

# Examine.com

## Liver Health

# Medical Disclaimer & Important Note

This guide is a general health-related information product, intended for healthy adults over the age of 18.

This guide is for educational purposes only. It is not medical advice. Please consult a medical or health professional before you begin any exercise, nutrition, or supplementation program, or if you have questions about your health.

Participating in exercise activities or using products mentioned in this guide may pose risks for people in poor health or with pre-existing physical or mental health conditions.

Do not use any products or participate in any activities if you are in poor health or have a pre-existing mental or physical health condition. If you choose to participate, you do so of your own free will, and you knowingly and voluntarily accept the risks.

While we will mention major known drug interactions, it may be possible for any supplement to interact with medications or other drugs. If you are currently taking medication, consult a health professional prior to using any supplement in this guide.

Specific study results described in this guide should not be considered representative of typical results. Not all supplements provide the exact amount of compounds as listed on the label. Always investigate supplement companies, as well as the supplement itself, before purchasing anything. Herbs, rather than isolated compounds, may also have some variability from one batch to the next that can alter the efficacy.

To read the evidence supporting claims mentioned in this guide, please visit [Examine.com](https://www.examine.com).

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# How to use this Guide

The team at Examine.com has been publishing research on nutrition and supplementation since March 2011. In that time, we've learned a great deal about supplements, especially how they can work together to help you with health goals.

This stack guide help you figure out which supplements can help you and which will hinder and/or be a waste of your money for your desired goals.

The following four sections present information on supplements that are relevant to *Liver Health*:

1. Base Supplements
2. Proven Options
3. Unproven Options
4. Cautionary and Overhyped Options

**Base Supplements** are recommended for the majority of people with this goal. They are either effective on their own or are required to boost the effects of another supplement. These are the first supplements to consider for your stack. Base Supplements are more researched and have less adverse drug interactions than options.

**Proven Options** are supplements that will provide a lot of benefits, but only in the right context. They cannot be recommended for everyone, but if you read the entry and find that you meet the criteria, feel free to add the supplement to your stack.

**Unproven Options** are another group of potentially beneficial supplements, but they lack evidence for their effects. They cannot be recommended with the same confidence as proven options. They could work or be a waste of your money - there is not enough evidence to know for sure. Keep unproven options in mind, but approach them cautiously when incorporating them into your stack.

**Cautionary and Overhyped Options** are supplements that are claimed to provide benefits but have been shown to be ineffective. If a supplement is deemed too risky to be used, it will also be found in this section. **Do not** add these compounds to your stack; they tend to be a waste of money or potentially harmful to your health.

Once we have explained the various supplements that you need to be aware of, the **Assembling your Supplement Stack** section will outline how different supplements can be combined, based on your objectives.

After that, we follow up with the **Stack Modification FAQ**, in which we cover common questions that may arise when assembling your stack.

Lastly, we include information on **Precautions and Troubleshooting**.

With all this combined, you should be able to identify and assemble a supplement stack best suited for your goals and objectives.

## Methylation agent

### Why you should take it

Methylation agents are compounds that support levels of S-adenosyl [methionine](#) (S-AdoMet) in the liver. Low levels of S-AdoMet are associated with non-alcoholic fatty liver disease (NAFLD).

Though methylation agents do not provide a curative effect, they are thought to reduce the risk of accumulating liver fat in the presence of compounds that may harm the liver, such as alcohol.

[Choline](#) and [trimethylglycine \(TMG\)](#) are proven methylation agents and considered base supplements for liver health. S-AdoMet itself can also be supplemented, but it is significantly more expensive than the options above. Creatine is another option, as it can preserve S-AdoMet levels in the liver, though it has not been noted to offer any protective effects.

### How to take it

To supplement choline, take 250 – 500 mg of choline bitartrate once a day, with a meal. If you eat more than four eggs (or yolks) a day, you do not need to supplement choline.

To supplement trimethylglycine (betaine), take 500 – 1,000 mg, once a day with a meal, as a minimum effective dose. Beets (250 - 500 g) and spinach (250 - 500 g) also contain trimethylglycine. Doses up to 2,500 - 6,000 mg may be more beneficial, but can only be acquired through the diet with the help of a lot of spinach.

To supplement creatine, take 2 g with a meal. Active people should supplement 5 g or more instead.

Some people are creatine nonresponders, which means creatine is unable to pass from their blood to their muscles.

More research is needed to find a proven way to circumvent creatine nonresponse. Some evidence suggests it helps to take creatine with a meal

high in both protein and carbohydrates, close to the time of actual muscle contraction. If you experience creatine nonresponse, consider taking creatine with a meal either before or after a workout.

If you respond to creatine, you don't have to worry about timing supplementation, though you will probably want to take it with a meal to lower the risk of an upset stomach.

## N-Acetylcysteine

### **Why you should take it**

N-acetylcysteine (NAC) is a compound used for producing glutathione. Low levels of glutathione are associated with various inflammatory and oxidative diseases. NAC supplementation will support glutathione levels and prevent any related health issues.

NAC supplementation is often used in cases of liver failure and toxin-induced liver damage, particularly paracetamol/acetaminophen overdoses. Low doses of NAC are a cheap and effective way to support liver antioxidants.

### **How to take it**

To supplement NAC, take 750 – 1,000 mg, once a day, if you have no known or likely liver ailments. People with oxidative or inflammatory liver problems should supplement 5,000 mg a day, after talking to their doctor.

NAC does not need to be taken with a meal.

## Milk Thistle

### **Why it is a proven option**

*Silybum marianum*, also known as milk thistle, is an herb traditionally used as a detoxifying agent. It is most known for being an antidote to death cap mushroom poisoning.

Milk thistle has limited evidence for increasing the DNA and protein synthesis rates in the liver. Milk thistle also acts as an anti-inflammatory agent in the presence of liver toxins.

People who are not using compounds that may harm the liver (ex. alcohol or medication) do not need to supplement milk thistle.

***Milk thistle supplementation may lower the effectiveness of some oral contraceptives.***

### **How to take it**

Milk thistle is dosed based on its silymarin content, which is the bioactive compound responsible for milk thistle's effects. To supplement milk thistle, take 150 mg of silymarin twice a day, for a total daily dose of 300 mg.

## Tauroursodeoxycholic Acid (TUDCA)

### **Why it is a proven option**

Tauroursodeoxycholic acid (TUDCA) is a water soluble bile acid, bound with the amino acid taurine. TUDCA supplementation can regulate inflammation and oxidation in the liver.

More evidence is needed to confirm TUDCA's protective effect on the liver. There is, however, significant evidence that TUDCA supplementation reduces the risk of gallstone formation, when taken alongside a low cholesterol diet. TUDCA can also be used to treat cholestasis, which is a disease characterized by bile being unable to flow in and out of the liver.

TUDCA supplementation is safe and effective, but it cannot be recommended as a general liver health supplement. It is a valuable supplement for people with cholesterol-rich non calcified gallstones, since it can induce cholesterol efflux, which is a way of regulating cholesterol levels in cells.

One study found that TUDCA supplementation can increase insulin sensitivity in muscle and liver cells in obese people, but these results have not been replicated.

### **How to take it**

To supplement TUDCA for the purpose of dissolving gallstones, take 500 – 1,750 mg a night, alongside a low cholesterol diet.

## Spirulina

### **Why it is an unproven option**

Spirulina is a blue-green algae with a high protein content. It also contains a compound called C-phycoerythrin, which may reduce liver inflammation.

Spirulina supplementation may be able to benefit people suffering from non-alcoholic fatty liver disease (NAFLD). Larger human studies on spirulina are ongoing and have not been published, but preliminary human evidence is promising. Spirulina is safe and can provide benefits for people suffering from oxidative damage caused by the immune system.

Spirulina's main bioactive, C-phycoerythrin, is a bile acid mimetic, which is why spirulina supplementation is thought to mimic Gilbert's Syndrome, a medical condition characterized by high levels of bile acids in the body. Elevated bile acid levels are associated with a reduced risk of obesity, diabetes, and cardiovascular complications. People with Gilbert's Syndrome tend to have a longer lifespan.

### **How to take it**

To supplement spirulina, take 5 – 10 g a day. People weighing 200 pounds or more should supplement toward the high end of the dosage range. Spirulina can be taken with food or an empty stomach.

Spirulina can be supplemented through a powdered form, mixed into a shake, or tablets.

## Picrorhiza kurroa

### **Why it is an unproven option**

*Picrorhiza kurroa* is a plant used in traditional Indian medicine to improve liver health.

When tested on animals, *Picrorhiza kurroa* supplementation was even more effective than milk thistle at protecting against an assortment of toxins, including death cap mushroom.

*Picrorhiza kurroa* also has antioxidant properties, and supplementation can improve bile movement in and out of the liver. There is even preliminary evidence to suggest *Picrorhiza kurroa* supplementation can reduce fat accumulation in the liver.

Though *Picrorhiza kurroa* has significant animal evidence for its effects, further human studies are needed before *Picrorhiza kurroa* can be recommended for liver health supplementation.

*Picrorhiza kurroa* is an endangered plant. If you choose to supplement *Picrorhiza kurroa*, seek out a company that focuses on plant sustainability.

## **How to take it**

*Picrorhiza kurroa* supplements are dosed based on their Picroliv content, which is the amount of picroliv I and picroliv II in the supplement. These are the compounds responsible for *Picrorhiza kurroa*'s effects. The standard dosages are:

- 130-260 mg for a 150 lb person
- 170-340 mg for a 200 lb person
- 220-440 mg for a 250 lb person

Do not take more than 440 mg even if you weigh more than 250 pounds.

# Cautionary & Overhyped Options

*There are no overhyped supplements to caution against.*

# Assembling Your Supplement Stack

The following outlines how to incorporate this supplement stack into your daily nutrition habits.

## Incorporating Base Supplements

The base supplements in the Liver Health stack include a methylation agent, which can be either dietary **choline** or **trimethylglycine** (betaine), and **N-acetylcysteine**.

People with diets high in choline and trimethylglycine, which includes foods like beets and eggs, may not need to supplement either methylation agent. People supplementing creatine also may not need to supplement a **methylation agent**.

N-acetylcysteine (NAC) should only be supplemented at higher doses (up to 5,000 mg) if oxidative damage or inflammation poses a threat to the liver.

## Incorporating Supplement Options

### For people with fatty liver

Take the base supplements as described above, then add **spirulina** (5 – 10 g), taken over the course of a day.

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### For people with gallstones in their liver

Take a base **methylation agent** and a low dose of **N-acetylcysteine**, once a day with a meal. Add **TUDCA** (500 – 1,750 mg) a night. This supplement combination will only alleviate cholesterol rich gallstones, and will not help if the gallstone is rich in calcium and other minerals.

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## For people concerned with liver health after a night of drinking

Take the base supplements as described above. The morning after, take milk thistle (150 mg) in two doses, one upon waking and one 4 – 6 hours later.

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## Other Options

*Picrorhiza kurroa* can replace milk thistle supplementation, but milk thistle is recommended in this guide because it is more widely available and it has more evidence for its effects.

## How do I add supplements to my stack that are not covered in this guide?

Before adding a new supplement to your stack, supplement your current stack for a few weeks to determine if you need to make a new addition. If you want to make multiple changes to your stack, pick one supplement to add at a time. Identify the stack change that you think will be the most effective, and do your research:

1. Use [Examine.com](https://www.examine.com) to determine if that supplement would have a negative interaction with your current stack. Talk to your doctor about including a new supplement in your stack.
2. Introduce the new supplement at half of the regular dose.
3. After a week with the new supplement, slowly increase the dose to the recommended dose if you are not experiencing the effects you want.

Stacks are intended to be synergistic, which means taking two supplements together may provide more effects than the supplements by themselves. New supplements should be added carefully, since even low doses can be powerful if other supplements in your stack improve their effects.

## Can I modify the recommended doses?

If a supplement has an established advised dosage range, stay within that range. If a supplement has a recommended dose, and not a range, stay within 10% of that dose. Halving or doubling an advised dose could be ineffective or even dangerous.

The safest way to add dietary supplements to your life is one at a time. If you are considering purchasing several supplements, purchase only one and add the others after a week or two of supplementation. This will limit the risk of new supplements, and it will also make it easier to figure out what supplements are providing you with your newfound benefits.

### If I don't have any of the liver problems listed above, can I supplement for liver health anyway?

Most organs are 'healthy' if they are not diseased or damaged. If there is no liver damage present then it is not possible to supplement to increase liver health, but preventative supplementation is an option.

# Precautions & Troubleshooting

The safest way to add dietary supplements to your life is one at a time. If you are considering purchasing several supplements, purchase only one and add the others after a week or two of supplementation. This will limit the risk of new supplements, and it will also make it easier to figure out what supplements are providing you with your newfound benefits.