

IRGM gene

immunity related GTPase M

Normal Function

The *IRGM* gene provides instructions for making a protein that plays an important role in the immune system. This protein is involved in a process called autophagy, which cells use to surround and destroy foreign invaders such as bacteria and viruses. Specifically, the IRGM protein helps trigger autophagy in cells infected with certain kinds of bacteria, including the type of bacteria that causes tuberculosis. In addition to protecting cells from infection, autophagy is used to recycle worn-out cell parts and break down certain proteins when they are no longer needed. This process also plays an important role in controlled cell death (apoptosis).

Health Conditions Related to Genetic Changes

Crohn's disease

Several variations in or near the *IRGM* gene have been associated with an increased risk of developing Crohn's disease. This increased risk has been found primarily in people of northern European ancestry. *IRGM* variations change single DNA building blocks (nucleotides) in regions of DNA that may regulate when and how the IRGM protein is produced. Researchers suspect that changes involving the IRGM protein may disrupt the autophagy process, preventing the immune system from destroying harmful bacteria effectively. An abnormal immune response to bacteria in the intestinal walls may lead to chronic inflammation and the digestive problems characteristic of Crohn's disease.

Other Names for This Gene

- A1A4Y4_HUMAN
- IFI1
- immunity-related GTPase family, M
- immunity-related GTPase family, M1
- immunity-related GTPase M
- IRGM1
- LRG-47

- LRG-47-like protein
- LRG47
- MGC149263
- MGC149264

Additional Information & Resources

Tests Listed in the Genetic Testing Registry

- Tests of IRGM ([https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=345611\[geneid\]](https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=345611[geneid]))

Scientific Articles on PubMed

- PubMed (<https://pubmed.ncbi.nlm.nih.gov/?term=%28IRGM%5BTIAB%5D%29+OR+%28%28IRGM1%5BTIAB%5D%29+OR+%28LRG-47%5BTIAB%5D%29+OR+%28LRG47%5BTIAB%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+1800+days%22%5Bdp%5D%29>)

Catalog of Genes and Diseases from OMIM

- IMMUNITY-RELATED GTPase FAMILY, M; IRGM (<https://omim.org/entry/608212>)

Gene and Variant Databases

- NCBI Gene (<https://www.ncbi.nlm.nih.gov/gene/345611>)
- ClinVar ([https://www.ncbi.nlm.nih.gov/clinvar?term=IRGM\[gene\]](https://www.ncbi.nlm.nih.gov/clinvar?term=IRGM[gene]))

References

- Chauhan S, Mandell MA, Deretic V. Mechanism of action of the tuberculosis and Crohn disease risk factor IRGM in autophagy. *Autophagy*. 2016;12(2):429-31. doi:10.1080/15548627.2015.1084457. Epub 2015 Aug 27. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/26313894>) or Free article on PubMed Central (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4835981/>)
- Parkes M, Barrett JC, Prescott NJ, Tremelling M, Anderson CA, Fisher SA, Roberts RG, Nimmo ER, Cummings FR, Soars D, Drummond H, Lees CW, Khawaja SA, Bagnall R, Burke DA, Todhunter CE, Ahmad T, Onnie CM, McArdle W, Strachan D, Bethel G, Bryan C, Lewis CM, Deloukas P, Forbes A, Sanderson J, Jewell DP, Satsangi J, Mansfield JC; Wellcome Trust Case Control Consortium; Cardon L, Mathew CG. Sequence variants in the autophagy gene IRGM and multiple other replicating loci contribute to Crohn's disease susceptibility. *Nat Genet*. 2007 Jul;39(7):830-2. doi: 10.1038/ng2061. Epub 2007 Jun 6. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/17644444>)

<https://pubmed.ncbi.nlm.nih.gov/17554261/>) or Free article on PubMed Central (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2628541/>)

- Rufini S, Ciccacci C, Di Fusco D, Ruffa A, Pallone F, Novelli G, Biancone L, Borgiani P. Autophagy and inflammatory bowel disease: Association between variants of the autophagy-related IRGM gene and susceptibility to Crohn's disease. *Dig Liver Dis.* 2015 Sep;47(9):744-50. doi: 10.1016/j.dld.2015.05.012. Epub 2015 May 21. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/26066377>)
- Singh SB, Davis AS, Taylor GA, Deretic V. Human IRGM induces autophagy to eliminate intracellular mycobacteria. *Science.* 2006 Sep 8;313(5792):1438-41. doi: 10.1126/science.1129577. Epub 2006 Aug 3. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/16888103>)

Genomic Location

The *IRGM* gene is found on chromosome 5 (<https://medlineplus.gov/genetics/chromosome/5/>).

Last updated December 1, 2017