

# CANINE MUSCULOSKELETAL SUPPORT

The musculoskeletal system is comprised of a variety of structural tissues and support organs, including muscles, ligaments, tendons, nerves, cartilage, blood vessels, heart, liver, kidneys and adrenal glands. The functional food ingredients in **Canine Musculoskeletal Support** provide nutrient support to all the interactive components of the musculoskeletal system with cellular nutrition for daily function, repair, regeneration and recovery.

## Indications for use:

- General growth support
- Injury/surgery/recovery for musculoskeletal system
- Athletes/performance animals
- Senior animals
- General musculoskeletal support
- Neuromuscular disorders

## Systems Supported:

- **Bone and cartilage** – primary support from veal bone PMG, trachea, *Perna canaliculus*, calcium glycerophosphate, *Strombus gigas*, dicalcium phosphate, and magnesium lactate
- **Periarticular tissues** – primary support mediated with heart PMG, flaxseed oil, manganese lactate, blackcurrant juice, and mushroom
- **Liver** – primary support of the liver and secondary support of the joints, mediated with desiccated liver, pea vine juice, ribonucleic acid, defatted wheat germ, wheat germ oil, orchic extract, soy bean lecithin, desiccated duodenum and jejunum, beet leaf, and beet root
- **Kidney** – primary support for the kidney and secondary support of the joints mediated with desiccated kidney, extract of *Rhizopus oryzae*, and buckwheat leaf juice and seed
- **Adrenal glands** – primary support of adrenal glands mediated with desiccated adrenal, *Eleutherococcus senticosus*, black currant juice, mushroom and alfalfa
- **Autonomic nervous system** – primary support of the parasympathetic nervous system mediated with alfalfa juice and calcium lactate

## Whole Food Ingredient Sources:

- **Tissue dessicates** – trachea, liver adrenal, kidney, jejunum, duodenum
- **Vitamin A complexes** – liver and kidney
- **Bioflavonoids** – buckwheat leaf juice and seed
- **Vitamin B complexes** – liver, defatted wheat germ, oat flour
- **Vitamin C complexes** – black currant juice, adrenal and mushroom
- **Vitamin E complexes** – pea vine juice, chlorophyll, wheat germ oil
- **Carotenoids** – carrot
- **Enzymes** – bromelain
- **Fatty acids** – black currant seed oil and flaxseed oil
- **Minerals** – alfalfa juice and *Strombus gigas*
- **Botanical phytonutrients** – *Boswellia serata*, *Eleutherococcus senticosus*, and *Tillandsia usneoides*
- **Protomorphogens** – veal bone, heart, and thyroid

## **Individual Ingredients:**

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

***Boswellia seratta*** – this herb contains boswellic acids, known to support and maintain healthy joints

**Bovine Trachea** – source of glucosamine, chondrocytes, sulphur compounds

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

***Perna caniculus*** (green lipped mussel) – source of joint cartilage precursors

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

**Oat flour** – Vitamin A source, supports capillary integrity, immune support.

**Black currant juice** – an excellent source of anthocyanins with antioxidant properties.

**Carrot** – source of whole vitamin A complex, trace minerals

**Bovine liver** – provides important cell substrates for hepatic cells and Kupffer cells. This is important for metabolic processes of the liver and for toxin removal.

**Bovine adrenal** – cellular components that support adrenal cellular functions.

***Eleutherococcus senticosus*** – contains eleutherosides, triterpenoid saponins and other compounds that work to promote vitality, enhance immune system function and support the body's ability to adapt to stress.

**Bovine orchic Cytosol™ extract** – promotes the penetration of nutrients into tissue and various tissue compartments by its hyaluronidase activity.

**Bovine kidney** – provides nutritional support to kidney. Critical in the process of replenishing depleted cellular supplies of key factors.

**Soy Bean Lecithin** – rich source of lecithin, a precursor to choline. Crucial to proper thyroid, nervous system, liver, cardiovascular and immune system health. Excellent source of essential fatty acids.

**Bromelain** – contains enzyme proteases that aid in cellular responses.

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

**Porcine jejunum** – important for maintaining the integrity of intestinal mucosa for proper digestion and absorption of nutrients.

***Strombus gigas*** (Conch) – a sea mollusk with a large spiral shell. A good source of protein, amino acids, and trace minerals.

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

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

**Manganese lactate** – source of manganese; manganese acts as a cofactor and catalyst in many enzymatic processes.

**Ribonucleic acid** – nucleic acid occurring in cell cytoplasm and the nucleolus, supports cell growth and development by activating protein synthesis in the blood. RNA deficiency inhibits leukocyte formation.

**Bovine Thyroid PMG™ extract** (processed to remove thyroxine) – contains specific thyroid cell determinant factors that improve the local nutritional environment and support appropriate cell function (Lee and Hanson, 1947).

**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.

**Calcium lactate** – bioavailable calcium source

**Defatted wheat germ** – wheat germ is noted for its dense nutritional content of the vitamin E complex, vitamin B complex, and many important trace minerals essential for the full physiological activity of the associated vitamin complexes.

**Wheat germ oil** – one of the richest sources of complete vitamin E complex; vitamin E is beneficial in multiple metabolic processes.

**Black currant seed oil** - rich source of vitamin C complexes, also an excellent source of omega-6 essential fatty acids.

***Tillandsia usneoides*** (Spanish Moss) – found to contain significant amounts of various minerals, chlorophyll, and most of the B vitamins.

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

**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).

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

**Dicalcium phosphate** – a bio-available calcium compound used in calcium therapy.

**Calcium glycerophosphate** – source of calcium

**Chlorophyll extract** - a fat-soluble extract from plant material; a rich source of vitamin K and stimulants for tissue health, maintenance and regeneration; Chlorophyll is regarded as a natural gastrointestinal tract deodorant and cleanser.

***Rhizopus oryzae*** (grown on *Tillandsia usneoides* and beet root) – source of enzymes.