

Choline

DNA Health Report

REPORT CATEGORIES —



NUTRITION



LIVER HEALTH

Sample Client

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Table of Contents

03 How this works

- 04 Impact
- 05 Evidence
- 06 Some things to keep in mind

07 Introduction

08 Your genetics

10 Your recommendations

26 Next Steps

- 26 Your Lab Results

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

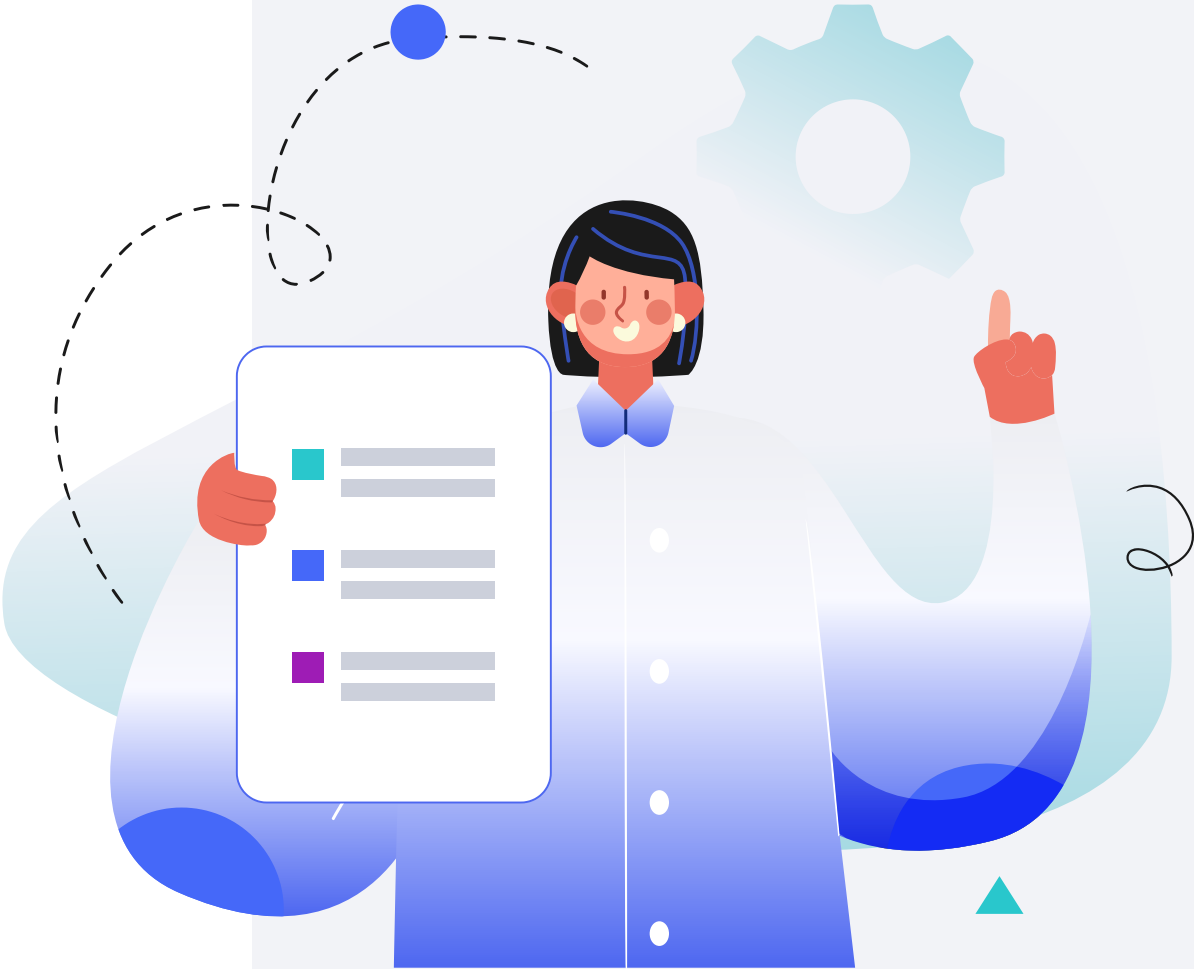
Male

HEIGHT

5ft 5" 165cm

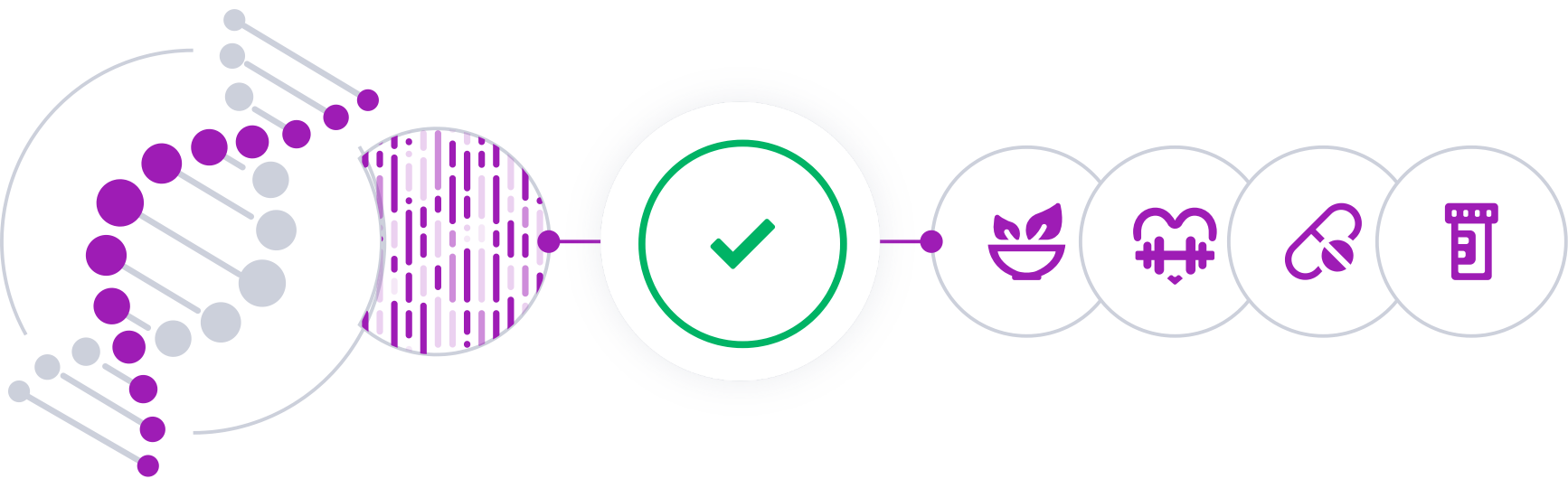
WEIGHT

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.

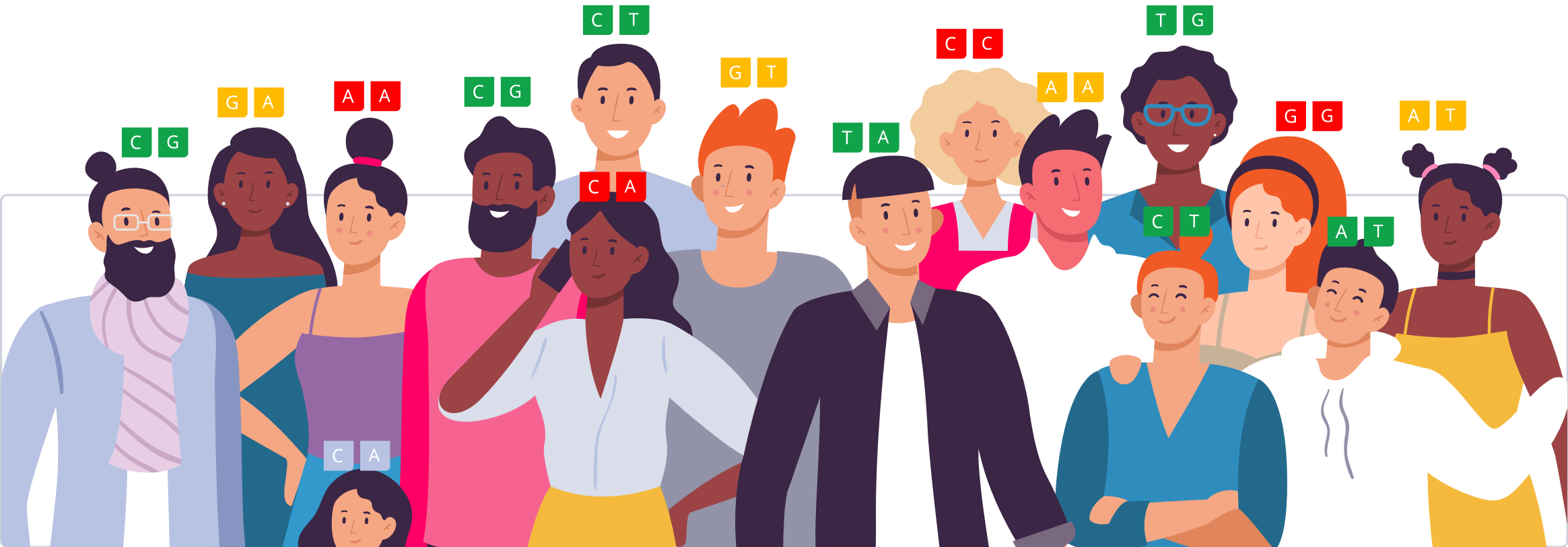


Similarly, our Trait Reports look at how your DNA influences your traits.



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

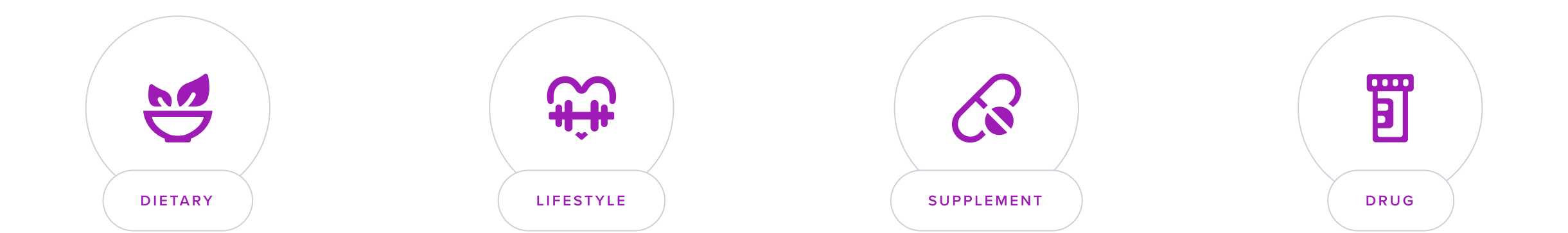
You have 2 risk alleles

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

[Choline](#) is an essential nutrient. Although the body makes some, we need to get choline from our diets to avoid deficiency [\[R\]](#).

It plays key roles in supporting [\[R\]](#), [\[R\]](#):

- **Liver health:** builds [phosphatidylcholine](#), which helps clear fat from the liver
- **Heart health:** helps remove [homocysteine](#), which raises the risk of heart disease
- **Brain and nerve health:** builds [acetylcholine](#), a crucial neurotransmitter
- **Cell shape:** builds phospholipids that give structure to cell membranes
- **Signaling:** builds molecules that act as cell messengers

Adult men need **550 mg** of choline per day, while adult women need **425 mg**. The needs increase during pregnancy and breastfeeding [\[R\]](#).

The best food sources of choline include [\[R\]](#), [\[R\]](#):

- **Beef liver:** 356 mg per serving (3 oz)
- **Eggs:** 147 mg per serving (1 large egg)
- **Chicken breast:** 72 mg per serving (3 oz)
- **Codfish:** 71 mg per serving (3 oz)

Most people don’t get enough choline in their diets. People who don't eat eggs or take choline supplements are much less likely to meet their needs [\[R\]](#), [\[R\]](#).

Choline deficiency can cause fatty liver, muscle damage, and more. Groups at a higher risk of choline deficiency include [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Postmenopausal or pregnant women
- Chronic alcohol consumers
- Pregnant women
- Athletes
- People on intravenous nutrition

Please note: *Many supplement manufacturers source choline from soybeans and eggs. If you are allergic to these foods, read the labels carefully to avoid having a reaction. Medical bodies recommend against taking more than **3.5 g** of choline per day. High intake can cause complications such as low blood pressure and diarrhea* [\[R\]](#).

Choline Genetics

Some people have no symptoms despite their reduced choline intake, while others may need even more than usually recommended amounts. Genetics may be partly responsible for this.

The [PEMT](#) gene helps make an enzyme that produces [phosphatidylcholine](#) (PC) in the liver. PC can release choline and make up for lower amounts of this nutrient in a diet [\[R\]](#), [\[R\]](#), [\[R\]](#).

People with certain *PEMT* variants, such as [rs12325817](#)-G, may benefit from getting more choline. Read [this post](#) for more details [\[R\]](#), [\[R\]](#).

Fatty liver is usually the first clinical sign of choline deficiency. One *PEMT* variant, [rs7946](#)-T, correlates with fatty liver and reduced choline supply. If you have this variant, you’re more likely to experience liver damage due to poor choline intake, a sedentary lifestyle, and overeating. Read [this post](#) for more details [\[R\]](#), [\[R\]](#).

The [CHDH](#) gene helps make an enzyme that turns choline into betaine. It may affect choline needs by ‘spending’ too much of this nutrient for betaine production. People with the following variants may be more sensitive to reduced choline intake [\[R\]](#):

- [rs9001](#)-T
- [rs12676](#)-A

Read [this post](#) for more details.

The [CHKA](#) gene helps make an enzyme called ‘*choline kinase alpha*’ that turns dietary methionine into phosphatidylcholine. People with the [rs10791957](#)-A allele may need higher dietary choline since they don’t convert dietary protein into choline well [\[R\]](#), [\[R\]](#).

Choline helps remove homocysteine, along with [folate](#) and [vitamin B12](#). The [MTHFD1](#) and [MTRR](#) genes are involved in this process and may affect choline needs. People with the following variants may benefit from increasing their choline intake [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):



Likely typical need for choline based on 12 genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
MTRR	rs1532268	CT
CHDH	rs9001	TT
PEMT	rs7946	CT
ALDH3B1	rs10791957	AC
BHMT	rs3733890	AG
MTHFD1	rs2236225	GA
PEMT	rs4646343	GT
PEMT	rs3760188	CT
MTRR	rs1801394	AG
CHKA	rs7928739	AC
PEMT	rs12325817	CC
CHDH	rs12676	CC

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

- [rs2236225](#)-A (read [this post](#) for more details)
- [rs1801394](#)-G (read [this post](#) for more details)
- [rs1532268](#)-T

Please note: *The available research for this report is limited, so take your results with a grain of salt. We will update the report as soon as more research is available. Also, keep in mind that your diet, environment, and other genetic variants can influence your choline needs.*

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	Dietary Choline	2	Phosphatidylcholine 420 mg
3	Choline Supplements 425 mg	4	SAM-e 400 mg
5	Betaine (TMG) 500 mg	6	Chicken
7	Beef liver	8	Beef
9	Cod	10	Chicken Liver
11	Quinoa	12	Citicoline (CDP Choline) 250 mg
13	Cauliflower	14	Alpha-GPC Choline 300 mg
15	Salmon	16	Potatoes
17	Brussels Sprouts	18	Soy
19	Eggs	20	Lecithin 7 g
21	Beef Heart	22	Kidney beans

Dietary Choline

IMPACT

5 / 5

EVIDENCE

5 / 5

How to implement

Increase your intake of choline-rich foods such as eggs, beef liver, chicken liver, fish, peanuts, and dairy products. Aim for an adult intake of about 425 mg to 550 mg of choline per day through these food sources, as part of your regular diet.

Description

Choline is an essential nutrient that supports brain function, nerve signaling, and liver health. It is involved in neurotransmitter synthesis and cell membrane structure.

How it helps

Increasing dietary choline intake is the best way to prevent deficiencies and associated symptoms. The recommended daily intake is 550 mg for men and 425 mg for non-pregnant women. Feel free to go above the suggested minimum, but stay below the upper limit of 3,500 mg/day [R].

The best food sources of choline include [\[R\]](#), [\[R\]](#):

- Beef liver: 356 mg per serving (3 oz)
- Eggs: 147 mg per serving (1 large egg)
- Chicken breast: 72 mg per serving (3 oz)
- Codfish: 71 mg per serving (3 oz)

For example, two ounces of beef liver and two eggs would meet your daily requirements. According to an extensive survey, people who don't eat eggs or take supplements are much less likely to get enough choline [\[R\]](#).

If you are [vegan](#) or vegetarian and have the 'bad' *CHDH* variants, consider taking a supplement. Decent plant-based choline sources include [\[R,R\]](#):

- [Shiitake](#) mushrooms: 58 mg per serving (½ cup)
- [Quinoa](#): 42.5 mg per serving (1 cup)
- Broccoli: 31.3 mg per serving (½ cup)
- Peanuts: 18.3 mg per serving (1 oz)

2



Phosphatidylcholine

IMPACT

5 / 5

EVIDENCE

5 / 5

How to implement

Take 420-900 mg of phosphatidylcholine supplement daily, ideally with meals to enhance absorption. Continue this regimen for at least 3 months to evaluate its effects on your health.

TYPICAL STARTING DOSE

420 mg

Description

Phosphatidylcholine is a crucial phospholipid found in cell membranes throughout the body, particularly in the brain. It plays a vital role in cognitive function and liver health, supporting processes like cell signaling and fat metabolism. Phosphatidylcholine can be derived from soybeans and other sources, and it is often used as a dietary supplement to promote brain health and liver function.

[Phosphatidylcholine](#) is a key component of cells [\[R\]](#).

It helps [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Maintain cell structure
- Protect the lungs, gut, liver, and nerves
- Break down fats

Because [choline](#) is needed to make phosphatidylcholine, low choline levels can limit its production [\[R\]](#).

How it helps

Phosphatidylcholine is a major component of biological membranes and can provide choline for metabolic processes when ingested. It supports cellular membrane composition and liver health.

Please note: *some studies suggest that phosphatidylcholine may interfere with iron absorption in the gut. If you have anemia, consult your healthcare provider before using phosphatidylcholine supplements.*

3



Choline Supplements

IMPACT4 / 5

EVIDENCE4 / 5

How to implement

Take choline supplements at a dosage of 425 mg to 550 mg daily, depending on age and gender, with a glass of water. It is best to consume choline supplements with a meal for optimal absorption. Continue this regimen daily as part of your dietary supplement routine.

TYPICAL STARTING DOSE

425 mg

Description

Choline is an essential nutrient that plays a crucial role in various bodily functions, including brain health, liver function, and metabolism. Incorporating choline-rich foods into your diet supports cognitive function and overall nutritional well-being.

[Choline](#) is a nutrient required for optimal health. Although the body makes some, we need to get choline from our diets to avoid deficiency [\[R\]](#).

It plays key roles in supporting [\[R\]](#), [\[R\]](#):

- DNA production
- Cell structure and function
- Brain, nerve, and heart health

Eggs and beef liver are the best sources of choline. If you can’t meet your daily requirements with food, consider taking a choline supplement such as [\[R\]](#):

- [Phosphatidylcholine](#) (PC)
- [Citicoline](#) (CDP-choline)
- [Alpha-GPC](#)
- [Lecithin](#)

They all supply choline, but each one has unique health perks you may prefer. Check out our posts on different choline-containing supplements to find out which one suits you best.

How it helps

If you can’t get enough choline from food, consider taking a supplement. Available forms include:

- [Phosphatidylcholine](#)
- [Citicoline](#) (CDP-choline)
- [Lecithin](#)
- [Alpha-GPC](#)

4



SAM-e

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Take 400-1600 mg of SAM-e as a supplement daily, preferably on an empty stomach to enhance absorption. It is often recommended to start with low dosage and observe how your body responds over a few weeks, adjusting as necessary under the guidance of a healthcare provider.

TYPICAL STARTING DOSE
400 mg

Description

[SAM-e](#) is a chemical that helps maintain liver and brain health. Your body makes SAM-e from the amino acid *methionine*, but it’s also available as a supplement [\[R\]](#).

SAM-e supplementation may help with:

- Joint pain [\[R\]](#)
- Liver disease [\[R\]](#)
- Depression [\[R\]](#)

Please note: SAM-e may not be safe for people with a bipolar disorder. It may also interact with 5-HTP, St. John’s wort, and different medications. Combining it with antidepressants can be dangerous and even life-threatening. Never take SAM-e supplements without consulting your doctor [\[R\]](#), [\[R\]](#), [\[R\]](#).

How it helps

[SAM-e](#) enables phosphatidylcholine production via the [PEMT](#) enzyme. Thus, it may compensate for lower choline levels and prevent choline deficiency [\[R\]](#), [\[R\]](#).

SAM-e can also help with fatty liver, which is the most common sign of choline deficiency [\[R\]](#).

5



Betaine (TMG)

IMPACT

2 / 5

EVIDENCE

4 / 5

How to implement

To take Betaine (TMG) as a supplement, consume 500-2000 mg daily, preferably with a meal to enhance absorption. It is recommended to start at the lower end of the dosage range and adjust based on personal tolerance and effectiveness. This supplement can be taken indefinitely for ongoing support of heart health and liver function.

TYPICAL STARTING DOSE
500 mg

Description

Betaine is a compound found in various foods and used in dietary supplements for its potential to support liver health and contribute to healthy homocysteine levels.

How it helps

In the absence of dietary betaine, your body will produce it from choline, which may amplify your genetic risk for choline deficiency. To prevent this, consume a variety of betaine-rich foods such as [\[R\]](#):

- Liver meats
- Quinoa
- Beets
- Wheat germ
- Spinach

Please note: Doses above 4 g/day may increase LDL and triglyceride levels. TMG supplementation can cause a person’s urine and sweat to smell fishy [\[R\]](#), [\[R\]](#).

6



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 is rich in choline, a nutrient essential for proper brain function and nerve signaling. Consuming chicken helps your body maintain optimal levels of choline, thereby preventing choline deficiency which can lead to neurological disorders.

7



Beef liver

IMPACT

2 / 5

EVIDENCE

1 / 5

How to implement

Incorporate beef liver into your diet 1-2 times per week, aiming for a serving size of about 3-4 ounces (85-113 grams) each time. This can be pan-fried, baked, or incorporated into dishes like stews or pate to make it more palatable.

Description

Beef liver is a commonly recommended organ meat due to its rich content of protein, B-vitamins, and minerals.

Chickpeas are a good source of vitamin B6, iron, folate, fiber, and rich in minerals like copper, zinc, and phosphorus. A ½ cup serving provides 1.1 mg of vitamin B6 or 65%DV.

How it helps

Beef liver is incredibly rich in choline, a nutrient needed for maintaining healthy cell membranes and brain function. Consuming it may increase the choline levels in your body, potentially preventing conditions associated with its deficiency.

8



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 a rich source of choline, an essential nutrient that aids in maintaining the structure of cellular membranes and plays a vital role in brain development. A regular intake of beef can prevent choline deficiency, thus preventing related disorders like liver disease, atherosclerosis, and neurological disorders.

9



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 choline, which is a crucial nutrient for brain health and overall nervous system functions. Therefore, a diet with cod can elevate choline levels in the body, potentially preventing deficiencies that could lead to neurological and liver conditions.

10



Chicken Liver

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate chicken liver into your meals 1-2 times per week, aiming for portions of about 100 grams (3.5 ounces) per serving. You can cook it by pan-frying, baking, or incorporating it into dishes like pâtés or spreads.

Description

Chicken liver is a nutrient-dense food that is rich in iron, vitamin A, and other essential nutrients. It can be a valuable addition to the diet to support healthy blood and overall nutritional health.

How it helps

Chicken liver has a high content of choline, helping to maintain the structure of cellular membranes.

11



Quinoa

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate quinoa into your diet by replacing rice or pasta with it in meals. Aim for 1-2 servings, which is about 1/2 to 1 cup cooked, 2-3 times a week to benefit from its high protein, fiber, and mineral content.

Description

Quinoa is a nutrient-rich, gluten-free grain-like seed originating from South America. It is packed with protein, fiber, B-vitamins, vitamins A, C, and E, as well as minerals like calcium phosphorus, iron, and zinc, making it a valuable addition to diets for promoting muscle health, aiding digestion, and providing essential nutrients.

[Quinoa](#) (*Chenopodium quinoa Willd*) is a flowering plant native to The Andes in South America. There, it is a **food staple for indigenous cultures** [\[R\]](#), [\[R\]](#), [\[R\]](#).

Quinoa is famous for its seeds, which are **gluten-free and high in protein**. In comparison with many grains, quinoa seeds have a greater amount of many nutrients, including [\[R\]](#), [\[R\]](#):

- Fiber
- [Fatty acids](#) (e.g., linoleic and α-linolenic acid)
- Vitamins (e.g., B1, B2, B6, C, and E)
- Minerals (e.g., calcium, phosphorus, iron, and zinc)

Quinoa seeds can be used whole or ground to a fine powder and shaped into flakes before use [\[R\]](#).

How it helps

Quinoa is a rich source of choline, which supports cell membrane integrity and helps transmit nerve impulses. Consuming quinoa can thus prevent choline deficiency which can lead to liver damage and other health issues.

12



Citicoline (CDP Choline)

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 250 to 1000 mg of citicoline (CDP choline) daily, in the morning with or without food. For best results, continue this supplement regimen daily for at least 6 weeks to 3 months.

TYPICAL STARTING DOSE
250 mg

Description

Citicoline is a compound that may have cognitive-enhancing properties and is sometimes used as a dietary supplement to support brain function and memory. It's believed to promote neural health and cognitive performance.

CDP-choline is a molecule naturally produced by the body. It is important for cell structure and function. It also contributes to the production of the chemical messenger [acetylcholine](#) [R, R].

The supplement form of CDP-choline is called [citicoline](#). It may support brain and eye health. It may also help with drug addictions [R, R].

How it helps

Citicoline is a nootropic compound that converts to choline and cytidine upon ingestion. It's used for cognitive enhancement and to possibly increase neuronal membrane phospholipid synthesis.

13



Cauliflower

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate cauliflower into your meals at least 2-3 times a week. You can consume it raw in salads, steamed as a side dish, or roasted with a drizzle of olive oil for a healthy snack or part of your main meal.

Description

Cauliflower is a nutritious vegetable high in vitamins, minerals, and fiber. It's a versatile ingredient that can be used in various dishes and may support digestive health and provide essential nutrients for overall wellness.

Cauliflower is a good source of vitamins C, K, and B6, as well as potassium, folate, manganese, with small amounts of others. A ½ cup serving provides 26 mg of vitamin C or 29%DV.

How it helps

Cauliflower provides a plant-based source of choline, which is important for many bodily functions, including brain activity.

14



Alpha-GPC Choline

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 300-600 mg of Alpha-GPC choline supplement daily, preferably in the morning or early afternoon to avoid interference with sleep. It can be taken with or without food. Continue this supplementation for at least 4-6 weeks to assess its effectiveness.

TYPICAL STARTING DOSE

300 mg

Description

Alpha-GPC (L-alpha glycerylphosphorylcholine) is a natural compound that can be found in small amounts in various foods, including soy, and is also produced in the body. It is a choline-containing compound that may support cognitive function and memory.

How it helps

Alpha-GPC is a compound that delivers choline to the brain across the blood-brain barrier. It can increase the production of acetylcholine, which is a neurotransmitter associated with memory and learning.

15



Salmon

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate at least two servings of salmon into your weekly diet, aiming for each serving to be about 3.5 ounces (100 grams), cooked. Choose wild-caught salmon when possible for higher omega-3 content.

Description

Salmon is a nutrient-rich fish known for its high content of omega-3 fatty acids, which can support heart health and reduce inflammation. It's also an excellent source of protein, vitamin D, and various minerals.

How it helps

Salmon is not only an excellent source of omega-3 fatty acids but also has a good amount of choline, which contributes to brain health.

16



Potatoes

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate potatoes into your diet 2-3 times per week, either baked, boiled, or steamed, avoiding deep-frying to minimize unhealthy fats. Aim for portion sizes of about a half to a whole medium-sized potato per serving.

Description

Potatoes are a starchy root vegetable rich in carbohydrates, molybdenum, iron, fiber, vitamin C, manganese and potassium. They provide sustained energy, and promote digestive regularity.

Potatoes are a good source for choline, as well as vitamins and minerals (mostly in the skin), including iron, vitamins C and B6, potassium, manganese, and niacin. One medium potato provides 57 mcg of choline or 10%DV.

How it helps

Potatoes are a rich source of choline, a nutrient vital for various bodily functions including nerve signaling and cell structure. Regular consumption can help prevent a choline deficiency which can lead to liver disease, heart disease, and neurological disorders.

17



Brussels Sprouts

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate brussels sprouts into your diet by eating them 2-3 times per week. They can be steamed, roasted, or sautéed and seasoned to taste, forming part of a balanced meal. Each serving should be about 1 cup, which roughly equals 5-6 medium-sized brussels sprouts.

Description

Brussels sprouts are a cruciferous vegetable packed with vitamins, fiber, and antioxidants. They are a nutritious addition to a balanced diet and may support immune health and overall well-being.

Brussels sprouts are good sources of vitamin C, vitamin K, fiber, as well as small amounts of other vitamins and minerals. A ½ cup serving provides 48 mg of vitamin C or 53%DV.

How it helps

Brussels sprouts are rich in various nutrients, including choline, which supports the development and functioning of the brain.

18



Soy

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate soy-based products such as tofu, soy milk, and edamame into your daily diet. Aim for at least one serving per day, equivalent to about a cup of soy milk, a half-cup of cooked soybeans, or a 3-ounce piece of tofu.

Description

Soy is a legume native to East Asia, and its health benefits include being a source of plant-based protein, fiber, and various vitamins and minerals. It is known for its potential to support heart health, reduce cholesterol levels, and provide essential nutrients in vegetarian and vegan diets.

Soy is a common food in many cuisines around the world, especially Asian cuisines [\[R\]](#).

It's a great source of [\[R\]](#), [\[R\]](#):

- Plant-based protein
- Fiber
- Omega-3 fats
- Antioxidants (isoflavones)

Soy-based foods include [\[R\]](#):

- Soy beverages
- Tofu
- Tempeh
- Edamame
- Miso
- Natto

Soy protein and soy isoflavones are also available as supplements.

How it helps

Eating soybeans can support choline levels since they are rich in this nutrient. Choline helps in maintaining the structural integrity of cell membranes, transmission of nerve impulses, fat transport, and metabolism, thus preventing choline deficiency.

19



Eggs

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate eggs into your diet 3-4 times a week, preferably for breakfast or as part of a balanced meal. They can be boiled, scrambled, or made into omelets, ensuring they are cooked thoroughly.

Description

Eggs are a nutrient-dense food rich in protein, vitamins, and minerals. They support various aspects of health, including muscle development, brain function, and eye health.

Eggs are great nutrition sources, with protein, healthy fats, arachidonic acid, and numerous vitamins and minerals.

How it helps

Eggs are rich in choline, a nutrient critical for brain health and nerve function. Consuming eggs can supply your body with this nutrient, helping to prevent deficiencies which might lead to neurological disorders.

20



Lecithin

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 1-2 tablespoons (7-14 grams) of lecithin granules or powder daily, or as directed on the supplement label. You can mix it with food or juice to improve palatability. For lecithin capsules or softgels, follow the dosage recommendation on the product label, typically 1-2 capsules daily with meals.

TYPICAL STARTING DOSE

7 g

Description

Lecithin is a natural emulsifier often used as a dietary supplement. It may support liver health and cognitive function due to its choline content, which is a precursor to neurotransmitters and involved in fat metabolism.

How it helps

Lecithin contains choline, which is utilized by the body to manufacture the neurotransmitter acetylcholine and to maintain cell membrane integrity.

21



Beef Heart

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate beef heart into your meals 2-3 times a week. It can be grilled, braised, or stewed. For a balanced diet, accompany it with vegetables and whole grains.

Description

Beef heart is a nutrient-dense organ meat that provides a concentrated source of essential nutrients, including iron, B vitamins, and coenzyme Q10. It is considered a nutritious food choice that can promote heart health and overall well-being when included in a balanced diet.

How it helps

Beef heart is high in choline, a nutrient that helps maintain the structural integrity of cell membranes, facilitates nerve transmissions, and aids fat metabolism in your body. Increasing your intake can assuage choline deficiency, preventing liver damage and muscle damage.

Beef heart is a good source of choline. It contains 229 mg of choline per 100 grams. Hearts from other animals may have similar nutritional profiles [\[R\]](#).

22



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 a valuable source of choline, a nutrient essential for maintaining healthy cell membranes and for nerve signaling. Regular intake can support your body's needs, potentially preventing a choline deficiency that might compromise these fundamental processes.

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.