SelfDecode™

Immunity & Inflammation

Summary Report

REPORT CATEGORY —

IMMUNE FUNCTION & INFLAMMATION

RL

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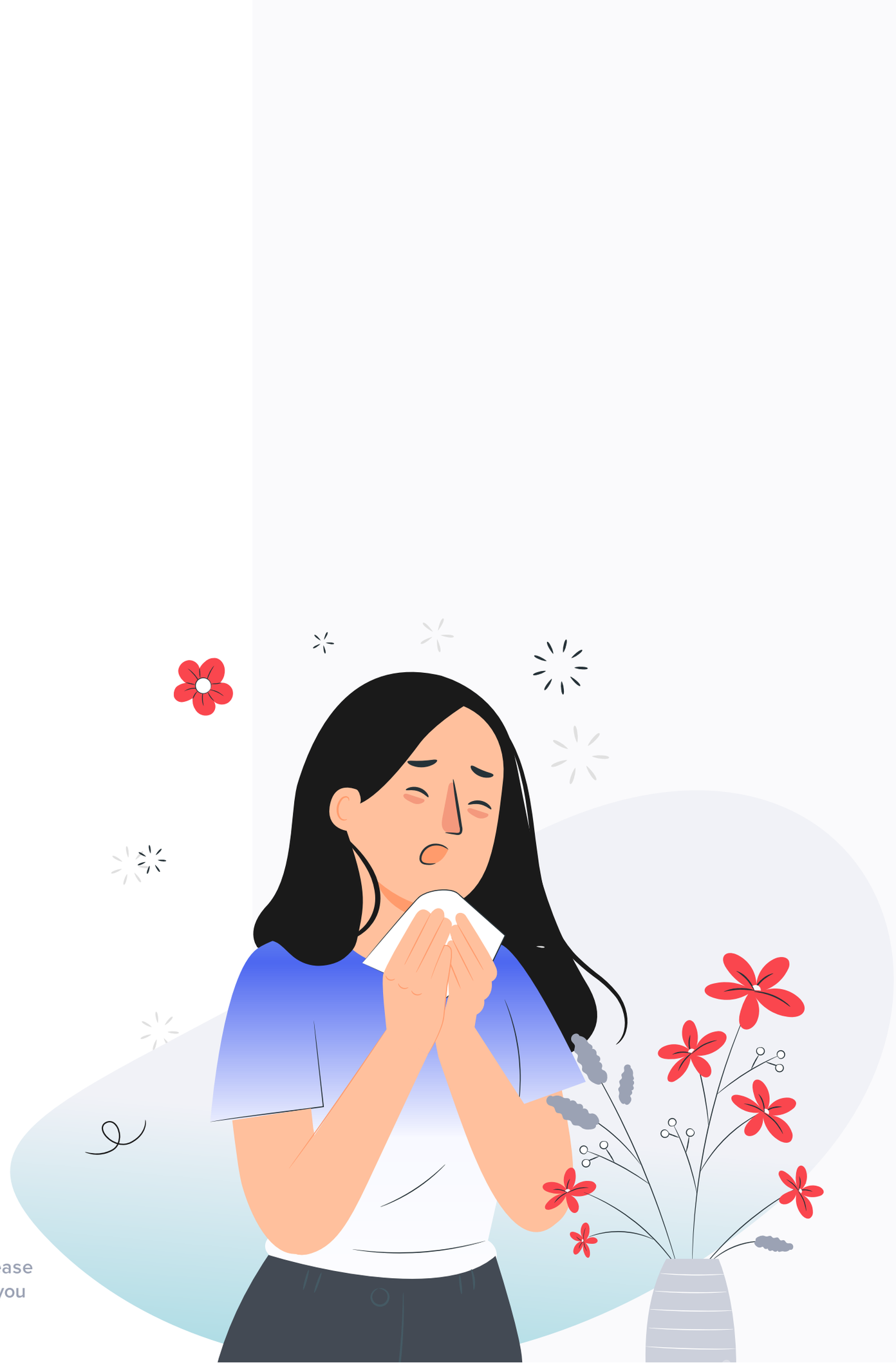
Table of contents



DISCLAIMER

This report does not diagnose this or any other health conditions. Please talk to a healthcare professional if this condition runs in your family, you think you might have this condition, or you have any concerns about your results.

Your Results in Details

Inflammatory And Autoimmune Conditions

You want your immune system to protect the good cells from bad cells, injury, and any other harms. You don't want it to lose the ability to distinguish between the good and the bad. **A number of autoimmune conditions can occur when your immune system attacks healthy cells, and your genetics has a massive impact**.

Excessive inflammation is the hallmark of autoimmunity, but it can happen for other reasons that mess up your immune response.

This section dives into your genetic predisposition to various inflammatory and autoimmune conditions, including **eczema, gluten sensitivity, joint and gut inflammation, and more**.

TYPICAL LIKELIHOOD

Inflammation

Typical likelihood of inflammation

TYPICAL LIKELIHOOD

Joint Inflammation

Typical likelihood of rheumatoid arthritis

TYPICAL LIKELIHOOD

Gut Inflammation

Typical likelihood of IBD

MORE LIKELY

Appendicitis

More likely to have appendicitis

TYPICAL LIKELIHOOD

Pancreas Inflammation

Typical likelihood of pancreas inflammation

TYPICAL

Gluten Sensitivity (Celiac)

Likely typical sensitivity to gluten

TYPICAL LIKELIHOOD

Psoriasis

Typical likelihood of psoriasis

LESS LIKELY

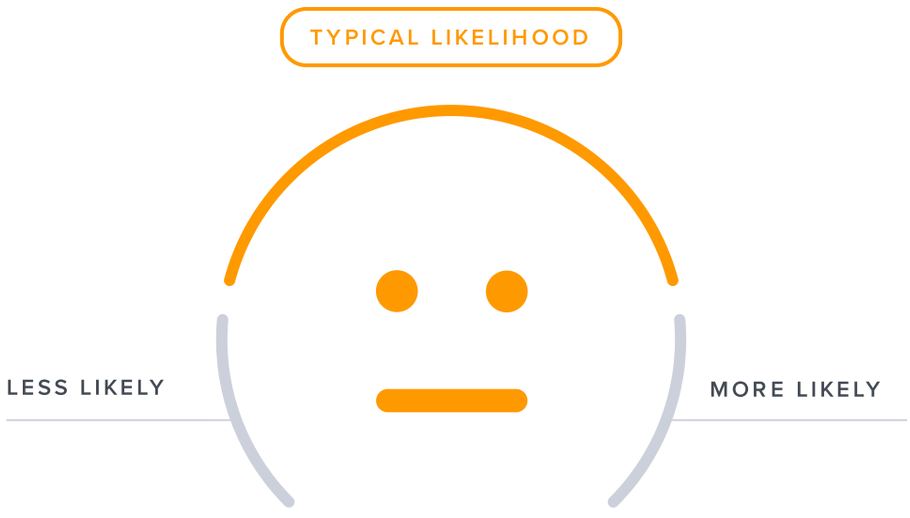
Eczema

Less likely to have eczema

Inflammation

Key Takeaways:

- Chronic inflammatory diseases like diabetes and heart disease, are responsible for **3 in 5** deaths worldwide.
- About **40-50%** of the differences in people's CRP (inflammatory protein) levels may be due to genetics.
- Other factors are equally important. They include diet, exercise, and life satisfaction.
- Click the **next steps** tab for relevant labs.



Typical likelihood of inflammation based on 9,358 genetic variants we looked at

Inflammation is an important biological process. It protects the body from disease and damage. When germs or other foreign substances enter the body, white blood cells rush to the site. The area then gets red, swollen, and warm. These changes help kill pathogens and prepare the tissue to heal [R, R].

A common marker that helps measure inflammation is **C-reactive protein** (**CRP**). **High sensitivity CRP** (**hs-CRP**) in particular helps measure low-grade inflammation.

CRP is produced in the liver. It helps recognize disease-causing microbes and damaged cells that need to be removed from the body. However, it may also play a role in autoimmune disease [R, R].

Short-term inflammation is helpful. However, too much inflammation can be a bad thing [R, R, R, R].

Chronic inflammation is linked to many diseases, including:

- Autoimmune conditions [R, R]
- Heart disease [R, R, R]
- Obesity [R, R]
- Type 2 diabetes [R, R]
- Fibromyalgia [R, R]
- Mental health conditions [R, R, R]
- Cancer [R, R, R, R, R]

In 2014, an estimated **60%** of Americans were living with at least one chronic inflammatory condition [R].

Factors that may influence chronic inflammation include [R, R, R]:

- Diet
- Exercise
- Life satisfaction
- **Genetics**

Common strategies for reducing low-grade inflammation include [R, R, R, R, R]:

- Lifestyle changes
- Diet changes
- Weight management
- Drugs targeting the underlying condition

Genetics may play an important role in inflammatory conditions. Genes involved in inflammation may influence [R, R, R, R, R, R]:

- Immune messengers (*STAT3*, *IL6*, *IL10*)
- Immune cell function (*HLA-DRB1*, *PTPN22*)
- Histamine levels (*AOC1*, *HNMT*)

Genetically high free testosterone levels may be causally associated with lower C-reactive protein [R].

Joint Inflammation

Key Takeaways:

- Up to 65% of differences in people's chances of developing rheumatoid arthritis may be due to genetics.
- Other risk factors include obesity and smoking.
- Rheumatoid arthritis affects about **1%** of people around the world. This means even a high genetic risk is still a low overall risk.
- Click the **Recommendations** tab for potential dietary and lifestyle changes and **next steps** for relevant labs.

Rheumatoid arthritis is an autoimmune condition in which the body attacks its own joints. This causes inflammation, tissue damage, and pain [R].

Rheumatoid arthritis affects about 1% of people around the world. Researchers have found big differences between populations. North America has the highest rate, with the lowest rates in South America and Asia [R].

According to one estimate, about **1.3 million Americans** have this condition [R].

Rheumatoid arthritis usually affects small joints in the hands and feet. Its signs and symptoms include [R, R]:

- Joint pain and tenderness
- Heat and swelling in the affected joints
- Joint stiffness

Many people have periods of worsening symptoms called "flares." These flares may be triggered by [R]:

- Stress
- Too much movement
- A change in medication

Rheumatoid arthritis may lead to complications outside the joints. They can include heart disease, nerve problems, and infections [R].

There is no cure for rheumatoid arthritis. Instead, patients and doctors work to control symptoms. Some ways to manage the condition include [R, R]:

- Medications
- Surgery (e.g., joint replacement surgery)
- Exercise
- Supplements to reduce inflammation and support bone health

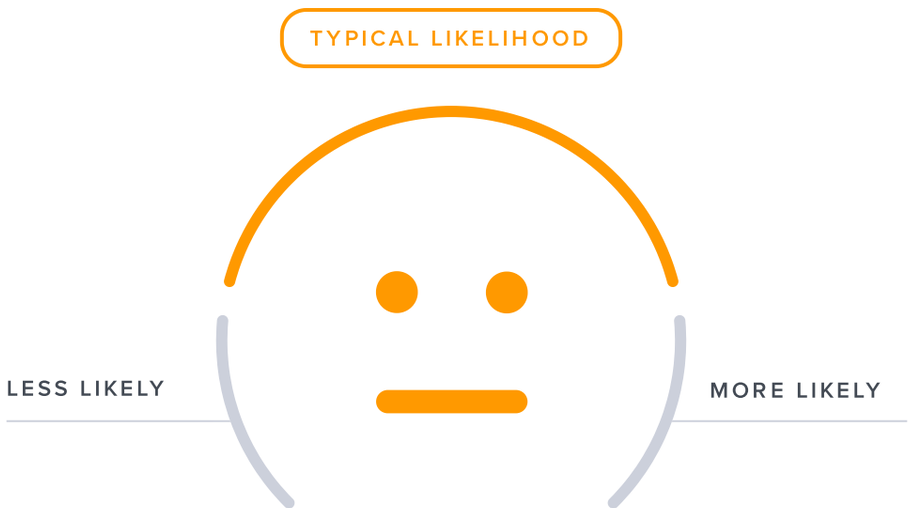
The exact cause of rheumatoid arthritis is unknown. Risk factors include [R, R, R]:

- Cigarette smoking
- Obesity
- **Genetics**

In fact, up to 65% of differences in people's chances of developing rheumatoid arthritis may be attributed to genetics. Genes involved in this condition may influence [R, R]:

- Immune function (*HLA-DRB1*, *PSORS1C1*)
- Inflammation (*STAT4*, *IL10*, *PTPN2*)

Genetically high testosterone and omega-3s levels may be causally associated with a high risk of rheumatoid arthritis [R, R].



Typical likelihood of rheumatoid arthritis based on 281 genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
TGFA	rs3771501	AA
SRR	rs216175	AA
FAM53A	rs798726	CC
ANAPC4	rs34811474	GG
HLA-DPB1	rs2856821	TT
LTBP1	rs2061027	AA
PRDM5	rs11729628	GG
MPPED2	rs11031191	TT
TMEM241	rs10502437	GG
COL11A1	rs2622873	CT
H4C8	rs115740542	TC
SGO1	rs62242105	GG
ICA1L	rs62182810	AG
CSK	rs35206230	CT
TGFB2	rs2785988	CA
CPNE1	rs2248393	CG
RAB28	rs1913707	AG
TSKU	rs1149620	AT
DPEP1	rs1126464	CG

The number of "risk" variants in this table doesn't necessarily reflect your overall result.

Gut Inflammation

Key Takeaways:

- Up to **75%** of differences in people's chances of developing IBD may be due to genetics.
- Risk factors include being under age 30, European ancestry, and smoking.
- IBD may cause: diarrhea, fatigue, abdominal pain, bloody stool, weight loss, inflammation, liver damage, and colon cancer.
- IBD only affects about **3 in 1000** people worldwide. So, even with high genetic risk, your overall risk is actually low.
- Click the **Recommendations** tab for potential dietary and lifestyle changes and **next steps** for relevant labs.

Our intestines do much more than absorb food. They can impact our immune system, mood, and more [R]!

Inflammatory bowel disease (IBD) is a group of gut diseases affecting **about 0.3% of people worldwide.** It's most common in North America, Europe, and Australia [R].

The exact causes of IBD are unknown. Possible risk factors include [R]:

- Age (most people develop IBD before the age of 30)
- European ancestry
- Cigarette smoking
- **Genetics**

There are two major types of IBD: ulcerative colitis and Crohn's disease. Ulcerative colitis involves inflammation in the large intestine, while Crohn's disease often affects both the large and small intestines [R, R, R].

In both types of IBD, the immune system reacts to normal gut bacteria as if they're dangerous. These immune reactions cause inflammation and damage to the gut lining [R].

This gut damage can cause signs and symptoms like [R, R, R]:

- Diarrhea
- Fatigue
- Abdominal pain and cramping
- Blood in the stool
- Low appetite
- Weight loss

Untreated IBD can have serious complications, including [R]:

- Skin, eye, and joint inflammation
- Bile duct and liver damage
- Blood clots
- Colon cancer

People with IBD typically need anti-inflammatory medications to control their disease [R, R].

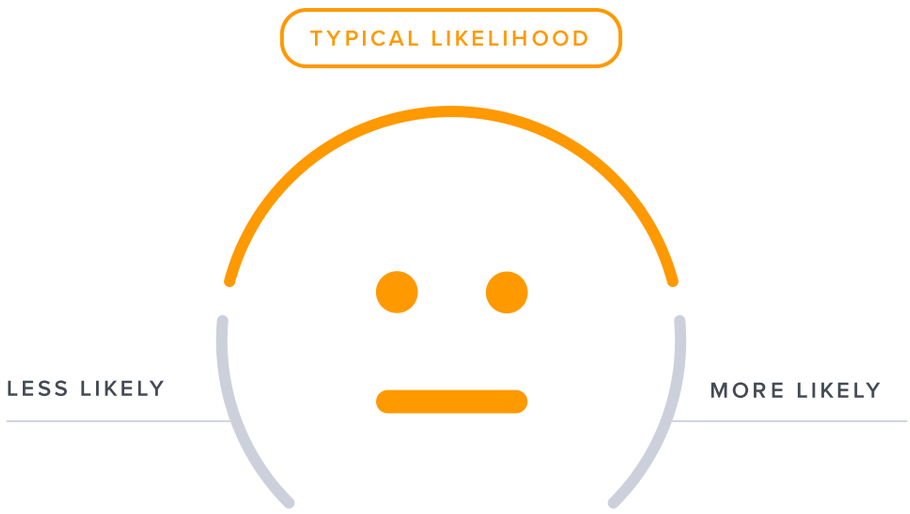
Many people with IBD take supplements because their damaged guts have trouble absorbing certain nutrients. Some people may need to adhere to special diets as well [R, R].

IBD can be a disabling condition, and many turn to alternative and complementary strategies to help them manage their symptoms. Your DNA may help determine which of these strategies is likely to work best for you.

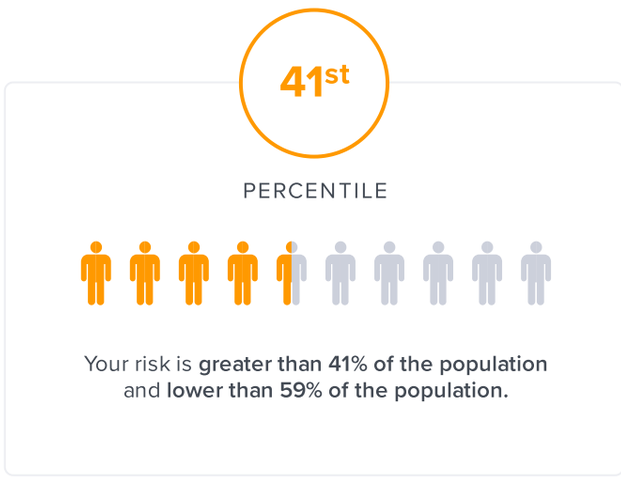
Up to 75% of differences in people's chances of developing IBD may be attributed to genetics. Genes involved in IBD may influence [R, R, R, R]:

- Inflammation (*JAK2*, *TNFSF15*, *SLAMF8*)
- Immune response (*TLR9*, *UBE2L3*, *BCL3*)

Moreover, genetically high betaine levels may be causally associated with a high risk of Crohn's disease. In contrast, genetically high levels of omega-3s may be causally associated with a lower risk [R, R, R, R].



Typical likelihood of IBD based on 41,199 genetic variants we looked at



Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
HLA-DQA2	rs2395185	GG
JAK2	rs10758669	CA
NCR3	rs1799724	CC
ATG16L1	rs2241880	GA
IL23R	rs10889677	AC
STAT3	rs744166	GA
TNFSF15	rs6478108	TC
HNF4A	rs6017342	CA
IL23R	rs11209026	GG
PDGFB	rs2413583	CC
PTGER4	rs11742570	CC
CARD9	rs10781499	AA
NKX2-3	rs4409764	TT
INAVA	rs7554511	CC
IRF8	rs10521318	CC
LRRC32	rs2155219	TT
RORC	rs4845604	GG
PHACTR2	rs12199775	AA
PTPN2	rs1893217	GA

The number of "risk" variants in this table doesn't necessarily reflect your overall result.

Appendicitis

Key Takeaways:

- Up to **56%** of differences in people's chances of developing appendicitis may be due to genetics.
- Other risk factors include being young and male.
- Appendicitis is not rare, happening to about 7-8% of people in their lifetime.
- If your genetic risk is high, know the symptoms and seek medical attention if you have them.
- Click the **Recommendations** tab for potential dietary and lifestyle changes and **next steps** for relevant labs.

The **appendix** is a small, finger-shaped pouch near the beginning of the large intestine. It is in the lower right of your abdomen [R, R].

The function of the appendix has been debated for many years. More recent studies suggest that the appendix is a "safe house" for good bacteria that live in the gut. If an illness wipes out large numbers of these bacteria in the gut, the ones from the appendix can help replace them [R].

Appendicitis is inflammation of the appendix. It is likely caused by something blocking the lining of the appendix, leading to an infection. If left untreated, the appendix can rupture and the infection can spread. This can be life-threatening [R].

Although anyone can develop appendicitis, it most often occurs in people between 10 and 30 years old. Men are slightly more likely to experience it than women [R, R].

The symptoms of appendicitis include [R]:

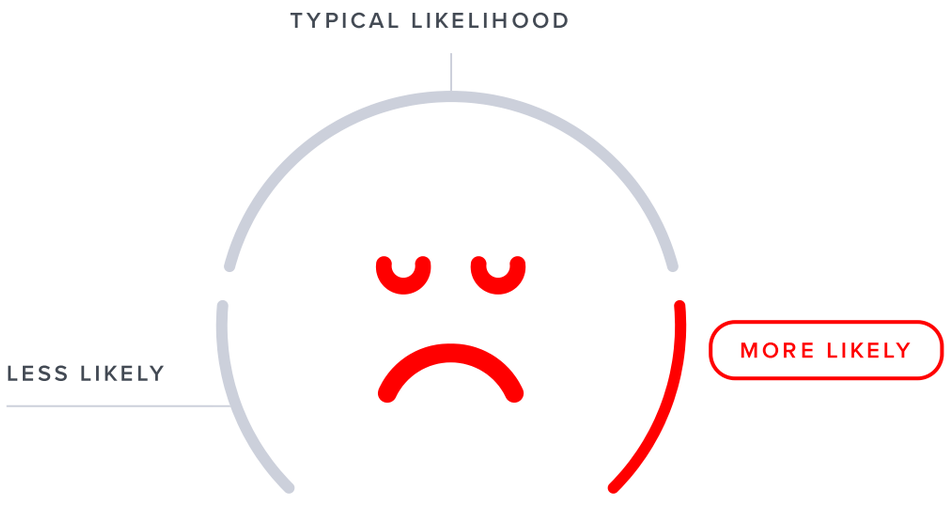
- Sudden pain in the lower right abdomen
- Sudden pain around the belly button that shifts to the lower right abdomen
- Pain that worsens if you move suddenly
- Nausea and vomiting
- Loss of appetite
- Fever
- Gut issues

The standard treatment for appendicitis is surgery to remove the appendix [R].

Up to 56% of differences in people's chances of developing appendicitis may be attributed to genetics. Involved genes may influence [R, R]:

- Gut development
- Gut function
- Inflammation

Genetically predicted higher levels of fasting insulin may be associated with appendicitis [R].



More likely to have appendicitis based on 809,853 genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
ENPEP	rs2129979	GT
MTARC1	rs3738182	GG
PITX2	rs7697491	AT
PITX2	rs13121924	AG
LTBR	rs10849448	GG
OSR1	rs56259011	CT
DLEU7	rs201768	CT
NKX2-3	rs7095491	TC
/	rs77114860	TT
TUB	rs72848490	CC
KRT73	rs146783619	AA
NKX2-3	rs41290504	CC

The number of "risk" variants in this table doesn't necessarily reflect your overall result.

Pancreas Inflammation

The pancreas is an organ located behind the stomach that releases crucial enzymes for carbs and fats digestion. **Pancreatitis** is inflammation of the pancreas, which can be acute or chronic.

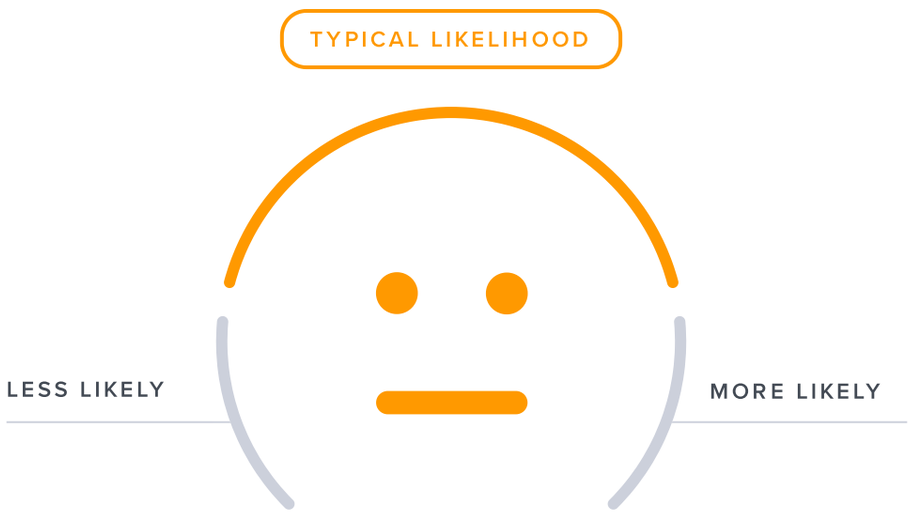
Potential risk factors for pancreatitis include [R, R, R]:

- **Alcohol**
- Cigarette smoking
- Obesity
- High blood lipids
- Certain medications
- Genetics

Genetically predicted higher fasting insulin may be associated with acute and chronic pancreas inflammation. In contrast, genetically high testosterone levels may be causally associated with a lower risk of pancreas inflammation [R, R].

Health conditions that may contribute to pancreas inflammation include [R, R]:

- Gallstones
- Diabetes
- Infections
- Injury or trauma



Typical likelihood of pancreas inflammation based on 1,669 genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
PRSS1	rs10273639	CC
JCAD	rs2995271	TT
TWIST2	rs4663946	TT
TBC1D8B	rs12689287	GA
RADX	rs5916761	GA
JAKMIP2	rs17107296	AA
JAKMIP2	rs150261364	CC
SPINK5	rs112861203	TT
STK32A	rs148849032	CC
MORC4	rs12688220	CC
JAKMIP2	rs146303903	AA
CTRC	rs497078	CC
STK32A	rs142623619	AA
/	rs150176211	GG
ADRB2	rs17640347	GG
ABCG5	rs75331444	GG
SLC25A34	rs60816621	CC
COLEC10	rs11988997	CC
NUP62CL	rs12688091	GG

The number of "risk" variants in this table doesn't necessarily reflect your overall result.

Gluten Sensitivity (Celiac)

Key Takeaways:

- It's estimated that 1-2% of the population has gluten sensitivity. The most likely risk factor is genetics.
- If you have symptoms, diet restriction may indicate whether you have the sensitivity or not. You should speak to a healthcare professional if symptoms persist.
- Symptoms include diarrhea/constipation, fatigue, weight loss, gut pain/bloating, and nausea.
- Celiac disease is rare, so even with high genetic risk, your overall risk is still low.
- Click the **next steps** tab for relevant labs.

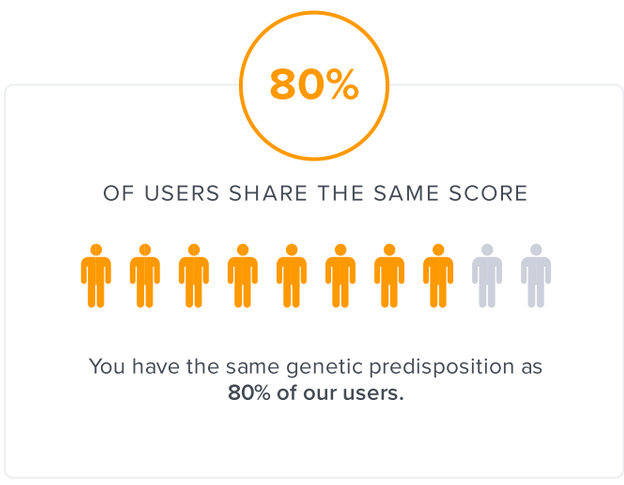
Gluten is a protein found in grains such as wheat, rye, spelt, barley, and triticale. Some people cannot properly digest gluten. In fact, their immune systems may react to gluten as if it is dangerous. To make matters worse, gluten is similar to a normal protein in the intestine. Sometimes, the immune system will attack both. People with this type of reaction have celiac disease [R, R, R].

Researchers aren't completely sure why some people are sensitive to gluten. Infections in the gut may play a role. However, a major risk factor is probably genetic [R, R, R].

The most important genes involved in celiac disease are *HLA* genes. These genes help make HLA proteins, which sit on the surface of white blood cells. They help the immune system attack and remove dangerous invaders like bacteria and viruses. In people with celiac disease, HLA proteins may attack gluten by mistake and damage the gut barrier [R, R].

Moreover, genetically high testosterone levels may be causally associated with a lower risk of celiac disease in men [R].

Likely typical sensitivity to gluten based on 2 genetic variants we looked at



Psoriasis

Key Takeaways:

- Up to **90%** of differences in people's odds of developing psoriasis may be due to genetics.
- Psoriasis triggers include: infections, weather, skin injuries, stress, cigarette smoke, alcohol abuse, steroid withdrawal.
- About **2%** of Americans have psoriasis, mostly appearing in younger and older adults.
- Even though the condition is rare, people with high genetic risk should understand and be wary of potential triggers.
- Click the **Recommendations** tab for potential dietary and lifestyle changes.

Psoriasis is an autoimmune skin disease in which the body attacks its own skin cells. In response, skin cells begin to grow too quickly. New cells then begin to pile up on the skin's surface, forming plaques. The result is itchy, inflamed, scaly skin — the hallmark of psoriasis [R, R, R].

About 2% of Americans have psoriasis. It can appear at any age, but most cases develop between the ages of 15-20 or 55-60 [R].

People predisposed to psoriasis don't always have symptoms. In fact, **symptoms may only appear after contact with a "trigger"** [R].

Some common triggers include [R]:

- Throat and skin infections
- Dry and cold weather
- Skin injuries (like bug bites and sunburns)
- Stress
- Cigarette smoke
- Alcohol abuse
- Topical steroid withdrawal

Signs and symptoms of psoriasis include [R]:

- White scales covering patches of inflamed, itchy skin (often on the elbows, knees, scalp, and back)
- Joint stiffness
- Thickened or discolored nails

People with psoriasis also tend to have problems with their kidneys, heart, and joints. In fact, about 30% of patients have *psoriatic arthritis*. This painful condition mainly affects the fingers and toes [R].

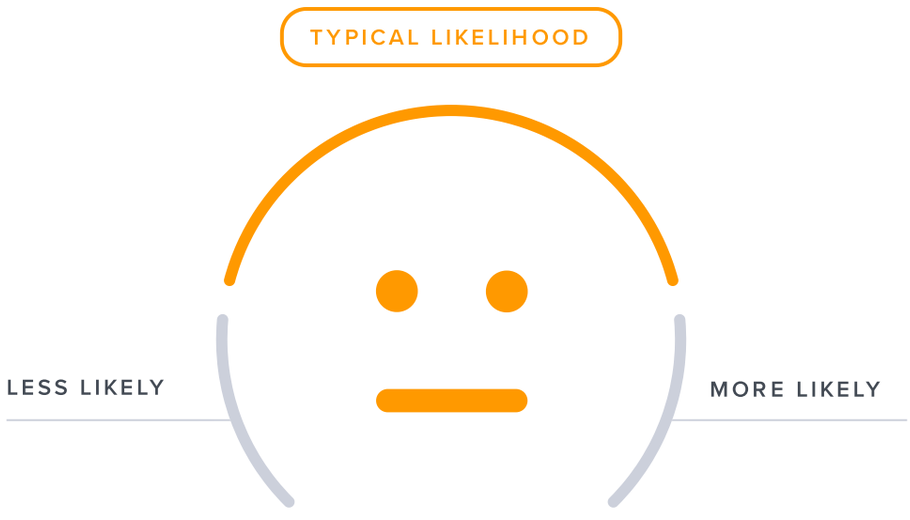
As there is no cure for psoriasis, treatment aims to manage symptoms. Your doctor may suggest [R, R, R]:

- Light therapy
- Coal tar
- Medications that block the immune response
- Topical vitamin D
- Retinoids

Between 60-90% of differences in psoriasis may be attributed to genetics. Genes involved in psoriasis may influence [R, R, R]:

- Inflammation (*IL12B*, *IL23A*, *IL23R*, *NFKBIZ*)
- Immune response (*IFNLR1*, *NOS2*, *IFIH1*, *HLA-C*)

Genetically high neutrophil levels may be causally associated with a higher risk of psoriasis [R].



Typical likelihood of psoriasis based on 688 genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
STAT3	rs744166	GA
LCE3C	rs4845459	AA
IFNLR1	rs10794648	CC
IL12B	rs7709212	TC
ZNF816	rs9304742	TT
DDX58	rs11795343	TT
IL13	rs20541	GG
TP63	rs28512356	CC
ETS1	rs6590334	TT
STX1B	rs13708	AG
IFIH1	rs1990760	TC
RUSC2	rs10814247	GG
ETS1	rs7933433	TT
CAVIN1	rs56364076	CT
SLC44A2	rs892085	GA
REL	rs842625	GA
MFSD4B	rs240993	CT
SPATA2	rs7352944	CT
RUNX1	rs8128234	TC

The number of "risk" variants in this table doesn't necessarily reflect your overall result.

Eczema

Key Takeaways:

- Up to **75%** of differences in people's chances of developing eczema may be due to genetics.
- Eczema triggers include: allergens, cold, dry air, Infections, skin irritants, and stress.
- It can affect your appearance and quality of life.
- If you have a high genetic risk, take special care to avoid potential triggers.
- Click the **Recommendations** tab for potential dietary and lifestyle changes.

Eczema is an inflammatory skin condition. It causes dry skin and itchy red rashes, usually on the elbow creases, neck, and back of the knees [R, R].

Up to 1 in 3 children experience eczema, usually in the first year of life. The condition is less common (2-10%) in adults [R].

Factors that tend to worsen eczema include [R, R]:

- Contact with allergens (pollen, mold, dust mites, or animals)
- Cold, dry air
- Infections like the flu
- Contact with skin irritants (chemicals or fabrics)
- Stress

People with eczema may be more prone to skin infections. Normally, the skin has a protective barrier that keeps out germs. Eczema can compromise this barrier, making it easier for infections to arise [R, R].

The symptoms of eczema can usually be managed at home with the help of [R]:

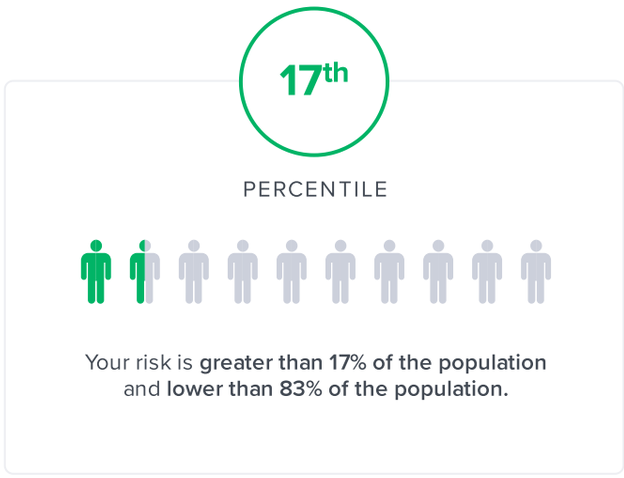
- Moisturizers
- Humidifiers
- Topical medications
- Trimming or covering fingernails (to limit scratching)
- Avoiding skin irritants

While the causes of eczema aren't completely clear, **genetics seems to play a major role**. What's more, the genetics of eczema, asthma, hay fever, and food allergies are very similar. This means that if you have one, you're more likely to have the others [R, R].

Up to 75% of differences in people's chances of developing eczema may be attributed to genetics. Genes involved in eczema may influence [R, R, R, R, R]:

- Skin barrier function (*FLG*, *OVOL1*, *KIF3A*)
- Inflammation (*IL13*, *IL4*)
- Immune response (*HLA-DQA1*, *EMSY*)

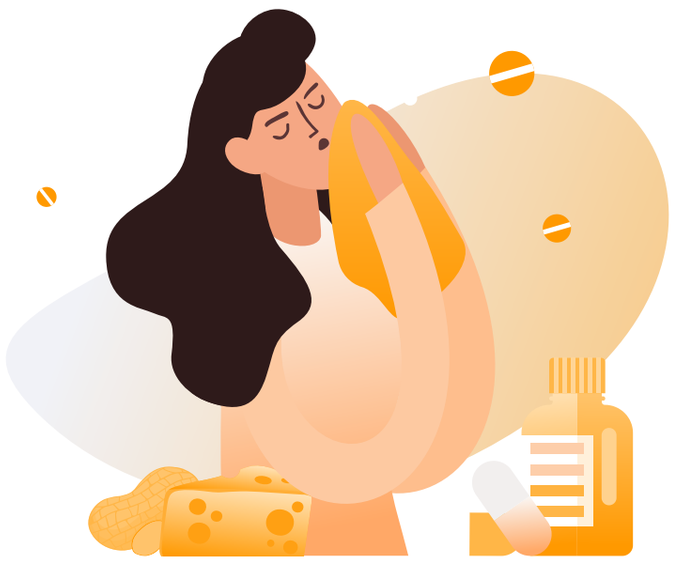
Less likely to have eczema based on 6,952 genetic variants we looked at



Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
LRRC32	rs7936434	CC
STMN3	rs3848669	TT
LRRC32	rs55646091	AG
PRR5L	rs10836538	GG
PPP2R3C	rs2415269	GG
SATB1	rs4395418	CC
NCF4	rs4821564	CC
IL2RA	rs62626322	TG
ID2	rs891058	GG
HLA-C	rs2844594	AG
SLC25A46	rs3853750	TC
PRR5L	rs6484847	TC
TREH	rs10790275	CG
TRIB1	rs12334935	AG
D2HGDH	rs34290285	AG
TRAF3	rs12888955	GA
FLG	rs61816761	GG
FLG	rs138726443	GG
LINGO4	rs12123821	CC

The number of "risk" variants in this table doesn't necessarily reflect your overall result.



Allergies

Can’t cuddle your family pet without sneezing? Have to pop an antihistamine before visiting a fluffy friend? If you answered yes to either of these questions, you aren’t alone. Up to **20%** of people are allergic to cats or dogs, while up to **40%** of American adults may have some kind of allergy.

An allergy is an immune reaction to a trigger that is normally harmless. This allergy trigger is called an allergen. **From pet to pollen, your genes may help determine the best strategies to potentially lessen the impact allergies have on your life.**

TYPICAL LIKELIHOOD

Allergies

Typical likelihood of allergies

TYPICAL LIKELIHOOD

Food Allergies

Typical likelihood of food allergies

LESS LIKELY

Egg Allergy

Less likely to have an egg allergy

MORE LIKELY

Peanut Allergy

More likely to have peanut allergy

Allergies

Key Takeaways:

- Up to **85%** of differences in people's chances of having allergies may be due to genetics.
- Up to **20%** of people are allergic to cats or dogs, and **40%** have allergies in general.
- Even with low genetic risk, your overall risk of allergies is relatively high because they are increasingly common.
- Click the **Recommendations** tab for potential dietary and lifestyle changes and **next steps** for relevant labs.

It's hard to say exactly how many people have allergies because they vary so much. **Up to 42% of American adults say that they have some kind of allergy** [R, R, R].

Some allergies may even become more common due to climate change. As temperatures and carbon dioxide levels rise, plants may produce more pollen. This could lead to more people developing seasonal allergies [R].

An *allergy* is an immune reaction to a trigger that is normally harmless. This allergy trigger is called an *allergen*. The best-known allergens are peanuts and pollen. However, people can be allergic to just about anything, including [R, R]:

- Animals
- Foods
- Insect stings and bites
- Medications
- Metals
- Latex
- Perfume
- Dust

An allergic reaction begins when the body recognizes an allergen. White blood cells release **histamine** and other molecules that cause inflammation. This inflammation can be mild or very dangerous. Its consequences can range from sneezing to death [R, R].

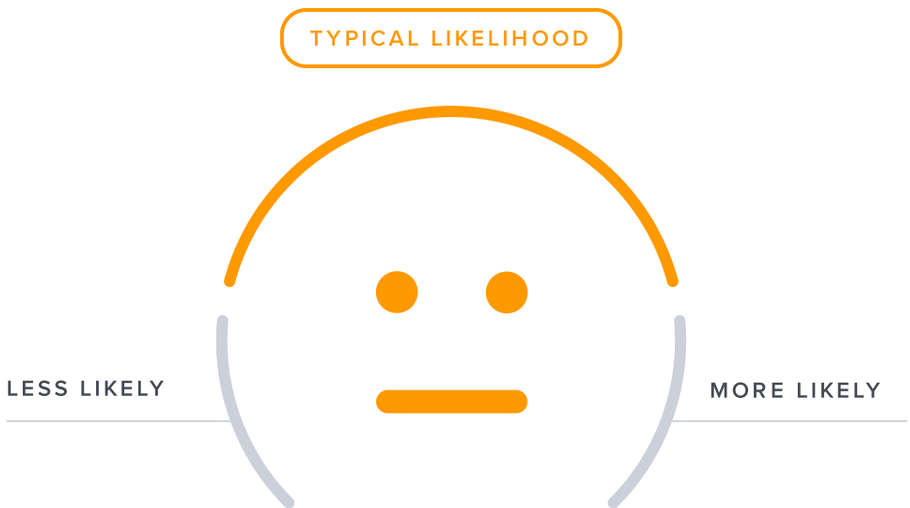
There are also different types of allergies including:

- **Food allergies:** Some foods cause a dangerous reaction that can stop your breathing. Others may cause stomach upset, sneezing, or tingling in the mouth [R].
- **Respiratory allergies:** Pollen and dust can cause a stuffy nose and itchy eyes [R].
- **Contact allergies:** Metal or latex can cause skin rashes if they touch the skin [R].

If you suspect you're allergic to something, you can get an allergy test. The most common types of allergy tests are [R, R, R]:

- **Skin prick test:** The allergen is mixed into water or oil. The doctor places a droplet on your arm and pricks the surface of the skin. If the skin becomes red and swollen, you are having an allergic reaction.
- **Patch test:** A patch is soaked with the allergen and placed on the skin for 1-3 days. This test is used to find allergies that don't cause a fast, dramatic reaction.
- **Provocation test:** In a lab setting, you are exposed to an allergen. If you are testing for seasonal allergies, a doctor may spray specific types of pollen up your nose. This test is only used when other tests haven't produced clear results.

Once identified, allergies generally cannot be treated. Instead, people try to prevent an allergic reaction from happening in the first place. The most important step is to avoid the allergen when possible. For example, people with peanut allergies should not eat food that contains peanuts. People with nickel allergies should not wear jewelery that contains nickel [R, R].



Typical likelihood of allergies based on 2,373 genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
LRRC32	rs2155219	TT
STAT6	rs3024971	TT
IL2RA	rs61839660	CT
HLA-DQA1	rs6906021	TC
LPP	rs9865818	AG
IL1RL1	rs950880	CA
GSDMB	rs9303280	CT
NFATC2	rs6021270	TC
IRF4	rs11242709	TC
GATA3	rs10795656	GA
RUNX3	rs760805	TA
TLR1	rs17616434	CT
SMAD3	rs17228058	AG
CCR7	rs112401631	TT
KIAA1109	rs17454584	AA
IL33	rs144829310	GG
TSLP	rs1438673	TT
PTGER4	rs7720838	GG
SH2B3	rs10774625	AA

The number of "risk" variants in this table doesn't necessarily reflect your overall result.

Thus, **people with respiratory allergies often look for ways to control their reactions.** Doctors may recommend medications, lifestyle changes, and nasal cleansing. Some people try supplements or diet changes [R, R].

Allergies tend to run in families. In fact, **up to 84% of differences in people's chances of having allergies may be attributed to genetics.** Genes that may contribute to allergies influence [R, R, R]:

- Immune response (*HLA-DRB1*, *HLA-DQB1*, *HLA-DPB1*, *CD14*)
- Inflammation (*IL10*, *IL4*, *IL6*, *IL13*, *TNF*)
- Skin barrier function (*OVOL1*)

Food Allergies

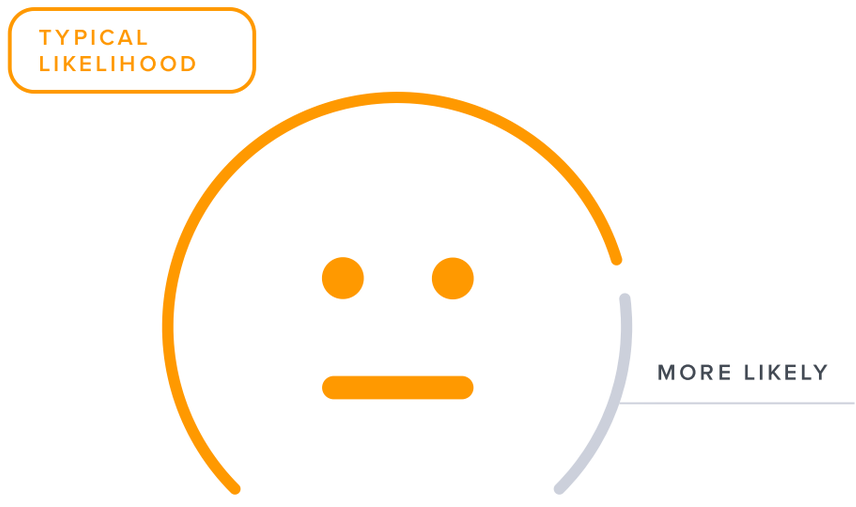
Key Takeaways:

- Up to 80% of differences in people's chances of having food allergies may be attributed to genetics.
- Many allergies come and go through childhood, but common ones that linger into adulthood, include nuts, seafood, milk, and eggs.
- Reducing risk for allergies involves avoiding the various food triggers.
- Click the **Recommendations** tab for potential dietary and lifestyle changes.

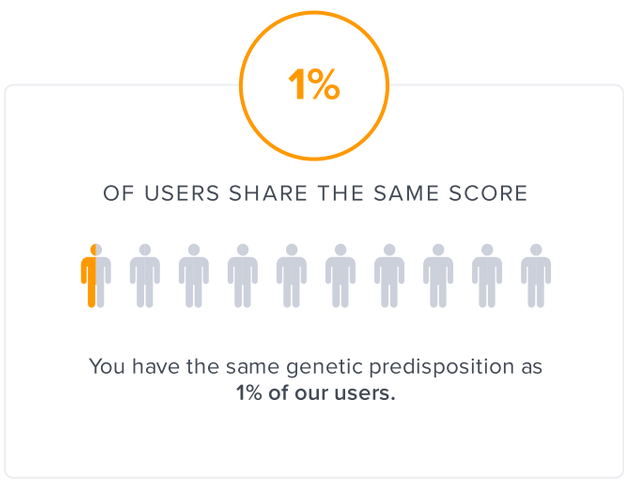
An *allergy* is an immune reaction to a trigger that is normally harmless. This allergy trigger is called an *allergen*. Food allergies are allergies triggered by foods.The best-known food allergens are peanuts. However, people can be allergic to just about anything [R, R].

Up to 80% of differences in people's chances of having food allergies may be attributed to genetics [R].

Many of the genes that influence food allergies affect the immune system [R, R].



Typical likelihood of food allergies based on 16,808 genetic variants we looked at



Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
HLA-DPA1	rs9277630	CA
HLA-DQA2	rs9275596	CC
HLA-DRA	rs7192	TT
RBFOX1	rs59325236	AG
LRRC32	rs7936434	CC
LRRC32	rs2212434	TT
TLR1	rs2101521	AG
FHIT	rs142617341	CC
GSTP1	rs1871042	CC
RCHY1	rs138784094	AG
FLG	rs1933064	GA
STAT6	rs4759044	CT
STAT6	rs324015	CT
SPINK6	rs9325071	AA
LINGO4	rs12123821	CC
HLA-DQA2	rs9271588	TT
KIZ	rs17664036	TT
SERPINB10	rs12964116	AA
SERPINB10	rs1243064	TT

The number of "risk" variants in this table doesn't necessarily reflect your overall result.

Egg Allergy

Egg allergies are relatively common, especially in children, and can be very severe. A person usually develops a reaction to one or more **egg white proteins.** Luckily, the allergy often fades with age [R, R].

About **80%** of differences in food allergy rates may be due to genetics. Most genes are involved in food allergies in general, rather than in a specific allergy. They may affect [R]:

- The immune response
- The function of skin and mucous membranes

However, keep in mind that your diet, environment, and other factors may play a role in egg allergies.

Less likely to have an egg allergy based on 373 genetic variants we looked at

PERCENTILE

Your risk is **greater than 3% of the population** and **lower than 97% of the population.**

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
LRRC32	rs2212434	TT
/	rs150212674	TT
LPIN2	rs28794896	GG
SLC35F2	rs79590713	GG
/	rs16833316	TT
RBFOX1	rs11866945	AA
ADAMTS8	rs12807953	GG
XXYLT1	rs62292087	GG
CSGALNACT1	rs11779828	TT
IRX2	rs1661109	TT
ARHGAP32	rs76670383	CT
HSPA13	rs76914408	AT
/	rs74612506	AG
SERPINB10	rs1243064	TT
BMPR1B	rs17023017	TT
SERPINB10	rs12964116	AA
LINGO4	rs12123821	CC
GNB5	rs80015591	CC
ID4	rs114735690	GG

The number of "risk" variants in this table doesn't necessarily reflect your overall result.

Peanut Allergy

Key Takeaways:

- Up to **80%** of differences in people's chances of having a peanut allergy may be due to genetics.
- About **3 million** people in the U.S. have a nut allergy.
- Risk factors involve contact with peanuts. Verify food content in restaurants, and read all food packaging labels to minimize risk.
- Allergy immunotherapy may help reduce the severity of reactions in some people.
- Click the **Recommendations** tab for potential dietary and lifestyle changes.

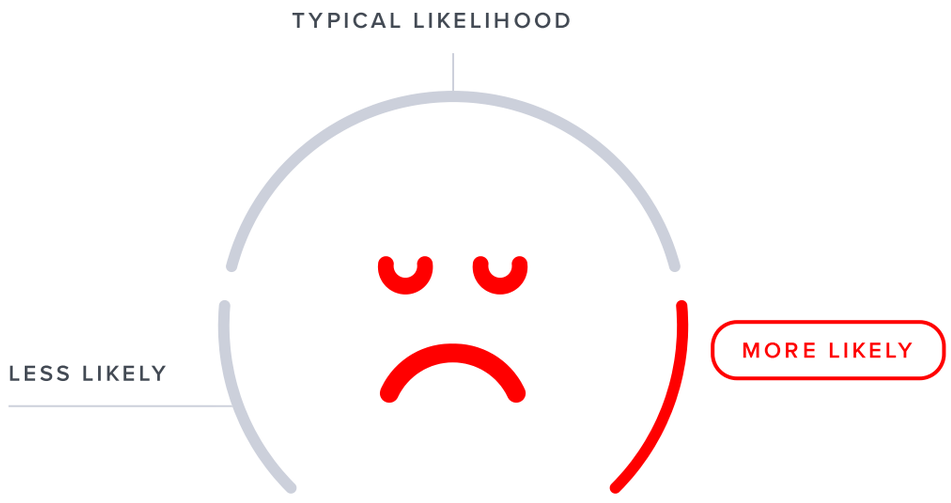
Peanut allergy is an immune response to proteins found in peanuts. Symptoms can range from mild to life-threatening and usually affect the gut, skin, and respiratory system.

Genetics may explain about 80% of differences in people's peanut allergy rates. Involved genes may affect the **immune response** to peanut proteins [R].

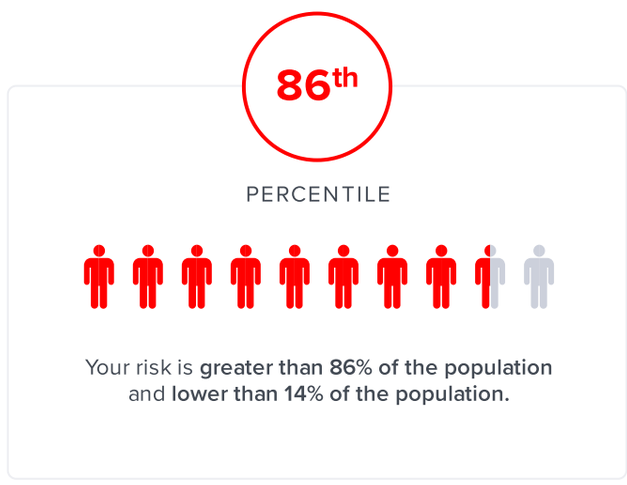
There is no cure for peanut allergy, but some children can outgrow it. The best way to prevent a reaction is to avoid peanuts and peanut-containing foods. **Allergy immunotherapy** may help reduce the severity of reactions in some people [R, R].

Introducing food containing peanuts into the diets of babies at risk of peanut allergy when they are **4-11 months old** may reduce the risk of developing this condition by **3 times**. At-risk babies include those with severe eczema or egg allergy. Please keep in mind that young children are at high risk of choking if they eat whole peanuts. Discuss the best approach with your child's doctor [R, R, R, R].

Treatment for allergic reactions may involve medication to manage symptoms and prevent anaphylaxis [R].



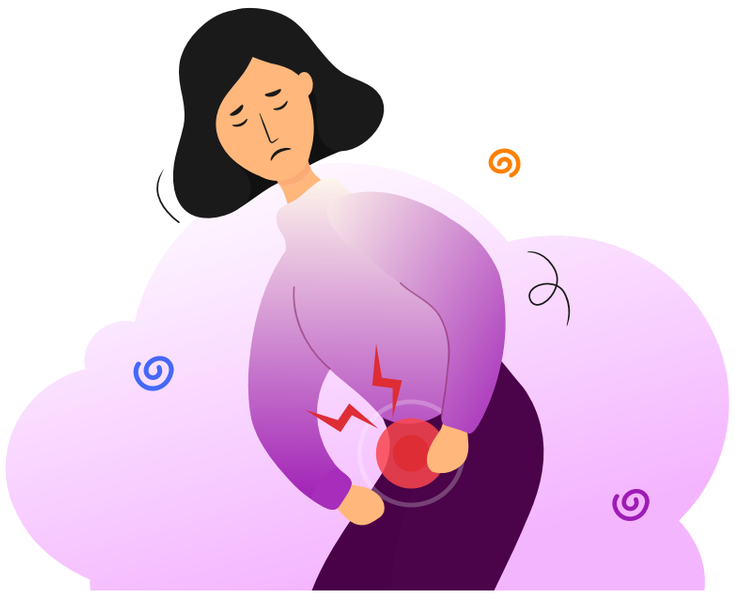
More likely to have peanut allergy based on 780 genetic variants we looked at



Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
HLA-DQA2	rs9275596	CC
HLA-DRA	rs7192	TT
HLA-DPA1	rs9277630	CA
RBFOX1	rs59325236	AG
LRRC32	rs2212434	TT
/	rs150212674	TT
LPIN2	rs28794896	GG
SLC35F2	rs79590713	GG
LRRC32	rs2155219	TT
ARHGAP32	rs76670383	CT
STAT6	rs3024971	TT
IL2RA	rs61839660	CT
HLA-DQA1	rs6906021	TC
LPP	rs9865818	AG
IL1RL1	rs950880	CA
KIZ	rs17664036	TT
SERPINB10	rs12964116	AA
SERPINB10	rs1243064	TT
LINGO4	rs12123821	CC

The number of "risk" variants in this table doesn't necessarily reflect your overall result.



Infections

Your body is host to millions of microbes that under normal conditions don't cause any issues. With a weakened immune system, microbes from inside and outside the body can cause infections. **Your genetics can make you more susceptible to some of them**.

This section reveals your genetic predisposition to UTIs, *H. pylori*, *C. diff*, and other infections. Knowing the risks can help you to make smarter decisions regarding your health regimen.

LESS LIKELY

Flu

Less likely to get the flu

TYPICAL LIKELIHOOD

H. pylori

Typical likelihood of H. pylori infection

TYPICAL LIKELIHOOD

Urinary Tract Infections

Typical likelihood of UTIs

MORE LIKELY

Yeast Infection

More likely to have yeast infections

TYPICAL LIKELIHOOD

Gastrointestinal Infection

Typical likelihood of a GI infection

TYPICAL LIKELIHOOD

C. difficile Infection

Typical likelihood of a C. difficile infection

LESS LIKELY

Genital Herpes

Less likely to get genital herpes

MORE LIKELY

EBV Infection

More likely to get EBV infection

TYPICAL LIKELIHOOD

Strep Infection

Typical likelihood of a strep infection

MORE LIKELY

Chlamydia

More likely to get chlamydia

TYPICAL LIKELIHOOD

HPV Infection

Typical likelihood of getting HPV infection

Flu

Flu (influenza) is a respiratory infection of the nose, throat and lungs, transferred via droplets that are either inhaled or picked up from surfaces.

Studies show that **genetic factors** can play a significant role in the risk of developing severe flu symptoms [R].

The following groups are at a higher risk of getting the flu and developing complications [R]:

- Young children under age 2
- Adults older than age 65
- Residents of nursing homes and other long-term care facilities
- Women who are pregnant during flu season
- People with weakened immune systems
- People who have chronic health conditions
- Obese people with a BMI of 40 or higher

Less likely to get the flu based on 8,860 genetic variants we looked at

Your risk is **greater than 4% of the population** and **lower than 96% of the population.**

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
NVL	rs112467163	CC
DRD1	rs142723725	TT
TRPS1	rs183950686	CC
UBE4B	rs143629080	AA
FRY	rs181806454	TT
C8ORF37	rs181713880	GG
ZFPM1	rs145453932	CC
CNIH3	rs10916657	CC
PAPPA	rs146267898	CC
ZFAT	rs140441520	CC
FAM216B	rs79927049	AA
TTC39C	rs578224362	GG
IL5RA	rs17882872	GG
TRPS1	rs149728106	CC
SRPK2	rs192703162	TT
BSN	rs114922254	GG
GLRB	rs112901368	GG
/	rs139049214	TT
OPN5	rs150665848	GG

The number of "risk" variants in this table doesn't necessarily reflect your overall result.

H. pylori

Key Takeaways:

- Genes involved in H.Pylori affect stomach acid production and the stomach's mucous barrier.
- Risk factors include an unsanitary environment, poverty, eating at restaurants, eating meat, and smoking.
- If you have a high genetic risk, you may reduce overall risk by taking action on risk factors that you can change.
- Click the **next steps** tab for relevant labs and lifestyle factors.

Helicobacter pylori (*H. pylori*) is a type of bacteria that can live in the stomach. About half of all people may be infected with *H. pylori*. Developing countries have higher infection rates [R, R, R].

Most people don't have any symptoms of infection. In some, however, the bacteria can start to break down the protective mucous barrier of the stomach wall. This can cause serious problems [R, R, R].

H. pylori may contribute to [R, R]:

- Gastritis (stomach inflammation)
- Peptic ulcers (sores in the stomach or upper small intestine lining)
- Stomach cancer

Symptoms arise when a person develops gastritis or ulcers. These can include [R, R, R]:

- Nausea
- Stomach pain
- Vomiting
- Low appetite
- Weight loss
- Indigestion

People usually become infected with *H. pylori* in childhood. Growing up around a lot of people or in unsanitary conditions may play a large role. Other risk factors for *H. pylori* infection include [R, R]:

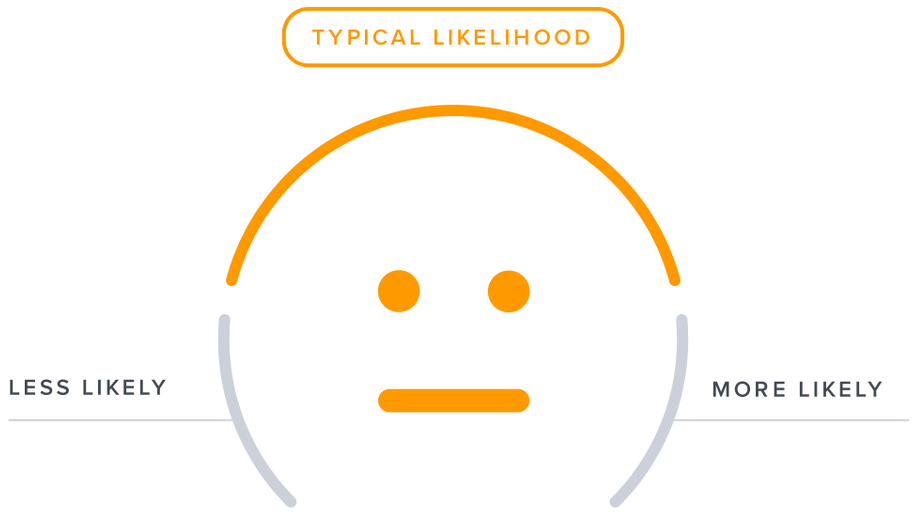
- Lower socioeconomic status
- Eating out at restaurants
- Eating meat
- Smoking cigarettes

Medications for *H. pylori* help kill the bacteria and heal the stomach. They are usually prescribed in different combinations [R, R, R].

Some strains of *H. pylori* are becoming more difficult to kill with antibiotics. This makes them harder to treat [R, R].

Genetics seems to play a role in the risk of ulcers due to *H. pylori*. Genes involved in *H. pylori* infection and related diseases may influence [R, R]:

- Stomach acid production (*GAST*)
- The mucous barrier in the stomach (*MUC1*, *FUT2*, *ABO*)



Typical likelihood of H. pylori infection based on 86,987 genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
DOCK10	rs10201967	CC
IKZF2	rs10194411	GG
AKR1E2	rs112501331	CC
VMP1	rs111821451	GG
FBXO21	rs111576798	GG
RAP2B	rs112013042	CC
SIPA1L3	rs113428378	AA
NFE2	rs11170954	CC
HPCAL1	rs10929658	AA
PDSS1	rs112022787	GG
METTL14	rs112991781	TT
PDZD2	rs10472790	TT
/	rs11059054	CC
LGSN	rs1020805	GG
PCDH15	rs11004387	TT
/	rs10008115	GG
TCF7L1	rs113194344	GG
GAREM2	rs1019972	CC
HEBP1	rs111707992	AA

The number of "risk" variants in this table doesn't necessarily reflect your overall result.

Urinary Tract Infections

Key Takeaways:

- About **150 million** people get at least one UTI per year. They're much more common in **women**.
- Women at a high genetic risk may want to take precautions, such as staying hydrated and maintaining personal hygiene.
- UTIs can cause frequent urination, discolored or strong smilling urine, burning pain while urinating, and pelvic pain.
- Click the **Recommendations** tab for potential dietary and lifestyle changes and **next steps** for relevant labs.

A **urinary tract infection** (**UTI**) is an infection in the system that carries urine out of the body. This includes parts of the kidneys, ureter, bladder, and urethra. UTIs are most common in the **bladder and urethra** [R].

An estimated 150 million people around the world get at least one UTI per year [R].

UTIs are more common in women. In fact, up to 60% of women will get at least one UTI in their lives. This may be because the female urinary tract is shorter and closer to the anus [R, R].

UTI signs and symptoms include [R, R]:

- Frequent urination
- Burning pain while urinating
- Cloudy, red, pink, or very dark urine
- Urine with a strong smell
- Pain in the pelvic region

Most UTIs are minor and can be treated with antibiotics. However, untreated UTIs can have serious complications. These include kidney damage and sepsis, a dangerous whole-body response to infection [R, R].

To prevent UTIs, doctors often recommend [R]:

- Drinking plenty of water
- Drinking cranberry juice

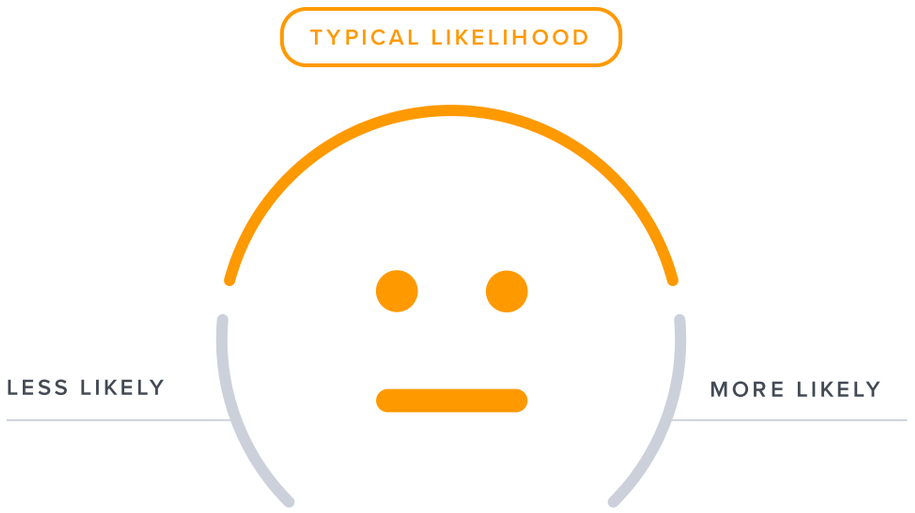
Women in particular may be advised to [R]:

- Wipe from front to back after using the toilet
- Pee after sex to flush bacteria from the urethra
- Avoid deodorant sprays or douches to prevent irritation
- Avoid diaphragms and spermicidal condoms, which can promote bacterial growth

Some people are prone to frequent UTIs no matter how careful they are. Their doctors may prescribe other interventions [R].

Genetics plays a significant role in UTI development. Genes involved in UTI development tend to influence the immune response. They include [R, R, R, R]:

- *TLR4*
- *CXCR1*
- *IRF3*
- *MYD88*
- *TGFB1*



Typical likelihood of UTIs based on 37,658 genetic variants we looked at

79th

PERCENTILE

Your risk is **greater than 79% of the population** and **lower than 21% of the population.**

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
SLC26A5	rs148099564	CC
ADAL	rs189027627	GG
ADAL	rs140427966	AA
ADAL	rs146906133	TT
TRIM69	rs181576645	AA
CTDSPL2	rs182345433	AA
FMO4	rs144708187	GG
CATSPER2	rs181750397	CC
SCIN	rs13243276	CC
FRA10AC1	rs7091068	TT
USP47	rs200063994	AA
PSCA	rs2976388	AG
HLA-DQA2	rs622871	AG
HLA-DQA2	rs1548306	AT
TCF12	rs4774899	TC
/	rs117879743	AA
LRRC7	rs147869396	CC
NPSR1	rs186476798	GG
NKAIN2	rs189203629	TT

The number of "risk" variants in this table doesn't necessarily reflect your overall result.

Yeast Infection

Candida albicans is a fungus that normally lives in and on the body. If its environment changes and promotes its growth, *Candida* can multiply and lead to an infection. This is called **a yeast infection** or **candidiasis** [R].

A yeast infection usually happens in the [R, R, R]:

- Mouth (oral thrush)
- Vagina (vaginal yeast infection)

Vaginal yeast infections are a common problem. They affect up to **3 out of 4 women** at some point in their lives. Many women have more than one in their lifetime [R].

Risk factors for yeast infections include [R, R, R]:

- Untreated or uncontrolled diabetes
- Weakened immune system (e.g., from HIV or certain cancer treatments)
- Antibiotics

Classic symptoms of a vaginal yeast infection include [R]:

- Vaginal itching, irritation, and pain
- Burning feelings while urinating or during sex
- Vaginal redness and swelling
- Thick and white or watery vaginal discharge

Symptoms of oral thrush include [R]:

- White lesions in the mouth that may bleed
- Redness, burning, or soreness in the mouth
- Loss of taste
- Cracking and redness at the corners of the mouth
- A cottony feeling in the mouth

Yeast infections can become more complicated in those who [R, R, R]:

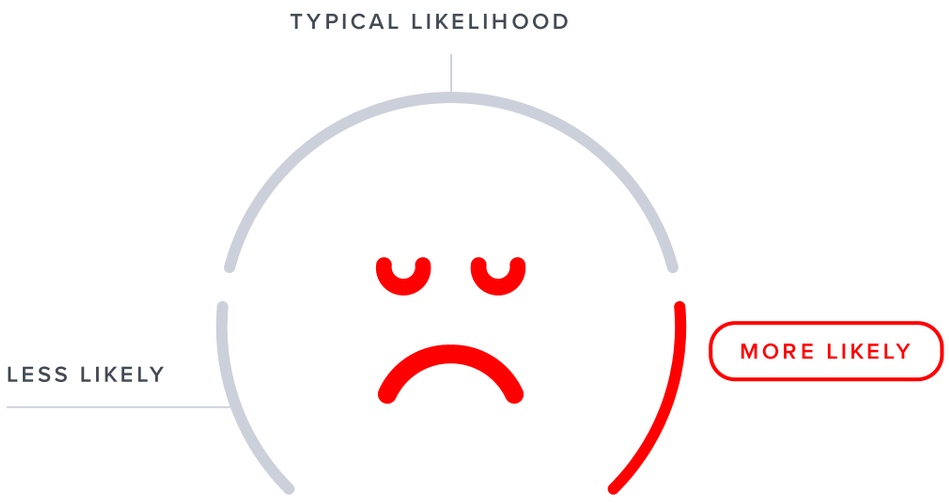
- Are pregnant
- Have diabetes
- Have weakened immune systems (e.g., people with HIV)

Thankfully, most yeast infections are easy to treat with medication [R, R].

Additional strategies to help manage yeast infections include [R, R, R, R, R]:

- Saltwater rinses
- Changes to oral or vaginal hygiene
- Wearing clothing (such as underwear and pantyhose) that is breathable and not too tight

People's chances of getting yeast infections may be affected by genetics. Genes involved in yeast infections may influence the immune response [R, R].



More likely to have yeast infections based on 104,352 genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
TRAF5	rs569660383	AA
FGFR2	rs139149394	CC
KIF17	rs150119925	GG
EIF4G3	rs142368506	GG
HP1BP3	rs114327939	CC
CNR2	rs184601170	CC
FMN2	rs549043672	CC
EIF4G3	rs563320351	CC
NAV1	rs146733481	CC
TCERG1L	rs78303108	CC
ADGRL4	rs78913903	GG
MGMT	rs78280217	CC
TXLNA	rs575793596	GG
HP1BP3	rs149468462	CC
OR2M3	rs144885655	CC
LCK	rs184521150	GG
DCDC2B	rs142941874	AA
SH3PXD2A	rs532548209	GG
LRRN2	rs574609503	GG

The number of "risk" variants in this table doesn't necessarily reflect your overall result.

Gastrointestinal Infection

Gastrointestinal (GI) infections are diseases of the digestive system. They are caused by the invasion of microbes that do not usually live there.

Many different microbes may cause GI infections. Some examples are [R, R, R]:

- Parasites (e.g., *Giardia lamblia*)
- Bacteria (e.g., *Salmonella, Shigella, Campylobacter, E. coli*)
- Virus (e.g., rotavirus, norovirus)

In developed countries, most cases are due to viruses [R].

The main sources of infection include [R]:

- Person-to-person contact
- Consumption of contaminated food (e.g., undercooked or poorly stored meat, raw milk)
- Consumption of contaminated water (e.g., river or swimming pool water)
- Contact with contaminated objects (e.g., soil, work tools)
- Contact with animals or their feces (e.g., contact with farm animals and pets, visiting petting zoos)

Risk factors for GI infections include [R, R, R, R, R, R].

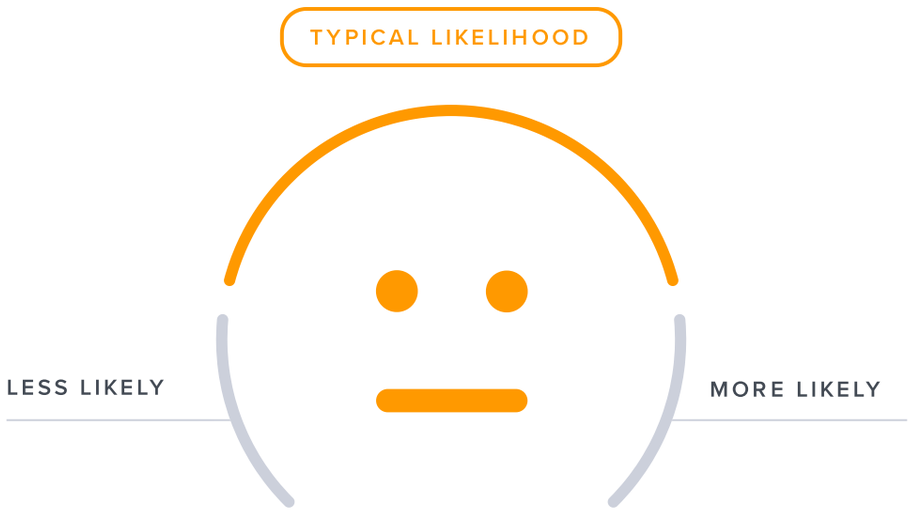
- Malnutrition
- A recent visit to an endemic area
- Recent use of antibiotics
- Drugs to reduce stomach acid (e.g., omeprazole)
- Chronic stress
- Weakened immunity
- Recent abdominal surgeries
- **Genetics**

The symptoms of GI infections depend on the causing microbe. They usually include [R, R]:

- Diarrhea
- Fever
- Belly cramps
- Nausea and vomiting
- Headache
- Muscle pain
- Dehydration (weakness, confusion, dizziness)

In most cases, the symptoms will disappear within 7 days. In rare cases, the GI infection can last more than 30 days and turn chronic [R, R].

Mild cases usually don't require treatment. Proper hydration and rest are crucial for recovery. Make sure to seek medical care if your symptoms are severe [R].



Typical likelihood of a GI infection based on 18,637 genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
MFHAS1	rs11995244	TT
FCHO2	rs3010256	TT
BHLHE41	rs3825165	TT
/	rs369614251	CC
NPC1	rs1652362	TC
ATXN1	rs3793102	AA
CNTN5	rs7112253	GA
MGA	rs7183231	AC
/	rs143538360	TT
RBMS3	rs115249766	TT
/	rs376479926	AA
FLNB	rs1866164	CC
PRICKLE1	rs117347473	CC
ABO	rs41302673	TT
PIK3R1	rs12517727	GG
ABO	rs635634	CC
SESN3	rs75887387	TT

The number of "risk" variants in this table doesn't necessarily reflect your overall result.

C. difficile Infection

***C. difficile* is a type of bacteria that may cause colitis**, meaning inflammation of the large intestine or colon. It can be found in **contaminated** [R, R, R]:

- Water
- Food (e.g., retail meat, vegetables)
- Human and animal feces
- Hospital surfaces

Recent antibiotic use is the main risk factor for *C. difficile* infection. Antibiotics alter the gut microbiome and make it susceptible to infection. Other risk factors include [R, R, R, R]:

- **Hospital or nursing home stay**
- Malnutrition
- Being 65 or older
- Drugs to reduce stomach acid (e.g., omeprazole)
- Inflammatory diseases (e.g., inflammatory bowel disease)
- Chronic kidney or liver disease
- Chemotherapy
- Previous *C. difficile* infection
- **Genetics**

***C. difficile* produces toxins**, which contribute to the following infection symptoms [R, R, R]:

- Diarrhea
- Belly pain and cramps
- Nausea and vomiting
- Fever

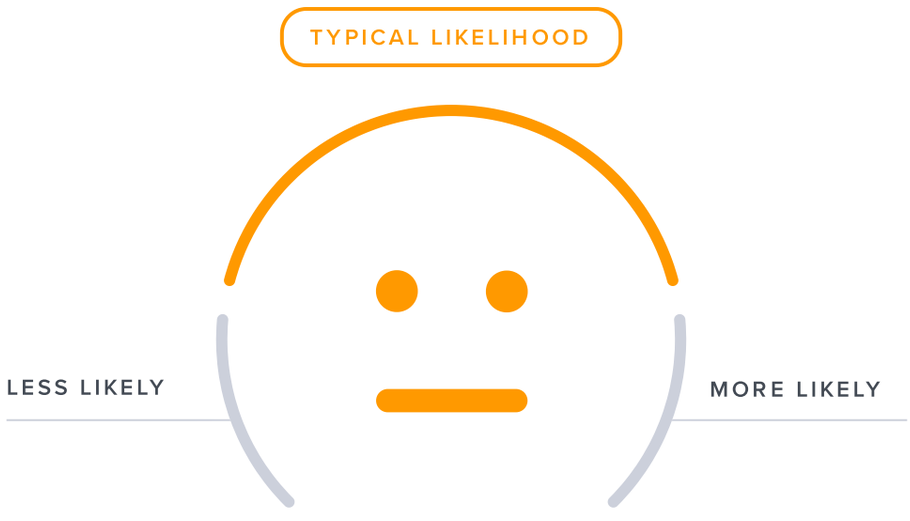
C. difficile infection may cause severe colon inflammation and even death if left untreated [R].

On the other hand, some people may not have symptoms at all, but they may still pass *C. difficile* on to others [R, R].

Medications for *C. difficile* help kill the bacteria. To prevent *C. difficile* infections, doctors also recommend [R, R, R]:

- Hand hygiene with soap and water
- Avoiding antibiotic misuse
- Taking probiotics

Some strains of *C. difficile* are becoming more difficult to kill with antibiotics. This makes them harder to treat and calls for new treatment approaches. One such treatment is *fecal microbiota transplantation* (FMT), or the transfer of a healthy person's feces into a patient's colon [R, R, R, R].



Typical likelihood of a C. difficile infection based on 2,751 genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
/	rs1434351	TG
/	rs11617974	CA
CDH8	rs141932469	CC
PRSS37	rs17719655	CC
CNOT4	rs117373257	GG
NWD2	rs116838950	TT
TRIM37	rs73321289	CC
DAP	rs13181507	GG
CSMD3	rs80176672	AA
USP25	rs192418381	TT
KCTD1	rs57118264	CC
CSMD1	rs890001	GG
NECTIN2	rs138769755	GG
C6ORF47	rs115062572	CC
LRRN1	rs139959052	GG
ASCL2	rs117600357	GG
/	rs35294279	TT
TCF19	rs149917912	TT
GALNT5	rs13409177	CC

The number of "risk" variants in this table doesn't necessarily reflect your overall result.

Genital Herpes

Genital herpes is a common sexually transmitted infection (STI), usually caused by the herpes simplex virus type 2 (HSV-2).

A higher risk of getting genital herpes is linked to [R]:

- Being female
- Being African American
- Any type of sexual activity (spreading is more common from men to women)
- Having sex with multiple partners
- Having a partner with an active infection
- Having a history of other STIs

To limit these risks, it's essential to adopt **safer sex practices** and consider getting **regular screenings** if you are sexually active.

Genetics may also affect susceptibility to genital herpes. Involved genes may play a role in the immune response, cell life cycle, and more [R].

Less likely to get genital herpes based on 284,981 genetic variants we looked at

1st

PERCENTILE

Your risk is **greater than 1% of the population** and **lower than 99% of the population.**

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
TAMM41	rs144232229	GG
ADAM32	rs117705146	GG
ATP1B3	rs538162817	TT
HASPIN	rs7503464	AA
CDH23	rs190960403	CC
POLR3A	rs144589616	GG
IL2RA	rs41294917	CC
CYP2C9	rs116878692	GG
OTUD1	rs188573619	CC
APBB1IP	rs113638825	AA
CELF2	rs188771969	TT
EGR2	rs188020302	GG
MSRB2	rs72800658	CC
CYP2C9	rs186327276	GG
CYP2C9	rs142997475	GG
ZNF365	rs537125040	TT
AKR1E2	rs139830049	GG
NOC3L	rs184211742	TT
CISD1	rs147432596	AA

The number of "risk" variants in this table doesn't necessarily reflect your overall result.

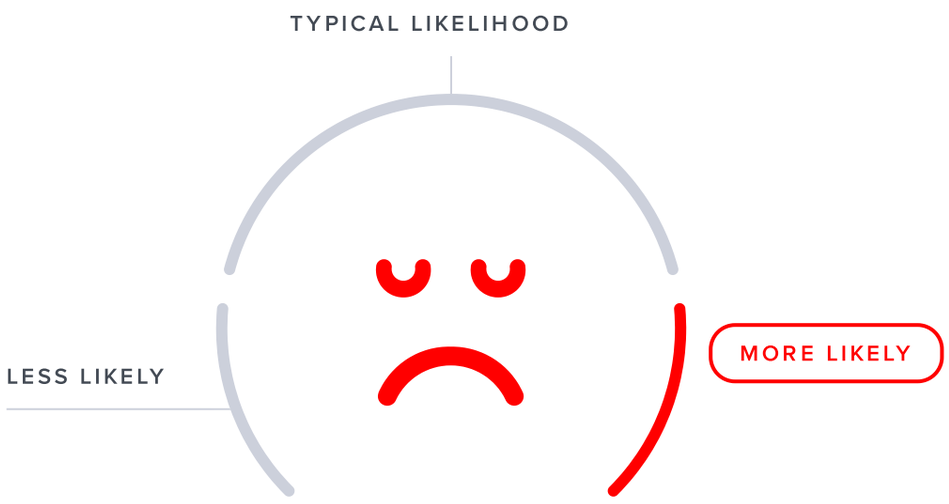
EBV Infection

Epstein-Barr virus (EBV) is one of the most common human viruses. It mainly spreads via saliva and may cause mononucleosis or “the kissing disease”.

Although almost everyone will come into contact with the virus, only a fraction of people will develop EBV infection. Risk factors for EBV infection include [R]:

- Contact with infected person or objects
- Spending time in unventilated, crowded spaces
- Compromised immune system
- **Genetics**

Genetics also seems to play a role in mononucleosis, the main condition caused by EBV [R].



More likely to get EBV infection based on 1,667 genetic variants we looked at

PERCENTILE

Your risk is **greater than 98% of the population** and **lower than 2% of the population.**

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
HLA-DQA1	rs6927022	AA
PHF14	rs73067509	CC
H3C12	rs34034915	TT
BTN3A2	rs9379862	TT
HLA-DRB1	rs9271536	AT
SUGCT	rs186721582	GG
P2RY12	rs67886110	GT
RHBDD3	rs138870856	CC
SLC24A4	rs4900130	GG
UTP20	rs78440807	GG
S1PR4	rs61731111	CC
PHKB	rs56257827	GG
SIDT1	rs34023543	AA
GCNT1	rs11546569	CC
SVEP1	rs74597491	TT
GBE1	rs28763904	AA
SPATA6	rs77303590	CC
CPXM1	rs41310169	CC
MS4A13	rs55756397	GG

The number of "risk" variants in this table doesn't necessarily reflect your overall result.

Strep Infection

Key Takeaways:

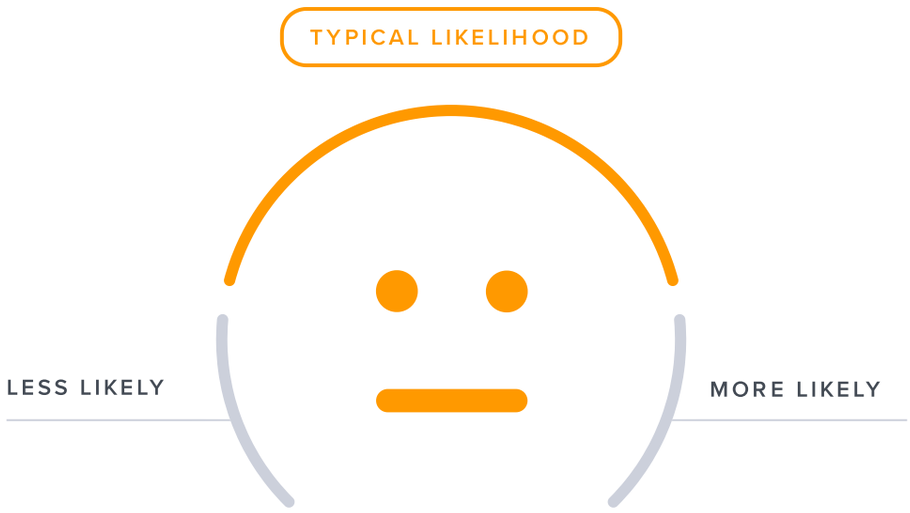
- The genetics involved in strep infection play a role in inflammation and the immune response.
- Other risk factors include age (childhood), time of year (winter/early spring), public/crowded places, poor hygiene, a weakened immune system, and some viral infections.
- Strep infection is common, affecting in the **100's of millions** every year worldwide.
- If you have high genetic risk, you may lower your overall risk by taking action on those factors that you can change.
- Click the **next steps** tab for relevant labs.

Strep infection is caused by Group A *Streptococcus* bacteria, known as **GAS** or **Strep A**.

Risk factors for strep infections include [R, R]:

- Young age (childhood)
- Time of year (winter and early spring)
- Being at public and crowded places like schools
- Poor hygiene
- A weakened immune system
- Some viral infections, such as the flu

Genetics may also affect your susceptibility to strep infections. Involved genes play a role in inflammation and the immune response against microbes [R].



Typical likelihood of a strep infection based on 37 genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
ZNF770	rs117330746	TT
STARD5	rs140751642	GG
MDFI	rs11757926	CC
COPS9	rs77982803	GG
FAM170A	rs2897116	TT
FAM170A	rs2130737	CC
PRR16	rs8180470	CC
PRR16	rs255806	AA
PRR16	rs6595205	CC
NTSR2	rs7567094	AC
PGLYRP2	rs2116905	CT
MICB	rs1055821	GG
GJA10	rs148419428	CC
NMRK1	rs138176776	GG
PHYHIPL	rs148775021	AA
HCN4	rs377537777	TT
FYB2	rs139595874	TT
/	rs142537630	GG
TBX3	rs61929721	TT

The number of "risk" variants in this table doesn't necessarily reflect your overall result.

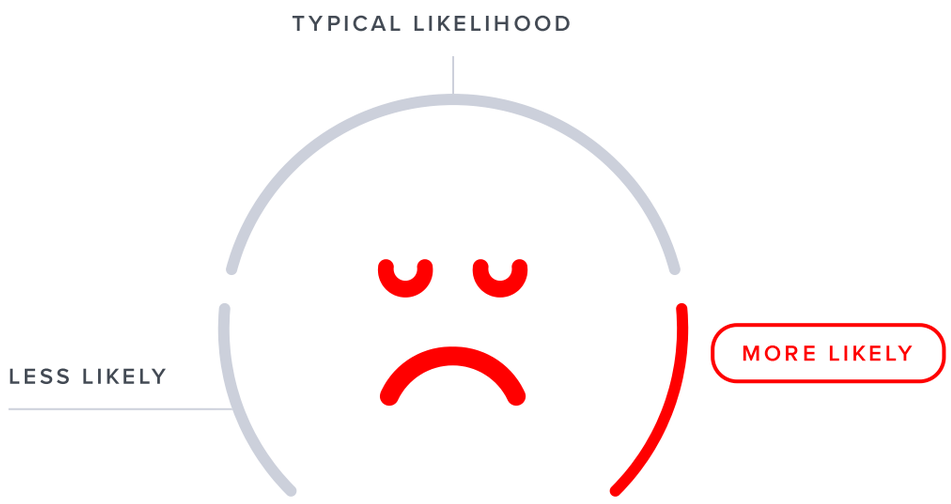
Chlamydia

Chlamydia is a common **sexually transmitted infection (STI)** caused by the *Chlamydia trachomatis* bacterium.

Factors that increase the risk of chlamydia include [R]:

- Female sex
- African ancestry
- Being sexually active before age 25
- Having multiple sex partners
- Not using a condom consistently
- History of STIs

Interestingly, studies have found **genetic variants** linked to increased susceptibility to chlamydia. Involved genes play a role in the **immune response and skin barrier function** [R].



More likely to get chlamydia based on 1,675 genetic variants we looked at

PERCENTILE

Your risk is **greater than 93% of the population** and **lower than 7% of the population.**

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
NPSR1	rs720756	TC
MT1X	rs79741827	TC
MANBA	rs6821248	GG
/	rs77175455	TA
PIGN	rs61755362	GG
SIGLEC1	rs150358287	CC
STARD3	rs11556624	GG
OR13F1	rs79177442	GG
SLC1A7	rs116623976	GG
ITIH3	rs74320783	GG
VAV2	rs61751477	GG
DKK1	rs12259288	AG
SCN9A	rs141268327	TT
VPS35L	rs150300279	CC
LAMA5	rs79319629	TT
APOBEC1	rs34275479	CC
VWA2	rs79009215	GG
ACAD9	rs115532916	AG
NCK2	rs143335233	CC

The number of "risk" variants in this table doesn't necessarily reflect your overall result.

HPV Infection

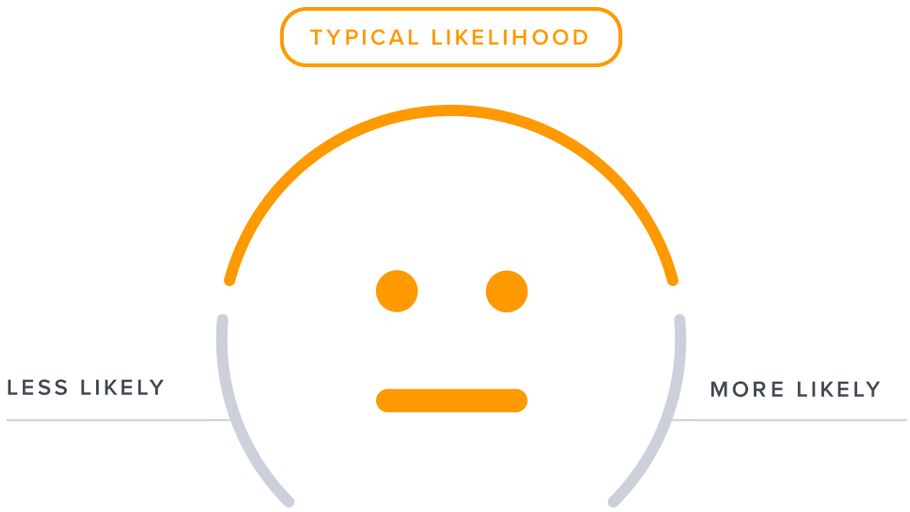
HPV infection is a common, sexually transmitted infection (STI) caused by the human papillomavirus.

Risk factors for HPV infection include [R]:

- **Risky sexual behavior**
- Age (childhood for common warts; early adulthood for genital warts)
- Weakened immune system
- Damaged skin
- Personal contact with an infected person
- Contact with contaminated surfaces

Genetics also plays a role in HPV infection. Involved genes may influence [R]:

- Cell growth and division
- The immune response against microbes
- DNA repair

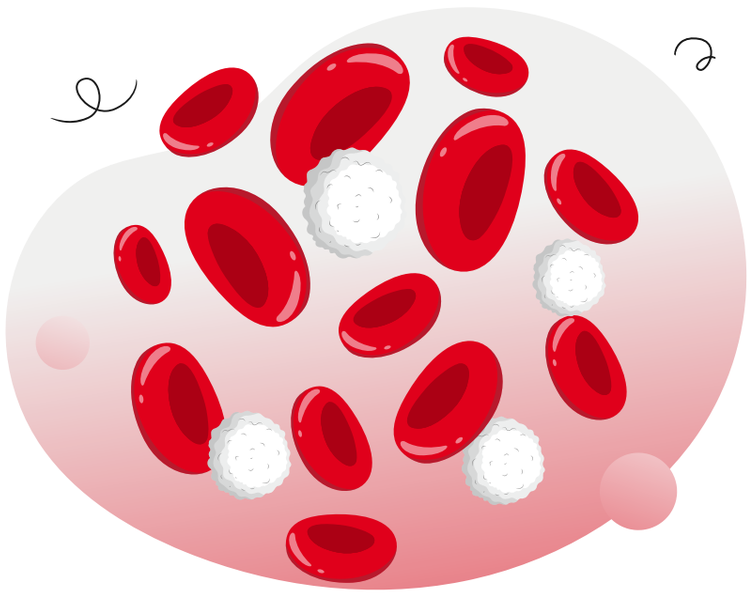


Typical likelihood of getting HPV infection based on 105,944 genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
ABHD2	rs405103	CC
DOK5	rs1293153	AA
GPR26	rs78231715	CC
MPZL2	rs145674624	GG
TCERG1L	rs186242350	CC
FDX1	rs74572764	TT
KAT6B	rs192376670	CC
RHOBTB1	rs145804860	TT
CHAT	rs144802194	CC
PPIF	rs114574602	CC
TCF7L2	rs11196144	CC
FAR1	rs146644242	CC
DDI1	rs117507333	TT
GDPD5	rs139493418	TT
DLG2	rs182189934	CC
ARHGAP20	rs142501564	TT
C10ORF67	rs74896095	GG
NCAM1	rs190991582	TT
/	rs79520499	TT

The number of "risk" variants in this table doesn't necessarily reflect your



Immune Cells

A healthy immune system has various cell types to do its job effectively. Different types of **white blood cells** are the cornerstone of a robust immune response. Abnormal levels of one or more of these cell types can indicate an ongoing infection or make a person more prone to it. They can also be indicative of other health issues.

This section dives into your genetics of white blood cells as a whole and their different subtypes.

TYPICAL

White Blood Cells

Likely typical white blood cell count

TYPICAL LEVELS

Monocytes

Likely typical monocyte levels

TYPICAL LEVELS

Basophils

Likely typical basophil levels

TYPICAL LEVELS

Eosinophils

Likely typical eosinophil levels

TYPICAL LEVELS

Neutrophils

Likely typical neutrophil levels

White Blood Cells

White blood cells are immune cells that protect your body against specific types of invaders. The different types of white blood cells are neutrophils, lymphocytes, basophils, eosinophils, and monocytes. Your **white blood cell count** is the total number of all white blood cells in your blood [R].

A high white blood cell count usually means that your immune system is responding to something stressful. Common causes of a high white blood cell count include [R, R]:

- Infections from viruses, bacteria, or parasites
- Stress
- Inflammatory disorders (e.g., inflammatory bowel disease, rheumatoid arthritis)
- Allergies

Your white blood cell count generally returns to normal when the root cause is dealt with. If it stays high or reaches extremely high levels, then your doctor may order additional tests.

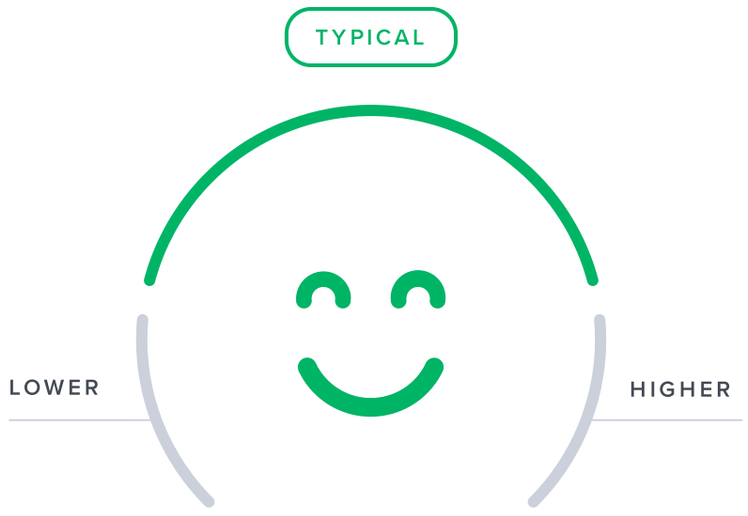
Anyone can have a temporarily low white blood cell count. It generally won't cause symptoms on its own. However, some conditions and treatments can cause a long-term decrease in white blood cell count. This can make infection more likely. Causes of low white blood cell count include [R]:

- Malnutrition or vitamin deficiencies
- HIV or other viruses
- Cancer treatment (chemo or radiation)
- Bone marrow damage

Most of the time, a low white blood cell count does not require specific treatment. If you're concerned about your white blood cell count, talk to your doctor about it.

About 50-60% of differences in white blood cell count may be attributed to genetics. Genes involved may influence [R, R, R]:

- White blood cell development in the bone marrow
- The immune response



Likely typical white blood cell count based on 34,015 genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
/	rs549579958	CC
ORMDL3	rs4795415	TT
MICB	rs2524079	AA
LYST	rs1886654	CC
PTPN22	rs2476601	GG
CXCL5	rs11733208	AC
TET2	rs199741557	IA
CXCR2	rs55799208	GG
NCLN	rs144284241	CC
JAML	rs143034248	CC
TTC28	rs62237617	CC
IRF8	rs11642657	CC
IL17RA	rs140221307	TT
FLT3	rs76428106	TT
ACKR1	rs34599082	CC
DPH5	rs77046277	CC
FERMT3	rs142815441	CC
TEX15	rs116898861	CC
EHD3	rs184409696	GG

The number of "risk" variants in this table doesn't necessarily reflect your overall result.

Monocytes

Monocytes are white blood cells that protect against bacterial, viral, and other infections. Monocytes kill microbes, remove dead cells, and boost the immune response [R].

Higher monocyte levels most commonly occur due to [R, R]:

- **Infection**
- **Inflammation**
- Autoimmune conditions
- Heart disease

Genetics seems to play an important role, too. Up to **60%** of differences in people's monocyte levels may be due to genetics [R].

Genetically lower monocyte levels may be causally associated with:

- Alzheimer's [R]
- Deep vein thrombosis [R]

Likely typical monocyte levels based on 842,556 genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
GSDMC	rs35389394	TT
LYST	rs10927074	CC
ACOXL	rs150449635	TC
ITGA4	rs10562650	IC
ST20	rs76648483	TA
RPN1	rs4045811	TC
NLRP12	rs10424405	AG
MCL1	rs4970966	TG
B3GNTL1	rs9902102	CG
TET2	rs199741557	IA
CKM	rs73036517	GA
IL17RA	rs140221307	TT
FLT3	rs76428106	TT
GFI1	rs150649461	GG
TNFRSF13B	rs34557412	AA
PRLR	rs186272630	GG
ACKR2	rs2228467	TT
EHD3	rs184409696	GG
S1PR4	rs3746072	GG

The number of "risk" variants in this table doesn't necessarily reflect your overall result.

Basophils

Basophils are white blood cells that help protect against infections, but can also play a role in autoimmune diseases and allergies [R, R].

High basophil levels can be due to:

- Allergies [R, R, R]
- Infection [R]
- Inflammatory diseases, such as inflammatory bowel disease (IBD) and rheumatoid arthritis [R, R, R, R]

Genetics may also affect basophil levels [R].

Genetically higher basophil counts may be causally associated with a lower risk of narcolepsy. [R]

Likely typical basophil levels based on 465,299 genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
PACC1	rs532279691	AA
GATA2	rs6782812	AA
DEFA3	rs10086568	AG
TENT5A	rs559377462	CC
LPO	rs546552332	AA
CXCR2	rs16858768	AA
CDKN2D	rs3218221	GG
MAP4K1	rs143002957	GG
TFCP2	rs117053853	GG
/	rs535521164	GG
SPINT2	rs34158728	GG
/	rs562526020	CC
BCL2	rs17758695	CC
FCGR3A	rs533276421	GG
MPO	rs28730837	GG
MPO	rs56378716	AA
CDK6	rs445	CC
RNF212B	rs147453535	AA
P2RY2	rs74472890	TT

The number of "risk" variants in this table doesn't necessarily reflect your overall result.

Eosinophils

Eosinophils are white blood cells that help fight infections caused by parasites, but are also involved in allergies and inflammation [R].

Common causes of high eosinophil levels are:

- Allergic diseases such as asthma, eczema, or seasonal allergies [R, R, R, R]
- Parasitic infections, mainly due to worms [R, R]

Genetics may also affect eosinophil levels [R].

Likely typical eosinophil levels based on 851,736 genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
GATA2	rs6782812	AA
SLC22A5	rs2706334	TT
LGALS14	rs412884	CC
IL18R1	rs9807989	CT
IKZF2	rs2170572	GA
ITGB8	rs34030463	AI
HBS1L	rs9389268	GA
NCF4	rs117582568	GG
/	rs536070968	CC
CCR3	rs138346219	AA
SHC1	rs8191981	GG
GFI1B	rs150813342	CC
ALOX15	rs71368508	CC
S1PR4	rs3746072	GG
IL17RA	rs140221307	TT
GATA1	rs146587548	GG
CCR7	rs112401631	TT
BCL2	rs17758695	CC
SH2B3	rs7310615	CC

The number of "risk" variants in this table doesn't necessarily reflect your overall result.

Neutrophils

Neutrophils are the most abundant white blood cells in the body. They protect you from bacterial, fungal, and other infections [R].

A high neutrophil level may be a sign of:

- Infections caused by bacteria, fungi, viruses, and parasites [R]
- Inflammation [R, R, R]
- Smoking [R]
- Stress [R]
- Strenuous exercise [R]
- Pregnancy [R].

Low neutrophil levels, on the other hand, can be due to:

- Autoimmune disorders, such as lupus or rheumatoid arthritis [R, R, R, R, R]
- Bone marrow damage and disorders [R, R, R, R]
- Radiation therapy [R, R]
- Certain drugs [R, R, R, R]

Neutrophil levels are also partly affected by genetics.
Genetically high neutrophils levels may be causally associated with:

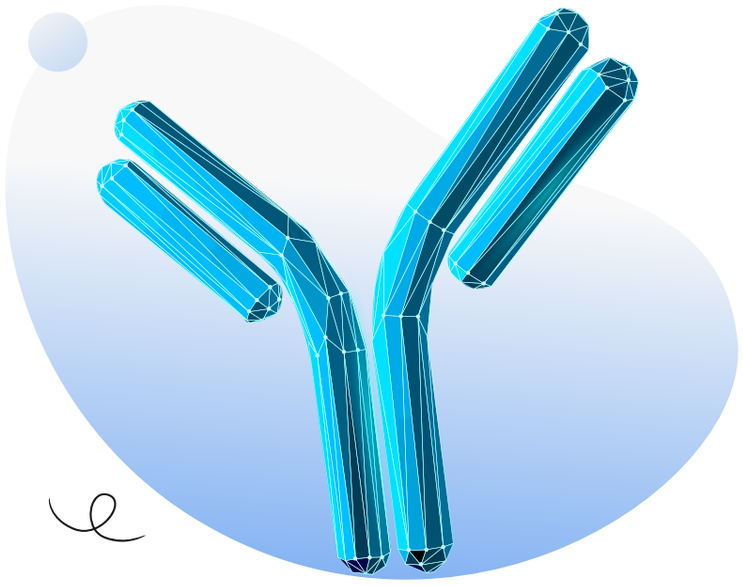
- Chronic pain (lower risk) [R].
- Stroke [R, R]
- Heart disease (CHD) [R].
- Lung health [R].
- High blood pressure [R].
- Alzheimer Disease [R].
- Psoriasis [R].
- High blood sugar [R].

Likely typical neutrophil levels based on 41,236 genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
MICB	rs2524079	AA
LYST	rs1886654	CC
CSF3R	rs3917932	GG
LEPR	rs12067936	AA
NBR1	rs199625942	CC
CXCL5	rs11733208	AC
CHD7	rs7846314	TA
/	rs10604955	CI
EHD4	rs72726038	CT
CXCR2	rs55799208	GG
NCLN	rs144284241	CC
JAML	rs143034248	CC
ACKR1	rs34599082	CC
TTC28	rs62237617	CC
TSPOAP1	rs138284624	CC
IFNA13	rs142938197	CC
FLT3	rs76428106	TT
ATF7	rs117788567	CC
ORMDL3	rs3826331	TT

The number of "risk" variants in this table doesn't necessarily reflect your overall result.



Antibodies

Antibodies are one of the weapons of the immune system. They are proteins called *immunoglobulins*, designed to attach themselves to foreign substances and help destroy them. **Your genetics can impact the amount and function of these antibodies**.

Abnormal levels of particular antibodies can indicate different health issues. For example, **IgE** antibodies are dominant in allergic reactions. People prone to allergies tend to have high IgE levels.

TYPICAL LEVELS

IgE

Likely typical IgE levels

IgE

Immunoglobulin E (IgE) is a type of antibody. The main role of IgE is to protect the body from infections by parasitic worms. On the downside, it also contributes to **allergic diseases** [R, R].

Genetics influence IgE levels. Involved genes play a role in our bodies' response to IgE. For example, the gene *FCER1A* helps make an IgE receptor —cell protein that binds IgE [R, R].

The most common causes of increased IgE levels are parasitic infections and allergies [R, R].

Smoking and alcohol drinking may also increase IgE levels. People with some health conditions may also have **high IgE levels**, including [R, R]:

- Viral infections [R, R]
- Inflammatory bowel disease (IBD) [R]
- Kidney disease [R]
- Rare genetic disorders [R, R]

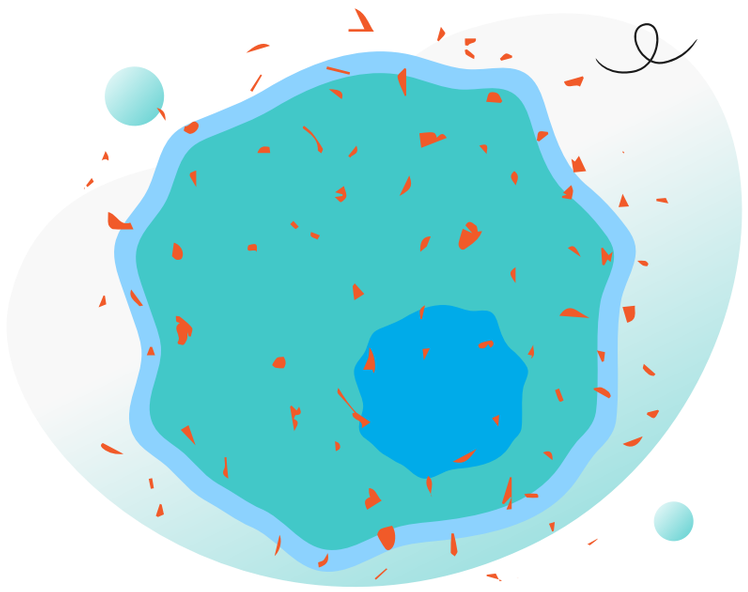
Keep in mind that this report is not about the rare genetic disorders mentioned above. They are very rare and usually diagnosed in infancy.

Likely typical IgE levels based on 16 genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
STAT6	rs1059513	TT
NQO1	rs6499255	AA
ACKR1	rs13962	AG
LPP	rs9290877	TC
HLA-DQB1	rs2858331	AG
HLA-C	rs3130941	GG
FCER1A	rs2251746	TT
FCER1A	rs4656784	AA
IL13	rs20541	GG
HLA-A	rs2571391	AA
HLA-A	rs2523809	GG
IL4R	rs1801275	AA

The number of "risk" variants in this table doesn't necessarily reflect your overall result.



Inflammatory Proteins

Your immune system creates an inflammatory response when activated against a potential threat. This response is turned on and off by proteins called **cytokines**. Excess levels of inflammatory cytokines may indicate an inflammatory condition or another imbalance in the immune response.

Genetics can affect the levels of different inflammatory cytokines like IL-17 and IL-6. This section reveals your results.

TYPICAL LEVELS

IL-17 (Th17)

Likely typical levels of IL-17

HIGHER LEVELS

IL-6

Likely higher levels of IL-6

TYPICAL LEVELS

IL-10

Likely typical levels of IL-10

IL-17 (Th17)

Interleukin 17 (IL-17) is a proinflammatory cytokine, produced mainly by Th17 cells [R].

The main role of IL-17 is to defend us against harmful microbes. It also supports our [R, R, R]:

- Gut
- Skin
- Lungs
- Brain

However, excessive IL-17 may cause harmful inflammation and contribute to inflammatory disorders, such as [R, R, R, R, R, R]:

- Obesity
- Type 2 diabetes
- Liver disease
- Asthma
- Autoimmune diseases (e.g., multiple sclerosis, psoriasis, rheumatoid arthritis, Crohn's disease)
- Lung failure

The main factors that may influence IL-17 levels include health status and **genetics** [R].

Likely typical levels of IL-17 based on 13,199 genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
/	rs117556572	CC
PTPMT1	rs139556855	AA
AMBRA1	rs148500124	AA
PTPRJ	rs185821266	GG
SLC1A1	rs7860087	GG
IKZF2	rs141312283	GG
/	rs187475560	CC
EPM2A	rs118117575	AA
/	rs148562661	CC
SHPRH	rs182530774	CC
EPM2A	rs187987903	GG
EPM2A	rs13215785	GG
GRM1	rs117785887	TT
GRM1	rs35548402	AA
NAV3	rs184080173	TC
TRIB3	rs62191444	GG
/	rs78612928	TT
/	rs12735700	GG
MCFD2	rs1446499	CT

The number of "risk" variants in this table doesn't necessarily reflect your overall result.

IL-6

Interleukin-6 (IL-6) is a cytokine with both pro- and anti-inflammatory properties. It's crucial in the defense against infections [R, R, R, R].

Up to 60% of differences in people's IL-6 levels may be due to genetics. Involved genes may influence our bodies' response to IL-6. For example, the *IL6R* gene helps make IL-6 receptors or proteins that bind IL-6 [R, R].

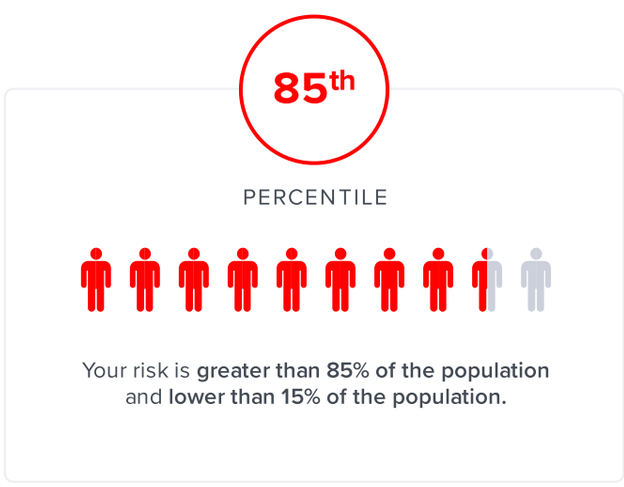
Normally, IL-6 is present in low levels. **An increase in its blood level has been linked to inflammatory conditions**, such as [R]:

- Autoimmune disorders (e.g., IBS, psoriasis, lupus, systemic sclerosis, rheumatoid arthritis) [R, R, R, R, R, R, R]
- Obesity [R]
- Diabetes [R]
- Infections [R, R, R]

Other factors linked to higher IL-6 levels include:

- Chronic stress [R, R, R]
- Coffee (>2 cups of coffee/day) [R, R]
- Smoking [R, R]
- Drinking alcohol [R, R]
- Intense, prolonged exercise like marathon (temporarily) [R, R, R]
- Older age [R, R, R, R]

Likely higher levels of IL-6 based on 391,026 genetic variants we looked at



Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
BTBD7	rs182261775	GG
NOS1	rs146828618	CC
P2RY1	rs114373846	CC
FBLN5	rs113207090	CC
ATP9A	rs73273528	CC
SOX4	rs185628618	GG
TBKBP1	rs72831623	GG
TBKBP1	rs113600793	CC
SERPINE2	rs13412535	GG
MTAP	rs2004627	CC
ATP2B2	rs4684700	CC
LRAT	rs2404476	GG
IL6R	rs4537545	CT
AKNA	rs10982213	AG
CASS4	rs1884910	CG
IL6R	rs11265618	CT
/	rs7824087	GA
AQP10	rs1386821	TG
RAP2B	rs75101555	CC

The number of "risk" variants in this table doesn't necessarily reflect your overall result.

IL-10

Interleukin-10 (IL-10) is an anti-inflammatory cytokine — a small protein involved in the communication between cells. **The main function of IL-10 is suppressing immune responses.** IL-10 helps our bodies recognize and not attack the proteins in our body (self-tolerance) and those that we eat (oral tolerance) [R, R, R].

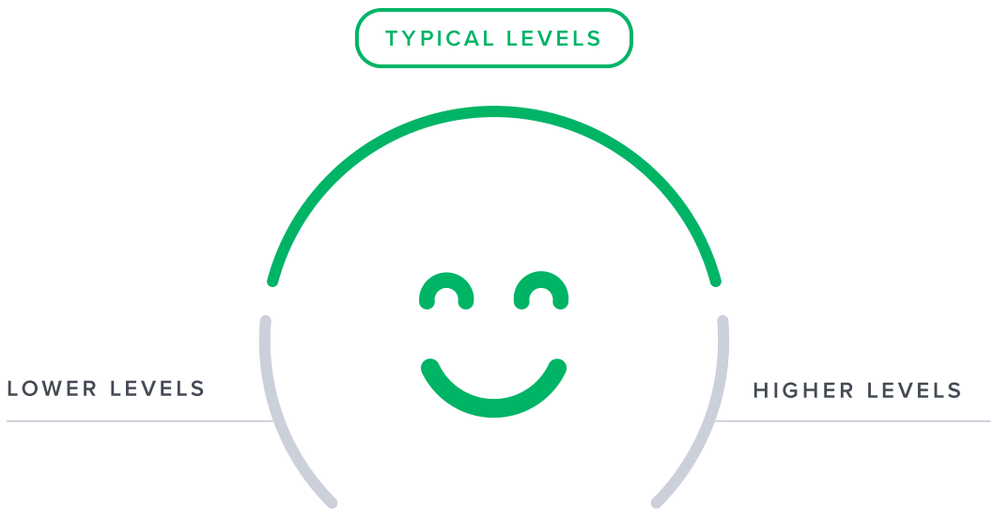
Up to **50%** of differences in people's IL-10 levels may be due to genetics. Interestingly, women naturally have lower levels than men [R, R].

In addition to **smoking**, the following health conditions may also lead to **low IL-10 levels** [R, R]:

- Sleep apnea [R]
- Depression and anxiety [R, R, R, R]
- Irritable bowel syndrome (IBS) [R, R]
- Autoimmune disorders (e.g., rheumatoid arthritis, psoriasis, multiple sclerosis) [R, R]
- Type 2 diabetes [R]
- Lung and heart disease [R, R]

On the other hand, people with the following health conditions may have **high IL-10 levels**:

- PTSD [R]
- Chronic fatigue syndrome [R]
- Fibromyalgia [R]
- Migraine [R]
- Lupus [R]
- Schizophrenia [R]
- Tuberculosis [R]
- Cancer [R, R, R]



Likely typical levels of IL-10 based on 27 genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
NNT	rs140614282	GG
IKBIP	rs1048911	TT
VEGFA	rs4349809	GT
SHROOM3	rs143141511	GG
BMP2	rs6085948	AA
VEGFA	rs3025021	TT
ZNF516	rs9951418	CC
MACROD2	rs465757	AA
PCP4	rs9981861	CC
MRPL37	rs11206302	CT
SERPINE2	rs282258	CT
PREP	rs10457128	GA
VLDLR	rs2375980	GC
PDIA5	rs1530455	CT
/	rs140244749	AA
NEBL	rs45559637	TT
LYRM7	rs148438889	GG
LYRM7	rs191791704	CC
RAPGEF6	rs147320771	TT

The number of "risk" variants in this table doesn't necessarily reflect your overall result.