Overview

Useful For
Assessing susceptibility to autoimmune (type 1, insulin-dependent) diabetes mellitus and related endocrine disorders (eg, thyroiditis and pernicious anemia)

Distinguishing between patients with type 1 and type 2 diabetes

Confirming a diagnosis of stiff-man syndrome, autoimmune encephalitis, cerebellitis, brain stem encephalitis, myelitis; titers generally ≥0.03 nmol/L

Confirming susceptibility to organ-specific neurological disorders (eg, myasthenia gravis, Lambert-Eaton syndrome); titers generally < or =0.02 nmol/L

Method Name
Radioimmunoassay (RIA)

NY State Available
Yes

Specimen

Specimen Type
Serum

Specimen Required

Container/Tube:

Preferred: Red top

Acceptable: Serum gel

Specimen Volume: 1.5 mL

Forms
If not ordering electronically, complete, print, and send 1 of the following forms with the specimen:

- General Request (T239)

- Neurology Specialty Testing Client Test Request (T732)

Specimen Minimum Volume
1 mL

Reject Due To

<table>
<thead>
<tr>
<th>Condition</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross hemolysis</td>
<td>Reject</td>
</tr>
<tr>
<td>Gross lipemia</td>
<td>Reject</td>
</tr>
<tr>
<td>Gross icterus</td>
<td>Reject</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>28 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frozen</td>
<td>28 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ambient</td>
<td>72 hours</td>
<td></td>
</tr>
</tbody>
</table>

**Clinical and Interpretive**

**Clinical Information**

Glutamic acid decarboxylase (GAD) is a neuronal enzyme involved in the synthesis of the neurotransmitter gamma-aminobutyric acid (GABA). Antibodies directed against the 65-kd isoform of GAD (GAD65) are seen in a variety of autoimmune neurologic disorders including stiff-man (Moersch-Woltman) syndrome, autoimmune cerebellitis, brain stem encephalitis, seizure disorders, neuromyelitis optica and other myelopathies, myasthenia gravis, Lambert-Eaton syndrome, and dysautonomia.

GAD65 antibody is also the major pancreatic islet antibody and an important serological marker of predisposition to type 1 diabetes. GAD65 autoantibody also serves as a marker of predisposition to other autoimmune disease that occur with type 1 diabetes, including thyroid disease (eg, thyrotoxicosis, Grave disease, Hashimoto thyroiditis, hypothyroidism), pernicious anemia, premature ovarian failure, Addison disease, (idiopathic adrenocortical failure) and vitiligo. GAD65 antibodies are found in the serum of approximately 8% of healthy subjects older than age 50, usually in low titer, but often accompanied by related "thyrogastric" autoantibodies.

**Reference Values**

< or =0.02 nmol/L

Reference values apply to all ages.

**Interpretation**

High titers (> or =0.02 nmol/L) are found in classic stiff-man syndrome (93% positive) and in related autoimmune neurologic disorders (eg, acquired cerebellar ataxia, some acquired nonparaneoplastic encephalomyelopathies).

Diabetic patients with polyendocrine disorders also generally have glutamic acid decarboxylase (GAD65) antibody values > or =0.02 nmol/L.

Values in patients who have type 1 diabetes without a polyendocrine or autoimmune neurologic syndrome are usually < or =0.02 nmol/L. Low titers (0.03-19.9 nmol/L) are detectable in the serum of approximately 80% of type 1 diabetic patients. Conversely, low titers are detectable in the serum of <5% of type 2 diabetic patients. A second islet cell antibody (IA-2) is more predictive for development of type 1 diabetes, but less frequent than glutamic acid decarboxylase (GAD65) antibody amongst diabetic patients. Insulin autoantibodies also serve as a marker of susceptibility to type 1 diabetes.

Differentiating type 1 from type 2 diabetics: Assays for IA-2, insulin, gastric parietal cell, thyroglobulin, and thyroid peroxidase antibodies, complement GAD65 antibody in this context; titers generally < or =0.02 nmol/L.

Low titers are found in approximately 25% of patients with myasthenia gravis, Lambert-Eaton syndrome, and rarer
autoimmune neurological disorders. Eight percent of healthy Olmsted County residents over age 50 have low-positive values. These are not false-positive; the antibodies are inhibited by unlabeled GAD65 antigen and are accompanied in at least 50% of cases by related organ-specific autoantibodies.

Values $>$ or $\geq 0.03$ nmol/L are consistent with susceptibility to autoimmune (type 1) diabetes and related endocrine disorders (thyroiditis and pernicious anemia).

**Cautions**

Antibodies specific for glutamic acid decarboxylase (GAD65) account for most, but not all, antibodies detected in the islet cell antibody test (IA-2). IA-2 (a protein tyrosine kinase-like protein) insulin and zinc transporter-8 antibodies are complementary islet cell antibodies.

This test should not be requested in patients who have recently received radioisotopes, therapeutically or diagnostically, because of potential assay interference. The specific waiting period before specimen collection will depend on the isotope administered, the dose given and the clearance rate in the individual patient. Specimens will be screened for radioactivity prior to analysis. Radioactive specimens received in the laboratory will be held 1 week and assayed if sufficiently decayed, or canceled if radioactivity remains.

**Clinical Reference**


**Performance**

**Method Description**

(125)I-labeled recombinant human glutamic acid decarboxylase (GAD65) is incubated with the patient's diluted serum. Anti-human IgG and IgM are then added to form an immunoprecipitate. After washing the precipitated immune complexes, specific antibodies are detected by counting gamma-emission from the pellet's bound (125)I-GAD65,(Walikonis JE, Lennon VA: Radioimmunoassay for glutamic acid decarboxylase [GAD65] autoantibodies as a diagnostic aid for stiff-man syndrome and a correlate of susceptibility to type 1 diabetes mellitus. Mayo Clin Proc 1998 December;73[12]:1161-1166)

**PDF Report**

No

**Day(s) and Time(s) Test Performed**

Monday through Friday; 5 a.m., 2 p.m.
Test Definition: GD65S
GAD65 Ab Assay, S

Saturday, Sunday; 7 a.m.

**Analytic Time**
3 days

**Maximum Laboratory Time**
6 days

**Specimen Retention Time**
28 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 was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the U.S. Food and Drug Administration.

**CPT Code Information**
86341

**LOINC® Information**

<table>
<thead>
<tr>
<th>Test ID</th>
<th>Test Order Name</th>
<th>Order LOINC Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>GD65S</td>
<td>GAD65 Ab Assay, S</td>
<td>94345-6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Result ID</th>
<th>Test Result Name</th>
<th>Result LOINC Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>81596</td>
<td>GAD65 Ab Assay, S</td>
<td>94345-6</td>
</tr>
</tbody>
</table>