



CASQ2 gene

calsequestrin 2

Normal Function

The *CASQ2* gene provides instructions for making a protein called calsequestrin 2. This protein is found in heart (cardiac) muscle cells called myocytes, where it is involved in the storage and transport of positively charged calcium atoms (calcium ions).

Within myocytes, calsequestrin 2 is located in a cell structure called the sarcoplasmic reticulum, which acts as a storage center for calcium ions. Most of these ions are stored by attaching (binding) to calsequestrin 2. This protein also helps regulate a protein called the RYR2 channel, which controls the flow of calcium ions out of the sarcoplasmic reticulum.

For the heart to beat normally, the cardiac muscle must tense (contract) and relax in a coordinated way. This cycle of muscle contraction and relaxation results from the precise control of calcium ions within myocytes. In response to certain signals, calcium ions stored by calsequestrin 2 in the sarcoplasmic reticulum are released into the surrounding cell fluid (the cytoplasm). The resulting increase in calcium ion concentration triggers the cardiac muscle to contract, which pumps blood out of the heart. Calcium ions are then transported back into the sarcoplasmic reticulum, and the cardiac muscle relaxes. In this way, the release and reuptake of calcium ions in myocytes produces a regular heart rhythm.

Health Conditions Related to Genetic Changes

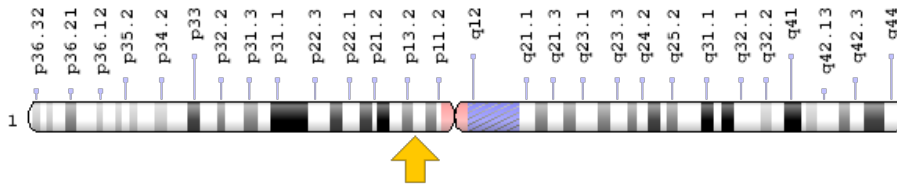
Catecholaminergic polymorphic ventricular tachycardia

At least seven mutations in the *CASQ2* gene have been identified in people with catecholaminergic polymorphic ventricular tachycardia (CPVT). Some of these mutations change single protein building blocks (amino acids) in the calsequestrin 2 protein, while other mutations prevent the cell from producing any functional calsequestrin 2. Studies suggest that the altered or missing protein is unable to perform its usual roles in calcium binding within myocytes. A lack of properly functioning calsequestrin 2 may also affect regulation of the RYR2 channel, allowing calcium ions to "leak" out of the sarcoplasmic reticulum. These changes disrupt the careful control of calcium ion flow within myocytes, which can trigger an abnormal heart rhythm in people with CPVT.

Chromosomal Location

Cytogenetic Location: 1p13.1, which is the short (p) arm of chromosome 1 at position 13.1

Molecular Location: base pairs 115,700,003 to 115,768,805 on chromosome 1 (Homo sapiens Annotation Release 109, GRCh38.p12) (NCBI)



Credit: Genome Decoration Page/NCBI

Other Names for This Gene

- calsequestrin 2 (cardiac muscle)
- calsequestrin 2, fast-twitch, cardiac muscle
- cardiac calsequestrin 2
- CASQ2_HUMAN
- PDIB2

Additional Information & Resources

Educational Resources

- Madame Curie Bioscience Database: Ca²⁺ Buffering: Cytosolic and Luminal
<https://www.ncbi.nlm.nih.gov/books/NBK5959/#A37640>

Clinical Information from GeneReviews

- Catecholaminergic Polymorphic Ventricular Tachycardia
<https://www.ncbi.nlm.nih.gov/books/NBK1289>

Scientific Articles on PubMed

- PubMed
<https://www.ncbi.nlm.nih.gov/pubmed?term=%28%28CASQ2%5BTIAB%5D%29+OR+%28calsequestrin+2%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+3600+days%22%5Bdp%5D>

Catalog of Genes and Diseases from OMIM

- CALSEQUESTRIN 2
<http://omim.org/entry/114251>

Research Resources

- Atlas of Genetics and Cytogenetics in Oncology and Haematology
http://atlasgeneticsoncology.org/Genes/GC_CASQ2.html
- ClinVar
<https://www.ncbi.nlm.nih.gov/clinvar?term=CASQ2%5Bgene%5D>
- HGNC Gene Symbol Report
https://www.genenames.org/data/gene-symbol-report/#!/hgnc_id/HGNC:1513
- Monarch Initiative
<https://monarchinitiative.org/gene/NCBIGene:845>
- NCBI Gene
<https://www.ncbi.nlm.nih.gov/gene/845>
- UniProt
<https://www.uniprot.org/uniprot/O14958>

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