Standard Process
WHOLE FOOD NUTRIENT SOLUTIONS

Nutritional Support Protocol

Support for Healthy Liver Function

Developed and reviewed by the clinical, chiropractic, and naturopathic members of the Standard Process team

Liver Health and Function

The liver plays an integral role in a range of physiological processes. Hepatocytes are the key cells in parenchymal liver tissue and are responsible for critical liver functions including detoxification, bile synthesis, blood filtering, and the metabolism of carbohydrates, lipids, and protein. Hepatocytes also play a role in immune cell activation and liver inflammatory processes.

Over 12% of the total blood volume in the body resides within the liver, and hepatocytes filter blood as part of the liver detoxification process. Hepatocytes are bathed in blood along multiple surfaces via vessels that facilitate the bidirectional exchange of nutrients, toxins, and other key substances. Phase I and II reactions convert xenobiotics like medications, alcohol, and other compounds from their lipophilic form to a hydrophilic form that can be more easily excreted from the body. This conversion process takes place within hepatocytes and relies on the activity of cytochrome p450 (CYP450) enzymes and the contribution of methyl groups, glutathione, and amino acids.

Hepatocellular injury can occur via several mechanisms. One major cause of liver damage and chronic liver dysfunction in modern society is metabolic-associated fatty liver disease (MAFLD). MAFLD is closely associated with other metabolic conditions like obesity, hypertension, and type 2 diabetes. In MAFLD, blood sugar dysregulation leads to fat accumulation in hepatocytes, which can compromise liver function, promote insulin resistance, and slow detoxification systems.

The goal of lifestyle and nutritional interventions is to support healthy hepatocyte function, liver detoxification pathways, and metabolic parameters.

Supportive Lifestyle Practices

- Recommend that patients limit excessive alcohol intake. As the primary site of ethanol metabolism, liver cells can sustain significant damage with prolonged and excessive alcohol intake. This damage can lead to vascular alterations, scarring, and liver failure.[1]
- Recommend topical application of castor oil over the upper abdomen and liver. Castor oil has a long history of traditional use and has been shown to exhibit anti-inflammatory and immune modulatory effects.[2] Topical castor oil may also help support the normalization of liver enzymes and cholesterol levels.[2]
- Consider intermittent fasting (IF) for appropriate patients. IF has been shown to improve metabolic parameters that are associated with fatty infiltration of liver cells.[3] Various regimens such as alternate day fasting and extended overnight fasting have shown promising results.

Whole Foods Nutritional Recommendations

- Encourage the consumption of beetroot, which is rich in betalains. Betalains are a group of phytonutrients that contribute to the red-violet color of beets and have been shown to increase the activity of nuclear factor erythroid-2 related factor (Nrf2), an enzyme responsible for boosting liver antioxidant defenses such as glutathione and other phase II detoxification enzymes.[4]
- Encourage intake of foods that support glutathione production. Glutathione is a “master” antioxidant that is concentrated in the liver. Whole foods that are known to support glutathione levels include green tea, omega-3 fatty acids, and whey protein.[5]
- Recommend consumption of foods from the cruciferous vegetable family including Brussels sprouts, broccoli, kale, and Spanish black radish. These foods are rich in glucosinolates, which are sulfur-containing molecules found almost exclusively in crucifers. Glucosinolates are converted to bioactive molecules that support glutathione synthesis, phase II detoxification enzymes, and key detoxification pathways.

Dietary Supplement Regimen

Livaplex®

Suggested Use: **1 capsule per meal**

Livaplex is a supplement that provides foundational support for the liver.*

- Supports the body's normal toxin-elimination function*
- Supports normal bile production*
- Contains a combination of key ingredients from A-F Betafood®, Hepatrophin PMG®, Betacol®, Spanish Black Radish, Zinc Complex, and Antronex®

Milk Thistle Forte

Suggested Use: **1 tablet 2-3 times daily**

Milk Thistle has been traditionally used in herbal preparations to:

- Support healthy liver function and structure*
- Protect liver tissue by supporting normal cellular defenses*
- Support general healthy detoxification function and toxin elimination function*
- Support normal bile production and secretion to help relieve symptoms of occasional mild digestive discomfort*

Hepatrophin PMG®

Suggested Use: **1 tablet 3 times per day on an empty stomach**

Hepatrophin PMG contains bone liver PMG™ extract, a proprietary Protomorphogen™ blend.

- PMGs contain a unique profile of nucleotides and peptides from bovine liver.

Cruciferous Complete™

Suggested Use: **1 capsule per day**

Cruciferous Complete is a supplement that contains cruciferous vegetables.

- Supports healthy liver function*
- Provides ingredients with antioxidant activity*
- Contains kale and Brussels sprouts, which have compounds that have been shown in our preclinical research to promote the liver's detoxification pathway*

Assessment of Liver Health

In Office/Physical Exam

- Lab studies: liver function tests, comprehensive metabolic panel (CMP), ferritin, c-reactive protein, lipid panel
- Liver palpation, skin examination
- Signs/Symptoms such as abdominal pain, itching, jaundice, bowel and urinary changes, fatigue, edema
- Ultrasound of the liver

REFERENCES

1. Osna, N. A., et al. (2017). Alcohol research: current reviews, 38(2), 147–161.
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3. Różański, G., et al (2021). Nutrients, 14(1), 91.
4. Clifford, T., et al. (2015). Nutrients, 7(4), 2801–2822.
5. Minich, D. M., & Brown, B. I. (2019). Nutrients, 11(9), 2073.
6. Esteve M. (2020). Frontiers in nutrition, 7, 111.

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

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