

# Sugar Intolerance

## Sugar Intolerance Strip Assay

Dietary carbohydrates for humans include polysaccharides (starch), disaccharides (sucrose, lactose) and monosaccharides (glucose, fructose, galactose). During digestion, specific brush border enzymes will initially hydrolyze poly- and disaccharides into their monosaccharide constituents, which subsequently become absorbed by apical cells of the small intestine and further metabolized. A variety of genetically determined enzyme and transporter deficiencies may cause hereditary intolerance to common dietary sugars.

Lactose intolerance (lactase non-persistence, adult-type hypolactasia) is an extremely frequent condition caused by the rapid decline of lactase activity after weaning. Undigested lactose is degraded into short-chain fatty acids and gas (CO<sub>2</sub>, H<sub>2</sub>) by colonic bacteria, leading to abdominal bloating, diarrhea, nausea and flatulence. In individuals of European descent lactose intolerance is highly associated with two polymorphisms located upstream of the lactase (LCT) gene locus.

Hereditary fructose intolerance (HFI) is an autosomal recessive disorder caused by mutations in the aldolase B gene. Affected subjects suffer from severe abdominal pain, vomiting and hypoglycaemia after intake of foods containing fructose. Prolonged ingestion may ultimately lead to death from irreversible liver and kidney damage. Most at risk are infants, who unlike many affected adults have not yet developed aversion to fruits and sweets. The severe condition of HFI due to aldolase B deficiency needs to be distinguished from the milder and more common fructose malabsorption, the molecular basis of which has not yet been elucidated.



## Sugar Intolerance StripAssay:

ViennaLab offers a reliable and convenient reverse-hybridization assay for the identification of two polymorphisms (-13910 T/C and -22018 A/G) upstream of the LCT gene and four mutations (del4E4, A149P, A174D, N334K) in the aldolase B gene. The assay can replace the inconvenient and time-consuming hydrogen breath test for diagnosing hereditary sugar intolerance in subjects of European descent.

The Sugar Intolerance StripAssay provides ready-to-use reagents for 20 tests. The entire assay can be accomplished in less than 6 hours, and may be carried out manually or largely automated.

### Principle of the assay:

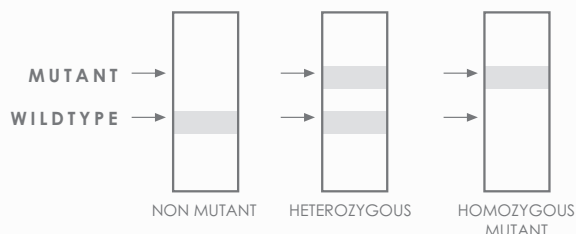
The Sugar Intolerance StripAssay is based on reverse-hybridization of biotinylated PCR products to a parallel array of allele-specific oligonucleotides immobilized on membrane teststrips. The StripAssay provides ready-to-use reagents for completion in four easy steps:

- Rapid and convenient isolation of genomic DNA from anticoagulated blood.
- Single multiplex PCR for the amplification of relevant LCT and aldolase B gene sequences.
- Hybridization of biotinylated amplification products to oligonucleotide probes on the teststrip.
- Detection of specifically bound mutant and wild-type alleles by visible enzymatic color reaction.

### Interpretation of results:

For each polymorphic position, one of three possible staining patterns may be obtained:

1. wild-type probe positive: normal genotype
2. wild-type and mutant probe positive: heterozygous genotype (carrier individual)
3. mutant probe positive: homozygous mutant genotype (affected individual)



### Sugar Intolerance StripAssay

Cat.no.: 4-310

**Further StripAssays are available or under development for:** Thalassaemia ( $\alpha$ -Globin,  $\beta$ -Globin), Cardiovascular Disease (CVD), Familial Mediterranean Fever (FMF), Gaucher Disease, Haemochromatosis, Pharmacogenetics, Cancer.



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