SelfDecode™

Homocysteine

DNA Health Report

REPORT CATEGORY

HEART & BLOOD VESSELS

Sample Client

Report date: 15 January 2026

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Table of Contents

Personal information

NAME

Sample Client

SEX AT BIRTH

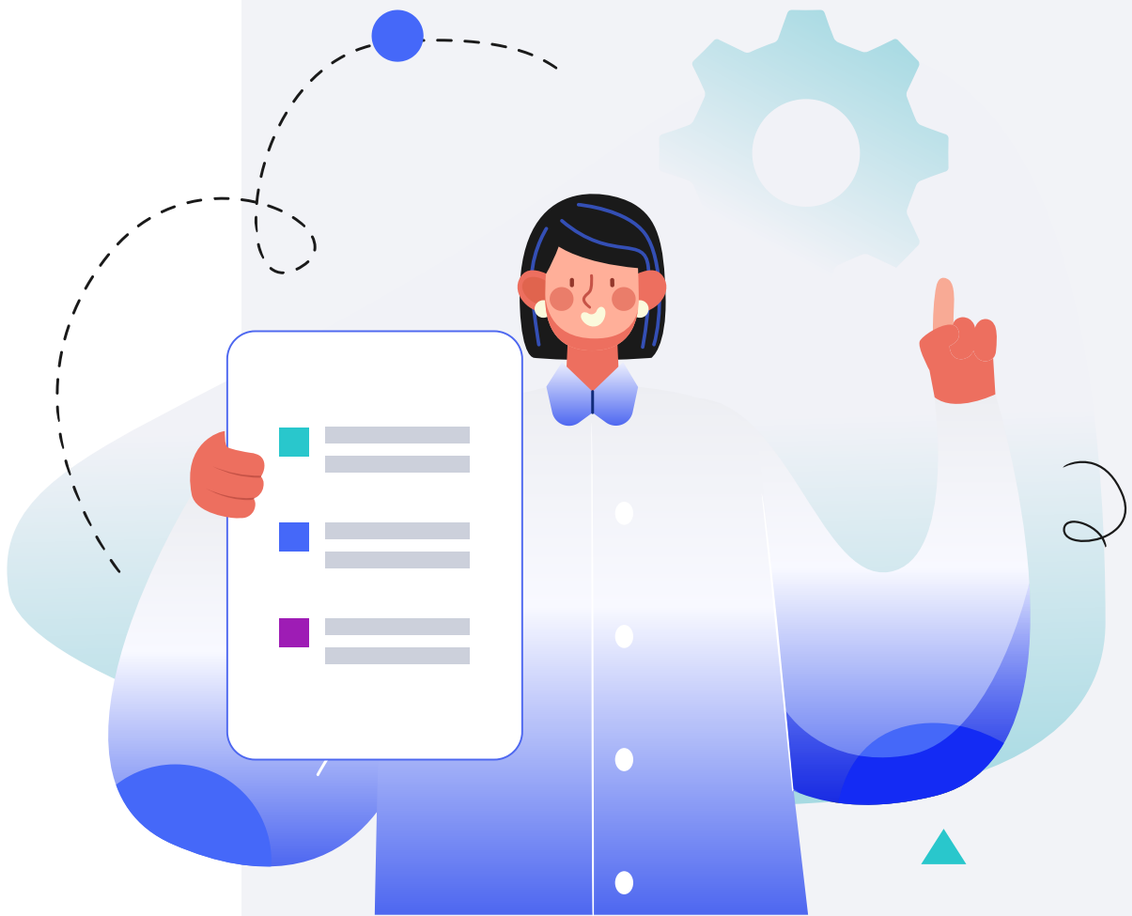
Male

HEIGHT

5ft 5" 165cm

WEIGHT

137lb 62kg

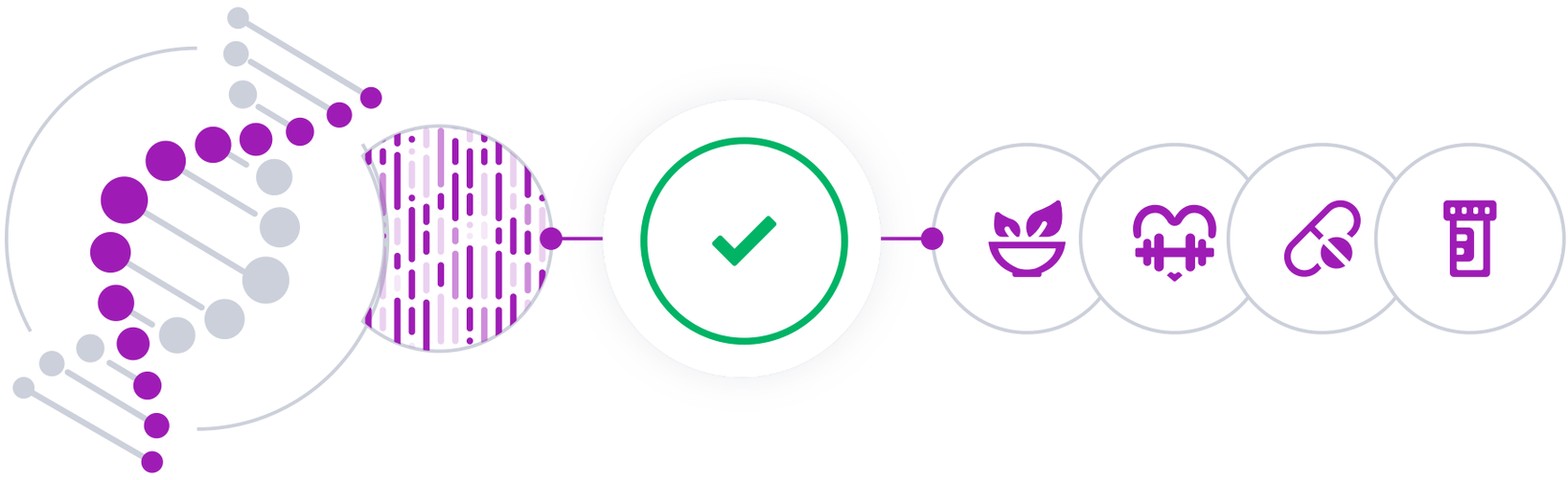


DISCLAIMER

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

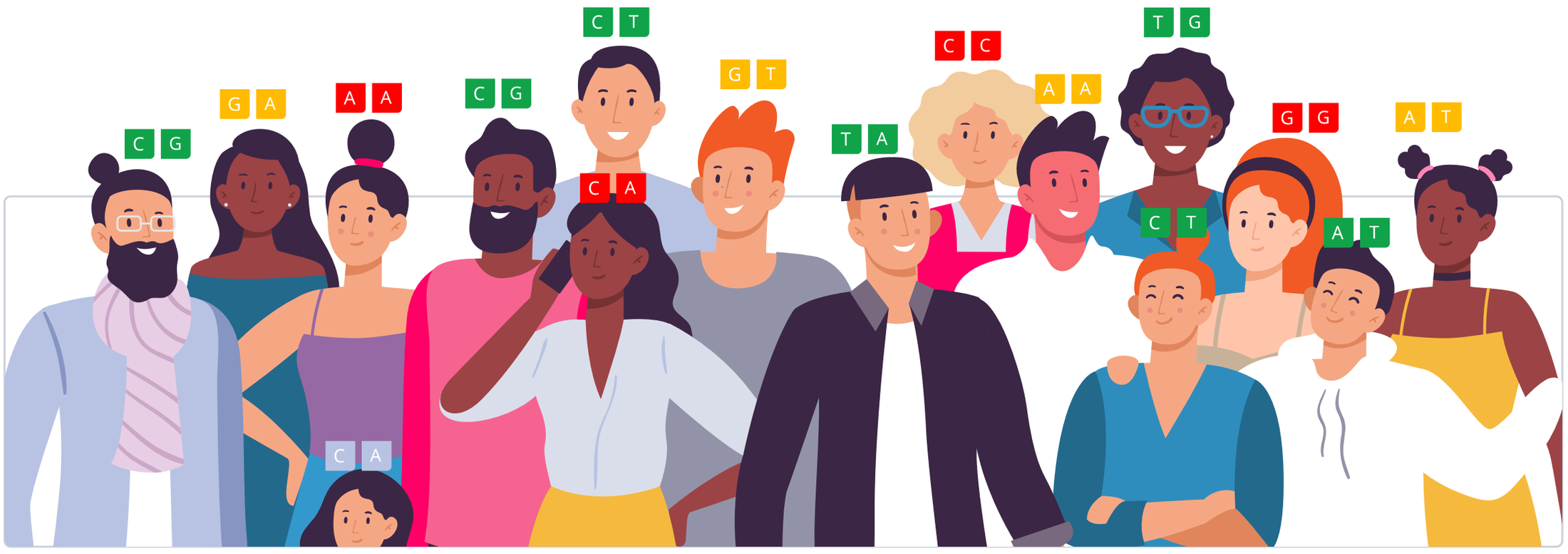
Our Wellness Reports analyze how your DNA influences your health.
We then use this analysis to give you personalized risk estimates and recommendations.



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.

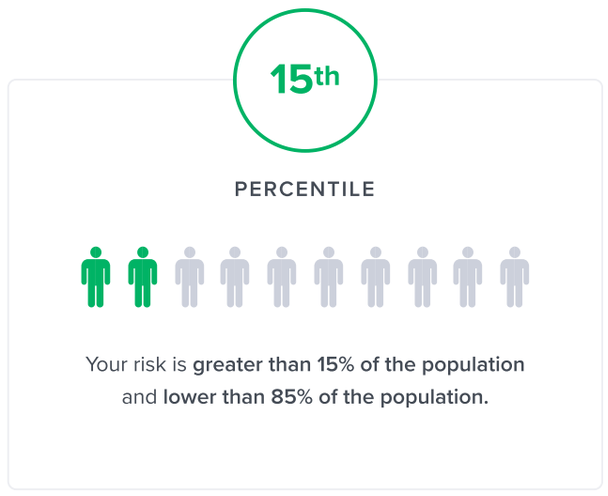
Genetic variants are parts of DNA that differ from person to person. Some can make you more vulnerable to certain health issues, while others may influence traits such as eye color.



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.

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

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



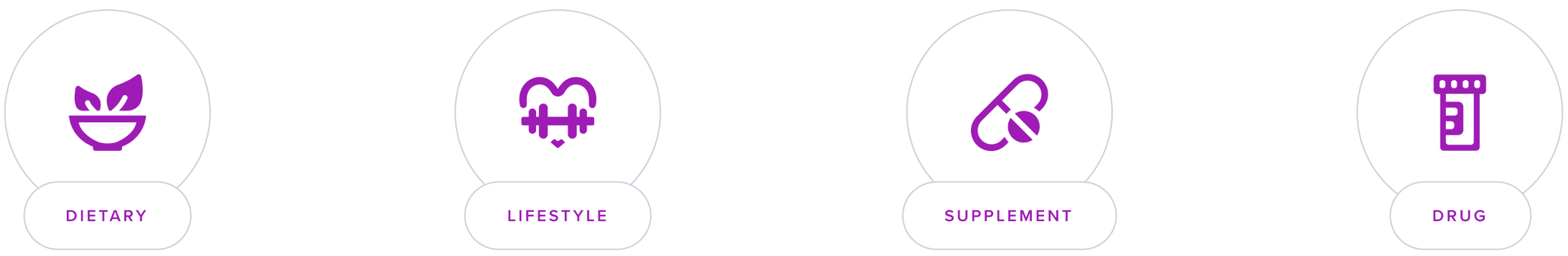
Genotype color info: AA You don't have any risk alleles | AA You have 1 risk allele | AA You have 2 risk alleles

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, afew 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

Homocysteine is a sulfur-containing amino acid that the body produces from another amino acid, methionine. It's usually found in very small amounts in your body. That's because our bodies clear it with the aid of B vitamins, namely **vitamins B12, B9 (folate), and B6** [R].

Genetically higher homocysteine levels may play a role in:

- Schizophrenia [R, R]
- Stomach cancer [R, R]
- Decreased kidney function and kidney disease [R, R]
- High cholesterol [R]
- Blood vessel problems in the brain [R, R, R, R, R]

They may also play a role in the following conditions, but the evidence is weaker:

- Blood clotting issues (venous thrombosis) [R]
- Obesity [R]
- High blood pressure [R]

On the other hand, homocysteine **may not have a causal role in heart disease** [R, R, R, R, R, R].

The link between homocysteine and conditions like diabetes, Alzheimer's disease, and stroke is still unclear [R, R, R, R, R, R].

Factors Affecting Homocysteine Levels

Key Takeaways:

- About 55% of differences in people's homocysteine levels may be due to genetics.
- High homocysteine is usually caused by the lack of vitamins B12, B9 (folate), and B6.
- People with heart disease and cognitive problems tend to have higher homocysteine.
- High homocysteine may not be a risk factor for heart disease.

Homocysteine is a metabolic byproduct linked to heart disease and cognitive decline. It's cleared out of our bodies with the aid of **vitamins B12, B9 (folate), and B6** [R].

A deficiency of vitamins B12, B9 (folate), or B6 is the most common cause of high homocysteine levels [R].

Homocysteine can also be increased by:

- Stress [R, R, R]
- Cigarette smoke [R, R]
- Alcohol [R, R]
- Certain medications [R, R, R, R, R, R, R]

About 55% of differences in people's homocysteine levels may be due to genetics. Unsurprisingly, involved genes like *MTHFR* play a role in the metabolism of folate and other B vitamins [R].

Gene variants that increase homocysteine levels may also play a role in schizophrenia and some types of cancer [R, R, R, R, R].

If you are worried about your genetic results, make sure to check your homocysteine lab marker to see your actual

HIGHER LEVELS

Predisposed to higher homocysteine levels based on 24 genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
MTRR	rs1801394	AG
MTHFR	rs1801133	AA
NOX4	rs7130284	CC
SPATA2L	rs154657	AA
MTR	rs2275565	GG
C12ORF43	rs2251468	CC
C1ORF167	rs12134663	AC
CPS1	rs1047891	AC
GTPBP10	rs42648	GG
CBS	rs234709	CT
SLC19A1	rs1051266	CT
COLEC12	rs621636	TT
TRDMT1	rs12780845	GA
MTR	rs28372871	TG
NOX4	rs957140	AG
FGF21	rs838133	AG
ZDHHC20	rs17356983	AG
CBS	rs2851391	TC
RNF175	rs2404916	GA
FANCA	rs12921383	TT
H2BC5	rs548987	GG
TCN2	rs1801198	GG
CUBN	rs1801222	GG
MMUT	rs9369898	GG
AKR1A1	rs4660306	CC
SYT6	rs79079833	TT
CSMD1	rs17394429	GG
TAFA5	rs13054085	GG
EDNRA	rs1429107	GG
NOX4	rs10830265	GG

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

levels. It may also be a good idea to check your genetics and levels of folate and other B vitamins.

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
1	Methylfolate	400 mcg
2	Dietary B Vitamins	
3	Vitamin B12	10 mcg
4	Strength Training	1 hour
5	Omega-3 (Fish Oil)	500 mg
6	Betaine (TMG)	500 mg
7	Zinc	10 mg
8	Limit Caffeine Intake	
9	Kefir	
10	Probiotics	10 billion
11	N-acetylcysteine (NAC)	600 mg
12	Riboflavin (Vitamin B2)	25 mg
13	Maintain Optimal Vitamin D Levels	1000 iu
14	Lactobacillus Acidophilus	10 billion CFU
15	Avoid Long Naps	
16	Genistein	30 mg
17	Avoid Secondhand Smoke	
18	Relaxation Techniques	30 minutes
19	Methylsulfonylmethane (MSM)	1 g
20	Taurine	500 mg
21	Leafy Green Vegetables	
22	Dietary Folate	
23	Beef liver	
24	Avoid Air Pollution	
25	Limit Coffee Intake	
26	Folinic Acid	
27	Lactobacillus Plantarum	10 billion CFU
28	Choline Supplements	425 mg
29	Bifidobacterium Longum	10 billion CFU
30	Lentils	
31	Cranberry	
32	Boron	3 mg

33	Tyrosol	10 mg
34	Creatine	2 g
35	Bifidobacterium Animalis Subsp. Lactis	10 billion CFU
36	Curcumin	500 mg
37	Fruits And Vegetables	
38	Dietary Vitamin B12	
39	Yoga	30 minutes
40	Dietary Beta-Carotene	
41	Phosphatidylcholine	420 mg
42	L-Serine	500 mg
43	Pyridoxine (Vitamin B6)	50 mg

1

Methylfolate

IMPACT 5 / 5

EVIDENCE 5 / 5

How to implement

Take an L-methyl folate supplement (400-800 micrograms daily), ideally with a meal, to improve absorption. This dosage is recommended for adults, including pregnant women, to support overall health, especially to reduce the risk of neural tube defects in developing fetuses. Continue daily use as part of your regular supplement routine.

TYPICAL STARTING DOSE

400 mcg

Description

Folate, a B-vitamin, is crucial for DNA synthesis, cell growth, and the formation of red blood cells. Adequate folate intake supports overall health and reduces the risk of neural tube defects during pregnancy.

Vitamin B9 (*folate*) plays an essential role in [R, R, R]:

- Making DNA
- Metabolism
- Energy production

SelfDecode recommends L-methylfolate as the preferred folate supplement for those who need one. It is superior to folic acid because it doesn't require activation, but the research is still ongoing [R, R].

How it helps

Increasing folate intake may lower homocysteine levels [R].

Supplementation with folate (0.5-1 mg/day), both alone and combined with vitamin B12, may lower homocysteine levels in healthy people, those at risk of heart disease or cognitive decline, and patients with type 2 diabetes. A dose of 0.8 mg/day may be most effective [R, R, R, R, R, R, R].

The combination of folate, vitamin B12, vitamin B6, and omega-3 fatty acids may further lower homocysteine levels [R].

B vitamins are required for the enzymes that break down homocysteine to work [R].

Please note: *You shouldn't consume more than 1,000 micrograms of folate from supplements per day* [R].

PERSONALIZED TO YOUR GENES

People with your *MTHFR* gene variant may have slightly lower folate and homocysteine levels. Take special care to get enough folate. Vitamins B12 and B6 may also be crucial for reducing homocysteine in people with this variant [R, R, R, R, R].

Some resources recommend supplementing with the "active" form, methylfolate, but the research behind it is preliminary [R, R].

YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
MTHFR	**rs1801133**	AA	

2

Dietary B Vitamins

IMPACT 5 / 5

EVIDENCE 5 / 5

How to implement

Incorporate foods rich in B vitamins like whole grains, meat, eggs, dairy products, leafy green vegetables, beans, peas, and nuts into your daily meals. For a balanced intake, aim to include at least one serving of a B vitamin-rich food in each meal throughout the day.

Description

B-vitamins are a group of water-soluble vitamins that play essential roles in metabolism, energy production, and overall health. They include B1 (thiamine), B2 (riboflavin), B3 (niacin), B5 (pantothenic acid), B6 (pyridoxine), B7 (biotin), B9 (folate), and B12 (cobalamin).

B vitamins help the body function properly. Three examples are **vitamin B9** (**folate**), **vitamin B12**, and **vitamin B6**. They play essential roles in heart, brain, and kidney health [R, R, R, R].

You can get these vitamins from [R, R, R]:

- Animal products
- Green leafy vegetables
- Fortified foods
- Supplements

Every day, adults should be getting [R]:

- **Folate:** 400 mcg
- **Vitamin B12**: 2.4 mcg
- **Vitamin B6**: 1.7 mg

Folic acid is a form of folate found in most supplements [R].

Folate deficiency is rare but can happen in people that don't eat enough fruits and vegetables. Alcoholics and lactating mothers may also be at an increased risk [R].

Vitamin B12 deficiency often takes years to develop, as the body is able to store large amounts in the liver. Groups that may be at an increased risk include [R, R]:

- Vegans
- Pregnant women
- Older people
- People with gut issues

People with kidney problems or gut issues may be at increased risk of vitamin B6 deficiency [R].

How it helps

High dietary intake of vitamin B12 and folate is associated with lower homocysteine levels [R, R].

Supplementation with folate (0.5-1 mg/day) and vitamin B12 (0.5 mg/day) may lower homocysteine levels. It may work in healthy people, those at risk of heart disease or cognitive decline, and type 2 diabetic patients [R, R, R, R, R, R, R].

The combination of folate, vitamin B12, vitamin B6, and omega-3 fatty acids may further lower homocysteine levels [R].

B vitamins are required for the enzymes that break down homocysteine to work [R].

PERSONALIZED TO YOUR GENES

People with your *MTHFR* gene variant may have slightly lower folate and homocysteine levels. Take special care to get enough folate. Vitamins B12 and B6 may also be crucial for reducing homocysteine in people with this variant [R, R, R, R, R].

Some resources recommend supplementing with the "active" form, methylfolate, but the research behind it is preliminary [R, R].

YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
MTHFR	**rs1801133**	AA	●●●●●

3

Vitamin B12

IMPACT 5 / 5

EVIDENCE 4 / 5

How to implement

Take a 50 mcg vitamin B12 supplement daily, preferably with a meal to enhance absorption.

TYPICAL STARTING DOSE

10 mcg

Description

Vitamin B12 is a water-soluble vitamin primarily found in animal-based foods like meat, fish, and dairy products. It plays a crucial role in maintaining healthy nerve cells, DNA synthesis, and red blood cell formation. Vitamin B12 deficiency can lead to anemia, neurological issues, and fatigue.

Vitamin B12 is important for [R, R]:

- Building DNA
- Nervous system function
- Energy production

You can get vitamin B12 from [R]:

- Animal products (meat, fish, eggs, and dairy)
- Fortified foods
- Supplements

Adults should be getting **2.4 micrograms** of vitamin B12 every day [R].

How it helps

People with high vitamin B12 levels may have lower homocysteine [R].

Supplementation with vitamin B12 (1 mg/day) may lower homocysteine levels in older people [R, R, R].

In people supplementing with folate, taking vitamin B12 (0.5 mg/day), may further lower homocysteine levels. The combination may work in healthy people and those at risk of dementia or heart disease [R, R, R, R, R].

The combination of folate, vitamin B12, vitamin B6, and omega-3 fatty acids may further lower homocysteine levels [R].

B vitamins are required for the enzymes that break down homocysteine to work [R].

Please note: *B12 may interact with certain medications, including tetracycline. If you have Leber's disease please consult your doctor before supplementing with B12.*

PERSONALIZED TO YOUR GENES

Low vitamin B12 levels may have a stronger impact on homocysteine in people with your *MTHFR* gene variant [R].

YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
MTHFR	**rs1801133**	AA	●●●○○

4

Strength Training

IMPACT 4 / 5

EVIDENCE 3 / 5

How to implement

Engage in strength training exercises, such as weight lifting or bodyweight exercises, for 60 minutes per session, 2 to 3 times per week. Ensure you work all major muscle groups and rest each muscle group for at least 48 hours before exercising it again.

TYPICAL STARTING DOSE

1 hour

Description

Strength training, also called resistance or *anaerobic* training, contracts the muscles against an external resistance for short periods of time. This helps gain muscle strength, tone, and mass. This can include activities like weight lifting, pushups, and crunches.

Strength training, also known as resistance training, is a type of physical exercise that uses resistance to build strength, anaerobic endurance, and size [R]. Some of the most common strength training methods include [R]:

- Weight lifting
- Bodyweight exercises like push-ups, pull-ups, squats, and lunges.
- Resistance bands
- Plyometrics or explosive force exercises

The benefits of strength training are numerous, and include [R]:

- Increased muscle strength
- Improved bone health
- Reduced risk of injury
- Improved balance and coordination
- Enhanced mood
- Boost metabolism

Consult with a doctor before starting any new exercise program, especially if you have any health conditions.

How it helps

Acute exercise may slightly increase homocysteine levels in the short term. In contrast, **regular strength (but not cardio) training may lower homocysteine levels in the long term** [R, R].

PERSONALIZED TO YOUR GENES

Regular moderate exercise may reduce homocysteine levels in people with your *MTHFR* gene variant. Keep in mind that vigorous exercise may have opposite effects [R].

YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
MTHFR	**rs1801133**	AA	

5

Omega-3 (Fish Oil)

IMPACT 3 / 5

EVIDENCE 3 / 5

How to implement

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

TYPICAL STARTING DOSE

500 mg

Description

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

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

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

Fatty fish are rich in EPA and DHA. They include [R]:

- Salmon
- Tuna
- Herring
- Sardines

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

How it helps

Supplementing with omega-3s (3-6 g/day for 12-48 weeks) may lower homocysteine levels, especially in people with high baseline levels [R, R].

Combining omega-3s (0.2-6 g/day) with folate, vitamin B6, and vitamin B12 may be more effective [R].

However, omega-3s may not lower homocysteine levels in people with end-stage kidney disease [R].

6

Betaine (TMG)

IMPACT 3 / 5

EVIDENCE 3 / 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

Betaine (TMG) helps by donating a molecule known as a methyl group to homocysteine, converting it into a harmless substance called methionine. This process helps lower elevated homocysteine levels, reducing the associated risk of heart disease and stroke.

Betaine supplementation has been studied for its effects on homocysteine levels [R, R, R, R]:

1. Meta-analysis: Betaine (≥4 g/day) reduced homocysteine levels but increased total cholesterol and LDL cholesterol. Lower doses (4 g/day) seemed to lower homocysteine without adverse lipid effects.
2. Patients with pyridoxine-non-responsive homocystinuria: Oral betaine (3 g, 2x/day for 1 year) reduced homocysteine levels without adverse effects.
3. Children with specific deficiencies: Betaine reduced total plasma homocysteine, with a threshold at 100 mg/kg/day. Higher doses were beneficial in cobalamin C deficiency but potentially harmful in cystathionine beta-synthase deficiency.
4. Adults with hyperhomocysteinemia: Betaine (1g/day) combined with low-dose B vitamins reduced plasma homocysteine concentrations.

In summary, betaine can lower homocysteine levels, but its impact on lipids, optimal dosages, and patient-specific considerations vary across studies and conditions.

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].

PERSONALIZED TO YOUR GENES

Your MTRR gene variant may be linked to impaired methylation and higher homocysteine levels. People with this variant might not produce enough betaine from choline and may thus need more dietary betaine [R, R, R, R].
A BHMT enzyme uses betaine to metabolize homocysteine. Your *BHMT* gene variant may be linked to impaired methylation and higher homocysteine levels. People with this variant may benefit from increasing betaine intake [R, R, R].

YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
MTRR	**rs1801394**	AG	●●●○○
BHMT	**rs3733890**	AG	●●○○○

7

Zinc

IMPACT 3 / 5

EVIDENCE 2 / 5

How to implement

Take a 15 mg zinc supplement daily, ideally with a meal to enhance absorption.

TYPICAL STARTING DOSE

10 mg

Description

Zinc is an essential mineral found in various foods, including meat, dairy, and nuts. It is crucial for immune function, wound healing, DNA synthesis, and maintaining healthy skin and nails. Zinc supplements are sometimes used to support immune health and manage zinc deficiencies.

Zinc is an essential mineral. Your body needs it to [R, R]:

- Defend against disease
- Protect DNA from damage
- Heal wounds
- Control blood sugar

Some of the best sources of zinc include **shellfish, pork, beef, and beans**. It is also available as a supplement [R].

Adults should get **8-11 mg of zinc** per day [R].

How it helps

Supplementation with zinc (30-40 mg/day for 6-12 weeks) may lower homocysteine levels [R, R, R].

In children, a lower dose (15 mg/day) may work [R].

In contrast, zinc may be ineffective in healthy older people [R].

Please note: *A high intake of zinc may cause stomach pain and gut irritation. Adults should not ingest more than **40 mg** of zinc per day* [R, R].

8

Limit Caffeine Intake

IMPACT 3 / 5

EVIDENCE 2 / 5

How to implement

Limit your caffeine consumption to less than 200 milligrams per day, equivalent to about two 6-ounce cups of coffee. Aim to avoid caffeine-containing foods and beverages such as tea, chocolate, and some soft drinks, especially in the late afternoon and evening to minimize sleep disturbances.

Description

Although caffeine is the world's most popular stimulant, some people choose to limit or avoid it due to potential adverse effects on their sleep, mood, or blood pressure.

How it helps

People who drink a lot of coffee (over 500 mL/day) may have higher homocysteine levels, especially if they also smoke [R, R, R, R, R, R].

Similarly, black tea may slightly increase homocysteine levels in the short term [R].

In heavy coffee drinkers (at least 4 cups/day), giving it up for 6 weeks may lower homocysteine levels [R].

Caffeine may increase homocysteine levels by interfering with vitamin B6 metabolism [R].

PERSONALIZED TO YOUR GENES

Coffee may increase homocysteine more in people with your *MTHFR* gene variant. Folic acid supplementation (200 mcg) may reduce the negative impact of coffee [R].

YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
MTHFR	**rs1801133**	AA	

9

Kefir

IMPACT 3 / 5

EVIDENCE 2 / 5

How to implement

Incorporate kefir into your daily diet by drinking approximately 1-2 cups (240-480 ml) per day. It can be consumed on its own, blended into smoothies, or used as a base for salad dressings or soups. Continuous consumption over several weeks is recommended to observe its health benefits.

Description

Kefir is a fermented dairy product packed with probiotics, which can promote gut health and support digestion. Regular consumption of kefir is associated with improved digestive function and may enhance the immune system.

How it helps

Kefir, being rich in vitamins like B6, B12, and folic acid, can assist in lowering homocysteine levels as these nutrients help convert homocysteine into other beneficial molecules. Additionally, its probiotic content supports better digestion and nutrient absorption, helping overall health.

Consuming kefir (2x/week) attenuated the increase in CRP observed over the course of a 15-week endurance training in a trial of 67 adults. In a non-placebo-controlled trial of 62 participants with metabolic syndrome, consuming kefir (180 mL/day for 12 weeks) decreased TNF-alpha, IL-6, IL-10, IFN-gamma, and homocysteine levels. Consuming kefir (400 mL/day for 4 weeks) also lowered CRP in a non-placebo-controlled trial of 45 IBD patients [R, R, R].

10

Probiotics

IMPACT 3 / 5

EVIDENCE 2 / 5

How to implement

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

TYPICAL STARTING DOSE

10 billion

Description

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

Probiotic bacteria are "good" bacteria found mainly in the large intestine. They support your body and mind by [R, R, R, R, R, R, R, R]:

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

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

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

- Oligo-fructose
- Oligo-galactose
- Inulin

Mixtures of probiotics and prebiotics are known as **synbiotics** [R].

How it helps

Supplementation with probiotic mixes may lower homocysteine levels. Tested strains include [R, R, R]:

- *Bifidobacterium longum*
- *B. breve*
- *B. bifidum*
- *B. animalis*
- *Lactobacillus acidophilus*
- *L. delbrueckii*
- *L. paracasei*
- *L. plantarum*
- *L. brevis*
- *L. casei*
- *L. salivarius*
- *Streptococcus thermophilus*
- *Lactococcus lactis*

Similarly, milk or kefir fermented with some of the above probiotics may lower homocysteine levels [R, R, R, R].

11

N-acetylcysteine (NAC)

IMPACT 2 / 5

EVIDENCE 3 / 5

How to implement

Take 600 mg of N-Acetylcysteine (NAC) supplement daily with water. It can be taken at any time of the day, but try to take it at the same time each day for best results.

TYPICAL STARTING DOSE

600 mg

Description

NAC is a supplement that contains a form of the amino acid cysteine, a protein building block that your body uses to make the antioxidant glutathione. It is used for its potential antioxidant properties and its ability to support lung, gut, and mental health.

N-acetylcysteine (NAC) is converted to cysteine in the body. Cysteine is a protein building block (amino acid) that helps make the antioxidant glutathione [R].

People take NAC to potentially support [R, R]:

- Mental health
- Ovarian health and pregnancy outcomes
- Lung health
- Gut health

How it helps

Supplementation with NAC (600-1800 mg/day for 4-8 weeks) may lower homocysteine levels [R].

The antioxidant activity of NAC may both lower homocysteine levels and reduce its harmful effects [R].

A meta-analysis of 28 studies concluded that supplementation with NAC **lowers homocysteine (by 1.45 pg/mL), IL-8 (by 2.56 pg/mL), and MDA (by 1.44 µmol/L), and TNF-α and IL-6 after sensitivity analysis** [R].

In a placebo-controlled trial of 60 patients with end-stage renal failure, infusion with NAC during a 4-hour hemodialysis session **lowered homocysteine by 23.7%**. However, oral NAC supplementation (1200 mg, 2x/day for 4 weeks) **failed to lower homocysteine** in a placebo-controlled trial of 38 hemodialysis patients [R, R].

In a non-placebo-controlled trial of 171 workers exposed to lead, supplementation with NAC (200-800 mg/day) for 12 weeks **decreased homocysteine and oxidative damage** [R, R].

12

Riboflavin (Vitamin B2)

IMPACT 2 / 5

EVIDENCE 3 / 5

How to implement

Take a riboflavin (vitamin B2) supplement daily, with a dose ranging from 5mg to 400mg, depending on the specific health concern or advice from a healthcare provider. Swallow the supplement with water, preferably with a meal to enhance absorption. This regimen can be continued long-term or as directed by a healthcare professional.

TYPICAL STARTING DOSE

25 mg

Description

Riboflavin is a water-soluble B vitamin found in various foods like dairy products, leafy greens, and lean meats. It plays a crucial role in energy production, metabolism, building red blood cells, and maintaining healthy skin and eyes.

Vitamin B2 helps our cells create energy. It's also known as riboflavin [R, R].

This vitamin is important for [R, R]:

- Brain, liver, and gut health
- Building red blood cells

Riboflavin deficiency is rare in the US. People with gut, eating, or hormonal disorders may be at a higher risk. Alcohol abuse and certain medications can also deplete this vitamin [R, R].

Good sources of riboflavin include [R, R]:

- Eggs
- Dairy
- Lean and organ meats
- Green vegetables
- Fortified cereals

How it helps

Riboflavin helps in the activation of vitamin B6, which is essential for the conversion of homocysteine into cysteine, hence reducing its levels. Therefore, riboflavin supplementation could potentially assist in preventing abnormally high levels of homocysteine, avoiding related conditions such as heart disease and stroke.

In a placebo-controlled trial of 42 older participants, supplementation with riboflavin (10 mg/day) for 28 days **significantly decreased blood homocysteine** [R].

However, supplementation with riboflavin (8.4 mg/day) for 2 weeks **failed to lower homocysteine and blunted the effects of folic acid supplementation** in a placebo-controlled trial of 32 healthy men [R].

Riboflavin (1.6 mg/day for 12 weeks) also **failed to lower homocysteine** in a placebo-controlled trial of 52 elderly participants with sub-optimal riboflavin status [R].

The beneficial effects of riboflavin on homocysteine might be limited to people with **lower MTHFR activity** [R, R, R, R].

PERSONALIZED TO YOUR GENES

Supplementing with riboflavin may lower homocysteine levels more in people with your *MTHFR* gene variant [R, R, R, R, R, R].

YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
MTHFR	**rs1801133**	AA	

13

Maintain Optimal Vitamin D Levels

IMPACT 2 / 5

EVIDENCE 2 / 5

How to implement

Check your vitamin D levels, they should ideally be in the 30-66 ng/mL range. If your levels are lower than that, take a vitamin D supplement, 1000-4000 IU daily, to reach an optimal range.

TYPICAL STARTING DOSE

1000 iu

Description

Vitamin D, often referred to as the "sunshine vitamin," can be synthesized by the skin when exposed to sunlight, as well as being found in fish, eggs, and fortified milk. It helps regulate calcium absorption, promoting strong bones and a healthy immune system. Vitamin D deficiency can lead to conditions like rickets in children and osteoporosis in adults.

Your body needs vitamin D for strong bones. Vitamin D also plays a role in [R]:

- Mood
- Immunity
- Heart health
- Blood sugar control

Sunlight is our main source of vitamin D. Experts recommend getting at least **5-15 minutes of midday sun, 2-3 times per week**. People with darker skin and those living at high latitudes may need longer periods of sun exposure [R, R].

Foods like fish, eggs, and fortified milk provide small amounts of vitamin D. **People lacking vitamin D should consider taking a supplement** [R].

How it helps

Low vitamin D levels may increase the risk of elevated homocysteine levels. In line with this, vitamin D sufficiency may be protective [R, R].

Supplementation with vitamin D (up to 4,000 IU/day or 28,000 IU/week) may lower homocysteine levels [R, R, R].

Vitamin D may also help in combination with exercise [R].

Please note: *Experts recommend getting 600-800 IU of vitamin D per day. Medical bodies recommend against taking more than 4,000 IU per day* [R].

14

Lactobacillus Acidophilus

IMPACT 2 / 5

EVIDENCE 2 / 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

Consuming yogurt with *Lactobacillus acidophilus* (La1, 10^12 CFU/day) for 42 days may lower homocysteine levels in children [R].

On the other hand, kefir enriched with *L. acidophilus*, *L. casei*, *Bifidobacterium animalis*, and *Streptococcus thermophilus* may lower homocysteine in people with type 2 diabetes [R].

A probiotic mix with *Lactobacillus acidophilus*, *L. delbrueckii*, *L. paracasei*, *L. plantarum*, *B. longum*, *B. breve*, and *S. thermophilus* strains (2 capsules/day for 8 weeks) may lower homocysteine in elderly people [R].

Another mix combining *L. acidophilus* with *B. bifidum*, *B. animalis*, *L. brevis*, *L. casei*, *L. salivarius*, and *Lactococcus lactis* (containing 2.5 × 10^9 CFU/g) may have the same effect in obese women [R].

**CFU (colony forming units) = the number of active bacteria in one probiotic serving*

15

Avoid Long Naps

IMPACT 2 / 5

EVIDENCE 2 / 5

How to implement

Limit your daily naps to 20-30 minutes. Try to nap before 3 pm to avoid interfering with nighttime sleep.

Description

Limiting long naps during the day can help improve nighttime sleep quality and reduce the risk of sleep disturbances. Shorter naps are generally more beneficial for enhancing daytime alertness without interfering with nighttime rest.

How it helps

A study involving 15,126 people revealed that extended midday napping (more than 90 minutes) may be associated with higher homocysteine levels compared to shorter naps (1-30 minutes). People who sleep long (more than 9 hours) and nap long may have even higher homocysteine levels [R].

16

Genistein

IMPACT 2 / 5

EVIDENCE 2 / 5

How to implement

Take a genistein supplement daily, with a usual dosage range between 30 mg to 100 mg. It is best taken with food to enhance absorption. Continue this regimen daily for at least six months to evaluate its benefits fully.

TYPICAL STARTING DOSE

30 mg

Description

Genistein is an isoflavone found in soy products that may offer potential health benefits, including antioxidant and anti-inflammatory properties. It has been studied for its potential role in hormone regulation and the reduction of certain cancer risks.

How it helps

A meta-analysis of 8 trials found that genistein was effective in reducing plasma levels of homocysteine (by 0.58 µmol/L) [R].

Genistein can encourage enzymes that break down homocysteine, therefore reducing its levels.

17

Avoid Secondhand Smoke

IMPACT 2 / 5

EVIDENCE 2 / 5

How to implement

Implementing a smoke-free lifestyle involves communicating your needs to family, friends, and coworkers, requesting they respect your choice by smoking away from you. At home, establish strict no-smoking policies indoors. When out, choose smoke-free venues and accommodations. Advocate for smoke-free environments in your community and support legislation that promotes public health by reducing exposure to secondhand smoke. Utilize air purifiers at home to reduce any residual particles.

Description

Avoiding secondhand smoke is crucial for maintaining good health. Exposure to secondhand smoke can lead to respiratory problems, cardiovascular disease, and an increased risk of lung cancer, even in non-smokers. Protecting oneself from secondhand smoke involves staying away from smoking areas, ensuring smoke-free environments at home and work, and advocating for smoke-free policies in public spaces.

How it helps

Smokers may have higher homocysteine levels, especially heavy smokers or those smoking for longer periods [R, R, R, R, R, R, R, R].

Secondhand exposure to cigarette smoke may also increase homocysteine levels, especially when combined with air pollution exposure [R, R, R, R].

Giving up smoking may lower homocysteine levels. However, simply smoking less may be ineffective [R].

18

Relaxation Techniques

IMPACT 2 / 5

EVIDENCE 2 / 5

How to implement

Incorporate relaxation techniques such as deep breathing exercises, meditation, or yoga into your daily routine. Spend at least 15-30 minutes each day practicing one of these techniques, preferably in a quiet, comfortable space without interruptions.

TYPICAL STARTING DOSE

30 minutes

Description

Relaxation techniques encompass various methods like deep breathing, yoga, meditation, and progressive muscle relaxation, aimed at reducing stress and promoting mental and physical relaxation. Practicing these techniques regularly can help manage stress, improve mental clarity, and enhance overall emotional well-being.

We all get stressed from time to time.

Stress can help you deal with a challenge or avoid danger. However, **it's not healthy to be stressed for a long time** [R, R].

Relaxation techniques such as yoga and meditation can relieve stress in different ways. Most of them focus on breathing and help you get rid of negative thoughts and emotions [R].

People use relaxation techniques to improve conditions like [R, R, R]:

- Anxiety
- Depression
- Chronic pain

Progressive muscle relaxation is another relaxation technique. In this technique, you focus on tensing and relaxing different parts of your body. It is common to start with the toes and slowly work your way up to the neck and head [R, R].

Autogenic training is a relaxation technique that a person may carry out on their own. It uses exercises that take the mind's attention to bodily sensations such as warmth and heaviness [R, R].

How it helps

Stress may increase homocysteine levels, especially in older people [R, R, R, R, R].

Relaxation techniques such as yoga may lower homocysteine by reducing stress [R].

19

Methylsulfonylmethane (MSM)

IMPACT 2 / 5

EVIDENCE 1 / 5

How to implement

Take 1 to 3 grams of Methylsulfonylmethane (MSM) per day, divided into three doses. This can be in the form of capsules or powder that is mixed with water. It is recommended to start with a lower dose to assess tolerance, then gradually increase to the desired dose over a period of 1 to 2 weeks.

TYPICAL STARTING DOSE

1 g

Description

MSM is a naturally occurring sulfur compound found in foods and used in dietary supplements. It has anti-inflammatory properties and may be used to support joint health and reduce exercise-related muscle soreness.

A molecule of MSM is broken down in the body into a sulfate (sulfur) group and two methyl groups.

The following may increase people's needs for sulfur and methyl groups: physical activity, recovery from injuries, inflammation, infections/sickness, toxins, etc.

People also need more sulfur when taking hormones (DHEA, pregnenolone, etc.), drugs (Aspirin, Tylenol, NSAIDs, birth control, etc.) or supplements (flavonoids & polyphenols - resveratrol, quercetin, curcumin, etc.) that undergo sulfation.

How it helps

Fifty men and women, 40–76 years of age with knee OA pain were enrolled in an outpatient medical center. Intervention was MSM 3g or placebo twice a day for 12 weeks (6 g/day total). Homocysteine significantly decreased from 8 to 7.2 µmol/L [R].

In another study, eight healthy men were randomly assigned to consume either 1.5 grams or 3.0 grams of MSM per day for 30 days. Before and after the intervention period, the men performed a knee extension exercise to induce muscle damage. Homocysteine decreased following exercise for both dosages [R].

20

Taurine

IMPACT 2 / 5

EVIDENCE 1 / 5

How to implement

Take 1-4 g of taurine supplement daily, divided into two or three doses with meals for optimal absorption. It can be taken continuously, with periodic evaluations of its effects and benefits.

TYPICAL STARTING DOSE

500 mg

Description

Taurine is an amino acid found in various foods and often used in energy drinks and supplements. It plays a role in neurological and cardiovascular health and can help support energy metabolism.

Taurine is the most abundant free amino acid in humans. It's not essential, which means we can produce it. We can also get it from protein-rich foods, such as [R]:

- Seafood
- Meat
- Dairy

Taurine is a popular additive in energy drinks and can also be taken as a supplement [R].

Taurine plays an important role in [R, R]:

- Bile production
- Calcium metabolism

It is also well-known for its antioxidant and anti-inflammatory properties [R].

How it helps

Taurine supplementation in middle-aged Korean women showed a significant decrease in plasma homocysteine levels, suggesting taurine's potential in modulating homocysteine levels and cardiovascular disease risk. 3g reduced homocysteine by 11% [R].

Another study involved 14 patients with pyridoxine-nonresponsive CBS deficiency and high homocysteine levels. Taurine treatment (75 mg/kg twice daily) was safe and showed rapid pharmacokinetics. While oxidative stress and inflammatory parameters were generally normal, taurine significantly improved endothelial function in patients with preexisting reduced function, particularly in those with low baseline flow-mediated dilation (FMD) and high homocysteine levels [R].

21

Leafy Green Vegetables

IMPACT 2 / 5

EVIDENCE 1 / 5

How to implement

Incorporate at least one serving of leafy green vegetables, such as spinach, kale, or Swiss chard, into your diet daily. This can be done by adding them to salads, smoothies, or as a side dish to your meals.

Description

Leafy green vegetables like spinach and kale are packed with vitamins, minerals, and antioxidants. Incorporating them into your diet can promote overall health by providing essential nutrients, supporting digestion, and reducing the risk of chronic diseases like heart disease and certain cancers.

Leafy green vegetables, also called leafy greens, or greens, are edible plant leaves, which can include stalks and shoots as well. Common examples include: lettuce, spinach, kale, chard, endive, and fennel.

Leafy greens contain a host of vitamins and minerals, as well as fiber. Most of them are a particularly good source of vitamin K.

How it helps

Insufficient intake of rich sources of folate, such as green leafy vegetables, can cause folate deficiency, which may lead to high homocysteine levels [R].

According to a study involving 4,507 Chinese adults, consumption of fruits and vegetables may decrease homocysteine levels, especially in women. This benefit may stem from an increase in dietary folate [R, R, R].

22

Dietary Folate

IMPACT 2 / 5

EVIDENCE 1 / 5

How to implement

Increase your intake of folate-rich foods such as leafy green vegetables, fruits, nuts, and legumes. Aim to consume these foods daily, incorporating them into various meals throughout the day to meet the recommended dietary allowance of 400 micrograms for adults.

Description

Vitamin B9 (*folate*) plays an essential role in [R, R, R]:

- Making DNA
- Metabolism
- Energy production

Rich sources of folate include [R, R]:

- Beef liver
- Spinach
- Black-eyed peas
- Asparagus
- Citrus fruits

While folate deficiency is rare, it can happen in people who don't eat enough fruits and vegetables. Alcoholics and lactating women may also be at increased risk [R].

Adults should get **400 micrograms (mcg)** of folate per day. Pregnant or breastfeeding women should get **500-600 mcg per day**. Supplements are usually in the form of *folic acid* or L-methylfolate (5-MTHF) [R, R].

How it helps

Intake of folate-rich foods, such as citric fruits and vegetables (containing approximately 560 ug/day of folate for 4 weeks), may decrease homocysteine levels. According to a study, consuming fruits and vegetables concentrate capsules may also help [R, R].

23

Beef liver

IMPACT 2 / 5

EVIDENCE 0 / 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

High homocysteine levels may be due to dietary deficiency of vitamin B12. People who follow a vegetarian or vegan diet may be at a greater risk [R, R].

Beef liver is rich in vitamin B12, which is crucial for converting homocysteine into methionine, thereby preventing an accumulation of homocysteine [R, R].

24

Avoid Air Pollution

IMPACT 1 / 5

EVIDENCE 2 / 5

How to implement

Stay indoors on days when air quality indexes (AQI) indicate high pollution levels, which are often reported by weather services or government environmental agencies. **Install air purifiers** in your home, especially in bedrooms, to reduce indoor pollutants. Limit outdoor exercise when air pollution warnings are issued, opting for indoor activities instead.

Description

Avoiding air pollution by reducing exposure to pollutants in the environment is essential for respiratory and overall health. It can help lower the risk of respiratory diseases, cardiovascular conditions, and other health issues associated with poor air quality.

While city life is convenient in a lot of ways, it comes with some health hazards. Cars, factories, and other sources increase air **pollution** [R].

Air pollution plays a role in [R, R, R, R, R]:

- Lung disease
- Heart disease
- Diabetes
- Asthma
- Skin conditions

How it helps

A systematic review of 10 studies associated exposure to particulate matter with elevated blood homocysteine levels [R].

PERSONALIZED TO YOUR GENES

Air pollution may increase blood homocysteine levels more in people with your *HFE* gene variant [R].

YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
HFE	**rs1800562**	GG	

25

Limit Coffee Intake

IMPACT 1 / 5

EVIDENCE 2 / 5

How to implement

Reduce your coffee consumption to no more than 2-3 cups (approximately 200-300 mg of caffeine) per day. Try to avoid drinking coffee after 2 PM to minimize potential impacts on sleep.

Description

Limiting coffee consumption can help prevent potential side effects like jitteriness, insomnia, and increased heart rate, while allowing for better sleep quality and overall energy regulation. Moderation in coffee intake supports overall well-being without overstimulation.

People often drink coffee for an energy and mood boost [R, R].

However, **coffee also comes with some drawbacks.** Drinking a lot of coffee can increase blood pressure and anxiety. It may also cause headaches [R, R, R].

How it helps

A meta-analysis demonstrated that coffee administration significantly increases homocysteine levels [R].

For instance, consuming 2 g of chlorogenic acid (equivalent to 1.5 L strong coffee) caused an acute rise of homocysteine levels (by 11-12%) in a non-placebo-controlled trial of 20 healthy volunteers [R].

26

Folinic Acid

IMPACT 1 / 5

EVIDENCE 2 / 5

How to implement

Folinic acid is administered in several forms, including oral tablets, injections, or infusions, depending on the medical condition being treated. Always use folinic acid as prescribed by a healthcare provider. The specific dose and frequency depend on the condition being treated and the individual patient's response. Regular monitoring by a healthcare provider is necessary, especially when used in conjunction with chemotherapy, to adjust doses as needed and to manage any side effects.

Description

Folinic acid, also known as leucovorin, is a form of folic acid used in pharmacology, primarily to diminish the toxic effects of certain chemotherapy medications. Unlike folic acid, folinic acid doesn't require enzymatic conversion to become biologically active and can be directly utilized by the body. It plays a crucial role in DNA synthesis and repair, and in the methylation process, which is vital for cellular health and function.

The health benefits of folinic acid are mostly seen in its ability to counteract the side effects of methotrexate, a drug used to treat certain types of cancer and autoimmune diseases. Methotrexate can inhibit the body's ability to use folate, leading to deficiencies. Administering folinic acid can help prevent or mitigate these deficiencies, aiding in faster recovery of healthy cells.

Folinic acid is also used in the treatment of megaloblastic anemia when it's caused by a deficiency in folate and not effectively treated by folic acid due to metabolic or absorption issues. Additionally, there is research into its potential benefits in improving symptoms of mental health disorders such as depression, suggesting that it might aid in managing conditions related to folate metabolism abnormalities.

How it helps

In 2 placebo-controlled trials of 135 hemodialysis patients, folinic acid (15 mg/day orally or 3 mg/week intravenously) lowered homocysteine levels as effectively as folic acid. However, folinic acid (70 µg/kg/day for 2 weeks) failed to lower homocysteine in a placebo-controlled trial of 37 newborns [R, R, R].

27

Lactobacillus Plantarum

IMPACT 1 / 5

EVIDENCE 1 / 5

How to implement

Take a probiotic supplement containing *Lactobacillus plantarum* 299V daily. The typical dosage is 10 billion colony-forming units (CFUs). Continue for at least 4 weeks to assess benefits on digestive health.

TYPICAL STARTING DOSE

10 billion CFU

Description

Lactobacillus plantarum is a probiotic bacterium found in many fermented plant products such as sauerkraut, pickles, brined olives, and Korean kimchi [R].

People take *L. plantarum* supplements to improve [R, R, R, R]:

- Diarrhea
- Skin appearance
- IBD
- High cholesterol

How it helps

Consuming milk fermented with *Lactobacillus plantarum* (80 mL/day for 90 days) may reduce homocysteine levels in people with metabolic syndrome [R].

Similarly, a yogurt with *L. plantarum* and *L. fermentum* lowered homocysteine in a small study including healthy volunteers and people with IBS [R].

A probiotic mix with *L. plantarum, B. longum*, *B. breve*, *Lactobacillus acidophilus*, *L. delbrueckii*, *L. paracasei*, and *Streptococcus thermophilus* strains (2 capsules/day for 8 weeks) may lower homocysteine in elderly people [R].

28

Choline Supplements

IMPACT 1 / 5

EVIDENCE 1 / 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

A low choline intake may be associated with increased homocysteine levels, especially in people with low folate and vitamin B-12 levels [R].

In line with this, choline supplementation (2.6 g choline/day as phosphatidylcholine for 2 weeks) may reduce homocysteine levels. However, not all studies found this benefit [R, R].

29

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

Supplementation with *Bifidobacterium longum* (3 x 10^9 CFU/day) for 12 weeks may reduce homocysteine levels in people with kidney failure [R].

A probiotic mix with *B. longum*, *B. breve*, *Lactobacillus acidophilus*, *L. delbrueckii*, *L. paracasei*, *L. plantarum*, and *Streptococcus thermophilus* strains (2 capsules/day for 8 weeks) may lower homocysteine in elderly people [R].

**CFU (colony forming units) = the number of active bacteria in one probiotic serving*

30

Lentils

IMPACT 1 / 5

EVIDENCE 1 / 5

How to implement

Incorporate at least 1/2 cup of cooked lentils into your daily diet. You can add them to salads, soups, or rice dishes for a nutritious boost. Continue this practice as a regular part of your diet to benefit from their high fiber and protein content.

Description

Lentils are a nutritious legume that provides a good source of plant-based protein, fiber, and essential vitamins and minerals.

Lentils are loaded with iron, protein, fiber, vitamins, minerals, like thiamine, phosphorus, zinc, manganese, and copper. A ½ cup serving provides 3 mg of iron or 17%DV.

How it helps

Insufficient intake of rich sources of folate, such as lentils, can cause folate deficiency, which may lead to high homocysteine levels [R, R].

31

Cranberry

IMPACT 1 / 5

EVIDENCE 1 / 5

How to implement

Consume one to two 8-ounce servings of unsweetened cranberry juice daily, or take 500 mg of cranberry supplements twice daily. Continue this practice consistently for at least several weeks to potentially observe benefits.

Description

Cranberries are known for their high antioxidant content and potential to promote urinary tract health by preventing bacterial adhesion. Consuming cranberries or cranberry products may help reduce the risk of urinary tract infections and provide antioxidant benefits.

Cranberries are fruits rich in vitamins, minerals, and antioxidants. They are available in different forms, including [R]:

- Dried fruits
- Juice
- Powder
- Pills

How it helps

In a non-placebo-controlled trial of 56 patients with metabolic syndrome, consuming low-energy cranberry juice (0.7 L/day) for 60 days **decreased homocysteine levels** [R].

Cranberries are rich in antioxidants which can reduce inflammation, and have a potential role in lowering homocysteine levels.

32

Boron

IMPACT 1 / 5

EVIDENCE 1 / 5

How to implement

Take a boron supplement of 3 to 6 mg daily, with food to enhance absorption. This dosage range is commonly recommended for general health benefits, based on nutritional studies. It's advisable to continue this regimen daily for an extended period, as long-term benefits depend on consistent supplementation.

TYPICAL STARTING DOSE

3 mg

Description

Boron is a trace mineral that plays a role in bone health, cognitive function, and hormone regulation.

Boron is a mineral in many foods, including:

- Fruits and fruit juices
- Avocados
- Potatoes
- Legumes
- Drinks (coffee, milk, cider, wine, and beer)

Scientists aren’t sure if boron has any roles in the body, so they don’t consider it an essential nutrient.

Some people take boron supplements to balance hormone levels, increase athletic performance, and more. However, the evidence to support these uses is weak.

How it helps

Supplementation with calcium fructoborate (112 mg/day for 30 days) may reduce levels of homocysteine in healthy people. Calcium fructoborate may also help reduce inflammation [R].

33

Tyrosol

IMPACT 1 / 5

EVIDENCE 1 / 5

How to implement

Take a tyrosol supplement of approximately 10 to 50 milligrams per day, ideally with a meal to enhance absorption. Continuous daily intake is recommended for at least 8 to 12 weeks to evaluate benefits.

TYPICAL STARTING DOSE

10 mg

Description

Tyrosol is a phenolic compound found in olive oil and is known for its antioxidant properties. It is used for its potential to protect cells from oxidative damage and support cardiovascular health.

How it helps

In a non-placebo-controlled trial of 33 individuals at cardiovascular risk, consuming white wine with tyrosine (25 mg) decreased homocysteine levels [R].

34

Creatine

IMPACT 1 / 5

EVIDENCE 1 / 5

How to implement

Take 4 grams of creatine supplement daily, ideally mixed with water or juice. This dosage can be maintained consistently without needing specific periods of cycling on or off.

TYPICAL STARTING DOSE

2 g

Description

Creatine is a popular dietary supplement among athletes and bodybuilders, known to enhance muscle performance during short bursts of high-intensity activities. It may help improve exercise performance and support muscle growth when used as directed.

Creatine is a compound naturally produced by the body. It's stored in the muscles and brain [R].

During exercise, creatine is released to boost performance and help build muscles. For this reason, it's a popular supplement among athletes [R, R].

Sources of creatine include [R]:

- Red meat
- Seafood
- Supplements

How it helps

A study involving healthy volunteers found that taking creatine supplements (equivalent to twice the daily creatinine excretion for 4 weeks), in addition to multivitamins, lowered levels of homocysteine (by -0.9 micromol/L) [R].

35

Bifidobacterium Animalis Subsp. Lactis

IMPACT 1 / 5

EVIDENCE 1 / 5

How to implement

Take a supplement containing Bifidobacterium animalis subsp. lactis at a dose of 10 billion colony-forming units (CFU) daily, with or without food. Joe's preferred strain is *B lactis* HN019 (10B CFU). Continue this regimen daily for at least 2 weeks to 4 weeks to observe potential benefits.

TYPICAL STARTING DOSE

10 billion CFU

Description

Bifidobacterium animalis lactis is a specific strain of probiotic bacteria known for its potential to support digestive health and immune function.

Bifidobacterium animalis is a probiotic bacterium that can be found in the healthy gut of most mammals, including humans. *B. lactis* was previously considered to be a separate species but was shown to be a subspecies of *B. animalis* [R, R].

People mainly take *B. animalis* to support gut health [R, R, R, R, R, R].

How it helps

Consuming milk supplemented with *Bifidobacterium animalis* (HN019 , 3.4 x 10^8 CFU/mL) for 90 days may decrease homocysteine levels in both healthy people and those with metabolic syndrome [R].

A probiotic mix with *B. animalis*, *Bifidobacterium bifidum*, *L. acidophilus*, *L. brevis*, *L. casei*, *L. salivarius*, and *Lactococcus lactis* (containing 2.5 × 10^9 CFU/g) may have the same effect in obese women [R].

**CFU (colony forming units) = the number of active bacteria in one probiotic serving*

36

Curcumin

IMPACT 1 / 5

EVIDENCE 1 / 5

How to implement

Take a 500 mg curcumin supplement daily with food. To enhance absorption, take it with a meal that contains fats or oils since curcumin is fat-soluble.

TYPICAL STARTING DOSE

500 mg

Description

Curcumin is a compound found in turmeric known for its anti-inflammatory and antioxidant properties. It has been studied for its potential to reduce inflammation, support joint health, and contribute to overall well-being.

Turmeric is a yellow spice from India. It may reduce inflammation and oxidative stress [R].

The most important active compound in turmeric is **curcumin.** People use curcumin for [R, R, R, R, R, R]:

- Joint pain
- Hay fever
- Mood
- High blood sugar
- Gut health
- Liver health

How it helps

According to a study of 22 young obese men, supplementation with curcumin combined with fenugreek soluble fiber for improved absorption (500 mg/day for 12 weeks) may reduce homocysteine levels. Curcumin may help by increasing betaine levels [R].

Please note: *curcumin may interfere with iron absorption due to its iron-chelating properties, potentially exacerbating anemia or making it harder to manage. If you have anemia, consult your healthcare provider before using curcumin or turmeric supplements* [R, R, R].

37

Fruits And Vegetables

IMPACT 1 / 5

EVIDENCE 1 / 5

How to implement

Increase your intake of fruits and vegetables to at least five servings per day, aiming for a variety of types and colors to ensure a broad range of nutrients. Each serving size should roughly be the amount you can fit in one hand. Try to incorporate at least one serving of fruits or vegetables into every meal and snack throughout the day.

Description

A diet rich in fruits and vegetables provides essential nutrients, antioxidants, and dietary fiber. This combination supports overall health, helps maintain a healthy weight, and reduces the risk of chronic diseases such as heart disease and certain cancers.

How it helps

Consumption of fruits and vegetables may decrease homocysteine levels, especially in women [R, R, R].

According to a study, consuming fruit and vegetable concentrate capsules may also help [R].

Citric fruits and vegetables may help by providing dietary folate [R, R].

38

Dietary Vitamin B12

IMPACT 1 / 5

EVIDENCE 1 / 5

How to implement

Incorporate foods rich in vitamin B12 into your daily diet, such as beef, chicken, fish, and dairy products. If you are vegetarian or vegan, consider fortified cereals or plant-based milks. Aim to meet the recommended dietary allowance (RDA) for adults of 2.4 micrograms of vitamin B12 per day.

Description

Vitamin B12 is important for nerve function, red blood cell production, and overall energy metabolism. It's crucial for preventing pernicious anemia and maintaining neurological health.

How it helps

High homocysteine levels may be due to dietary deficiency of vitamin B12. People who follow a vegetarian or vegan diet may be at a greater risk [R, R, R].

Consumption of the following vitamin B12 rich foods may lower homocysteine levels [R, R]:

- Dairy products
- Meat
- Fish

39

Yoga

IMPACT 1 / 5

EVIDENCE 1 / 5

How to implement

Practice yoga for at least 20 to 30 minutes a day, most days of the week. Choose a style that matches your fitness level and goals, and consider attending a class or using online resources to guide your practice.

TYPICAL STARTING DOSE

30 minutes

Description

Yoga is a mind-body practice that combines physical postures, breathing exercises, and meditation. It enhances flexibility, strength, and mental well-being and is used for stress reduction, relaxation, and overall health improvement.

Yoga combines breathing, stretching, and relaxation techniques. Practicing yoga may help [R, R, R]:

- Reduce stress
- Improve fitness
- Lower blood pressure and heart rate
- Manage pain

How it helps

Practicing yoga for 8 weeks may lower homocysteine in women with painful periods [R].

High homocysteine may be a consequence of painful periods. Yoga may help by reducing discomfort [R].

40

Dietary Beta-Carotene

IMPACT 1 / 5

EVIDENCE 1 / 5

How to implement

Incorporate foods rich in beta-carotene into your diet daily. These include carrots, sweet potatoes, spinach, kale, and cantaloupe. Aim for at least one serving of these vegetables or fruits at each meal to ensure an adequate intake of beta-carotene.

Description

Beta-carotene is a type of dietary antioxidant and a precursor to vitamin A. It supports healthy vision, skin, and immune function, and may reduce the risk of certain diseases.

Beta-carotene is a plant-derived golden-yellow carotenoid pigment. In addition to its antioxidant activity, **beta-carotene is converted to vitamin A in the body**. Beta-carotene **contributes about 30-35% of the dietary intake of this vitamin** in western countries. In developing countries, it represents the most abundant, and sometimes the sole source of vitamin A [R, R, R]

Good sources of beta-carotene include [R, R, R]:

- Fruits (apricots, peaches, persimmons, melons, citrus, tomatoes, etc.)
- Green vegetables (spinach, broccoli, parsley, collard greens)
- Orange tuber vegetables (carrots, sweet potatoes)

How it helps

Getting more beta-carotene may lower homocysteine in people exposed to high lead levels [R].

Beta-carotene may help by reducing oxidative stress [R].

Please note: *While dietary beta-carotene is generally considered safe, beta-carotene supplements have been linked to heart disease and cancer, especially lung cancer. These links may be stronger in smokers. Make sure to consult your doctor before taking beta-carotene supplements* [R, R, R, R, R, R].

41

Phosphatidylcholine

IMPACT 1 / 5

EVIDENCE 1 / 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

In a placebo-controlled trial of 26 men, supplementation with phosphatidylcholine (2.6 g/day) for 2 weeks reduced post methionine-loading increase in homocysteine by 29% (9.2 micromol/L) while a single 1.5-g dose lowered it by 15% (4.8 micromol/L) [R].

Phosphatidylcholine provides your body with choline, which it turns into betaine. Betaine helps lower homocysteine levels.

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.*

42

L-Serine

IMPACT 1 / 5

EVIDENCE 1 / 5

How to implement

Take l-serine supplements orally, starting with a dose of 500 mg per day. If well tolerated and based on the desired effect, the dose can be gradually increased, but it should not exceed 2,000 mg per day without medical advice. It's best taken with meals to enhance absorption.

TYPICAL STARTING DOSE

500 mg

Description

L-serine is an amino acid essential for the production of proteins and other important molecules in the body. It plays a role in supporting brain health, immune function, and overall well-being.

How it helps

Dietary L-serine may reduce the homocysteine-raising effects of methionine. Adding this amino acid to methionine-containing meals may reduce postprandial homocysteine [R].

43

Pyridoxine (Vitamin B6)

IMPACT 0 / 5

EVIDENCE 0 / 5

How to implement

Take a pyridoxine (vitamin B6) supplement daily. Requirements range from 1.3 to 1.7 milligrams per day for adults, but supplement doses usually start from 50 mg. Consult with a healthcare provider for higher doses or specific medical conditions that might benefit from increased supplementation.

TYPICAL STARTING DOSE

50 mg

Description

A **vitamin B6 supplement** of up to 1.3-1.7 mg per day can be taken to meet needs not achieved through diet. Long term supplementation of vitamin B6 can be problematic, so talk to your doctor before using.

How it helps

A B vitamin complex with pyridoxine may lower homocysteine levels more in people with certain gene variants [R].

Next Steps

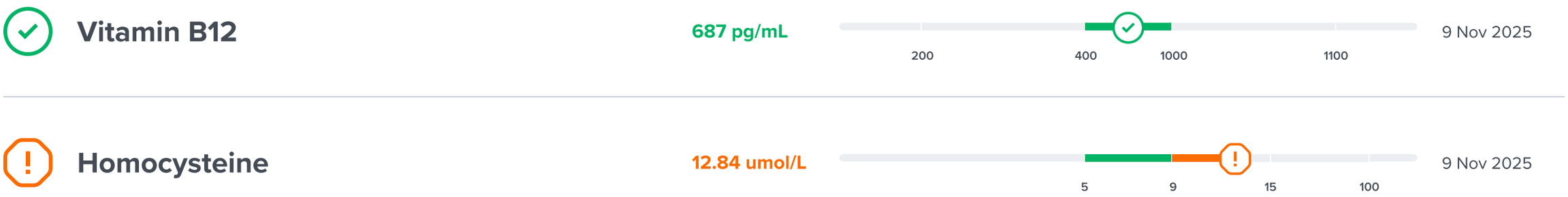
Remember, your genes only tell one important part of your health story!

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

Your lab results

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

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



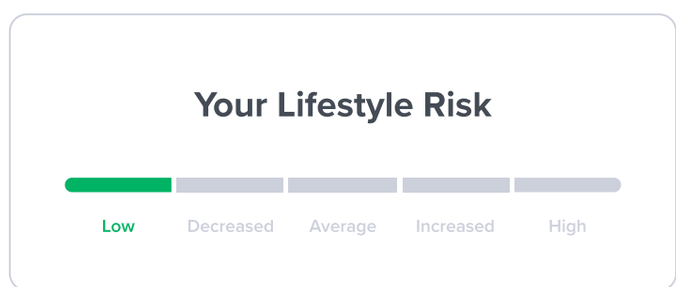
Your Lifestyle Assessments

Ever heard of the term Nature vs. Nurture?

The thing is, both DNA and environment play a role in determining your health risks. The following assessments shows how much of an impact your lifestyle, environment and medical history are having on your health risks.

LIFESTYLE

You have a reduced risk of high homocysteine based on the answers you provided.



Factors impacting your risk:

In a typical week, how many times do you participate in any physical activities or exercise for 30 minutes at a time? (such as walking, running, bike riding, weight training, yoga, etc.)

*Note: longer exercise equals more sessions (e.g., 1 hour = 2 sessions)

8 or more

Decreasing Risk

Do you smoke tobacco?

No, never

Decreasing Risk

How much alcohol do you drink on a typical day?
Calculate your alcohol consumption in units here

0 units

Decreasing Risk

What is your age?

41

Decreasing Risk

Do you regularly eat 5 or more servings of fruit or vegetables a day?

Yes

Decreasing Risk

Have you ever been diagnosed with high uric acid?

No

Decreasing Risk

Your BMI:

22.77

Decreasing Risk

What is your height?

165 cm

No impact

What is your current weight?

62.0 kg

No impact