

# MODULE 3: GENETICS

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# HLA CLASS

The Genes that are used as markers for Celiac Disease belong to the **HLA Class** (known as **human leukocyte antigen**.)

They are a system of genes found on chromosome 6 which encode cell surface proteins that regulate the immune system.

HLA class 1 genes correspond to MHC class 1 genes.

MHC stands for **major histocompatibility complex** and they are a group of genes essential for the adaptive immune system.

An example is if the cell is infected by a virus, the HLA system brings fragments of the virus to the surface of the cell so that the cell can be destroyed by the immune system.

The HLA class 2 genes correspond to MHC class 2 genes and it's these that make someone susceptible to Celiac disease.

Other cell receptor proteins in his MHC class 2 are DP, DM, DO, DQ, and DR.

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# A NOTE ON DR GENES

These particular antigens stimulate the multiplication of **T-helper cells** (also called CD4-positive T cells), which in turn stimulate antibody-producing **B-cells** to produce antibodies to that specific antigen as in the case of Celiac Disease.

I wanted to mention this is because although the genetic markers are HLA DQ2 and HLA DQ8, you may come across the **DR genes**. Studies and research are finding there is a correlation between certain DR and DQ genes that make one more susceptible to Celiac. And you would see this if you took the HLA Autoimmunity Genetic test, many autoimmune conditions contain the DR genes that correlate to the DQ genes.

Although they are not used as markers as such, it's not unheard of for some medical health care providers to tell you to get your DR and DQ checked.

So if that happens you know the connection. The DR and DQ genes are both part of this HLA/MHC system which ultimately is responsible for the regulation of the immune system.

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# HLA DQ.2 AND HLA DQ8

The HLA gene alleles that predispose a person to celiac disease are called **DQ2 and DQ8**.

It's possible for a person to have one copy of HLA-DQ2 known as **heterozygous** or two copies of HLA-DQ2 known as **homozygous**.

In the case of having only one copy of DQ2 or DQ8 there is a risk of about 3% of being predisposed to celiac disease, whereas people who have two copies of either have a risk of 10%.

Almost all people with celiac disease have at least one DQ2 or DQ8 copy. More than 95% of people affected by celiac disease are carriers of DQ2, while 5% are carriers of DQ8.

DQ2 has serotypes under it.

The two most common ones are 2.2 and 2.5.

I thought to mention this as might show on your genetic test and this is just showing you which sub variant you have.

the highest risk is represented by the DQ2.5 which is homozygous genotype. (so remember that means you have two copies)

This variant is linked mostly to **type 1 diabetes and celiac disease** and an increased risk for **rheumatoid arthritis**.

So remember it is not saying you will develop type 1 diabetes, arthritis or celiac disease but rather you have the **predisposition** or risk for developing it.

Only 5% of people who are affected by celiac are carriers of the DQ8.

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# WHY GENETIC TESTING?

Why get genetic testing?

Genetic testing can only be used to **rule out** Celiac disease but will not definitively confirm it.

Genetic testing tells you what you are **predisposed** to, so you have the predisposition to develop Celiac, it does not mean you have it.

If you think you might have celiac disease and you **HAVE** one of the genetic markers, **your doctor will need to perform more tests.**

Sometimes genetic testing is used when other serology or histology testing is inaccurate or inconclusive.

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# HLA AUTOIMMUNE RISK TEST

The comprehensive **DNA Risk HLA-Related Autoimmunity** (HLA test) looks at gene variants related to common autoimmune diseases and provides healthcare practitioners 'diagnostic insight' for patients already suffering from an autoimmune disorder, or who are identified as at risk due to a family history of disease and exposure to environmental risk factors.

It's **Ideal for individuals suffering from an autoimmune disorder because if you have one autoimmune condition, more are likely to follow** or where an autoimmune disorder is **suspected** like in the case of Celiac Disease.

Individuals identified as being at risk due to a **family history** of disease and/or exposure to **environmental risk factors** should also consider this test.

As an accredited practitioner, your test results are sent directly to me and then we arrange a **feedback consultation** in which I give explain your results to you.

You will also receive your test results. You can then show these genetic results to your relevant healthcare practitioner when you are pursuing serology or histology testing.

So my job is to be the facilitator between the genetic testing company and you. In South Africa it is known as DNALysis and in other countries as DNA life. This is available in most countries.

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# AUTOIMMUNE CONDITIONS TESTED

- Alopecia areata (AA)
- Ankylosing spondylitis (AS)
- Coeliac disease (CD)
- Graves' disease (GD)
- Hashimoto thyroiditis (HT)
- IgA nephropathy (IgAN)
- Lyme borreliosis
- Multiple sclerosis (MS)
- Rheumatoid arthritis (RA)
- Systemic lupus erythematosus (SLE)
- Vitiligo
- Idiopathic membranous nephropathy (IMN)

It is good to note that those who have an autoimmune condition are at risk of developing other autoimmune conditions too. One that is on this list that is closely linked to celiac is **Hashimoto Thyroiditis**.