SLC25A15 gene

solute carrier family 25 member 15

Normal Function

The *SLC25A15* gene provides instructions for making a protein called mitochondrial ornithine transporter 1. This protein participates in the urea cycle, which is a sequence of biochemical reactions that occurs in liver cells. The urea cycle breaks down excess nitrogen, made when protein is broken down by the body, to make a compound called urea that is excreted by the kidneys in urine. Excreting the excess nitrogen prevents it from accumulating in the form of ammonia, which is toxic, especially to the nervous system.

Mitochondrial ornithine transporter 1 is needed to move a molecule called ornithine within the mitochondria (the energy-producing centers in cells). Specifically, this protein transports ornithine across the inner membrane of mitochondria to the region called the mitochondrial matrix, where it participates in the urea cycle.

Health Conditions Related to Genetic Changes

Ornithine translocase deficiency

At least 35 mutations in the *SLC25A15* gene have been identified in individuals affected by ornithine translocase deficiency, which is characterized by abnormally high levels of ammonia in the blood. This condition can cause extreme tiredness (lethargy), difficulty feeding, problems controlling breathing or body temperature, and seizures in infancy. Affected adults can have episodes of vomiting, difficulty with movements, liver problems, or neurological problems.

The most common mutation found in people with ornithine translocase deficiency deletes the protein building block (amino acid) phenylalanine at position 188 (written as Phe188del or F188del). This mutation is seen in 30 to 50 percent of affected individuals and most commonly occurs in the French-Canadian population. Another common mutation replaces the amino acid arginine with a premature stop signal in the instructions for making the protein (written as Arg179Ter or R179X). This mutation is found in about 15 percent of affected individuals and most commonly occurs in Japanese and Middle Eastern populations.

Mutations in the *SLC25A15* gene cause the production of a mitochondrial ornithine

transporter 1 with reduced or absent function. As a result, ornithine transport is impaired and the urea cycle cannot proceed normally. Without a normally functioning urea cycle, nitrogen accumulates in the bloodstream in the form of toxic ammonia instead of being converted to less toxic urea and being excreted. Ammonia is especially damaging to the brain, and excess ammonia causes neurological problems and other signs and symptoms of ornithine translocase deficiency.

Other Names for This Gene

- D13S327
- HHH
- ORC1
- ornithine transporter 1
- ORNT1
- ORNT1_HUMAN
- OTTHUMP00000042249
- solute carrier family 25 (mitochondrial carrier; ornithine transporter) member 15

Additional Information & Resources

Tests Listed in the Genetic Testing Registry

- Tests of SLC25A15 (https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=10166[geneid])

Scientific Articles on PubMed

- PubMed (https://pubmed.ncbi.nlm.nih.gov/?term=%28%28SLC25A15%5BTIAB%5D%29+OR+%28solute+carrier+family+25+++member+15%5BTIAB%5D%29%29+OR+%28%28HHH%5BTIAB%5D%29+OR+%28ORNT1%5BTIAB%5D%29+OR+%28D13S327%5BTIAB%5D%29+OR+%28OTTHUMP00000042249%5BTIAB%5D%29+OR+%28ornithine+transporter+1%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+2160+days%22%5Bdp%5D)

Catalog of Genes and Diseases from OMIM

- SOLUTE CARRIER FAMILY 25 (MITOCHONDRIAL CARRIER, ORNITHINE TRANSPORTER), MEMBER 15; SLC25A15 (https://omim.org/entry/603861)

Gene and Variant Databases

- NCBI Gene (https://www.ncbi.nlm.nih.gov/gene/10166)

- ClinVar (https://www.ncbi.nlm.nih.gov/clinvar?term=SLC25A15[gene])

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Genomic Location

The *SLC25A15* gene is found on chromosome 13 (https://medlineplus.gov/genetics/chromosome/13/).

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