

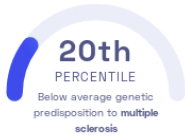
International Multiple Sclerosis Genetics Consortium, et al.
Science

Inflammation Autoimmunity

STUDY SUMMARY

Identification of 233 novel variants associated with multiple sclerosis and the body's immune response system.

YOUR RESULT



STUDY DESCRIPTION

Multiple sclerosis is an autoimmune disease that leads to degeneration of the central nervous system. It's characterized by damage to the nerves that can lead to problems with vision, movement, and speech. This study analyzed the genetic data of 115,803 individuals of European ancestry and discovered 233 variants that appear to correlate with a risk of developing multiple sclerosis. These variants help explain ~48% of the heritability of multiple sclerosis. Many of these variants are located near genes that are expressed in the brain and play a role in *antigen* recognition by the immune system. To date, this is the largest genome-wide association analysis of multiple sclerosis and it explains almost half of the genetic contribution to the disease risk.

DID YOU KNOW?

Though multiple sclerosis cannot be cured, doctors recommend lowering inflammation levels by maintaining a healthy diet (e.g. mediterranean diet rich in fish, whole grains, fruits, vegetables and olive oil) and exercising regularly.

YOUR DETAILED RESULTS

To calculate your genetic predisposition to multiple sclerosis we summed up the effects of genetic variants that were linked to multiple sclerosis in the [study that this report is based on](#). These variants can be found in the table below. The variants highlighted in green have **positive effect sizes** and increase your genetic predisposition to multiple sclerosis. The variants highlighted in blue have **negative effect sizes** and decrease your genetic predisposition to multiple sclerosis. Variants that are not highlighted are not found in your genome and do not affect your genetic predisposition to multiple sclerosis. By adding up the effect sizes of the highlighted variants **we calculated your polygenic score for multiple sclerosis to be 1.46**. To determine whether your score is high or low, we compared it to the scores of 5,000 other Nebula Genomics users. We found that your polygenic score for multiple sclerosis is in the **20th percentile**. This means that it is higher than the polygenic scores 20% of people. We consider this to be a **below average genetic predisposition to multiple sclerosis**. However, please note that genetic predispositions do not account for important non-genetic factors like lifestyle. Furthermore, the genetics of most traits has not been fully understood yet and many associations between traits and genetic variants remain unknown. For additional explanations, click on the column titles in the table below and visit our [Nebula Library tutorial](#).

VARIANT [Ⓞ]	YOUR GENOTYPE [Ⓞ]	EFFECT SIZE [Ⓞ]	VARIANT FREQUENCY [Ⓞ]	SIGNIFICANCE [Ⓞ]
rs1071743_G	G / G	-0.37 (↓)	12%	1.05 × 10 ⁻²⁸⁰
rs3097671_C	G / G	0.29 (-)	14%	2.19 × 10 ⁻¹³¹
rs2844482_A	NA	0.30 (-)	< 1%	7.13 × 10 ⁻¹²⁴
rs4081559_T	C / C	0.27 (-)	11%	4.69 × 10 ⁻⁸²
rs10801908_C	C / C	0.26 (↑)	69%	4.55 × 10 ⁻⁷⁰
rs11256593_T	C / T	0.19 (↑)	42%	2.96 × 10 ⁻⁶⁶
rs9266629_C	T / T	-0.20 (-)	17%	8.88 × 10 ⁻⁵⁷
rs438613_C	T / C	0.14 (↑)	37%	2.31 × 10 ⁻⁴⁹
rs1800693_T	T / T	-0.14 (↓)	64%	2.24 × 10 ⁻⁴⁷
rs7454108_C	T / T	0.22 (-)	86%	1.70 × 10 ⁻⁴¹
rs6670198_C	T / T	-0.13 (-)	43%	1.54 × 10 ⁻³⁶
rs62420820_A	G / A	0.13 (↑)	19%	9.26 × 10 ⁻³⁶
rs1738074_T	T / T	-0.12 (↓)	50%	3.48 × 10 ⁻³⁵
rs35540610_C	T / C	0.13 (↑)	21%	2.98 × 10 ⁻³³
rs1323292_A	A / A	0.15 (↑)	86%	3.64 × 10 ⁻³³
rs1077667_C	C / C	0.14 (↑)	80%	7.88 × 10 ⁻³³
rs35486093_A	A / A	-0.19 (↓)	90%	2.27 × 10 ⁻³¹
rs2150879_G	G / A	0.11 (↑)	58%	4.05 × 10 ⁻³¹
rs701006_G	A / G	0.12 (↑)	56%	9.63 × 10 ⁻³¹
rs11809700_C	C / T	-0.12 (↓)	70%	2.95 × 10 ⁻³⁰
rs9843355_G	G / G	0.14 (↑)	81%	4.14 × 10 ⁻³⁰
rs4939490_G	G / G	0.12 (↑)	38%	2.00 × 10 ⁻²⁹
rs4896153_A	A / A	-0.11 (↓)	70%	2.72 × 10 ⁻²⁹
rs72928038_G	G / A	-0.14 (↓)	90%	8.38 × 10 ⁻²⁹
rs10063294_A	G / A	-0.12 (↓)	59%	1.58 × 10 ⁻²⁸
rs1026916_G	A / G	-0.11 (↓)	57%	2.32 × 10 ⁻²⁸
rs1014486_C	C / C	0.10 (↑)	39%	3.13 × 10 ⁻²⁸
rs11751659_G	A / G	0.16 (↑)	12%	5.75 × 10 ⁻²⁸
rs11079784_C	T / C	0.10 (↑)	46%	1.99 × 10 ⁻²⁷
rs6589706_A	G / G	0.10 (-)	38%	4.63 × 10 ⁻²⁶
rs11749040_G	G / G	-0.14 (↓)	84%	4.54 × 10 ⁻²⁶
rs631204_A	C / C	0.11 (-)	44%	4.92 × 10 ⁻²⁵
rs4808760_G	C / C	-0.11 (-)	76%	5.83 × 10 ⁻²⁵
rs12478539_G	G / C	0.11 (↑)	75%	1.65 × 10 ⁻²⁴
rs58166386_G	A / A	0.10 (-)	38%	4.42 × 10 ⁻²⁴
rs7977720_C	C / T	-0.09 (↓)	47%	4.96 × 10 ⁻²⁴
rs34947566_C	C / C	0.14 (↑)	88%	1.30 × 10 ⁻²³
rs1250551_G	G / T	-0.10 (↓)	69%	1.68 × 10 ⁻²³
rs114071506_C	G / G	-0.25 (-)	5%	3.84 × 10 ⁻²²

rs28703878_A	A / A	-0.10 (↓)	66%	5.27 x 10 ⁻²²
rs3809627_A	C / A	-0.09 (↓)	42%	1.23 x 10 ⁻²¹
rs140522_C	T / T	-0.11 (-)	63%	1.31 x 10 ⁻²¹
rs6711717_G	A / A	0.10 (-)	40%	3.18 x 10 ⁻²¹
rs59655222_T	T / T	0.10 (↑)	79%	5.66 x 10 ⁻²¹
rs2364485_C	C / C	-0.11 (↓)	86%	1.51 x 10 ⁻²⁰
rs2331964_C	T / T	0.09 (-)	63%	4.91 x 10 ⁻²⁰
rs6990534_A	G / G	-0.10 (-)	32%	5.85 x 10 ⁻²⁰
rs2327586_T	C / T	0.10 (↑)	36%	9.48 x 10 ⁻²⁰
rs12925972_C	T / T	0.10 (-)	50%	1.11 x 10 ⁻¹⁹
rs9610458_T	C / T	0.09 (↑)	46%	1.16 x 10 ⁻¹⁹
rs9591325_T	T / C	0.21 (↑)	94%	1.26 x 10 ⁻¹⁹
rs2248137_G	G / G	-0.09 (↓)	48%	1.92 x 10 ⁻¹⁹
rs12365699_G	G / G	0.12 (↑)	87%	2.10 x 10 ⁻¹⁹
rs1177228_G	G / G	0.09 (↑)	78%	2.31 x 10 ⁻¹⁹
rs1076928_C	T / C	-0.12 (↓)	45%	2.75 x 10 ⁻¹⁹
rs1087056_G	A / A	-0.08 (-)	63%	3.50 x 10 ⁻¹⁹
rs28834106_T	T / T	0.11 (↑)	60%	3.61 x 10 ⁻¹⁹
rs60600003_T	T / G	-0.14 (↓)	93%	4.60 x 10 ⁻¹⁹
rs6032662_C	C / T	0.09 (↑)	21%	5.28 x 10 ⁻¹⁹
rs2546890_A	A / A	0.08 (↑)	49%	5.30 x 10 ⁻¹⁹
rs10951042_C	T / T	0.10 (-)	45%	1.50 x 10 ⁻¹⁸
rs9878602_T	G / G	0.10 (-)	57%	1.91 x 10 ⁻¹⁸
rs1465697_C	C / T	-0.09 (↓)	74%	3.02 x 10 ⁻¹⁸
rs483180_G	C / C	-0.08 (-)	27%	1.45 x 10 ⁻¹⁷
rs1112718_A	A / G	0.08 (↑)	57%	2.08 x 10 ⁻¹⁷
rs35703946_G	G / G	0.12 (↑)	88%	2.83 x 10 ⁻¹⁷
rs12434551_A	A / T	0.08 (↑)	55%	4.14 x 10 ⁻¹⁷
rs34026809_C	NA	-0.09 (-)	4%	7.68 x 10 ⁻¹⁷
rs62013236_C	C / C	0.10 (↑)	87%	8.53 x 10 ⁻¹⁷
rs9909593_A	A / G	-0.08 (↓)	62%	8.57 x 10 ⁻¹⁷
rs2986736_T	T / T	-0.11 (↓)	62%	8.91 x 10 ⁻¹⁷
rs9271366_G	A / A	0.45 (-)	15%	1.34 x 10 ⁻¹⁶
rs13327021_C	C / T	-0.08 (↓)	66%	1.55 x 10 ⁻¹⁶
rs12133753_C	C / C	0.12 (↑)	84%	1.67 x 10 ⁻¹⁶
rs10093_G	C / G	-0.13 (↓)	31%	1.97 x 10 ⁻¹⁶
rs61863928_G	G / T	0.09 (↑)	74%	3.01 x 10 ⁻¹⁶
rs2317231_G	G / T	0.08 (↑)	53%	3.25 x 10 ⁻¹⁶
rs12622670_T	C / T	0.09 (↑)	53%	5.08 x 10 ⁻¹⁶
rs983494_G	G / A	0.08 (↑)	79%	6.10 x 10 ⁻¹⁶
rs6533052_A	G / G	0.09 (-)	54%	7.03 x 10 ⁻¹⁶
rs4796224_A	G / G	-0.09 (-)	50%	1.13 x 10 ⁻¹⁵
rs72922276_G	G / G	0.15 (↑)	89%	1.41 x 10 ⁻¹⁵
rs12722559_C	C / A	0.13 (↑)	89%	1.76 x 10 ⁻¹⁵
rs3135024_C	T / T	0.15 (-)	25%	1.82 x 10 ⁻¹⁵
rs12147246_G	G / G	-0.09 (↓)	49%	1.98 x 10 ⁻¹⁵
rs1801133_A	G / A	-0.10 (↓)	31%	2.31 x 10 ⁻¹⁵
rs405343_G	G / T	-0.10 (↓)	77%	3.05 x 10 ⁻¹⁵
rs7731626_G	A / A	0.09 (-)	71%	3.89 x 10 ⁻¹⁵
rs58394161_T	T / T	-0.12 (↓)	85%	1.37 x 10 ⁻¹⁴
rs9863496_T	T / T	-0.07 (↓)	74%	2.75 x 10 ⁻¹⁴
rs244656_A	A / A	0.11 (↑)	76%	2.96 x 10 ⁻¹⁴
rs1049079_C	C / G	-0.13 (↓)	92%	2.99 x 10 ⁻¹⁴
rs6564681_T	C / T	-0.08 (↓)	66%	3.70 x 10 ⁻¹⁴
rs6742_C	T / C	0.14 (↑)	77%	4.11 x 10 ⁻¹⁴
rs373798_A	A / A	0.07 (↑)	44%	4.12 x 10 ⁻¹⁴
rs17724508_T	T / T	0.13 (↑)	92%	6.07 x 10 ⁻¹⁴
rs883871_G	G / G	-0.12 (↓)	80%	8.56 x 10 ⁻¹⁴
rs9308424_A	G / G	-0.09 (-)	38%	9.25 x 10 ⁻¹⁴
rs2269434_T	T / C	-0.09 (↓)	57%	1.47 x 10 ⁻¹³
rs719316_T	C / T	0.07 (↑)	50%	1.62 x 10 ⁻¹³

rs2084007_C	C / T	0.08 (↑)	55%	1.91 × 10 ⁻¹³
rs6738544_C	A / C	0.07 (↑)	62%	2.40 × 10 ⁻¹³
rs7975763_C	C / C	-0.08 (↓)	78%	2.99 × 10 ⁻¹³
rs34695601_T	T / T	0.08 (↑)	83%	5.66 × 10 ⁻¹³
rs735542_A	A / A	0.07 (↑)	66%	5.66 × 10 ⁻¹³
rs249677_C	C / A	-0.07 (↓)	32%	5.73 × 10 ⁻¹³
rs2523500_C	NA	-0.08 (-)	< 1%	6.06 × 10 ⁻¹³
rs6496663_A	A / C	-0.09 (↓)	63%	1.13 × 10 ⁻¹²
rs6589939_A	A / G	-0.08 (↓)	63%	1.76 × 10 ⁻¹²
rs4262739_A	G / A	-0.07 (↓)	48%	4.41 × 10 ⁻¹²
rs2289746_C	T / C	0.08 (↑)	63%	4.69 × 10 ⁻¹²
rs17780048_C	C / C	0.10 (↑)	96%	5.15 × 10 ⁻¹²
rs12614091_A	A / A	0.07 (↑)	75%	6.18 × 10 ⁻¹²
rs766848979_A	NA	-0.17 (-)	< 1%	6.35 × 10 ⁻¹²
rs4409785_T	T / T	-0.08 (↓)	87%	6.87 × 10 ⁻¹²
rs57116599_A	G / A	-0.09 (↓)	24%	1.11 × 10 ⁻¹¹
rs11231749_C	T / C	0.07 (↑)	23%	1.12 × 10 ⁻¹¹
rs2705616_G	C / G	-0.07 (↓)	40%	1.16 × 10 ⁻¹¹
rs10245867_G	G / T	-0.07 (↓)	62%	1.22 × 10 ⁻¹¹
rs6837324_A	A / A	-0.06 (↓)	68%	1.34 × 10 ⁻¹¹
rs10936602_T	T / T	0.07 (↑)	71%	1.90 × 10 ⁻¹¹
rs34681760_C	T / T	0.08 (-)	60%	2.01 × 10 ⁻¹¹
rs9992763_T	T / T	-0.06 (↓)	44%	2.36 × 10 ⁻¹¹
rs34636443_G	G / G	0.19 (↑)	97%	3.39 × 10 ⁻¹¹
rs13386171_C	T / C	0.07 (↑)	62%	3.47 × 10 ⁻¹¹
rs2726479_T	C / C	-0.07 (-)	49%	3.84 × 10 ⁻¹¹
rs3184504_T	T / C	0.06 (↑)	33%	4.24 × 10 ⁻¹¹
rs9955954_G	A / A	-0.09 (-)	24%	4.85 × 10 ⁻¹¹
rs780517_C	C / C	0.07 (↑)	59%	5.22 × 10 ⁻¹¹
rs5756405_A	A / G	0.06 (↑)	56%	5.35 × 10 ⁻¹¹
rs1399180_T	T / T	-0.10 (↓)	25%	7.16 × 10 ⁻¹¹
rs9277626_G	A / G	-0.09 (↓)	30%	7.16 × 10 ⁻¹¹
rs10230723_A	A / A	0.08 (↑)	85%	7.69 × 10 ⁻¹¹
rs17493811_G	NA	-0.20 (-)	2%	8.98 × 10 ⁻¹¹
rs7865251_T	T / T	0.07 (↑)	67%	1.23 × 10 ⁻¹⁰
rs6911131_A	A / A	-0.11 (↓)	90%	1.31 × 10 ⁻¹⁰
rs17051321_C	C / C	-0.08 (↓)	77%	1.41 × 10 ⁻¹⁰
rs7222450_A	G / A	0.06 (↑)	43%	2.09 × 10 ⁻¹⁰
rs2836438_G	G / G	-0.10 (↓)	89%	2.62 × 10 ⁻¹⁰
rs10951154_T	T / T	-0.08 (↓)	75%	3.05 × 10 ⁻¹⁰
rs2585447_T	T / C	-0.08 (↓)	87%	3.13 × 10 ⁻¹⁰
rs3819292_A	C / C	0.09 (-)	20%	3.19 × 10 ⁻¹⁰
rs2229092_C	NA	0.16 (-)	4%	3.45 × 10 ⁻¹⁰
rs10191360_T	T / C	0.08 (↑)	56%	3.85 × 10 ⁻¹⁰
rs4940730_A	G / G	0.06 (-)	52%	3.90 × 10 ⁻¹⁰
rs12832171_C	C / C	0.15 (↑)	> 99%	4.13 × 10 ⁻¹⁰
rs11125803_T	C / C	-0.07 (-)	69%	5.45 × 10 ⁻¹⁰
rs73414214_C	C / C	0.12 (↑)	91%	6.34 × 10 ⁻¹⁰
rs13414105_C	C / A	0.09 (↑)	82%	6.90 × 10 ⁻¹⁰
rs11919880_A	A / G	0.06 (↑)	66%	7.63 × 10 ⁻¹⁰
rs13136820_C	C / T	0.07 (↑)	37%	7.79 × 10 ⁻¹⁰
rs354033_G	G / A	0.08 (↑)	76%	7.99 × 10 ⁻¹⁰
rs802730_T	T / T	0.06 (↑)	76%	1.08 × 10 ⁻⁹
rs56095240_T	T / T	-0.10 (↓)	89%	1.13 × 10 ⁻⁹
rs11852059_A	A / A	-0.09 (↓)	77%	1.19 × 10 ⁻⁹
rs531612_C	T / T	-0.07 (-)	50%	1.21 × 10 ⁻⁹
rs6789653_G	A / A	0.06 (-)	75%	1.30 × 10 ⁻⁹
rs7260482_A	A / C	-0.07 (↓)	61%	1.43 × 10 ⁻⁹
rs6427540_C	C / C	0.10 (↑)	82%	1.48 × 10 ⁻⁹
rs6672420_T	A / T	-0.06 (↓)	55%	1.48 × 10 ⁻⁹
rs9808753_G	A / A	0.08 (-)	18%	1.60 × 10 ⁻⁹

rs12588969_C	C / C	-0.07 (↓)	72%	1.82 x 10 ⁻⁹
rs4325907_T	T / T	-0.07 (↓)	64%	1.99 x 10 ⁻⁹
rs11161550_A	G / A	-0.06 (↓)	43%	2.06 x 10 ⁻⁹
rs11083862_A	A / T	0.07 (↑)	53%	2.44 x 10 ⁻⁹
rs6072343_G	G / G	-0.08 (↓)	50%	2.69 x 10 ⁻⁹
rs10271373_C	A / A	-0.06 (-)	42%	3.11 x 10 ⁻⁹
rs4728142_G	G / A	-0.06 (↓)	62%	3.37 x 10 ⁻⁹
rs2286974_G	A / A	-0.10 (-)	50%	4.09 x 10 ⁻⁹
rs8062446_T	C / T	0.08 (↑)	39%	4.30 x 10 ⁻⁹
rs2590438_T	T / G	-0.07 (↓)	99%	4.65 x 10 ⁻⁹
rs9568402_A	A / A	-0.09 (↓)	85%	4.80 x 10 ⁻⁹
rs12609500_C	C / C	0.06 (↑)	82%	5.27 x 10 ⁻⁹
rs72989863_G	G / G	0.06 (↑)	72%	5.55 x 10 ⁻⁹
rs12971909_G	G / G	-0.07 (↓)	61%	5.56 x 10 ⁻⁹
rs4812772_C	T / C	0.07 (↑)	69%	6.17 x 10 ⁻⁹
rs61884005_C	C / C	0.09 (↑)	84%	6.34 x 10 ⁻⁹
rs962052_C	C / T	0.06 (↑)	32%	8.28 x 10 ⁻⁹
rs137955_T	T / T	0.06 (↑)	34%	9.63 x 10 ⁻⁹
rs4820955_A	T / A	0.06 (↑)	46%	1.06 x 10 ⁻⁸
rs35218683_C	C / T	-0.08 (↓)	72%	1.36 x 10 ⁻⁸
rs13066789_C	T / T	0.06 (-)	49%	1.50 x 10 ⁻⁸
rs11899404_T	T / T	-0.05 (↓)	50%	1.66 x 10 ⁻⁸
rs3923387_T	C / C	0.06 (-)	31%	1.76 x 10 ⁻⁸
rs61708525_G	A / A	0.07 (-)	30%	1.80 x 10 ⁻⁸
rs12211604_A	A / A	-0.06 (↓)	48%	2.15 x 10 ⁻⁸
rs11578655_T	T / T	-0.08 (↓)	89%	2.89 x 10 ⁻⁸
rs2469434_T	T / C	-0.05 (↓)	58%	2.92 x 10 ⁻⁸
rs55858457_G	G / G	-0.06 (↓)	59%	2.95 x 10 ⁻⁸
rs32658_G	G / T	-0.06 (↓)	63%	3.24 x 10 ⁻⁸
rs1415069_C	G / G	-0.07 (-)	80%	3.32 x 10 ⁻⁸
rs1365120_T	C / T	-0.09 (↓)	74%	4.06 x 10 ⁻⁸
rs17741873_G	G / G	0.07 (↑)	82%	4.69 x 10 ⁻⁸
rs9900529_C	G / G	0.06 (-)	39%	4.76 x 10 ⁻⁸
rs3093982_T	NA	0.10 (-)	< 1%	4.95 x 10 ⁻⁸
rs10938182_T	NA	0.09 (-)	< 1%	4.99 x 10 ⁻⁸

N/A indicates variants that could not be imputed using the 1000 genomes project datasets and variants that have a frequency of < 5%. Your genome was sequenced at 30x/100x coverage and is not imputed. However, to calculate percentiles, we need to compare your data with other users imputed data. To make the data comparable, we need to exclude some of the variants from your data.