

## IL23R gene

interleukin 23 receptor

### Normal Function

The *IL23R* gene provides instructions for making a protein called the interleukin 23 (IL-23) receptor. This protein is embedded in the outer membrane of several types of immune system cells, including T cells, natural killer (NK) cells, monocytes, and dendritic cells. These cells identify foreign substances and defend the body against infection and disease.

At the cell surface, the IL-23 receptor interacts with a protein called IL-23. These two proteins fit together like a lock and key. IL-23 is a cytokine, which is a type of protein that regulates the activity of immune cells. When IL-23 binds to its receptor, it triggers a series of chemical signals inside the cell. These signals promote inflammation and help coordinate the immune system's response to foreign invaders such as bacteria and viruses.

### Health Conditions Related to Genetic Changes

#### Ankylosing spondylitis

Several variations (polymorphisms) in the *IL23R* gene have been found to influence the risk of ankylosing spondylitis. This condition is a form of painful, ongoing joint inflammation (chronic inflammatory arthritis) that primarily affects the spine.

One of these *IL23R* gene polymorphisms appears to reduce the likelihood of developing this disorder. This genetic change alters a single protein building block (amino acid) in the IL-23 receptor, replacing the amino acid arginine with the amino acid glutamine at protein position 381 (written as Arg381Gln or R381Q). Other *IL23R* variations appear to increase the risk of developing ankylosing spondylitis.

It is not fully known how these changes are related to a person's risk of developing this disorder, but studies suggest that the effects of *IL23R* variations are likely related to the IL-23 receptor's role in inflammation. Other genetic and environmental factors, many of which are unknown, also affect the chance of developing ankylosing spondylitis.

#### Crohn's disease

Several variants in or near the *IL23R* gene have been found to influence the risk of

developing Crohn's disease. These associations have been reported primarily in people of northern European ancestry. For example, Arg381Gln, which is a protective factor for ankylosing spondylitis (described above), also appears to reduce the risk of developing Crohn's disease. Although it is unclear how this change protects against Crohn's disease, researchers believe that the receptor's role in triggering inflammation in the intestinal walls may underlie its connection with this disorder.

### Psoriatic arthritis

MedlinePlus Genetics provides information about Psoriatic arthritis

### Ulcerative colitis

MedlinePlus Genetics provides information about Ulcerative colitis

### Other disorders

Variants in the *IL23R* gene have also been associated with the risk of several other immune system-related conditions, including a skin disorder called psoriasis. In people with light skin, this chronic inflammatory condition causes patches of red, irritated skin that are often covered by flaky white scales, but these patches are darker looking in people with darker skin. Psoriasis likely results from a malfunction of the immune system in which the body's immune response turns against itself, attacking healthy skin cells by mistake.

Each of the known *IL23R* variations changes a single amino acid in the IL-23 receptor. One of these variations, Arg381Gln, appears to reduce the risk of developing psoriasis. (This variation has also been shown to protect against ankylosing spondylitis and Crohn's disease, described above.) Other *IL23R* variations may increase the risk of developing psoriasis. Researchers suggest that changes in the *IL23R* gene may contribute to general problems with regulation of the immune system, which may help explain why these variations are related to several different disorders characterized by immune system dysfunction.

## **Other Names for This Gene**

- IL-23R
- IL23R\_HUMAN
- interleukin-23 receptor

## **Additional Information & Resources**

### Tests Listed in the Genetic Testing Registry

- Tests of IL23R ([https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=149233\[geneid\]](https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=149233[geneid]))

### Scientific Articles on PubMed

- PubMed (<https://pubmed.ncbi.nlm.nih.gov/?term=%28%28IL23R%5BTI%5D%29+OR+%28interleukin+23+receptor%5BTI%5D%29%29+OR+%28IL-23R%5BTI%5D%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+1080+days%22%5Bdp%5D%29%29%29>)

### Catalog of Genes and Diseases from OMIM

- INTERLEUKIN 23 RECEPTOR; IL23R (<https://omim.org/entry/607562>)

### Gene and Variant Databases

- NCBI Gene (<https://www.ncbi.nlm.nih.gov/gene/149233>)
- ClinVar ([https://www.ncbi.nlm.nih.gov/clinvar?term=IL23R\[gene\]](https://www.ncbi.nlm.nih.gov/clinvar?term=IL23R[gene]))

### **References**

- Abdollahi E, Tavasolian F, Momtazi-Borojeni AA, Samadi M, Rafatpanah H. Protective role of R381Q (rs11209026) polymorphism in IL-23R gene in immune-mediated diseases: A comprehensive review. *J Immunotoxicol.* 2016 May;13(3):286-300. doi: 10.3109/1547691X.2015.1115448. Epub 2016 Apr 4. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/27043356>)
- Capon F, Di Meglio P, Szaub J, Prescott NJ, Dunster C, Baumber L, Timms K, Gutin A, Abkevic V, Burden AD, Lanchbury J, Barker JN, Trembath RC, Nestle FO. Sequence variants in the genes for the interleukin-23 receptor (IL23R) and its ligand (IL12B) confer protection against psoriasis. *Hum Genet.* 2007 Sep;122(2):201-6. doi: 10.1007/s00439-007-0397-0. Epub 2007 Jun 22. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/17587057>)
- Duerr RH, Taylor KD, Brant SR, Rioux JD, Silverberg MS, Daly MJ, Steinhart AH, Abraham C, Regueiro M, Griffiths A, Dassopoulos T, Bitton A, Yang H, Targan S, Datta LW, Kistner EO, Schumm LP, Lee AT, Gregersen PK, Barmada MM, Rotter JI, Nicolae DL, Cho JH. A genome-wide association study identifies IL23R as an inflammatory bowel disease gene. *Science.* 2006 Dec 1;314(5804):1461-3. doi:10.1126/science.1135245. Epub 2006 Oct 26. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/17068223>) or Free article on PubMed Central (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4410764/>)
- Kannan AK, Su Z, Gauvin DM, Paulsboe SE, Duggan R, Lasko LM, Honore P, Kort ME, McGaraughty SP, Scott VE, Gauld SB. IL-23 induces regulatory T cell plasticity with implications for inflammatory skin diseases. *Sci Rep.* 2019 Nov 27;9(1):17675. doi: 10.1038/s41598-019-53240-z. Citation on PubMed (<https://www.ncbi.nlm.nih.gov/pubmed/31776355>)
- Nancy Z, Yan L, Hui S, Paul B, Liye C. From the Genetics of Ankylosing Spondylitis to New Biology and Drug Target Discovery. *Front Immunol.* 2021 Feb 17;12:624632.

doi: 10.3389/fimmu.2021.624632. eCollection 2021. Citation on PubMed (<https://www.ncbi.nlm.nih.gov/pubmed/33679768>)

- Rueda B, Orozco G, Raya E, Fernandez-Sueiro JL, Mulero J, Blanco FJ, VilchesC, Gonzalez-Gay MA, Martin J. The IL23R Arg381Gln non-synonymous polymorphism confers susceptibility to ankylosing spondylitis. *Ann Rheum Dis*. 2008 Oct;67(10):1451-4. doi: 10.1136/ard.2007.080283. Epub 2008 Jan 16. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/18199597>)
- Sherlock JP, Joyce-Shaikh B, Turner SP, Chao CC, Sathe M, Grein J, Gorman DM, Bowman EP, McClanahan TK, Yearley JH, Eberl G, Buckley CD, Kastelein RA, Pierce RH, Laface DM, Cua DJ. IL-23 induces spondyloarthritis by acting on ROR-gamma+CD3+CD4-CD8- entheseal resident T cells. *Nat Med*. 2012 Jul 1;18(7):1069-76. doi:10.1038/nm.2817. Citation on PubMed (<https://www.ncbi.nlm.nih.gov/pubmed/22772566>)
- Sherlock JP, Taylor PC, Buckley CD, Cua DJ. Spondyloarthritis: interleukin 23 and disease modification. *Lancet*. 2015 May 23;385(9982):2017-8. doi:10.1016/S0140-6736(15)60970-9. No abstract available. Citation on PubMed (<https://www.ncbi.nlm.nih.gov/pubmed/26009213>)
- Tonel G, Conrad C, Laggner U, Di Meglio P, Grys K, McClanahan TK, Blumenschein WM, Qin JZ, Xin H, Oldham E, Kastelein R, Nickoloff BJ, Nestle FO. Cutting edge: A critical functional role for IL-23 in psoriasis. *J Immunol*. 2010 Nov 15;185(10):5688-91. doi: 10.4049/jimmunol.1001538. Epub 2010 Oct 18. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/20956338>) or Free article on PubMed Central (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3776381/>)
- Wang MH, Picco MF. Crohn's Disease: Genetics Update. *Gastroenterol Clin North Am*. 2017 Sep;46(3):449-461. doi: 10.1016/j.gtc.2017.05.002. Epub 2017 Jul 19. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/28838408>)
- Wellcome Trust Case Control Consortium; Australo-Anglo-American Spondylitis Consortium (TASC); Burton PR, Clayton DG, Cardon LR, Craddock N, Deloukas P, Duncanson A, Kwiatkowski DP, McCarthy MI, Ouwehand WH, Samani NJ, Todd JA, Donnelly P, Barrett JC, Davison D, Easton D, Evans DM, Leung HT, Marchini JL, Morris AP, Spencer CC, Tobin MD, Attwood AP, Boorman JP, Cant B, Everson U, Hussey JM, Jolley JD, Knight AS, Koch K, Meech E, Nutland S, Prowse CV, Stevens HE, Taylor NC, Walters GR, Walker NM, Watkins NA, Winzer T, Jones RW, McArdle WL, Ring SM, Strachan DP, Pembrey M, Breen G, St Clair D, Caesar S, Gordon-Smith K, Jones L, Fraser C, Green EK, Grozeva D, Hamshere ML, Holmans PA, Jones IR, Kirov G, Moskvina V, Nikolov I, O'Donovan MC, Owen MJ, Collier DA, Elkin A, Farmer A, Williamson R, McGuffin P, Young AH, Ferrier IN, Ball SG, Balmforth AJ, Barrett JH, Bishop TD, Iles MM, Maqbool A, Yuldasheva N, Hall AS, Braund PS, Dixon RJ, Mangino M, Stevens S, Thompson JR, Bredin F, Tremelling M, Parkes M, Drummond H, Lees CW, Nimmo ER, Satsangi J, Fisher SA, Forbes A, Lewis CM, Onnie CM, Prescott NJ, Sanderson J, Matthew CG, Barbour J, Mohiuddin MK, Todhunter CE, Mansfield JC, Ahmad T, Cummings FR, Jewell DP, Webster J, Brown MJ, Lathrop MG, Connell J, Dominiczak A, Marcano CA, Burke B, Dobson R, Gungadoo J, Lee KL, Munroe PB, Newhouse SJ, Onipinla A, Wallace C, Xue M, Caulfield M, Farrall M, Barton A; Biologics in RA Genetics and Genomics Study Syndicate (BRAGGS) Steering Committee; Bruce IN, Donovan H, Eyre S,

Gilbert PD, Hilder SL, Hinks AM, John SL, Potter C, Silman AJ, Symmons DP, Thomson W, Worthington J, Dunger DB, Widmer B, Frayling TM, Freathy RM, Lango H, Perry JR, Shields BM, Weedon MN, Hattersley AT, Hitman GA, Walker M, Elliott KS, Groves CJ, Lindgren CM, Rayner NW, Timpson NJ, Zeggini E, Newport M, Sirugo G, Lyons E, Vannberg F, Hill AV, Bradbury LA, Farrar C, Pointon JJ, Wordsworth P, Brown MA, Franklyn JA, Heward JM, Simmonds MJ, Gough SC, Seal S; Breast Cancer Susceptibility Collaboration (UK); Stratton MR, Rahman N, Ban M, Goris A, Sawcer SJ, Compston A, Conway D, Jallow M, Newport M, Sirugo G, Rockett KA, Bumpstead SJ, Chaney A, Downes K, Ghori MJ, Gwilliam R, Hunt SE, Inouye M, Keniry A, King E, McGinnis R, Potter S, Ravindrarajah R, Whittaker P, Widdon C, Withers D, Cardin NJ, Davison D, Ferreira T, Pereira-Gale J, Hallgrimsdottir IB, Howie BN, Su Z, Teo YY, Vukcevic D, Bentley D, Brown MA, Compston A, Farrall M, Hall AS, Hattersley AT, Hill AV, Parkes M, Pembrey M, Stratton MR, Mitchell SL, Newby PR, Brand OJ, Carr-Smith J, Pearce SH, McGinnis R, Keniry A, Deloukas P, Reveille JD, Zhou X, Sims AM, Dowling A, Taylor J, Doan T, Davis JC, Savage L, Ward MM, Leach TL, Weisman MH, Brown M. Association scan of 14,500 nonsynonymous SNPs in four diseases identifies autoimmunity variants. *Nat Genet.* 2007 Nov;39(11):1329-37. doi: 10.1038/ng.2007.17. Epub 2007 Oct 21. Citation on PubMed (<https://pubmed.ncbi.nlm.nih.gov/17952073>) or Free article on PubMed Central (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2680141/>)

## Genomic Location

The *IL23R* gene is found on chromosome 1 (<https://medlineplus.gov/genetics/chromosome/1/>).

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