Krabbe disease

Other names: Globoid leukodystrophy

What is Krabbe disease?

Krabbe disease is a type of leukodystrophy.

Leukodystrophies are a group of genetic conditions that mainly affect the white matter of the brain and spinal cord. The white matter is the wiring network of the brain that connects different brain regions and links the brain to the spinal cord and rest of the body.

Krabbe disease is characterized by the loss of the protective covering, or myelin, on the neurons. This is called demyelination.

Krabbe disease is also called globoid leukodystrophy due to the presence of abnormal, large, multi-nucleated cells, in the brain. The underlying enzyme deficiency causes lipids to build-up in cells which gives them the globoid appearance and leads to the depletion of myelin in the brain.

What are the symptoms of Krabbe disease?

There are two major types of Krabbe disease:

1. Infantile onset
This is the most common and more severe form of the condition affecting children less than 6 months of age. The life expectancy in these children is around the age of 2.

2. Childhood onset
Individuals start showing symptoms between 8-24 months of age. These individuals are known to have comparatively longer life expectancies.

Symptoms include:

- Irritability and feeding difficulties.
- Muscle weakness, feeding difficulties.
- Episodes of fever without any sign of infection.
- Stiff posture (spasticity).
- Vision loss.
- Seizures.
- Walking difficulties.

What causes Krabbe disease?

Krabbe disease is caused by changes in the *GALC* gene. This gene provides instructions for an enzyme called galactosylceramidase that break down galactolipids, which are important for the production and preservation of myelin.

Changes in this gene impacts the production of galactosylceramidase, resulting in the formation of globoid cells which impair the production of myelin and lead to demyelination of neurons.

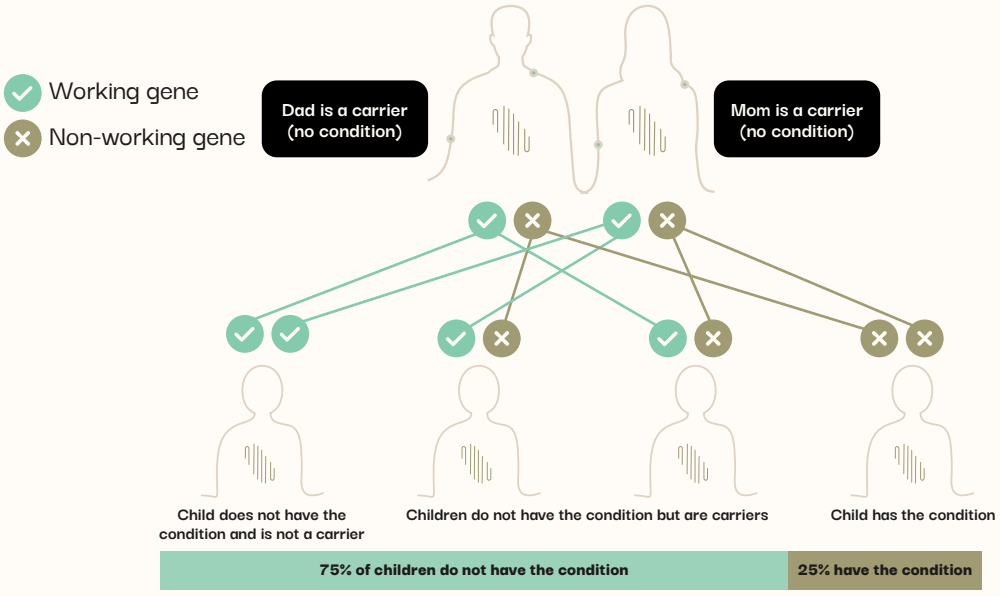
How is Krabbe disease diagnosed?

- Abnormal neuroimaging.
- GALC enzyme levels.
- Psychosine levels – elevated levels are suggestive of Krabbe disease.
- Molecular testing of *GALC* gene.

In some parts of the world, Krabbe disease can be established in an asymptomatic newborn from newborn screening tests. Molecular testing of the *GALC* gene is necessary to establish the diagnosis.

How is Krabbe disease inherited?

Krabbe disease is inherited in an autosomal recessive pattern. This is where two copies of the altered gene change causes Krabbe disease. Each parent passes on one copy of the altered gene change. This means that in each of the subsequent pregnancies the couple has a 1 in 4 chance of having an affected child. This also means that siblings of the parents can also be carriers.



Can Krabbe disease be treated?

Hematopoietic stem cell therapy (HSCT) is recommended for any individual under 14 days of age once the diagnosis is established. HSCT does not reverse the symptoms, but it is observed that the severity of the symptoms is reduced, and life expectancy is increased.

For individuals who are not eligible for HSCT, treatment is focused on the symptoms and the goal is to improve the quality of life. The multifunctional team of specialists includes neurologists, pulmonologists, physiotherapists, urologists, gastroenterologists, ophthalmologists, and dentists.

Support and resources:

- **Caring 4 Krabbe Kids** caring-4-krabbe-kids.com
- **Krabbe Connect** krabbeconnect.org
- **The Legacy of Angels Foundation** tloaf.org
- **Partners for Krabbe Research** krabbes.org
- **Peace, Love and Trevor Foundation** peaceloveandtrevor.com/about-us
- **United Leukodystrophy Foundation and Krabbe connect: Krabbe and Patient Focused Drug Development video** youtube.com/watch?v=go5nYnxxq94
- **Leukodystrophy Australia** leuko.org.au
- **Mission Massimo Foundation** missionmassimo.com
- **Hunter's Hope** huntershope.org/familycare/leukodystrophies/adrenoleukodystrophy

Research:

- **Australian Leukodystrophy Clinical and Research Program** leukonet.org.au
- **Clinical trials** clinicaltrials.gov/ct2/results?cond=krabbe+disease&term=&cntry=&state=&city=&dist=
- **Global Leukodystrophy Initiative** theglia.org

References:

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- medlineplus.gov/genetics/condition/krabbe-disease