MAYO CLINIC LABORATORIES

Test Definition: MSAES

Myositis Specific Antibody Evaluation, Serum

Overview

Useful For

Accurately diagnosing, classifying, and managing idiopathic inflammatory myopathies (IIM) by identifying subtype-specific biomarkers that guide prognosis and treatment

Enabling early detection of IIM, particularly in atypical or severe cases, and reducing diagnostic uncertainty for personalized care

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
EJS	EJ Ab, S	No	Yes
HMGCR	HMG-CoA Reductase Ab, S	Yes	Yes
JO1	Jo 1 Ab, IgG, S	Yes	Yes
MDA5S	MDA5 Ab, S	No	Yes
MI2S	Mi2 Ab, S	No	Yes
MYSI	Myositis Specific Ab Interp, S	No	Yes
NXP2S	NXP2 Ab, S	No	Yes
OJS	OJ Ab, S	No	Yes
PL12S	PL12 Ab, S	No	Yes
PL7S	PL7 Ab, S	No	Yes
SAE1S	SAE1 Ab, S	No	Yes
SRPIS	SRP IFA Screen, S	No	Yes
TIFGS	TIF1G Ab, S	No	Yes

Reflex Tests

Test Id	Reporting Name	Available Separately	Always Performed
SRPBS	SRP Immunoblot, S	No	No
SRPTS	SRP IFA Titer, S	No	No

Testing Algorithm

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

Method Name

EJS, MDA5S, MI2S, NXP2S, OJS, PL12S, PL7S, SAE1S, TIFGS: Bead-Based Multi-Analyte Immunoassay
JO1: Multiplex Flow Immunoassay (MFI)
SRPIS, SRPTS: Indirect Immunofluorescence Assay (IFA)
HMGCR: Chemiluminescence Immunoassay (CIA)

SRPBS: Immunoblot (IB)
MYSI: Technical Interpretation

NY State Available
Yes

Specimen

Specimen Type
Serum

Ordering Guidance
This test is appropriate for patients presenting with proximal muscle weakness, elevated muscle enzymes (eg, creatine kinase), and/or suggestive cutaneous features (eg, heliotrope rash, Gottron's papules) consistent with myositis and related disorders. This test can assist in classifying IIM subtypes (eg, dermatomyositis, anti-synthetase syndrome, immune-mediated necrotizing myopathy, or inclusion body myositis. It may be useful in distinguishing idiopathic inflammatory myopathy from overlapping connective tissue diseases (CTDs). For patients with suspicion of overlap syndromes with CTDs additional myositis-associated antibody testing may be warranted beyond this panel.

Additional Testing Requirements
In patients with atypical or non-classical presentations testing for some myositis associated antibodies may be considered including anti-U1-snRNP, PM/Scl, Ro52 or Ro60.

Necessary Information
Provide the following information:
-Relevant clinical information
-Ordering provider name, phone number, mailing address, and e-mail address

Specimen Required
Supplies: Sarstedt Aliquot Tube, 5 mL (T914)
Collection Container/Tube:
Preferred: Red top
Acceptable: Serum gel
Submission Container/Tube: Plastic vial
Specimen Volume: 2.5 mL
Collection Instructions: Centrifuge and aliquot serum 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
1.5 mL

Reject Due To

Gross hemolysis	Reject
Gross lipemia	Reject
Gross icterus	Reject
Heat-Treated	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	21 days	
	Frozen	21 days	

Clinical & Interpretive

Clinical Information

Myositis-specific antibody (MSA) testing plays a crucial role in diagnosing, classifying, and managing idiopathic inflammatory myopathies (IIM). These antibodies serve as biomarkers to identify specific subtypes of IIM, assess disease activity, and predict prognosis. Testing is particularly indicated in patients with suspected IIM who present with proximal muscle weakness, elevated muscle enzymes (eg, creatine kinase), and characteristic cutaneous features such as heliotrope rash or Gottron's papules. MSAs are also essential for differentiating IIM subtypes, including dermatomyositis, polymyositis, inclusion body myositis, necrotizing autoimmune myopathy, and anti-synthetase syndrome. In cases of non-classical or atypical presentations, such as clinically amyopathic dermatomyositis or overlap syndromes with connective tissue diseases (eg, systemic sclerosis, Sjogren syndrome, or lupus), MSA testing can help clarify the diagnosis.

Additionally, MSAs are highly relevant in patients with interstitial lung disease (ILD), particularly when it may be associated with myositis (eg, autoantibodies to Jo-1, threonyl-tRNA synthetase [PL7], alanyl-tRNA synthetase [PL12], or melanoma differentiation-associated protein 5 [MDA5]). They also aid in identifying cancer-associated myositis, especially in patients with dermatomyositis or suspected malignancy (eg, autoantibodies to transcriptional intermediary factor 1 gamma [TIF1g] or nuclear matrix protein 2 [NXP2]). For patients with unexplained severe muscle weakness or necrosis on biopsy, such as those with necrotizing autoimmune myopathy, MSAs like anti-3-hydroxy-3-methylglutaryl coenzyme A reductase (HMGCR) and anti-signal recognition particle (SRP) are critical for diagnosis and management. Testing is further recommended when a delay in diagnosis or diagnostic uncertainty exists, especially if initial investigations, such as biopsies, are inconclusive.

Clinically, MSAs enable precise phenotyping and stratification of IIM subtypes, providing insights into associated extra muscular disease activity, disease prognosis, and therapeutic responses. For example, anti-MDA5 positivity is linked with rapidly progressive ILD, while anti-TIF1g indicates a high risk of cancer in dermatomyositis. Antibodies such as anti-Jo-1 may guide treatment, as they predict better responsiveness to steroids. However, accurate interpretation of results requires alignment with the patient's clinical presentation to avoid false positives or negatives, especially given variability in testing methods across laboratories. Early and accurate testing ensures prompt diagnosis and tailored management, particularly in rapidly progressive cases like anti-MDA5-associated ILD, emphasizing the importance of

MSAs in advancing personalized care in IIM.

Reference Values

Test ID	Reporting Name	Methodology*	Reference Value
MYSI	Myositis Specific Ab Interp, S	Technical interpretation	Interpretive report
EJS	EJ Ab, S	PMAT	Negative
HMGCR	HMG-CoA Reductase Ab, S	CIA	<20.0
JO1	Jo 1 Ab, IgG, S	MFI	<1.0 U
MDA5S	MDA5 Ab, S	PMAT	Negative
MI2S	Mi2 Ab, S	PMAT	Negative
NXP2S	NXP2 Ab, S	PMAT	Negative
OJS	OJ Ab, S	PMAT	Negative
PL12S	PL12 Ab, S	PMAT	Negative
PL7S	PL7 Ab, S	PMAT	Negative
SAE1S	SAE1 Ab, S	PMAT	Negative
SRPIS	SRP IFA Screen, S	IFA	Negative
TIFGS	TIF1G Ab, S	PMAT	Negative

*Methodology abbreviations:
Bead-based multi-analyte immunoassay (PMAT)
Multiplex flow immunoassay (MFI)
Indirect immunofluorescence assay (IFA)
Chemiluminescence immunoassay (CIA)
Immunoblot (IB)

Interpretation

The presence of a myositis-specific antibody provides supportive evidence of an idiopathic inflammatory myopathy and/or related disorder. However, these results must be interpretated in the appropriate clinical context. A negative result does not exclude the possibility of an idiopathic inflammatory myopathy.

Cautions

It is important to note the while myositis-specific antibody testing provides valuable information, it should be used in conjunction with clinical evaluation, physical examination and other diagnostic tests to arrive at a comprehensive and accurate diagnosis.

In routine clinical testing, antibody testing for myositis specific antibodies maybe performed using a variety of solid-phase immunoassays such as the enzyme-linked immunosorbent assay, line immunoassay, chemiluminescence immunoassay, fluorescent enzyme immunoassay, and various radioimmunoprecipitation assays. The performance characteristics of these assays for the detection of each myositis-specific antibody have not been extensively investigated to establish comparability.

Clinical Reference

1. Chinoy H, Fertig N, Oddis CV, Ollier WE, Cooper RG. The diagnostic utility of myositis autoantibody testing for predicting the risk of cancer-associated myositis. Ann Rheum Dis. 2007;66(10):1345-1349

2. Betteridge Z, McHugh N. Myositis-specific autoantibodies: an important tool to support the diagnosis of myositis. J Intern Med. 2016;280(1):8-23

Performance

Method Description

Bead-based Multi-analyte Technology:
The assay uses a multi-analyte bead-based immunoassay methodology (utilizing particle-based multi-analyte technology), where antigens are bound to paramagnetic beads. These beads are incubated with patient serum samples, allowing any specific IgG antibodies present to bind to the antigens. Unbound antibodies are washed away, and a secondary antibody conjugated to a detectable fluorescent label is added, forming a complex with the bound IgG. The intensity of the fluorescent signal produced is proportional to the concentration of specific IgG antibodies in the serum, which is then measured and interpreted qualitatively.(Unpublished Mayo method)

3-Hydroxy-3-Methylglutaryl Coenzyme A Reductase:
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 from the RLU value obtained for each sample.(Package insert: QUANTA Flash HMGCR 701333. Inova Diagnostics, Inc; v04, 09/2018)

Signal Recognition Protein Indirect Immunofluorescence Assay:
The patient's sample is tested by a standardized indirect immunofluorescence assay 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. Signal recognition protein (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, 03/2018)

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, which 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. EUROIMMUN Medizinische Labordiagnostika AG; 03/2018)

JO 1 Multiplex Flow Immunoassay:
Recombinant Jo 1 antigen is coupled covalently to polystyrene microspheres, which are impregnated with fluorescent dyes to create a unique fluorescent signature. Jo 1 antibodies, if present in diluted serum, bind to the Jo 1 antigen on the microspheres. The microspheres are washed to remove extraneous serum proteins. Phycoerythrin (PE)-conjugated antihuman IgG antibody is then added to detect IgG anti-Jo 1 bound to the microspheres. The microspheres are washed to remove unbound conjugate, and bound conjugate is detected by laser photometry. A primary laser reveals the fluorescent signature of each microsphere to distinguish it from microspheres that are labeled with other antigens, and a secondary laser reveals the level of PE fluorescence associated with each microsphere. Results are calculated by comparing the median fluorescence response for Jo 1 microspheres to a 4-point calibration curve.(Package insert: Bioplex 2200 ANA Screen. Bio-Rad Laboratories, 02/2019)

Interpretation:
An interpretation based on test results is generated by the laboratory information system.

PDF Report
No

Day(s) Performed
Varies

Report Available
3 to 7 days

Specimen Retention Time
14 days

Performing Laboratory Location
Mayo Clinic Laboratories - Rochester Main Campus

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

CPT Code Information

86255 x10
82397
86235
84182-SRPBS (if appropriate)
86256-SRPTS (if appropriate)

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
MSAES	Myositis Specific Ab Eval, S	107564-7

Result ID	Test Result Name	Result LOINC® Value
JO1	Jo 1 Ab, IgG, S	33571-1
603540	SRP IFA Screen, S	97562-3
607414	HMG-CoA Reductase Ab, S	93493-5
622115	Myositis Specific Ab Interp, S	69048-7
622112	TIF1G Ab, S	107562-1
622114	SAE1 Ab, S	107565-4
622108	PL7 Ab, S	33772-5
622109	PL12 Ab, S	33771-7
622074	OJ Ab, S	45152-6
622110	NXP2 Ab, S	107566-2
622113	Mi2 Ab, S	18485-3
622111	MDA5 Ab, S	107563-9
621604	EJ Ab, S	45149-2