ALG12-congenital disorder of glycosylation

Description

ALG12-congenital disorder of glycosylation (*ALG12*-CDG, also known as congenital disorder of glycosylation type Ig) is an inherited disorder with varying signs and symptoms that can affect several body systems. Individuals with *ALG12*-CDG typically develop signs and symptoms of the condition during infancy. They may have problems feeding and difficulty growing and gaining weight at the expected rate (failure to thrive). In addition, affected individuals often have intellectual disability, delayed development, and weak muscle tone (hypotonia), and some develop seizures.

Some people with *ALG12*-CDG have physical abnormalities such as a small head size (microcephaly) and unusual facial features. These features can include folds of skin that cover the inner corners of the eyes (epicanthal folds), a prominent nasal bridge, and abnormally shaped ears. Some males with *ALG12*-CDG have abnormal genitalia, such as a small penis (micropenis) and undescended testes.

People with *ALG12*-CDG often produce abnormally low levels of proteins called antibodies (or immunoglobulins), particularly immunoglobulin G (IgG). Antibodies help protect the body against infection by attaching to specific foreign particles and germs, marking them for destruction. A reduction in antibodies can make it difficult for affected individuals to fight infections.

Less common abnormalities seen in people with *ALG12*-CDG include a weakened heart muscle (cardiomyopathy) and poor bone development, which can lead to skeletal abnormalities.

Frequency

ALG12-CDG is a rare condition; its prevalence is unknown. Only a handful of affected individuals have been described in the medical literature.

Causes

Mutations in the *ALG12* gene cause *ALG12*-CDG. This gene provides instructions for making an enzyme that is involved in a process called glycosylation. During this process, complex chains of sugar molecules (oligosaccharides) are added to proteins and fats (lipids). Glycosylation modifies proteins and lipids so they can fully perform their functions. The enzyme produced from the *ALG12* gene transfers a simple sugar called

mannose to growing oligosaccharides at a particular step in the formation of the sugar chain. Once the correct number of sugar molecules are linked together, the oligosaccharide is attached to a protein or lipid.

ALG12 gene mutations lead to the production of an abnormal enzyme with reduced activity. Without a properly functioning enzyme, mannose cannot be added to the chain efficiently, and the resulting oligosaccharides are often incomplete. Although the short oligosaccharides can be transferred to proteins and fats, the process is not as efficient as with the full-length oligosaccharide. As a result, glycosylation is reduced. The wide variety of signs and symptoms in *ALG12*-CDG are likely due to impaired glycosylation of proteins and lipids that are needed for normal function of many organs and tissues, including the brain.

Learn more about the gene associated with ALG12-congenital disorder of glycosylation

- ALG12

Inheritance

This condition is inherited in an autosomal recessive pattern, which means both copies of the gene in each cell have mutations. The parents of an individual with an autosomal recessive condition each carry one copy of the mutated gene, but they typically do not show signs and symptoms of the condition.

Other Names for This Condition

- ALG12-CDG
- CDG Ig
- CDG1G
- Congenital disorder of glycosylation type 1G
- Congenital disorder of glycosylation type Ig

Additional Information & Resources

Genetic Testing Information

- Genetic Testing Registry: ALG12-congenital disorder of glycosylation (https://www.ncbi.nlm.nih.gov/gtr/conditions/C2931001/)

Genetic and Rare Diseases Information Center

- ALG12-CDG (https://rarediseases.info.nih.gov/diseases/9833/index)
- Congenital disorder of glycosylation (https://rarediseases.info.nih.gov/diseases/10307/index)

Patient Support and Advocacy Resources

- National Organization for Rare Disorders (NORD) (https://rarediseases.org/)

Catalog of Genes and Diseases from OMIM

- CONGENITAL DISORDER OF GLYCOSYLATION, TYPE Ig; CDG1G (https://omim.org/entry/607143)

Scientific Articles on PubMed

- PubMed (https://pubmed.ncbi.nlm.nih.gov/?term=%28congenital+disorder+of+glycosylation+type+Ig%29+AND+english%5Bla%5D+AND+human%5Bmh%5D)

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