

LACTOSE INTOLERANCE TEST REPORT

Name:	Sample collection date:
Date of birth:	Sample arrival date:
Order ID:	Analysis completion date:
Sample ID:	Sample type:

PRINCIPLE OF THE TEST

LCT gene encodes lactase, an enzyme that catalyzes the hydrolysis of lactose into glucose and galactose. LCT gene polymorphism -13910C>T (HGVS: g.30366C>T, rs4988235) has been associated with adult-type lactose intolerance in Caucasian populations. Individuals who are homozygous for C allele are likely to be lactose intolerant (Enattah et al., 2002).

LACTOSE INTOLERANCE TEST RESULT

Patient genotype is related to a HIGH RISK for developing lactose intolerance and may lead to decreased level of lactase activity in adulthood. The patient should consider a lactose-restricted diet and dietary consultation is recommended.

Analysis results of genetic markers tested

Marker	Variant Name	Detected genotype	Zygoty
rs4988235	g.30366C>T	CC	homozygous

Methods used: PCR and RFLP

RECOMMENDATIONS

Lactose-intolerant individuals should:

- introduce dietary changes to minimize clinical symptoms. Depending on the severity of lactose intolerance, the diet may vary in the extent to which dairy products are eliminated from the diet.
- consider being counseled by health-care practitioner or a nutritionist in order to receive consultation on dietary recommendations and education on the lactose-restricted diet.
- have periodic medical check-up performed by a health-care practitioner. Consultation with a dietitian is recommended as the dietary restrictions may cause deficiency of vitamins (vitamins A, B12 and D) and minerals (calcium, magnesium and zinc), which may increase risk for developing several conditions like osteopenia, osteoporosis, malnutrition and weight loss.

DESCRIPTION OF LACTOSE INTOLERANCE

Lactose intolerance is a widespread metabolic disorder caused by the inability to digest lactose due to a shortage of the lactase enzyme. Lactase activity is high during infancy, when milk is the main source of nutrition, and declines after the weaning phase in most mammals. Approximately 75% of the world's population loses the ability to digest lactose. The prevalence of adult type lactose intolerance varies depending on ethnicity, from less than 5% in north-western Europe to almost 100% in some Asian populations.

Clinical symptoms of lactose intolerance usually begin 30 minutes to 2 hours after eating or drinking foods that contain lactose, such as dairy products. The onset of symptoms is directly related to the quantity of ingested lactose. The severity of symptoms varies, depending on the amount of lactose each individual can tolerate. It is important to distinguish lactose intolerance from other conditions, for example irritable bowel syndrome, which have very similar symptoms.

Common symptoms of lactose intolerance and conditions with similar symptoms

Typical symptoms after consuming food or drink containing lactose	Conditions with similar symptoms
Abdominal bloating	Celiac disease
Abdominal pain	Cows' milk protein allergy (casein and whey)
Diarrhea	Crohn's disease
Flatulence	Irritable bowel syndrome
Failure to thrive	Ulcerative colitis
Nausea	
Steatorrhea (excess fat in stool)	
Stomach cramps	
Vomiting	

TREATMENT

Treatment for lactose intolerance includes a lactose-restricted diet. The extent of dietary changes depends on how much lactose a person can consume without exhibiting symptoms. Additionally, a lactose-intolerant individual may use commercially available lactase (LactAid, Lactase, DairyEase etc.), which reduces the lactose to glucose and galactose.

LACTOSE-RESTRICTED DIETARY GUIDELINES (the list is not conclusive)

Dairy products not permitted in a lactose restricted diet	Foods that may contain lactose*	Foods that do not contain lactose
Fresh milk	Bread and other baked foods	All types of milk made from almonds, coconuts, hazelnuts, oats, peas, potatoes, quinoa and rice
Butter	Medications in tablet format	All foods labeled "dairy-free", "lactose-free" or "suitable for vegans"
Ice cream	Mixes to make pancakes and biscuits	Cheese (cottage, edam, cheddar)
	Packets of instant potatoes and instant soup	Sour cream
	Peanut butter	Yogurts (probiotic yogurts)
	Some breakfast cereals	
	Some processed meats (sliced ham)	
	Sweets: biscuits, boiled sweets, candies, cakes, chocolate	

* Consumption of these foods depends on a person's exact level of intolerance to lactose. Lactose-intolerant individuals are recommended to check the ingredients of all food and drink products carefully, because milk or lactose are often hidden ingredients.

REFERENCES

Di Rienzo T, D'Angelo G, D'aversa F, Campanale MC, Cesario V, Montalto M, Gasbarrini A, Ojetti V. Lactose intolerance: from diagnosis to correct management. *Eur Rev Med Pharmacol Sci.* 2013 Dec;17 Suppl 2:18-25.

Enattah NS, Sahi T, Savilahti E, Terwilliger JD, Peltonen L, Järvelä I. Identification of a variant associated with adult-type hypolactasia. *Nat Genet.* 2002 Feb;30(2):233-7.