MAYO CLINIC LABORATORIES

Test Definition: ARBI

ACh Receptor (Muscle) Binding Ab

Overview

Useful For

Supporting the diagnosis of autoimmune myasthenia gravis (MG) in adults and children

Distinguishing autoimmune from congenital MG in adults and children or other acquired forms of neuromuscular junction transmission disorders

An adjunct to the test for P/Q-type calcium channel binding antibodies as a diagnostic aid for Lambert-Eaton myasthenic syndrome

Testing Algorithm

This is the primary diagnostic test for myasthenia gravis.

For information see:

Myasthenia Gravis Evaluation with MuSK Reflex Algorithm

Myasthenia Gravis/Lambert Eaton Syndrome Diagnostic Algorithm

Special Instructions

- Myasthenia Gravis/Lambert Eaton Syndrome Diagnostic Algorithm
- Myasthenia Gravis Evaluation with MuSK Reflex Algorithm

Method Name

Radioimmunoassay (RIA)

NY State Available

Yes

Specimen

Specimen Type

Serum

Ordering Guidance

For the initial diagnostic workup of patients with suspicion of myasthenia gravis, one of the following testing algorithms is recommended:

-Myasthenia Gravis Evaluation with MuSK Reflex Algorithm

-Myasthenia Gravis/Lambert Eaton Syndrome Diagnostic Algorithm

Standalone testing ARBI / Acetylcholine Receptor (Muscle AChR) Binding Antibody, Serum is recommended in certain situations.

This test **should not be requested** in patients who have recently received radioisotopes, therapeutically or diagnostically, because of potential assay interference. The specific waiting period before specimen collection will depend on the isotope administered, the dose given, and the clearance rate in the individual patient. Specimens will be screened for radioactivity prior to analysis. Radioactive specimens received in the laboratory will be held for 1 week and assayed if sufficiently decayed or canceled if radioactivity remains.

Specimen Required

Patient Preparation: For optimal antibody detection, specimen collection is recommended prior to initiation of immunosuppressant medication.

Supplies: Aliquot Tube, 5 mL (T465)

Collection Container/Tube:

Preferred: Red top

Acceptable: Serum gel

Submission Container/Tube: Plastic vial

Specimen Volume: 1.5 mL

Forms

If not ordering electronically, complete, print, and send a Neurology Specialty Testing Client Test Request (T732) with the specimen.

Reject Due To

Gross hemolysis	Reject
Gross lipemia	Reject
Gross icterus	Reject

Specimen Minimum Volume

1 mL

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	28 days	
	Frozen	28 days	
	Ambient		

Clinical & Interpretive

Clinical Information

Fatigable weakness due to impaired postsynaptic transmission at the neuromuscular junction is characteristic of myasthenia gravis (MG). A clinical diagnosis should be supported by electrodiagnostic testing (ie, clinical-electrodiagnosis [EDX]). Positive autoimmune serology increases certainty of MG diagnosis but needs to be interpreted in the proper clinical-EDX context with response to anticholinesterase medications supporting the diagnosis. Most cases are autoimmune and are caused by IgG autoantibodies binding to critical postsynaptic membrane molecules (nicotinic muscle acetylcholine receptor [AChR] or its interacting proteins, such as muscle-specific kinase). Serologically, the detection of AChR binding antibody provides the best diagnostic sensitivity. However, the presence of both AChR binding and modulating activity improves diagnostic accuracy. Autoantibody detection frequency is lowest in patients with weakness confined to extraocular muscles (approximately 70% are positive for AChR binding antibodies) and highest in patients with generalized weakness due to MG (approximately 90% are positive for AChR binding antibodies). In adults with MG and AChR antibodies, approximately 20% will have thymoma and very rarely (<1%) extrathymic cancers. Computed tomography imaging of the chest is considered the standard of care to evaluate for thymoma.

These results should only be interpreted in the appropriate clinical and electrophysiological context and are not diagnostic in isolation.

Note: Single antibody tests may be requested in the follow-up of patients with positive results previously documented in this laboratory.

Reference Values

< or =0.02 nmol/L

Interpretation

Positive results (>0.02 nmol/L) are indicative of autoimmune myasthenia gravis (MG). These results should be

interpreted in the appropriate clinical and electrophysiological context.

With a diagnosis of MG, a paraneoplastic basis should be considered with thymoma being the most commonly associated tumor with MG.

The clinical sensitivity of this assay is approximately 90% in nonimmunosuppressed patients with generalized MG. The frequency of antibody detection is lower in MG patients with weakness clinically restricted to ocular muscles (71%), and antibody titers are generally low in ocular MG (eg, 0.03-1.0 nmol/L).

Negative results do not exclude the diagnosis of MG. If clinical suspicion remains and symptoms persist or worsen consider retesting. Results may be negative in the first 12 months after symptoms of MG appear or during immunosuppressant therapy. **Note:** In follow up of seronegative patients with adult-acquired generalized MG, 17.4% seroconvert to positive at 12 months (ie, seronegativity rate at 12 months is 8.4%). A subset of MG patients that are persistently negative for acetylcholine receptor binding antibodies will have muscle-specific kinase (MuSK) antibodies, and therefore, it is recommended to test for MuSK antibodies in seronegative patients with high clinical suspicion of MG.

In general, there is not a close correlation between antibody titer and severity of weakness, but in individual patients, clinical improvement may be accompanied by a decrease in titer.

Cautions

The presence of elevated immunoglobulins due to therapeutic intervention or other disorders (ie, hypergammaglobulinemia) may lead to false-positive results.

Positive results may be found in some patients with Lambert-Eaton syndrome, paraneoplastic central nervous system, and peripheral nervous system autoimmune disorders and in healthy individuals.

The presence of alpha-bungarotoxin antibodies may interfere with this assay.

Specimens ideally should be collected prior to initiation of immunosuppressive therapies as these may reduce the sensitivity of this test.

Clinical Reference

1. Lennon VA: Serological profile of myasthenia gravis and distinction from the Lambert-Eaton myasthenic syndrome. Neurology. 1997 Apr;48(Suppl 5):S23-S27. doi: 10.1212/WNL.48.Suppl_5.23S

2. Lachance DH, Lennon VA: Paraneoplastic neurological autoimmunity. In: Kalman B, Brannagan III T, eds. Neuroimmunology in Clinical Practice. Blackwell Publishing Ltd; 2008:210-217

3. Gilhus NE: Myasthenia gravis. N Engl J Med. 2016 Dec;375(26):2570-2581. doi: 10.1056/NEJMra1602678

4. Nicolle MW: Myasthenia gravis and Lambert-Eaton myasthenic syndrome. Continuum (Minneap Minn). 2016;22(6, Muscle and Neuromuscular Junction Disorders):1978-2005. doi: 10.1212/CON.0000000000000415

5. Shelly S, Paul P, Bi H, et al. Improving accuracy of myasthenia gravis autoantibody testing by reflex algorithm. Neurology. 2020 Dec;95(22):e3002-e3011. doi: 10.1212/WNL.0000000000010910

Performance

Method Description

Acetylcholine receptors (a mixture of adult and fetal type) are solubilized from human limb muscle in nonionic detergent and complexed with (125)I-labeled alpha-bungarotoxin to provide antigen. After incubation with patient's serum, an excess of goat-antihuman IgG is added. Acetylcholine receptor-(125)I-alpha-bungarotoxin complexes to which antibodies have bound will coprecipitate with the total human immunoglobulin. The radioactivity of the washed pellet is determined. All positive results are verified by ruling out false-positive binding of immunoglobulin to (125)I-alpha-bungarotoxin, such as might occur in patients with immune complex disorders or subjects exposed to snake venom products.(Griesmann GE, Kryzer TJ, Lennon VA: Autoantibody profiles of myasthenia gravis and Lambert-Eaton myasthenic syndrome. In: Rose NR, Hamilton RG, eds. Manual of Clinical and Laboratory Immunology. 6th ed. ASM Press; 2002:1005-1012; Waters P, Pettingill P, Lang B: Detection methods for neural autoantibodies. Handb Clin Neurol. 2016;133:147-163. doi: 10.1016/B978-0-444-63432-0.00009-8)

PDF Report

No

Specimen Retention Time

28 days

Performing Laboratory Location

Rochester

Fees & Codes

Test Definition: ARBI

ACh Receptor (Muscle) Binding Ab

Test Classification

This test was developed, and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information

83519

LOINC® Information

Test ID	Test Order Name	Order LOINC Value
ARBI	ACh Receptor (Muscle) Binding Ab	97558-1

Result ID	Reporting Name	LOINC®
8338	ACh Receptor (Muscle) Binding Ab	97558-1