Myasthenia Gravis Testing

The presence of acetylcholine receptor (AChR) antibodies that block or destroy receptors for the neurotransmitter acetylcholine traditionally defined myasthenia gravis (MG), an autoimmune disease caused by antibodies to neuromuscular and intramuscular elements impairing function and leading to muscle weakness and fatigue. However, this definition has expanded to include the presence of other autoantibodies, including muscle-specific kinase antibodies (MuSK).

### Disease Overview

#### Incidence
3-30 per million/year

#### Prevalence
14-20/100,000 in U.S.

#### Age of Onset
- Mean age of onset
  - Females: 28 years
  - Males: 42 years
- Individuals <50 years: female predominance
- Individuals >60 years: no gender predominance
- Incidence rate increases with age for both genders

#### Symptoms
Main symptom: sporadic, fatigable muscle weakness
- Begins with mild weakness in limited muscle groups
  - Initially and most severely affects in ocular and bulbar muscles
  - 40% of individuals only experience weakness in ocular muscles initially
- Almost always progresses to weakness of multiple muscle groups within first year
  - 16% of individuals only experience weakness in ocular muscles after first year
  - Most serious condition results when respiratory muscles are affected, which may result in myasthenic crisis

#### Diagnostic Issues
- AChR antibody
  - Specific for MG
  - Presence does not correlate with disease severity
  - Detected in ~85% of patients with MG
  - Not detected in ~15% of patients (predominantly female) with MG who have generalized MG

### Tests to Consider

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- Experience weakness in respiratory and bulbar muscles
- Have antibodies against other neuromuscular junction proteins
- MuSK antibodies
  - Detected in ~6% of patients with MG
  - Should be assessed when patient is seronegative for AChR antibodies
- Titin and/or striated muscle antibodies
  - Characteristic of MG
  - Not specific to MG
  - Presence in early onset MG indicates ≥95% likelihood of underlying thymoma
  - Testing may be useful
    - In conjunction with AChR antibodies in the management of individuals with MG
    - In AChR antibody-negative MG

### Testing Strategy
- Acetylcholine Receptor (AChR) Antibody Reflexive Panel tests for binding and blocking antibodies and reflexes to modulating antibody, and is the most cost-effective testing algorithm for the diagnosis of MG.
  - AChR testing should not be performed for patients who recently received radioisotopes for diagnostic or therapeutic reasons, due to the potential for false-positive results.
- Muscle-specific kinase (MuSK) antibody should be considered for patients who are AChR antibody seronegative.

### Test Interpretation

#### Sensitivity
Combination of binding and blocking AChR antibody testing identifies 99.6% of population possessing AChR antibodies and is
- Positive in up to 90% of individuals with generalized MG
- Positive in 50-70% of individuals with purely ocular MG

#### Results
Paraneoplastic disease is likely when positive AChR modulating antibody is in conjunction with
- Striated muscle antibody titer of ≥1:80
- Titin antibody index value of 0.72
- Both antibodies (which usually indicates thymoma)

#### Limitations
Negative result does not rule out a diagnosis of MG

### Additional Resources
Howard JF. Clinical overview of MG. Myasthenia Gravis Foundation of America. [Accessed: Jul 2019]


### Related Information
Myasthenia Gravis - MG

### Related Tests

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**Reflex to Titer 0050746**

**Method:** Semi-Quantitative Indirect Fluorescent Antibody

- Secondary diagnostic testing for MG
- Order if the primary tests are negative
- Differential evaluation of NMJ

**Titin Antibody 2005636**

**Method:** Semi-Quantitative Enzyme-Linked Immunosorbent Assay

- Secondary diagnostic testing for MG
- Order if the primary tests are negative
- Screen for presence of thymoma in patients with MG

See Related Tests for individually orderable tests.
Acetylcholine Receptor Blocking Antibody 0099580
Method: Semi-Quantitative Flow Cytometry

Acetylcholine Receptor Modulating Antibody 0099521
Method: Semi-Quantitative Flow Cytometry

Acetylcholine Receptor Binding Antibody 0080009
Method: Quantitative Radioimmunoassay