MAYO CLINIC LABORATORIES

Test Definition: FACT

F-Actin Ab, IgG, S

Overview

Useful For

Evaluating patients with chronic liver disease in whom the diagnosis of chronic active autoimmune hepatitis is suspected

Method Name

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: 0.5 mL

Reject Due To

Gross hemolysis	OK
Gross lipemia	OK
Gross icterus	OK
Heat treated specimens	Reject

Specimen Minimum Volume

0.4 mL

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 caused by chronic inflammation within the liver, resulting in damage to the hepatocytes.(1) Initially, patients with AIH may be clinically asymptomatic, usually identified only through an incidental finding of abnormal liver function tests. 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. There are several autoantibodies associated with AIH, although the most common is anti-smooth muscle antibody (anti-SMA).(2) SMAs are generally identified by indirect immunofluorescence using a smooth muscle substrate. The antigen specificity of anti-SMAs in the context of AIH has been identified as filamentous-actin (F-actin).(2) Because the clinical symptoms of AIH are nonspecific, being found in a variety of liver diseases (drug/alcohol-associated hepatitis, viral hepatitis, primary sclerosing cholangitis, etc), 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.(3) The combination of autoantibody serology, specifically anti-SMAs and anti-F-actin antibodies with liver histology, and thorough clinical evaluation are useful in the evaluation of patients with suspected autoimmune hepatitis.

Reference Values

Negative: <20.0 U

Weak Positive: 20.0-30.0 U

Positive: >30.0 U

Interpretation

Seropositivity for anti-filamentous-actin (F-actin) antibodies is consistent with a diagnosis of autoimmune hepatitis (AIH).

A negative result for anti-F-actin antibodies does not exclude a diagnosis of AIH.

In a study conducted at Mayo Clinic, the F-actin enzyme-linked immunosorbent assay (ELISA) had a clinical sensitivity of 92.9% when using the manufacturer's recommended cutoff of 20.0 U. In addition, the F-actin ELISA had a clinical specificity of 76.7% when using the aforementioned cutoffs. See Supportive Data.

Cautions

Serologic tests for autoantibodies, including anti-filamentous-actin (F-actin), should not be relied upon exclusively to

determine the etiology or prognosis of patients with liver disease.

A negative result for anti-F-actin antibodies does not exclude a diagnosis of autoimmune hepatitis (AIH).

Supportive Data

In a study performed at Mayo Clinic, 173 serum samples submitted for clinical testing for anti-smooth muscle antibodies (anti-SMA), as performed by indirect immunofluorescence, were collected. These samples were subsequently tested using the anti-filamentous-actin (F-actin) antibody enzyme-linked immunosorbent assay (ELISA). By using the manufacturer's cut-offs for the 2 tests (negative at <20.0 units for the F-actin ELISA and <1:20 titer for the anti-SMA indirect immunofluorescence), the 2 tests had an overall concordance of 79.8%. In addition to the analytical concordance, patient histories were abstracted for diagnoses related to liver dysfunction. Of the 14 patients with autoimmune hepatitis, 13 were positive (> or =20.0 units) for F-actin antibodies by ELISA, which corresponded to a sensitivity of 92.9%. Of the remaining 159 patients who had a diagnosis of something other than autoimmune hepatitis, 122 were negative (<20.0 units), which corresponded to a specificity of 76.7%. In comparison, at a clinical specificity of 76.1%, which is similar to the ELISA, the anti-SMA indirect immunofluorescence method had a significantly lower clinical sensitivity of 78.6%. Positivity for either anti-F-actin antibodies or anti-SMA improved the diagnostic sensitivity to 92.9%, although the specificity decreased to 66.0%. This data indicates that the ELISA for F-actin antibodies may have improved diagnostic utility in comparison to the anti-SMA by indirect immunofluorescence, although a combination of these tests may be useful for some patients.

Clinical Reference

1. Mieli-Vergani G, Vergani D, Czaja AJ, et al: Autoimmune hepatitis. Nat Rev Dis Primers. 2018 Apr 12;4:18017

2. Terziroli Beretta-Piccoli B, Mieli-Vergani G, Vergani D: Serology in autoimmune hepatitis: A clinical-practice approach. Eur J Intern Med. 2018 Feb;48:35-43

3. Hennes EM, Zeniya M, Czaja AJ, et al: Simplified criteria for the diagnosis of autoimmune hepatitis. Hepatology. 2008 Jul;48(1):169-176

Performance

Method Description

The method used to detect antibodies directed against filamentous-actin (F-actin) is enzyme-linked immunosorbent assay (ELISA). Prediluted controls and diluted patient sera are added to separate wells, allowing any actin antibodies present to bind to the antigen. Unbound sample is washed away, and an enzyme labeled anti-human IgG is added to each well. A second incubation allows the enzyme labeled anti-human IgG to bind to any patient antibodies, which have become attached to the microwells, and any unbound conjugate is removed by another wash step. The bound conjugate is visualized with 3,3',5,5' tetramethylbenzidine (TMB) substrate, which gives a blue reaction product, the intensity of which is proportional to a concentration of autoantibody in the sample. Sulfuric acid is added to each well to stop the reaction. This produces a yellow endpoint color, which is read at 450 nm. Testing is performed on the DS2 instrument by

Dynex.(Package insert: QUANTA Lite Actin IgG ELISA 708785. INOVA Diagnostics; Rev. 5, 02/2015)

PDF Report

No

Specimen Retention Time

14 days

Performing Laboratory Location

Rochester

Fees & Codes

Test Classification

This test has been cleared, approved, or is exempt by the US Food and Drug Administration and is used per manufacturer's instructions. Performance characteristics were verified by Mayo Clinic in a manner consistent with CLIA requirements.

CPT Code Information

83516

LOINC® Information

Test ID	Test Order Name	Order LOINC Value
FACT	F-Actin Ab, IgG, S	44706-0

Result ID	Reporting Name	LOINC®
FACT	F-Actin Ab, IgG, S	44706-0