Overview

Useful For
Evaluating patients suspected of having autoimmune hepatitis

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

Specimen Minimum Volume
0.4 mL

Reject Due To

<table>
<thead>
<tr>
<th>Condition</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross hemolysis</td>
<td>OK</td>
</tr>
<tr>
<td>Gross lipemia</td>
<td>OK</td>
</tr>
<tr>
<td>Gross icterus</td>
<td>OK</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>21 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frozen</td>
<td>21 days</td>
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Clinical and 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). Anti-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). 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. 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**

<table>
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<tr>
<th>Category</th>
<th>Value</th>
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<tbody>
<tr>
<td>Negative</td>
<td>&lt;20.0 U</td>
</tr>
<tr>
<td>Weak Positive</td>
<td>20.0-30.0 U</td>
</tr>
<tr>
<td>Positive</td>
<td>&gt;30.0 U</td>
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</table>

**Interpretation**

Seropositivity for anti-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 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-F-Actin, should not be relied upon exclusively to determine the etiology or prognosis of patients with liver disease.

**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-F-Actin antibody 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. Invernizzi P, Lleo A, Podda M: Interpreting serological tests in diagnosing autoimmune liver diseases. Semin Liver
Test Definition: FACT
F-Actin Ab, IgG, S

Dis 2007:27(2):161-172


Performance

Method Description
The method used to detect antibodies directed against F-Actin is 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 Triturus instrument by Grifols.(Package insert: QUANTA Lite Actin IgG ELISA 708785, INOVA Diagnostics, San Diego CA, Rev. 5, 2/2015)

PDF Report
No

Day(s) and Time(s) Test Performed
Thursday; Evening

Analytic Time
1 day

Maximum Laboratory Time
7 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
This test has been cleared or approved by the U.S. 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.
## Test Definition: FACT

F-Actin Ab, IgG, S

### CPT Code Information

83516

### LOINC® Information

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<th>Test Order Name</th>
<th>Order LOINC Value</th>
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<tbody>
<tr>
<td>FACT</td>
<td>F-Actin Ab, IgG, S</td>
<td>44706-0</td>
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<table>
<thead>
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<th>Test Result Name</th>
<th>Result LOINC Value</th>
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<tbody>
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<td>FACT</td>
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