ABCG8 gene

ATP binding cassette subfamily G member 8

Normal Function

The *ABCG8* gene provides instructions for making sterolin-2, which makes up half of a protein called sterolin. The other half of the sterolin protein, sterolin-1, is produced from a gene called *ABCG5*. Sterolin is involved in eliminating plant sterols, which are fatty components of plant-based foods that cannot be used by human cells.

Sterolin is a transporter protein, which is a type of protein that moves substances across cell membranes. It is found mostly in cells of the intestines and liver and transports plant sterols. After plant sterols are absorbed from food into intestinal cells, the sterolin transporters in these cells pump them back into the intestinal tract. Sterolin transporters in liver cells pump the plant sterols into a fluid called bile that is released into the intestine. From the intestine, the plant sterols are eliminated with the feces. This process removes most of the dietary plant sterols, and allows only about 5 percent of these substances to get into the bloodstream. Sterolin also helps regulate levels of cholesterol, another fatty substance found in animal products, in a similar fashion; normally about 50 percent of cholesterol in the diet is absorbed by the body.

Health Conditions Related to Genetic Changes

Sitosterolemia

At least 28 *ABCG8* gene mutations have been identified in people with sitosterolemia, which is a condition caused by accumulation of plant sterols. The mutations result in a defective sterolin transporter and impair the elimination of plant sterols and, to a lesser degree, cholesterol from the body. These fatty substances build up in the arteries, skin, and other tissues, resulting in clogged blood vessels that can impair blood flow (atherosclerosis), fatty skin growths (xanthomas), and the additional signs and symptoms of sitosterolemia. Excess plant sterols in red blood cells likely make their cell membranes stiff and prone to rupture, leading to a reduced number of red blood cells (anemia). Changes in the lipid composition of the membranes of red blood cells and platelets may account for the other blood abnormalities that sometimes occur in sitosterolemia.

Other disorders

Certain normal variations (polymorphisms) in the *ABCG8* gene are associated with an increased risk of gallstones, which are small pebble-like deposits in the gallbladder or the bile ducts. Bile ducts carry bile (a fluid that helps digest fats) from the liver, where bile is produced, to the gallbladder, where it is stored, and to the small intestine, where it aids in digestion. Researchers suggest that the *ABCG8* gene changes that increase the risk of gallstones may result in a sterolin transporter protein that pumps more cholesterol than usual into bile. This leads to the presence of more cholesterol than can be dissolved in the bile fluid in the bile ducts and gallbladder, resulting in the formation of gallstones.

Other Names for This Gene

- ABCG8_HUMAN
- ATP-binding cassette sub-family G member 8
- ATP-binding cassette, sub-family G (WHITE), member 8
- ATP-binding cassette, subfamily G, member 8
- GBD4
- sterolin 2
- sterolin-2
- STSL

Additional Information & Resources

Tests Listed in the Genetic Testing Registry

- Tests of ABCG8 (https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=64241[geneid])

Scientific Articles on PubMed

- PubMed (https://pubmed.ncbi.nlm.nih.gov/?term=%28ABCG8%5BTIAB%5D%29+AND+%28%28Genes%5BMH%5D%29+OR+%28Genetic+Phenomena%5BMH%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+1440+days%22%5Bdp%5D)

Catalog of Genes and Diseases from OMIM

- ATP-BINDING CASSETTE, SUBFAMILY G, MEMBER 8; ABCG8 (https://omim.org/entry/605460)

Gene and Variant Databases

- NCBI Gene (https://www.ncbi.nlm.nih.gov/gene/64241)

- ClinVar (https://www.ncbi.nlm.nih.gov/clinvar?term=ABCG8[gene])

References

- Calandra S, Tarugi P, Speedy HE, Dean AF, Bertolini S, Shoulders CC. Mechanisms and genetic determinants regulating sterol absorption, circulating LDLlevels, and sterol elimination: implications for classification and disease risk.J Lipid Res. 2011 Nov;52(11):1885-926. doi: 10.1194/jlr.R017855. Epub 2011 Aug23. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/21862702) or Free article on PubMed Central (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3284125/)
- Chan J, Vandeberg JL. Hepatobiliary transport in health and disease. ClinLipidol. 2012 Apr;7(2):189-202. doi: 10.2217/clp.12.12. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/22859919) or Free article on PubMed Central (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3408080/)
- Fitzgerald ML, Mujawar Z, Tamehiro N. ABC transporters, atherosclerosis andinflammation. Atherosclerosis. 2010 Aug;211(2):361-70. doi:10.1016/j.atherosclerosis.2010.01.011. Epub 2010 Jan 21. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/20138281) or Free article on PubMed Central (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2888932/)
- Kerr ID, Haider AJ, Gelissen IC. The ABCG family of membrane-associatedtransporters: you don't have to be big to be mighty. Br J Pharmacol. 2011Dec;164(7):1767-79. doi: 10.1111/j.1476-5381.2010.01177.x. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/21175590) or Free article on PubMed Central (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3246702/)
- Kidambi S, Patel SB. Cholesterol and non-cholesterol sterol transporters:ABCG5, ABCG8 and NPC1L1: a review. Xenobiotica. 2008 Jul;38(7-8):1119-39. doi:10.1080/00498250802007930. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/18668442)
- Kuo KK, Shin SJ, Chen ZC, Yang YH, Yang JF, Hsiao PJ. Significant associationof ABCG5 604Q and ABCG8 D19H polymorphisms with gallstone disease. Br J Surg. 2008 Aug;95(8):1005-11. doi: 10.1002/bjs.6178. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/18457353)
- Myrie SB, Steiner RD, Mymin D. Sitosterolemia. 2013 Apr 4 [updated 2020 Jul16]. In: Adam MP, Feldman J, Mirzaa GM, Pagon RA, Wallace SE, Bean LJH, Gripp KW, Amemiya A, editors. GeneReviews(R) [Internet]. Seattle (WA): Universityof Washington, Seattle; 1993-2024. Available fromhttp://www.ncbi.nlm.nih.gov/books/NBK131810/ Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/23556150)
- Niu DM, Chong KW, Hsu JH, Wu TJ, Yu HC, Huang CH, Lo MY, Kwok CF, Kratz LE, HoLT. Clinical observations, molecular genetic analysis, and treatment ofsitosterolemia in infants and children. J Inherit Metab Dis. 2010Aug;33(4):437-43. doi: 10.1007/s10545-010-9126-2. Epub 2010 Jun 3. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/20521169)
- Rudkowska I, Jones PJ. Polymorphisms in ABCG5/G8 transporters linked tohypercholesterolemia and gallstone disease. Nutr Rev. 2008 Jun;66(6):343-8. doi:

10.1111/j.1753-4887.2008.00042.x. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/18522623)

- Sabeva NS, Liu J, Graf GA. The ABCG5 ABCG8 sterol transporter andphytosterols: implications for cardiometabolic disease. Curr Opin EndocrinolDiabetes Obes. 2009 Apr;16(2):172-7. doi: 10.1097/med.0b013e3283292312. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/19306529) or Free article on PubMed Central (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4097028/)
- Stender S, Frikke-Schmidt R, Nordestgaard BG, Tybjaerg-Hansen A. Steroltransporter adenosine triphosphate-binding cassette transporter G8, gallstones, and biliary cancer in 62,000 individuals from the general population. Hepatology. 2011 Feb;53(2):640-8. doi: 10.1002/hep.24046. Epub 2010 Dec 28. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/21274884)

Genomic Location

The *ABCG8* gene is found on chromosome 2 (https://medlineplus.gov/genetics/chromosome/2/).

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