

Chronic Lyme

Biohacker Report

REPORT CATEGORY —



INFLAMMATION &
AUTOIMMUNITY

Sample Client

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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.

Personal information

NAME

Sample Client

SEX AT BIRTH

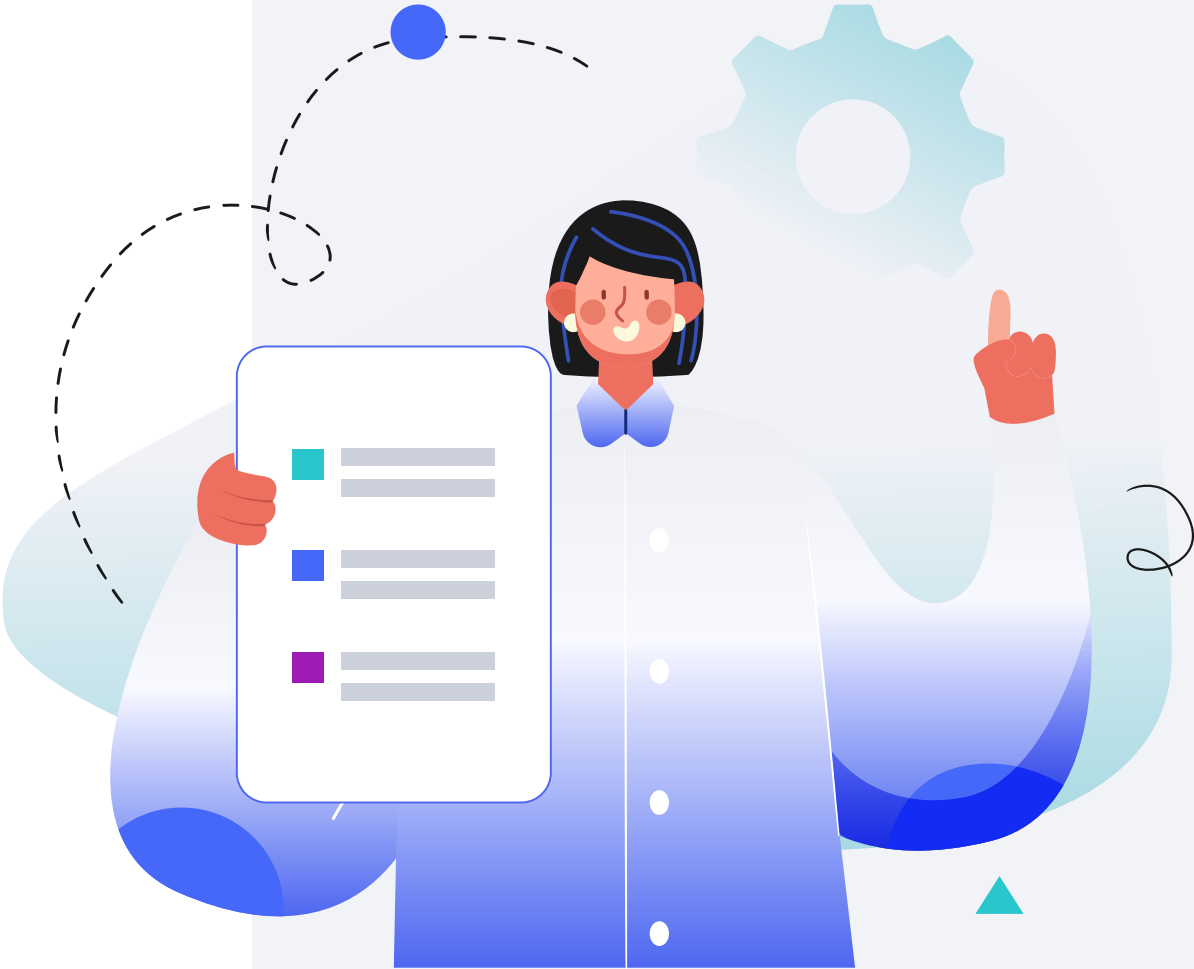
Male

HEIGHT

5ft 5" 165cm

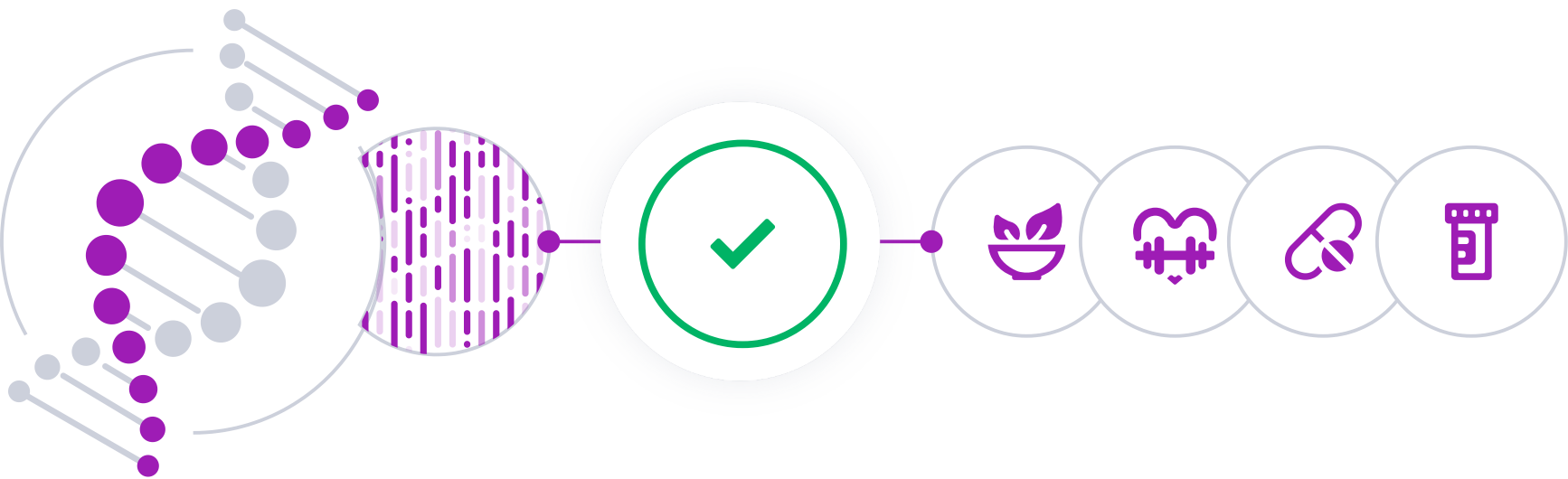
WEIGHT

137lb 62kg



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.

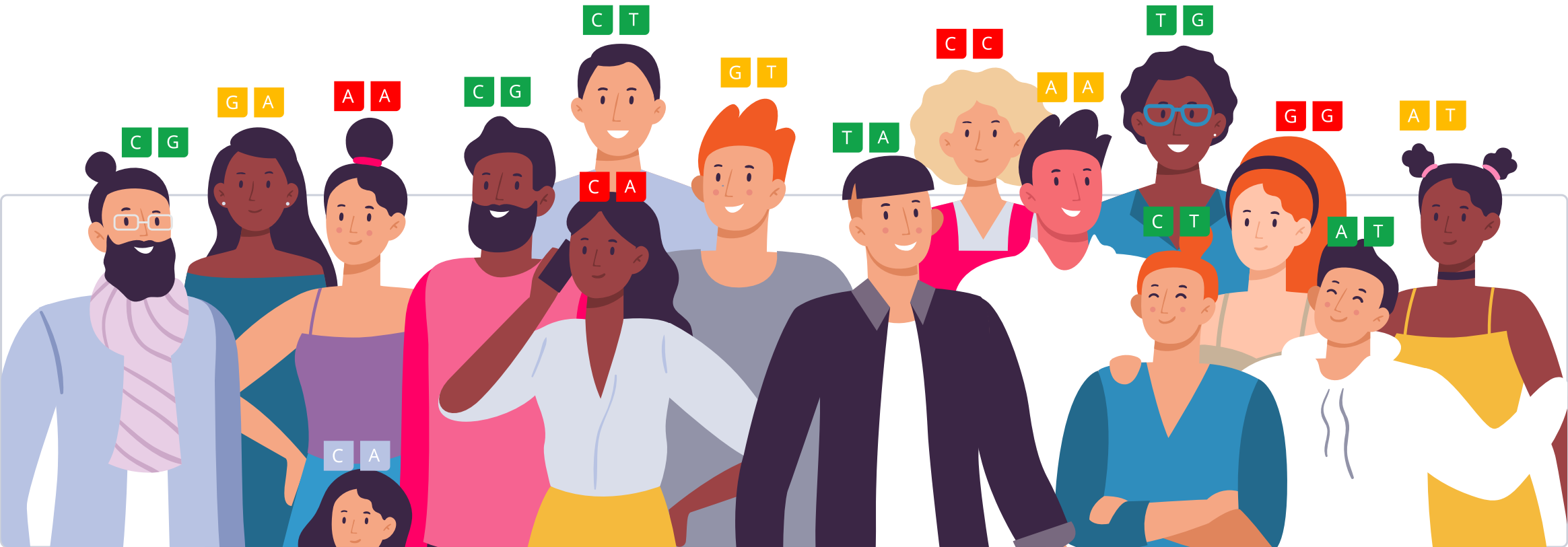


Similarly, our Trait Reports look at how your DNA influences your traits.



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

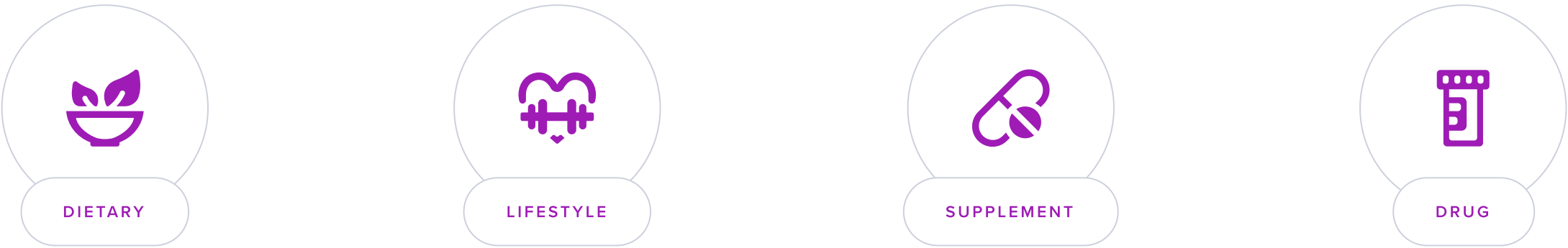
You have 2 risk alleles

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

[Lyme disease](#) is caused by an infection of *Borrelia burgdorferi* bacteria, typically transmitted to humans by tick bites [\[R\]](#).

A typical feature of early Lyme disease is a **slowly expanding red rash resembling a bull’s-eye** at the site of the tick bite. A person may also develop flu-like symptoms and enlarged lymph nodes. Most people treated with **antibiotics** at this stage never develop further symptoms such as nerve and heart problems [\[R\]](#).

However, some people suffer from joint pain, fatigue, headaches, and cognitive problems for months or years after treatment. This is called *post-treatment Lyme disease syndrome* (PTLDS) [\[R\]](#), [\[R\]](#).

Risk Factors and Genetics

The risk of developing Lyme disease is mainly influenced by a person’s chance of getting bitten by an infected tick. Relevant factors include:

- Location
- Time spent outdoors
- Season

Genetics doesn’t seem to play a major role in susceptibility to Lyme disease. However, in some people, it may affect **chronic post-treatment symptoms**, especially joint pain. Involved genes play a role in [R, R, R, R, R, R]:

- Immune response and inflammation ([TLR1](#), [TLR2](#), [HLA-DRB1](#))
- Removal of toxic bacterial products ([ABCB1](#))

Keep in mind the research in this area is limited, and there have been some mixed results. Please take your results with a grain of salt until more research is done [R, R].



TYPICAL LIKELIHOOD

Typical likelihood of having “chronic Lyme” based on 5 genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
TLR2	rs5743708	GG
HLA-DQA2	rs660895	GA
HLA-DQA2	rs6910071	GA
DDAH2	rs9267658	CT
HLA-DQA2	rs17208888	GG
/	rs9271366	AG
TLR1	rs5743618	AA
ABCB1	rs1128503	GG
HLA-DOB	rs3817964	TT
C6ORF47	rs4947332	CC
HLA-DQA2	rs3763305	GG

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	Lingonberry	400 mg	2	Low-Level Laser Therapy (LLLT)	30 seconds
3	High-Intensity Laser Therapy	10 minutes	4	Lactobacillus Rhamnosus	10 billion CFU
5	Luteolin	100 mg	6	Avoid Contact Triggers	
7	Avoid Triggers		8	Lactobacillus Acidophilus	10 billion CFU
9	Bifidobacterium Longum BB536	10 billion CFU	10	Avoid Food Triggers	
11	Bifidobacterium Longum	10 billion CFU	12	Address Food Sensitivities	

1



Lingonberry

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 400 mg of lingonberry supplement daily with a glass of water, preferably in the morning with your breakfast for at least 8 to 12 weeks to observe beneficial effects.

TYPICAL STARTING DOSE
400 mg

Description

Lingonberries are rich in antioxidants and vitamins, supporting immune health and potentially reducing the risk of chronic diseases. Their consumption may also promote urinary tract health and help manage blood sugar levels.

How it helps

Lingonberry's rich antioxidant content helps combat oxidative stress, which may play a role in the inflammation associated with Chronic Lyme disease. By supporting immune function and reducing oxidative damage, it may aid in the management of symptoms and overall health.

2



Low-Level Laser Therapy (LLLT)

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Use a low-level laser therapy device, as directed by its manual or a healthcare professional, on the affected area. Generally, treatment involves applying the laser for a specified duration, often between 30 seconds to several minutes, per treatment area. Sessions can be conducted 2-3 times per week for a period of 4-12 weeks, depending on the condition being treated and the device used.

TYPICAL STARTING DOSE
30 seconds

Description

Low-level laser therapy (LLLT), also known as photobiomodulation, is a type of light therapy that uses low-intensity lasers to promote healing. It has been shown to be effective in treating a variety of conditions, including pain, inflammation, and wound healing.

How it helps

Low-Level Laser Therapy (LLLT) assists in managing chronic Lyme symptoms by effectively reducing pain and inflammation, promoting tissue repair through increased cellular metabolism, and enhancing the body's natural healing processes.

3



High-Intensity Laser Therapy

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Attend high-intensity laser therapy sessions at a certified clinic, with each session lasting approximately 5 to 10 minutes, targeting the affected area. It's typically recommended to undergo this therapy 2 to 3 times a week for a span of 4 to 6 weeks, depending on the condition being treated and the therapist's assessment.

TYPICAL STARTING DOSE

10 minutes

Description

High-Intensity Laser Therapy is a medical treatment that uses focused light to help heal and relieve pain. It targets damaged or injured parts of the body, promoting tissue repair and growth. It's important for overall health as it provides a non-invasive alternative for pain relief and accelerates the body's own healing process.

How it helps

High-Intensity Laser Therapy alleviates chronic Lyme-associated joint pain by delivering targeted light energy that reduces inflammation and promotes tissue healing, leading to improved function and pain relief.

4



Lactobacillus Rhamnosus

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take a probiotic supplement containing Lactobacillus rhamnosus. Typically, the suggested dose is 10 billion CFUs (colony-forming units) per day. This can be taken as a single daily dose or divided into two doses, morning and evening, with or without food. Continue this regimen for at least 4 weeks to observe benefits.

TYPICAL STARTING DOSE

10 billion CFU

Description

Lactobacillus rhamnosus is a beneficial probiotic strain that can support digestive health and contribute to a balanced gut microbiome. It may help improve gut function, enhance nutrient absorption, and bolster the immune system, promoting overall well-being.

[Lactobacillus rhamnosus](#) is a [probiotic](#) bacterium, part of the normal gut microflora. Various foods may have added *L. rhamnosus*, including yogurt, cheese, and fermented legumes [\[R\]](#), [\[R\]](#).

People take *L. rhamnosus* supplements to balance their immune system and help with infections, allergies, and dermatitis [\[R\]](#).

How it helps

Lactobacillus rhamnosus can improve gut health by enhancing microbial balance and immune function, which is particularly beneficial for individuals with chronic Lyme disease who often experience gastrointestinal disturbances. This support can alleviate symptoms and promote recovery.

5



Luteolin

IMPACT1 / 5

EVIDENCE1 / 5

How to implement

Take a luteolin supplement in the range of 100-200 mg per day, ideally with a meal to enhance absorption. It is recommended to continue this regimen daily for at least 8 to 12 weeks to evaluate its effectiveness.

TYPICAL STARTING DOSE

100 mg

Description

Luteolin is a flavonoid with potential anti-inflammatory and antioxidant properties, and it is found in various fruits and vegetables. Incorporating luteolin-rich foods into your diet may help reduce inflammation and support overall health.

How it helps

Luteolin may alleviate inflammation associated with chronic Lyme disease by modulating inflammatory pathways, thereby potentially reducing symptoms such as pain and fatigue. Its antioxidant properties may also support overall cellular health, enhancing recovery.

6



Avoid Contact Triggers

IMPACT1 / 5

EVIDENCE1 / 5

How to implement

Identify substances or materials that irritate your skin or exacerbate your condition and consistently avoid direct contact with them. This may involve wearing protective clothing or gloves, changing household cleaners or detergents to hypoallergenic options, and carefully reading labels on cosmetics and skin care products to ensure they do not contain irritants specific to your sensitivity.

Description

Identifying and avoiding contact triggers, such as allergens or irritants, can help individuals manage allergies or sensitive skin conditions more effectively, reducing symptoms and improving overall quality of life.

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

A contact trigger can be something you touch or inhale. It can include anything from your own sweat to dust in the air [\[R\]](#).

A physical trigger can be anything you come into physical contact with that causes a change to your body. It can include anything from swimming in cold water to wearing tight clothing [\[R\]](#), [\[R\]](#).

In people who are sensitive to them, physical triggers may contribute to vitiligo [\[R\]](#), [\[R\]](#).

In fact, **about 1 in 5 people may have at least one contact trigger**. Common triggers may include [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Nickel and cobalt (e.g., jewelry)
- Latex (e.g., rubber gloves)
- Fragrances

Contact triggers may cause or worsen symptoms in people with eczema [\[R\]](#), [\[R\]](#).

How it helps

Avoiding contact triggers can significantly reduce symptom exacerbation in chronic Lyme by minimizing the body's inflammatory response to irritants. This proactive approach helps stabilize overall health and enhance quality of life for affected individuals.

7



Avoid Triggers

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Identify substances or environmental factors that exacerbate your condition, such as specific foods, stress, or allergens, and actively avoid them. This may involve reading food labels, asking about ingredients when eating out, and making changes to your home or work environment to reduce exposure to identified triggers.

Description

A "trigger" is something that prompts or worsens the symptoms of a health condition. They can be something you eat or come into contact with. Triggers can lead to a wide range of symptoms, such as gut and skin problems and migraines.

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

A **food trigger** can be something you eat.

A **physical trigger** can cause a change to your body through physical contact. It can include swimming in cold water or something you touch or inhale [\[R, R, R\]](#).

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

- Gut problems
- Skin problems
- Migraines

How it helps

Avoiding identified triggers can help mitigate the exacerbation of symptoms associated with chronic Lyme disease, thereby improving overall quality of life. This proactive approach contributes to symptom stabilization and enhances the effectiveness of targeted therapies.

8



Lactobacillus Acidophilus

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take a probiotic supplement containing Lactobacillus acidophilus. Look for products that offer around 10 billion CFUs (colony-forming units) and take it once daily, preferably on an empty stomach, either first thing in the morning or right before bed.

TYPICAL STARTING DOSE
10 billion CFU

Description

Lactobacillus acidophilus is a [probiotic](#) bacterium that has been traditionally and widely used in the dairy industry to make yogurt [\[R\]](#).

More recently, *L. acidophilus* has been used as a probiotic. People take it to help with [\[R, R, R, R\]](#):

- High cholesterol
- Gut diseases
- Allergies
- Vaginal infections

How it helps

Lactobacillus acidophilus aids in restoring gut microbiota balance, enhancing immune response and potentially alleviating chronic symptoms associated with Lyme disease by promoting a healthier digestive environment.

9



Bifidobacterium Longum BB536

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

B. longum BB536 is available in several forms, including capsules, powders, and chewables. The typical dosage for *B. longum* BB536 is around 10 billion colony-forming units (CFUs) per day, depending on the health objectives and the specific product formulation. It is often recommended to start with a lower dose to assess tolerance before gradually increasing to the desired dose.

TYPICAL STARTING DOSE
10 billion CFU

Description

Bifidobacterium longum BB536 is a well-researched probiotic strain that offers various health benefits. Originating from human gut flora, this strain has a high survival rate through the gastrointestinal tract, enhancing its efficacy.

B. longum BB536 is a versatile probiotic that supports digestive health, strengthens the immune system, and offers antioxidant benefits.

How it helps

Bifidobacterium Longum BB536 may promote a balanced gut microbiota, enhancing gut barrier function and modulating immune responses. This support can alleviate chronic Lyme symptoms by potentially reducing systemic inflammation and improving overall gut health.

10



Avoid Food Triggers

IMPACT

1 / 5

EVIDENCE

1 / 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

Avoiding food triggers in individuals with chronic Lyme disease can help reduce inflammation, alleviate gastrointestinal distress, and mitigate symptomatic flare-ups. This tailored dietary approach may enhance overall well-being and improve the management of chronic symptoms.

11



Bifidobacterium Longum

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take a Bifidobacterium longum supplement daily, with a typical dosage around 10 billion colony-forming units (CFUs). It can be consumed any time of day, but taking it with a meal might improve its absorption and effectiveness. Continue this regimen for at least 4 weeks to assess its benefits on digestive health.

TYPICAL STARTING DOSE
10 billion CFU

Description

Bifidobacterium longum is a beneficial probiotic strain known for its potential to support digestive health and boost the immune system.

[Bifidobacterium longum](#) is a [probiotic](#) bacterium naturally present in the human gastrointestinal tract. Its subspecies *B. longum subsp. infantis* is one of the earliest bacteria to colonize the infant gut [\[R\]](#).

People take *B. longum* to enhance immunity against infections and support gut health [\[R, R, R\]](#).

How it helps

Bifidobacterium longum may help improve gut health in individuals with chronic Lyme by enhancing gut microbiota balance, which can support the immune system. A stronger immune response may aid in managing the symptoms and complications associated with Lyme disease.

12



Address Food Sensitivities

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Begin by eliminating common allergens and irritants from your diet, such as dairy, gluten, soy, and nuts, for a period of 4 weeks. After this elimination phase, gradually reintroduce each food group one at a time over a period of 2-3 days each, monitoring for any adverse reactions to pinpoint specific sensitivities.

Description

Food sensitivities refer to adverse reactions to specific foods or food components that can cause symptoms like digestive issues, skin problems, or headaches, without involving the immune system as in allergies.

A *food intolerance* is a non-allergic reaction that makes it hard to digest certain foods. For example, those with lactose intolerance can’t digest dairy [\[R\]](#).

A *food sensitivity* is similar to a food intolerance. However, the cause may be more difficult to pinpoint [\[R\]](#), [\[R\]](#).

People with food sensitivities may have symptoms ranging from gut problems to migraines [\[R\]](#), [\[R\]](#), [\[R\]](#).

How it helps

Identifying and addressing food sensitivities can alleviate chronic symptoms of Lyme disease by reducing inflammation and gastrointestinal distress, thereby promoting better overall health and facilitating more effective management of the condition.

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

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.

