COL3A1 gene

collagen type III alpha 1 chain

Normal Function

The COL3A1 gene provides instructions for making type III collagen. Collagens are a family of proteins that strengthen and support many tissues in the body. Type III collagen is found in the skin, lungs, intestinal walls, and the walls of blood vessels.

The components of type III collagen, called pro-α1(III) chains, are produced from the COL3A1 gene. Each molecule of type III procollagen is made up of three copies of this chain.

The triple-stranded, rope-like procollagen molecules are processed by enzymes outside the cell to create mature type III collagen. The collagen molecules then arrange themselves into long, thin fibrils that form stable interactions (cross-links) with one another and with other types of collagen in the spaces between cells. The cross-links result in the formation of very strong collagen fibers.

Health Conditions Related to Genetic Changes

Ehlers-Danlos syndrome

More than 500 mutations in the COL3A1 gene have been found to cause a form of Ehlers-Danlos syndrome called the vascular type. Ehlers-Danlos syndrome is a group of disorders that affect the connective tissues that support the skin, bones, blood vessels, and many other organs and tissues. The vascular type can cause potentially life-threatening complications, including tearing (rupture) of blood vessels, intestines, and other organs. The mutations that cause this form of the disorder alter the structure and production of type III procollagen molecules. As a result, a large percentage of type III collagen molecules are assembled incorrectly, or the amount of type III collagen is greatly reduced. Researchers believe that these changes affect tissues that are normally rich in this type of collagen, such as the skin, blood vessel walls, and internal organs. An insufficient amount of type III collagen weakens connective tissues in these parts of the body, causing the signs and symptoms of the vascular type of Ehlers-Danlos syndrome.
Chromosomal Location

Cytogenetic Location: 2q32.2, which is the long (q) arm of chromosome 2 at position 32.2

Molecular Location: base pairs 188,974,373 to 189,012,746 on chromosome 2 (Homo sapiens Annotation Release 109, GRCh38.p12) (NCBI)

Credit: Genome Decoration Page/NCBI

Other Names for This Gene

- alpha 1 type III collagen
- CO3A1_HUMAN
- collagen III, alpha-1 polypeptide
- collagen type III alpha 1
- collagen, fetal
- collagen, type III, alpha 1
- collagen, type III, alpha 1 (Ehlers-Danlos syndrome type IV, autosomal dominant)
- EDS4A

Additional Information & Resources

Educational Resources

  https://www.ncbi.nlm.nih.gov/books/NBK21582/

Clinical Information from GeneReviews

- Vascular Ehlers-Danlos Syndrome
  https://www.ncbi.nlm.nih.gov/books/NBK1494
Scientific Articles on PubMed

- PubMed
  https://www.ncbi.nlm.nih.gov/pubmed?term=%28COL3A1%5BTIAB%5D%29+OR+%28%28collagen%5BTI%5D%29+AND+%28type+III%5BTI%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+720+days+%22%5Bdp%5D

Catalog of Genes and Diseases from OMIM

- COLLAGEN, TYPE III, ALPHA-1
  http://omim.org/entry/120180

Research Resources

- Atlas of Genetics and Cytogenetics in Oncology and Haematology
  http://atlasgeneticsoncology.org/Genes/GC_COL3A1.html
- ClinVar
- Ehlers-Danlos Syndrome Variant Database
  https://eds.gene.le.ac.uk/home.php?select_db=COL3A1
- HGNC Gene Family: Collagens
  https://www.genenames.org/cgi-bin/genefamilies/set/490
- HGNC Gene Symbol Report
  https://www.genenames.org/cgi-bin/gene_symbol_report?q=data/hgnc_data.php&hgnc_id=2201
- Monarch Initiative
  https://monarchinitiative.org/gene/NCBIGene:1281
- NCBI Gene
- UniProt
  https://www.uniprot.org/uniprot/P02461

Sources for This Summary

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/22143279
- Germain DP. Ehlers-Danlos syndrome type IV. Orphanet J Rare Dis. 2007 Jul 19;2:32. Review.
  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/17640391
  Free article on PubMed Central: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1971255/
  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/10923041

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/28306229

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/16012458

  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/11577371
  Free article on PubMed Central: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1274375/


Reviewed: November 2017
Published: October 9, 2018

Lister Hill National Center for Biomedical Communications
U.S. National Library of Medicine
National Institutes of Health
Department of Health & Human Services