MAYO CLINIC LABORATORIES

Test Definition: SMAS

Smooth Muscle Antibody Screen, Serum

Overview

Useful For

Evaluation of patients with hepatitis of unknown origin associated with hypergammaglobulinemia and/or abnormal liver enzymes

Reflex Tests

Test Id	Reporting Name	Available Separately	Always Performed
SMAT	Smooth Muscle Ab Titer, S	No	No

Testing Algorithm

If smooth muscle antibody (SMA) screen is positive, then the SMA titer will be performed at an additional charge.

Method Name

Indirect Immunofluorescence

NY State Available

Yes

Specimen

Specimen Type

Serum

Specimen Required

Supplies: Sarstedt Aliquot Tube, 5 mL (T914)
Collection Container/Tube:
Preferred: Serum gel
Acceptable: Red top
Specimen Volume: 0.8 mL
Collection Instructions: Centrifuge and aliquot serum into plastic vial

Forms

If not ordering electronically, complete, print, and send 1 of the following forms with the specimen:
-General Request (T239)
-Gastroenterology and Hepatology Test Request (T728)

Specimen Minimum Volume

0.4 mL

Reject Due To

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

Specimen Stability Information

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

Clinical & Interpretive

Clinical Information

Autoimmune hepatitis (AIH) is a chronic disease resulting from immune-mediated liver injury with varied clinical manifestations.(1-2) The precise factors leading to disease initiation and perpetuation are unknown, but likely reflect a combination of genetic predisposition relating to defects in immunological control of autoreactivity, as well as environmental triggers, which precipitate a persistent breakdown in self-tolerance.(2) Initially, patients with AIH may be clinically asymptomatic, and are usually identified only through an incidental finding of abnormal liver function tests.(1-4) At a more advanced stage, patients may manifest with symptoms such as jaundice, pruritus, or ascites, which are secondary to the more extensive liver damage. As implied by the name, AIH has many characteristics of an autoimmune disease, including female predominance, hypergammaglobulinemia, association with specific *HLA* alleles, responsiveness to immunosuppression, and the presence of autoantibodies.(1-3)

The clinical features of AIH are nonspecific and can be seen in variety of liver diseases such as drug/alcohol-associated hepatitis, viral hepatitis, and primary sclerosing cholangitis. Therefore, the diagnosis can be challenging. A set of diagnostic criteria for AIH has been published and includes the presence of various autoantibodies, elevated total IgG, evidence of hepatitis on liver histology, and absence of viral markers.(1,3,4) Based on the specific autoantibodies present, AIH can be categorized in three categories.(4) The most prevalent is AIH type 1, linked to the presence of smooth muscle autoantibodies (SMA), antinuclear antibodies (ANA) and perinuclear anti-neutrophil cytoplasmic antibodies. SMA are generally identified by indirect immunofluorescence using a smooth muscle substrate. The antigen specificity of SMA in the context of AIH has been identified as filamentous-actin (F-actin).(3) The combination of autoantibody serology, specifically SMA and anti-F-actin antibodies with liver histology and thorough clinical evaluation are useful in the evaluation of patients with suspected autoimmune hepatitis. SMAs are detected in up to 85% of patients with AIH, either alone or in conjunction with ANA.(1,4,5) The SMA titer can also contribute to International Autoimmune Hepatitis Group diagnostic score in patients with a probable or definite diagnosis of AIH.(1,4,5) These antibodies have also been reported in 33% to 65% of cases of primary biliary cholangitis/AIH overlap syndrome (6), the concomitant presence of SMA and AMA being highly suggestive in this setting.

Reference Values

Negative

Reference values apply to all ages.

Interpretation

Positivity for smooth muscle antibodies (SMA) may help support a diagnosis of autoimmune hepatitis (AIH) following exclusion of other causes of hepatitis.

A negative result for SMA does not exclude a diagnosis of AIH.

Cautions

Serologic tests for autoantibodies, including smooth muscle antibodies (SMA), should not be relied upon exclusively to determine the etiology or prognosis of patients with liver disease.

A positive result for SMA may occur in patients who do not have autoimmune hepatitis. A negative result does not exclude a diagnosis of autoimmune hepatitis.

Clinical Reference

1. European Association for the Study of the Liver. EASL clinical practice guidelines: autoimmune hepatitis. J Hepatol. 2015; 63(4):971-1004
2. Mieli-Vergani G, Vergani D, Czaja AJ, et al. Autoimmune hepatitis. Nat Rev Dis Primers. 2018;4:18017. Published 2018 Apr 12. doi:10.1038/nrdp.2018.17
3. Sebode M, Weiler-Normann C, Liwinski T, Schramm C. Autoantibodies in Autoimmune Liver Disease-Clinical and Diagnostic Relevance. Front Immunol. 2018;9:609. Published 2018 Mar 27. doi:10.3389/fimmu.2018.00609
4. Terziroli Beretta-Piccoli B, Mieli-Vergani G, Vergani D. Autoimmune Hepatitis: Serum Autoantibodies in Clinical Practice. Clin Rev Allergy Immunol. 2022;63(2):124-137. doi:10.1007/s12016-021-08888-9
5. Bogdanos DP, Invernizzi P, Mackay IR, Vergani D. Autoimmune liver serology: current diagnostic and clinical challenges. World J Gastroenterol 2008;14:3374-87.
6. Muratori P, Granito A, Pappas G, et al. The serological profile of the autoimmune hepatitis/primary biliary cirrhosis overlap syndrome. Am J Gastroenterol. 2009;104(6):1420-1425. doi:10.1038/ajg.2009.126

Performance

Method Description

Both 1:40 (initial screening) and 1:20 dilutions of the patient's serum are added to fresh tissue from mouse stomach/kidney and incubated; fluorescein-conjugated antiglobulin is then added. The slides are read with a fluorescence microscope.(Package insert: Kallestad Mouse Stomach/Kidney. Bio-Rad Laboratories, Inc; 06/2022)

PDF Report

No

Day(s) Performed

Monday through Saturday

Report Available

2 to 4 days

Specimen Retention Time

14 days

Performing Laboratory Location

Rochester

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

86015

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
SMAS	Smooth Muscle Ab Screen, S	26971-2

Result ID	Test Result Name	Result LOINC® Value
609515	Smooth Muscle Ab Screen, S	26971-2