Overview

Useful For
Evaluating patients with suspected necrotizing autoimmune myopathy

Highlights
The utilization of this combinatorial immunoassay provides accuracy and speed in diagnosis of necrotizing autoimmune myopathy (NAM). Early diagnosis facilitates better prognosis through initiation of aggressive immune treatments, typically requiring more than 1 agent, and discontinuation of statin medications. Persons without access to specialty muscle biopsy testing services may be afforded an early diagnosis through application of this testing.

Identification of NAM may indicate the presence of a paraneoplastic disorder.

Profile Information

<table>
<thead>
<tr>
<th>Test ID</th>
<th>Reporting Name</th>
<th>Available Separately</th>
<th>Always Performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSI1</td>
<td>Necrotizing Myopathy Interp, S</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>HMGCR</td>
<td>HMG-CoA Reductase Ab, S</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>SRPIS</td>
<td>SRP IFA Screen, S</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Reflex Tests

<table>
<thead>
<tr>
<th>Test ID</th>
<th>Reporting Name</th>
<th>Available Separately</th>
<th>Always Performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRPBS</td>
<td>SRP Immunoblot, S</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>SRPTS</td>
<td>SRP IFA Titer, S</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

Testing Algorithm
This focused algorithmic test is designed to achieve high sensitivity for identification of antibodies specific for necrotizing autoimmune myopathy (HMGCOA-IgG and SRP-IgG). This test is unique in the market by having an initial screen for signal recognition particle (SRP) antibodies performed using tissue indirect immunofluorescence, which increases clinical sensitivity as compared to SRP immunoblot methodologies.

If indirect immunofluorescence assay (IFA) pattern suggests signal recognition particle (SRP) antibody, SRP IFA titer and SRP54 immunoblot are performed at an additional charge.

See [Necrotizing Myopathy Evaluation](#) in Special Instructions.

Special Instructions
- [Necrotizing Myopathy Evaluation](#)

Method Name
SRPIS, SRPTS: Indirect Immunofluorescence Assay (IFA)
SRPBS: Immunoblot

HMGCR: Chemiluminescent Assay (CIA)

NSI1: Medical Interpretation

NY State Available
Yes

Specimen

Specimen Type
Serum

Necessary Information
Provide the following information:

- Relevant clinical information
- Ordering provider name, phone number, mailing address, and e-mail address

Specimen Required

Container/Tube:

Preferred: Red top

Acceptable: Serum gel

Specimen Volume: 3 mL

Collection Instructions: Centrifuge within 2 hours of collection and aliquot 2 mL into a plastic vial.

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

Specimen Minimum Volume
2 mL

Reject Due To

<table>
<thead>
<tr>
<th>Gross hemolysis</th>
<th>Reject</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross lipemia</td>
<td>Reject</td>
</tr>
<tr>
<td>Gross icterus</td>
<td>Reject</td>
</tr>
</tbody>
</table>

Specimen Stability Information

<table>
<thead>
<tr>
<th>Specimen Type</th>
<th>Temperature</th>
<th>Time</th>
<th>Special Container</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum</td>
<td>Refrigerated (preferred)</td>
<td>28 days</td>
<td></td>
</tr>
</tbody>
</table>
Test Definition: NMS1
Necrotizing Myopathy Evaluation, S

<table>
<thead>
<tr>
<th>Specimen Type</th>
<th>Temperature</th>
<th>Time</th>
<th>Special Container</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frozen</td>
<td></td>
<td>28 days</td>
<td></td>
</tr>
<tr>
<td>Ambient</td>
<td></td>
<td>72 hours</td>
<td></td>
</tr>
</tbody>
</table>

**Clinical and Interpretive**

**Clinical Information**

Necrotizing autoimmune myopathy (NAM) is a serious, but rare muscle disease strongly associated with autoantibodies to either signal recognition protein (SRP) or 3-hydroxy-3-methylglutaryl-CoA reductase (HMGCR). (1) NAM typically manifests with subacute proximal limb muscle weakness and persistently elevated serum creatine kinase (CK) concentrations, but slower onsets can occur and complicate diagnosis. Muscle biopsies in affected patients can demonstrate necrotic and regenerating myofibers without inflammatory infiltrates, suggesting the diagnosis. (2) However, sampling issues and lack of access to persons having expertise in obtaining, preparing, and interpreting muscle biopsy specimens may delay a diagnosis. (3)

Early identification of NAM and subsequent aggressive immune-modulating therapy is critical. (1,3) Discovery of SRP- or HMGCR-1gG autoantibodies can aid in establishing an earlier diagnosis and treatment initiation. In addition, the discovery of SRP or HMGCR autoantibodies should prompt a search for an underlying malignancy. (4) Serial testing for these autoantibodies can delay diagnosis with the discovery of either antibody aiding in establishing an earlier diagnosis and treatment initiation. (1,3)

The clinical onsets are not specific to NAM consisting of proximal limb weakness in associations with an elevated serum creatinine kinase, with or without exposure to lipid lowering statin medications. (1,3-9) The clinical presentation can be confused with forms of inflammatory (dermatomyositis, polymyositis), toxic, metabolic or even neurodegeneration (ie, muscular dystrophy) and the diagnosis delayed without serological testing by SRP- or HMGCR-autoantibody testing. Panel testing of both HMGCR and SRP autoantibodies is the preferred strategy for the best patient care.

**Reference Values**

3-Hydroxy-3-Methylglutaryl Coenzyme-A (HMG-CoA) Reductase:

<20.0 CU

Signal Recognition Particle Antibody Screen:

Negative

Signal Recognition Particle Antibody:

Negative

Signal Recognition Particle Antibody, Titer:

<1:240

**Interpretation**

Seropositivity for 3-hydroxy-3-methylglutaryl-CoA reductase (HMGCR) or signal recognition protein (SRP) autoantibodies supports the clinical diagnosis of necrotizing autoimmune myopathy (NAM). A paraneoplastic basis
should be considered, according to age, sex, and other risk factors. In cases of NAM, immune therapy is required and often multiple simultaneously utilized immunotherapies are needed to successfully treat patients.

**Cautions**

Antibodies against 3-hydroxy-3-methylglutaryl-CoA reductase (HMGCR) or signal recognition protein (SRP) may be detected in cases of polymyositis, dermatomyositis, or other autoimmune disorders. It is recommended that serology results be interpreted along with muscle biopsy findings and in the appropriate clinical context.

**Clinical Reference**


**Performance**

**Method Description**

**Signal recognition protein (SRP) Indirect Immunofluorescence Assay (IFA):**

The patient’s sample is tested by a standardized IFA that uses composite frozen sections of mouse cerebellum, kidney, and gut tissues. After incubation with patient sample and washing, fluorescein-conjugated goat antihuman IgG is applied. SRP-specific autoantibodies are identified by their characteristic fluorescence staining patterns. Samples that are scored positive are titrated to an endpoint. Interference by coexisting non-neuron-specific autoantibodies is eliminated or lessened by serologic absorption. This method does not distinguish between antibodies against different SRP proteins. *(Package insert: EUROLINE Autoimmune Inflammatory Myopathies 16 Ag (IgG) test instruction. EUROIMMUN Medizinische Labordiagnostika AG, LÄ¼beck, Germany. Version: 20/03/2018)*

**HMGCR CIA:**
IgG antibodies to 3-Hydroxy-3-Methylglutaryl Coenzyme A reductase (HMGCR) are detected by a chemiluminescent assay using the Inova BIO-FLASH instrument. HMGCR antigen is coated on to paramagnetic beads, which are stored in the reagent cartridge lyophilized. When the assay cartridge is ready to be used for the first time, a buffer solution is added to the tube containing the beads, and the beads are resuspended with the buffer. The reagent cartridge is then loaded onto the BIO-FLASH instrument. A patient serum sample is diluted 1:17 by the instrument in a disposable plastic cuvette. An aliquot of the diluted patient serum, HMGCR-coupled beads, and assay buffer are combined into a second cuvette, and mixed. This cuvette is incubated at 37 degrees C. The beads are then magnetized and washed several times. Isoluminol conjugated anti-human IgG antibody is then added to the cuvette, and incubated at 37 degrees C. Again, the beads are magnetized and washed repeatedly. The isoluminol conjugate produces a luminescent reaction when "Trigger" reagents are added to the cuvette. The light produced from this reaction is measured as Relative Light Units (RLU) by the BIO-FLASH optical system. RLU values are proportional to the amount of bound isoluminol conjugate, which in turn is proportional to the amount of anti-HMGCR antibodies bound to the antigen on the beads. The QUANTA Flash HMGCR assay utilizes a predefined lot specific Master Curve that is uploaded into the instrument through the reagent cartridge barcode. Based on the results obtained by running two calibrators, an instrument specific Working Curve is created, which is used by the software to calculate chemiluminescent units (CU) from the RLU value obtained for each sample.(Package insert: QUANTA Flash HMGCR 701333 Inova Diagnostics, Inc, San Diego ,CA) v04, 09/2018

SRP Immunoblot:

The assay is performed using the EUROBlotOne instrument. All reagents required are supplied in the kit. Samples are diluted 1:100 (15 mcL in 1.5 mL sample buffer) and added to the strips placed in incubation trays. The sample and test strips are incubated for 30 minutes at room temperature. Unbound antibodies are removed from trays by washing steps using wash buffer. Bound patient IgG antibodies are detected by adding antihuman-IgG antibodies coupled to horse radish peroxidase followed by incubation at room temperature for 30 minutes. The strips are washed again to remove excess antihuman-IgG antibodies. The substrate is added for 10 minutes (room temperature) and the reaction is subsequently stopped. The strip is scanned and band intensities are digitized. The digital image is converted to band signal intensities by the EUROLineScan software and these are normalized to an internal standard. Bands corresponding to SRP with signal intensities of 15 U (arbitrary) or greater are reported as positive. The SRP antigen used is recombinant SRP 54. Positive immunoblot results confirm that a patient’s serum contains antibodies directed against the SRP 54 subunit. Negative immunoblot results do exclude the presence of SRP antibodies.(Package insert: EUROLINE Autoimmune Inflammatory Myopathies 16 Ag (IgG) test instruction. EUROMMUN Medizinische Labordiagnostika AG, LÅ¼beck, Germany. Version: 20/03/2018)

PDF Report

No

Day(s) and Time(s) Test Performed

Signal Recognition Particle Antibody:

Tuesday, Thursday; 2 p.m.

Signal Recognition Particle Antibody Screen:

Tuesday, Thursday, Sunday; 6 a.m.

Signal Recognition Particle Antibody, Titer:

Tuesday, Thursday, Sunday; 6 a.m.

3-Hydroxy-3-Methylglutaryl Coenzyme-A (HMG-CoA) Reductase:
Test Definition: NMS1
Necrotizing Myopathy Evaluation, S

Monday through Friday; 6 p.m.

**Analytic Time**
10 days

**Maximum Laboratory Time**
14 days

**Specimen Retention Time**
28 days

**Performing Laboratory Location**
Rochester

---

**Fees and 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 Regional Manager. For assistance, contact Customer Service.

**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 U.S. Food and Drug Administration.

**CPT Code Information**

86255

82397

86256 (if appropriate)

84182 (if appropriate)

**LOINC® Information**

<table>
<thead>
<tr>
<th>Test ID</th>
<th>Test Order Name</th>
<th>Order LOINC Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>NMS1</td>
<td>Necrotizing Myopathy Evaluation, S</td>
<td>In Process</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Result ID</th>
<th>Test Result Name</th>
<th>Result LOINC Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>607414</td>
<td>HMG-CoA Reductase Ab, S</td>
<td>93493-5</td>
</tr>
<tr>
<td>603543</td>
<td>Necrotizing Myopathy Interp, S</td>
<td>69048-7</td>
</tr>
<tr>
<td>603540</td>
<td>SRP IFA Screen, S</td>
<td>53010-5</td>
</tr>
</tbody>
</table>