



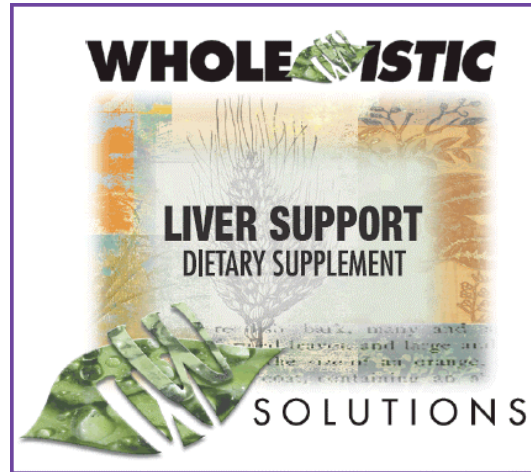
Liver Support

The liver is one of the body's most vital organs, performing hundreds of functions. Its complexity makes it susceptible to almost as many different diseases. Most are rare, but a few including hepatitis, cirrhosis, alcohol-related disorders, and liver cancer, are all too common. The American Liver Foundation reports that more than 25 million people are afflicted with liver and gallbladder disease each year.

The liver processes many chemicals necessary for health, converting carbohydrates, fats, and proteins into substances essential for life. As our most important detoxifying organ, it cleanses the blood of toxins either ingested or produced by the body itself. When the liver is not functioning optimally, the body begins to store toxins in the tissues leading to any number of mild to serious conditions.

The herbs and nutrients in Liver Support have been carefully selected to provide a synergistic benefit for detoxifying the liver and supporting its function. Liver Support contains:

Milk thistle (*Silybum marianum*) is the most widely recognized natural remedy for liver health. It is an herb that is well documented in early traditional herbal medicine, and in Europe, doctors routinely prescribe milk thistle as medicine for their hepatitis patients.



Supplement Facts

Serving Size: 1 Capsule
Servings Per Container: 60

	Elemental Amount per dose	% DV
Niacinamide (Flush Free Niacin)	10 mg	50%
Selenium (from L-SelenoMethionine 0.5%)	50 mcg	71%
Chlorella Powder (Japanese Cracked Wall Chlorella)	100 mg	*
N-Acetyl Cysteine	100 mg	*
Beef Liver Powder (Undefatted Beef Liver Powder)	100 mg	*
Choline Bitartrate	90 mg	*
Milk Thistle Extract Pwd 80% Silymarin (Silybum marianum)	80 mg	*
Sarsaparilla Extract Pwd 4:1 (Smilax officinalis)	60 mg	*
Betaine Powder (derived from Beet Powder)	50 mg	*
Licorice Root Extract Pwd (< 3% Deglycyrrhinated)	50 mg	*
Artichoke Extract Powder 8:1 (Cynara scolymus)	40 mg	*
Black Radish Root Extract Pwd 8:1 (Raphanus niger)	40 mg	*
L-Methionine	70 mcg	*

* Daily Value (DV) not established

Other ingredients: Gelatin, Rice Bran and Magnesium stearate (Vegetable source)





Numerous scientific studies from abroad and as well as in the U.S. indicate that it may help support healthy liver function.

These studies suggest that milk thistle not only protects liver cells by preventing toxins (including ethanol (alcohol), acetaminophen (Tylenol), and carbon tetrachloride) from penetrating the interior of liver cells, but that it also stimulates protein synthesis to accelerate the regeneration and production of hepatocytes, the working cells of the liver. This process of actually enhancing the ability of the liver to make new cells to replace damaged ones is extremely important in patient recovery from liver disease.

Silymarin, extracted from milk thistle seeds, consists of a large number of flavonoids, including silybin, isosilybin, dehydrosilybin, silydianin and silychristin. Most liver toxins produce their damaging effects by free radical mechanisms. These flavonoids function as antioxidants, protecting cell membranes from free-radical-mediated oxidative damage, known as lipid peroxidation.

As an antioxidant, silymarin also has anti-inflammatory effects, blocking leukotriene formation and stabilizing mast cells and liver macrophages. Leukotrienes are among the most damaging inflammatory chemicals that the body produces, and mast cells and macrophages also contribute to inflammation. Reducing inflammation lowers tissue destruction, and allows liver cells to function at optimum levels. Silymarin also helps regulate the balance of prostaglandins in

the liver. Prostaglandins are hormone like molecules that regulate a variety of body functions.

Other compounds in milk thistle have a similarly renewing effect on the kidneys, and may also be beneficial for the prostate gland.

Black Radish, commonly called Spanish Black Radish, has been used medicinally since ancient times. Black Radish is rich in B Vitamins, Vitamin C, sulfur, and fiber. It is an antioxidant and beneficial to digestion. Black Radish Root creates a tonic effect on the respiratory system, activates the liver cells, maintains a healthy gallbladder, aids digestion, facilitates a diuretic effect, has cleansing and antibacterial properties, and is an excellent coadjutant for a hepatic colic by stimulating the secretion of bile. By being rich in Vitamin C, Black Radish root makes for an interesting ally during winter months to help fight off coughs, infections and free radicals. Additionally, its high fiber content increases peristaltic movements, and is a helpful laxative for constipation and bile movement.

Defatted Beef Liver Concentrate from fresh, hormone-free Argentine Beef Liver is carefully processed to preserve all the fragile nutritional elements without additives or solvents residues. Liver powder provides a well-balanced combination of nutrients needed for healthy liver function. It is naturally rich in choline and vitamin B12, which prevent deposition of fat in the liver (lipotropes).





Betaine or trimethylglycine was first discovered in the juice of sugar beets (*Beta vulgaris*). Betaine is a metabolite of choline (see Choline) and is a substrate in one of the two recycling pathways that convert homocysteine to L-methionine. Betaine may lower elevated homocysteine levels in some.

Betaine may also have lipotropic and hepatoprotective activity. A lipotropic agent is defined as a substance that prevents the deposition of fat in the liver or accelerates its removal. The condition of fatty degeneration is called steatosis. Betaine, choline and L-methionine have been found to prevent or to reverse hepatic steatosis in animal studies. It is thought that the lipotropic activity of betaine, choline and L-methionine is mediated via the body's principal transmethylating agent, S-adenosylmethionine (SAmE). SAmE is involved in a number of biochemical functions that may promote liver health, including the formation of phospholipids, which are essential for normal cell membrane formation and function.

Betaine has been found to protect the livers of experimental animals against the hepatotoxins ethanol and carbon tetrachloride. This protective effect of betaine is thought to be mediated via SAmE.

Choline is an essential nutrient involved in the production and metabolism of fats and cholesterol which protects the liver from fatty deposits. Most of the choline in the body is contained in a specialized fat molecule called phosphatidylcholine, better known as lecithin. Without lecithin,

fat and cholesterol accumulate in the liver leading to a condition called "fatty liver" that can progress to the point of liver damage. An association between a low-choline diet and fatty infiltration of the liver was first reported in 1935. Cholines, as well as other substances, such as methionine, folic acid and vitamin B12, that prevent deposition of fat in the liver are known as lipotropes. The primary criterion used to estimate the "Adequate Intake" (AI) for choline is the prevention of liver damage as assessed by measuring serum levels of the liver enzyme alanine aminotransferase or ALT.

Increased choline intake has recently been recommended by the Food and Nutrition Board of the National Academy of Sciences for pregnant and nursing women to help ensure normal fetal brain development. In addition to being helpful in some liver diseases, choline may be beneficial in treating manic conditions, cognitive disorders, tardive dyskinesia and, possibly, some cancers.

Sarsaparilla has been used in herbal medicine for the treatment of diseases associated with increased endo-toxin levels, including arthritis, intestinal ulcerative conditions, eczema and psoriasis. Sarsaparilla has been hyped as a natural (and legal) source of anabolic steroids for body-builders. Although it *does* contain steroid compounds, they are not anabolic. These non-anabolic compounds, called saponins, bind with toxins in the digestive tract. The saponins along with numerous other flavonoids in sarsaparilla stimulate the removal of accumulated waste products from the cells, blood and lymph. These actions tend to increase the health and vitality of the entire body, thereby increasing energy and endurance.





A proprietary blend of artichoke and sarsaparilla, named LIVUNO, was developed and studied for its effects on liver disease caused by alcohol. These nutrients were chosen because they contain an abundance of the following naturally occurring bioflavonoids and polyphenols: silymarin, quercetin, catechin, hesperidin, rutin, cynarin and chlorogenic acid. In two separate double blind studies, after only 15 days of treatment for those patients' taking the blend of artichoke and sarsaparilla, their blood-work improved an average of 30% and 23% respectively. Results were based on measuring factors such as bilirubin and prothrombine time. In both indexes the group who took placebo had a negative average of recuperation. Thus, the protective, detoxifying and regenerative effect of the complex of flavonoids from artichoke and sarsaparilla was evident in liver disease due to alcohol.

Artichoke is a member of the milk thistle family. In herbal medicine the artichoke has been used for centuries to increase bile production in the liver, and to mobilize fatty stores in the liver and detoxify them. Cynarin is considered one of artichoke's main biologically active chemicals. It has been shown to stimulate the clearance of bile from the liver, prevent congestion in the liver and thus diminish the chances of liver damage. Other documented "active" chemicals include flavonoids, sesquiterpene lactones, polyphenols and caffeoylquinic acids.

The liver detoxifying and protective properties of artichoke first came to the attention of researchers in 1966 (in a study that supported its effect on liver regeneration in rats). A 1987 study found that the cynarin and caffeic acids in artichoke have significant protective effects on rat liver cells subjected to harmful chemical agents. A study in 2002, also noted that artichoke leaf extract reversed damage done by harmful chemicals in rat liver cells and in doing so, enhanced bile production.

A portion of artichoke's liver protective properties can also be attributed to its antioxidant actions which protect liver cell membranes from free-radical-mediated oxidative damage.

N-acetyl-L-cysteine

The only supplement that effectively raises glutathione levels in the body is N-acetyl-L-cysteine (NAC). A major role of glutathione is the maintenance of a normal redox state of the liver, a state which is vital to normal hepatic function. It is thought that NAC, in its role as a precursor to L-cysteine and glutathione, may protect cell membranes against lipid peroxidation and protein oxidation.

High-dose NAC has been used successfully as an antidote for acetaminophen poisoning. Given that acetaminophen overdose is the most common cause of calls to poison control centers in the United States, NAC's contribution is quite significant in this context. (An advisory committee to the Food and Drug Administration has recommended that drugs containing acetaminophen, the active ingredient in Tylenol, warn on the label that exceeding





the recommended maximum dosage (eight 500 mg tablets daily) can cause liver problems). Fulminate hepatic failure induced by acetaminophen overdose has been significantly ameliorated by NAC treatment. It is believed that NAC accomplishes these benefits by preventing hepatic necrosis through replenishment of glutathione and, possibly, through enhanced oxygen delivery and consumption.

Additionally, in one series of 11 patients with *Amanita phalloides* (death cap mushroom) poisoning, a detoxifying regimen that included NAC and milk thistle extract produced successful recovery in all but one subject without need of liver transplantation. It has been suggested that NAC might also be useful in some infectious liver disorders, such as hepatitis C.

Chlorella is a genus of unicellular green algae belonging to the Phylum *Chlorophyta*. Chlorophytes comprise a major component of the phytoplankton. Chlorella is rich in protein. In addition, it is rich in chlorophyll and carotenoids such as astaxanthin, canthaxanthin, flavoxanthin, loraxanthin, neoxanthin and violaxanthin. Chlorella also contains the xanthophyll, echinenone.

Chlorella has demonstrated anti-tumor and anti-metastatic effects in animal studies. An extract of chlorella markedly increased survival time in mice injected with tumor cells. A glycoprotein constituent of chlorella demonstrated anti-tumor properties *in vitro*. Recently, a glycoprotein extract exerted a

pronounced anti-tumor effect against spontaneous and experimentally induced metastasis in mice. Immune-enhancement appeared to play a central role, particularly T cell activation in the peripheral lymph nodes of the tumor-bearing mice.

Chlorella has shown some anti-atherogenic activity and some radio-protective and chemo-detoxifying effects. Aortic atheromatous lesions were significantly inhibited by chlorella in rabbits on a high-cholesterol diet. Chlorella has demonstrated an ability to protect against gamma-radiation, as well as against a number of drugs and various toxic chemicals. In one animal experiment, it alleviated some of the side effects of 5-fluorouracil. In another study, chlorella helped prevent gastrointestinal absorption and promoted the excretion of dioxin already present in tissues in rats.

It has shown some preliminary benefit in immune function, and in a recent clinical trial, patients with moderately severe symptoms of fibromyalgia were said to derive significant benefit from consumption of chlorella. In one animal model of peptic ulcer, oral administration of dry powder chlorella helped protect gastric mucosa.

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Deglycyrrhizinated licorice,

commonly abbreviated DGL, is an extract of the root of true licorice, *Glycyrrhiza glabra*. The Glycyrrhizinic and glycyrrhetic acids, associated with high blood pressure, cardiac arrhythmias, water retention and other problems have been removed from deglycyrrhizinated licorice, yielding a product without those undesirable effects. Research has shown that deglycyrrhizinated licorice supports and promotes a healthy stomach lining and intestinal flora.

Licorice has a number of medicinal properties, including peptic ulcer healing, anti-inflammatory, anti-microbial and antioxidant activities. DGL was found to stimulate and/or accelerate the differentiation of glandular cells in the fore-stomach of the rat, as well as stimulate mucus formation and secretion. The stimulation of mucus secretion in the stomach is believed to account, at least in part, for the activity of DGL. DGL contains some flavonoids that have antimicrobial activity, including activity against the ulcer-causing bacterium *Helicobacter pylori*. This too could account, at least in part, for DGL's activity. New substances are continually being discovered in licorice, and it is possible that some of these may also play a role in DGL's activity.

DGL appears to confer significant protection against the gastric mucosal damage caused by aspirin and other nonsteroidal anti-inflammatory drugs. Gastric bleeding induced by aspirin intake

can also be reduced with DGL supplementation.

Selenium is an essential cofactor for an important antioxidant enzyme system in the body called glutathione peroxidase. The antioxidant role of glutathione peroxidases is to detoxify hydrogen peroxide and fatty acid-derived hydroperoxides. Selenium's antioxidant activity also plays a major role in the immune system, enhancing T-cell responses, to stimulate antibody production and to partially reverse age-related cellular immuno-suppression.

The possible ant-carcinogenic activity of selenium may be accounted, for, in part, by its antioxidant activity as well as its possible immune-enhancing activity. A long-term study, conducted in China, employed 200 micrograms of **selenium** daily over a four-year period. Those thus supplemented had a significantly lower incidence of primary liver cancer than did the un-supplemented control group.

It has been shown to reduce the risk of secondary cancers in a group of individuals with a previous diagnosis of skin cancer. Recent studies have also shown that taken orally or applied topically, selenium protects against both daily and excessive UV damage, with less burning after exposure. Selenium appears to preserve tissue elasticity and slow the aging and hardening of tissues due to oxidation.

Selenium may also have some anti-inflammatory benefits and it has the ability to detoxify a number of toxic metals, including cadmium and arsenic. Low dietary intake of selenium is associated





with increased risk of cardiovascular disease, and increased incidence of some cancers. It is important to use an organic form of selenium like selenomethionine rather than the inorganic forms, selenate and selenite, which are not absorbed as efficiently.

Niacin is one the family of B vitamins, previously known as vitamin B3. It includes both nicotinic acid and nicotinamide (niacinamide). Like other B vitamins, niacin acts as a cofactor for important enzymes involved in metabolism of DNA, NAD, and NADP. Niacin deficiency has been found to inhibit DNA repair in cell culture models. NAD or nicotinamide adenine dinucleotide and NADP or nicotinamide adenine dinucleotide phosphate, are coenzymes found in every cell in the body. They are involved in energy production and in the metabolism of protein, fat and carbohydrate and other essential cellular reactions.

Niacin may have anti-diabetogenic activity in some. It may also have antioxidant, anti-inflammatory and anticarcinogenic activities. *In vitro*, it has been found to inhibit protein oxidation and lipid peroxidation. It has also been found to inhibit reactive oxygen species-induced apoptosis, to inhibit phagocytic generation of reactive oxygen species, to scavenge reactive oxygen species and to inhibit the oxidative activity of nitric oxide. Niacin may also help protect against osteoarthritis.

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