



PNPLA3 gene

patatin like phospholipase domain containing 3

Normal Function

The *PNPLA3* gene provides instructions for making a protein called adiponutrin, which is found in fat cells (adipocytes) and liver cells (hepatocytes). The liver is a part of the digestive system that helps break down food, store energy, and remove waste products, including toxins. The function of the adiponutrin protein is not well understood, but it is thought to help regulate the development of adipocytes and the production and breakdown of fats (lipogenesis and lipolysis) in hepatocytes and adipocytes. Studies indicate that the activity (expression) of the *PNPLA3* gene decreases during periods without food (fasting) and increases after eating, suggesting that the amount of adiponutrin protein produced is regulated as needed to help process and store fats in the diet.

Health Conditions Related to Genetic Changes

Non-alcoholic fatty liver disease

A particular variation in the *PNPLA3* gene has been associated with an increased risk of developing non-alcoholic fatty liver disease (NAFLD). NAFLD is a buildup of excessive fat in the liver that can lead to liver damage resembling the damage caused by alcohol abuse, but that occurs in people who do not drink heavily. In some cases NAFLD leads to inflammation of the liver (non-alcoholic steatohepatitis, also known as NASH) and permanent liver damage (cirrhosis).

The *PNPLA3* gene variation associated with NAFLD changes the protein building block (amino acid) isoleucine to the amino acid methionine at protein position 148, written as Ile148Met or I148M. Research suggests that the altered protein leads to increased production and decreased breakdown of fats in the liver. Studies are ongoing to determine how this and other genetic changes contribute to the development of NAFLD and its complications.

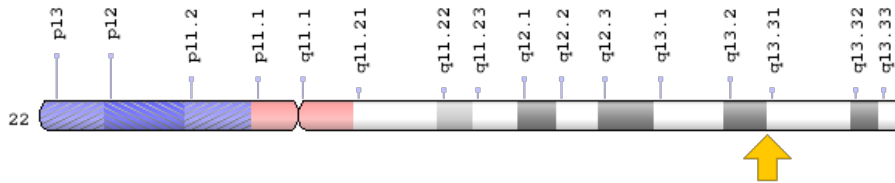
Other disorders

The I148M variation of the *PNPLA3* gene has also been associated with the worsening of other liver diseases, such as a viral infection called hepatitis C. The variation also increases the risk of liver damage in people with alcoholism. The mechanism of this effect is not well understood, but the altered protein appears to increase fibrosis of the liver in people with these conditions.

Chromosomal Location

Cytogenetic Location: 22q13.31, which is the long (q) arm of chromosome 22 at position 13.31

Molecular Location: base pairs 43,923,739 to 43,947,568 on chromosome 22 (Homo sapiens Annotation Release 109, GRCh38.p12) (NCBI)



Credit: Genome Decoration Page/NCBI

Other Names for This Gene

- acylglycerol O-acyltransferase
- adiponutrin
- ADPN
- C22orf20
- calcium-independent phospholipase A2-epsilon
- dJ796I17.1
- FLJ22012
- iPLA(2)epsilon
- iPLA2-epsilon
- iPLA2epsilon
- patatin-like phospholipase domain-containing protein 3

Additional Information & Resources

Educational Resources

- Endotext: Lipid and Lipoprotein Metabolism in Liver Disease
<https://www.ncbi.nlm.nih.gov/books/NBK326742/>

Scientific Articles on PubMed

- PubMed
<https://www.ncbi.nlm.nih.gov/pubmed?term=%28%28PNPLA3%5BTI%5D%29+OR+%28patatin+like+phospholipase+domain+containing+3%5BTI%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+720+days%22%5Bdp%5D>

Catalog of Genes and Diseases from OMIM

- PATATIN-LIKE PHOSPHOLIPASE DOMAIN-CONTAINING PROTEIN 3
<http://omim.org/entry/609567>

Research Resources

- Atlas of Genetics and Cytogenetics in Oncology and Haematology
http://atlasgeneticsoncology.org/Genes/GC_PNPLA3.html
- HGNC Gene Symbol Report
https://www.genenames.org/data/gene-symbol-report/#!/hgnc_id/HGNC:18590
- Monarch Initiative
<https://monarchinitiative.org/gene/NCBIGene:80339>
- NCBI Gene
<https://www.ncbi.nlm.nih.gov/gene/80339>
- UniProt
<https://www.uniprot.org/uniprot/Q9NST1>

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