

Vitamin B12

DNA Health Report

REPORT CATEGORY —



Sample Client

Report date: 15 January 2026

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DISCLAIMER

This report does not diagnose this or any other health conditions. Please talk to a healthcare professional if this condition runs in your family, you think you might have this condition, or you have any concerns about your results.

Personal information

NAME

Sample Client

SEX AT BIRTH

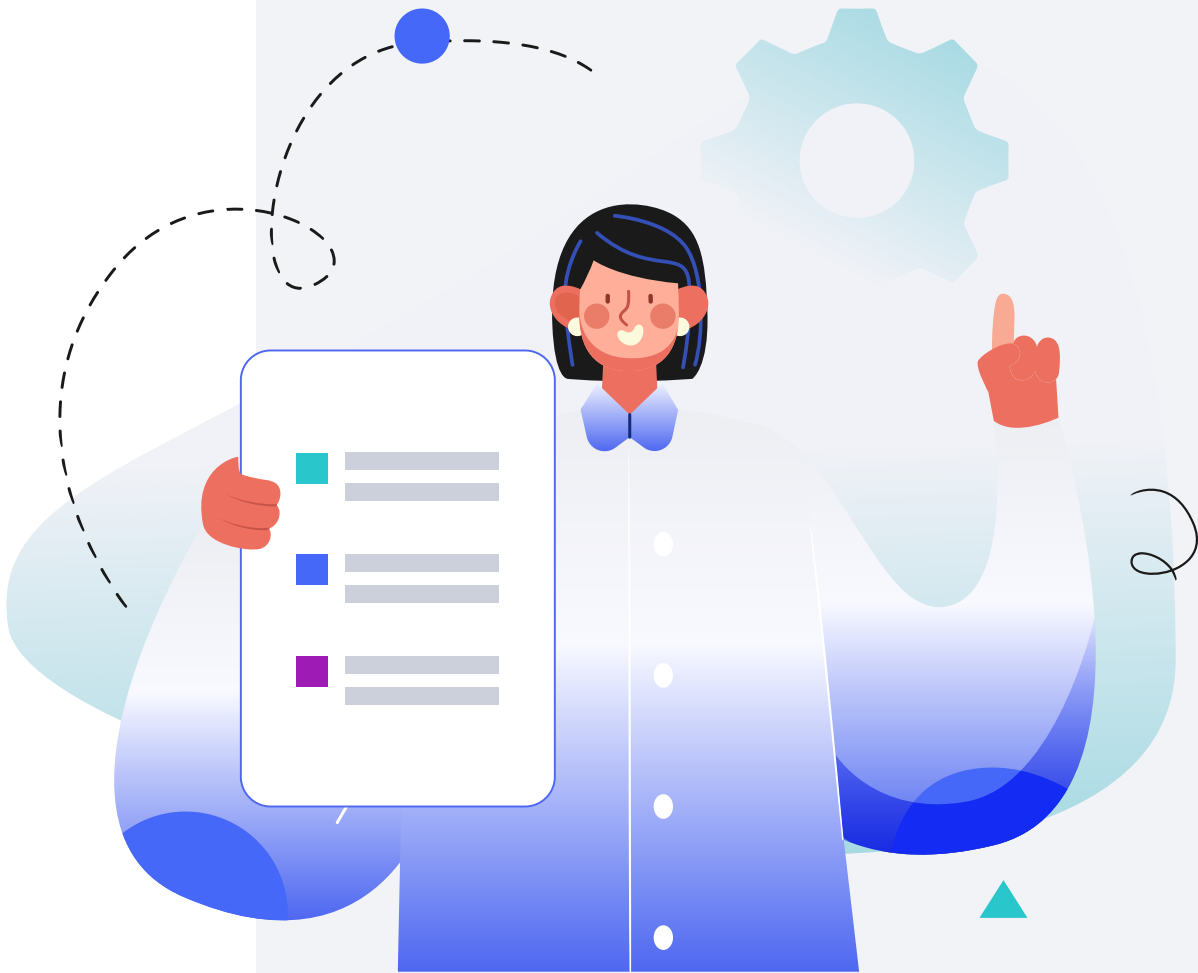
Male

HEIGHT

5ft 5" 165cm

WEIGHT

137lb 62kg



How this works

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



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



Your DNA is like an instruction manual — it contains a lot of information.
You can think of it as a blueprint for your body.

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



We use artificial intelligence and machine learning to analyze all this information.
We then summarize your results as a risk score or display it on a gauge.

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

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



Genotype color info:

AA

You don't have any risk alleles

AA

You have 1 risk allele

AA

You have 2 risk alleles

Your risk is also displayed as a percentile. This will tell you how your risks compare to our sample population. The lower your percentile number, the lower your risk. The "50th percentile" would be an average risk.

Similarly, the gauge tells you your relative risk score compared to our sample population, or it indicates a specific trait or haplotype you are more likely to have based on your genetic variants.

When applicable, we also list top evidence-based recommendations that may help lower your risk. The focus is on recommendations that may be of benefit to you, based on your genetics.

Our recommendations come in four categories: lifestyle, diet, supplements and drugs.
The following icons tell you which category a recommendation falls into:



Our team of scientists also ranks each recommendation.
We rank based on impact and the strength of evidence in the medical literature.

Impact shows how strongly a recommendation will affect your health in a certain area.
Evidence is how much scientific support there is for the recommendation. Rankings are from 1 to 5 (low to high):



Impact

Impact scores range from 1-5. These scores reflect how much of an effect each recommendation can have. An impact score of 5 predicts the biggest effect.

When a recommendation affects something we can measure, we use those measurements to assign the impact score. For example, a recommendation that decreases cholesterol by 20% will have a higher impact score than one that decreases it by 5%.

Some recommendations affect things that we cannot directly measure, like stress or mood. For these, the impact score is based on how well they work relative to other recommendations and standard treatments. The best ones get the highest scores.

If there is a lot of research that shows a recommendation works especially well for your genotype, the impact score gets increased.

Recommendation Evidence

- 5 / 5
- Recommendations that are considered effective and generally recommended by experts and medical bodies.
-
- 4 / 5
- Recommendations that are considered likely effective and that have multiple independent meta-analyses and a great many studies supporting them.
-
- 3 / 5
- Recommendations that are considered possibly effective and have many studies supporting them
-
- 2 / 5
- Recommendations that have insufficient evidence, with two or several clinical trials supporting them, or many studies but with ambiguous results.
-
- 1 / 5
- Recommendations that have insufficient evidence, with a single clinical trial, or with many studies most of which didn't find support for the recommendation.
-
- 0 / 5
- No evidence in humans.

Genotype-specific Evidence

- High-quality
- Direct evidence that a recommendation helps more in people with your gene variant (many clinical trials, a few large clinical trials, or a meta-analysis).
-
- Medium-quality
- Direct evidence that a recommendation helps more in people with your gene variant (a few clinical trials or one large clinical trial).
-
- Low-quality
- Direct evidence that a recommendation helps more in people with your gene variant (a single clinical trial or more trials with inconsistent results).
-
- Indirect
- A recommendation may help more in people with your gene variant because it targets a specific gene or protein affected by your variant (e.g., MTHFR, dopamine).
-
- In theory
- A recommendation may help more in people with your gene variant because it targets a specific mechanism affected by your variant (e.g., inflammation, oxidative stress).

Some things to keep in mind:

- Genetics doesn’t play a considerable role in a condition or a trait.
- There is not enough research available to estimate a genetic predisposition.
- There are technical limitations to estimating or presenting a genetic predisposition.
- The topic is sensitive, and a genetic predisposition should only be estimated and presented by a healthcare professional.

Introduction

[Vitamin B12](#) (cobalamin) is a nutrient that helps [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Make energy
- Build DNA
- Make red blood cells
- Support nerve function

The best way to get enough vitamin B12 is to eat foods rich in this vitamin, such as [\[R\]](#):

- Animal products (e.g., meat, fish, eggs, and dairy)
- Fortified foods (e.g., fortified [nutritional yeast](#), fortified breakfast cereal)

Adults should be getting **2.4 micrograms** of vitamin B12 per day [\[R\]](#).

Some people may not eat enough foods rich in vitamin B12. Others may have trouble absorbing this vitamin from the food they eat. This may lead to vitamin B12 deficiency [\[R\]](#).

Vitamin B12 Deficiency

PERSONALIZED TO GENES

Based on the genetic variants we looked at, you likely have a typical need for vitamin B12.

Try to aim for the recommended daily amount of **vitamin B12**. For most adults, that’s **2.4 mcg** of vitamin B12 per day [R].

Key Takeaways:

- Vitamin B12 is important for making energy and red blood cells, building DNA, and nerve function.
- It is most easily obtained via animal products like meat, eggs, dairy, and fortified foods.
- If you have an increased need or you tested as deficient, you may want to examine your current diet. You should talk to your doctor before taking B12 supplements.
- Click the **next steps** tab for relevant labs.

People more prone to low levels of vitamin B12 include [R]:

- Vegetarians and vegans
- Older adults
- People with gut disorders (e.g., Crohn's disease, celiac disease)

A hallmark of vitamin B12 deficiency is a lack of healthy red blood cells (anemia). Anemia can cause symptoms like weakness and fatigue. A sign of long-term vitamin B12 deficiency is nerve damage [R, R, R, R].

Vitamin B12 deficiency can be detected with a blood test. After it is diagnosed, you may need to work with your doctor to figure out the cause. Your doctor may recommend oral supplements or injections of vitamin B12 to help correct the deficiency [R, R].



TYPICAL NEED

Likely typical need for vitamin B12 based on 1,023,826 genetic variants we looked at

Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
TCN2	rs1801198	GG
FUT2	rs1047781	AA
FUT2	rs602662	AG
CUBN	rs11254363	GG
ADGRE1	rs62123070	CC
FUT2	rs601338	AG
MTRR	rs1801394	AG
ABCD4	rs4148077	CC
TCN1	rs526934	AG
FUT5	rs3760775	GT
FUT3	rs708686	CT
FUT2	rs516246	TC
CBS	rs234706	AG
MMAB	rs7134594	CT
CUBN	rs1801222	GG
TCN1	rs34324219	CC
RGS7	rs7544372	TT
/	rs1990193	AA
/	rs1513859	AA
FAM240C	rs12478296	CC
SLC25A2	rs3749779	AA
FOXK1	rs314590	AA
CFAP299	rs1385890	AA
LAMA4	rs76190642	GG
CHODL	rs34988353	AA
ARAP2	rs142554771	TT
LAMA4	rs144505878	GG
C1QL3	rs79770840	GG
RGS18	rs114973754	CC
ADGRL3	rs545255284	TT
C16ORF82	rs139645308	CC
POU3F3	rs188141458	GG

If you are not deficient, it is best to get vitamin B12 from food. Talk to your doctor before taking vitamin B12 supplements [\[R\]](#).

GENE	SNP	GENOTYPE
KCNK2	rs72761546	TT
KCNK2	rs189754522	AA
PCSK2	rs141477158	GG
TMEM179	rs79885401	CC
LRRC6	rs117429467	AA
STT3B	rs188968123	AA
SPATA18	rs142766122	CC
SRRM4	rs73215576	CC
MICA	rs556990455	GG
CADM2	rs188586547	AA
CENPF	rs72759663	GG
SMYD3	rs148487271	TT
HSPB7	rs144839376	AA
AKAIN1	rs7239302	CC
ST8SIA6	rs188363440	AA
DACT1	rs118119041	GG
MMUT	rs9473555	GG
TCN2	rs9606756	AA

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

Your Recommendations

Your recommendations are prioritized according to the likelihood of it having an impact for you based on your genetics, along with the amount of scientific evidence supporting the recommendation.

You'll likely find common healthy recommendations at the top of the list because they are often the most impactful and most researched.

DOSAGE		DOSAGE			
1	Vitamin B12	10 mcg	2	Red Meat	
3	Beef liver		4	Tuna	
5	Vitamin B12 And Folate		6	Beef	
7	Milk		8	Clams	
9	Fish		10	Turkey	
11	Beef Heart		12	Tempeh	
13	Chicken Liver		14	Eggs	
15	Salmon		16	Beef Spleen	

How to implement

TYPICAL STARTING DOSE

10 mcg

Description

Vitamin B12 is important for [[R](#), [R](#)]:

- Building DNA
- Nervous system function
- Energy production

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

How it helps

Vitamin B12 supplements are available over-the-counter, and their recommended intake varies with age. For example, 2.4 micrograms of vitamin B12 per day is recommended for individuals ages 14 and over [R].

2



Red Meat

IMPACT

4 / 5

EVIDENCE

4 / 5

How to implement

Limit your red meat consumption to no more than three portions per week, with each portion being about 3-4 ounces (85-113 grams), roughly the size of a deck of cards. Opt for leaner cuts of meat and consider replacing some red meat meals with poultry, fish, or plant-based protein sources.

Description

Proteins, fats, and carbs are macronutrients. You need these nutrients in large (‘macro’) amounts. They provide your body with the energy it needs to function properly [\[R\]](#).

You should choose high-quality foods that give you the “best” version of each macronutrient. For example, too much saturated fat and protein from certain animal sources may increase the risk of heart disease and infertility [\[R, R, R\]](#).

Red meat can be part of a balanced diet when consumed in moderation. It is a rich source of essential nutrients, including high-quality protein, which helps build and repair tissues, and important vitamins like B12, crucial for nerve health and red blood cell formation. Red meat also contains iron in its heme form, which is more readily absorbed by the body compared to non-heme iron from plant sources. This can be especially beneficial for individuals with iron deficiencies or higher iron needs.

However, it’s important to opt for lean cuts and control portion sizes to reduce the intake of saturated fats. Balance your diet by also incorporating a variety of protein sources such as poultry, fish, and legumes.

How it helps

Red meat is one of the most significant dietary sources of vitamin B12, which is vital for maintaining nerve health, producing red blood cells, and supporting DNA synthesis. It also provides heme iron, a form of iron that is more readily absorbed by the body compared to non-heme iron found in plant-based foods, reducing the risk of iron-deficiency anemia [\[R\]](#).

3



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 rich in vitamin B12, a nutrient your body needs to keep nerve cells healthy and to make DNA and red blood cells. Including it in your diet can prevent B12 deficiency, which can lead to tiredness, weakness, and nerve damage.

4



Tuna

IMPACT

2 / 5

EVIDENCE

1 / 5

How to implement

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

Description

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

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

How it helps

Tuna is rich in Vitamin B12, which your body needs to produce red blood cells and keep the nervous system healthy. Regular consumption can prevent B12 deficiency, which can lead to anemia and neurological complications.

5



Vitamin B12 And Folate

IMPACT

2 / 5

EVIDENCE

1 / 5

How to implement

Take a combined supplement of vitamin B12 and folate daily. For adults, the typical dose is 2.4 mcg of B12 and 400 mcg of folate. This supplement should be taken with water and a meal to enhance absorption.

Description

Vitamin B12 and folate (vitamin B9) work together to support DNA synthesis and red blood cell formation. Both are essential for preventing megaloblastic anemia and are commonly found in a variety of foods, including leafy greens, legumes, and fortified cereals.

How it helps

Vitamin B12 supplements in combination with folate are crucial in preventing megaloblastic anemia, a condition where the bone marrow produces unusually large, structurally abnormal, immature red blood cells. Supplementation helps maintain healthy nerve cells and aids in the production of DNA and RNA, the body's genetic material.

6



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 Vitamin B12, a nutrient vital for brain function and blood formation. Including beef in your diet can help maintain optimal B12 levels, preventing deficiency-related issues like fatigue and anemia.

7



Milk

IMPACT

2 / 5

EVIDENCE

1 / 5

How to implement

Incorporate milk into your daily diet by drinking 1-2 glasses (around 8-16 ounces) each day, either as a beverage, mixed with cereal or coffee, or used in cooking and baking recipes. Choose a type of milk that suits your nutritional needs and dietary preferences, such as whole, skim, lactose-free, or plant-based alternatives.

Description

Milk is a nutrient-rich beverage that provides essential calcium, protein, and vitamins like vitamin D. It supports bone health, helps build and repair tissues, and can be a valuable part of a balanced diet.

How it helps

Milk is a good source of vitamin B12 and contributes to healthy vitamin levels when consumed regularly.

8



Clams

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate cooked clams into your diet 2-3 times per week, either as part of main dishes, in soups, or salads. Each serving should be about 3-4 ounces (85-113 grams).

Description

Clams are a seafood source rich in essential nutrients like protein, vitamin B12, and minerals. Including clams in your diet can support healthy blood and nerve function, as well as overall nutritional well-being.

Clams provide manganese, vitamin B12, protein, and omega-3's along with being a good source of riboflavin. A 3-ounce serving provides 0.9 mg of manganese or 39%D.

How it helps

Eating clams can significantly increase your vitamin B12 intake because they are a rich source of this nutrient, thus, preventing B12 deficiency. Adequate B12 levels are necessary for brain function and creating red blood cells that transport oxygen in your body.

9



Fish

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate two servings of fish into your diet each week, focusing on oily fish like salmon, mackerel, or sardines for their high omega-3 fatty acid content. Each serving should be about 3.5 ounces cooked, or about ¾ cup of flaked fish.

Description

Fish, particularly fatty fish like salmon and mackerel, is an excellent source of omega-3 fatty acids, which support cardiovascular health, brain function, and inflammation management. Regular consumption of fish can promote heart health and overall well-being.

Fish is a great source of [omega-3s](#), protein, and other essential nutrients. Omega-3s from fish (EPA and DHA) are some of the healthiest fats we can eat. They help reduce inflammation and **protect the heart, brain, and eyes** [\[R\]](#), [\[R\]](#), [\[R\]](#).

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

Many types of fish are great sources of vitamin B12, especially sardines, salmon, tuna, and cod.

10



Turkey

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

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

Description

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

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

How it helps

Turkey is rich in Vitamin B12, which helps keep the body's nerve and blood cells healthy. Therefore, regular consumption of turkey can provide sufficient B12 to prevent you from developing a deficiency.

11



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

Eating beef heart can increase your vitamin B12 levels because it is a rich source of this essential nutrient. This can help treat your vitamin B12 deficiency, leading to improvements in your energy level, brain function and cell metabolism.

Beef heart is a good source of vitamin B12. It contains 10.8 mcg of vitamin B12 per 100 grams. Hearts from other animals may have similar nutritional profiles [\[R\]](#).

12



Tempeh

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate tempeh into your diet by consuming about 1 to 2 servings (a serving is approximately 100 grams) daily. It can be eaten steamed, sautéed, or added to salads, sandwiches, and stir-fries. Try this practice for at least a few weeks to observe potential health benefits.

Description

Tempeh is a plant-based protein source made from fermented soybeans. It's rich in protein, fiber, and probiotics, making it a nutritious addition to plant-based diets.

Tempeh (soybean) is high in protein with a number of vitamins and minerals, and is a good non-dairy source of calcium. A ½ cup serving provides 0.1 mcg of vitamin B12 or 3%DV.

How it helps

Tempeh, a fermented soy product, is a good source of Vitamin B12, which is essential for brain function and blood formation. Regular consumption can help prevent B12 deficiency, associated with fatigue and nerve damage.

13



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 is rich in vitamin B12, which is vital for nerve tissue health, brain function, and the production of red blood cells.

14



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 a rich source of Vitamin B12, which is essential for the proper function and development of the brain, nerves, and blood cells. Therefore, regular consumption of eggs can help prevent B12 deficiency by supplying the necessary amount of this nutrient to your body.

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 rich in vitamin B12, which is crucial for nerve function and the production of DNA and red blood cells. Including it in your diet can help prevent B12 deficiency, which can lead to anemia and nervous system damage.

16



Beef Spleen

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate beef spleen into your diet by consuming it 2-3 times a week. You can cook it by braising, grilling, or making it into stews. Ensure it's thoroughly cooked before eating.

Description

Beef spleen is an organ meat that provides essential nutrients, including iron and vitamin B12. It can be incorporated into a balanced diet to support overall nutritional well-being.

How it helps

Consuming beef spleen increases vitamin B12 levels because it is a rich source of this nutrient. This supports red blood cell formation and nerve function, which can alleviate symptoms like weakness and fatigue related to vitamin B12 deficiency.

Beef spleen is a good source of vitamin B12. It contains 5 mcg of vitamin B12 per 100 grams. Spleens from other animals may have similar nutritional profiles [\[R\]](#).

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.

	RDW	13.8 %		9 Nov 2025
	MCH	28.2 pg		9 Nov 2025
	MCV	85.6 fL		9 Nov 2025
	Vitamin B12	687 pg/mL		9 Nov 2025
	Active B12	500 pmol/L		13 Jan 2026
	RDW-SD	41.7 fL		9 Nov 2025
	Homocysteine	12.84 umol/L		9 Nov 2025