

**Brain & Cognitive Disorders**

# CANINE COGNITIVE DYSFUNCTION SYNDROME



Canine cognitive dysfunction syndrome is a degenerative, metabolic brain disorder, similar to Alzheimer's disease in people, that is associated with advancing age.

Multiple metabolic, functional, and structural changes occur in the brain with advancing age that, if severe, lead to cognitive dysfunction syndrome. Clinical signs can include problems with memory, attention, and trainability as well as disorientation, changes in sleep-wake cycle, and decreased social interaction. The prevalence of cognitive dysfunction syndrome has been estimated at 14% to 35% of dogs, and prevalence and severity increase with age. Although cognitive dysfunction syndrome is incurable, a multimodal management approach, including targeted nutrition, may help manage signs and slow further progression.

**Key Messages**

- With age, metabolic, functional, and structural changes can occur in the brain that may lead to cognitive dysfunction syndrome.
  - Healthy brains rely on glucose as the primary energy source, but an aging dog's brain becomes less efficient at metabolizing glucose, resulting in brain energy depletion. Regions of the brain critical to cognitive function have the greatest reduction in glucose metabolism.
  - Production of free radicals increases and levels of endogenous antioxidants decrease with aging, resulting in oxidative stress and damage to cells.
  - Increased levels of pro-inflammatory compounds contribute to a chronic, low-grade inflammatory state.
  - Blood vessels in the brain can become scarred and vessel walls thickened with aging. This decreases cerebral blood flow, which reduces delivery of energy and oxygen to brain cells.
  - B vitamins are involved in many metabolic reactions, including glucose metabolism and neurotransmitter production. In humans, studies have shown a link between vitamin B deficiency and cognitive dysfunction in the elderly.

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## Key Messages (continued)

- Nutritional strategies targeted at these changes can help manage signs of cognitive dysfunction syndrome in dogs and slow further progression:
  - Medium chain triglycerides (MCTs) can provide an alternative energy source (both ketones and medium chain fatty acids) for the brain. Up to 60-70% of the brain's energy needs can be met by ketones.
  - Antioxidants, e.g., vitamins C and E, may help reduce oxidative stress.
  - The omega-3 fatty acids DHA and EPA have anti-inflammatory activity.
  - The amino acid arginine, precursor to nitric oxide, may help improve cerebral blood flow.
  - B vitamins may support brain health. While B vitamin deficiency has been linked to cognitive dysfunction in people, additional research suggests that supplementation above levels needed to prevent deficiency may also provide cognitive benefits.
- A Purina study showed that dogs with cognitive dysfunction syndrome fed a diet containing a proprietary blend of MCT oil, omega-3 fatty acids, antioxidants, arginine, and B vitamins significantly improved in 5 of 6 DISHAA categories within 30 days and in all 6 categories within 90 days.

## Additional Resources

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The Purina Institute aims to help put nutrition at the forefront of pet health discussions by providing user-friendly, science-based information that helps pets live longer, healthier lives.