LIMK1 gene

LIM domain kinase 1

Normal Function

The *LIMK1* gene provides instructions for making a protein that is highly active in the brain, where it is thought to be involved in the growth and development of nerve cells. Studies suggest that this protein may play an important role in areas of the brain that are responsible for processing visual-spatial information (visuospatial constructive cognition). These parts of the brain are important for visualizing an object as a set of parts and performing tasks such as writing, drawing, constructing models, and assembling puzzles.

Within cells, the LIMK1 protein likely regulates aspects of the cytoskeleton, the structural framework that helps to determine cell shape, size, and movement. The LIMK1 protein helps control the organization of actin filaments, which are long, thin fibers that are part of the cytoskeleton. Actin filaments are necessary for several normal cellular functions, such as cell division, cell movement (motility), maintenance of cell shape, transport of proteins and other molecules within cells, and chemical signaling between cells.

Health Conditions Related to Genetic Changes

Williams syndrome

The *LIMK1* gene is located in a region of chromosome 7 that is deleted in people with Williams syndrome, which is a developmental disorder characterized by mild to moderate intellectual disability or learning problems, unique personality characteristics, distinctive facial features, and heart and blood vessel (cardiovascular) problems. As a result of the deletion, people with Williams syndrome are missing one copy of the *LIMK1* gene in each cell. Some studies suggest that a loss of this gene contributes to the characteristic problems with visual-spatial tasks (such as writing and drawing) seen in Williams syndrome; however, other studies have not found this connection. Researchers are working to determine how a reduction in the amount of LIMK1 protein could be related to the specific impairments seen in Williams syndrome.

Cancers

The LIMK1 protein is produced at unusually high levels (overexpressed) in some

cancerous tumors. For example, increased amounts of this protein have been found in a form of skin cancer called melanoma and in ovarian cancer, breast cancer, lung cancer, and prostate cancer. Researchers believe that high levels of the LIMK1 protein may be associated with changes in the organization of actin filaments and an increased chance that a tumor will invade other tissues.

Other Names for This Gene

- LIM kinase
- LIM kinase 1
- LIM motif-containing protein kinase
- LIMK
- LIMK-1
- LIMK1_HUMAN

Additional Information & Resources

Tests Listed in the Genetic Testing Registry

- Tests of LIMK1 (https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=3984[geneid])

Scientific Articles on PubMed

- PubMed (https://pubmed.ncbi.nlm.nih.gov/?term=%28LIMK1%5BTIAB%5D%29+OR+%28%28LIMK%5BTIAB%5D%29+OR+%28LIMK-1%5BTIAB%5D%29+OR+%28LIM+kinase+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

- LIM DOMAIN KINASE 1; LIMK1 (https://omim.org/entry/601329)

Gene and Variant Databases

- NCBI Gene (https://www.ncbi.nlm.nih.gov/gene/3984)
- ClinVar (https://www.ncbi.nlm.nih.gov/clinvar?term=LIMK1[gene])

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Genomic Location

The *LIMK1* gene is found on chromosome 7 (https://medlineplus.gov/genetics/chromosome/7/).

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