MAYO CLINIC LABORATORIES

Test Definition: ARBI

ACh Receptor (Muscle) Binding Ab

Overview

Useful For

A first-order test for the laboratory diagnosis of myasthenia gravis (MG)
Detecting "subclinical MG" in recipients of D-penicillamine, in patients with thymoma without clinical evidence of MG, and in patients with graft-versus-host disease
Distinguishing acquired disease (90% positive) from congenital disease (negative)
Monitoring disease progression in MG or response to immunotherapy
An adjunct to the test for P/Q-type calcium channel binding antibodies as a diagnostic aid for Lambert-Eaton myasthenic syndrome (LES) or primary lung carcinoma

Testing Algorithm

This is the primary diagnostic test for myasthenia gravis.
See the following algorithms in Special Instructions:
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

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 1 week and assayed if sufficiently decayed or canceled if radioactivity remains.

Specimen Required

Supplies: Aliquot Tube, 5 mL (T465)
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

Myasthenia gravis (MG) is characterized by weakness and easy fatigability that are relieved by rest and anticholinesterase drugs. The weakness in most cases results from an autoantibody-mediated loss of functional acetylcholine receptors (AChR) in the postsynaptic membrane of skeletal muscle.

Demonstration of muscle AChR autoantibodies in a patient's serum supports the diagnosis of acquired (autoimmune) MG, and quantitation provides a baseline for future comparisons.

Muscle AChR antibodies are not found in congenital forms of MG and are uncommon in neurologic conditions other than acquired MG, with the exception of patients with paraneoplastic autoimmune neurological disorders, and Lambert-Eaton myasthenic syndrome (LES) with or without cancer (13% of LES patients have positive results for muscle AChR binding or striational antibodies). Patients with autoimmune liver disease are also frequently seropositive.

The assay for muscle AChR binding antibodies is considered a first-order test for the laboratory diagnosis of MG, and for detecting "subclinical MG" in recipients of D-penicillamine, in patients with thymoma without clinical evidence of MG, and in patients with graft-versus-host disease.

Reference Values

< or =0.02 nmol/L

Interpretation

Values above 0.02 nmol/L are consistent with a diagnosis of acquired myasthenia gravis (MG), provided that clinical and electrophysiological criteria support that diagnosis.

The assay for muscle acetylcholine receptor (AChR) binding antibodies is positive in approximately 90% of non-immunosuppressed 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).
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%). Of persistently seronegative patients, 38% have muscle-specific kinase (MuSK) antibody.
Sera of nonmyasthenic subjects bind 0.02 nmol/L or less of muscle AChR complexed with (125)I-labeled-alpha-bungarotoxin.
In general, there is not a close correlation between antibody titer and severity of weakness, but in individual patients, clinical improvement is usually accompanied by a decrease in titer.

Cautions

Positive results for muscle acetylcholine receptor (AChR) binding or striational antibodies are found in 13% of patients with Lambert-Eaton myasthenic syndrome (LES). This does not mean that myasthenia gravis (MG) and LES coexist.
Antibodies to P/Q type calcium channels are found in 95% of LES patients, but not in MG, except in very rare paraneoplastic cases related to small-cell lung carcinoma.
Positive results are frequently found with autoimmune liver disease.
Magnitude of the result is not useful for predicting severity of MG.
The presence of alpha-bungarotoxin antibodies may interfere with this assay.

Clinical Reference

1. Lennon VA: Serological diagnosis of myasthenia gravis and distinction from the Lambert-Eaton myasthenic syndrome. Neurology. 1997;48(Suppl 5):S23-S27
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;375(26):2570-2581
4. Nicolle MW: Myasthenia gravis and Lambert-Eaton myasthenic syndrome. Continuum (Minneap Minn). 2016;22(6, Muscle and Neuromuscular Junction Disorders):1978-2005

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 and IgM 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)

PDF Report

No

Specimen Retention Time
28 days

Performing Laboratory Location
Rochester

Fees & Codes

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