TAZ gene

Normal Function

The TAZ gene provides instructions for producing a protein called tafazzin. Several different versions (isoforms) of the tafazzin protein are produced from the TAZ gene. Most isoforms are found in all tissues, but some are found only in certain types of cells. Tafazzin is located in structures called mitochondria, which are the energy-producing centers of cells. Tafazzin is involved in altering a fat (lipid) called cardiolipin, which plays critical roles in the mitochondrial inner membrane. Tafazzin adds a fatty acid called linoleic acid to the cardiolipin molecule, which enables cardiolipin to perform its functions. Cardiolipin is necessary for maintaining mitochondrial shape, energy production, and protein transport within cells.

Health Conditions Related to Genetic Changes

Barth syndrome

More than 160 mutations in the TAZ gene have been found to cause Barth syndrome. This rare condition occurs almost exclusively in males and is characterized by an enlarged and weakened heart (dilated cardiomyopathy), muscle weakness, recurrent infections, and short stature. TAZ gene mutations that cause Barth syndrome result in the production of tafazzin proteins with little or no function. As a result, linoleic acid is not added to cardiolipin, which causes problems with normal mitochondrial shape and functions such as energy production and protein transport. Tissues with high energy demands, such as the heart and other muscles, are most susceptible to cell death due to reduced energy production in mitochondria. Additionally, affected white blood cells have abnormally shaped mitochondria, which could impair their ability to grow (proliferate) and mature (differentiate), leading to a weakened immune system and recurrent infections. Dysfunctional mitochondria likely lead to other signs and symptoms of Barth syndrome.

Familial dilated cardiomyopathy

Left ventricular noncompaction

Other disorders

Some mutations in the TAZ gene cause dilated cardiomyopathy without the other features of Barth syndrome (described above). Dilated cardiomyopathy is a condition in which the heart becomes weakened and enlarged and cannot pump blood efficiently, often resulting in heart failure. The decreased blood flow can lead to
swelling in the legs and abdomen, fluid in the lungs, and an increased risk of blood clots.

Mutations in the TAZ gene can also cause a heart condition called isolated noncompaction of left ventricular myocardium (INVM). This condition occurs when the lower left chamber of the heart (left ventricle) does not develop correctly. In INVM, the heart muscle is weakened and cannot pump blood efficiently. Abnormal heart rhythms (arrhythmias) can also occur. INVM frequently causes heart failure.

Chromosomal Location

Cytogenetic Location: Xq28, which is the long (q) arm of the X chromosome at position 28

Molecular Location: base pairs 154,411,539 to 154,421,726 on the X chromosome (Homo sapiens Updated Annotation Release 109.20200522, GRCh38.p13) (NCBI)

Credit: Genome Decoration Page/NCBI

Other Names for This Gene

- BTHS
- CMD3A
- EFE
- EFE2
- G4.5
- LVNCX
- tafazzin (cardiomyopathy, dilated 3A (X-linked); endocardial fibroelastosis 2; Barth syndrome)
- TAZ_HUMAN
- XAP-2
Additional Information & Resources

Educational Resources

• Molecular Biology of the Cell (fourth edition, 2002): Mitochondria Import Most of Their Lipids; Chloroplasts Make Most of Theirs
  https://www.ncbi.nlm.nih.gov/books/NBK26924/#A2634

• Molecular Biology of the Cell (fourth edition, 2002): The Mitochondrion Contains an Outer Membrane, an Inner Membrane, and Two Internal Compartments
  https://www.ncbi.nlm.nih.gov/books/NBK26894/#A2499

Clinical Information from GeneReviews

• Dilated Cardiomyopathy Overview
  https://www.ncbi.nlm.nih.gov/books/NBK1309

Scientific Articles on PubMed

• PubMed
  https://www.ncbi.nlm.nih.gov/pubmed?term=%28%28TAZ%5BTIAB%5D%29%29+OR+%28tafazzin%5BTIAB%5D%29%29+OR+%28Barth+syndrome%5BTIAB%5D%29%29+OR+%28%28BTHS%5BTIAB%5D%29%29+OR+%28CMD3A%5BTIAB%5D%29%29+OR+%28%28EFE%5BTIAB%5D%29%29+OR+%28%28G4.5%5BTIAB%5D%29%29+OR+%28tafazzin%5BTIAB%5D%29%29+OR+%28%28XAP-2%5BTIAB%5D%29%29%29+AND+%28%28Genes%5BMH%5D%29%29+OR+%28%28Genetic+Phenomena%5BMH%5D%29%29+AND+human%5Bmh%5D+AND+%22last+1080+days%22+AND+TAFAZZIN

Catalog of Genes and Diseases from OMIM

• TAFAZZIN
  http://omim.org/entry/300394

Research Resources

• Atlas of Genetics and Cytogenetics in Oncology and Haematology
  http://atlasgeneticsoncology.org/Genes/GC_TAZ.html

• Barth Syndrome Foundation: TAZ Gene Mutation Database
  https://www.barthsyndrome.org/research/tafazzindatabase.html

• ClinVar
  https://www.ncbi.nlm.nih.gov/clinvar?term=TAZ%5Bgene%5D

• HGNC Gene Symbol Report

• Monarch Initiative
  https://monarchinitiative.org/gene/NCBIGene:6901
• NCBI Gene
• UniProt
  https://www.uniprot.org/uniprot/Q16635

Sources for This Summary

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/23432031

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/15098233

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/8630491

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/15793838

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/16099986

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/19619503

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/24342716

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/15499385

• OMIM: TAFAZZIN
  http://omim.org/entry/300394

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