

FELINE HEPATIC SUPPORT

The liver is a complex and critically important organ with multiple functions within the body: detoxification, enzyme production, protein metabolism, fat metabolism, carbohydrate metabolism, hormone conversion, vitamin/mineral storage and more. The ingredients in **Feline Hepatic Support** address all aspects of these functions, as well as the associated organs that interact with the liver (kidney, thyroid, digestive tract, adrenal, spleen, circulation). **Feline Hepatic Support** is formulated with ingredients known as functional foods. These are foods that have been shown to benefit specific organs and tissues in the body. The goal of **Feline Hepatic Support** is to normalize liver function, to support repair and regeneration, and to reestablish liver health.

Indications for use:

- General hepatic support
- Patients with reduced hepatic function or with increased metabolic demand
- Patients that are receiving drugs that are known to create hepatic stress
- Hepatic patients in need of additional renal support
- Clinical signs associated with hepatic dysfunction including decreased appetite, depression, vomiting and diarrhea
- Abnormal ALT, Alkaline phosphatase, bile acids studies, low BN, liver histopathology, or ultrasound.
- Patients with intestinal dysfunction

Systems Supported:

- **Liver** – primary support for the liver mediated with liver PMG, desiccated liver, *Silybum marianum*, *Taraxacum officinale*, beet root, beet leaf, defatted wheat germ, inositol, choline, *Strombus gigas*, nutritional yeast, rice bran and oat flour.
- **Small Intestine** – secondary support for the liver mediated by support for the small intestine with desiccated duodenum, desiccated stomach, L-glutamine and spleen.
- **Kidney** – secondary support for the liver mediated by support for the kidney with desiccated kidney, and buckwheat leaf juice and seed.
- **Autonomic Nervous System** – tertiary support for the liver mediated by support for the autonomic nervous system with alfalfa juice, nutritional yeast, and rice bran.
- **Immune tissue** – tertiary support for the liver mediated by support for the immune system with desiccated duodenum, spleen and zinc liver chelate.
- **Circulation** – tertiary support for the liver mediated by support for blood circulation with buckwheat leaf juice and seed, defatted wheat germ, rice bran, nutritional yeast, liver fat extract, and alfalfa juice.

Whole Food Ingredient Sources:

- **Tissue desiccates** – liver, kidney, duodenum, jejunum, stomach, and spleen
- **Vitamin A complex** – liver and kidney
- **Vitamin B complex** – nutritional yeast, defatted wheat germ, oat flour, and rice bran
- **Vitamin C complex** – alfalfa juice
- **Bioflavonoids** – buckwheat leaf juice and seed
- **Minerals** – alfalfa juice and beet leaf juice and zinc liver chelate
- **Botanical phytonutrients** – *Silybum marianum*, *Taraxacum officinale* and *Tillandsia usneoides*
- **Protomorphogens** – liver and kidney

Individual Ingredients:

Bovine liver PMG extract – provides a source of the liver Protomorphogen™ extract. Use for support of the liver (Lee, 1947).

Bovine and ovine spleen – known to contain high levels of superoxide dismutase, which has been shown to reduce the damaging effects of hypoxia by acting as a free radical scavenger (Itoh, 1999)

Bovine kidney – provides nutritional support to kidney, critical in the process of replenishing depleted cellular supplies of key nutrients.

L-glutamine - used as a primary energy source for enterocytes. Important for maintaining mucosal integrity and tight junctions (Buchman 1999).

Emblica officinalis – rich source of bioflavonoids and vitamin C. Immune enhancing properties

Porcine stomach – provides cellular materials derived from the stomach. Used to improve cellular biochemistry of the gastric mucosa, submucosa, and the neuronal components. Supports the ability of these tissues to respond to changing metabolic demands. Substances like secretin are known to be produced and released from stomach mucosa. Secretin promotes secretion of pancreatic fluid and bicarbonate. Also supports parietal cell function.

Bone meal – provides cellular factors from immune cells in the marrow

Pea vine juice – source of whole vitamin E complex. Important antioxidant.

Porcine duodenum – used to improve cellular biochemistry of the duodenum. Known to produce digestive secretions, like secretin, which promotes secretion of pancreatic fluid and bicarbonate (Chey, 2003).

Buckwheat leaf juice and seed – Source of bioflavonoids. Provide general benefits for healing and reducing inflammatory conditions. The bioflavonoids are useful for improvement of capillary fragility and promotion of normal arterial elasticity (Berger, 1992). Major source of building blocks and supportive nutrients for the heart and other vascular structures. Buckwheat seed, considered a pseudo-cereal, is noted for its high nutritional quality based upon digestibility, available lysine, and protein utilization.

Strombus gigas (Conch) - source of protein, amino acids, and trace minerals.

Oat flour - Vitamin A source, supports capillary integrity

Bovine Kidney PMG™ Extract – supports the renal tissue and normalizes its repair rate, improves local nutritional environment of kidney cells.

Defatted wheat germ - source of vitamin E complex, vitamin B complex, trace minerals, antioxidant.

Nutritional yeast - provides a range of the whole vitamin B complexes that aid in nerve conduction and intestinal contractions.

Bovine liver fat extract – provides substances that improve hepatic blood flow (Sato, 1927, Sato, 1928). May be beneficial for inactivating substances like histamine and maintaining optimum Kupffer cell function.

Bovine adrenal – glandular protein source, adrenal support

Silybum marianum (Milk Thistle) – shown to have beneficial effects for liver function. Contains a bioflavonoid complex known as silymarin, which includes the compounds silibinin, silidianin, and silicristin.

Silymarin protects liver cells by blocking entrance of harmful toxins into cells through cell membranes. These bioflavonoids also facilitate removal of toxins from liver cells (Hikino, 1984, Tuchweber,1979). When combined with liver damaging drugs, *Silymarin* has been shown to protect the liver (Palasciano, 1994). There may be a stimulating effect on liver and gallbladder activity as well. Additionally, silybin from *Silybum marianum* has been shown to increase proliferative activity of Kupffer cells without a change in phagocytic activity (Mills, 2000).

Beet leaf juice - supports proper bile production and flow, preventing accumulation of toxic bile salts (Graff 2002, Yerushalmi 2001). Also, the major protein in bile is IgA, which plays a significant part in mucosal immunity in the bile and upper small intestine (Brown 1989).

Beet root - contains betaine, glutamine, high levels of folic acid, and triterpene saponins. Important methyl group donor, facilitates Phase II hepatic detoxification.

Inositol – a component of the B vitamin complex, acts as an important catalyst in energy reactions that involve metabolism of some fats and carbohydrates.

Choline bitartrate – a vitamin of the B complex group, essential to liver function.

Alfalfa juice - – source of bioavailable protein, vit A, C, E, and K complexes, carotenoids, chlorophyll, calcium potassium, isoflavonoids and triterpene saponins.

Rice bran - provides whole vitamin B complex, important for cell energy reactions.

Copper Liver Chelate – provides an excellent source of copper, an essential trace mineral for a wide range of biochemical processes.

Zinc Liver Chelate – source of liver-chelated zinc for immune, dermal and general system support.

Iron Liver Chelate – an excellent source of iron, an important nutrient essential for a wide range of biological processes, including hemoglobin synthesis, oxygen and electron transport.

Rhizopus oryzae – a mold grown on **Tillandsia usneoides** and beet root as a source of enzymes.
Tillandsia usneoides (Spanish Moss) contains significant amounts of various minerals, chlorophyll, and most of the B vitamins.

