SLC16A2 gene

solute carrier family 16 member 2

Normal Function

The *SLC16A2* gene (also known as *MCT8*) provides instructions for making a protein that plays a critical role in nervous system development. This protein transports a particular hormone into nerve cells in the developing brain. This hormone, called triiodothyronine or T3, is produced by the thyroid (a butterfly-shaped gland in the lower neck). Once inside a nerve cell, T3 interacts with receptors in the nucleus that turn specific genes on or off. The activity of this hormone appears to be critical for the maturation of nerve cells, the movement of these cells to their proper locations (cell migration), and the formation of specialized cell outgrowths called dendrites. T3 may also play a role in the development of synapses, which are junctions between nerve cells where cell-to-cell communication occurs.

In addition to the nervous system, T3 is produced in the liver, kidney, heart, and several other tissues. T3 and other forms of thyroid hormone help regulate the development of many organs and control the rate of chemical reactions in the body (metabolism).

Health Conditions Related to Genetic Changes

Allan-Herndon-Dudley syndrome

At least a dozen mutations in the *SLC16A2* gene have been identified in people with the characteristic features of Allan-Herndon-Dudley syndrome. Some of these mutations insert or delete genetic material in the gene. Other mutations change single protein building blocks (amino acids) used to make the SLC16A2 protein. All of these genetic changes alter the structure and function of this protein, preventing it from transporting T3 into nerve cells effectively. A lack of this critical hormone in certain parts of the brain disrupts normal brain development, resulting in intellectual disability and problems with movement.

If T3 is not taken up by nerve cells, excess amounts of this hormone continue to circulate in the bloodstream. An increase in circulating T3 may be toxic to some organs, such as the liver. Researchers are working to determine whether increased T3 levels in the body contribute to the signs and symptoms of Allan-Herndon-Dudley syndrome.

Other Names for This Gene

- DXS128E
- MCT8
- monocarboxylate transporter 8
- MOT8_HUMAN
- solute carrier family 16 (monocarboxylic acid transporters), member 2
- solute carrier family 16, member 2 (monocarboxylic acid transporter 8)
- solute carrier family 16, member 2 (thyroid hormone transporter)
- X-linked PEST-containing transporter
- XPCT

Additional Information & Resources

Tests Listed in the Genetic Testing Registry

- Tests of SLC16A2 (https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=6567[geneid])

Scientific Articles on PubMed

- PubMed (https://pubmed.ncbi.nlm.nih.gov/?term=%28SLC16A2%5BTIAB%5D%29+OR+%28%28AHDS%5BTIAB%5D%29+OR+%28MCT8%5BTIAB%5D%29+OR+%28monocarboxylate+transporter+8%5BTIAB%5D%29+OR+%28X-linked+PEST-containing+transporter%5BTIAB%5D%29+OR+%28XPCT%5BTIAB%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+3600+days%22%5Bdp%5D)

Catalog of Genes and Diseases from OMIM

- SOLUTE CARRIER FAMILY 16 (MONOCARBOXYLIC ACID TRANSPORTER), MEMBER 2; SLC16A2 (https://omim.org/entry/300095)

Gene and Variant Databases

- NCBI Gene (https://www.ncbi.nlm.nih.gov/gene/6567)
- ClinVar (https://www.ncbi.nlm.nih.gov/clinvar?term=SLC16A2[gene])

References

- Dumitrescu AM, Liao XH, Weiss RE, Millen K, Refetoff S. Tissue-specificthyroid hormone deprivation and excess in monocarboxylate transporter (mct)8-deficient

mice. Endocrinology. 2006 Sep;147(9):4036-43. doi:10.1210/en.2006-0390. Epub 2006 May 18. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/16709608)

- Friesema EC, Grueters A, Biebermann H, Krude H, von Moers A, Reeser M, BarrettTG, Mancilla EE, Svensson J, Kester MH, Kuiper GG, Balkassmi S, Uitterlinden AG,Koehrle J, Rodien P, Halestrap AP, Visser TJ. Association between mutations in athyroid hormone transporter and severe X-linked psychomotor retardation. Lancet.2004 Oct 16-22;364(9443):1435-7. doi: 10.1016/S0140-6736(04) 17226-7. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/15488219)
- Friesema EC, Jansen J, Heuer H, Trajkovic M, Bauer K, Visser TJ. Mechanisms ofdisease: psychomotor retardation and high T3 levels caused by mutations inmonocarboxylate transporter 8. Nat Clin Pract Endocrinol Metab. 2006Sep;2(9): 512-23. doi: 10.1038/ncpendmet0262. Citation on PubMed (https://pubmed.ncbi.nlm. nih.gov/16957765)
- Friesema EC, Kuiper GG, Jansen J, Visser TJ, Kester MH. Thyroid hormonetransport by the human monocarboxylate transporter 8 and its rate-limiting rolein intracellular metabolism. Mol Endocrinol. 2006 Nov;20(11):2761-72. doi:10. 1210/me.2005-0256. Epub 2006 Aug 3. Citation on PubMed (https://pubmed.ncbi.nl m.nih.gov/16887882)
- Herzovich V, Vaiani E, Marino R, Dratler G, Lazzati JM, Tilitzky S, Ramirez P, Iorcansky S, Rivarola MA, Belgorosky A. Unexpected peripheral markers of thyroidfunction in a patient with a novel mutation of the MCT8 thyroid hormonetransporter gene. Horm Res. 2007;67(1):1-6. doi: 10.1159/000095805. Epub 2006 Sep15. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/16974106)
- Holden KR, Zuniga OF, May MM, Su H, Molinero MR, Rogers RC, Schwartz CE.X-linked MCT8 gene mutations: characterization of the pediatric neurologicphenotype. J Child Neurol. 2005 Oct;20(10):852-7. doi:10.1177/08830738050200101601. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/16417886)
- Jansen J, Friesema EC, Kester MH, Milici C, Reeser M, Gruters A, Barrett TG, Mancilla EE, Svensson J, Wemeau JL, Busi da Silva Canalli MH, Lundgren J, McEntagart ME, Hopper N, Arts WF, Visser TJ. Functional analysis ofmonocarboxylate transporter 8 mutations identified in patients with X-linkedpsychomotor retardation and elevated serum triiodothyronine. J Clin EndocrinolMetab. 2007 Jun;92(6):2378-81. doi: 10.1210/jc.2006-2570. Epub 2007 Mar 13. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/17356046)
- Jansen J, Friesema EC, Milici C, Visser TJ. Thyroid hormone transporters inhealth and disease. Thyroid. 2005 Aug;15(8):757-68. doi: 10.1089/thy.2005.15.757. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/16131319)
- Kakinuma H, Itoh M, Takahashi H. A novel mutation in the monocarboxylatetransporter 8 gene in a boy with putamen lesions and low free T4 levels incerebrospinal fluid. J Pediatr. 2005 Oct;147(4):552-4. doi:10.1016/j.jpeds. 2005.05.012. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/16227048)
- Maranduba CM, Friesema EC, Kok F, Kester MH, Jansen J, Sertie AL, Passos-BuenoMR, Visser TJ. Decreased cellular uptake and metabolism in Allan-Herndon-Dudleysyndrome (AHDS) due to a novel mutation in the MCT8 thyroid hormone transporter.J Med Genet. 2006 May;43(5):457-60. doi: 10.1136/jmg.2005.035840.

Epub 2005 Jun24. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/15980113) or Free article on PubMed Central (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2649011/)

- Schwartz CE, May MM, Carpenter NJ, Rogers RC, Martin J, Bialer MG, Ward J, Sanabria J, Marsa S, Lewis JA, Echeverri R, Lubs HA, Voeller K, Simensen RJ, Stevenson RE. Allan-Herndon-Dudley syndrome and the monocarboxylate transporter 8(MCT8) gene. Am J Hum Genet. 2005 Jul;77(1):41-53. doi: 10.1086/431313. Epub 2005May 11. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/15889350) or Free article on PubMed Central (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1226193/)

Genomic Location

The *SLC16A2* gene is found on the X chromosome (https://medlineplus.gov/genetics/chromosome/x/).

Last updated May 1, 2007