

Phenylalanine

Biohacker Report

REPORT CATEGORY —



NUTRITION

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

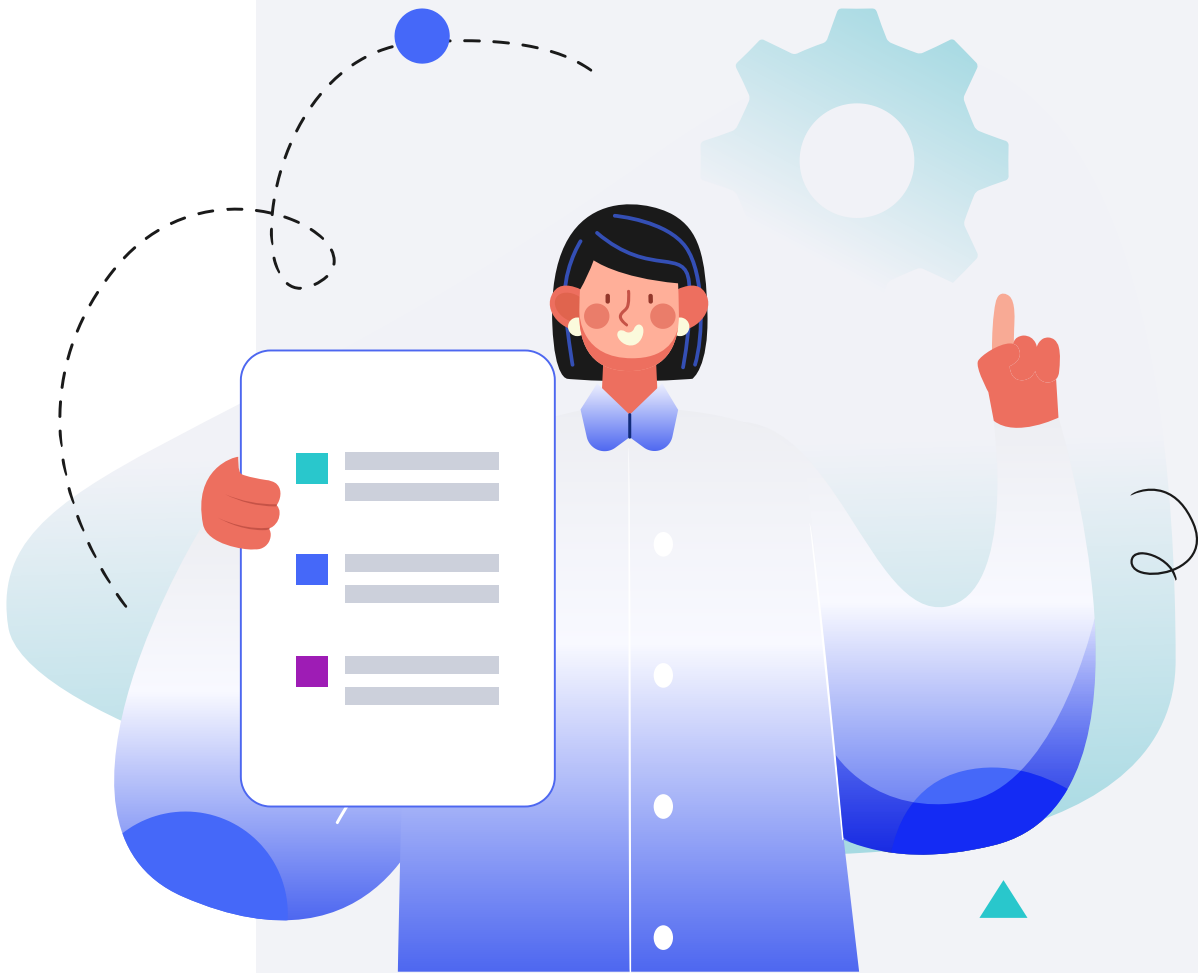
Male

HEIGHT

5ft 5" 165cm

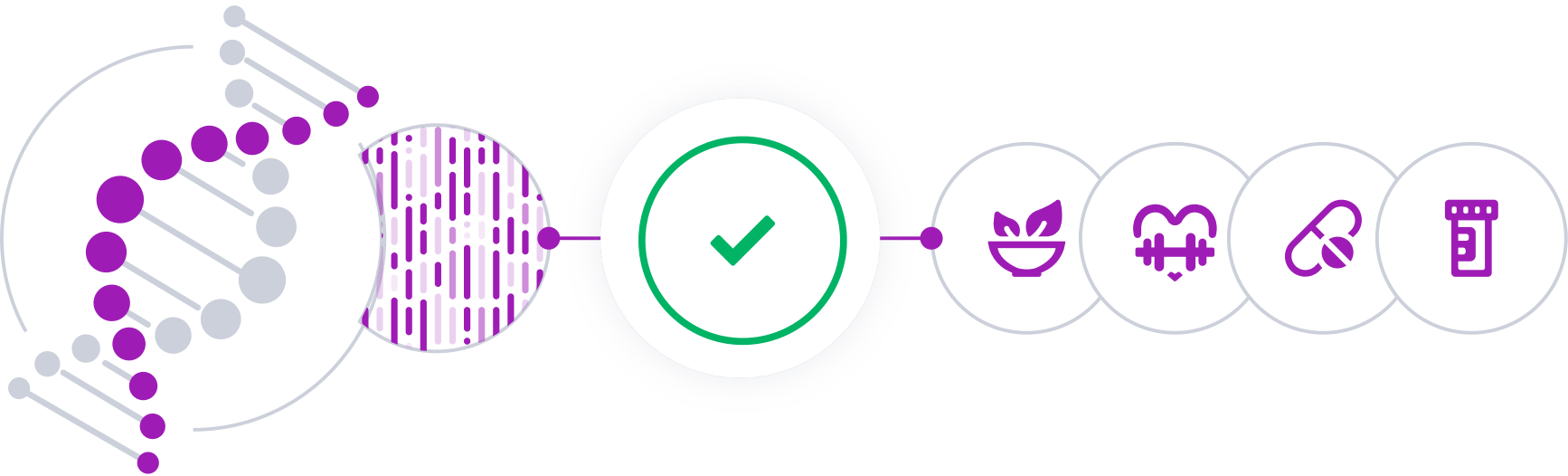
WEIGHT

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

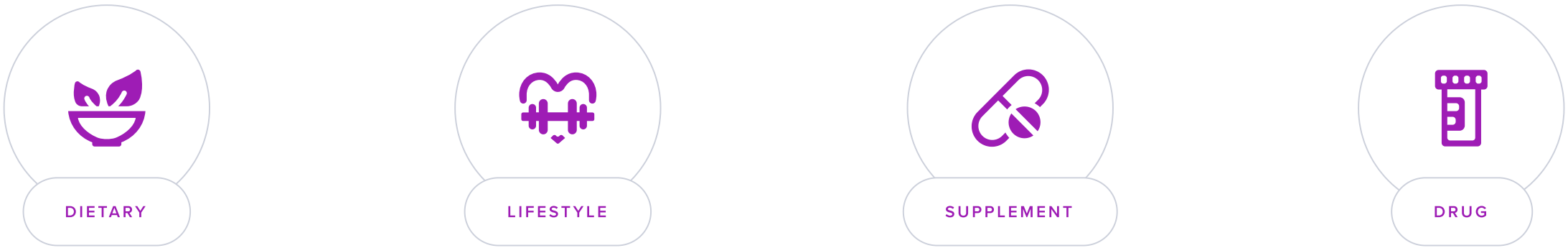
You have 2 risk alleles

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

[Phenylalanine](#) is an essential amino acid. This means that the human body can't make it and we need to obtain it from food. Most **protein-rich foods** contain decent amounts of phenylalanine, including [\[R\]](#):

- Eggs
- Milk and dairy products
- Legumes (e.g., lentils, beans, peanuts)
- Red meat and poultry
- Fish
- Nuts

It can also be taken as a supplement.

Phenylalanine is crucial as a building block for proteins and helps build another amino acid, [tyrosine](#). Phenylalanine also helps produce chemical messengers such as [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- [Dopamine](#)
- [Epinephrine](#) (adrenaline)
- [Norepinephrine](#) (noradrenaline)
- [Thyroxine](#) (thyroid hormone)
- Melanin (skin pigment)
- [Cholecystokinin](#) (digestive hormone)

Hence, phenylalanine plays important roles in [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Brain health
- Cognition
- Skin health
- Thyroid Health
- Appetite

Studies show that low phenylalanine levels may be linked to reduced appetite. On the other hand, excessive levels may impair mood and brain function [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

Factors Influencing Phenylalanine Levels



TYPICAL NEED

Likely typical need for phenylalanine based on 13 genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
PAH	rs5030858	GG
PAH	rs189898276	AA
ASCL1	rs184768787	CC
NUP37	rs116868345	CC
CHST11	rs191631370	TT
GCH1	rs17253619	CT
RBMS2	rs2933235	AA
CPS1	rs715	CT
PAH	rs1498694	AA
TIMM10	rs10750864	AA
NHLRC1	rs150772783	CC
SLC17A1	rs9467618	CC
NOMO3	rs4781730	CC

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

Key Takeaways:

- Genes involved in imbalances play a role in phenylalanine metabolism.
- Other risk factors include excessive phenylalanine supplementation, iron deficiency, and the genetic disorder phenylketonuria.
- Even if your genetic risk is high, phenylalanine imbalances are very rare, so the overall risk is low.
- Click the **next steps** tab for relevant labs.

Phenylalanine deficiency is very rare and may happen due to rare genetic disorders [R].

High phenylalanine levels may result from [R, R, R]:

- Excessive phenylalanine supplementation
- [Iron deficiency](#).
- A rare genetic disorder called *phenylketonuria*

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

Phenylalanine levels are also slightly influenced by more common gene variants covered in this report. Involved genes play a role in phenylalanine metabolism [R, R, R].

For example, the [PAH](#) gene helps make the enzyme *phenylalanine hydroxylase*. This enzyme converts phenylalanine to tyrosine. Variants that increase PAH activity may reduce phenylalanine levels [R, R].

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.

- 1

Cottage Cheese
- 2

Seaweed
- 3

Spinach
- 4

Beef
- 5

Pork
- 6

L-Phenylalanine
- 7

Egg white powder
- 8

Kidney beans
- 9

Watercress
- 10

Turkey
- 11

Catfish

1



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

Cottage cheese is low in phenylalanine, a substance your body may struggle to break down if you have a disorder like PKU (phenylketonuria). By eating cottage cheese, you can still get protein without overloading your body with phenylketonuria-aggravating phenylalanine.

2



Seaweed

IMPACT

2 / 5

EVIDENCE

1 / 5

How to implement

Incorporate seaweed into your diet 2-3 times per week by adding it to salads, soups, or as a wrap for sushi and other ingredients. Seaweed can be consumed both in dried form as a snack or rehydrated in meals.

Description

Seaweed is a marine algae that is a source of vitamins A and C, iron, calcium, iodine, omega-3s, and dietary fiber. It is often consumed as a food and is valued for its potential to provide essential nutrients, including iodine, and support thyroid health.

Seaweed is a good source of iodine and also has vitamins A, C, E and K, along with folate, zinc, sodium, calcium and magnesium. A 2-tablespoon serving provides 116 mcg of iodine or 77%DV.

How it helps

Seaweed is rich in Tyrosine, the amino acid that those with Phenylketonuria (PKU) often struggle to metabolize from Phenylalanine. The ready availability of Tyrosine in seaweed could aid in limiting accumulation of Phenylalanine, potentially improving the condition.

3



Spinach

IMPACT

2 / 5

EVIDENCE

1 / 5

How to implement

Incorporate one cup of fresh spinach or half a cup of cooked spinach into your daily diet. You can add spinach to salads, smoothies, omelets, or pastas to easily increase your intake.

Description

Spinach is a leafy green vegetable packed with essential nutrients, including vitamins A and K, iron, and folate. Incorporating spinach into the diet supports eye health, bone health, and overall nutrition.

Spinach is a good source of molybdenum, folate, calcium, and iron, as well as vitamins A, C, and K1. A ½ cup serving provides 8 mcg of molybdenum or 18%DV.

How it helps

Phenylketonuria (PKU) is a rare genetic disorder that impedes the body's ability to metabolize an amino acid called phenylalanine, not phenylalanine itself. Consuming spinach, which has low phenylalanine levels, can help manage PKU by limiting dietary input of this amino acid, reducing its buildup in the body.

4



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, a rich source of protein, supplies essential amino acids, but it's not beneficial for those with a condition called phenylketonuria (PKU) where the body can't process the amino acid phenylalanine. For those facing PKU, excessive intake of high protein foods like beef could be harmful and exacerbate symptoms as the undigested phenylalanine can accumulate in the brain, leading to brain damage.

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 a good source of protein, providing essential amino acids like phenylalanine used for protein synthesis in the body. However, it doesn't prevent phenylketonuria (PKU), a disorder affecting phenylalanine processing - this is a genetic condition.

6



L-Phenylalanine

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate foods high in l-phenylalanine into your diet daily. This includes lean meats, fish, eggs, dairy products, soy products, and certain nuts and seeds like almonds and pumpkin seeds.

Description

L-phenylalanine is an amino acid used by the body to produce important neurotransmitters and proteins. It plays a role in mood regulation, cognitive function, and overall neurological health.

L-phenylalanine is a building block for proteins, hormones, and chemical messengers. It plays an important role in brain function, thyroid function, and skin health.

L-phenylalanine is found in foods like [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Meat
- Nuts
- Wheat
- Soy

It can also be taken as a supplement.

How it helps

Taking Phenylalanine supplements can help your body maintain adequate levels of this essential amino acid, aiding in the production of key brain chemicals and proteins necessary for everyday function.

7



Egg white powder

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate egg white powder into your diet by adding approximately 20-30 grams of the powder into smoothies, shakes, or baking recipes. This should be done daily as part of your meal planning to ensure consistent protein intake.

Description

Egg white powder is a good source of protein, phenylalanine, B-vitamins, potassium, magnesium, and selenium.

Egg white powder is a good source of protein, phenylalanine, B-vitamins, potassium, magnesium, and selenium. Egg white powder contains 27.56 mg of phenylalanine per gram.

How it helps

Egg white powder is high in protein but does not contain phenylalanine, an amino acid individuals with PKU cannot metabolize properly. Thus, it provides essential protein without exacerbating the condition.

8



Kidney beans

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate a half to one cup of cooked kidney beans into your diet 2-3 times a week. You can add them to salads, soups, chili, or make a bean-based spread to increase your intake.

Description

Kidney beans are a nutritious legume rich in protein and fiber. They can support digestive health, help regulate blood sugar levels, and contribute to a balanced diet.

Kidney beans are mineral rich and also a good source of protein and fiber, with iron, copper, manganese, potassium, and folate. A ½ cup serving provides 2 mg of iron or 11%DV.

How it helps

Kidney beans are rich in natural proteins that compete with phenylalanine for absorption, increasing the amount of phenylalanine the body can safely consume. Furthermore, they contain fewer phenylalanines than animal proteins, making them a safer source of the essential protein.

9



Watercress

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate fresh watercress into your diet 3-4 times a week. You can add it to salads, sandwiches, or use it as a garnish in soups and other dishes. Aim for at least a cup of fresh watercress to reap its health benefits.

Description

Watercress is a leafy green vegetable rich in vitamins, minerals, and antioxidants, including vitamin K and vitamin C. It is used to support bone health, boost immunity, and provide important nutrients for overall well-being.

Watercress is a good source of tryptophan, vitamins A, C, and K, calcium and manganese. Watercress contains 20.73 mg of phenylalanine per gram.

How it helps

Watercress is rich in phenylalanine hydrolase, an enzyme that helps break down phenylalanine in your body, reducing the risk of buildup. Hence, eating watercress could be beneficial in preventing phenylalanine-related disorders like PKU.

10



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 a good source of protein which is crucial for cell repair and growth. However, for people with Phenylketonuria (an inability to metabolize phenylalanine), eating turkey can lead to a buildup of phenylalanine, potentially causing brain damage or other problems, so it does not prevent the condition.

11



Catfish

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate catfish into your diet 1-2 times per week, preferably baked or grilled to minimize added fats. Each serving should be about 3-4 ounces (85-113 grams) cooked.

Description

Catfish is a low-calorie, high-protein fish that can be a part of a healthy diet. It provides essential nutrients like omega-3 fatty acids, B-vitamins, selenium, and also supports muscle growth and overall nutritional wellness.

Catfish is a good source of protein, phenylalanine, B-vitamins, phosphorus and selenium. Catfish contains 13.46 mg of phenylalanine per gram.

How it helps

Catfish is a good source of protein, with lower levels of phenylalanine compared to other protein sources. Eating catfish can offer essential nutrients while minimizing the impact on phenylketonuria, a condition related to high levels of phenylalanine.

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.