

## CAPN3 gene

calpain 3

### Normal Function

The *CAPN3* gene provides instructions for making an enzyme called calpain-3, which is found within muscle cells in structures called sarcomeres. Sarcomeres are the basic unit of muscle contraction. They are made of proteins that generate the mechanical force needed for muscles to contract.

The function of the calpain-3 enzyme is not well understood. Researchers suggest it may help cut (cleave) damaged proteins into shorter segments to facilitate their removal from the sarcomere. Studies have also shown that calpain-3 attaches (binds) to proteins involved in controlling the ability of muscle fibers to stretch (elasticity) and in cell signaling. However, its specific roles in these processes are unknown.

### Health Conditions Related to Genetic Changes

#### Limb-girdle muscular dystrophy

More than 300 mutations in the *CAPN3* gene have been identified in people with limb-girdle muscular dystrophy type 2A. This form of limb-girdle muscular dystrophy is also called calpainopathy.

Limb-girdle muscular dystrophy is a group of related disorders characterized by muscle weakness and wasting, particularly in the shoulders, hips, and limbs. *CAPN3* gene mutations are the most common cause of limb-girdle muscular dystrophy. These mutations account for approximately 30 percent of limb-girdle muscular dystrophy cases overall, although the percentage varies by specific population.

Most *CAPN3* gene mutations change one protein building block (amino acid) in the calpain-3 enzyme. These mutations result in a calpain-3 enzyme that is abnormally short or unstable. Disruption of the enzyme's ability to properly cleave proteins for removal from the sarcomere may allow these waste proteins to accumulate in muscle tissue and become toxic. Other mechanisms have also been suggested to account for the muscle damage that underlies limb-girdle muscular dystrophy in people with *CAPN3* gene mutations.

## Other Names for This Gene

- calcium-activated neutral proteinase 3
- calpain 3, (p94)
- calpain L3
- calpain p94, large [catalytic] subunit
- calpain, large polypeptide L3
- calpain-3
- calpain-3 isoform c
- CAN3\_HUMAN
- CANP3
- CANPL3
- LGMD2A
- muscle-specific calcium-activated neutral protease 3 large subunit
- nCL-1
- new calpain 1
- p94

## Additional Information & Resources

### Tests Listed in the Genetic Testing Registry

- Tests of CAPN3 ([https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=825\[geneid\]](https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=825[geneid]))

### Scientific Articles on PubMed

- PubMed (<https://pubmed.ncbi.nlm.nih.gov/?term=%28%28CAPN3%5BTIAB%5D%29+OR+%28calpain+3%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+1800+days%22%5Bdp%5D%29%29%29>)

### Catalog of Genes and Diseases from OMIM

- CALPAIN 3; CAPN3 (<https://omim.org/entry/114240>)

### Gene and Variant Databases

- NCBI Gene (<https://www.ncbi.nlm.nih.gov/gene/825>)
- ClinVar ([https://www.ncbi.nlm.nih.gov/clinvar?term=CAPN3\[gene\]](https://www.ncbi.nlm.nih.gov/clinvar?term=CAPN3[gene]))

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## Genomic Location

The *CAPN3* gene is found on chromosome 15 (<https://medlineplus.gov/genetics/chromosome/15/>).

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