

GNMT gene

glycine N-methyltransferase

Normal Function

The *GNMT* gene provides instructions for producing the enzyme glycine N-methyltransferase. This enzyme is involved in a multistep process that breaks down the protein building block (amino acid) methionine. Specifically, glycine N-methyltransferase starts a reaction that converts the compounds glycine and S-adenosylmethionine (also called AdoMet) to N-methylglycine and S-adenosylhomocysteine (also called AdoHcy).

This reaction also helps to control the relative amounts of AdoMet and AdoHcy. The AdoMet to AdoHcy ratio is important in many body processes, including the regulation of other genes by the addition of methyl groups, consisting of one carbon atom and three hydrogen atoms (methylation). Methylation is important in many cellular functions. These include determining whether the instructions in a particular segment of DNA are carried out, regulating reactions involving proteins and lipids, and controlling the processing of chemicals that relay signals in the nervous system (neurotransmitters).

The glycine N-methyltransferase enzyme is also involved in processing toxic compounds in the liver.

Health Conditions Related to Genetic Changes

Hypermethioninemia

At least six variants (also called mutations) in the *GNMT* gene have been described in individuals with hypermethioninemia, which is characterized by an excess of methionine in the blood. Most of these variants substitute one amino acid for another in the N-methyltransferase enzyme, which reduces the enzyme's function. The reduced glycine N-methyltransferase activity resulting from *GNMT* gene variants impairs the breakdown of methionine, causing it to build up in the blood. Excess methionine can result in neurological problems and other signs and symptoms in some individuals with hypermethioninemia.

Prostate cancer

MedlinePlus Genetics provides information about Prostate cancer

Cancers

Certain inherited variations in the *GNMT* gene have been associated with an increased risk of liver and prostate cancers. Other *GNMT* gene variants that have been found in cancerous tumors are acquired during a person's lifetime and are present only in certain cells. These changes, which are called somatic variants, are not inherited. *GNMT* gene variants likely impair glycine N-methyltransferase functions such as processing potential cancer-causing substances in the liver and helping to regulate other genes, including those responsible for controlling cell growth. When cells grow too rapidly or in an uncontrolled way, a cancerous tumor can form.

Other Names for This Gene

- Glycine Methyltransferase
- Glycine Sarcosine Methyltransferase
- Glycine Sarcosine N-Methyltransferase
- GNMT_HUMAN

Additional Information & Resources

Tests Listed in the Genetic Testing Registry

- Tests of GNMT ([https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=27232\[geneid\]](https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=27232[geneid]))

Scientific Articles on PubMed

- PubMed (<https://pubmed.ncbi.nlm.nih.gov/?term=%28%28GNMT%5BTIAB%5D%29+OR+%28glycine+N-methyltransferase%5BTIAB%5D%29%29+AND+%28%28Genes%5BMH%5D%29+OR+%28Genetic+Phenomena%5BMH%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+3600+days%22%5Bdp%5D%29%29%29>)

Catalog of Genes and Diseases from OMIM

- GLYCINE N-METHYLTRANSFERASE; GNMT (<https://omim.org/entry/606628>)

Gene and Variant Databases

- NCBI Gene (<https://www.ncbi.nlm.nih.gov/gene/27232>)
- ClinVar ([https://www.ncbi.nlm.nih.gov/clinvar?term=GNMT\[gene\]](https://www.ncbi.nlm.nih.gov/clinvar?term=GNMT[gene]))

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Genomic Location

The *GNMT* gene is found on chromosome 6 (<https://medlineplus.gov/genetics/chromosome/6/>).

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