INTOLERANCE^2

Genetic study of gluten intolerance and age-related lactose intolerance

There are increasingly more people suffering gastric discomfort after taking some foodstuffs. The foods most commonly related to this gastric discomfort are foods derived from cereals and dairy products.

Celiac disease

Celiac disease is due to intolerance to gluten, which is a group of proteins present in most cereals. It is characterized by an inflammatory reaction of the small bowel mucosa, caused by an immune response, which hinder the absorption of macro and micro-nutrients.

The most common symptoms are loss of weight and appetite, fatigue, nausea, vomiting, diarrhea, abdominal distension and pain, loss of muscle weight, delayed growth and depression, among others.

Treatment consists of following a strict gluten-free diet that must continue all lifelong. Removing gluten from diet returns to clinical and functional normality, repairing the damage caused in intestinal villi. However, it must be noted that this exclusion diet involves difficulties as gluten is present in 80% of manufactured solid food.

Celiac disease affects about 1% of the European population, and is more common in women, with a 2:1 ratio.

Primary intolerance to lactose

Sometimes people suffer pain and abdominal distension, swelling, gas and diarrhea, after taking dairy products. These symptoms can be caused by the inability to metabolize lactose, the main sugar of milk. Lactose is hydrolysed in the body through an enzyme called *lactase*, giving rise to glucose and galactose which are absorbed in the bowel. When lactose is not hydrolysed, it enters the large bowel causing the symptoms.

Primary intolerance to lactose or acquired hypolactasia is the most common cause of intolerance to lactose in adults and has a genetic origin. It is estimated that about 75% of the population loses its ability to digest lactose some time during their life. The loss of activity is associated with age and a reduction of this activity can be seen from 3-5 years, though it most commonly occurs in the adult age.

INTOLERANCE^2

The **INTOLERANCE^2** test allows to see with a single test if there is a genetic susceptibility to celiac disease and/or primary lactose intolerance.

Intolerance to gluten is determined by the study of the risk haplotypes HLA-DQ2 and HLA-DQ8. 90% of the patients with celiac disease are HLA-DQ2 positive, while the rest show allele variants that code HLA-DQ8 without HLA-DQ2 (6%) or only one allele of HLA-DQ2. Therefore, the absence of the haplotypes studied makes that the diagnosis of celiac disease is very unlikely.

Intolerance to lactose is determined by the analysis of the *LTC* gene promoter region located in the gene *MCM6*. The **INTOLERANCE^2** test analyses the polymorphism -13910 (rs4988235) in the *MCM6* gene, which is responsible for 90% of the cases of primary intolerance to lactose in Caucasian population.

Indications

The **INTOLERANCE^2** test is particularly indicated for:

- Patients with clinically suspected celiac disease and negative serology study, before performing the biopsy.
- Patients with positive serological testing positive for celiac disease, who reject the biopsy.
- Patients with symptoms consistent with celiac disease.
- Patients with symptoms consistent with intolerance to lactose.

Requirements

No fasting or special preparation are required.

Sample: Buccal swab kit.

Documentation: Specific Test Requisition Form and Informed Consent.

Do you experience discomfort after eating **cereals and dairy products?**

INTOLERANCE²

Genetic study for coeliac disease and lactose intolerance

More and more **people are reporting digestive discomfort** after eating certain foods, especially **cereals and dairy products**.

Coeliac disease

Coeliac disease is a systemic autoimmune disorder that affects **genetically susceptible individuals** which is caused by eating gluten, a set of proteins found in wheat, rye, barley, oats and all of their varieties.

Symptoms vary considerably depending on the age at which the disease appears. In children, digestive problems and delayed growth are quite common. However, in adults, the development of coeliac disease is mainly marked by a manifestation of extradigestive symptoms that may be difficult to associate with this pathology and other minor digestive symptoms, which hinders diagnosis.

DIGESTIVE SYMPTOMS

- Diarrhoea
- Abdominal bloating
- Abdominal discomfort or pain
- Vomiting
- Constipation
- Flatulence

EXTRADIGESTIVE SYMPTOMS

- Anaemia
- Unintentional weight loss
- Headaches
- Dermatitis
- Muscular weakness, paresthesia, convulsions, ataxia
- Osteoporosis, osteopenia
- Thyroid problems

In children: delayed growth, delayed menarche (1st menstruation)

In women: infertility, miscarriage, low birthweight babies, premature births

The genetic study for coeliac disease is an analysis for the **at-risk haplotypes HLA-DQ2 and HLA-DQ8. An absence of these markers can exclude the disease and its future development with a very high probability rate (>99%)**. On the contrary, the presence of these markers does not imply a diagnosis for coeliac disease as additional testing will be required in the event of a suspected case.

COELIAC DISEASE AFFECTS NEARLY 1% OF THE EUROPEAN POPULATION AND IS MOST COMMON IN WOMEN

Primary lactose intolerance

Intolerance for lactose (the main sugar in milk and dairy products) **is one of the most common metabolic disorders and is caused by a shortage of the lactase enzyme**. People with lactose intolerance cannot digest and absorb this sugar in the intestines. Therefore, the lactose remains in the intestine where it's fermented by bacteria which causes the formation of gases responsible for typical symptoms such as: **abdominal pain or bloating, diarrhoea, nausea and tiredness, among others.**

APPROXIMATELY 75% OF THE POPULATION IS BELIEVED
TO LOSE THEIR CAPACITY TO DIGEST LACTOSE
AT SOME POINT IN THEIR LIFE

Of the different causes of lactose intolerance, the most common is of genetic origin known as primary or hereditary. This is characterised by a progressive loss of the capacity to produce lactase after the age of 3-5.

The genetic primary lactose intolerance study analyses a **genetic variant (rs4988235) that's responsible for 90% of all primary lactose intolerance cases** among the Caucasian population.

INTOLERANCE²

The **INTOLERANCE²** test can show in a single analysis whether a person is genetically predisposed to coeliac disease and/or primary lactose intolerance.

IS THIS TEST RIGHT FOR ME?

The INTOLERANCE² test is specially indicated for:

- People with clinically suspected coeliac disease and a negative serology study prior to doing the biopsy
- People with a positive serology study for coeliac disease who reject the biopsy
- People with symptoms that are compatible with coeliac disease
- People with symptoms that are compatible with lactose intolerance