AMT gene

aminomethyltransferase

Normal Function

The *AMT* gene provides instructions for making an enzyme called aminomethyltransferase. This protein is one of four enzymes that work together in a group called the glycine cleavage system. Within cells, this system is active in specialized energy-producing centers called mitochondria.

As its name suggests, the glycine cleavage system breaks down a molecule called glycine by cutting (cleaving) it into smaller pieces. Glycine is an amino acid, which is a building block of proteins. This molecule also acts as a neurotransmitter, which is a chemical messenger that transmits signals in the brain. The breakdown of excess glycine when it is no longer needed is necessary for the normal development and function of nerve cells in the brain.

The breakdown of glycine by the glycine cleavage system produces a molecule called a methyl group. This molecule is added to and used by a vitamin called folate. Folate is required for many functions in the cell and is important for brain development.

Health Conditions Related to Genetic Changes

Nonketotic hyperglycinemia

Mutations in the *AMT* gene account for about 20 percent of all cases of nonketotic hyperglycinemia. This condition is characterized by abnormally high levels of glycine in the body (hyperglycinemia). Affected individuals have serious neurological problems. The signs and symptoms of the condition vary in severity and can include severe breathing difficulties shortly after birth as well as weak muscle tone (hypotonia), seizures, and delayed development of milestones. More than 70 mutations have been identified in affected individuals. Most of these genetic changes alter single amino acids in aminomethyltransferase. Other mutations delete genetic material from the *AMT* gene or disrupt how genetic information from the gene is spliced together to make a blueprint for producing aminomethyltransferase.

AMT gene mutations alter the structure and function of aminomethyltransferase. When an altered version of this enzyme is incorporated into the glycine cleavage system, it impairs the system's ability to break down glycine. Some *AMT* gene mutations reduce

the activity of the glycine cleavage system, while others completely eliminate its activity. As a result, excess glycine can build up in the body's organs and tissues. In addition, the production of methyl groups for use by folate is reduced. It is unclear how these abnormalities contribute to the developmental disability, seizures, breathing difficulties, and other features characteristic of nonketotic hyperglycinemia.

Other Names for This Gene

- GCE
- glycine cleavage system protein T
- NKH

Additional Information & Resources

Tests Listed in the Genetic Testing Registry

- Tests of AMT (https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=275[geneid])

Scientific Articles on PubMed

- PubMed (https://pubmed.ncbi.nlm.nih.gov/?term=%28aminomethyltransferase%5BTIAB%5D%29+OR+%28%28glycine+cleavage%5BTIAB%5D%29+AND+%28T+protein+OR+protein+T%5BTIAB%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+1800+days%22%5Bdp%5D)

Catalog of Genes and Diseases from OMIM

- AMINOMETHYLTRANSFERASE; AMT (https://omim.org/entry/238310)

Gene and Variant Databases

- NCBI Gene (https://www.ncbi.nlm.nih.gov/gene/275)
- ClinVar (https://www.ncbi.nlm.nih.gov/clinvar?term=AMT[gene])

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Genomic Location

The *AMT* gene is found on chromosome 3 (https://medlineplus.gov/genetics/chromosome/3/).

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