LIVER PRIME

Clinical Applications

- Supports Healthy Liver Function*
- Supports Cytokine Balance*
- Supports Glutathione Production*
- May Protect Liver Tissue*

Liver Prime *contains the amino acid N-acetyl-L-cysteine, a key component of glutathione—a tripeptide that plays a significant role in detoxification and antioxidant support.* Liver Prime *also contains a combination of alpha-lipoic acid, milk thistle extract, and selenium for support of antioxidant activity, regeneration of other antioxidants, and promotion of healthy immune function.**

All Mendoza Sports & Wellness Formulas Meet or Exceed cGMP Quality Standards

Discussion

The liver is the body's major metabolic organ. It processes, packages, stores, and ships out carbohydrates, fats, proteins, and micronutrients. It is responsible for the breakdown and elimination of alcohol, toxins, hormones, and medications, as well as for the synthesis of vital proteins, such as albumin, prealbumin, and clotting factors. It may be stated that the health of the body depends on the health of the liver. Research suggests that providing targeted nutrition supplementation may help support liver function and health.*[1]

N-Acetyl-Cysteine (NAC) An acetylated derivative of the sulfur-containing amino acid L-cysteine, NAC promotes the synthesis of glutathione—a tripeptide that is active in detoxification and antioxidant systems. Glutathione also supports a healthy defense against hepatotoxic environmental pollutants, gamma-radiation, and other potential toxins.*[1,2]

Alpha-Lipoic Acid Sometimes referred to as thioctic acid, alpha-lipoic acid is both water- and fat-soluble. It supports glutathione, helps regenerate antioxidant vitamins C and E, helps maintain the ratio of reduced to oxidized CoQ10 in the mitochondria, and helps support healthy levels of nitric oxide in the liver and kidney. [3] The redox couple of lipoic acid and dihydrolipoic stabilizes NF-kappaB transcription and may help support healthy immune functions in the body.*[4,5]

Milk Thistle Seed Extract Silymarin, the active component in milk thistle, has a history of use in promoting liver health. It supports antioxidant activity, neutralizes toxins, and also may protect hepatocytes' genetic material. Like alpha-lipoic acid, silymarin supports production of cellular glutathione. Its actions in the liver include maintaining normal levels of fat peroxidation and fibrous tissue formation; supporting a healthy immune response and the natural response to inflammation; and promoting protein synthesis and normal regeneration of liver tissue.[6] A randomized placebo-controlled study of 103 individuals suggested that silymarin yielded statistically positive results and was well tolerated.*[7]

Selenium (as selenomethionine) An important coenzyme for the glutathione peroxidase detoxification system, selenium also appears to support the endogenous antioxidant defenses of hepatocytes by upregulating their manganese superoxide dismutase (MnSOD) expression. At the same time, selenium appears to support healthy cytokine balance by affecting interleukin-6 (IL-6) transcription in Kupffer cells (liver-based macrophages).[8] Kupffer cells play a crucial role in maintaining normal structure and function in the liver. Supporting their function and the body's normal inflammatory response in turn supports liver health overall.*[9]

Upon studying targeted nutrition support for liver health, researchers combined alpha-lipoic acid, silymarin, and selenium to obtain a balanced and low-cost approach to liver support.[10] These three ingredients plus NAC are all present in Liver Prime to support liver health, antioxidant activity, and the body's natural immune defenses.*

*These statements have not been evaluated by the Food and Drug Administration.
This product is not intended to diagnose, treat, cure, or prevent any disease.

@mswnutrition

LIVER PRIME

GUT

Clinical Applications

- Supports Glutamine Replenishment During and After Metabolic Stress*
- Supports Intestinal Health and Barrier Integrity*
- Supports Healthy Immune Function*
- Supports Muscle Mass Retention*
- Supports Increased Glutathione Synthesis*

L-Glutamine *(glutamine) is the most abundant amino acid in the body and is necessary for the maintenance of many metabolic functions. Under situations of stress, physiological demands increase, triggering a need for glutamine supplementation. For ease of dosing, XYMOGEN's L-Glutamine provides 4 grams of this amino acid per scoop to help replenish the body's stores and support glutamine's many functional roles.**

All MSW Nutrition Formulas Meet or Exceed cGMP Quality Standards

Discussion

Glutamine is the most abundant free amino acid in the body and is an energy substrate for most cells—especially enterocytes (intestinal epithelial cells) and immune cells. It is also an essential component for numerous metabolic functions, including acid-base (pH) homeostasis; nitrogen supply; neurotransmitter production; and synthesis of glutathione, glucose, proteins, and nucleic acids.[1,2] Glutamine is primarily synthesized and stored in skeletal muscle. It is considered a conditionally essential amino acid because, under normal circumstances, the body can manufacture enough to sustain physiological demands. However, under metabolic stress—such as illness/disease, injury, infection, surgery, chemotherapy, prolonged exercise, or environmental stress—glutamine is released from body stores into the bloodstream and transported to tissues in deficit. Increased demands make exogenous glutamine sources (food, supplements) a necessity.*[2]

Support During and Recovery After Stress States During stress states, the body's glutamine requirement exceeds supply, severely reducing both plasma and skeletal muscle pools of free glutamine.[1] Without adequate glutamine to meet the needs of the intestine, immune system, and vital organs, a negative nitrogen balance and catabolism can result.[3] Nitrogen is necessary to repair wounds and keep the vital organs functioning; approximately one third of this nitrogen comes from glutamine. Adequate nutrition, which includes glutamine, can help spare host energy reserves and impede recovery complications.[4] In fact, it has been recommended that patients preparing for elective surgery ready themselves nutritionally, in part through glutamine supplementation, to optimize recovery.[5] Research also suggests glutamine may help diminish risks associated with conventional therapeutics—such as high-dose chemotherapy and radiation—by supporting mucosal integrity, immune competence, and glutathione biosynthesis.*[4,6,7]

Intestinal Health and Barrier Function The greatest amount of glutamine is used by enterocytes. As their preferred fuel source, glutamine is necessary for their maintenance and healthy turnover. Supplementation may therefore enhance mucosal health.[1,8] A healthy intestinal mucosa not only supports optimal nutrient absorption, but it also supports mucosal immune function and provides a barrier between bacteria and their products in the intestines and the bloodstream.[1,9,10] Disruption of intestinal barrier function can lead to decreases in mucosal immune activity and increases in escaping toxins and bacteria, resulting in infections, illness, allergic reactions, skin conditions, and more. In various experimental models, glutamine administration has been shown to reduce epithelial cell death and preserve or improve barrier function.[11-13] For instance, in an animal model of chemotherapy-induced intestinal damage, glutamine decreased the severity of intestinal injury perhaps through improved intestinal cell turnover and enhanced antioxidant activity.*[14]

Muscle Tissue Preservation Of the 20 amino acids required for protein synthesis, glutamine is the most abundant. It makes up 50% of all amino acids in the blood and 60% of those in the body. Not only is glutamine necessary to maintain positive nitrogen balance and protein synthesis, but also it has recently been shown to prevent muscle loss by influencing myostatin levels.[15] Myostatin is a protein that inhibits muscle differentiation and growth. Its increased bioactivity has been observed in glucocorticoid-induced hypercatabolism and is associated with several pathologies characterized by marked skeletal muscle depletion.*[15]

Glutamine is thought to have ergogenic effects through its influences on fluid and electrolyte uptake, glutamine pool repletion after intense training, stimulation of muscle glycogen synthesis, and ability to increase growth hormone levels.[16-18] While ergogenic effects are supported from a biochemical standpoint, more definitive studies are needed.*

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GUT

Supplement Facts

Serving Size: 1 Scoop (about 4 g)
Servings Per Container: About 85

	Amount Per Serving	%Daily Value
L-Glutamine	4 g	**

** Daily Value (DV) not established.

Other Ingredients: none.

Directions:

Take one scoop daily, mixed with plain water, on an empty stomach, or as directed by your healthcare professional. Consume within 30 minutes of mixing.

Consult your healthcare professional prior to use. Individuals taking medication should discuss potential interactions with their healthcare professional. Do not use if tamper seal is damaged.

Storage:

Keep closed in a cool, dry place out of reach of children.

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Formulated To Exclude

Wheat, gluten, corn, yeast, soy, animal and dairy products, fish, shellfish, peanuts, tree nuts, egg, ingredients derived from genetically modified organisms (GMOs), artificial colors, artificial sweeteners, and artificial preservatives.

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LIVER BOOST

Clinical Applications

- Provides Micronutrients, Phytonutrients, and Cofactors that Support Detoxification of Xenobiotics and Xenoestrogens*
- Supports Healthy Estrogen Metabolism*
- Supports Antioxidant Mechanism and Glutathione Production*

Liver Boost *is a comprehensive formula designed to support phase I and phase II liver detoxification of environmental pollutants, endocrine disruptors, estrogen metabolites, xenoestrogens, and other toxins. Liver Boost also supports antioxidant activity throughout the detoxification process. Micronutrients, phytonutrients, and activated cofactors provide additional support for energy production, cellular protection, and liver function during crucial metabolic biotransformation processes.**

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LIVER BOOST

Discussion

Xenobiotics (chemicals foreign to a living organism) have the potential to disrupt metabolism and negatively affect cellular health.[1-3] Classes of xenobiotics include pesticides, petroleum-based plastic compounds, industrial chemicals, and xenoestrogens. Liver Boost comprises an array of compounds to support detoxification and elimination of these potentially toxic molecules. Man-made xenoestrogens (including BPA, DDT, and DES), act as endocrine disruptors and can alter hormonal function in sensitive tissues including breast, uterus, cervix, and prostate.[4,5] Xenoestrogens at very low levels are believed to disrupt neurotransmitter balance, glucose homeostasis, normal reproduction, and healthy metabolism.[5] Detoxification of xenobiotics is a complex process that requires micronutrients, phytonutrients, energy, and adequate antioxidant support for safe and effective completion.*[6]

Antioxidant and Detoxification Support Several nutrients support antioxidant activity, both phases of detoxification, and the health and function of the liver (the major site of detoxification). **Milk thistle extract** contains silymarin, a compound found to limit the entry of hepatotoxins, donate sulfhydryl groups for detoxification, and increase hepatic glutathione by over 35%.[7] Its action in the liver reduces fat peroxidation and fibrous tissue formation, supports a normal immune and inflammatory response, promotes protein synthesis and tissue regeneration, and supports glucuronidation and glutathione levels.[8] **Alpha-lipoic acid** is both water- and fat-soluble. It supports glutathione metabolism, helps regenerate antioxidant vitamins C and E, and helps maintain the ratio of reduced-to-oxidized CoQ10 in mitochondria.[7] The redox couple of lipoic acid and dihydrolipoic acid stabilizes NF-kappaB transcription and may help support healthy immune functions in the body.[9,10] **Methylselenocysteine (MSC)** is considered a well-tolerated form of the trace element selenium and may support normal cell-life regulation.[11] Selenium provides antioxidant support via glutathione peroxidase and manganese superoxide dismutase (MnSOD) activity.[12] **N-acetyl-cysteine (NAC)** may significantly increase glutathione in the body, which, in turn, is incorporated into crucial antioxidant and detoxification enzymes. Glutathione supports antioxidant activity, phase II detoxification, and the normal breakdown of metabolites, toxins, and other compounds. NAC supports phase II sulfation reactions as well.[7] **Calcium D-glucarate** has been added to support glucuronidation. **5-methyltetrahydrofolate (5-MTHF)** is present as Quatrefolic® (a stable, bioavailable form of folate) to support methylation, energy generation, and phase I and phase II activity.*

Phytonutrients A variety of phytonutrients support antioxidant activity in the body. **Green tea catechins** have been found to assist in free-radical scavenging, support detoxification through modification of phase I and phase II enzymes, and support normal cell-life regulation via multiple signaling pathways.[13,14] Bioflavonoids, including **resveratrol, quercetin**, and the highly absorbable FlavitPURE™ form of **dihydroquercetin (DHQ)**, support phase I detoxification as well as intermediary antioxidant protection.[1] **Pterostilbene**, a highly absorbable, methylated form of resveratrol, is thought to work together with quercetin in supporting normal cell-life regulation.[15] Turmeric extract provides curcumin, a phytonutrient valued for its promotion of antioxidant activity, support of metabolic detoxification, and modulation of cytokine production.[16,17] BioPerine®, a patented form of piperine from **black pepper**, has been added to enhance the absorption of nutrients, particularly curcumin.*[18]

Xenoestrogen Metabolism Liver Boost provides **diindolymethane (DIM)** and **glucoraphanin** as SGS™. DIM promotes healthy estrogen metabolism and creates a better balance of estrogen metabolites (2-OH, 4-OH, 16-alpha-OH) through phase I cytochrome P450 enzyme induction and promotion of 2-hydroxylation.[19,20] The action of DIM is complemented by glucoraphanin, which supports long-term antioxidant activity and phase II detoxification of less-desirable estrogen metabolites and xenoestrogens.[21,22] Glucoraphanin and its metabolite sulforaphane are found to be effective, long-acting, indirect antioxidants and significant inducers of phase II detoxification enzymes.[23,24] These actions may help support healthy estrogen balance and may be crucial for the health of estrogen-sensitive tissue.*

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Supplement Facts

Serving Size: 2 Capsules
Servings Per Container: 60

	Amount Per Serving	%DV
Folate (as (6S)-5-methyltetrahydrofolic acid, glucosamine salt)[S1]	340 mcg DFE	85%
Calcium (as tricalcium phosphate and calcium d-glucarate tetrahydrate)	75 mg	6%
Selenium (as methylselenocysteine)	15 mcg	27%
Calcium D-Glucarate Tetrahydrate	250 mg	**
Green Tea Aqueous Extract (*Camellia sinensis*)(leaf) (60% catechins, 30% EGCG, 6% caffeine)	250 mg	**
Alpha-Lipoic Acid	100 mg	**
N-Acetyl-L-Cysteine	100 mg	**
Milk Thistle Extract (*Silybum marianum*)(seed)(30% silybins)	100 mg	**
DIM (diindolylmethane)	75 mg	**
Quercetin (as quercetin dihydrate)(from *Sophora japonica*)(bud)	50 mg	**
Turmeric Extract (*Curcuma longa*)(rhizome)(95% curcuminoids)	50 mg	**
trans-Resveratrol (as *Polygonum cuspidatum* root extract)	18.5 mg	**
trans-Pterostilbene[S2]	15.5 mg	**
Glucoraphanin (from broccoli extract)(*Brassica oleracea italica*)(seed)[S3]	15 mg	**
Dihydroquercetin	5 mg	**
Black Pepper Extract (*Piper nigrum*)(fruit)[S4]	5 mg	**

** Daily Value (DV) not established.

Other Ingredients: Capsule (hypromellose and water), stearic acid, magnesium stearate, and silica.

Quatrefolic® S1. Quatrefolic® is a registered trademark of Gnosis S.p.A. Produced under U.S. patent 7,947,662.

pTeroPure® S2. pTeroPure® is a registered trademark of ChromaDex, Inc.

true broc® S3. TrueBroc® is protected by trademarks and patents of Brassica Protection Products LLC: www.brassica.com/ip

S4. BioPerine is a registered trademark of Sabinsa Corp. BioPerine is protected by U.S. patents 5,536,506; 5,744,161; 5,972,382; and 6,054,585.

Directions

Take two capsules daily, or as directed by your healthcare professional.

Consult your healthcare professional prior to use. Individuals taking medication should discuss potential interactions with their healthcare professional. Do not use if tamper seal is damaged.

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Formulated To Exclude

Wheat, gluten, yeast, soy, animal and dairy products, fish, shellfish, peanuts, tree nuts, egg, sesame, ingredients derived from genetically modified organisms (GMOs), artificial colors, and artificial sweeteners.

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