MAYO CLINIC LABORATORIES

Test Definition: GD65S

Glutamic Acid Decarboxylase (GAD65)
Antibody Assay, Serum

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, autoimmune ataxia, brain stem encephalitis, autoimmune epilepsy, autoimmune myelopathy

Method Name

Radioimmunoassay (RIA)

NY State Available

Yes

Specimen

Specimen Type

Serum

Ordering Guidance

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.

Specimen Required

Collection Container/Tube:
Preferred: Red top
Acceptable: Serum gel
Submission Container/Tube: Plastic vial
Specimen Volume: 1.5 mL
Collection Instructions: Centrifuge and aliquot serum into a plastic vial.

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

Gross hemolysis	Reject
Gross lipemia	Reject
Gross icterus	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Refrigerated (preferred)	28 days	
	Ambient	72 hours	
	Frozen	28 days	

Clinical & 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-kDa isoform of GAD (GAD65) are encountered at high titers (> or =20 nmol/L) in a variety of autoimmune neurologic disorders, including stiff-person (Moersch-Woltman) syndrome, autoimmune cerebellitis, brain stem encephalitis, seizure disorders, and other myelopathies.

GAD65 antibody is also the major pancreatic islet antibody and an important serological marker of predisposition to type 1 diabetes. GAD65 autoantibody 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 years, 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 =20.0 nmol/L) are found in classic stiff-person syndrome (93% positive) and in related autoimmune neurologic disorders (eg, acquired cerebellar ataxia, some acquired non-paraneoplastic encephalomyelopathies).

Diabetic patients with polyendocrine disorders generally have glutamic acid decarboxylase antibody values 0.02 nmol/L

or above.

Values in patients who have type 1 diabetes without a polyendocrine or autoimmune neurologic syndrome are usually 0.02 nmol/L or below. 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 less than 5% of patients with type 2 diabetes. Testing for autoimmune type 1 diabetes is complimented by testing for insulin, islet cell (IA-2), and ZnT8 antibodies.

Eight percent of healthy Olmsted County residents over age 50 years have low-positive values and may be at risk for future autoimmune disease.

Values 0.03 nmol/L or above 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.

Clinical Reference

1. McKeon A, Tracy JA. GAD65 neurological autoimmunity. Muscle Nerve. 2017;56(1):15-27. doi:10.1002/mus.25565
2. Pittock SJ, Yoshikawa H, Ahlskog JE, et al. Glutamic acid decarboxylase autoimmunity with brainstem, extrapyramidal and spinal cord dysfunction. Mayo Clin Proc. 2006;81(9):1207-1214
3. McKeon A, Robinson MT, McEvoy KM, et al. Stiff-man syndrome and variants: clinical course, treatments, and outcomes. Arch Neurol. 2012;69(2):230-238
4. Steriade C, Britton J, Dale RC, et al. Acute symptomatic seizures secondary to autoimmune encephalitis and autoimmune-associated epilepsy: Conceptual definitions. Epilepsia. 2020;61(7):1341-1351
5. Bingley PJ. Clinical applications of diabetes antibody testing. J Clin Endocrinol Metab. 2010;95(1):25-33

Performance

Method Description

(125)I-labeled recombinant human glutamic acid decarboxylase 65 (GAD65) is incubated with the patient sample. Anti-human IgG is then added to form an immunoprecipitate. After washing the immunoprecipitate, the amount of (125)I-labeled antigen in the immunoprecipitate is measured using a gamma-counter. The amount of gamma emission in the precipitate is proportional to the amount of GAD65-IgG in the sample. Results are reported as units of precipitated antigen (nMol) per L of patient sample.(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;73[12]:1161-1166; Horta ES, Lennon VA, Lachance DH, et al. Neural autoantibody clusters aid diagnosis of cancer. Clin Cancer Res. 2014;20[14]:3862-9386)

PDF Report

No

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Antibody Assay, Serum

Day(s) Performed
Monday through Sunday

Report Available
3 to 6 days

Specimen Retention Time
2 days

Performing Laboratory Location
Mayo Clinic Laboratories - Rochester Main Campus

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
86341

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
GD65S	GAD65 Ab Assay, S	94345-6

Result ID	Test Result Name	Result LOINC® Value
81596	GAD65 Ab Assay, S	94345-6