Krabbe disease

What is Krabbe disease?

Krabbe disease is an inherited condition that causes damage to the nervous system. The damage to the nervous system causes the muscles to become weak and not function properly. Krabbe disease is inherited and passed on through the GLAC gene.

Types of Krabbe disease

There are two types of Krabbe disease: infantile-onset disease and later-onset disease.

Infantile onset

About 90% of individuals with Krabbe disease have infantile-onset disease. For these individuals, symptoms develop by 6 months of age. Initially, irritability and difficulties feeding are noted. Infants with Krabbe disease may be feverish without any signs of an infection, have stiff posture, and delays in their development. As Krabbe disease progresses, an infant's ability to move, chew, swallow, and breathe is affected. Vision loss and seizures also occur and infants with Krabbe disease usually do not survive past 2 years of age.

Later-onset Krabbe disease

About 10% of individuals with Krabbe disease have later-onset disease. Symptoms may begin in childhood, adolescence, or adulthood. Initially, problems with vision and walking are the most common symptoms but signs and symptoms are highly variable and are different between individuals with this type of Krabbe disease.

How is the GLAC gene inherited?

Everyone has two copies of most of their genes: one inherited from their mum and one from their dad. Krabbe disease occurs when both copies of the GLAC gene have a change in the gene instructions. This gene change stops the GLAC genes from working properly. This means Krabbe disease is a recessive condition because individuals with Krabbe disease will have inherited two copies (one from their mum and one from their dad) of the GLAC gene with a change.

Are family members at risk of Krabbe disease?

Individuals with one changed copy of their GLAC gene and one working copy of their GLAC gene are called carriers and will NOT develop Krabbe disease. Both parents of an individual with Krabbe disease are carriers. They have a 1 in 4 chance for every pregnancy of having a child with Krabbe disease.

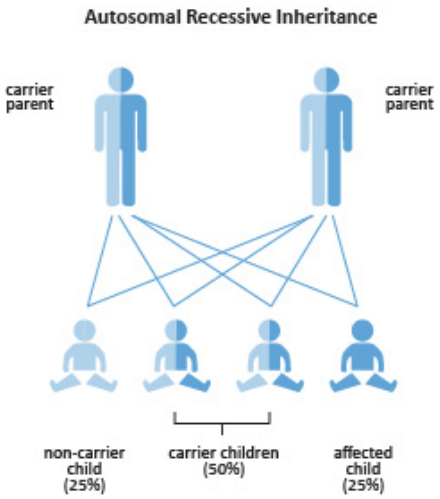

Figure 1. Diagram of autosomal recessive inheritance of GLAC gene changes
Source: https://www.jnetics.org/jewish_genetic_disorders/introduction_to_genetics/ accessed on 6/10/2019

What does the GLAC gene do?

The GLAC gene contains instructions for making an enzyme called galactosylceramidase. This enzyme breaks down a type of fat called galactolipids. When both copes of the GLAC genes are changed, they do not work properly and reduce the action of the enzyme. This means that galactolipids are not broken down and damage the nervous system cells that make myelin. This means that not enough myelin is produced, which is the material that wraps around nerves to protect them. Nerves and their myelin wrapping are called white matter. Without enough myelin, white matter is damaged, and the nervous system cannot work properly. This loss of white matter causes the signs and symptoms of Krabbe disease.

Treatment for Krabbe disease

There is no cure for Krabbe disease. However, treatment using stem cell transplant appears to have some effect in preventing or delaying the onset of symptoms. For individuals with Krabbe disease, the success of stem cell transplants depends on whether the treatment starts before symptoms develop. For most individuals with Krabbe disease, treatment is aimed at providing support and increasing quality of life.

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