

MLC1 gene

modulator of VRAC current 1

Normal Function

The *MLC1* gene provides instructions for making a protein that is found primarily in the brain but also in the spleen and white blood cells (leukocytes). Within the brain, the MLC1 protein is found in astroglial cells, which are a specialized form of brain cells called glial cells. Glial cells protect and maintain other nerve cells (neurons). The MLC1 protein functions at junctions that connect neighboring astroglial cells. The role of the MLC1 protein at the cell junction is unknown, but research suggests that it may control the flow of fluids into cells or the strength of cells' attachment to one another (cell adhesion). Studies indicate that the MLC1 protein may be involved in transporting molecules across the blood-brain barrier and the brain-cerebrospinal fluid barrier. These barriers protect the brain's delicate nerve tissue by allowing only certain substances to pass into the brain.

Health Conditions Related to Genetic Changes

Megalencephalic leukoencephalopathy with subcortical cysts

More than 80 mutations in the *MLC1* gene have been found to cause megalencephalic leukoencephalopathy with subcortical cysts type 1; this type accounts for 75 percent of all cases. This condition affects brain development and function, resulting in problems with movement and recurrent seizures. Most of the *MLC1* gene mutations that cause this condition change single protein building blocks (amino acids) in the MLC1 protein. These changes alter the structure of the MLC1 protein or prevent the cell from producing any protein. It is unknown how a lack of MLC1 protein at astroglial cell junctions impairs brain development and function, causing the signs and symptoms of megalencephalic leukoencephalopathy with subcortical cysts type 1.

Other Names for This Gene

- KIAA0027
- LVM
- megalencephalic leukoencephalopathy with subcortical cysts 1 gene product
- MLC
- MLC1_HUMAN

- VL

Additional Information & Resources

Tests Listed in the Genetic Testing Registry

- Tests of MLC1 ([https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=23209\[geneid\]](https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=23209[geneid]))

Scientific Articles on PubMed

- PubMed (<https://pubmed.ncbi.nlm.nih.gov/?term=%28MLC1%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+3600+days%22%5Bdp%5D>)

Catalog of Genes and Diseases from OMIM

- MODULATOR OF VRAC CURRENT 1; MLC1 (<https://omim.org/entry/605908>)

Gene and Variant Databases

- NCBI Gene (<https://www.ncbi.nlm.nih.gov/gene/23209>)
- ClinVar ([https://www.ncbi.nlm.nih.gov/clinvar?term=MLC1\[gene\]](https://www.ncbi.nlm.nih.gov/clinvar?term=MLC1[gene]))

References

- Boor PK, de Groot K, Waisfisz Q, Kamphorst W, Oudejans CB, Powers JM, Pronk JC, Scheper GC, van der Knaap MS. MLC1: a novel protein in distal astroglial processes. *J Neuropathol Exp Neurol*. 2005 May;64(5):412-9. doi:10.1093/jnen/64.5.412. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/15892299>)
- Capdevila-Nortes X, Lopez-Hernandez T, Apaja PM, Lopez de Heredia M, Sirisi S, Callejo G, Arnedo T, Nunes V, Lukacs GL, Gasull X, Estevez R. Insights into MLCpathogenesis: GlialCAM is an MLC1 chaperone required for proper activation of volume-regulated anion currents. *Hum Mol Genet*. 2013 Nov 1;22(21):4405-16. doi: 10.1093/hmg/ddt290. Epub 2013 Jun 20. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/23793458>)
- Ijla Boor PK, de Groot K, Mejaski-Bosnjak V, Brenner C, van der Knaap MS, Scheper GC, Pronk JC. Megalencephalic leukoencephalopathy with subcortical cysts: an update and extended mutation analysis of MLC1. *Hum Mutat*. 2006 Jun;27(6):505-12. doi: 10.1002/humu.20332. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/16652334>)
- Lopez-Hernandez T, Sirisi S, Capdevila-Nortes X, Montolio M, Fernandez-Duenas V,

Scheper GC, van der Knaap MS, Casquero P, Ciruela F, Ferrer I, Nunes V, Estevez R. Molecular mechanisms of MLC1 and GLIALCAM mutations in megalencephalicleukoencephalopathy with subcortical cysts. *Hum Mol Genet.* 2011 Aug15;20(16):3266-77. doi: 10.1093/hmg/ddr238. Epub 2011 May 30. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/21624973>)

- Montagna G, Teijido O, Eymard-Pierre E, Muraki K, Cohen B, Loizzo A, Grosso P, Tedeschi G, Palacin M, Boespflug-Tanguy O, Bertini E, Santorelli FM, Estevez R. Vacuolating megalencephalic leukoencephalopathy with subcortical cysts: functional studies of novel variants in MLC1. *Hum Mutat.* 2006 Mar;27(3):292. doi:10.1002/humu.9407. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/16470554>)

Genomic Location

The *MLC1* gene is found on chromosome 22 (<https://medlineplus.gov/genetics/chromosome/22/>).

Last updated March 1, 2015