



ThorneVet Canine Cognitive Support

Helps Maintain Cognitive Function in the Older Dog

A powerhouse combination of ingredients to support cognitive and mental health in dogs.

ThorneVet's Canine Cognitive Support formula combines 13 ingredients – potent antioxidants, phospholipids, botanicals, and tissue-ready B vitamins – to synergistically support the nervous system and protect against neurodegenerative disorders that can adversely impact our canine friends.

Key Nutritional Support Features

- | Helps balance the nervous system's inflammatory response
- | Protects against damage from free radicals
- | Protects cerebral blood flow and oxygenation with antioxidants and botanicals
- | Provides effective amounts of membrane phospholipids to stabilize neuronal membranes
- | Supports optimal nervous system function and cognition with nootropic botanical extracts
- | Helpful in slowing progression of cognitive decline in the older dog

Canine Cognitive Support – Special Nutrients

Foundational Support – Integral Nutrients

Dimethylglycine or **DMG** is an amino acid that has shown benefit across multiple organ systems that can provide benefits to the aging brain. **DMG** has beneficial cardiovascular effects that support brain function by improving oxygenation and perfusion. In addition to its positive circulatory effects, **DMG** has been shown to be an effective scavenger of free radicals, thus providing beneficial antioxidative effects. **DMG** has also been found to enhance the production of the brain's neurotransmitters and to increase the production of an important energy molecule for the brain – phosphocreatine. Phosphocreatine is a precursor that boosts ATP production, and **DMG** produces both the glycine and the methyl groups needed to produce the creatine that goes into phosphocreatine. This combination can significantly enhance brain function.¹

L- Arginine is an amino acid that helps the body build protein. **L- Arginine** has been found to enhance cognitive function by reducing oxidative damage and by enhancing mitochondrial functions.² **L- Arginine** is converted to nitric oxide in the dog's body, which has a beneficial vasodilatory effect, thus providing the positive circulatory effects that are attributable to **L- Arginine**. The circulatory benefits attributed to **L- Arginine** contribute to positive cognitive support by improving blood flow to the dog's brain, as well as increasing the blood's oxygenation.³

Antioxidants

The **Canine Cognitive Support** formula includes two potent antioxidants that have been shown to cross the blood-brain barrier. **Astaxanthin** is a carotenoid that is highly present in the marine environment; for example, it's the pigment responsible for giving salmon its deep pink color. The **astaxanthin** in **Canine Cognitive Support** is derived from the microalgae – *Haematococcus pluvialis*. Because both oxidative damage and increased neuro-inflammation contribute to the late-onset neuronal loss seen in neuro-degenerative conditions, the counteracting neuro-protective effect of natural compounds, such as **astaxanthin**, provides significant nutritional support for these conditions.⁴ Many recent studies have demonstrated **astaxanthin's** role in ameliorating both oxidative stress and out-of-balance inflammatory processes, both of which are at the foundation of many canine chronic health conditions. Moreover, **astaxanthin** exerts a strong protective effect on the brain, partly due to its unique chemical structure that enables it to readily cross over the blood-brain barrier.^{5,6}

Alpha lipoic acid (ALA) is a naturally occurring disulfide molecule that has both potent antioxidant properties and positive inflammatory response properties. Although **ALA** plays many different roles in the pathogenic pathways of cognition loss, its primary beneficial role is that of being a neuro-protective agent. **ALA** fulfills its neuro-protective role by increasing acetylcholine production, inhibiting hydroxyl radical production, and up-regulating the processes that eliminate reactive oxygen species.⁷ Some studies actually suggest that supplementation with **alpha lipoic acid** can improve cognitive tests in dogs. A longitudinal study (the kind of research that involves repeated observations of the same variables over a sustained period of time) in dogs showed that a diet enriched with a broad spectrum of antioxidants, including **ALA**, produced significant improvements in cognitive performance and mitigated age-related cognitive decline in older dogs.⁸

Membrane Phospholipids

Phosphatidylserine, a phospholipid, is a key component of every cell's membrane. **Phosphatidylserine** is important for promoting cellular communication, plus it facilitates the transporting of important substances that are outside the cell to inside the cell. This transporting function is especially important in the brain and nervous system, where optimal transporting is required for healthy nerve cell membranes and myelin. **Phosphatidylserine** is also thought to have cognition enhancing ability. Analysis of several human studies reveals that supplemental **Phosphatidylserine** is absorbed efficiently in humans, readily crosses the blood-brain barrier, and safely slows, halts, or even reverses biochemical alterations and structural deterioration in nerve cells.⁹ **Phosphatidylserine** has been shown to have similar superior absorption in dogs. In fact, a review of the studies on **Phosphatidylserine** concludes that, in addition to being safe, the large amount of the existing mechanistic, experimental, human, and veterinary clinical data indicates that **Phosphatidylserine** is effective in ameliorating age-related cognitive decline.¹⁰

Tissue-Ready B Vitamins

5-methyl-tetrahydrofolate (5-MTHF) is the most active form of **Vitamin B9** or **folate**. **5-MTHF** acts as a methyl donor for the production of the important **amino acid S-Adenosyl methionine (SAME)**, as well as playing a key role in DNA methylation. Without an adequate supply of **SAME** and subsequent methylation processes, there can be an adverse cascading effect on the production of many other vital building blocks crucial for life processes, such as the production of **epinephrine, norepinephrine, serotonin, melatonin, glutathione, cysteine, Coenzyme Q10, and taurine**. Because the body's production of **SAME** directly relies on the presence of **5-MTHF**, methylation depends on sufficient levels of active folate to carry out its many functions. In conjunction with **vitamin B12**, **5-MTHF** functions as a methyl group donor, facilitating conversion of the amino acid homocysteine to methionine, which is important because too high of a level of homocysteine is a risk factor for several health complications.¹¹ **Vitamins B1, B6, and B12**, which are considered to be neurotropic B vitamins, have been shown to ameliorate nerve injury by promoting nerve repair and regeneration. **Vitamin B6 (pyridoxine)** plays a key role in neurotransmitter synthesis, inhibits the release of glutamate, which is neurotoxic, and helps maintain sensory nerve function. There is also convincing evidence that **vitamin B12 (cobalamin)** fulfills a nerve-regenerating role, in addition to promoting nerve cell survival, remyelination, and the maintenance of myelin sheaths.¹² **ThorneVet** makes sure to use the most tissue-ready forms of these three neurotropic B vitamins to ensure their optimal bioavailability.

Botanical Support

The leaf of **Ginkgo biloba** might be one of the most well-studied botanicals available today. **Ginkgo's** use has long been investigated in the treatment of cognitive decline in both humans and animals. **Ginkgo biloba** has been found to have a beneficial effect on slowing down cognitive decline and it exhibits a neuroprotective effect. An extract of **Ginkgo** has been shown to promote peripheral and central blood flow and to protect the brain from oxidative damage. At the same time, the flavonoids in **Ginkgo** can stabilize vascular permeability and integrity.¹³ **Ginkgo biloba** stimulates several neurotransmitters, including acetylcholine,¹⁴ and exerts antioxidant effects.¹⁵

Extracts of the immature or milky oat part of the plant **Avena sativa** have a long history of medicinal use in various psychotropic indications, including insomnia and anxiety.¹⁶ **Avena sativa** extracts contain a wide range of potentially bioactive secondary metabolite compounds.¹⁷ These structural groups of phytochemicals include numerous compounds that have been shown to exert wide ranging cellular and physiological effects and to modulate human brain function.¹⁸ There are studies that confirm both the acute cognitive beneficial effects of **Avena sativa** extracts, as well as benefits for long-term supplementation on cognitive function and modulation of the response to stress.¹⁹

Bacopa monnieri is a tropical plant native to places like India and Australia. **Bacopa** has been used for centuries in the Ayurvedic system of medicine. **Bacopa** was used traditionally as a brain tonic to enhance memory, learning, and concentration. **Bacopa** was also used to provide relief to patients with anxiety or epileptic disorders.²⁰ The **Bacopa** constituents that are responsible for its beneficial cognitive effects are bacosides A and B. The extracts of **B. monnieri** are well-recognized for their antioxidant activity with numerous modes of action that protect the brain against oxidative damage and cognitive decline in the elderly.²¹ Based on animal study results, **B. monnieri** extract and its bacosides enhanced antioxidant status in the brain region of the hippocampus, frontal cortex, and striatum.²² **Bacopa monnieri** has also been found to have a mild anxiolytic effect, which might help a dog suffering from cognitive dysfunction because increased anxiety and agitation are likely contributors to the dysfunction.

Lion's Mane mushroom (Hericium erinaceus) grows on the trunks of dead hardwood trees, such as oaks. As a potent medicinal mushroom, **Lion's Mane** has a long history of use in East Asian medicine. **Lion's Mane** has been shown in clinical studies to support cognitive function and help maintain neurological function. Research shows that **Lion's Mane** passes through the blood-brain barrier and stimulates the production of Nerve Growth Factor (NGF), which facilitates the growth of new cholinergic neurons in the brain.²⁴ Cholinergic nerve activity in the brain is related to awareness, learning, memory, attention, and reward. There is increasing evidence that declining cholinergic nerve activity in the brain is associated with declining cognitive health. Therefore, boosting NGF production with **Lion's Mane mushroom** helps maintain the integrity of the cholinergic neurons in the brain and their activity, thus potentially slowing cognitive decline.²⁵

Ingredient Synergism

The pathophysiological effects of cognitive decline in both humans and dogs involves multiple pathways and factors. For this reason, a multi-modal formula designed to support the many different facets of cognitive health can be most effective at slowing cognitive loss and protecting the nervous system from further degeneration. ThorneVet's Canine Cognitive Support provides this support with carefully selected nutrients, antioxidants, membrane phospholipids, and botanical extracts that enhance and protect nervous system function and cognitive health in the aging dog.



Canine Cognitive Support Formula Helps Maintain Cognitive Function in the Older Dog



1 soft chew per 25 pounds body weight daily

V966-SC / 90 Soft Chews

PRODUCT FACTS

Active Ingredients per 3.5-gram Soft Chew:			
L-Arginine	250 mg	Pyridoxine (Vitamin B6)	10 mg
Dimethylglycine	100 mg	Pyridoxal 5'-Phosphate (Vitamin B6)	2.5 mg
Ginkgo Phytosome (Virtiva®)		Astaxanthin	1 mg
(Ginkgo biloba (leaf))†	50 mg	L-5 Methyltetrahydrofolate	200 mcg
Avena sativa extract	50 mg	Methylcobalamin (Vitamin B12)	200 mcg
Bacopa monnieri extract	50 mg	Inactive ingredients (soft chew matrix):	
Lion's Mane Mushroom Extract	50 mg	Buffered white distilled vinegar, chickpea flour,	
Phosphatidylserine	50 mg	citric acid, coconut glycerin, coconut oil, natural	
Alpha-Lipoic Acid	10 mg	hickory smoke flavor, rosemary extract, sunflower lecithin, sunflower oil, tapioca starch, water.	

†Virtiva is a registered trademark of Indena S.p.A.

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