

## Overview

### Useful For

Evaluation of patients with suspected autoimmune liver disease, specifically autoimmune hepatitis or primary biliary cirrhosis

Evaluation of patients with liver disease of unknown etiology

### Profile Information

Test ID	Reporting Name	Available Separately	Always Performed
AMA	Mitochondrial Ab, M2, S	Yes	Yes
ANA2	Antinuclear Ab, S	Yes	Yes
SMAS	Smooth Muscle Ab Screen, S	Yes	Yes

### 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

AMA: Enzyme Immunoassay (EIA)

SMAS: Indirect Immunofluorescence

ANA2: Enzyme-Linked Immunosorbent Assay (ELISA)

### NY State Available

Yes

## Specimen

### Specimen Type

Serum

### Specimen Required

**Container/Tube:**

**Preferred:** Serum gel

**Acceptable:** Red top

**Specimen Volume:** 1.5 mL

**Forms**

[If not ordering electronically, complete, print, and send a Gastroenterology and Hepatology Client Test Request \(T728\)](#) with the specimen.

**Specimen Minimum Volume**

1 mL

**Reject Due To**

Gross hemolysis	Reject
Gross lipemia	Reject
Gross icterus	OK

**Specimen Stability Information**

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	14 days	
	Frozen	14 days	

**Clinical and Interpretive**

**Clinical Information**

Autoimmune liver diseases result from damage to hepatocytes or cholangiocytes caused by an inflammatory immune reaction. Included within this disease group are autoimmune hepatitis (AIH), primary biliary cirrhosis (PBC), and primary sclerosing cholangitis (PSC). In some cases, patients with these diseases may present asymptotically, with increases in various liver enzymes being identified incidentally during an unrelated clinical evaluation. On the other end of the spectrum are patients who present with clinical evidence of liver disease, including fatigue, hepatomegaly, ascites, esophageal varices, and jaundice.

Diagnosis of an autoimmune liver disease first requires that other etiologies of liver injury, including viral, drug, and metabolic causes, be excluded. In some situations, a liver biopsy may be indicated. For those patients in whom an autoimmune liver disease is suspected, autoantibody serology testing may be considered. This assay includes markers that may support a diagnosis of an autoimmune liver disease, specifically AIH or PBC. Unfortunately, there are no known autoantibodies specific for PSC that are useful as diagnostic markers.

Patients with AIH may be positive for smooth muscle antibodies (SMA) and/or antinuclear antibodies (ANA). The SMA associated with AIH are generally specific for F-actin. SMA have a specificity of 80% to 90% for AIH, although the sensitivity is only in the range of 70% to 80%. In contrast, ANA, although relatively sensitive for AIH, lack specificity, being associated with a variety of autoimmune diseases. Both SMA and ANA, along with other lab markers and biopsy evaluation, are included in the international diagnostic criteria for AIH.

Antimitochondrial antibodies (AMA) are a diagnostic marker for PBC. AMA are found in more than 90% of patients with PBC, with a specificity of greater than 95%. AMA are included in the diagnostic criteria for PBC, which were

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developed through an international collaborative effort.

**Reference Values****SMOOTH MUSCLE ANTIBODIES**

Negative

If positive, results are titered.

Reference values apply to all ages.

**MITOCHONDRIAL ANTIBODIES (M2)**

Negative: <0.1 Units

Borderline: 0.1-0.3 Units

Weakly positive: 0.4-0.9 Units

Positive: > or =1.0 Units

Reference values apply to all ages.

**ANTINUCLEAR ANTIBODIES (ANA2)**

Negative: < or =1.0 Units

Weakly positive: 1.1-2.9 Units

Positive: 3.0-5.9 Units

Strongly positive: > or =6.0 Units

Reference values apply to all ages.

**Interpretation**

The presence of smooth muscle antibodies (SMA) or antinuclear antibodies (ANA) is consistent with a diagnosis of chronic autoimmune hepatitis, in patients with clinical or laboratory evidence of hepatocellular damage.

The presence of antimitchondrial antibodies (AMA) is consistent with a diagnosis of primary biliary cirrhosis, in patients with clinical or laboratory evidence of hepatobiliary damage.

**Cautions**

Smooth muscle antibodies (SMA) may be found in patients with active hepatitis caused by alcohol or drug exposure.

Antinuclear antibodies (ANA) occur in patients with a variety of systemic autoimmune diseases, including systemic lupus erythematosus, rheumatoid arthritis, Sjogren syndrome, and systemic sclerosis.

The presence of smooth muscle antibodies (SMA), antinuclear antibodies (ANA), and antimitchondrial antibodies (AMA) should not be exclusively relied upon to diagnose an autoimmune liver disease. Correlation with clinical presentation and other laboratory parameters of liver disease is required.

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## Clinical Reference

1. Invernizzi P, Lleo A, Podda M: Interpreting serological tests in diagnosing autoimmune liver diseases. *Sem Liver Dis.* 2007;27(2):161-172
2. Hennes EM, Zeniya M, Czaja AJ, et al: Simplified criteria for the diagnosis of autoimmune hepatitis. *Hepatology.* 2008;48:169-176
3. Muratori L, Granito A, Muratori P, et al: Antimitochondrial antibodies and other antibodies in primary biliary cirrhosis: diagnostic and prognostic value. *Clin Liver Dis.* 2008;12:261-276
4. Karlsen TH, Schrumph E, Boberg KM: Update on primary sclerosing cholangitis. *Dig Liver Dis.* 2010;42:390-400

## Performance

### Method Description

**Smooth Muscle Antibody:** The patient's serum in 1:20 and 1:40 dilutions is 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; 01/2018)

**Mitochondrial Antibodies:** This method is an enzyme immunosorbent assay that detects both IgG and IgM antibodies to M2 antigens. A dilution of patient serum is added to the wells coated with M2 antigen and incubated. After incubation and washing, all unbound human antibodies are washed away and enzyme-conjugated IgG and IgM anti-human is added. The enzyme conjugate binds to the antibody complex. Excess enzyme-conjugate is washed away and substrate is added. After incubation, the enzyme substrate reaction is stopped. The complete assay is measured on a spectrophotometer plate reader. The intensity of the color generated is proportional to the amount of IgG and IgM specific antibody in the sample. (Package insert: Kallestad Anti-Mitochondrial Kit. Bio-Rad Laboratories; 10/2014)

**Antinuclear Antibodies:** The method used to detect antinuclear antibody (ANA) is enzyme-linked immunosorbent assay (ELISA). A HEp-2 lysate supplemented with various purified antigens (double-stranded deoxyribonucleic acid: dsDNA, histone, SS-A [Ro], SS-B [La], Smith, RNP, Scl-70, Jo-1, plus centromere antigen) are coated onto microtiter plate wells. A dilution of patient serum is added to the well and incubated. After washing to remove unbound serum protein, an enzyme conjugated antihuman-IgG antibody is added to detect human IgG bound to the microtiter plate well. After incubation and washing to remove unbound conjugate, a substrate to the enzyme is added to the well. After incubation, the enzyme substrate reaction is stopped. The complete assay is measured on a spectrophotometer plate reader. The optical density measured is proportional to the antibody present in the patient serum. (Package insert: ELISA kits. Bio-Rad Laboratories; 07/2014)

### PDF Report

No

### Day(s) Performed

Monday through Saturday

### Report Available

2 to 3 days

### Specimen Retention Time

14 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**

See Individual Test IDs

**CPT Code Information**

86255

83516

86038

86256-if appropriate

**LOINC® Information**

Test ID	Test Order Name	Order LOINC Value
ALDG	Autoimmune Liver Disease Panel, S	94700-2

Result ID	Test Result Name	Result LOINC Value
609515	Smooth Muscle Ab Screen, S	26971-2
AMA	Mitochondrial Ab, M2, S	51715-1
ANA2	Antinuclear Ab, S	94875-2