

Fatty Liver

DNA Health Report

REPORT CATEGORY —



Sample Client

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DISCLAIMER

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

Personal information

NAME

Sample Client

SEX AT BIRTH

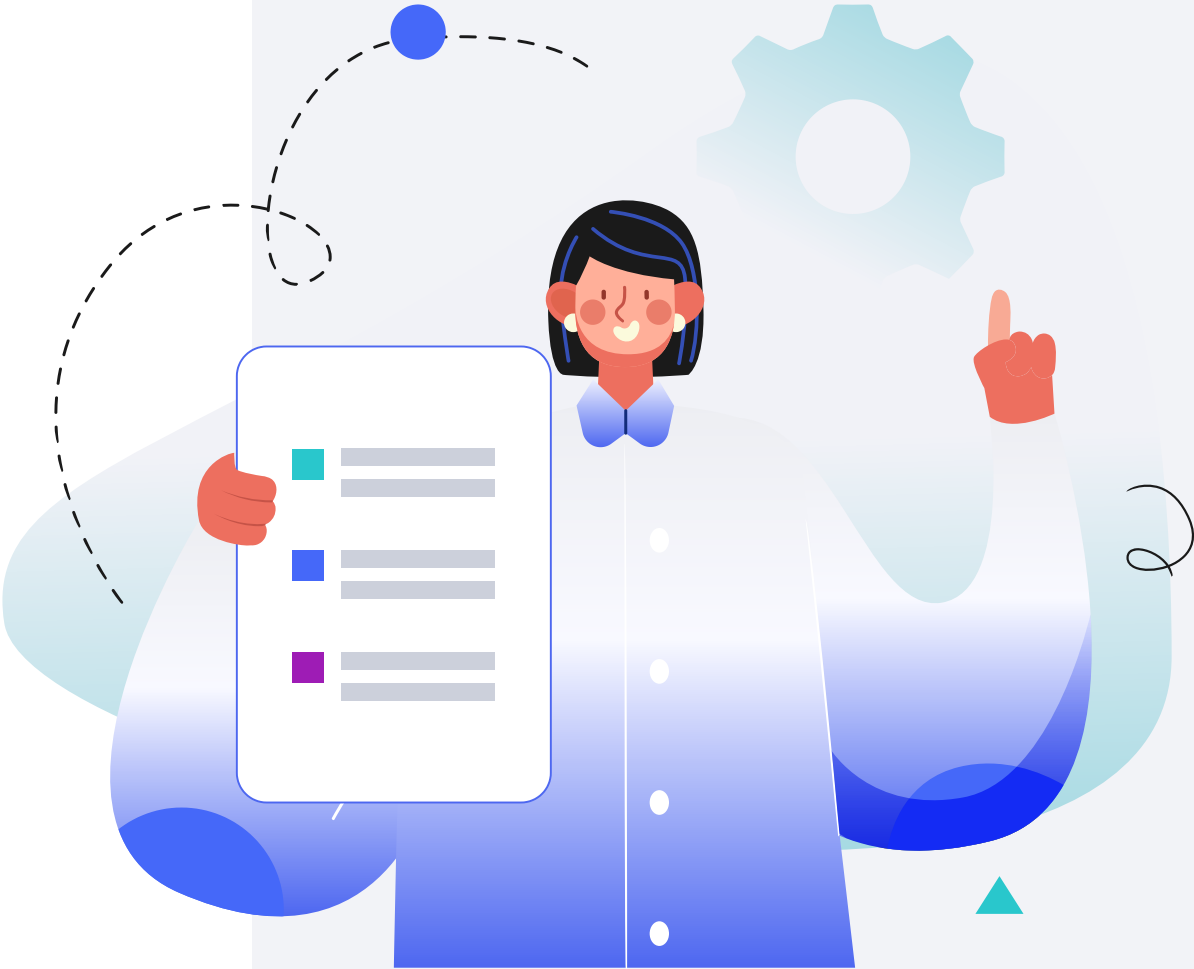
Male

HEIGHT

5ft 5" 165cm

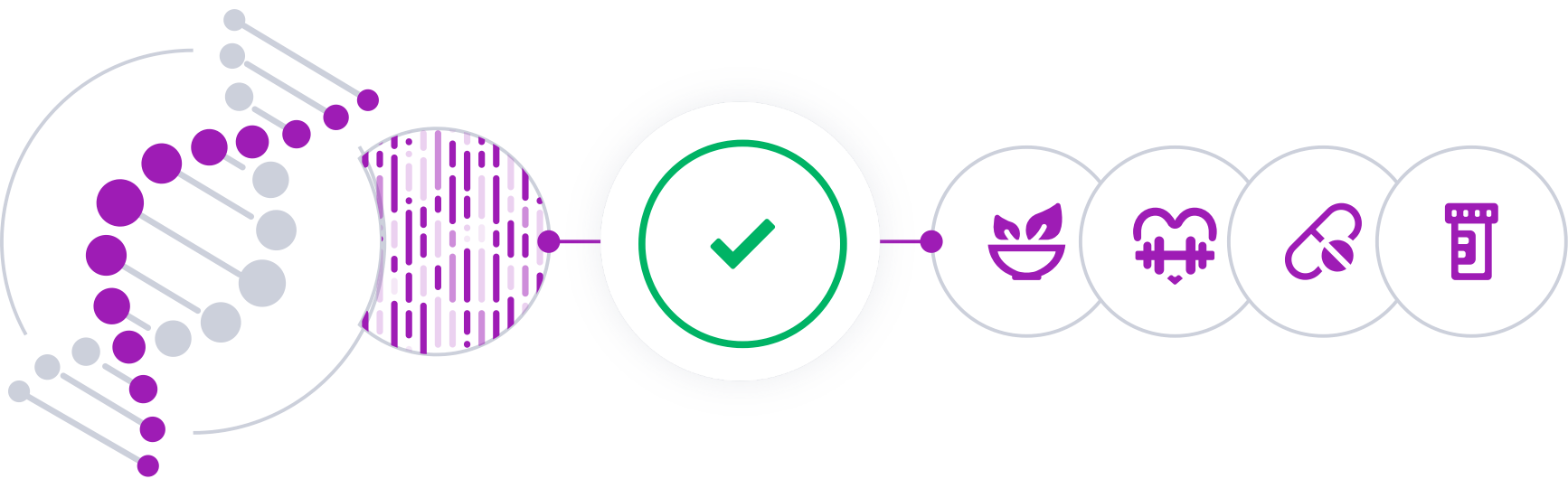
WEIGHT

137lb 62kg



How this works

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

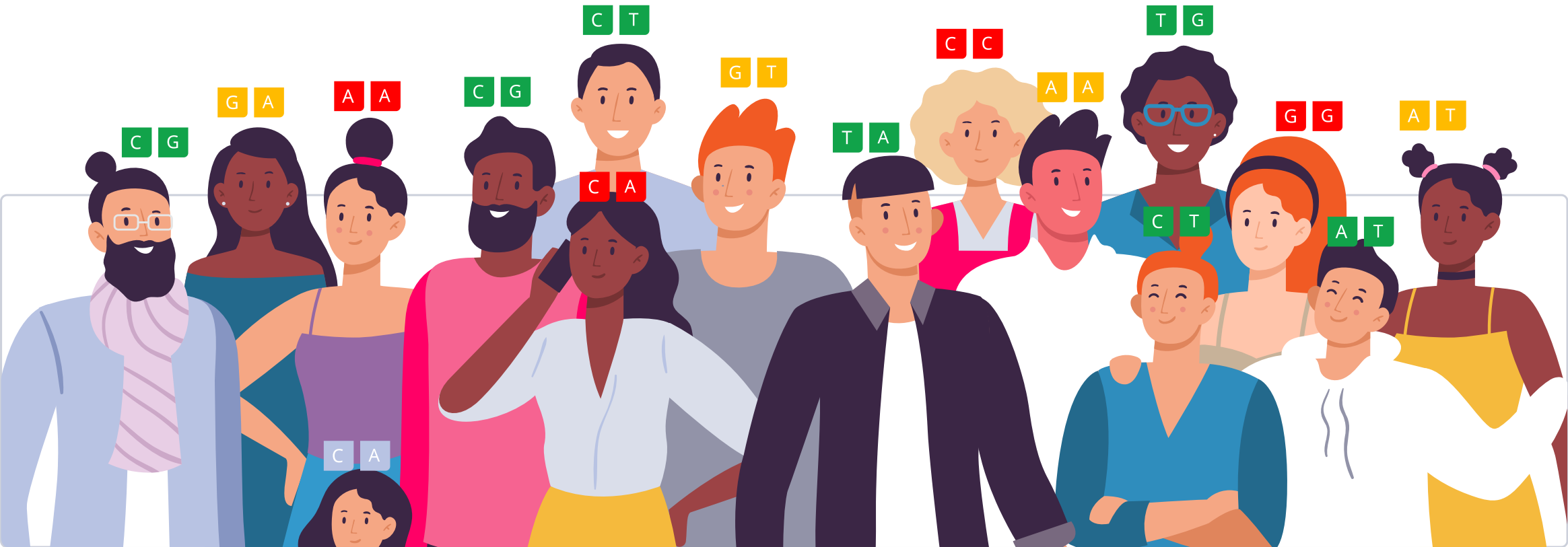


Similarly, our Trait Reports look at how your DNA influences your traits.



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

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



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

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

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



Genotype color info:

AA

You don't have any risk alleles

AA

You have 1 risk allele

AA

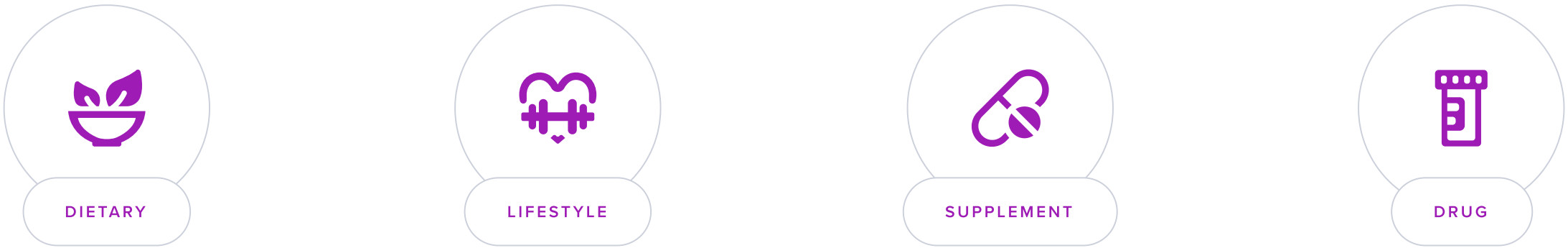
You have 2 risk alleles

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

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

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

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



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

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



Impact

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

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

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

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

Recommendation Evidence

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

Genotype-specific Evidence

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

Some things to keep in mind:

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

Introduction

How much do you know about your liver?

All in all, your liver is a pretty big deal. It’s also pretty big. As far as solid organs go, it’s actually the biggest, weighing in at up to 1.8 kg in males and 1.3 kg in females [\[R\]](#)!

But what does this organ do?

You probably know that it helps clear toxins like alcohol from your body, but it does a lot more. In fact, your liver performs more than 500 functions that your body needs to survive [\[R\]](#).

These include producing bile to help digest food and regulating the amount of blood in your body [\[R\]](#).

The liver is vital. So what happens if it isn’t functioning properly?

Thankfully, even if part of the liver is damaged, it can continue to perform its functions. However, if your liver fails completely, you can only survive a day or two without emergency treatment [\[R\]](#).

Each time your liver is damaged, it tries to repair itself. Over time, this damage can become permanent, lowering the function of your liver.

A major risk factor for liver damage is fat buildup. When fatty deposits in the liver are caused by factors other than alcohol consumption, such as an unhealthy diet, the condition is called nonalcoholic fatty liver disease (NAFLD).

The risk of developing NAFLD can be influenced by genetics. Equally, genetics may be able to inform you of the best ways to manage fatty liver.

For example, if you carry a variant of the [STAT3](#) gene, the Mediterranean diet may be particularly beneficial when it comes to improving NAFLD [\[R\]](#).

Alternatively, if you carry a variant of the [PNPLA3](#) gene, you may be at a lower risk of developing NAFLD if you exercise regularly [\[R\]](#).

Read on to find out more about:

- **How your genetics play a role in NAFLD**
- **Your genetic risk score based on over 666,000 genetic variants**
- **Personalized recommendations based on your genetics**

About Fatty Liver

Key Takeaways:

- **NAFLD (now called MASLD)** affects up to 1 in 4 Americans, often with little or no symptoms until it becomes serious.
- Risk factors may include high cholesterol, obesity, diabetes, hormonal issues, sleep apnea, and your genetics.
- If you have high genetic risk and even if you don't, because symptoms are not obvious, you may want to take action on those risk factors you can control.
- Click the **next steps** tab for relevant labs and lifestyle factors.

The liver is an amazing organ that handles a wide range of functions. These include [\[R\]](#), [\[R\]](#):

- Removing drugs and toxins from the body
- Storing vitamins
- Processing fat and sugar
- Supporting digestion

Certain liver problems can cause it to build up fat. When this happens to someone who drinks little to no alcohol, it's called *nonalcoholic fatty liver disease* (NAFLD) [\[R\]](#), [\[R\]](#), [\[R\]](#).

NAFLD is the most common form of chronic liver disease in the USA. It affects about 1 in 4 Americans [\[R\]](#).

Experts don't know exactly what causes fat buildup in the liver. Fatty liver has been linked to risk factors like [\[R\]](#), [\[R\]](#), [\[R\]](#):

- High cholesterol
- Obesity
- Diabetes
- Hormonal issues
- Sleep apnea
- **Genetics**

Fatty liver can progress to *nonalcoholic steatohepatitis* (NASH). The main feature of NASH is liver inflammation. People with NASH are prone to serious complications like liver scarring and liver failure [\[R\]](#), [\[R\]](#).



TYPICAL LIKELIHOOD

Typical likelihood of fatty liver based on 638,415 genetic variants we looked at



Your top variants that most likely impact your genetic predisposition:

GENE	SNP	GENOTYPE
PNPLA3	rs738409	GG
PEMT	rs7946	CT
MAU2	rs10401969	TT
SAMM50	rs2896019	GG
APOE	rs429358	TT
GCKR	rs1260326	TC
SAMM50	rs738491	TT
TRIB1	rs112875651	GG
RND3	rs71413689	GA
SAMM50	rs3747207	AA
FAM107B	rs913295	GG
SAMM50	rs5764430	CC
KRTCAP3	rs1881396	TT
TRIB1	rs2980888	TC
TRIB1	rs17321515	AA
GCKR	rs780094	TC
MTARC1	rs2642442	TT
/	rs6936723	CT
LPL	rs13702	TC
MAU2	rs58542926	CC
/	rs61951503	GG
/	rs61950023	AA
/	rs61951392	CC
FAM171A1	rs112845472	GG

Most people with fatty liver have no symptoms until the condition has progressed to NASH. However, some people may experience [\[R\]](#):

- Fatigue
- Pain in the upper right abdomen

The symptoms of NASH are more obvious. They include [\[R\]](#):

- Swelling in the abdomen
- Large blood vessels bulging under the skin of the abdomen
- Enlarged spleen
- Red palms
- Yellowing skin and eyes (*jaundice*)

People with fatty liver are usually advised to lose weight through diet and exercise [\[R\]](#).

Did you know? Nonalcoholic fatty liver disease (NAFLD) has a new name: metabolic dysfunction-associated steatotic liver disease or **MASLD**. The name encompasses people who have fatty liver and at least one of five cardiometabolic risk factors [\[R\]](#).

Likewise, NASH is now called **MASH** (metabolic dysfunction-associated steatohepatitis).

Genetic differences may play a major role in people's chances of developing fatty liver. Genes involved in liver health tend to influence [\[R\]](#), [\[R\]](#):

- Fat metabolism
- Sugar metabolism

Genetically predicted high fasting insulin and testosterone may be associated with a higher risk of fatty liver [\[R\]](#), [\[R\]](#).

GENE	SNP	GENOTYPE
NMT2	rs45607632	GG
TCERG1L	rs4439433	CC
COMMD1	rs113180498	GG
KRTAP5-5	rs117542855	CC
PSD4	rs28946269	CC
ATP13A1	rs56408111	TT
/	rs72996252	GG
MAU2	rs73001065	GG
GATAD2A	rs4808199	GG
PWWP3A	rs2668423	GG
FTO	rs9922619	GG

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	Exercise At Least One Hour a Day	1 hour	2	Aerobic Exercise (Cardio)	1 hour
3	Avoid Iron Supplements (Unless Deficient)		4	Mediterranean Diet	
5	Avoid Sugary Foods & Drinks		6	Extra Virgin Olive Oil (EVOO)	
7	Fish		8	Dietary Omega-3 Fatty Acids	
9	Vitamin E	200 iu	10	Limit Calorie Intake	
11	Omega-3 (Fish Oil)	500 mg	12	Green Tea	400 mg
13	Probiotics	10 billion	14	Garlic	
15	Betaine (TMG)	500 mg	16	Dietary Folate	
17	Milk Thistle (Silymarin)	300 mg	18	Curcumin	500 mg
19	Sleep for 7+ Hours		20	N-acetylcysteine (NAC)	1200 mg
21	Inositol	2 g	22	Myo-inositol	4 g
23	Avoid Secondhand Smoke		24	Choline Supplements	425 mg
25	Black Seed (Black Cumin)	1000 mg	26	Hesperidin	500 mg
27	Whole Grains		28	Flaxseed	2 tbsp
29	Aquatic Exercise	1 hour	30	Artichoke Leaf Extract	500 mg
31	Propolis		32	Intermittent Fasting	

33	L-Carnitine	500 mg	34	Soy	
35	Berberine	500 mg	36	Phosphatidylcholine	420 mg
37	Zinc	10 mg	38	Melatonin	500 mcg
39	Tocotrienols	100 mg	40	Maintain Optimal Vitamin D Levels	1000 iu
41	Cupping Therapy	15 minutes	42	Lactobacillus Paracasei	10 billion CFU
43	Bacillus Coagulans		44	Almonds	
45	Chum Salmon Milt		46	Grape Seed Extract	100 mg
47	Hydrogen Water		48	Chia Seeds	
49	Alpha-Lipoic Acid	600 mg	50	Walking	30 minutes
51	Fucoxanthin And Pomegranate Seed Oil	200 mg	52	Avoid Cadmium Exposure	
53	Glutathione supplements		54	Essential Amino Acids (EAA)	10 g
55	L-Ornithine L-Aspartate	3 g	56	Sulforaphane	30 mg
57	Chicory		58	Avoid Organochlorine Pesticide Exposure	
59	Green Cardamom		60	Ginger	500 mg
61	Pomegranate Extract	250 mg	62	Oligonol	100 mg
63	L-Citrulline	3 g	64	Chlorella	3 g
65	Avoid PFAS Exposure		66	Fucoidan	300 mg
67	Bifidobacterium Longum	10 billion CFU	68	Lychee Extract	100 mg
69	Clostridium Butyricum	300 mg	70	Garcinia Cambogia	500 mg
71	Jiaogulan (Gynostemma Pentaphyllum)	1350 mg	72	Keto Diet	

73	Pomegranate Seed Oil	2 g	74	Lactobacillus Reuteri	10 billion CFU
75	Strength Training	1 hour	76	Cranberry	
77	Avoid Phthalate Exposure		78	Cardamom	500 mg
79	Reishi		80	Alpha-GPC Choline	300 mg
81	Kimchi		82	Dietary L-Alanine	

1



Exercise At Least One Hour a Day

IMPACT

5 / 5

EVIDENCE

4 / 5

How to implement

Dedicate a minimum of 60 minutes to moderate-intensity activities such as brisk walking, swimming, or cycling. Do this most days of the week, aiming for at least 5 days to optimize benefits.

TYPICAL STARTING DOSE

1 hour

Description

[Exercise](#) can do wonders for your health. It can help you lose weight, improve your heart health, boost your mood, and more [\[R\]](#).

There are many ways you can be active. You can walk, run, swim, dance, or play team sports. **Everything counts, and it's never too late to start!**

Try to get at least **60 minutes of moderate physical activity on most days**, including walking. **Getting a mix of cardio (min 150 min/day) and strength training (min 2 times a week) may be optimal.**

How it helps

Experts agree that 20-30 minutes of physical activity per day may help with fatty liver [\[R\]](#), [\[R\]](#), [\[R\]](#).

Both aerobic and resistance training may help reduce liver fat and improve liver function. They may help with or without weight loss [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

Exercise may also help reduce [\[R\]](#), [\[R\]](#), [\[R\]](#):

- [Insulin](#) levels
- Inflammation
- Cholesterol

Combining exercise with diet changes may have additional benefits [\[R\]](#).

 PERSONALIZED TO YOUR GENES

Exercise may protect the liver more in people with your [PNPLA3](#) gene variant [\[R\]](#).

YOUR GENETIC VARIANTS			
GENE	SNP	GENOTYPE	EVIDENCE
PNPLA3	rs738409	GG	

2

Aerobic Exercise (Cardio)

IMPACT4 / 5

EVIDENCE5 / 5

How to implement

Engage in at least 150 minutes of moderate-intensity aerobic exercise or 75 minutes of vigorous-intensity activity each week. Distribute this time over at least 3 days per week, avoiding consecutive days of vigorous exercise to allow for recovery.

TYPICAL STARTING DOSE

1 hour

Description

Engaging in regular aerobic exercise, such as running, swimming, or cycling, offers numerous health benefits, including improved cardiovascular fitness, weight management, and mood enhancement. It supports overall physical and mental well-being while reducing the risk of chronic diseases.

Cardio, short for cardiovascular exercise, is any type of physical activity that temporarily increases your heart rate. Examples include **running, cycling, swimming, and brisk walking**.

Regular cardio exercise has many benefits for your overall health. It can help lower your risk of heart disease and diabetes, support weight loss, and improve your mood and energy levels. To get the most out of cardio, try to do it for at **least 30 minutes, 3-5 times a week**.

Interval training is a type of cardio that combines periods of high-intensity training with brief rest periods.

How it helps

Aerobic exercise, such as running or cycling, helps burn excess calories, thereby reducing overall body fat, including fat in the liver. Regular cardio can also improve liver function and reduce inflammation, helping to reverse or mitigate fatty liver disease.

Eleven meta-analyses (the largest one with 34 studies and 2652 patients) concluded that aerobic exercise **reduces intra-hepatic lipid content, ALT (by 3.30 IU/L), AST (by 4.85 IU/L), GGT, triglycerides (by 3 mg/dL), total cholesterol, LDL-C (by 6.45 mg/dL) weight (by 1.2 kg), BMI, fasting blood glucose, insulin, HbA1c, and HOMA-IR, while increasing HDL-C (by 5.96 mg/dL), physical performance and increase peak oxygen consumption (by 6.29 mL/kg/min), in patients with NAFLD**. Its **combination with resistance training was most effective** [[R](#), [R](#), [R](#), [R](#), [R](#), [R](#), [R](#), [R](#), [R](#), [R](#), [R](#)].

3



Avoid Iron Supplements (Unless Deficient)

IMPACT

4 / 5

EVIDENCE

3 / 5

How to implement

Only take iron supplements if a blood test shows you are iron deficient. If not deficient, do not use iron supplements. For those diagnosed with iron deficiency, follow your healthcare provider's instructions on the type and dosage of iron supplement to take.

Description

Iron (Fe) is an essential mineral. It helps make [hemoglobin](#), a protein that carries oxygen to cells. In this way, iron **increases energy** and supports **brain and immune system function** [\[R, R, R\]](#).

Avoiding unnecessary iron supplements, particularly without a confirmed deficiency, can prevent the risk of iron overload, which can lead to health issues like hemochromatosis and oxidative stress.

However, too much iron can be bad for the body. It can deposit into organs, such as the liver, heart and the pancreas. This can cause issues such as liver disease, heart problems and diabetes [\[R, R\]](#).

How it helps

Increased hepatic iron stores and iron deposition in specific liver cells are associated with a higher severity of fatty liver and may exacerbate disease progression by enhancing oxidative stress and affecting insulin signaling and lipid metabolism [\[R\]](#).

Excessive body iron is implicated in insulin resistance, a key component of fatty liver, and iron depletion therapies have shown promise in reducing metabolic alterations and liver enzymes in people with fatty liver [\[R, R\]](#).

Mild to moderate excess hepatic iron may increase the risk of fatty liver progression to more severe stages, and while iron depletion has been proposed as a therapeutic strategy, more conclusive studies are needed [\[R, R\]](#).

Iron overload in people with fatty liver, often referred to as dysmetabolic iron overload syndrome (DIOS), may worsen the disease's natural course and is mainly due to impaired iron mobilization related to inflammation and metabolic disturbances [\[R\]](#).

Genetically higher iron levels may be associated with a 24% increased risk for fatty liver [\[R, R\]](#).

Please note: *Some people deficient in iron may need to take iron supplements. Your doctor should help you make that decision based on your actual iron levels.*

4



Mediterranean Diet

IMPACT

3 / 5

EVIDENCE

4 / 5

How to implement

Incorporate a variety of primarily plant-based foods, such as fruits, vegetables, whole grains, nuts, and legumes, into every meal. Choose healthy fats, like olive oil, over saturated fats and consume fish and poultry at least twice a week. Limit red meat to a few times a month and include a moderate amount of dairy products. Opt for water and red wine in moderation as your beverages.

Description

The [Mediterranean diet](#) is based on the traditional cuisine from the Mediterranean regions. It moderates the intake of red meat and dairy, while being rich in fruits and vegetables, whole grains, and healthy fats ([olive oil](#)).

The [Mediterranean diet](#) focuses on traditional cuisine from the Mediterranean regions. It’s rich in [\[R\]](#):

- [Olive oil](#)
- Fruits and vegetables
- Whole grains
- Nuts and seeds
- Fish

This type of diet may **reduce inflammation and protect the brain and heart** [\[R, R, R, R\]](#).

Limited intake of animal products, saturated fat, and refined sugar likely contribute to the health benefits of the Mediterranean diet [\[R\]](#).

How it helps

A diet high in sugar and saturated fat, like a typical Western diet, may increase the risk of fatty liver [\[R\]](#).

On the other hand, the Mediterranean diet may reduce the risk by decreasing liver fat [\[R, R\]](#).

Experts recommend a healthy diet, such as the Mediterranean diet, to help improve fatty liver. The Mediterranean diet may help [\[R, R, R, R\]](#):

- Reduce levels of fat in the blood
- Reduce body weight
- Improve insulin resistance
- Protect against disease complications

 PERSONALIZED TO YOUR GENES

The Mediterranean diet may improve fatty liver more in people with your [STAT3](#) gene variant [\[R\]](#).

YOUR GENETIC VARIANTS			
GENE	SNP	GENOTYPE	EVIDENCE
STAT3	rs2293152	GC	

5



Avoid Sugary Foods & Drinks

IMPACT3 / 5

EVIDENCE4 / 5

How to implement

To avoid sugary foods, eliminate or significantly reduce consumption of foods and beverages high in added sugars such as sodas, candies, baked goods, and sugary cereals from your diet. Instead, opt for natural sugar sources like fruits. Aim to do this daily for ongoing health benefits.

Description

High-sugar foods like baked goods, sweets, and sugary drinks, can spike your blood sugar levels. Consuming a lot of these types of foods can contribute to health issues like diabetes, obesity, insomnia, and heart disease.

High-sugar foods and refined carbs have a high glycemic index (GI). This means they tend to spike your blood sugar levels. They include [R](#), [R](#), [R](#):

- Sugary drinks
- Baked goods
- Sweets
- White bread
- White rice
- Pasta

Eating a lot of sugary foods can contribute to:

- Diabetes [R](#), [R](#), [R](#)
- Weight gain and obesity [R](#), [R](#)
- Insomnia [R](#)
- Heart disease [R](#)

You may also want to avoid processed sugars and sugary drinks. They may have a role in increasing IL-1B [R](#), [R](#).

How it helps

Sugary drinks may increase the risk of fatty liver. The more you drink, the higher the risk [R](#), [R](#), [R](#).

Diets high in sugar may increase liver fat and reduce liver function. Sugary foods are higher in calories. Extra calories that our bodies don't use get converted into fat [R](#), [R](#), [R](#), [R](#).

Limiting calorie intake by eating less sugar may support healthy liver function [R](#), [R](#).

6



Extra Virgin Olive Oil (EVOO)

IMPACT3 / 5

EVIDENCE3 / 5

How to implement

Incorporate 1-2 tablespoons of extra virgin olive oil into your daily diet. Use it as a dressing for salads, vegetables, or incorporate it into cooking, but avoid using it at high temperatures to preserve its health benefits.

Description

Extra virgin olive oil is a high-quality olive oil obtained from the first pressing of olives. It is rich in monounsaturated fats and antioxidants, like polyphenols, and is associated with various health benefits, including heart health and anti-inflammatory properties.

[Olive oil](#) is fat from the olive, a traditional tree of the Mediterranean Basin [\[R\]](#).

Olive oil has anti-inflammatory and antioxidant properties. It may also reduce the risk of [\[R\]](#), [\[R\]](#):

- Heart disease
- Diabetes
- Cancer

Olive oil is also the primary fat source in the [Mediterranean diet](#), which may improve brain and heart health [\[R\]](#).

How it helps

Extra Virgin Olive Oil (EVOO) is high in healthy monounsaturated fats and antioxidants, which can help lower liver enzyme levels and control weight, reducing the likelihood of fatty liver disease. Regular consumption of EVOO can also help decrease inflammation and oxidative stress, further protecting your liver health.

A [meta-analysis of 18 trials and 24,867 participants](#) found that the Western dietary pattern increases the risk of NAFLD by 56%, while **the Mediterranean diet (rich in olive oil) decreases it by 23%**. Eating a Mediterranean diet enriched in EVOO for 3 years **reduced the prevalence of hepatic steatosis** in a [non-placebo-controlled trial of 100 older individuals at high cardiovascular risk](#) [\[R\]](#), [\[R\]](#).

In [3 non-placebo-controlled trials of 209 patients with NAFLD](#), consuming olive oil (20 g/day) for 3-6 months **reduced the grading of fatty liver, liver span, ALT, AST, measures of insulin resistance, and lipids**. Consuming olive oil enriched with omega-3s (6.5 mL/day) for 12 months **improved the liver echo-texture and the Doppler Perfusion Index, as well as decreasing circulating liver enzymes and triglycerides**, in a [non-placebo-controlled trial of 11 patients with NAFLD](#) [\[R\]](#), [\[R\]](#), [\[R\]](#).

In a [non-placebo-controlled trial of 72 women with PCOS](#), consuming olive oil (25 g/day) for 10 weeks **reduced the fatty liver grade** [\[R\]](#).

In a [non-placebo-controlled trial of 43 people with prediabetes](#), consuming a high-MUFA diet for 12 weeks **decreased liver fat** [\[R\]](#).

7



Fish

IMPACT

3 / 5

EVIDENCE

3 / 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

A large-scale cohort study in South Korea found that the intake of oily fish and its derived fatty acids, such as monounsaturated and polyunsaturated fatty acids, had a preventative effect on the development of fatty liver, especially among women [\[R\]](#).

A study demonstrated that long-term supplementation with fish oil, rich in omega-3 polyunsaturated fatty acids (n-3 PUFA), led to improvements in liver fibrosis and a reduction in markers like alkaline phosphatase (ALP) in people with fatty liver [\[R\]](#).

8



Dietary Omega-3 Fatty Acids

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Incorporate foods high in omega-3 fatty acids into your diet daily. This includes eating fish such as salmon, mackerel, and sardines at least twice a week. Alternatively, include a tablespoon of flaxseed oil or chia seeds in your daily diet.

Description

[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. **EPA and DHA are vital for mental and heart health** [\[R\]](#), [\[R\]](#), [\[R\]](#).

Fatty fish are rich in EPA and DHA. They include [\[R\]](#):

- Salmon
- Tuna
- Herring
- Sardines

For optimal health, 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

A systematic review and meta-analysis found that omega-3 fatty acid supplementation leads to significant improvements in liver fat and liver function tests such as alanine aminotransferase (ALT) and aspartate aminotransferase (AST). This review included nine studies and demonstrated that omega-3 PUFA treatment reduced liver fat and showed a beneficial effect on AST, with a trend towards improvement in ALT as well [\[R\]](#).

Omega-3 fatty acids are known to have beneficial effects on several cardio-metabolic risk factors, including hyperlipidemia and hypertension, by regulating gene transcription factors involved in lipid metabolism and insulin sensitivity [\[R\]](#).

9



Vitamin E

IMPACT3 / 5

EVIDENCE3 / 5

How to implement

Take 200 IU of Vitamin E daily as a supplement, preferably with a meal that contains fat to enhance absorption.

TYPICAL STARTING DOSE

200 iu

Description

Vitamin E is a fat-soluble antioxidant found in various foods, such as nuts and seeds. It is known for its ability to protect cells from oxidative damage, support immune function, and may play a role in skin health. Vitamin E supplements are used to bolster antioxidant defenses and may be beneficial for conditions related to oxidative stress.

[Vitamin E](#) is an antioxidant important for the immune system and for heart health [\[R\]](#).

Plant-based foods have the most vitamin E. These include [\[R\]](#):

- Wheat germ
- Sunflower seeds
- Almonds
- Plant oils

Adults need about **15 mg** of vitamin E per day [\[R\]](#).

How it helps

Vitamin E may support healthy liver function in people with fatty liver. It may also lower the levels of fat in the liver and blood [\[R, R, R, R\]](#).

However, one review only found benefits for people with advanced fatty liver [\[R\]](#).

Vitamin E may help by reducing oxidative stress [\[R\]](#).

Please note: *While dietary vitamin E is generally considered safe, vitamin E supplements have been linked to prostate cancer. They may also not be the best option for pregnant people. Those who have heart disease, bleeding disorders, or other conditions may also need to avoid them. Consult your doctor before taking vitamin E supplements* [\[R, R, R\]](#).

10



Limit Calorie Intake

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Consume fewer calories than your body needs for maintenance. Calculate your daily caloric needs using an online calculator based on your sex, age, weight, height, and activity level, then reduce that number by 500-1000 calories per day to safely lose 1-2 pounds per week. Adjust the caloric intake as needed based on your progress.

Description

People often limit their calorie intake to help them lose weight [\[R, R\]](#). However, moderate calorie restriction may also help you stay healthier and age better [\[R, R, R, R, R\]](#).

There are different ways to take in fewer calories. You can:

- **Eat low-calorie foods**, such as those rich in proteins, fiber, and water. Avoid fatty and sugary foods, which tend to be high in calories [\[R\]](#).
- Try [intermittent fasting](#), which involves changing how often you eat [\[R\]](#).

If you are restricting your calories, make sure your diet remains healthy and balanced. Experts also recommend being physically active, to prevent the loss of muscle and bone mass.

How it helps

In people with fatty liver, **low-calorie diets** may [\[R, R\]](#):

- Support healthy liver function
- Improve blood sugar metabolism
- Decrease levels of fat in the blood

Intermittent fasting may decrease liver fat. It may also lower body fat and levels of fat in the blood. Techniques that may help include [\[R, R\]](#):

- **Alternate-day fasting**: Fasting every other day
- **Time-restricted eating**: Eating during an 8-hour period
- **Periodic fasting**: Fasting for more than one day in a row during a set period

Any extra calories that our bodies don't use get converted into fat. Limiting calorie intake may support liver health by decreasing how much fat the liver makes [\[R, R\]](#).

Please note: *Limiting calorie intake too much or fasting for too long can cause malnutrition, anemia, eating disorders, and other health problems. Talk to your doctor before making any drastic changes to your calorie intake* [\[R\]](#).

11



Omega-3 (Fish Oil)

IMPACT3 / 5

EVIDENCE3 / 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

Experts suggest that omega-3 fatty acids may decrease liver fat accumulation and triglyceride levels [\[R\]](#).

Supplementation with omega-3 fatty acids (for 6-12 months) may improve liver fat content, liver enzymes, and other clinical parameters of fatty liver. They help by reducing triglycerides, improving insulin sensitivity, and decreasing inflammation [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

However, omega-3 fatty acids may offer less beneficial effects on liver fat in obese and overweight people [\[R\]](#).

Omega-3 fatty acids may help by altering liver fat metabolism, reducing inflammation, and improving insulin sensitivity [\[R\]](#).

Please note: Omega-3s can interact with blood thinners (like aspirin, Plavix, Coumadin). Consult your doctor before taking omega-3s [\[R\]](#).

12



Green Tea

IMPACT

3 / 5

EVIDENCE

3 / 5

How to implement

Consume 400 mg of green tea extract daily. This can be taken in the form of capsules or tablets available that specify the amount of green tea extract. Ensure the supplement is taken according to the product's specific instructions, usually once a day with water.

TYPICAL STARTING DOSE

400 mg

Description

Tea is a beverage made by steeping the leaves of the *Camellia sinensis* plant in hot water. It comes in various types, including black, green, white, and herbal teas, and is known for its diverse flavors and potential health benefits due to antioxidants and other bioactive compounds.

[Green](#) and black tea are made from the same plant (*Camellia sinensis*). This plant is processed in different ways to make each type of tea [\[R, R\]](#).

Tea contains antioxidants called **flavonoids**, which may help prevent [\[R, R, R, R\]](#):

- Heart disease
- Cancer
- Diabetes

How it helps

In people with fatty liver, **drinking green tea** may [\[R, R\]](#):

- Support healthy liver function
- Reduce body fat
- Reduce levels of fat in the blood

Supplementing with **EGCG (500-800 mg/day for 8-12 weeks)** may have similar effects [\[R\]](#).

Green tea may help by decreasing how much fat and sugar are absorbed in the gut. It may also decrease oxidative stress [\[R, R, R\]](#).

Please note: polyphenols from green tea may bind to iron and form insoluble complexes, which reduces iron absorption in the gut. If you have anemia, consult your healthcare provider before using green tea [\[R\]](#).

 PERSONALIZED TO YOUR GENES

Your [PNPLA3](#) gene variant is linked to fatty liver. Drinking green tea daily may reduce the negative effects of this variant on the liver [\[R, R\]](#).

YOUR GENETIC VARIANTS			
GENE	SNP	GENOTYPE	EVIDENCE
PNPLA3	rs738409	GG	

13



Probiotics

IMPACT

3 / 5

EVIDENCE

3 / 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

Fatty liver is linked to changes in the makeup of gut bacteria [\[R\]](#).

In people with fatty liver, **probiotics** may [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Support healthy liver function
- Boost levels of “good” cholesterol
- Decrease inflammation
- Reduce insulin resistance

Synbiotics may have similar effects. However, one review noted that probiotics may be better [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#).

Helpful probiotics (at least 10 million CFU*) include [\[R\]](#), [\[R\]](#):

- *Bifidobacterium breve*
- *B. longum*
- *Streptococcus thermophilus*
- *Lactobacillus acidophilus*
- *L. casei*
- *L. reuteri*

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

14



Garlic

IMPACT

3 / 5

EVIDENCE

2 / 5

How to implement

Incorporate 1-2 cloves of raw garlic into your meals daily. This can be achieved by finely chopping or crushing the garlic and letting it sit for a few minutes before adding it to your dishes to maximize its health benefits.

Description

Garlic is a popular herb known for its potential cardiovascular benefits, including lowering blood pressure and cholesterol levels. It also possesses antimicrobial properties and may support immune function.

[Garlic](#) is a vegetable often used to flavor food. It’s been a part of traditional medicine for thousands of years [\[R\]](#).

Today, people take garlic to help control their blood pressure and cholesterol [\[R\]](#).

How it helps

Eating raw garlic (1-7 times/week) may be linked to a reduced risk of fatty liver in men but not in women [\[R\]](#).

In people with fatty liver, **garlic powder (800-1,600 mg/day)** may help [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Support healthy liver function
- Reduce body weight
- Control blood sugar
- Improve levels of fat in the blood

Fermented garlic extract (1,500 mg/day) may also support healthy liver function [\[R\]](#).

Garlic may help by [\[R\]](#):

- Boosting sugar and fat metabolism
- Decreasing oxidative stress

Please note: *Garlic can interact with blood thinners (such as aspirin, Plavix, and Coumadin). In addition, garlic can irritate the stomach in some people. Talk to your doctor before taking garlic* [\[R\]](#), [\[R\]](#).

15



Betaine (TMG)

IMPACT3 / 5

EVIDENCE2 / 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 helps in breaking down fatty acids in the liver, reducing the accumulation of fat. With long-term use, it can potentially improve liver function and prevent fatty liver disease.

In [a pilot study with 7 adult patients with NASH](#), betaine anhydrous for oral solution (Cystadane) in two divided doses (daily for 12 months) improved serum levels of aspartate aminotransferase and ALAT, decreased by >50% in 3/7 patients, the degree of steatosis, necroinflammatory grade, and stage of fibrosis [\[R\]](#).

A [randomized placebo-controlled trial with 55 patients with biopsy-proven nonalcoholic steatohepatitis \(NASH\)](#) found that oral betaine (20 g/day for 12 months) did not improve hepatic steatosis but **may protect against worsening steatosis** [\[R\]](#).

In a [prospective, randomized, double-blind therapeutic trial with 191 patients with non-alcoholic steatohepatitis](#) treated with betaine glucuronate combined with diethanolamine glucuronate and nicotinamide ascorbate (Ietepar) (2x/day for 8 weeks), the intervention **reduced by 25% hepatic steatosis and by 6% hepatomegaly**. It also reduced discomfort in the abdominal upper right quadrant and the increased liver transaminases (ALT, AST and gamma-GT) [\[R\]](#).

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 [PEMT](#) gene variant is linked to increased choline needs and higher odds of fatty liver. Choline is a major source of betaine, so people with this variant may need more betaine [\[R\]](#), [\[R\]](#).

YOUR GENETIC VARIANTS			
GENE	SNP	GENOTYPE	EVIDENCE
PEMT	rs7946	CT	

16



Dietary Folate

IMPACT

3 / 5

EVIDENCE

2 / 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

Higher dietary folate intake may be associated with a lower risk of fatty liver [\[R\]](#).

A study investigated the effects of folic acid supplementation on liver enzymes, lipid profile, and insulin resistance in people with fatty liver. The results showed improvements in liver function, particularly a reduction in liver enzymes, suggesting the beneficial effects of folate on liver health [\[R\]](#).

Genetically higher folate levels may be associated with a reduced risk of fatty liver [\[R\]](#).

17



Milk Thistle (Silymarin)

IMPACT2 / 5

EVIDENCE3 / 5

How to implement

Take a 300 mg milk thistle (silymarin) supplement daily with water, preferably with a meal for better absorption. Continue this regimen as advised by your healthcare provider.

TYPICAL STARTING DOSE

300 mg

Description

Silymarin is a natural plant extract derived from the milk thistle plant (*Silybum marianum*). It has been traditionally used for its potential anti-inflammatory and liver-protective properties. Silymarin consists of several flavonolignans, including silybin, silydianin, and silychristin.

Milk thistle (*Silybum marianum*) is a purple flowering plant in the daisy family. Traditionally, it has been used for liver problems. Some people also eat the leaves in salads [\[R\]](#), [\[R\]](#).

The extract of milk thistle is called *silymarin* [\[R\]](#), [\[R\]](#), [\[R\]](#).

People use milk thistle to help with [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Liver problems
- Blood sugar control
- Indigestion
- Skin problems

How it helps

Silymarin (140-280 mg/day for 8-24 weeks) may help support healthy liver function [\[R\]](#), [\[R\]](#).

Milk thistle may help by reducing liver inflammation [\[R\]](#).

Please note: *Avoid milk thistle if you're allergic to ragweed, daisies, or chrysanthemums. Because it belongs to the same plant family, it may cause similar reactions. People with diabetes or some forms of cancer should talk to their doctor before taking milk thistle. Milk thistle may also interact with some medications* [\[R\]](#), [\[R\]](#).

18



Curcumin

IMPACT

2 / 5

EVIDENCE

3 / 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

In people with fatty liver, curcumin may [R, R, R]:

- Support healthy liver function
- Reduce levels of fat in the blood
- Control blood sugar levels

Studied forms include [R, R]:

- **Turmeric:** 2-3 g/day for 8-12 weeks
- **Curcumin:** 0.3-1.5 g/day for 8-12 weeks

Note that curcumin is hard to absorb. *Bioavailable* curcumin is easier to absorb. Combining it with [piperine](#) (a compound in black pepper) may also help [R, 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].

19



Sleep for 7+ Hours

IMPACT2 / 5

EVIDENCE3 / 5

How to implement

Ensure you allocate enough time in your schedule to achieve a minimum of 7 hours of sleep each night. This might involve going to bed earlier or adjusting your evening routine to promote relaxation and make it easier to fall asleep.

Description

Optimizing sleep involves adopting healthy sleep habits and creating a sleep-conducive environment to ensure restorative and sufficient sleep duration. It supports cognitive function, mood stability, and overall physical health. Most experts recommend getting **at least 7 hours of good-quality sleep each night**.

[Sleep](#) supports your body and mind [\[R, R\]](#). More precisely, sleep helps:

- Support brain health [\[R, R\]](#)
- Maintain a healthy weight and appetite [\[R, R, R\]](#)
- Regulate blood pressure [\[R, R\]](#)
- Balance blood sugar [\[R, R\]](#)

Ways to sleep better include [\[R\]](#):

- Reducing your bright light exposure (screen time) in the evenings
- Sticking to a regular sleep schedule
- Avoiding hunger or large meals before bed
- Avoiding nicotine, caffeine, and alcohol before bed
- Maintaining a sleep area that’s cool, dark, and quiet

How it helps

The following sleep disturbances are linked to a higher risk of fatty liver [\[R, R, R\]](#):

- Short sleep duration
- Having trouble falling or staying asleep (*insomnia*)
- Breathing problems during sleep (*obstructive sleep apnea*)

Obstructive sleep apnea is also associated with more severe fatty liver, worse liver function, and liver scarring [\[R, R, R\]](#).

Poor sleep may contribute to fatty liver by increasing:

- Fat production and storage in the liver [\[R, R\]](#)
- Inflammation [\[R, R, R\]](#)

20



N-acetylcysteine (NAC)

IMPACT

2 / 5

EVIDENCE

2 / 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
1200 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

NAC may improve liver function in people with fatty liver, with effects noted in reducing serum alanine aminotransferase levels, an indicator of liver health [\[R\]](#).

NAC has been observed to alleviate high-fat diet-induced hepatic steatosis and liver injury by regulating intestinal microecology, indicating its role in improving gut-liver axis health [\[R\]](#).

21



Inositol

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take inositol as a daily supplement, usually available in powder or capsule form. The typical dosage ranges from 2 grams to 18 grams per day, divided into smaller doses taken with meals and water to aid absorption. It's important to start with a lower dose and gradually increase to avoid digestive side effects.

TYPICAL STARTING DOSE

2 g

Description

Inositol is a naturally occurring compound that plays a role in cell signaling and neurotransmitter function. It has been studied for its potential in promoting mental health and managing conditions like anxiety and depression when used as a supplement under the guidance of a healthcare professional.

Inositol is a type of sugar that our bodies need to function. It was considered a vitamin (vitamin B8) until it was discovered that our bodies can make it from another common sugar, glucose [\[R\]](#).

[Myo-inositol](#) is the most common form of inositol. It plays a role in [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Heart health
- Normal blood sugar levels
- Mental health
- Cognitive function
- Reproductive health

Myo-inositol can convert to [D-chiro-inositol](#) in the body. These two forms of inositol are often combined in supplements. People use them to improve blood sugar control and PCOS [\[R\]](#), [\[R\]](#), [\[R\]](#).

How it helps

In a double-blinded trial with 48 obese NAFLD patients, MI (4g/day) led to significant weight loss, lower systolic BP, reduced insulin levels, improved lipid profile, liver enzymes, and NAFLD severity compared to placebo after 8 weeks [\[R\]](#).

In an 8-week trial, 92 obese NAFLD patients were randomly assigned to ALA, MI, propolis, or control groups. MI led to significant improvements in cholesterol, while ALT levels decreased notably (but less than in the propolis group) [\[R\]](#).

22



Myo-inositol

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take 2 grams of myo-inositol supplement orally twice a day, preferably with meals to enhance absorption. This regimen should be followed daily for at least 6 months to observe significant benefits.

TYPICAL STARTING DOSE

4 g

Description

Myo-inositol is a naturally occurring compound that plays a role in various cellular functions. It is used in dietary supplements and is believed to have potential benefits for mental health, hormone regulation, and insulin sensitivity.

Inositol is a type of sugar that our bodies need to function. It was considered a vitamin (vitamin B8) until it was discovered that our bodies can make it from another common sugar, glucose [\[R\]](#).

[Myo-inositol](#) is the most common form of inositol. It plays a role in [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Heart health
- Normal blood sugar levels
- Mental health
- Cognitive function
- Reproductive health

Myo-inositol can convert to [D-chiro-inositol](#) in the body. These two forms of inositol are often combined in supplements. People use them to improve blood sugar control and PCOS [\[R\]](#), [\[R\]](#), [\[R\]](#).

How it helps

In a double-blinded trial with 48 obese NAFLD patients, MI (4g/day) led to significant weight loss, lower systolic BP, reduced insulin levels, improved lipid profile, liver enzymes, and NAFLD severity compared to placebo after 8 weeks [\[R\]](#).

In an 8-week trial, 92 obese NAFLD patients were randomly assigned to ALA, MI, propolis, or control groups. MI led to significant improvements in cholesterol, while ALT levels decreased notably (but less than in the propolis group) [\[R\]](#).

23



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

Smoking is linked to a higher risk of fatty liver. In fact, the more cigarettes smoked, the higher the risk. Combining cigarettes with alcohol is linked to an even higher risk than smoking alone [\[R\]](#), [\[R\]](#), [\[R\]](#).

Secondhand smoke is also linked to an increased risk of fatty liver [\[R\]](#).

In people with fatty liver, smoking is linked to liver scarring. This may impact liver function [\[R\]](#).

Experts recommend quitting smoking to improve liver health [\[R\]](#), [\[R\]](#).

24



Choline Supplements

IMPACT2 / 5

EVIDENCE2 / 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

Studies have demonstrated that choline supplementation can improve liver function in people with fatty liver by reducing liver enzyme levels and aiding in the recovery of liver pathology. Choline is essential for the normal breakdown of fats, which helps prevent fatty liver, a condition where fat accumulates in the liver cells [\[R\]](#).

Clinical trials and population studies have also supported the role of choline in reducing the risk of fatty liver, especially in certain populations such as postmenopausal women. Higher choline intake has been associated with a lower risk of developing NAFLD, highlighting the importance of adequate choline consumption [\[R\]](#).

25



Black Seed (Black Cumin)

IMPACT2 / 5

EVIDENCE2 / 5

How to implement

Take 1000 mg of black seed (black cumin) supplement daily, preferably split into two doses of 500 mg each, one in the morning and one in the evening.

TYPICAL STARTING DOSE

1000 mg

Description

Black seed, also known as black cumin or *Nigella sativa*, has been used for its potential health benefits in traditional medicine. It is believed to have anti-inflammatory, antioxidant, and immune-boosting properties.

[Black seed](#) (black cumin) and its oil are used in cooking and traditional medicine [\[R\]](#).

People use black seed for [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Asthma
- Allergies
- High blood sugar
- High blood pressure
- Joint pain

How it helps

Black seed may help reduce the severity of fatty liver and support healthy liver function. It may also help [\[R\]](#):

- Reduce blood sugar levels
- Boost “good” cholesterol levels
- Decrease inflammation

Beneficial forms of black seed include [\[R\]](#):

- **Powder:** 2 g/day for 12 weeks
- **Oil:** 1-5 g/day for 8-12 weeks

Please note: *Black seed may interact with some medications. Consult your doctor before taking black seed* [\[R\]](#).

26



Hesperidin

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take 500 mg of hesperidin supplement daily with water, preferably with a meal for better absorption. This should be maintained for at least a few weeks to gauge effectiveness, and adjustments should be made based on personal tolerance and results.

TYPICAL STARTING DOSE

500 mg

Description

Hesperidin is a flavonoid, a type of plant compound that has antioxidant and anti-inflammatory properties. It is found in citrus fruits, such as oranges, grapefruits, lemons, and tangerines.

People take hesperidin to reduce [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Inflammation
- Blood sugar
- Cholesterol

How it helps

In a study of 50 people with fatty liver, supplementation with hesperidin (1 g/day) for 12 weeks reduced liver enzymes, total cholesterol, triglycerides, liver steatosis, and inflammation [\[R\]](#).

Hesperidin (1 g/day), both alone and combined with flaxseed, improved glucose and lipid metabolism while reducing inflammation and hepatic steatosis in a study of 100 people with fatty liver [\[R\]](#).

27



Whole Grains

IMPACT2 / 5

EVIDENCE2 / 5

How to implement

Incorporate at least three servings of whole grains into your daily diet. This can include consuming foods such as whole grain bread, brown rice, whole grain pasta, and oats. Aim to replace refined grains with whole grains at each meal for optimal benefits.

Description

Whole grains encompass a variety of grains like wheat, oats, and quinoa, where the entire grain kernel is intact. They are rich in fiber, vitamins, minerals, and antioxidants, supporting heart health and reducing the risk of chronic diseases.

Unlike refined grains, whole grains contain nutritious parts of the grain like bran and germ.

Whole grains provide many crucial nutrients, including:

- Fiber
- B-vitamins
- Iron
- Magnesium
- Phosphorus

Due to their high fiber content, whole grains don’t tend to spike blood sugar like refined grains do.

How it helps

A study demonstrated that consumption of whole grains (for 12 weeks) reduced grades of fatty liver and liver enzyme levels [\[R\]](#).

Another study found that whole-grain consumption was associated with lower abdominal fat levels, lower insulin resistance indices, and lower levels of interleukin-6 in people with fatty liver. It also suggested that whole grains could potentially decrease the likelihood of having histological steatohepatitis, a more severe form of fatty liver disease [\[R\]](#).

28



Flaxseed

IMPACT2 / 5

EVIDENCE2 / 5

How to implement

Consume 2 tablespoons of ground flaxseed daily. You can add it to your breakfast cereal, smoothies, or salads.

TYPICAL STARTING DOSE

2 tbsp

Description

Flaxseed is a nutrient-dense food that's high in fiber and omega-3 fatty acids. It may contribute to heart health, promote digestive regularity, and help manage cholesterol levels when included in a balanced diet.

[Flaxseed](#) is a common ingredient in bakery products. Some people also use it as a health food to support digestion [\[R\]](#).

Flaxseed is rich in many compounds, including [\[R\]](#):

- Vitamins and minerals
- Protein
- Fiber
- Omega-3 fatty acids ([ALA](#))

How it helps

Consuming flaxseed (30 g/day) as an add-on to a lifestyle modification intervention reduced liver enzymes, liver scarring, and fat accumulation in a 12-week study of 50 people with fatty liver [\[R\]](#).

Similarly, taking 20 g/day flaxseed oil as part of a weight-loss program for 12 weeks reduced fatty liver grade, weight, and inflammation in a study of 68 people with fatty liver [\[R\]](#).

Flaxseed (30 g/day), both alone and combined with hesperidin, improved glucose and lipid metabolism while reducing inflammation and hepatic steatosis in a study of 100 people with fatty liver [\[R\]](#).

29



Aquatic Exercise

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Participate in aquatic exercise sessions, such as swimming or water aerobics, for 60 minutes, 3 to 5 times per week. Ensure the exercise intensity is moderate, allowing you to talk but not sing during the activity. Consistency over time is key, so aim to incorporate this into your weekly routine for at least 3 to 6 months to observe benefits.

TYPICAL STARTING DOSE

1 hour

Description

Aquatic exercise involves physical activity performed in water, such as swimming, water aerobics, or aquatic therapy. It is gentle on the joints, making it suitable for individuals with mobility issues, and can help improve cardiovascular fitness and muscle strength.

Aquatic exercise is any type of low-impact physical activity performed in a pool. In this type of cardio exercise, water helps the body float, which reduces gravity and makes the practice more comfortable and tolerable [\[R\]](#), [\[R\]](#).

Compared to land-based exercise, aquatic exercise may be better by [\[R\]](#):

- Reducing the stress and impact on joints
- Lowering fracture risk

Hence, it is usually **recommended for the elderly**. Aquatic exercise is also suitable for people who don't know how to swim [\[R\]](#).

How it helps

A study demonstrated that supervised exercise, including aquatic types, led to a reduction in liver fat in people with fatty liver. This change was associated with improvements in cardiorespiratory fitness, indicating a beneficial role of exercise in managing liver fat content [\[R\]](#).

Another comprehensive review highlighted that exercise interventions, including aquatic exercise, positively affect liver fat mobilization in people with fatty liver [\[R\]](#).

30



Artichoke Leaf Extract

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take 500 mg of artichoke leaf extract daily with a glass of water, preferably with or after a meal to aid absorption.

TYPICAL STARTING DOSE

500 mg

Description

Artichoke leaf extract is derived from the leaves of the artichoke plant and is used as a dietary supplement. It is being researched for its potential to support liver health and digestive function.

[Artichokes](#) are packed with antioxidants and fiber. People eat the heart of the artichoke. However, many of the plant’s active compounds are also found in its leaves [\[R\]](#), [\[R\]](#).

People use artichoke leaf extracts to help [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Lower cholesterol
- Lower blood pressure
- Improve digestion

How it helps

Artichoke leaf extract (600-1,000 mg/day for 8 weeks) may help improve liver function in people with fatty liver [\[R\]](#), [\[R\]](#).

Artichoke leaf extract may help by boosting fat metabolism and reducing oxidative stress [\[R\]](#), [\[R\]](#).

31



Propolis

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take a propolis supplement in capsule or tablet form, typically ranging from 500mg to 1000mg per day. It's best to follow the dosage instructions on the product label or a healthcare provider's advice. Propolis can be taken continuously, but consult a healthcare provider for specific durations especially if it exceeds three months.

Description

Propolis is a resinous substance collected by bees from tree buds and used to seal their hives. It has been traditionally used in natural medicine for its potential antimicrobial properties and as a source of antioxidants that may support oral and immune health.

Propolis is a waxy compound, also known as “bee glue.” Honeybees make it from plants and use it to build, repair, and protect their hives [\[R\]](#).

People use propolis to potentially help [\[R\]](#):

- Reduce the appearance of acne
- Maintain oral health
- Support the immune system

How it helps

Propolis, a compound produced by bees, contains antioxidants and anti-inflammatory properties that can reduce inflammation and oxidative stress in the liver. These effects can help reverse fat buildup and damage in the liver, improving symptoms of fatty liver disease.

In this double-blind placebo-controlled randomized clinical trial, 44 patients with NAFLD were randomly allocated into either the "propolis" (n = 23) or "placebo" (n = 21) group along with a calorie-restricted diet (-500 kcal d-1) for 8 weeks. Propolis supplementation along with a calorie-restricted diet for 8 weeks could significantly improve the glucose homeostasis, hepatic fibrosis score and liver function in patients with NAFLD [\[R\]](#).

In a study involving 54 NAFLD patients, those given 250 mg of propolis tablets twice daily for 4 months showed significant improvements in hepatic steatosis, liver stiffness, and CRP levels compared to the placebo group. After adjusting for various factors, the propolis group had a 5.6x higher likelihood of experiencing hepatic steatosis improvement [\[R\]](#).

In an 8-week study with 92 obese NAFLD patients, dietary weight loss accompanied by propolis supplementation led to improvements in metabolic parameters and liver steatosis. Propolis had a significant effect on reducing alanine aminotransferase (ALT) levels, suggesting its potential in NAFLD management [\[R\]](#).

32



Intermittent Fasting

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Limit your daily eating to a specific window of time, typically within an 8-hour period such as from 12 pm to 8 pm, and fast for the remaining 16 hours of the day. Repeat this daily or for at least 3-4 days per week.

Description

Intermittent fasting is an eating pattern that involves cycling between periods of fasting and eating. It may help with weight management, improve metabolic health, and offer potential benefits for certain health conditions when done under proper guidance.

[Intermittent fasting](#) (IF) is a pattern of eating that alternates between periods of eating and fasting. The most popular IF method is called the 16/8 method, where you fast for 16 hours and eat during an 8-hour window.

People mainly practice IF to lose weight. Besides benefits related to weight reduction, IF may help lower the risk of [\[R\]](#):

- Alzheimer's disease
- Joint pain
- Asthma
- Multiple sclerosis
- Stroke

Some types of intermittent fasting, such as Ramadan fasting, are also practiced for religious reasons.

How it helps

Twenty studies with 601 adult participants found that Ramadan-style intermittent fasting had a significant, albeit small to medium, positive effect on liver function tests (AST, ALP, BLU, GGT), potentially offering short-term protection against fatty liver disease in healthy individuals [\[R\]](#).

Among adults with obesity and NAFLD, time-restricted eating did not produce additional benefits for reducing IHTG content, body fat, and metabolic risk factors compared with daily calorie restriction [\[R\]](#).

Intermittent fasting may help lessen strain on the liver, improving its ability to rid toxins and metabolic waste.

33



L-Carnitine

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

Take 500 mg of L-carnitine supplement daily with a glass of water, preferably with a meal to enhance absorption.

TYPICAL STARTING DOSE

500 mg

Description

L-carnitine is an amino acid-like compound that plays a role in energy metabolism and helps prevent toxic substances from building up in cells. It is often used in dietary supplements for its potential to support muscle recovery, reduce fatigue, and enhance athletic performance.

[L-carnitine](#) is a compound that helps you burn fat. It also prevents toxic substances from building up in cells [\[R\]](#).

Your body can usually make enough carnitine to meet its needs. You can also get it from **meat and dairy products** [\[R\]](#).

People use L-carnitine for [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Heart problems
- Overactive thyroid
- Fertility problems
- Blood sugar control
- Weight control

How it helps

In people with fatty liver, **carnitine** may partly improve liver function. It may also reduce insulin resistance and levels of fat in the blood. Forms of carnitine that may help include [\[R\]](#), [\[R\]](#):

- **L-carnitine:** 500-2,000 mg/day for 3-6 months
- **Carnitine orotate complex:** 300 mg/day for 12 weeks

Carnitine helps the body break down fat. It may also reduce oxidative stress [\[R\]](#), [\[R\]](#).

However, one study didn’t find a benefit of L-carnitine on fatty liver [\[R\]](#).

34



Soy

IMPACT

2 / 5

EVIDENCE

2 / 5

How to implement

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

Description

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

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

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

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

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

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

Soy protein and soy isoflavones are also available as supplements.

How it helps

Frequent intake of **soy products** may be linked to a reduced risk of fatty liver. People who eat soy at least 4 times a week may see the greatest benefits [\[R\]](#).

In people with fatty liver, **consuming soy products for 8 weeks** may [\[R\]](#):

- Support healthy liver function
- Decrease body weight
- Decrease insulin resistance

However, one review only found beneficial effects on insulin resistance [\[R\]](#).

Soy may help by reducing oxidative stress and fat buildup in the liver [\[R\]](#), [\[R\]](#), [\[R\]](#).

35



Berberine

IMPACT2 / 5

EVIDENCE2 / 5

How to implement

Take 500 mg of berberine two times a day before meals. Continue this regimen for up to three months, then evaluate its effects with your healthcare provider.

TYPICAL STARTING DOSE

500 mg

Description

Berberine is a compound found in certain plants, known for its potential to support blood sugar control and heart health.

[Berberine](#) is an active compound of some plants used in traditional medicine, such as [\[R\]](#):

- European barberry
- Oregon grape
- Goldenseal
- Chinese goldthread
- Tree turmeric

Berberine is also available as a supplement. People use it to help with [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Diabetes
- High cholesterol
- High blood pressure
- PCOS

How it helps

Supplementation with berberine (0.5 g, 3x/day for 12-16 weeks) reduced liver fat (from 52.7% to 36.4%), body weight, insulin resistance, liver enzymes, triglycerides, and LDL-cholesterol in 2 studies of 224 people with fatty liver. Berberine helped more than standard therapy [\[R\]](#), [\[R\]](#).

In a study of 100 people with fatty liver, supplementation with an ionic salt of berberine and ursodeoxycholic acid (1000 mg, 2x/day for 18 weeks) reduced liver fat by 4.8%, liver-associated enzymes, and weight, while improving blood sugar control [\[R\]](#).

Berberine may help by reducing circulating levels of ceramides, as seen in a study of 80 people with fatty liver [\[R\]](#).

36



Phosphatidylcholine

IMPACT2 / 5

EVIDENCE1 / 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

According to a single observational study, phosphatidylcholine (3.5 g/day for 24 weeks) combined with standard care may help [\[R\]](#), [\[R\]](#):

- Make fatty liver less severe
- Support healthy liver function

Please note: Medical bodies recommend against taking more than 3.5 g of choline per day. High intake can cause complications such as low blood pressure and diarrhea [\[R\]](#).

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.

37



Zinc

IMPACT

2 / 5

EVIDENCE

1 / 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

Low zinc levels may be a risk factor for liver scarring in people with fatty liver [\[R\]](#).

A study of 56 people found zinc supplementation (30mg/day for 12 weeks) improved liver enzyme levels, waist circumference, levels of insulin, and insulin resistance [\[R\]](#), [\[R\]](#).

Zinc is important for fat and sugar metabolism. It may also reduce oxidative stress and inflammation [\[R\]](#).

38



Melatonin

IMPACT

1 / 5

EVIDENCE

2 / 5

How to implement

Take 500 mcg of melatonin orally, about 30 minutes before bedtime, to help with sleep. It can be taken daily as needed.

TYPICAL STARTING DOSE

500 mcg

Description

Melatonin is a natural hormone produced by the pineal gland in the brain that helps regulate the sleep-wake cycle. It plays a crucial role in promoting sleep onset and maintaining a consistent sleep pattern, making it a commonly used supplement for managing sleep disorders and jet lag.

[Melatonin](#) is an important sleep hormone. Bright light at night may prevent your body from making enough melatonin [\[R\]](#), [\[R\]](#), [\[R\]](#).

Your body makes melatonin on its own. However, some people take melatonin supplements to help them sleep. It may help with jet lag in particular [\[R\]](#), [\[R\]](#), [\[R\]](#).

How it helps

In people with fatty liver, **melatonin (6-18 mg/day for 4-56 weeks)** may [\[R\]](#), [\[R\]](#):

- Support healthy liver function
- Slow disease progression
- Decrease levels of fat in the blood

Please note: *Melatonin may interact with some medications. Consult your doctor before taking melatonin* [\[R\]](#).

How to implement

TYPICAL STARTING DOSE
100 mg

Description

Tocotrienols are a form of vitamin E that helps to protect your cells. They fight harmful substances in your body called free radicals, which can damage our cells and lead to illness. By helping your body in this way, tocotrienols contribute to overall health, boosting immunity, and slowing down aging processes.

How it helps

In a placebo-controlled trial of 71 patients with NAFLD, supplementation with δ -tocotrienol (300 mg, 2x/day for 24 weeks) improved biochemical markers of hepatocellular injury and steatosis). It reduced fatty liver index, hepatic steatosis, insulin resistance, CRP, MDA, ALT, and AST. Similarly, the combination of δ -tocotrienol (300 mg, 2x/day for 48 weeks) and α -tocopherol (268 mg, 2x/day for 48 weeks) improved fatty liver index, liver-to-spleen attenuation ratio, insulin resistance, and MDA in a placebo-controlled trial of 100 patients with NAFLD [R, R].

Tocotrienols may help by reducing inflammation and oxidative stress in your liver.

40

Maintain Optimal Vitamin D Levels

IMPACT1 / 5

EVIDENCE2 / 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

People with fatty liver may have lower vitamin D levels and an increased risk of being vitamin D-deficient [\[R\]](#), [\[R\]](#), [\[R\]](#).

However, not all studies found this association [\[R\]](#), [\[R\]](#).

Moreover, vitamin D supplementation may not help with fatty liver [\[R\]](#), [\[R\]](#).

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* [\[R\]](#).

41



Cupping Therapy

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

To practice cupping therapy as part of your lifestyle, schedule sessions with a qualified therapist once or twice a month to address specific concerns or for general wellness. Each session usually lasts between 5 to 15 minutes. Consistent treatment over several months may yield the best results.

TYPICAL STARTING DOSE

15 minutes

Description

Cupping therapy is an alternative therapy that involves placing cups on the skin to create suction. Some believe it may help with pain relief and muscle tension.

How it helps

Cupping therapy may aid in boosting your immune system and improving blood circulation. However, it cannot directly treat fatty liver, which requires lifestyle changes like healthy eating, regular exercise, weight loss, and limiting alcohol intake.

In a non-placebo-controlled trial of 120 patients with NAFLD, receiving wet cupping therapy (3 sessions over 1 month) decreased insulin resistance, ALT, and AST, and improved ultrasound images of the liver in 23% of the patients (compared to 10% in the control group) [\[R\]](#).

42



Lactobacillus Paracasei

IMPACT1 / 5

EVIDENCE1 / 5

How to implement

Take a supplement containing Lactobacillus paracasei daily, with a dose of around 10 billion colony-forming units (CFUs). Consume the supplement with or without food, but consistently at the same time each day for at least 4 weeks to observe beneficial effects.

TYPICAL STARTING DOSE
10 billion CFU

Description

Lactobacillus paracasei is a beneficial probiotic strain that can support digestive health and contribute to a balanced gut microbiome. It may help improve gut function, enhance nutrient absorption, and bolster the immune system, promoting overall well-being.

[Lactobacillus paracasei](#) is a type of bacteria naturally found in the intestine. It is considered a [probiotic bacteria](#), which means “good” bacteria that has health benefits when taken in adequate amounts [\[R\]](#).

L. paracasei is used in the production of the following fermented foods [\[R\]](#):

- Yogurt
- Cheese
- Sauerkraut

It may help [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Improve gut and skin health
- Boost immunity
- Fight allergies

How it helps

In a placebo-controlled trial of 80 healthy volunteers, supplementation with *L. paracasei* IJH-SONE68 for 12 weeks decreased AST and ALT levels, and increased the relative abundance changes within *Anaerostipes*, which has been reported to help suppress hepatic inflammation [\[R\]](#).

L. paracasei may help by reducing the amount of fat and inflammation in the liver.

43



Bacillus Coagulans

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take a Bacillus coagulans supplement containing 1 to 2 billion CFUs (colony forming units) daily, with a glass of water, preferably with meals. This routine should be consistently followed for at least four weeks to potentially see benefits.

Description

Bacillus coagulans is a probiotic strain believed to support digestive health and boost the immune system. It's used in various probiotic supplements and may aid in maintaining gut balance.

How it helps

Bacillus Coagulans works by improving your gut health which is important for liver function. It may aid in reducing inflammation and oxidative stress in the body often associated with fatty liver disease.

In a [placebo-controlled trial of 53 patients with NAFLD](#), taking a synbiotic with B. coagulans (GBI-30, 109 cfu) and inulin for 12 weeks **lowered ALT, GGT, TNF-alpha, NF-kB, and hepatic steatosis** [\[R\]](#).

44



Almonds

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate a handful of almonds (about 23 kernels) into your daily diet. You can eat them as a snack, add them to your breakfast cereals or yogurt, or include them in salads and other dishes. Do this consistently for ongoing health benefits.

Description

Almonds are a good source of omega-6s, protein and vitamins, making for a great snack food. A 1-ounce serving provides 3700 mg of omega-6.

Almonds are nutritious tree nuts that originate from the Prunus dulcis tree. They are packed with essential nutrients, including healthy fats, fiber, vitamin E, and magnesium, which collectively contribute to heart health, support weight management, and may help regulate blood sugar levels.

How it helps

Almonds are high in healthy monounsaturated fats and fiber which can help in weight control and reduce fat accumulation in the liver. They also contain beneficial antioxidants and Vitamin E which can reduce inflammation and possible damage to the liver.

Dietary almonds (10g/day) in Pakistani and American varieties reduced liver enzyme levels (AST, ALT, GGT) significantly compared to the control group after 12 weeks [\[R\]](#).

45



Chum Salmon Milt

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate chum salmon milt into your diet 2-3 times per week, preferably by including it in meals such as sushi, salads, or pasta. It can be consumed cooked or raw, depending on your preference and food safety considerations.

Description

Chum salmon milt, also known as salmon roe or fish sperm, is a nutrient-rich food source high in omega-3 fatty acids, vitamins, and minerals. Consuming chum salmon milt may contribute to heart health, brain function, and overall nutritional well-being.

How it helps

In a pilot clinical trial with 50 healthy Japanese participants, salmon milt DNA (530 mg/day) didn't significantly impact liver function, but it showed improvements in males [\[R\]](#).

Chum salmon milt is high in essential omega-3 fatty acids, which can help reduce inflammation and prevent fat accumulation.

46



Grape Seed Extract

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 100-300 mg of grape seed extract daily, preferably with a meal to enhance absorption. This can be done either through a single dose or split into multiple doses throughout the day. Continue this regimen for at least 3 months to observe potential benefits.

TYPICAL STARTING DOSE

100 mg

Description

Grape seed extract is rich in antioxidants called polyphenols, which may help protect against oxidative stress and support cardiovascular health. It's also believed to have potential benefits for skin health and overall well-being.

[Grape seed extract](#) is made from the seeds of wine grapes. It contains antioxidant compounds that may help support [\[R\]](#), [\[R\]](#):

- Blood circulation
- Heart health
- Blood sugar control
- Healthy weight

How it helps

In a study of 30 people with fatty liver, supplementation with grape seed extract (100 mg/day) improved the grade of fatty liver and reduced liver enzyme levels [\[R\]](#).

47



Hydrogen Water

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Drink 1.5 to 2 liters of hydrogen-rich water daily, spread out over the course of the day. It is best to start with a lower volume and gradually increase it to allow your body to adjust. This practice should be continued daily as a part of your lifestyle to maintain its potential benefits.

Description

Drinking hydrogen-rich water is believed to have antioxidant properties and may help combat oxidative stress in the body. Some studies suggest it could potentially support overall health and well-being.

How it helps

Hydrogen-rich water can help reduce oxidative stress and inflammation in the body, which are key contributors to fatty liver disease. This water can enhance your body's antioxidant capacities and reduce fat accumulation in the liver.

In a placebo-controlled trial of 12 overweight participants with mild-to-moderate NAFLD, drinking hydrogen-rich water (1 L/day) for 28 days reduced liver fat accumulation and AST levels (by 10%) [\[R\]](#).

48



Chia Seeds

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate 1 to 2 tablespoons of chia seeds into your daily diet. You can add them to yogurt, smoothies, oatmeal, or salads. Do this regularly as part of your daily meals.

Description

Chia seeds are high in fiber, omega-3 fatty acids, and various vitamins and minerals. Adding chia seeds to your diet can support digestive health, provide essential nutrients, and contribute to overall nutritional wellness.

Chia seeds are a healthy source of omega-3s, calcium, as well as fiber, iron, magnesium phosphorus, and vitamins B1 and B3. A 1-ounce serving provides 5.06 g of ALA.

How it helps

Chia seeds are high in fiber, which aids in the digestion process, and thus helps reduce fat storage in the liver. They're also packed with beneficial fatty acids, such as Omega-3, which has been shown to decrease liver fat and inflammation.

49



Alpha-Lipoic Acid

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 600-1800 mg of alpha-lipoic acid daily, preferably with a meal to enhance absorption.

TYPICAL STARTING DOSE

600 mg

Description

[Alpha-lipoic acid](#) is a natural antioxidant found in almost every cell in your body. People use alpha-lipoic acid to help with issues like skin aging, weight loss, and high blood sugar [\[R, R, R\]](#).

People use alpha-lipoic acid to help with [\[R, R, R, R\]](#):

- Complications of high blood sugar
- Skin aging
- Weight loss
- Carpal tunnel syndrome

How it helps

Combined therapy with alpha-lipoic acid and ursodeoxycholic acid (ALA/UDCA) reduced AST, ALT, and GGT values and reduced liver scarring in patients with nonalcoholic fatty liver disease [\[R\]](#).

A study investigated the effects of ALA supplementation (1,200 mg, 2x/day for 12 weeks) on liver enzymes and inflammatory markers in obese people with fatty liver. ALA improved adiponectin and IL-6 levels **but did not improve any other measure** [\[R\]](#).

ALA improved liver health and reduced the levels of ALT in several animal studies [\[R, R\]](#).

50



Walking

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Incorporate at least 30 minutes of brisk walking into your daily routine, aiming for a minimum of five days a week. This can be done in one continuous session or broken into shorter periods, such as three 10-minute walks throughout the day.

TYPICAL STARTING DOSE

30 minutes

Description

Walking is a low-impact form of exercise that can contribute to cardiovascular fitness, weight management, and improved overall health. It is used to support physical activity goals, enhance mood, and promote better cardiovascular health.

How it helps

Research specifically investigating walking has demonstrated that even moderate levels of regular walking can help reduce intrahepatic triglyceride content and improve metabolic risk factors among people with fatty liver. This shows that walking is not only accessible but also effective in managing the condition [\[R\]](#).

51



Fucoxanthin And Pomegranate Seed Oil

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take a combined supplement of fucoxanthin and pomegranate seed oil once daily, typically found in capsule form. The standard dose is 200-250 mg of pomegranate seed oil and 2.4-5 mg of fucoxanthin, depending on the product's concentration. This regimen should be taken for at least 12 weeks to observe potential benefits.

TYPICAL STARTING DOSE

200 mg

Description

Fucoxanthin is a natural pigment found in certain types of seaweed and algae. It is believed to have potential health benefits, including supporting weight management and promoting antioxidant activity. Pomegranate seed oil is rich in antioxidants and essential fatty acids. It is often used in skincare products for its potential to promote skin health and hydration.

How it helps

Fucoxanthin, found in brown seaweed, may help reduce liver fat by improving liver function and reducing inflammation. Pomegranate seed oil's antioxidants can combat oxidative stress, a key contributor to fatty liver disease.

52



Avoid Cadmium Exposure

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

To avoid cadmium exposure, refrain from smoking or exposure to secondhand smoke, reduce consumption of foods high in cadmium like shellfish, liver, kidney meats, and certain leafy vegetables, and use ceramic or glass containers instead of plastic when microwaving food. Limit intake of cadmium-contaminated workplace air by using protective gear if you work in battery manufacturing, welding, or metal refining industries.

Description

Avoiding cadmium exposure is essential to prevent potential health risks associated with this heavy metal, such as kidney damage and increased cancer risk. Reducing exposure to cadmium-containing products and contaminated foods is crucial.

Heavy metals are elements naturally found in the environment. They are also used for agricultural, industrial, and medicinal purposes. Some can even be found in small amounts in your body [\[R\]](#), [\[R\]](#).

Long-term exposure to high amounts of heavy metals can be harmful to your health [\[R\]](#), [\[R\]](#).

Heavy metals that are most often linked to health problems include [\[R\]](#), [\[R\]](#):

- Lead
- Cadmium
- Arsenic
- Chromium
- Mercury

How it helps

In a study of 15,783 subjects, serum cadmium levels were significantly linked to elevated ALT, substantial liver steatosis, and fibrosis. Individuals in the fourth quartile of serum cadmium had higher odds of ALT elevation and hepatic steatosis compared to the first quartile [\[R\]](#).

Cadmium causes oxidative stress to liver cells, potentially increasing the risk of NAFLD.

53



Glutathione supplements

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take glutathione supplements orally, usually in pill or powder form, with a recommended dose ranging from 500mg to 1000mg daily, divided into two doses. It's best taken on an empty stomach or as directed by a healthcare professional. Continuous use is advised for sustained benefits, but consulting with a healthcare provider for personalized advice and duration is important.

Description

Glutathione (GSH) is your body’s strongest antioxidant. It has an enormous capacity to combat [oxidative stress](#) and neutralize harmful free radicals. Chemically speaking, glutathione is a tripeptide made up of 3 amino acids [\[R\]](#):

- [Glutamate](#)
- **Cysteine**
- [Glycine](#)

Low glutathione levels have been linked to cognitive decline, age-related disease, and general mortality among the elderly [\[R, R\]](#).

People take glutathione supplements to help with:

- Oxidative stress and detox
- Immune system support
- Skin aging and damage
- Exercise recovery
- Chronic diseases such as type 2 diabetes, Alzheimer's disease, Parkinson's disease, or COPD

How it helps

In a placebo-controlled trial of 29 patients with NAFLD, supplementation with glutathione (300 mg/day) for 4 months lowered ALT, triglycerides, non-esterified fatty acids, and ferritin levels [\[R\]](#).

54



Essential Amino Acids (EAA)

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take a supplement containing all nine essential amino acids, aiming for a total of 10-20 grams per day. This can be divided into 2-3 doses throughout the day, ideally around exercise sessions or with meals. Continue as long as you are seeking to enhance muscle recovery, growth, or overall protein intake.

TYPICAL STARTING DOSE

10 g

Description

Essential amino acids are crucial for building and repairing tissues, supporting immune function, and maintaining overall health. Obtaining these amino acids through a balanced diet or supplementation can promote muscle growth, better immune response, and overall well-being.

How it helps

In a study with nine male volunteers, a high-fructose diet increased liver fat and VLDL-triglyceride levels, while adding essential amino acids decreased liver fat but had no effect on triglyceride levels or palmitate production [\[R\]](#).

Essential amino acids may help by supporting the detoxification and regeneration of liver cells. They also aid in reducing fat accumulation in the liver, which is crucial for managing fatty liver disease.

55



L-Ornithine L-Aspartate

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 3 to 6 grams of L-Ornithine L-Aspartate daily, divided into two to three doses, with water. This regimen can be followed daily for up to 6 months to support liver health and help in reducing symptoms of high ammonia levels.

TYPICAL STARTING DOSE

3 g

Description

L-ornithine is an amino acid often used to reduce exercise-related fatigue and support muscle recovery. It is also studied for its role in promoting detoxification processes in the body. L-aspartate is an amino acid used in dietary supplements to support liver function, improve exercise performance, as well as playing a role in energy metabolism.

How it helps

L-ornithine L-aspartate has shown hepatoprotective properties in NAFLD. It's suggested that LOLA (12 weeks treatment with 6-9 g/d) may influence mechanisms like nitric oxide synthesis and ammonia metabolism, which could be beneficial for liver health in NAFLD patients. [\[R\]](#)

56



Sulforaphane

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take a sulforaphane supplement, typically available in capsule form, with a dosage ranging from 30 to 60 milligrams per day. It is generally taken once daily, with or without food, according to the product's label instructions or a healthcare provider's advice. Continue this regimen daily for as long as you seek its benefits, but consult a healthcare provider for long-term use guidance.

TYPICAL STARTING DOSE

30 mg

Description

Sulforaphane is a natural compound found in cruciferous vegetables like broccoli and cauliflower. It is known for its potent antioxidant and anti-inflammatory properties, potentially offering protective effects against chronic diseases and promoting overall health.

How it helps

In a placebo-controlled trial of 52 patients with fatty liver, supplementation with glucoraphanin (a sulforaphane precursor) for 2 months **decreased serum ALT and GGT, as well as urinary 8-OHdG** [\[R\]](#).

57



Chicory

IMPACT

1 / 5

EVIDENCE

1 / 5

Description

Chicory is a nutrient-rich vegetable that has been shown to have a number of health benefits. It is a good source of fiber, vitamin K, and antioxidants. Chicory may also help to improve digestion, lower blood sugar levels, and boost the immune system.

How it helps

Chicory supplementation (9 g/day), both alone and combined with turmeric showed significant benefits on obesity markers (BMI and waist circumference) and lipid profile (HDL cholesterol) in a placebo-controlled trial of 92 patients with NAFLD [\[R\]](#).

58

Avoid Organochlorine Pesticide Exposure

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Minimize exposure by choosing organic fruits and vegetables, thoroughly washing produce before consumption, and avoiding areas where organochlorine pesticides are applied. Consider using air purifiers in homes close to agricultural areas to reduce indoor pesticide levels.

Description

Reducing organochlorine pesticide exposure involves minimizing contact with pesticides like DDT, which can accumulate in the body and potentially lead to adverse health effects, including disruption of hormonal functions and carcinogenicity.

How it helps

Organochlorine pesticides can increase fatty deposits inside your liver, worsening fatty liver disease. Reducing your exposure to these pesticides may help slow down the progression of this condition.

A [study of 1515 participants](#) associated high oxychlordane levels with a **3.5-fold higher risk of NAFLD** [\[R\]](#).

59

Green Cardamom

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 500mg of green cardamom extract in capsule form daily with water, preferably in the morning after breakfast. Continue this supplementation for at least 8-12 weeks to evaluate its benefits.

Description

Green cardamom is a flavorful spice often used in cooking and herbal remedies. It may have digestive benefits and antioxidant properties, supporting overall well-being.

How it helps

In a study of 87 overweight or obese people with fatty liver, supplementation with green cardamom (500 mg, 3x/day for 3 months) increased HDL-cholesterol while decreasing fasting insulin, triglycerides, LDL-cholesterol, insulin resistance, and the grade of fatty liver [\[R\]](#).

60



Ginger

IMPACT1 / 5

EVIDENCE1 / 5

How to implement

Take a 500 mg ginger supplement daily, preferably with a meal to enhance absorption and minimize potential stomach discomfort.

TYPICAL STARTING DOSE

500 mg

Description

Ginger is a versatile spice known for its potential anti-inflammatory and digestive benefits. It may help alleviate nausea, reduce muscle soreness, and support gastrointestinal comfort when consumed as part of a balanced diet.

[Ginger root](#) is a cooking spice and a traditional remedy. People mostly use it to relieve [\[R\]](#):

- Nausea
- Menstrual cramps
- Joint pain

How it helps

Ginger has antioxidant properties that can reduce inflammation and oxidative stress on the liver, which are common problems in fatty liver disease. It also may help reduce fat accumulation in the liver, which can halt the progression of the disease.

A [meta-analysis of 3 trials](#) concluded that supplementation with ginger **improves liver levels of cholesterol (by 5.60 mg/g), triglycerides (by 4.28 mg/g), malondialdehyde (by 3.16 nmol/mg), catalase (by 3.35 nmol/mg), and SOD (by 3.01 U/mg), and serum levels of ALT (by 2.85 U/L), AST (by 0.98 U/L), triglycerides (by 4.98 mg/dL), LDL (by 3.94 mg/dL), total cholesterol (by 3.45 mg/dL), HDL (by 1.27 mg/dL), and fasting blood sugar (by 2.54 mg/dL) in patients with NAFLD [\[R\]](#).**

61



Pomegranate Extract

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 250 to 500 mg of pomegranate extract once daily, preferably with a meal to enhance absorption. This should be continued consistently for at least 4 weeks to observe potential health benefits.

TYPICAL STARTING DOSE

250 mg

Description

Pomegranate extract is derived from the fruit of the pomegranate tree, a plant that has been used traditionally for thousands of years, from the Mediterranean to Asia. Pomegranate extract is often used today in supplements due to its high levels of antioxidants like punicalagins and anthocyanins, which may support heart health and reduce inflammation.

[Pomegranates](#) are red fruits that contain seeds covered by edible sweet coats. They are rich in antioxidants [\[R\]](#), [\[R\]](#).

Pomegranate may reduce inflammation and support heart health. People use pomegranate seed oil and peel in cosmetics and traditional medicine [\[R\]](#), [\[R\]](#).

How it helps

In a placebo-controlled trial of 44 patients with NAFLD, supplementation with pomegranate extract for 12 weeks improved glycemic indicators, serum lipids, anthropometric indices, and blood pressure [\[R\]](#).

Pomegranate extract reduced ALT, AST, GGT, and IL-6 in a 12-week placebo-controlled trial of 44 patients with NAFLD [\[R\]](#).

Pomegranate extract contains antioxidants that help to reduce inflammation. It also aids in improving liver function by enhancing its ability to process fats and cholesterol.

62



Oligonol

IMPACT1 / 5

EVIDENCE1 / 5

How to implement

Take 100 mg of Oligonol supplement daily, preferably with a meal to enhance absorption. Continue this regimen consistently for at least 8 to 12 weeks to observe potential benefits.

TYPICAL STARTING DOSE
100 mg

Description

Oligonol is a supplement derived from lychee fruit and green tea that contains antioxidants, potentially offering health benefits such as improved skin health and cardiovascular support.

How it helps

In a placebo-controlled trial of 38 patients with NAFLD, supplementation with oligonol for 24 weeks reduced the MRI-PDFF and the abundance of pathogenic bacteria such as *Dorea*, *Romboutsia*, *Erysipelotrichaceae* UCG-003, and *Agathobacter*, while increasing SCFA-producing bacteria such as *Akkermansia*, *Lachnospira*, *Dialister*, and *Faecalibacterium* [R].

However, supplementation with oligonol for 24 wasn’t significantly more effective than the placebo at lowering liver fat in a placebo-controlled trial of 40 patients with NAFLD [R].

Oligonol is loaded with antioxidants and anti-inflammatory properties that may help ameliorate liver fat accumulation. It boosts the liver's natural detoxification process and reduces oxidative stress, improving overall liver health.

63



L-Citrulline

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 1.5 to 5 grams of L-citrulline supplements per day, orally, with or without food. This dosage can be taken all at once or divided into two to three smaller doses throughout the day. It's generally recommended to start at the lower end of the dosage range and adjust based on your body's response.

TYPICAL STARTING DOSE

3 g

Description

L-citrulline is an amino acid that may help improve blood flow and reduce muscle soreness, making it a popular supplement for athletes and individuals with certain cardiovascular conditions. Its potential to enhance nitric oxide production supports vascular health and overall circulation.

[Citrulline](#) is an amino acid (protein building block). Citrulline can be found in foods like [R](#), [R](#), [R](#), [R](#), [R](#):

- Watermelon
- Pumpkins
- Cucumber
- Bitter melon

The body uses L-citrulline to produce nitric oxide, a compound that helps widen blood vessels. It is important for heart and sexual health [R](#), [R](#), [R](#).

L-citrulline is commonly used as supplement to support [R](#):

- Blood vessel health
- Muscle health
- Metabolic health
- Sexual health

How it helps

L-Citrulline is an amino acid that helps the body detoxify harmful compounds, such as ammonia, that can accumulate due to a fatty liver. This can help reduce the inflammation and oxidative stress often seen in fatty liver disease.

In a placebo-controlled trial of 50 patients with NAFLD, supplementation with citrulline (2 g/day) for 3 months lowered CRP, TNF-alpha, ALT, and liver steatosis [R](#).

64



Chlorella

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 3 to 5 grams of chlorella in tablet or powder form daily, ideally before meals to improve digestion. Continue this supplementation for at least 2 to 3 months to observe benefits.

TYPICAL STARTING DOSE

3 g

Description

[Chlorella](#) is a microalga from freshwater. People consume chlorella in rice, pancakes, or tea. It can also be found as a supplement [\[R\]](#), [\[R\]](#).

Chlorella is **rich in protein** and several micronutrients. It may be useful to [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#), [\[R\]](#):

- Reduce blood sugar
- Lower cholesterol
- Reduce blood pressure
- Improve immunity

How it helps

In 2 placebo-controlled trials of 146 patients with NAFLD, supplementation with chlorella (1200 mg/day), both alone and as an add-on to metformin and vitamin E, for 8 weeks lowered ALT, AST, triglycerides, uric acid, fasting glucose, HbA1c, HOMA-IR, and CRP [\[R\]](#), [\[R\]](#).

Chlorella may help by improving liver function and decreasing oxidative stress. It may also aid in detoxification, which lightens the liver's workload.

65

Avoid PFAS Exposure

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

To avoid PFAS exposure, choose products that are labeled PFAS-free, especially when selecting cookware, cosmetics, and clothing. Reduce the consumption of packaged and fast foods since the packaging often contains PFAS. Use a water filter that is certified to remove PFAS compounds for your drinking and cooking water.

Description

Avoiding per- and polyfluoroalkyl substances (PFAS) exposure means avoiding products and environments contaminated with these chemicals, which can help prevent potential health issues like hormonal disruption and adverse effects on liver and immune function.

How it helps

Reducing PFAS (Per- and polyfluoroalkyl substances) exposure can help prevent fatty liver disease as PFAS can disrupt metabolic functions, leading to fat buildup in the liver. Therefore, minimising contact with items like non-stick cookware, which often contain PFAS, can help maintain liver health.

A [study of 1150 participants](#) associated **PFOS with liver fibrosis but not steatosis** [R].

A [study of 5073 participants](#) associated high exposure to **PFOA with 2-fold higher risks of MAFLD** [R].

66

Fucoidan

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 300 mg of fucoidan supplement once daily, preferably with a meal to aid absorption. Continue this regimen for a minimum of four weeks to evaluate its effects on your health.

TYPICAL STARTING DOSE

300 mg

Description

Fucoidan is a compound found in certain brown seaweeds and marine plants, and it is consumed for its immune system support and anti-inflammatory effects.

How it helps

In a placebo-controlled trial of 42 patients with NAFLD, supplementation with low-molecular-weight fucoidan and high-stability fucoxanthin (275 mg LMF and 275 mg HSFx, 3x/day) for 24 weeks reduced liver fibrosis and steatosis, AST, ALT, total cholesterol, triglycerides, fasting glucose, HbA1c, IL-6, and IFN-gamma [R].

Fucoidan has anti-inflammatory and antioxidant properties that may help reduce liver fat and inflammation. It may also help regulate lipid metabolism, which can reduce the overall fat content in your liver.

67



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

Bifidobacterium Longum is beneficial as it aids in the reduction of liver fat and overall inflammation. It improves gut health which is closely linked to liver health, subsequently alleviating the symptoms of a Fatty Liver.

A total of 66 NASH patients were randomly and equally divided into two groups receiving Bifidobacterium longum with FOS and lifestyle modification (i.e., diet and exercise) versus lifestyle modification alone. Bifidobacterium longum with Fos and lifestyle modification, when compared to lifestyle modification alone, significantly reduces TNF, CRP, serum AST levels, insulin resistance, and fatty liver [\[R\]](#).

68



Lycchee Extract

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take lycchee extract in supplement form, usually available as capsules or powder. For adults, the typical dosage can be around 100 to 200 mg daily, taken with meals. This supplement should be taken consistently for at least one month to begin observing potential health benefits.

TYPICAL STARTING DOSE

100 mg

Description

Lycchee extract is derived from lycchee fruit and is often used for its potential antioxidant and anti-inflammatory effects. It may offer benefits for skin health, immune function, and overall well-being when used as part of a balanced diet.

How it helps

Lycchee extract contains antioxidants and anti-inflammatory properties that can help protect the liver from damage. It helps in reducing fat accumulation in the liver, thus, improving fatty liver condition.

A 24-week study on 38 NAFLD patients using litchi extract oligonol showed reduced liver fat (MRI-PDFF), improved gut microbiota diversity, and increased beneficial bacteria producing short-chain fatty acids [\[R\]](#).

In a 24-week trial on 40 NAFLD patients, oligonol from Litchi chinensis extract had a limited effect, with 20% showing ≥30% reduction in MRI-PDFF, similar to the placebo group. No significant changes in other health markers were observed [\[R\]](#).

69



Clostridium Butyricum

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take Clostridium butyricum as a supplement in capsule or powder form, typically ranging from 300 to 450 mg per day. This should be consumed with a glass of water, ideally before meals. Continue daily for at least four weeks to evaluate its benefits.

TYPICAL STARTING DOSE

300 mg

Description

Clostridium butyricum is a probiotic bacterium believed to support digestive health by producing beneficial short-chain fatty acids in the gut. It is used in some probiotic supplements to promote gut microbiome balance and overall well-being.

How it helps

Clostridium Butyricum is a probiotic that aids in the production of butyrate, which helps reduce liver inflammation and fat accumulation, key factors in fatty liver disease. Consequently, it may aid in maintaining healthy liver condition and potentially reversing some symptoms of fatty liver disease.

In a [non-placebo-controlled trial of 96 patients with NAFLD](#), supplementation with C butyricum as an add-on to rosuvastatin **improved intestinal flora imbalance, reduced blood lipid (total cholesterol, triglycerides, free fatty acids) levels, and alleviated liver fibrosis and liver function damage markers (bilirubin, AST, ALT)** [\[R\]](#).

70



Garcinia Cambogia

IMPACT1 / 5

EVIDENCE1 / 5

How to implement

Take 500 mg of Garcinia Cambogia as a supplement 30 to 60 minutes before each meal. It is typically recommended to do this three times a day for effective results.

TYPICAL STARTING DOSE

500 mg

Description

Garcinia cambogia is a tropical fruit extract commonly used in weight management supplements. It contains hydroxycitric acid (HCA), which is believed to help curb appetite and support weight loss goals, although scientific evidence is mixed.

[Garcinia cambogia](#) is a plant native to Asia [\[R\]](#).

Different parts of *G. cambogia* are used to [\[R\]](#):

- Preserve and flavor food
- Make artwork and polish metals

In traditional medicine, people mainly use *G. cambogia* and its active compounds to manage weight [\[R\]](#), [\[R\]](#).

How it helps

In a non-placebo-controlled trial of 40 overweight or obese women with NAFLD, supplementation with *Garcinia cambogia* extract as an add-on to a low-calorie diet for 8 weeks reduced weight, BMI, waist circumference, hip circumference, fasting glucose, triglycerides, LDL cholesterol, and the triglycerides:HDL ratio while increasing HDL cholesterol [\[R\]](#).

Please note: *G. cambogia* may cause liver damage. Consult your doctor before taking it [\[R\]](#), [\[R\]](#), [\[R\]](#).

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Jiaogulan (Gynostemma Pentaphyllum)

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take a capsule of jiaogulan (gynostemma pentaphyllum) containing 450 mg to 500 mg, three times a day with meals. Continue this routine daily for best results.

TYPICAL STARTING DOSE
1350 mg

Description

Jiaogulan, often referred to as the "immortality herb," is an herb used in traditional Chinese medicine for its potential adaptogenic and antioxidant properties. Some research suggests it may support overall well-being and longevity, but more studies are needed to confirm these effects.

[Gynostemma](#) (*Gynostemma pentaphyllum*), also called jiaogulan, is a climbing vine native to Southeast Asia. It is used in traditional Chinese medicine for [R](#):

- High cholesterol
- Diabetes

People call it the "poor man's [ginseng](#)" because it may have similar benefits but cost less than Panax (Asian) ginseng [R](#), [R](#).

How it helps

In a placebo-controlled trial of 56 patients with NAFLD, supplementation with *Gynostemma pentaphyllum* (80 mL) for 4 months as an add-on to a controlled diet lowered BMI, AST, ALP, insulin, and insulin resistance better than the diet alone [R](#).

Jiaogulan is known to boost your body's antioxidant activity which aids in reducing inflammation and protecting liver cells from damage. It could help mitigate fatty liver by improving your body's use of glucose and fat, thereby reducing the amount of fat stored in your liver.

72



Keto Diet

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Adopt a diet that consists of about 70-80% fat, 10-20% protein, and 5-10% carbohydrates. Eliminate or significantly reduce the intake of sugar and starches like bread, pasta, rice, and potatoes, focusing instead on high-fat foods like meats, fatty fish, eggs, butter, and healthy oils, as well as low-carb vegetables like leafy greens. This dietary pattern should be maintained consistently for a period of at least 3-4 weeks to achieve ketosis, after which it can be adjusted based on individual goals and responses.

Description

The keto diet is a high-fat, low-carbohydrate eating plan designed to induce a state of ketosis in the body, where it primarily burns fat for energy. It is often used for weight loss and managing certain medical conditions.

The ketogenic diet, or the ‘keto’ diet, is rich in fat and restricts carb intake [\[R\]](#), [\[R\]](#).

On the ketogenic diet, 50 g of carbs or less are consumed per day. Around 55-80% of the calories come from fat [\[R\]](#).

The ketogenic diet depletes the body of sugars like glucose. When people fast or eat very little carbs, the body makes less insulin. In response, the body starts using fat for energy.

When the body only uses fat for energy, molecules called ketones are formed. This state is called *ketosis*.

The ketogenic diet may help with:

- Seizures [\[R\]](#)
- Excess weight [\[R\]](#)
- Diabetes [\[R\]](#), [\[R\]](#)

How it helps

A Keto diet, high in healthy fats and low in carbs, encourages your body to enter ketosis, a metabolic state where fat is burned for energy instead of carbohydrates. This can help reduce the fat storage in your liver, improving fatty liver condition.

In an uncontrolled trial of 5 obese participants with fatty liver, following a ketogenic diet for 6 months improved steatosis, inflammation, and fibrosis in 4 out of 5 biopsies. In a placebo-controlled trial of 14 overweight participants, following a ketogenic diet for 6 weeks reduced liver fat, especially in those with NAFLD. Men benefited more than women from following a very low-calorie ketogenic diet for 25 days in terms of NAFLD in an uncontrolled trial of 70 severely obese participants. [\[R\]](#), [\[R\]](#), [\[R\]](#).

73



Pomegranate Seed Oil

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 2 to 3 grams of pomegranate seed oil daily, either in capsule form or as a liquid, ideally divided into two doses. Continue this supplementation for at least 12 weeks to observe potential benefits.

TYPICAL STARTING DOSE

2 g

Description

Pomegranate seed oil is extracted from the seeds of the fruit and is rich in fatty acids, primarily puniic acid. It has been utilized traditionally for centuries in its native regions from the Mediterranean to Asia. It is rich in antioxidant compounds like punicalagins, anthocyanins, and puniic acid. It is used in skincare and haircare products for its moisturizing and potential anti-inflammatory properties.

How it helps

Pomegranate, including its seed oil, is rich in polyphenols, which have high antioxidant capabilities that can help lower oxidative stress and inflammation associated with NAFLD. The studies have revealed that pomegranate juice and other parts of the fruit can decrease the activity of liver damage markers like AST and ALT, lower inflammation markers such as TNF-α, and improve overall antioxidant capacity in people with fatty liver [R].

Pomegranate extract may help by inhibiting diet-induced hyperlipidemia and hepatic lipid deposition [R].

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Lactobacillus Reuteri

IMPACT1 / 5

EVIDENCE1 / 5

How to implement

Take a supplement containing Lactobacillus reuteri daily, ideally choosing a product that specifies CFU (colony-forming units) to ensure you receive an effective dose. Dosage can vary depending on the specific product, but it's typically around 10 billion CFUs. Continue taking the supplement for at least 4 to 8 weeks to evaluate its benefits for your gut health.

TYPICAL STARTING DOSE
10 billion CFU

Description

Lactobacillus reuteri is a beneficial probiotic strain that can support digestive health and contribute to a balanced gut microbiome. It may help improve gut function, enhance nutrient absorption, and bolster the immune system, promoting overall well-being.

[Lactobacillus reuteri](#) is a [probiotic](#) bacterium that is part of the normal [microbiome](#) of the gut, skin, urinary tract, and, occasionally, the stomach [\[R\]](#).

L. reuteri is also used as a probiotic. People take it to help with [\[R, R, R, R\]](#):

- High cholesterol
- Gut diseases
- Constipation
- Helicobacter pylori infections

In the 1960s, **30-40 percent** of people had *Lactobacillus reuteri* as a part of their microbiome. Today, estimates suggest it is found in only **10-20 percent** [\[R, R\]](#).

How it helps

Lactobacillus Reuteri is a probiotic that helps improve gut health and reduce inflammation. By rebalancing the gut microbiota, it assists in decreasing liver fat accumulation, aiding in treatment of fatty liver.

In a clinical trial with 50 NASH patients, the impact of synbiotic supplementation on metabolic parameters, hepatic steatosis, intestinal permeability, SIBO, and LPS serum levels was investigated. Patients were divided into two groups: one receiving synbiotics (Lactobacillus reuteri with guar gum and inulin) along with nutritional counseling, and the other receiving only nutritional counseling. After three months, only the synbiotic group showed reduced steatosis, weight loss, and decreased BMI and waist circumference [R](#).

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Strength Training

IMPACT1 / 5

EVIDENCE1 / 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

A study demonstrated that resistance exercise (for 8 weeks) led to a 13% relative reduction in liver lipid content in sedentary adults with fatty liver, even without any changes in body weight. Improvements were also noted in lipid oxidation and glucose control, indicating that strength training can have beneficial effects on metabolic health [R].

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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 [placebo-controlled trial of 41 patients with NAFLD](#), consuming a cranberry supplement (288 mg/day) for 12 weeks **reduced ALT and insulin while improving insulin resistance, fatty liver grade, and anthropometric measurements** [\[R\]](#).

Cranberries are high in antioxidants that help improve liver function and overall health. They also aid in reducing inflammation and fat deposits in the liver.

77



Avoid Phthalate Exposure

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

To avoid phthalate exposure, check product labels and choose phthalate-free options for personal care items, plastics (look for recycling codes 3 and 7 or the letters 'V' or 'PVC'), and household products. Additionally, reduce the use of plastic containers for food storage, especially those not marked as 'phthalate-free', and avoid microwaving food in plastic containers. Aim to make these changes consistently in your daily life for long-term health benefits.

Description

Avoiding phthalate exposure involves choosing phthalate-free products, such as personal care items and plastics, to minimize potential endocrine-disrupting effects and protect reproductive and hormonal health.

How it helps

1450 participants, NHANES; higher prevalence of NAFLD is correlated with DEHP but not DINP or DIDP in American adults. There is no significant relationship between phthalates and liver fibrosis [\[R\]](#).

78



Cardamom

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take 500 mg of cardamom powder or extract supplement daily with water, preferably after meals. Continue this regimen daily for at least 8-12 weeks to potentially observe benefits.

TYPICAL STARTING DOSE

500 mg

Description

Cardamom is a fragrant spice known for its potential to aid digestion, reduce inflammation, and provide antioxidant benefits. Incorporating cardamom into your diet or as a herbal remedy can promote overall digestive comfort and well-being.

[Cardamom](#) (*Elettaria cardamomum*) is a plant in the ginger family used to flavor food. It’s also known as green cardamom or the “Queen of Spices,” due to its price tag [\[R\]](#), [\[R\]](#).

The plant produces pods or capsules that contain 15-20 seeds each. The seeds can be used whole or can be ground to a fine powder before use [\[R\]](#), [\[R\]](#).

Some people use cardamom powder to help lower triglycerides [\[R\]](#), [\[R\]](#).

How it helps

In a placebo-controlled trial of 87 patients with NAFLD, supplementation with cardamom (500 mg, 3x/day for 3 months) improved the grade of fatty liver, blood sugar and lipid profile, and irisin level [\[R\]](#).

Cardamom contains antioxidants that can decrease inflammation and oxidative stress, both of which can exacerbate fatty liver disease. Moreover, it may also help in weight management, which is crucial in managing and treating fatty liver disease.

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Reishi

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

Take a reishi mushroom supplement, ranging from 500mg to 1500mg once daily. It is best consumed with water and can be taken with or without food. Continue consistently for at least 2 to 3 months to observe potential benefits.

Description

Reishi (*Ganoderma lucidum*) is a type of medicinal mushroom consumed in various forms, including teas, extracts, and capsules. Native to Asia, reishi has been used for centuries in traditional Chinese medicine for its potential to boost the immune system, promote relaxation, and support overall well-being. Reishi contains various compounds, including triterpenes and polysaccharides.

How it helps

Reishi is a type of mushroom that contains compounds which are known to improve liver function and promote detoxification. In the case of fatty liver, it may aid in the prevention or slow the progression of liver damage by reducing fat accumulation and inflammation.

In [4 placebo-controlled trials of 42 healthy volunteers](#), supplementation with reishi mushroom (225 mg/day) for 6 months **reverted mild fatty liver to normal condition and lowered liver damage markers (GOT and GPT)** [\[R\]](#).

80



Alpha-GPC Choline

IMPACT

1 / 5

EVIDENCE

1 / 5

How to implement

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

TYPICAL STARTING DOSE

300 mg

Description

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

How it helps

Alpha-GPC Choline helps by reducing liver fat as it's instrumental in breaking down fat cells and turning them into usable energy. By doing this, it can aid in the treatment of fatty liver by reducing the fatty deposits in the liver.

In a study with 8 healthy males, a single dose of 1,000 mg of alpha-GPC led to increased plasma growth hormone secretion after 60 minutes and raised serum free fatty acid levels after 120 minutes. Similar effects were observed with serum acetoacetate and 3-hydroxybutyrate levels, indicating enhanced hepatic fat oxidation at 120 minutes after alpha-GPC ingestion [\[R\]](#).

81



Kimchi

IMPACT

0 / 5

EVIDENCE

1 / 5

How to implement

Incorporate about a half cup of kimchi into one of your daily meals. This could be as a side dish or part of the meal for at least one month to observe potential health benefits such as improved digestion.

Description

Kimchi is a fermented vegetable dish commonly consumed in Korean cuisine. It's packed with probiotics and nutrients, which can promote gut health and boost the immune system.

How it helps

Kimchi may improve metabolic parameters such as blood glucose, insulin sensitivity, blood lipid profile, and anthropometric measurements, potentially helping prevent NAFLD. Fermented kimchi may be more effective than fresh kimchi [\[R\]](#), [\[R\]](#), [\[R\]](#).

 PERSONALIZED TO YOUR GENES

Your ***PNPLA3*** gene variant has been associated with an increased risk of NAFLD. Consuming kimchi may decrease the risk in carriers [\[R\]](#).

YOUR GENETIC VARIANTS

GENE	SNP	GENOTYPE	EVIDENCE
PNPLA3	rs738409	GG	

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Dietary L-Alanine

IMPACT

0 / 5

EVIDENCE

0 / 5

How to implement

Incorporate foods high in L-alanine, such as meat, fish, dairy, eggs, and certain beans and seeds, into your daily meals. For a specific dietary intake, aim to consume these alanine-rich foods as part of at least two meals per day to help meet your body's alanine needs.

Description

L-alanine is a non-essential amino acid that plays a crucial role in the body's energy metabolism, particularly during periods of intense exercise. It can help support endurance and muscle recovery by providing a source of energy and aiding in the removal of harmful metabolic byproducts like lactic acid.

How it helps

A Mendelian randomization study indicated that genetically predicted higher levels of alanine and phenyl lactate were negatively correlated with NAFLD [\[R\]](#).

Next Steps

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

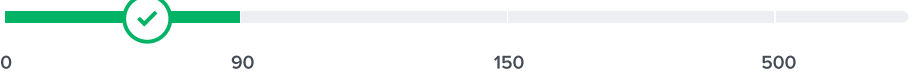
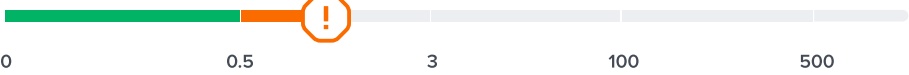
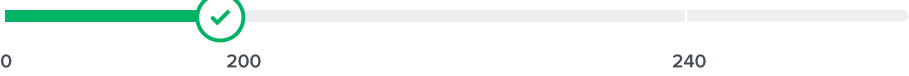
Now that you've seen your DNA-based results for this health topic, let's take a look at other contributing factors.

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.

	ALT	26 IU/L		9 Nov 2025
	AST	17 IU/L		9 Nov 2025
	ALP	68 IU/L		9 Nov 2025
	% Saturation	60 %		9 Nov 2025
	SHBG	39.3 nmol/L		9 Nov 2025
	Lymphocytes (%)	21.4 %		9 Nov 2025
	GGT	9 IU/L		9 Nov 2025
	Bilirubin, Direct	0.3 mg/dL		9 Nov 2025
	Ferritin	102.2 ng/mL		9 Nov 2025

	Glucose, Fasting	97 mg/dL		9 Nov 2025
	Triglycerides	54 mg/dL		9 Nov 2025
	Bilirubin, Indirect	0.7 mg/dL		9 Nov 2025
	Albumin	4.3 g/dL		9 Nov 2025
	Homocysteine	12.84 umol/L		9 Nov 2025
	Insulin, Fasting	9.08 uU/mL		9 Nov 2025
	hs-CRP	1.6 mg/L		9 Nov 2025
	Testosterone, Total	1500 ng/dL		9 Nov 2025
	Bilirubin, Total	1 mg/dL		9 Nov 2025
	Cholesterol, Total	182 mg/dL		9 Nov 2025
	HbA1c (%)	4 %		29 Dec 2025
	Iron	228 mcg/dL		9 Nov 2025