CANINE 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 ***Canine Hepatic Support Canine*** *address all aspects of these functions, as well as the associated organs that interact with the liver (kidney, thyroid, digestive tract, adrenal, spleen, circulation).* ***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* ***Canine 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,* wheat germ oil, betaine, beet root, beet leaf, defatted wheat germ, inositol, choline, Brussels sprouts, *Strombus gigas,* orchic extract, calcium glycerophosphate, magnesium lactate, nutritional yeast, rice bran, oat flour, and ribonucleic acid
- **Small Intestine** – secondary support for the liver mediated by support for the small intestine with desiccated duodenm, desiccated jejunum, desiccated stomach, L-glutamine, betaine hydrochloride, chlorophyll, spleen, and veal bone PMG
- **Kidney** – secondary support for the liver medicated by support for the kidney with desiccated kidney, flaxseed oil, carrot, 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 and jejunum, veal bone PMG, spleen, zinc liver chelate, and calcium lactate
- **Circulation** – tertiary support for the liver mediated by support for blood circulation with heart PMG, buckwheat leaf juice and seed, *Ginko biloba,* wheat germ oil, defatted wheat germ, rice bran, nutritional yeast, liver fat extract, and alfalfa

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** – mushroom
- **Vitamin E complex** – wheat germ oil
- **Bioflavonoids** – buckwheat leaf juice and seed
- **Fatty acids** – flaxseed oil and black currant seed oil
- **Minerals** – alfalfa juice and beet leaf juice, zinc liver chelate, and high selenium yeast
- **Botanical phytonutrients** – *Silybum marianum, Taraxacum officinale, Tillandsia usneoides,* and *Ginko biloba*
- **Protomorphogens** – liver, veal bone, heart, pituitary gland, and thyroid glands

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 factors.

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.

Veal bone PMG - source of bone protomorphogen, minerals, provides support for connective tissue structure and immune cells in bone marrow.

Porcine jejunum – provides cellular materials derived from the jejunum. Used to improve cellular biochemistry of the jejunum mucosa, submucosa, and neuromuscular components and their ability to respond to physiological demands – important for maintaining the integrity of the intestinal mucosa for proper absorption.

Wheat germ oil - rich source of whole vitamin E complex

Mushroom – provides the whole vitamin C complex which is important for optimal cellular function, antioxidant activity. Vitamin C complex is felt to aid in the formation of bile and certain detoxification processes. It also acts as an antioxidant. Vitamin C deficiency has been shown to impair oxidative drug metabolism and to reduce Cytochrome P-450 and associated enzyme activity.

Bovine liver - liver support, provides important cell substrates for hepatic cells and the Kupffer cells. Important both for the metabolic processes of the liver such as histamine detoxification and for particulate and bacterial toxin removal (increased intensity in Leaky Gut Syndrome).

Bovine heart PMG extract – improves cardiac function by improving the local nutritional environment of the myocytes. Direct cardiac support for circulatory health.

Bovine orchic extract – general endocrine support

Ribonucleic acid – nucleic acid occurring in cell cytoplasm and the nucleolus, general circulation support

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

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

Calcium lactate – bioavailable form of calcium

Ginko biloba – known for a number of medicinal benefits, including strengthening blood vessels, stabilizing cell membranes, and scavenging free radicals, also supports healthy oxygen flow to the brain and peripheral areas of the body.

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

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

Black currant seed oil – an excellent source of omega-6 fatty acids, such as gamma linoleic acid.

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.

Oat flour - Vitamin A source, supports capillary integrity

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 boy 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).

Taxacum officinale (Dandelion) – useful for its ability to stimulate the liver, as a diuretic, and for its cellular protection properties.

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.

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.

Flaxseed oil – contains alpha-linoleic acid, an omega-3 fatty acid that benefits multiple body systems including the immune system, integument, and cardiovascular system.

High-selenium yeast – a rich source of selenium, an essential trace element with antioxidant activity. It is also believed to help maintain healthy heart and joints.

Calcium glycerophosphate – calcium/mineral source

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

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

Brussels sprouts – a rich source of phytochemicals, shown to have protective actions against cancer, and enzyme activity against cancer cells. Also contain large amounts of Vitamin A and C, folacin, potassium, calcium and fiber.

Potassium para-aminobenzoate (PABA) – an intermediate in the synthesis of folic acid in bacteria. Known for its ability to protect the skin from harmful rays of the sun when used topically, may also prevent or reverse the accumulation of abnormal fibrous tissue in the body.

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

Carrot - source of whole vitamin A complex, trace minerals

Tillandsia usneoides (Spanish Moss) – contains significant amounts of various minerals, cholorophyll, and most of the B vitamins.

Bovine pituitary PMG – Protomorphogen extract from pituitary glands. Offers direct support for the pituitary gland and signaling for the pancreas (Lee, 1947). Pituitary adenylate cyclase activating polypeptide has been shown to have a promoting effect on pancreatic insulin secretion (Yamaguchi, 2001).
Porcine brain – support for autonomic nervous system and nerves

Allantoin - a substance found in amniotic fluid and certain plants that is reported to promote natural cellular regeneration.

Bovine thyroid PMG extract – Protomorphogen extract from thyoid glands. Offers direct support for the thyroid gland.

Magnesium lactate – source of magnesium, which plays an essential role as a cofactor. Assists enzymes in catalyzing many necessary reactions.

Betaine hydrochloride – a source of hydrochloric acid. Acidity of the gastric secretions is critical for maintaining a proper gastric environment and intestinal flora.

Chlorophyll extract – a fat soluble extract from plant material. Rich source of vitamin K and stimulants for tissue healing, maintenance and regeneration. Regarded as a natural GI tract deodorant and cleanser.

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