

Vitamin B12, also called cobalamin, is a vitamin the body cannot make for itself. It comes almost entirely from animal foods, meat, fish, eggs, and dairy, and from fortified foods and supplements. The body needs it to build red blood cells and to keep nerves working properly.

Absorbing it takes a protein made by the stomach called intrinsic factor, which is why a shortage far more often reflects a problem with absorption than a problem with diet.

The amount of vitamin B12 in the blood is usually a good guide to how much the body has stored, but not always. B12 travels through the blood attached to carrier proteins, and when the amount of those carriers is unusual, the blood level can be misleading in either direction. A result can look low in someone who is not short of the vitamin, and it can look normal or even high in someone who is. That is why the result is interpreted alongside symptoms and other tests rather than on its own.

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 Vitamin B12?

Vitamin B12 is measured when a symptom or a medication points toward a possible shortage. It is commonly ordered to:

- **Investigate anemia**, especially the kind in which the red blood cells are larger than usual.
- **Evaluate tiredness, tingling or numbness** in the hands and feet, unsteadiness, or problems with memory and concentration.
- **Check people taking metformin long term**, whether for type 2 diabetes or for polycystic ovary syndrome, also called polyendocrine metabolic ovarian syndrome (PMOS/PCOS), because the medicine reduces how much vitamin B12 is absorbed.
- **Check people taking medicines that reduce stomach acid over long periods**, which has the same effect.
- **Look for a cause of poor absorption**, such as an autoimmune stomach condition, celiac disease, or previous stomach or bowel surgery.
- **Assess people whose diet contains little or no animal food**, and women who are pregnant or breast feeding, whose requirements are higher.
- **Check vitamin B12 alongside folate whenever the red blood cells are enlarged**, because treating a folate shortage without recognizing a vitamin B12 shortage at the same time can allow nerve damage to progress while the anemia itself improves.



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Special Instructions:

- **Fasting before the draw:** Fasting is required when vitamin B12 and folate are ordered together, because the folate result is affected by recent eating. A vitamin B12 test ordered on its own does not require fasting. The request should make clear which tests are wanted so the patient is given the right instructions.
- **Protecting the sample from light:** The sample should not be left in strong or direct light after it is drawn. Protecting it from light is part of collecting this test properly, and it is handled by the collection site and the laboratory.
- **Biotin supplements:** Biotin is sold on its own and is present in many hair, skin, and nail products. At high levels, it can change the result of this test. Patients should tell the ordering provider what they take and at what dose, so the provider can decide whether the timing of the draw needs to change.
- **Recent vitamin B12 treatment:** A recent injection, tablet, or multivitamin raises the blood level and can hide a shortage that is still present in the tissues, so any vitamin B12 treatment and the date it was last taken should be noted on the request.
- **Comparing results over time:** Different laboratories and different methods can give slightly different results on the same sample. Repeat testing should be done at the same laboratory whenever possible.

Limitations:

Every laboratory test has limits. For vitamin B12, the main ones are:

- A normal or high result does not rule out a shortage, and a low result does not always mean there is one. Where the result and the clinical picture disagree, the picture takes precedence, and further testing may be needed to settle it.
- The lowest value this test reports is 150 pg/mL, and results below that point are reported as less than 150 pg/mL rather than as an exact number. The test is also at its least reproducible near the bottom of its range, so small differences between two low results should not be read as a change.
- A high result is not by itself reassuring. Liver disease, some blood disorders, and multivitamin use all raise the blood level, whether or not the body has enough vitamin B12 to use.
- Rarely, antibodies that some people carry after routine contact with animals or animal products can interfere with tests built this way and produce a result that does not fit the clinical picture.
- A vitamin B12 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):

Vitamin B12 is reported in picograms per milliliter (pg/mL). The manufacturer publishes a single adult range rather than separate ranges for women and men, measured in 147 healthy volunteers. Results toward the lower end of the range are the ones most often repeated, because a shortage of vitamin B12 can begin before the blood level falls below the range at all.

- **Adults: 193 – 982 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*
Vitamin B12	Vitamin B12 deficiency	↓↓
Vitamin B12	Type 2 diabetes (metformin use)	↓
Vitamin B12	Malabsorption	↓
Vitamin B12	Celiac disease	↓
Vitamin B12	Chronic liver disease	↑

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

What are some references that discuss the medical necessity of testing Vitamin B12?

1. National Institute for Health and Care Excellence. *Vitamin B12 Deficiency in Over 16s: Diagnosis and Management* NICE Guideline NG239 (NICE, London, 2024).
2. Devalia V, et al. Guidelines for the diagnosis and treatment of cobalamin and folate disorders. *Br J Haematol*, **166**, 496–513 (2014).
3. Andrès, E, et al. The pathophysiology of elevated vitamin B12 in clinical practice. *QJM*, **106**, 505–515 (2013).
4. Rubio-Tapia, A, et al. American College of Gastroenterology guidelines update: diagnosis and management of celiac disease. *Am J Gastroenterol*, **118**, 59–76 (2023).
5. Achebe MM, Gafter-Gvili A. How I treat anemia in pregnancy: iron, cobalamin, and folate. *Blood*, **129**, 940–949 (2017).



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