

SH2B3 (Autoimmunity)

Gene Report

REPORT CATEGORY —



INFLAMMATION &
AUTOIMMUNITY

Sample Client

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Personal information

NAME

Sample Client

SEX AT BIRTH

Male

HEIGHT

5ft 5" 165cm

WEIGHT

137lb 62kg

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.



How this works

Our Wellness Reports analyze how your DNA influences your health.
We then use this analysis to give you personalized risk estimates and recommendations.



Similarly, our Trait Reports look at how your DNA influences your traits.



Your DNA is like an instruction manual — it contains a lot of information.
You can think of it as a blueprint for your body.

Genetic variants are parts of DNA that differ from person to person. Some can make you more vulnerable to certain health issues, while others may influence traits such as eye color.



We use artificial intelligence and machine learning to analyze all this information.
We then summarize your results as a risk score or display it on a gauge.

In total, we analyze up to 83 million genetic variants.

When we give a risk score, the risk icon tells you if you are at a higher or lower risk compared to other people:



Genotype color info:

AA

You don't have any risk alleles

AA

You have 1 risk allele

AA

You have 2 risk alleles

Your risk is also displayed as a percentile. This will tell you how your risks compare to our sample population. The lower your percentile number, the lower your risk. The "50th percentile" would be an average risk.

Similarly, the gauge tells you your relative risk score compared to our sample population, or it indicates a specific trait or haplotype you are more likely to have based on your genetic variants.

When applicable, we also list top evidence-based recommendations that may help lower your risk. The focus is on recommendations that may be of benefit to you, based on your genetics.

Our recommendations come in four categories: lifestyle, diet, supplements and drugs.
The following icons tell you which category a recommendation falls into:



Our team of scientists also ranks each recommendation.
We rank based on impact and the strength of evidence in the medical literature.

Impact shows how strongly a recommendation will affect your health in a certain area.
Evidence is how much scientific support there is for the recommendation. Rankings are from 1 to 5 (low to high):



Impact

Impact scores range from 1-5. These scores reflect how much of an effect each recommendation can have. An impact score of 5 predicts the biggest effect.

When a recommendation affects something we can measure, we use those measurements to assign the impact score. For example, a recommendation that decreases cholesterol by 20% will have a higher impact score than one that decreases it by 5%.

Some recommendations affect things that we cannot directly measure, like stress or mood. For these, the impact score is based on how well they work relative to other recommendations and standard treatments. The best ones get the highest scores.

If there is a lot of research that shows a recommendation works especially well for your genotype, the impact score gets increased.

Recommendation Evidence

- 5 / 5
- Recommendations that are considered effective and generally recommended by experts and medical bodies.
-
- 4 / 5
- Recommendations that are considered likely effective and that have multiple independent meta-analyses and a great many studies supporting them.
-
- 3 / 5
- Recommendations that are considered possibly effective and have many studies supporting them
-
- 2 / 5
- Recommendations that have insufficient evidence, with two or several clinical trials supporting them, or many studies but with ambiguous results.
-
- 1 / 5
- Recommendations that have insufficient evidence, with a single clinical trial, or with many studies most of which didn't find support for the recommendation.
-
- 0 / 5
- No evidence in humans.

Genotype-specific Evidence

- High-quality
- Direct evidence that a recommendation helps more in people with your gene variant (many clinical trials, a few large clinical trials, or a meta-analysis).
- Medium-quality
- Direct evidence that a recommendation helps more in people with your gene variant (a few clinical trials or one large clinical trial).
- Low-quality
- Direct evidence that a recommendation helps more in people with your gene variant (a single clinical trial or more trials with inconsistent results).
- Indirect
- A recommendation may help more in people with your gene variant because it targets a specific gene or protein affected by your variant (e.g., MTHFR, dopamine).
- In theory
- A recommendation may help more in people with your gene variant because it targets a specific mechanism affected by your variant (e.g., inflammation, oxidative stress).

Some things to keep in mind:

- Genetics doesn’t play a considerable role in a condition or a trait.
- There is not enough research available to estimate a genetic predisposition.
- There are technical limitations to estimating or presenting a genetic predisposition.
- The topic is sensitive, and a genetic predisposition should only be estimated and presented by a healthcare professional.

Introduction

The [SH2B3](#) gene codes for SH2B adapter protein 3. This protein helps regulate an array of essential pathways, including [\[R\]](#):

- Inflammation and the immune response
- Blood cell formation (hematopoiesis)
- Cell growth and migration

Due to its wide range of functions, SH2B3 has considerable significance for human health. Studies have linked its variants with different autoimmune conditions, heart disease, blood disorders, and more [\[R, R\]](#).

SH2B3 primarily regulates the function of T cells and has been associated with relative numbers of eosinophils (a type of [white blood cell](#)). It may suppress [Th1](#) cell response and prevent autoimmunity by inhibiting the formation of auto-antibodies [\[R, R, R\]](#).

However, when the Th1 response is suppressed, the [Th2](#) response may increase to compensate. The Th2 response is responsible for allergic inflammation, so this change may increase susceptibility to allergies. This is an example of why it's so important to keep [Th1 and Th2](#) in balance [\[R, R\]](#).

Some evidence suggests this gene may also be involved in fine-tuning the inflammatory response. For example, a rare human case of a genetic SH2B3 loss resulted in severe autoimmune disease, along with other developmental issues. In mice without this protein, scientists have observed over-production of inflammatory cytokines [\[R, R, R\]](#).

SH2B3 Genetics and Autoimmunity

SH2B3 variants associated with autoimmune conditions probably reduce the activity of this gene, which then fails to suppress an autoimmune reaction. Further research should clarify the exact mechanisms.

For instance, the ‘C’ allele of [rs653178](#) is believed to promote the Th1 response and has been associated with autoimmune conditions such as [\[R\]](#), [\[R\]](#), [\[R\]](#):

- [Lupus](#) [\[R\]](#)
- [Celiac disease](#) [\[R\]](#)
- [Graves’ disease](#) and elevated thyroid peroxidase antibodies [\[R\]](#), [\[R\]](#), [\[R\]](#)
- Rheumatoid arthritis [\[R\]](#)

In contrast, this variant may protect against [asthma](#) [\[R\]](#).

Another variant, ‘T’ at [rs3184504](#), decreases SH2B3 levels in the blood and has been linked to [\[R\]](#):

- Celiac disease [\[R\]](#)
- Hashimoto’s disease [\[R\]](#)

This variant may also raise [blood pressure](#) by increasing the levels of a protein called beta-2 microglobulin (β2M or B2M) and the inflammatory cytokines [IL-6](#), [IL-1b](#), and [TNF-alpha](#) [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

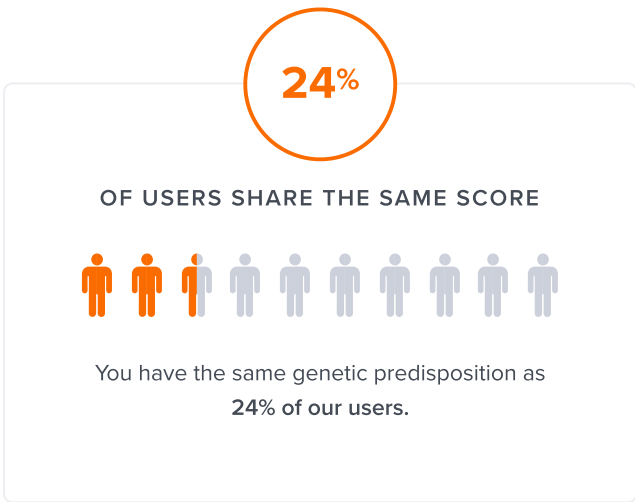
Finally, the ‘A’ allele of [rs597808](#) has been associated with higher rates of lupus [\[R\]](#).

These variants are usually inherited together, meaning you will most likely carry none or all of them.



LOWER ACTIVITY

Likely lower SH2B3 activity based on the genetic variants we looked at



Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
SH2B3	rs653178	CT
SH2B3	rs3184504	TC
SH2B3	rs597808	AA

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

Your Recommendations

Your recommendations are prioritized according to the likelihood of it having an impact for you based on your genetics, along with the amount of scientific evidence supporting the recommendation.

You’ll likely find common healthy recommendations at the top of the list because they are often the most impactful and most researched.

DOSAGE		DOSAGE			
1	Omega-3 (Fish Oil)	2000 mg	2	Gluten-Free Diet	
3	Probiotics	30 billion CFU	4	Avoid Food Triggers	
5	Myo-inositol	4 g			

1



Omega-3 (Fish Oil)

IMPACT3 / 5

EVIDENCE4 / 5

How to implement

Take 1-2 g of omega-3 (fish oil) supplement daily, preferably with a meal to enhance absorption.

TYPICAL STARTING DOSE

2000 mg

Description

Omega-3 fatty acids are essential fats found in fatty fish like salmon, flaxseeds, and walnuts. They are known for their potential cardiovascular and brain health benefits, including reducing the risk of heart disease and supporting cognitive function.

[Omega-3 fatty acids](#) are some of the healthiest fats we can eat. They help lower inflammation and protect the heart, brain, and eyes. Our bodies produce less omega-3s than we need for optimal health, so it's important to get enough through food or supplements [\[R\]](#), [\[R\]](#), [\[R\]](#).

There are three major types of omega-3s: ALA, EPA, and DHA [\[R\]](#), [\[R\]](#).

Fatty fish are rich in EPA and DHA. They include [\[R\]](#):

- Salmon
- Tuna
- Herring
- Sardines

For optimal protection, try to get at least **two servings of fatty fish per week**. Fish oil supplements are available for those who don't eat fish regularly [\[R\]](#).

How it helps

Long-term supplementation with omega-3 fatty acids from [fish oil](#) (EPA + DHA) significantly reduced IL-6 and IL-1b (but not TNF-α) in 174 Alzheimer's disease patients [\[R\]](#).

Omega-3s from fish oil may help with various inflammatory and autoimmune conditions. According to one review: “*Many of the placebo-controlled trials of fish oil in chronic inflammatory diseases reveal significant benefit, including decreased disease activity and a lowered use of anti-inflammatory drugs*” [\[R\]](#), [\[R\]](#).

Some early studies have reported that fish oil increased the thyroid hormone *thyroxine* (T4) in a clinical trial of 66 participants. Additionally, a few animal studies have reported that it stimulated thyroid receptors and protected against hypothyroidism in mice [\[R\]](#), [\[R\]](#), [\[R\]](#).

2



Gluten-Free Diet

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Remove all foods containing wheat, barley, and rye from your diet. This includes obvious sources like bread and pasta, as well as hidden sources in sauces, soups, and processed foods. Check labels for gluten-free certification, and aim to maintain this diet consistently, as even small amounts of gluten can cause symptoms to recur in sensitive individuals.

Description

A gluten-free diet is essential for individuals with celiac disease or gluten sensitivity. It helps prevent digestive issues and promotes overall health by avoiding foods containing gluten, a protein found in wheat, barley, and rye.

Gluten is a protein found in wheat and some other grains. **People with celiac disease have to follow a gluten-free diet to prevent gut damage.** A gluten-free diet eliminates all foods containing [\[R\]](#), [\[R\]](#):

- Wheat
- Barley
- Rye
- Malt
- [Brewer’s yeast](#)

How it helps

The only effective treatment for celiac disease is a strict gluten-free diet. Most people can successfully manage their symptoms by avoiding gluten.

This approach may be essential for people with certain *SH2B3* variants, as gluten can spike TNF-alpha and Th1 cytokines in people who don’t tolerate it. Th1 cells play a central role in celiac disease development [\[R\]](#), [\[R\]](#), [\[R\]](#).

 PERSONALIZED TO YOUR GENES

Celiac disease is more common in people with your [SH2B3](#) gene variant [\[R\]](#).

Celiac disease is more common in people with your [SH2B3](#) gene variant [\[R\]](#).

YOUR GENETIC VARIANTS			
GENE	SNP	GENOTYPE	EVIDENCE
SH2B3	rs3184504	TC	
GENE	SNP	GENOTYPE	EVIDENCE
SH2B3	rs653178	CT	

3



Probiotics

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Take a probiotic supplement containing 10 billion or more live cultures once daily, preferably with a meal or as directed by the packaging or a healthcare provider.

TYPICAL STARTING DOSE
30 billion CFU

Description

Probiotics are live beneficial bacteria and yeasts that can support gut health and digestive function when consumed as supplements or found in fermented foods like yogurt and sauerkraut. They may be beneficial to gut health, immune function, blood sugar, and mood.

Probiotic bacteria are “good” bacteria found mainly in the large intestine. They support your body and mind by [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Maintaining gut health
- Supporting a healthy immune system
- Improving your mood
- Helping to maintain healthy blood sugar

Prebiotics are certain types of fiber and other complex carbs that serve as food for gut bacteria. **They support gut health by helping boost the activity and growth of “good” bacteria** [\[R\]](#), [\[R\]](#).

Prebiotics are also added to foods and supplements. Common prebiotic ingredients are [\[R\]](#), [\[R\]](#):

- Oligo-fructose
- Oligo-galactose
- [Inulin](#)

Mixtures of probiotics and prebiotics are known as **synbiotics** [\[R\]](#).

How it helps

Just like beta-glucans, probiotics can suppress the growth of harmful bacteria in the intestines, which cause excess TNF-alpha and IL-1b levels. Two large meta-analyses confirmed the potential of probiotic supplementation to reduce TNF-a [\[R\]](#), [\[R\]](#).

According to experts, probiotics may be helpful for some people with IBD. This is because people with IBD often lack “good” gut bacteria [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

Probiotic supplements that contain *Lactobacillus*, *Bifidobacterium*, and *Streptococcus* species may support gut health in people with ulcerative colitis [\[R\]](#), [\[R\]](#), [\[R\]](#).

Probiotics may be less effective for Crohn's disease [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

Gut microbiome disturbance plays a significant role in celiac disease. Most CD patients have fewer *Bifidobacterium* strains and more harmful strains such as *Clostridium*, *Bacteroides*, and *Enterobacteria* [\[R\]](#).

Please note: *Talk to your doctor before taking probiotics* [\[R\]](#).

4



Avoid Food Triggers

IMPACT2 / 5

EVIDENCE1 / 5

How to implement

Identify foods that trigger negative reactions in your body, such as digestive issues, allergies, or headaches, and eliminate them from your diet entirely. This may require keeping a food diary for a few weeks to observe patterns and might involve cutting out common triggers like dairy, gluten, soy, or certain additives. Continuously monitor and adjust your diet to avoid these triggers as long as the symptoms persist.

Description

Food triggers are specific substances or ingredients in one's diet that can exacerbate or induce adverse reactions, such as allergies, sensitivities, or digestive issues, often leading to symptoms like inflammation, bloating, or discomfort.

A "trigger" is something that prompts or worsens the symptoms of a health condition.

Food triggers can lead to a wide range of symptoms in people who are sensitive to them. These may include [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Gut problems
- Skin problems
- Migraines

How it helps

Dietary [lectins](#) may also worsen inflammation in people sensitive to them. For example, lectins contributed to autoimmunity in one study with rheumatoid arthritis patients. Preliminary research suggests that avoiding lectins may reduce the symptoms of autoimmune conditions in sensitive individuals [\[R\]](#), [\[R\]](#).

Lectins may stimulate [TNF-alpha](#) and IL-1b production in response to bacterial infections and thus mimic your *SH2B3* variants [\[R\]](#), [\[R\]](#), [\[R\]](#).

A trial of 800 people suggested TNF-a levels as a marker for lectin exposure in sensitive people. Additionally, lectins may worsen the impact of your variant by promoting Th1-mediated immunity [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

Gut damage and inflammation in celiac disease may cause temporary lactose intolerance. Such patients may need to avoid dairy until their gut lining recovers [\[R\]](#).

Elimination diets such as the [Lectin Avoidance Diet](#) may help identify and remove common food irritants — such as lectins, gluten, and dairy — that may be worsening autoimmunity in sensitive individuals [\[R\]](#), [\[R\]](#), [\[R\]](#).

5



Myo-inositol

IMPACT1 / 5

EVIDENCE1 / 5

How to implement

Take 2 grams of myo-inositol supplement orally twice a day, preferably with meals to enhance absorption. This regimen should be followed daily for at least 6 months to observe significant benefits.

TYPICAL STARTING DOSE

4 g

Description

Myo-inositol is a naturally occurring compound that plays a role in various cellular functions. It is used in dietary supplements and is believed to have potential benefits for mental health, hormone regulation, and insulin sensitivity.

Inositol is a type of sugar that our bodies need to function. It was considered a vitamin (vitamin B8) until it was discovered that our bodies can make it from another common sugar, glucose [\[R\]](#).

[Myo-inositol](#) is the most common form of inositol. It plays a role in [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Heart health
- Normal blood sugar levels
- Mental health
- Cognitive function
- Reproductive health

Myo-inositol can convert to [D-chiro-inositol](#) in the body. These two forms of inositol are often combined in supplements. People use them to improve blood sugar control and PCOS [\[R\]](#), [\[R\]](#), [\[R\]](#).

How it helps

Different types of inositol were able to reduce IL-1b, IL-6, and other *SH2B3*-related cytokines in animal trials. These inflammatory components were higher in animals deficient in [myo-inositol](#) [\[R\]](#), [\[R\]](#), [\[R\]](#).

Preliminary studies suggest that myo-inositol, especially when combined with selenium, may help restore normal thyroid function and prevent progression to hypothyroidism in patients with Hashimoto's disease [\[R\]](#), [\[R\]](#), [\[R\]](#).

Next Steps

Remember, your genes only tell one important part of your health story!

Now that you've seen your DNA-based results for this health topic, let's take a look at other contributing factors.

Your lab results

Your lab results are impacted by the combined effect of your genes, environment and lifestyle.

Lab tests will give you the best picture of your current health status, while your genes provide insight into your health predispositions and which recommendations are best for you.