SLC29A3 gene

solute carrier family 29 member 3

Normal Function

The *SLC29A3* gene provides instructions for making a protein called equilibrative nucleoside transporter 3 (ENT3). ENT3 belongs to a family of proteins that transport molecules called nucleosides in cells. With chemical modification, nucleosides become the building blocks of DNA, its chemical cousin RNA, and molecules such as ATP and GTP, which serve as energy sources in the cell. Molecules derived from nucleosides play an important role in many functions throughout the body.

ENT3 is found in the membranes surrounding cell structures known as lysosomes and mitochondria. Lysosomes are compartments within the cell that use digestive enzymes to break down large molecules into smaller ones that can be reused by cells. Researchers believe that ENT3 transports nucleosides generated by the breakdown of DNA and RNA out of lysosomes into the cell so they can be reused.

Mitochondria are structures within cells that convert the energy from food into a form that cells can use. While most DNA is packaged in chromosomes within the nucleus, mitochondria also have a small amount of their own DNA (called mitochondrial DNA). Researchers believe that the ENT3 protein in mitochondrial membranes helps transport nucleosides into mitochondria; the nucleosides can then be used for the formation or repair of mitochondrial DNA and RNA, which are essential for proper functioning of the structures.

Health Conditions Related to Genetic Changes

Histiocytosis-lymphadenopathy plus syndrome

Mutations in the *SLC29A3* gene cause histiocytosis-lymphadenopathy plus syndrome, which is a group of conditions with overlapping signs and symptoms that affect many parts of the body. A feature common to the disorders in this spectrum is histiocytosis, which is the overgrowth of immune system cells called histiocytes. These cells abnormally accumulate in tissues, often in the lymph nodes of the neck. Buildup of these cells in the lymph nodes causes swelling of the lymph nodes (lymphadenopathy). Other features can include unusually dark (hyperpigmented) skin patches with excessive hair growth (hypertrichosis), diabetes, and hearing loss.

The *SLC29A3* gene mutations involved in this spectrum of disorders reduce or eliminate the activity of the ENT3 protein. Researchers are unsure how loss of ENT3 activity causes histiocytosis and other features of histiocytosis-lymphadenopathy plus syndrome. They speculate that the resulting impairment of nucleoside transport leads to a buildup of nucleosides in lysosomes and possibly in other cellular structures. The excess nucleosides may be damaging to cell function. A lack of ENT3 activity can also lead to a reduction in the amount of nucleosides in mitochondria. This nucleoside shortage could impair cellular energy production, which would impact many body systems. It is unclear how *SLC29A3* gene mutations cause different patterns of signs and symptoms, even within the same family.

Other Names for This Gene

- ENT3
- equilibrative nucleoside transporter 3
- FLJ11160
- HCLAP
- HJCD
- PHID
- solute carrier family 29 (equilibrative nucleoside transporter), member 3
- solute carrier family 29 (nucleoside transporters), member 3

Additional Information & Resources

Tests Listed in the Genetic Testing Registry

- Tests of SLC29A3 (https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=55315[geneid])

Scientific Articles on PubMed

- PubMed (https://pubmed.ncbi.nlm.nih.gov/?term=%28SLC29A3%5BTIAB%5D%29+AND+%28%28Genes%5BMH%5D%29+OR+%28Genetic+Phenomena%5BMH%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

- SOLUTE CARRIER FAMILY 29 (NUCLEOSIDE TRANSPORTER), MEMBER 3: SLC29A3 (https://omim.org/entry/612373)

Gene and Variant Databases

- NCBI Gene (https://www.ncbi.nlm.nih.gov/gene/55315)

- ClinVar (https://www.ncbi.nlm.nih.gov/clinvar?term=SLC29A3[gene])

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Genomic Location

The *SLC29A3* gene is found on chromosome 10 (https://medlineplus.gov/genetics/chromosome/10/).

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