MAYO CLINIC LABORATORIES

Test Definition: DGLDN

Gliadin (Deamidated) Antibodies Evaluation, IgG and IgA, Serum

Overview

Useful For

Assessment of deaminated gliadin IgA and IgG antibodies for evaluating patients suspected of having celiac disease, including patients with compatible clinical symptoms, patients with atypical symptoms, and individuals at increased risk (family history, previous diagnosis with associated disorder, positivity for *HLA DQ2* and/or *DQ8*)

Monitoring response to a gluten-free diet in patients with celiac disease.

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
DAGL	Gliadin(Deamidated) Ab, IgA, S	Yes	Yes
DGGL	Gliadin(Deamidated) Ab, IgG, S	Yes	Yes

Testing Algorithm

The following algorithms are available:
-Celiac Disease Comprehensive Cascade Test Algorithm
-Celiac Disease Diagnostic Testing Algorithm
-Celiac Disease Gluten-Free Cascade Test Algorithm
-Celiac Disease Routine Treatment Monitoring Algorithm
-Celiac Disease Serology Cascade Test Algorithm

Special Instructions

- Celiac Disease Diagnostic Testing Algorithm
- Celiac Disease Comprehensive Cascade Test Algorithm
- Celiac Disease Gluten-Free Cascade Test Algorithm
- Celiac Disease Routine Treatment Monitoring Algorithm
- Celiac Disease Serology Cascade Test Algorithm

Method Name

Enzyme-Linked Immunosorbent Assay (ELISA)

NY State Available

Yes

Specimen

Specimen Type

Serum

Ordering Guidance

Cascade testing is recommended for celiac disease. Cascade testing ensures that testing proceeds in an algorithmic fashion. The following cascades are available; select the appropriate one for your specific patient situation.
-CDCOM / Celiac Disease Comprehensive Cascade, Serum and Whole Blood: complete testing including HLA DQ
-CDSP / Celiac Disease Serology Cascade, Serum: complete serology testing excluding HLA DQ
-CDGF / Celiac Disease Gluten-Free Cascade, Serum and Whole Blood: for patients already adhering to a gluten-free diet
To order individual tests, see Celiac Disease Diagnostic Testing Algorithm.

Specimen Required

Supplies: Sarstedt Aliquot Tube 5 mL (T914)
Collection Container/Tube:
Preferred: Serum gel
Acceptable: Red top
Submission Container/Tube: Plastic vial
Specimen Volume: 0.5 mL
Collection Instructions: Centrifuge and aliquot serum into a plastic vial.

Forms

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

Specimen Minimum Volume

0.4 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)	21 days	
	Frozen	21 days	

Clinical & Interpretive

Clinical Information

Celiac disease (gluten-sensitive enteropathy, celiac sprue) results from an immune-mediated inflammatory process that occurs in genetically susceptible individuals following ingestion of wheat, rye, or barley proteins.(1) The inflammation in celiac disease occurs primarily in the mucosa of the small intestine, which leads to villous atrophy. Common clinical manifestations related to gastrointestinal inflammation include abdominal pain, malabsorption, diarrhea, and/or constipation. Clinical symptoms of celiac disease are not restricted to the gastrointestinal tract. Other common manifestations of celiac disease include failure to grow (delayed puberty and short stature), iron deficiency, recurrent fetal loss, osteoporosis, chronic fatigue, recurrent aphthous stomatitis (canker sores), dental enamel hypoplasia, and dermatitis herpetiformis. Patients with celiac disease may also present with neuropsychiatric manifestations including ataxia and peripheral neuropathy and are at increased risk for development of non-Hodgkin lymphoma. The disease is also associated with other clinical disorders including thyroiditis, type I diabetes mellitus, Down syndrome, and IgA deficiency.

Individuals with family members who have celiac disease are at increased risk of developing the disease.(2) Genetic susceptibility is related to specific human leukocyte antigen (HLA) markers. More than 97% of individuals with celiac disease in the United States have *DQ2* and/or *DQ8* HLA markers, compared to approximately 40% of the general population. For this reason, *HLA-DQ2* and *HLA-DQ8* are considered genetic risk factors for celiac disease and are required, but not sufficient, for the disease process to occur. HLA testing is not required for diagnosis in all cases, but can be useful in situations where histology and serology are discrepant, or for individuals who have started a gluten free diet before evaluation.(3)

A definitive diagnosis of celiac disease requires a duodenal biopsy demonstrating villous atrophy.(3) Given the invasive nature and cost of the biopsy, serologic tests may be used to identify individuals with a high probability of having celiac disease. Because no single laboratory test can be relied upon completely to establish a diagnosis of celiac disease, individuals with positive laboratory results may be referred for small intestinal biopsy, thereby decreasing the number of unnecessary invasive procedures (see Celiac Disease Diagnostic Testing Algorithm). In terms of serology, celiac disease is associated with a variety of autoantibodies, including endomysial antibody, tissue transglutaminase (tTG), and deamidated gliadin antibodies.(4) Although the IgA isotype of these antibodies usually predominates in celiac disease, individuals may also produce IgG isotypes, particularly if the individual is IgA deficient. The most sensitive and specific serologic tests is tTG IgA isotype, in individuals who produce sufficient total IgA. For individuals who are IgA deficient, testing for tTG and deamidated gliadin IgG antibodies is required.

A recent multi-cohort international study found that a tTG IgA titer of greater than or equal to 10 times the upper limit of normal (ULN) had a positive predictive value of 95% in an adult population.(5) In addition, several prospective studies have shown that a biopsy free approach to celiac disease diagnosis may be possible in children with a tTG titer greater than or equal to 10 times the ULN who meet certain criteria.(6-9) Given this evidence, the American College of Gastroenterology now suggests that a positive tTG IgA result greater than 10 times the upper limit of normal with a positive endomysial antibody in a separate blood sample may be sufficient for a diagnosis celiac disease in children.(3)

The treatment for celiac disease is maintenance of a gluten-free diet. In most patients who adhere to this diet, concentrations of associated autoantibodies decline, which is sometimes accompanied by reconstitution of the small intestinal villi. In most patients, an improvement in clinical symptoms is observed. For evaluation purposes, all serologic tests ordered for the diagnosis of celiac disease should be performed while the patient is on a gluten-containing diet. Once a patient has initiated the gluten-free diet, serologic testing may be repeated to assess the response to treatment. In some patients, it may take up to 1 year for antibody titers to normalize. Persistently elevated results suggest poor

adherence to the gluten-free diet or the possibility of refractory celiac disease.

See Celiac Disease Diagnostic Testing Algorithm for the recommended approach to a patient suspected of celiac disease.

An algorithm is available for monitoring the patient's response to treatment, see Celiac Disease Routine Treatment Monitoring Algorithm.

Reference Values

Negative: <20.0 U
Weak positive: 20.0-30.0 U
Positive: >30.0 U
Reference values apply to all ages.

Interpretation

Positive test results for deamidated gliadin IgA or IgG antibodies, are consistent with a diagnosis of celiac disease.

Negative results for deamidated gliadin IgA or IgG antibodies indicate a decreased likelihood of celiac disease.

A decrease in the concentrations of deamidated gliadin IgA or IgG antibodies may begin after initiation of a gluten-free diet and could indicate a response to therapy.

Cautions

This test should not be solely relied upon to establish a diagnosis of celiac disease. It should be used to identify patients who have an increased probability of having celiac disease and in whom a small intestinal biopsy is recommended.

Affected individuals who have been on a gluten-free diet prior to testing may have a negative result.

For individuals who test negative, IgA deficiency should be considered. If total IgA is normal and deamidated gliadin IgA is negative, there is a low probability of the patient having celiac disease and a biopsy may not be necessary.

If serology is negative or there is substantial clinical doubt remaining, then further investigation should be performed with endoscopy and bowel biopsy. This is especially important in patients with frank malabsorptive symptoms since many syndromes can mimic celiac disease. For the patient with frank malabsorptive symptoms, a bowel biopsy should be performed regardless of serologic test results.

Testing for IgA and IgG antibodies to unmodified gliadin proteins is no longer recommended because of the low sensitivity and specificity of these tests for celiac disease.

This test should not be ordered as a replacement for TSTGP / Tissue Transglutaminase Antibodies, IgA and IgG Profile, Serum.

Clinical Reference

1. Rubin JE, Crowe SE. Celiac disease. Ann Intern Med. 2020;172(1):ITC1-ITC16. doi:10.7326/AITC202001070
2. Lebwohl B, Rubio-Tapia A: Epidemiology, presentation, and diagnosis of celiac disease. Gastroenterology. 2021;160(1):63-75. doi:10.1053/j.gastro.2020.06.098

3. Rubio-Tapia A, Hill ID, Semrad C, et al. American College of Gastroenterology Guidelines Update: Diagnosis and Management of Celiac Disease [published correction appears in Am J Gastroenterol. 2024 Jul 1;119(7):1441. doi: 10.14309/ajg.0000000000002210.]. Am J Gastroenterol. 2023;118(1):59-76. doi:10.14309/ajg.0000000000002075
4. Penny HA, Raju SA, Sanders DS. Progress in the serology-based diagnosis and management of adult celiac disease. Exp Rev Gastroenterol Heptatol. 2020;14(3):147-154. doi:10.1080/17474124.2020.1725472
5. Penny HA, Raju SA, Lau MS, et.al. Accuracy of a no-biopsy approach for the diagnosis of coeliac disease across different adult cohorts. Gut. 2021;70(5):876-883. doi:10.1136/gutjnl-2020-320913
6. Ylonen V, Lindfors K, Repo M, et al. Non-Biopsy Serology-Based Diagnosis of Celiac Disease in Adults Is Accurate with Different Commercial Kits and Pre-Test Probabilities. Nutrients. 2020;12(9):2736. Published 2020 Sep 8. doi:10.3390/nu12092736
7. Werkstetter KJ, Korponay-Szabo IR, Popp A, et al. Accuracy in Diagnosis of Celiac Disease Without Biopsies in Clinical Practice. Gastroenterology. 2017;153(4):924-935. doi:10.1053/j.gastro.2017.06.002
8. Wolf J, Petroff D, Richter T, et al. Validation of Antibody-Based Strategies for Diagnosis of Pediatric Celiac Disease Without Biopsy. Gastroenterology. 2017;153(2):410-419.e17. doi:10.1053/j.gastro.2017.04.023
9. Ho SS, Keenan JI, Day AS. Role of serological tests in the diagnosis of coeliac disease in children in New Zealand. J Paediatr Child Health. 2020;56(12):1906-1911. doi:10.1111/jpc.15076

Performance

Method Description

IgA and IgG antibodies to deamidated gliadin peptides are detected by enzyme-linked immunosorbent assay by binding to purified peptides adsorbed to the wells of a microtiter plate. Peptides are bound to the wells under conditions that preserve the antigens in their native states. Prediluted controls and diluted patient sera are added to separate wells allowing antibodies to bind to the deamidated gliadin peptides. Unbound sample constituents are washed away, and horseradish peroxidase-labeled antihuman IgA or IgG antibody conjugate is added to each well. After a second incubation, unbound enzyme-labeled conjugate is washed away, and bound conjugate is detected by adding tetramethylbenzidine chromogenic substrate. After a final incubation, colored product is measured spectrophotometrically, and the absorbance compared to the low, positive calibrator. The intensity of color is directly proportional to the level of IgA or IgG antibodies to deamidated gliadin peptides expressed in arbitrary units.(Package inserts: QUANTA Lite Gliadin IgA II. INOVA Diagnostics, Inc; Rev 2,10/2019; QUANTA Lite Gliadin IgG II. INOVA Diagnostics, Inc; Rev 4, 05/2020)

PDF Report

No

Day(s) Performed

Monday, Wednesday, Friday

Report Available

2 to 4 days

Specimen Retention Time

14 days

Performing Laboratory Location

Mayo Clinic Laboratories - Rochester Superior Drive

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 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

86258 x 2

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
DGLDN	Gliadin (Deamidated) Ab, Eval, S	57776-7

Result ID	Test Result Name	Result LOINC® Value
DAGL	Gliadin(Deamidated) Ab, IgA, S	47393-4
DGGL	Gliadin(Deamidated) Ab, IgG, S	47394-2