TARGETED GENOMICS™

GlutenID®

Celiac Genetic Health Risk Report

Charles Warden, 4/5/1985, GID-2371

GLUTEN ID

GRADIENT OF CELIAC RISK

FAMILY RELEVANCE

LIFESTYLE & OTHER FACTORS

1. Your GlutenID Test Report

Charles, two copies of the **DQ8** haplotype were detected in your genes.

Celiac Risk Genes Detected

DQ8+DQ8

Your GlutenID

This Means You—

- Have elevated risk of developing celiac disease
- Have a 100% chance of passing your DQ8 genes to your children
- Have inherited these risk genes from your parents; each of your parents is expected to have the DQ8 haplotype
- Should talk with your healthcare provider about your test and ways to manage your risks

Celiac Genetic Health Risk Identified by GlutenID

The table and graph below illustrate the gradient of celiac genetic health risk for each of the GlutenID haplotype combinations. The GlutenID report shows if you have variants falling within the risk gradient but does not describe your overall risk for developing celiac disease.

GlutenID	Risk Gradient
DQ2+DQ8	Elevated
DQ2+DQ2	Elevated
DQ2+half+DQ2	Elevated
DQ8+DQ8	**Elevated**
DQ8+half+DQ2	Moderate
half-DQ2+half-DQ2	Moderate
DQ2+DQ7	Moderate
DQ2(cis)	Moderate
DQ2(trans)	Moderate
DQ8+DQ7	Low
DQ8	Low
half-DQ2	Low
DQ7+DQ7	Low
DQ7	Low
NCG (non-celiac genetics)	Extremely Low

INCREASING RISK

Gene Transmission Risk

Chance of transmitting celiac risk genes for each **GlutenID**

100% TRANSMISSION RISK

DQ2(trans), DQ7+DQ7, half-DQ2+half-DQ2, half-DQ2+DQ8, DQ8+DQ7, DQ2+DQ7, DQ8+DQ8, DQ2+half-DQ2, DQ2+DQ2, DQ2+DQ8

50% TRANSMISSION RISK

DQ7, half-DQ2, DQ8, DQ2(cis)

0% TRANSMISSION RISK

NCG (non-celiac genetics)

References 3 & 12

The **GlutenID** test does NOT diagnose if you have celiac disease, gluten sensitivity or any other health condition.

Genetic Testing: Your Results in Detail

Celiac Genetic Risk Haplotypes Identified in Your DNA: HLA-DQ2(cis)

Haplotype	Other Names for These Halotypes	Tag SNP	Your Genotype	Variant Genotype	Number of Copies
HLA-DQ8	DQ8	rs7454108	C / C	C	2

Celiac Risk Haplotypes Tested and **NOT** Present in Your DNA

Haplotype	Other Names for These Halotypes	Tag SNP	Your Genotype	Variant Genotype	Number of Copies
HLA-DQ2	DQ2(cis) DQ2.5	rs2187668	C / C	T	0
HLA-DQ2.2	half-DQ2	rs7775228	T / T	C	0
HLA-DQ7	half-DQ2	rs4639334	G / G	A	0

Note: Two additional SNPs rs2395182 and rs4713586 are used for confirmation of DQ2.2.

Interpreting Your Genetic Test Results

Inheriting certain variants associated with HLA-DQA1 and HLA-DQB1 genes can increase your risk for developing celiac disease. Since these genes are linked, they are inherited together as a group from your parents. HLA-DQA1 and HLA-DQB1 genes provide instructions for making specific immune cell receptors HLA-DQ2 and HLA-DQ8—celiac risk haplotypes variants that can trigger an abnormal immune response to gluten. **In your case, you have inherited the variant HLA-DQ8 from both your parents.**

When to Share Your GlutenID Results with Your Healthcare Professional

Your symptoms are important. They led you to learn your risk for celiac disease using the GlutenID test. **You should share these results with your healthcare provider, *regardless* of your test result.**

- Your GlutenID test result showed you have moderately increased risk for celiac disease—your provider can help you determine next steps based on your level of risk and family history.
- You may want to discuss this report with a genetics counselor.

2. About the GlutenID Test

Intended Use

TheGlutenID Celiac Genetic Health Risk (GHR) Test uses qualitative genotyping to detect clinically relevant variants in genomic DNA isolated from human buccal (cheek) cells collected by individuals > 18 years for the purpose of reporting and interpreting celiac GHR.

The **Celiac Genetic Risk Health Report** is indicated for—

- Reporting of one variant associated with the HLA-DQ2.5 haplotype, one variant associated with the HLADQ8 haplotype, one variant associated with the HLA-DQ7 haplotype, and three variants associated with the HLA-DQ2.2 haplotype.
- Describing if a person has variants linked to a haplotype within a gradient of increased risk for developing celiac disease, but it does not describe a person's overall risk of developing celiac disease. This report is most relevant for people of European descent.

Professional Recommendations for Celiac Genetic Risk Testing

The College of American Pathologists and American College of Gastroenterology recommend celiac genetic-risk testing in certain scenarios including—

- Using the high negative predictive value (NPV) of 'non-celiac genetics' to rule out a diagnosis of celiac disease
- Assessing genetic risk in celiac family members
- Supporting a celiac disease diagnosis for individuals on a gluten-free diet and in those with equivocal serologic and/or biopsy results
- References 11 & 13

Clinical Performance

Approximately 95% of all cases of celiac disease are associated with one or more copies of HLA-DQ2.5(cis) and/or HLA-DQ8 haplotypes.

Analytical Performance

Accuracy was determined by comparing next generation sequencing (NGS) results from the GlutenID test with results from bi-directional Sanger sequencing. Results showed 100% accuracy between the two methods.

Warnings and Limitations

- GlutenID does not diagnose celiac and other health conditions or potential gluten or wheat-related sensitivities or conditions.
- This test does not test for emerging celiac-associated genetic markers with insufficient level of evidence (LOE) to be classified as clinically relevant.
- While unlikely, this test may provide false positive or false negative results
- Genetic tests offered by other companies may be detecting different genetic variants for the same disease so the user may receive different results using a test from a different company.
- Consult and share your GlutenID test results with your healthcare provider—
  - -If you are having signs and symptoms of celiac disease
  - -If you are concerned about your test results for any reason
  - -If you feel you might need to consult with a certified genetic counselor
- Any diagnostic or treatment decisions should be based on testing and/or other informations you and your doctor determine to be appropriate for your symptoms.

Relevant Ethnicities

Haplotypes included in the GlutenID test are common in multiple ethnicities but are most relevant for people of Northern European descent.

3. Frequently Asked Questions

Q. My results say I have inherited DQ8 genes—what does this mean?

You have two copies of the DQ8 haplotype which means your risk of developing celiac disease is elevated compared to the general population. You should share your test results with your healthcare provider if you have any of the following—

- A family history of celiac disease
- Signs or symptoms associated with celiac disease
- Concerns about any associated risk factors for developing celiac disease

Q. What does "elevated risk" mean with my test results?

Based on your **GlutenID** results, you have elevated risk which may be influenced by lifestyle and other factors such as a dietary gluten, family genetics, and other autoimmune disorders.

Q. What do these results mean for my family?

You have inherited a known celiac disease-associated haplotype, HLA-DQ8 from each of your parents. Because these HLA haplotypes are hereditary, you have a 100% chance of passing these genes to your children. And because celiac-associated haplotypes are inherited, each of your parents will likely have this DQ8 variant. While your GlutenID results cannot discern which parent contributed your DQ8 risk gene, learning your parent's GlutenID via this genetic testing can provide that information to you.

Share your GlutenID results with your family. Celiac disease and disease risk affects families. Encourage them to find out their genetic risk for developing celiac disease. Be sure to share these results with your family health provider to learn what you should do to mitigate your risk, such as removing gluten from your diet.

Q. Now that I know my celiac genetic risk status, what should I do next?

It's best to share your HLA-DQ results with your healthcare provider to discuss what is next for you based on your health status, signs and symptoms and your family history that led you to order this test. Depending on your health status and family history, your provider may recommend lifestyle changes or, they may feel your symptoms warrant additional diagnostic testing to determine if you have celiac disease. Any significant lifestyle changes should be discussed with your healthcare provider or a genetics counselor.

4. Learning Resources & Articles

National Celiac Association	https://www.nationalceliac.org
Beyond Celiac	https://www.beyondceliac.org
Celiac Foundation	https://celiac.org
American Academy of Allergy & Asthma	https://www.aaaai.org/conditions-and-treatments/library/allergy-library/celiac-disease
Genetics Home Reference	https://ghr.nlm.nih.gov/condition/celiacdisease
HLA-DQA1 and HLA-DQB1 genes	https://ghr.nlm.nih.gov/gene/HLA-DQA1
Celiac Disease Center	https://ghr.nlm.nih.gov/gene/HLA-DQB1
University of Chicago Medicine	https://www.cureceliacdisease.org/category/faq-about-celiac-disease/

Peer-Reviewed Journal Articles

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13 Rubio-Tapai A et al. (2013) ACG clinical guidelines: diagnosis and management of celiac disease." Am J Gastro. 108:656-676. pubmed.ncbi.nlm.nih.gov/23609613/

Contact Us
Targeted Genomics
711 Navarro Street Suite 235
San Antonio, Texas 78205
Web targeted-genomics.com/contact-us/
Email helpdesk@targeted-genomics.com