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My46 Trait Profile

Classic galactosemia

Other Names: Galactosemia type 1, galactose-1-phosphate uridyltransferase (GALT) deficiency

Classic galactosemia is a rare condition characterized by the body's inability to fully break down a sugar called galactose. It is most commonly caused by mutations in a gene called GALT that makes the protein galactose-1-phosphate uridyltransferase.

Characteristics of Classic galactosemia

Individuals with classic galactosemia cannot properly breakdown a sugar called galactose. Galactose is a simple sugar primarily found in breast milk, cow's milk, and dairy products (in the form of lactose). Galactose cannot be broken down into glucose because the enzyme, galactose-1-phosphate uridyltransferase, is not working properly. If an infant with galactosemia is given milk, harmful substances made from galactose build up in the body and damage the liver, brain, kidneys, and eyes. Galactosemia can cause yellowing of the skin and whites of the eyes (jaundice), clouding of the lens of the eye (cataracts), poor feeding and weight gain (failure to thrive), lack of energy (lethargy), vomiting, seizures, serious bacterial infections (sepsis), and even death in some untreated babies. Infants who are diagnosed and begin treatment within the first 1-2 weeks of life usually have a relatively normal life. However, even people who avoid lactose in their diet may still experience complications later in life. These can include intellectual disability, learning disabilities, and speech difficulties (apraxia of speech, dysarthria). There can also be neurological problems (ataxia, tremors, dystonia). The majority of females with classic galactosemia will experience reproductive problems caused by early ovarian failure (premature ovarian insufficiency).

Diagnosis/Testing

Virtually 100% of infants with classic galactosemia are diagnosed within the first few days or weeks of life through newborn screening (NBS). NBS tests a spot of blood from the baby's heel to see if the GALT enzyme is working properly. NBS test results are confirmed with additional blood and urine chemical tests, as well as with genetic testing of the GALT gene. This gene makes the galactose-1-phosphate uridyltransferase enzyme that is responsible for breaking down or processing galactose. Most individuals with classic galactosemia have changes or mutations in the GALT gene. If a pregnancy is known to be at risk for galactosemia, amniocentesis can be used for prenatal diagnosis.

There are two other less common forms of galactosemia: galactosemia type II and galactosemia type III. Galactosemia type II results from mutations in the GALK1 gene. Mutations in the GALE gene cause galactosemia type III. Like in classic galactosemia, the enzymes made from the GALK1 and GALE genes are essential for processing galactose. Without these enzymes, galactose and related compounds build up in the body. Galactosemia type II typically causes fewer medical problems than the classic type. Infants with galactosemia type II usually develop cataracts, but otherwise experience few long-term complications. The signs and symptoms of galactosemia type III range from being completely benign to severe and causing cataracts, delayed growth and development, intellectual disability, liver disease, and kidney problems.

Management/Surveillance

People with galactosemia follow a special diet: they must avoid eating any dairy or milk-containing foods, or any

other foods that contain lactose. This is a life-long diet restriction. Calcium and vitamin D supplements may be used for bone health. Children with galactosemia should have routine developmental evaluations. In addition, individuals may participate in speech therapy and special education services as needed.

Mode of inheritance

Classic galactosemia is inherited in an autosomal recessive pattern. This means that an individual has to inherit two GALT mutations (i.e., one from each parent) to be affected with galactosemia. If both parents are carriers of a GALT mutation, they have a 1 in 4 (25%) chance with each pregnancy of having a child with galactosemia. Babies born in the United States are screened for galactosemia by newborn screening.

Risk to family members

Parents of a child with galactosemia are carriers of galactosemia. If a sibling of a child with galactosemia is unaffected, he/she has a 2 in 3 (or 66%) chance of being a carrier of galactosemia.

Special considerations

Duarte variant galactosemia (DG) is a milder or benign form of galactosemia. In DG, the body is able to breakdown galactose, but at a reduced amount. Almost all individuals with DG show no features of classic galactosemia. No dietary restriction is required.

Resources

Galactosemia Foundation
http://galactosemia.org/
Genetics Home Reference: Galactosemia
http://ghr.nlm.nih.gov/condition=galactosemia
Medical Home Portal: Galactosemia
http://www.medicalhomeportal.org/newborn/galactosemia

References

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