Inheritest®
CARRIER SCREEN

Guanidinoacetate methyltransferase deficiency

What is guanidinoacetate methyltransferase deficiency?

Guanidinoacetate methyltransferase deficiency is an inherited disease with early age of onset.[1,2] Individuals with guanidinoacetate methyltransferase deficiency have a deficiency of the guanidinoacetate methyltransferase enzyme needed for making creatine, which is used by the body to store and use energy.[3] The symptoms of guanidinoacetate methyltransferase deficiency are due the shortage of the enzyme and consequent effects on parts of the body that need energy, especially the nervous system.[1] Guanidinoacetate methyltransferase deficiency belongs to a group of disorders called creatine deficiency syndromes.[2]

What are the symptoms of guanidinoacetate methyltransferase deficiency and what treatment is available?

Symptoms are usually evident between three months and three years of age and may include[1,2]:

- Intellectual disability
- Limited speech development
- Seizures
- Involuntary movements
- Developmental delay
- Hypotonia (poor muscle tone)
- Autistic behaviors including self-mutilation

Dietary treatment is most beneficial when started early and includes supplementation of creatine monohydrate and ornithine, and restriction of arginine or protein.[2] Other treatments are supportive to manage symptoms and prevent complications.[2]

How is guanidinoacetate methyltransferase deficiency inherited?

Guanidinoacetate methyltransferase deficiency is an autosomal recessive disease caused by mutations in the *GAMT* gene.[1] An individual who inherits one copy of a *GAMT* gene mutation is a carrier. Carriers are not affected with guanidinoacetate methyltransferase deficiency. An individual who inherits two *GAMT* mutations, one from each parent, is expected to be affected with guanidinoacetate methyltransferase deficiency.

If both members of a couple are carriers of mutations in the same gene, the risk for an affected child is 25% in each pregnancy; therefore, it is especially important that the reproductive partner of a carrier be offered testing.

Who is at risk for guanidinoacetate methyltransferase deficiency?

Guanidinoacetate methyltransferase deficiency is a rare condition that can occur in individuals of all races and ethnicities. It appears to be most common in individuals of Portuguese ancestry with a carrier frequency of 1 in 125.[4]

Having a relative who is a carrier or who is affected can increase an individual's risk to be a carrier. Consultation with a genetics health professional may be helpful in determining carrier risk and appropriate testing.

What does a positive test result mean?

If a gene mutation is identified, an individual should speak to a physician or genetics health professional about the implications of the result and appropriate testing for the reproductive partner and at-risk family members.

What does a negative test result mean?

A negative result reduces, but does not eliminate, the possibility that an individual carries a gene mutation. The likelihood of being a carrier is also influenced by family history, medical symptoms, and other relevant test results.

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Where can I get more information?

Genetics Home Reference: http://ghr.nlm.nih.gov/condition/guanidinoacetate-methyltransferase-deficiency

Children Living with Inherited Metabolic Diseases (CLIMB): http://www.climb.org.uk/

References

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4. Almeida LS, *et al*. A prevalent pathogenic GAMT mutation (c.59G>C) in Portugal. *Mol Genet Metab*. 2007;91(1):1-6