

Histidine

Biohacker Report

REPORT CATEGORY —



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

Histidine is an essential amino acid, which means that our bodies can't make it and we must get it through diet. Histidine is found in most protein-rich foods such as [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Red meat and poultry
- Fish
- Grains (e.g., wheat, oats, and whole grains in general)
- Legumes (e.g., soybeans, kidney beans)
- Nuts

Histidine is one of the building blocks for proteins in our bodies. Histidine is also crucial in the production of [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- [TRH](#), which controls thyroid hormone secretion
- [Histamine](#), a chemical messenger crucial in digestion, inflammation, and brain health
- [Carnosine](#) and anserine, which support muscle function
- [Urocanic acid](#), which protects against ultraviolet radiation (UVR)
- [Hemoglobin](#), necessary for red blood cell production

Histidine also plays important roles in [\[R\]](#):

- Protection against [heavy metals](#)
- Inflammation control
- Immunity

Low histidine levels are linked to [anemia](#), skin lesions, and inflammation [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

On the other hand, excess histidine levels may contribute to [\[R\]](#):

- [Headaches](#)
- Weakness
- Fatigue
- [Nausea](#)
- Eating disorders
- [Depression](#)
- Memory difficulties

Factors Influencing Histidine Levels

Up to 50% of differences in people’s histidine levels may be due to genetics [R, R].

Genes involved may influence histidine breakdown. For example, the [HAL](#) gene helps make an enzyme that converts histidine into urocanic acid [R, R, R].

Low histidine levels may also result from [R, R, R, R, R, R, R]:

- Malnutrition
- [Obesity](#)
- [Folate](#) deficiency
- [Rheumatoid arthritis](#)

On the other hand, rare genetic disorders may cause high histidine levels [R, R].



Likely typical need for histidine based on 21 genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
HAL	rs61937878	CC
HAL	rs143854097	GG
HAL	rs117991621	CC
HPS3	rs181648651	CC
NEDD1	rs559243300	AA
CP	rs35331711	GG
ADAL	rs139974673	TT
MAFB	rs1883711	GG
NDRG2	rs1958393	CC
AMDHD1	rs75341400	GT
CPS1	rs1047891	AC
SPRYD4	rs2933243	AG
SLC38A4	rs76191003	CT
SERPINA1	rs709932	CT
GCKR	rs780094	TC
SLC39A4	rs2272662	CT
NDRG2	rs147773754	CC
AMDHD1	rs143387210	TT
SGK1	rs117591301	AA
CP	rs34004251	TT
LMO1	rs2168101	CC
KHNYN	rs11621792	CC
NME7	rs3766077	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	Chicken	2	Cottage Cheese
3	Beef	4	Tuna
5	Pork	6	Turkey
7	Alpha-Ketoglutarate (AKG)	8	Egg Whites
9	Histidine	10	Mackerel
11	Snapper	12	Cod

1



Chicken

IMPACT

2 / 5

EVIDENCE

1 / 5

How to implement

Incorporate chicken into your meals 2-3 times a week, preferably opting for lean cuts like breast meat. Cook it through methods such as grilling, baking, or boiling to avoid adding excess fats. Aim for a portion size of about 3-4 ounces (85-113 grams) per serving.

Description

Chicken is a lean source of protein and essential nutrients like vitamin B12 and selenium. It can be a healthy part of a balanced diet that supports muscle growth and overall nutritional well-being.

Chicken and particularly dark meat like the thigh, is a good source of omega-6s that also contains protein, vitamins, and even needed trace minerals like selenium. One chicken thigh contains 3792 mg of omega-6.

How it helps

Chicken, rich in essential amino acids, provides histidine, which the body uses to develop and maintain healthy tissues. Regular consumption thus aids in preventing histidine deficiency and promoting overall health.

2



Cottage Cheese

IMPACT

2 / 5

EVIDENCE

1 / 5

How to implement

Incorporate 1/2 cup of cottage cheese into your daily diet. This can be included as part of your breakfast, as a snack, or mixed into dishes like salads or pasta. Continue this habit daily for long-term health benefits.

Description

Cottage cheese (1%) is a healthy dairy product, high in protein, and a good source of selenium, calcium, vitamin B12, and riboflavin.

Cottage cheese (1%) is a healthy dairy product, high in protein, and a good source of selenium, calcium, vitamin B12, and riboflavin. A 1-cup serving provides 20 mcg of selenium or 36%DV.

How it helps

Histidine is an essential amino acid that your body doesn't naturally produce, so it must be obtained from the diet. Cottage cheese is rich in histidine, thus eating it can help maintain healthy levels and prevent a deficiency that could lead to poor growth, skin lesions, fatigue and other problems.

3



Beef

IMPACT

2 / 5

EVIDENCE

1 / 5

How to implement

Incorporate lean beef into your diet 2-3 times per week, with a serving size of about 3-4 ounces (85-113 grams) per meal. Choose cuts like sirloin or round to minimize saturated fat intake.

Description

Beef is a rich source of high-quality protein, essential vitamins, and minerals like iron and zinc. Incorporating lean cuts of beef into a balanced diet can support muscle growth, overall nutrition, and iron intake.

Beef is an excellent source of many B-vitamins, protein, proline, and minerals like zinc and iron. Grass-fed uncharred beef is healthiest. Beef contains 34.82 mg of proline per gram.

How it helps

Beef is rich in histidine, an essential amino acid that your body does not produce but requires for protein synthesis and metabolic functions. Regular consumption of histidine-rich food like beef can therefore potentially prevent a histidine deficiency.

4



Tuna

IMPACT

2 / 5

EVIDENCE

1 / 5

How to implement

Incorporate tuna into your meals 2-3 times per week, aiming for a serving size of about 3.5 ounces (100 grams) per meal. Choose fresh or water-packed tuna instead of oil-packed to reduce unnecessary calorie intake.

Description

Tuna is a type of saltwater fish commonly consumed worldwide, rich in lean protein, omega-3 fatty acids, and essential vitamins and minerals. Its health benefits include heart health support, improved brain function, and reduced inflammation. Tuna is often included in diets for conditions like cardiovascular disease prevention and cognitive enhancement.

Tuna is a source of niacin, vitamin D, as well as being a very good source of protein and omega-3 fatty acids. A 3-ounce serving has 8.6 mg of niacin or 54%DV.

How it helps

Eating tuna, which is rich in Histidine - an essential amino acid, helps replenish its level in the body. This prevents Histidine deficiency, which can lead to conditions like inflammation, anemia, and even impaired growth.

5



Pork

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate lean cuts of pork, such as tenderloin or loin chop, into your diet 2-3 times per week, aiming for a portion size of about 3-4 ounces (85-113 grams) per meal. Cook it using healthy methods like grilling, baking, or broiling to minimize added fats.

Description

Pork is a meat obtained from pigs, and is a great source of zinc, protein, and iron, as well as leucine, selenium, phosphorus, and B-vitamins.

Pork is a good source of protein, chromium, selenium, phosphorus, zinc, and potassium. A 3-ounce serving provides 3.6 mcg of chromium or 10%DV.

How it helps

Pork is rich in protein, including histidine, an essential amino acid that the body doesn't naturally produce. Consuming pork can help increase histidine levels, supporting immune function and joint health, and preventing histidine deficiency.

6



Turkey

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate turkey into your diet 2-3 times per week, choosing lean cuts like turkey breast. Aim for portions about the size of a deck of cards (3-4 ounces) for each serving.

Description

Turkey is a poultry meat known for its lean protein content and is a good source of nutrients like selenium and B vitamins. It is valued for its health benefits, including muscle growth, immune support, and stress reduction due to its content of tryptophan, which is a precursor to serotonin.

Turkey is a good source of zine, and rich in B-vitamins, minerals like selenium and phosphorus, and protein. A 3-ounce serving provides 1.5 mg of zinc or 14%DV.

How it helps

Turkey is rich in histidine, an essential amino acid our bodies cannot produce. Consuming turkey can therefore help replenish histidine levels, potentially preventing its deficiency-related conditions.

7



Alpha-Ketoglutarate (AKG)

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take alpha-ketoglutarate (AKG) as a dietary supplement in a dose of approximately 1-2g per day, preferably with meals to aid in its absorption. The exact dosage may vary based on the specific product and individual health needs, so it's important to follow the label instructions or consult a healthcare provider for personalized advice. This supplementation can be ongoing, with periodic evaluations to assess its effects on your health.

TYPICAL STARTING DOSE

1 g

Description

Alpha-ketoglutarate (AKG) is a key molecule in the Krebs cycle, crucial for energy production in cells. It plays a role in amino acid synthesis and nitrogen transport. In supplement form, it's claimed to improve athletic performance and support recovery, but the scientific evidence for these benefits is limited.

How it helps

In hemodialysis patients, a study showed that combining alpha-ketoglutarate with calcium carbonate over one year improved amino acid metabolism. **Plasma urea decreased, while histidine, arginine, proline, and certain keto acids increased.** This combination treatment effectively reduced hyperphosphatemia [\[R\]](#).

8



Egg Whites

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Consume egg whites by separating them from the yolks of whole eggs. You can eat egg whites daily, incorporating them into meals such as breakfast omelettes, scrambled eggs, or as a protein addition to smoothies. Aim for 2-4 egg whites per day depending on your dietary protein needs.

Description

Egg whites are great nutrition sources, with protein, healthy fats, and numerous vitamins and minerals.

Egg whites are great nutrition sources, with protein, healthy fats, and numerous vitamins and minerals. Egg white contains 16.6 mg of methionine per gram.

How it helps

Eating egg whites provides a high-quality source of protein, which includes the essential amino acid histidine. Your body uses histidine to develop and maintain healthy tissues, especially in the myelin sheaths, which wrap around nerve cells and ensure the transmission of electrical signals through your body.

9



Histidine

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 500-1000 mg of histidine supplement per day, ideally with a meal. It is best to start with a lower dose, such as 500 mg, to assess tolerance and then adjust as needed up to 1000 mg. Consistent daily intake for at least 4 to 8 weeks may be necessary to notice benefits.

TYPICAL STARTING DOSE

500 mg

Description

Histidine is an essential amino acid that plays a role in protein synthesis and the formation of histamine. It is important for overall health and is found in various protein-rich foods.

A histidine supplement of up to 14 mg/kg/d can be taken to meet the needs not achieved through diet.

You can also increase your dietary histidine intake. Histidine is found in protein-rich foods such as meat, chicken, fish, beans, oats, and wheat. It's especially high in the Japanese food ingredient dashi or dried bonito, often used for soup stock [R].

How it helps

Histidine can aid in producing red and white blood cells, which are vital for your immune system and overall health. If your body lacks histidine, it may result in histidinemia, a rare metabolic disorder, so taking a histidine supplement might prevent it.

10



Mackerel

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate mackerel into your diet 2-3 times per week, preferably choosing baked or grilled preparation methods to preserve its nutritional quality.

Description

Mackerel is a fatty fish high in omega-3 fatty acids, which are known for their anti-inflammatory properties and potential cardiovascular benefits. Regular consumption of mackerel can support heart health and provide essential nutrients like vitamin D and selenium.

Mackerel is a good source of omega-3s along with histidine, vitamins D and B12, protein, selenium, phosphorus, and magnesium. Mackerel contains 11.37 mg of histidine per gram.

How it helps

Mackerel is rich in histidine, an essential amino acid, meaning your body cannot produce it and it must be supplied through diet. Regular consumption of mackerel can therefore fulfill your histidine needs, helping to prevent potential health issues related to histidine deficiency.

11



Snapper

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate snapper, a type of fish, into your diet 2-3 times a week, baking, grilling, or steaming it to preserve its nutrients. Opt for wild-caught snapper when possible to reduce exposure to contaminants. Each serving should be about 3-4 ounces (85-113 grams) cooked.

Description

Snapper is a type of fish that is a good source of protein, histidine, omega-3 fatty acids, vitamins B6 and B12, as well as selenium, potassium, and phosphorus. Its nutrients may be beneficial toward heart health.

Snapper is a good source for histidine, vitamins B6 and B12, as well as phosphorus, potassium, and selenium. Snapper contains 12.08 mg of histidine per gram.

How it helps

Snapper is rich in protein, which contains histidine, an essential amino acid our body can't produce itself. Consuming Snapper helps ensure your body gets enough histidine, which is vital for growth, tissue repair, and maintaining your body's overall health.

12



Cod

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate cod into your diet 2-3 times per week, choosing baked or grilled options to maximize health benefits. Each serving should be about 3-4 ounces (85-113 grams).

Description

Cod is a common white fish with protein, iodine, choline, B-vitamins, as well as phosphorus and selenium.

Cod is a common white fish with protein, iodine, choline, B-vitamins, as well as phosphorus and selenium. One 3-ounce serving provides 158 mcg of iodine or 106%DV.

How it helps

Cod is rich in histidine, an essential amino acid that our bodies cannot produce. Consuming cod provides your body with histidine, which plays vital roles including tissue repair and maintaining a healthy immune system.

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.