MAYO CLINIC LABORATORIES

Test Definition: IFBA

Intrinsic Factor Blocking Antibody, Serum

Overview

Useful For
Confirming the diagnosis of pernicious anemia

Testing Algorithm
For information see Vitamin B12 Deficiency Evaluation.

Special Instructions
- Vitamin B12 Deficiency Evaluation

Method Name
Immunoenzymatic Assay

NY State Available
Yes

Specimen

Specimen Type
Serum

Ordering Guidance
For a comprehensive workup of patients with suspected pernicious anemia, order ACASM / Pernicious Anemia Cascade, Serum, which initiates testing with measurement of vitamin B12. Depending of the vitamin B12 concentration, testing for intrinsic factor blocking antibody, gastrin, and methylmalonic acid may be added.

Specimen Required
Patient Preparation:
1. Fasting: 8 hours, required
2. This test should not be performed on patients who have received a vitamin B12 injection or radiolabeled vitamin B12 injection within the previous 2 weeks.
Supplies: Sarstedt Aliquot Tube, 5 mL (T914)
Collection Container/Tube:
Preferred: Serum gel
Acceptable: Red top
Submission Container/Tube: Plastic vial
Specimen Volume: 1 mL serum
Collection Instructions: Centrifuge and aliquot serum into a plastic vial.

Specimen Minimum Volume

Serum: 0.5 mL

Reject Due To

Gross hemolysis	Reject
Gross lipemia	OK

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	14 days	
	Frozen	14 days	

Clinical & Interpretive

Clinical Information

The cobalamins, also referred to as vitamin B12, are a group of closely related enzymatic cofactors involved in the conversion of methylmalonyl-coenzyme A to succinyl-coenzyme A and in the synthesis of methionine from homocysteine. Vitamin B12 deficiency can lead to megaloblastic anemia and neurological deficits. The latter may exist without, or precede, anemia. Adequate replacement therapy will generally improve or cure cobalamin deficiency. Unfortunately, many other conditions, which require different interventions, can mimic the symptoms and signs of vitamin B12 deficiency. Moreover, even when cobalamin deficiency has been established, clinical improvement may require different dosages or routes of vitamin B12 replacement, depending on the underlying cause. In particular, patients with pernicious anemia (PA), possibly the most common type of cobalamin deficiency in developed countries, require either massive doses of oral vitamin B12 or parenteral replacement therapy. This is due to patients with PA having gastric mucosal atrophy, most likely caused by a destructive autoimmune process. This results in diminished or absent gastric acid, pepsin, and intrinsic factor (IF) production. Gastric acid and pepsin are required for liberation of cobalamin from binding proteins, while IF binds the free vitamin B12, carries it to receptors on the ileal mucosa, and facilitates its absorption. Most PA patients have autoantibodies against gastric parietal cells or IF, with the latter being very specific but only present in approximately 50% of cases. By contrast, parietal cell antibodies are found in approximately 90% of PA patients but are also found in a significant proportion of patients with other autoimmune diseases and in approximately 2.5% (4th decade of life) to approximately 10% (8th decade of life) of healthy individuals.

Reference Values

Negative

Interpretation

The aim of the work-up of patients with suspected vitamin B12 deficiency is to first confirm the presence of deficiency and then to establish its most likely etiology.

Measurement of serum vitamin B12, either preceded or followed by serum methylmalonic acid measurement, is the first step in diagnosing pernicious anemia (PA). If these tests support deficiency, then intrinsic factor blocking antibody (IFBA) testing is indicated to confirm PA as the etiology. A positive IFBA test very strongly supports a diagnosis of PA.

Since the diagnostic sensitivity of IFBA testing for PA is only around 50%, an indeterminate or negative IFBA test does not exclude the diagnosis of PA. In these patients, either PA or another etiology, such as malnutrition, may be present. Measurement of serum gastrin levels will help in these cases. In patients with PA, fasting serum gastrin is elevated to more than 200 pg/mL in an attempted compensatory response to the achlorhydria seen in this condition.

For a detailed overview of the optimal testing strategies in PA diagnosis, see ACASM / Pernicious Anemia Cascade, Serum and associated Vitamin B12 Deficiency Evaluation.

Cautions

Patients who have received a vitamin B12 injection or radiolabeled vitamin B12 injection within the previous 2 weeks may have high serum vitamin B12 levels, which can interfere with this assay, leading to falsely elevated results.

Some patients with other autoimmune diseases may have positive intrinsic factor blocking antibody (IFBA) assays without suffering from pernicious anemia (PA). This is reported particularly in patients with autoimmune thyroid disease or type I diabetes mellitus. In the validation of this assay, 24 individuals with these autoimmune endocrine diseases were tested and all were IFBA negative. However, 5 of 15 of patients with rheumatoid arthritis were IFBA positive during the validation of this assay. The literature suggests such individuals may, in fact, be at risk of later development of PA.

Since this is a competitive binding assay, the risk of heterophile antibody interference is low. During validation, 24 human antimouse antibody positive specimens and 25 specimens with other heterophile antibodies were tested and all were IFBA negative. However, if the clinical picture does not agree with the IFBA test result, the laboratory should be consulted for advice.

Clinical Reference

1. Toh BH, van Driel IR, Gleeson PA. Pernicious anemia. N Engl J Med. 1997;337(20):1441-1448. doi:10.1056/NEJM199711133372007
2. Klee GG. Cobalamin and folate evaluation: measurement of methylmalonic acid and homocysteine vs vitamin B(12) and folate. Clin Chem. 2000;46(8 Pt 2):1277-1283
3. Ward PC. Modern approaches to the investigation of vitamin B12 deficiency. Clin Lab Med. 2002;22(2);435-445. doi:10.1016/s0272-2712(01)00003-8
4. Stabler SP, Allen RH. Vitamin B12 deficiency as a worldwide problem. Annu Rev Nutr. 2004;24:299-326. doi:10.1146/annurev.nutr.24.012003.132440
5. Roberts NB, Taylor A, Sodi R. Vitamins and trace elements. In: Rifai N, Horvath AR, Wittwer CT, eds. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. 6th ed. Elsevier; 2018:639-718
6. Bizzaro N, Antico A. Diagnosis and classification of pernicious anemia. Autoimmun Rev. 2014;13(4-5):565-568. doi:10.1016/j.autrev.2014.01.042

Performance

Method Description

The Access Intrinsic Factor (IF) Antibody assay is a competitive binding immunoenzymatic assay. The sample is added to a reaction vessel along with IF alkaline phosphatase conjugate and a protein blocking solution. IF antibody in the sample binds to the IF conjugate. After incubation in a reaction vessel, paramagnetic particles coated with a mouse monoclonal antibody, specific for the vitamin B12 binding site on IF, is added to the reaction. IF conjugate that has not been blocked

by sample anti-IF binds to the monoclonal antibody on the solid phase. After an additional incubation, materials bound to the solid phase are held in a magnetic field, while unbound materials are washed away. Chemiluminescent substrate is added to the vessel and light generated by the reaction is measured with a luminometer. The light production is inversely proportional to the concentration of IF antibody in the sample expressed in AU/mL (antibody units/mL). The amount of analyte in the sample is determined from a stored calibration.(Package insert: Access Intrinsic Factor Ab. Beckman Coulter, Inc; 06/2020)

PDF Report
No

Day(s) Performed
Monday through Friday

Report Available
1 day to 3 days

Specimen Retention Time
2 weeks

Performing Laboratory Location
Mayo Clinic Laboratories - Rochester Superior Drive

Fees & Codes

Fees
- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their account representative. For assistance, contact Customer Service.

Test Classification
This test has been cleared, approved, or is exempt by the US Food and Drug Administration and is used per manufacturer's instructions. Performance characteristics were verified by Mayo Clinic in a manner consistent with CLIA requirements.

CPT Code Information
86340

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
IFBA	Intrinsic Factor Blocking Ab, S	31444-3

Result ID	Test Result Name	Result LOINC® Value
IFBLA	Intrinsic Factor Blocking Ab, S	31444-3
CMT31	Comment	48767-8