LDB3 gene

LIM domain binding 3

Normal Function

The *LDB3* gene provides instructions for making a protein called LIM domain binding 3 (LDB3). The LDB3 protein is found in heart (cardiac) muscle and muscles used for movement (skeletal muscle). Within muscle fibers, LDB3 proteins are found in structures called sarcomeres, which are necessary for muscles to tense (contract). This protein attaches (binds) to other proteins and is involved in maintaining the stability of rod-like structures within sarcomeres called Z-discs. Z-discs link neighboring sarcomeres together to form myofibrils, the basic unit of muscle fibers. The linking of sarcomeres and formation of myofibrils provide strength for muscle fibers during repeated cycles of muscle contraction and relaxation.

Several different versions (isoforms) of the LDB3 protein are produced from the *LDB3* gene.

Health Conditions Related to Genetic Changes

Myofibrillar myopathy

At least three mutations in the *LDB3* gene have been found to cause myofibrillar myopathy. These mutations change single protein building blocks (amino acids) in the LDB3 protein. Mutated LDB3 proteins cluster together with other muscle proteins in the sarcomere to form clumps (aggregates). The aggregates prevent these proteins from functioning normally. A dysfunctional desmin protein cannot properly interact with Z-discs, leading to abnormalities of sarcomere structure and problems with the formation of myofibrils. *LDB3* gene mutations that cause myofibrillar myopathy impair the function of muscle fibers, causing weakness and the other features of this condition.

Familial dilated cardiomyopathy

MedlinePlus Genetics provides information about Familial dilated cardiomyopathy

Left ventricular noncompaction

MedlinePlus Genetics provides information about Left ventricular noncompaction

Other disorders

Mutations in the *LDB3* gene also cause a form of heart disease called dilated cardiomyopathy. This condition enlarges (dilates) and weakens the cardiac muscle, preventing it from pumping blood efficiently. Although cardiomyopathy is a sign of myofibrillar myopathy, some cases of dilated cardiomyopathy caused by *LDB3* gene mutations are not associated with weakness of the skeletal muscles. Researchers have identified at least two mutations in the *LDB3* gene that cause dilated cardiomyopathy without the other features of myofibrillar myopathy. These mutations, written as Asp117Asn and Lys136Met, change single amino acids in the LDB3 protein. Researchers are not certain why some mutations in the *LDB3* gene cause dilated cardiomyopathy instead of myofibrillar myopathy.

Other Names for This Gene

- LDB3_HUMAN
- LDB3Z1
- LDB3Z4
- LIM domain-binding protein 3
- ZASP

Additional Information & Resources

Tests Listed in the Genetic Testing Registry

- Tests of LDB3 (https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=11155[geneid])

Scientific Articles on PubMed

- PubMed (https://pubmed.ncbi.nlm.nih.gov/?term=%28%28LDB3%5BTIAB%5D%29+OR+%28LIM+domain+binding+3%5BTIAB%5D%29%29+OR+%28ZASP%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+1080+days%22%5Bdp%5D)

Catalog of Genes and Diseases from OMIM

- CARDIOMYOPATHY, DILATED, 1C, WITH OR WITHOUT LEFT VENTRICULAR NONCOMPACTION; CMD1C (https://omim.org/entry/601493)
- LIM DOMAIN-BINDING 3; LDB3 (https://omim.org/entry/605906)

Gene and Variant Databases

- NCBI Gene (https://www.ncbi.nlm.nih.gov/gene/11155)
- ClinVar (https://www.ncbi.nlm.nih.gov/clinvar?term=LDB3[gene])

References

- Ferrer I, Olive M. Molecular pathology of myofibrillar myopathies. Expert RevMol Med. 2008 Sep 3;10:e25. doi: 10.1017/S1462399408000793. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/18764962)
- Schroder R, Schoser B. Myofibrillar myopathies: a clinical and myopathologicalguide. Brain Pathol. 2009 Jul;19(3):483-92. doi:10.1111/j.1750-3639.2009.00289.x. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/19563540)
- Selcen D, Engel AG. Mutations in ZASP define a novel form of musculardystrophy in humans. Ann Neurol. 2005 Feb;57(2):269-76. doi: 10.1002/ana.20376. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/15668942)

Genomic Location

The *LDB3* gene is found on chromosome 10 (https://medlineplus.gov/genetics/chromosome/10/).

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