PURINA Institute

Advancing Science for Pet Health

GRAY MUZZLE, BRIGHT MIND:

NUTRITIONAL SCIENCE TO SUPPORT THE BRAIN HEALTH OF ADULT AND SENIOR PETS

Veterinarians and pet owners alike are familiar with that sinking feeling that comes when a beloved pet (or patient) transitions to "senior" status. A graying muzzle is often the first sign that pet owners notice as a sign of aging, but they may not be aware of (or may not want to acknowledge) the less visible changes going on in their aging pet. A number of adverse changes, some irreversible, accompany normal aging in the brain. These changes may affect cognition – a pet's ability to learn, solve problems, remember, and communicate.

Aging pets may develop cognitive decline – or the more extreme cognitive dysfunction – that can impact their quality of life as well as that of their owners. When the pet's cognitive decline interferes with their daily life or affects their social interactions, the bond between owner and pet can become strained as the relationship changes from "best friend and companion" to that of a patient and caregiver. As a veterinarian, your focus is on keeping that pet healthy and preserving that bond. But how can you slow down an apparently inevitable process?

It's no secret that aging affects the brain as well as the body, but the impact of nutrition on brain health is often unrecognized or overlooked. In fact, only 2% of veterinarians surveyed[1] were aware of the link between brain health and nutrition. We don't have the power to stop brain aging, but through nutrition we can target the risk factors that impact cognition.

Optimizing an aging pet's nutrition provides veterinarians and pet owners with a brain health-promoting tool with every meal. Purina scientists have devoted more than a decade to studying the effects of nutrition on brain health in pets, and what we've learned can help you better help your aging patients.

The aging brain undergoes a number of anatomic, metabolic and vascular changes. Oxidative stress, due to an increase in free radical production coupled with reduced antioxidant production, contributes to age-related cellular damage. By targeting some of these known causes of age-related neurodegeneration, nutrition can support cognitive health.

A complete and balanced diet supplemented with a blend of fish oil (to provide omega-3 fatty acids, which play neuroprotective and anti-inflammatory roles), antioxidants (to fight free radicals), B vitamins (to provide necessary coenzymes and metabolites) and arginine (to support blood flow) improved performance of aged dogs and adult cats on a number of validated cognitive tests[2,3].

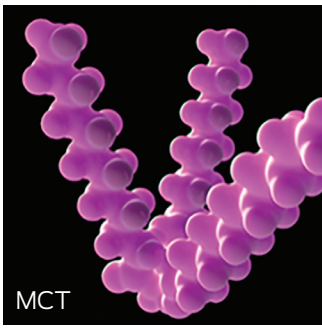
Aging reduces the brain's ability to utilize glucose as an energy source, even when it's readily available; given that the brain is particularly vulnerable to changes in its energy supply, the reduced glucose metabolism leads to energy depletion and reduced brain cell function. By providing ketones from medium-chain triglycerides (MCTs) as an alternative energy source for the brain, we can target the metabolic changes that contribute to cognitive decline.

A study showed senior dogs fed a complete and balanced diet containing MCTs made fewer errors on cognitive tests, with improvement in memory beginning within 2 weeks, and performed better than control diet-fed dogs as the cognitive tasks became more complex[4].

In a double-blinded clinical trial, dogs with confirmed cognitive dysfunction syndrome (CDS) who were fed a diet containing MCTs and brain-protecting nutrients showed significant improvement in as little as 30 days[5].

MCTs AND CANINE IDIOPATHIC EPILEPSY

In addition to their cognitive-boosting abilities in aging pets, MCTs can help reduce seizures in epileptic dogs. In a double-blinded, crossover, clinical trial in dogs with refractory epilepsy (continuation of seizure activity despite anti-epilepsy medications), 71% of dogs showed an overall reduction in seizure frequency – including some dogs that became seizure-free on the MCT diet[6]. **In conjunction with anti-epilepsy drug treatment, nutritional intervention can help veterinarians better manage dogs with idiopathic epilepsy.**



Q WHEN SHOULD YOU START TALKING TO CLIENTS ABOUT THEIR PET'S BRAIN HEALTH?

Mild cognitive impairment has been detected in apparently normal dogs and cats as early as 6 and 7.7 years, respectively[7,8]. That means the time to start the conversation is in adulthood, before the overt signs of aging occur.

- Include a nutritional assessment in every wellness exam, and use the information to help your clients find the optimal diet for their pets.
- Recommend regular physical activity – within the pet's abilities – to support brain function and overall health.
- Provide recommendations for mental stimulation, such as food puzzles, new activities, and novel environments.

Aging pets don't have to act old: Purina's research has shown that early intervention through targeted nutrition can help support brain function in dogs and cats as they age.

REFERENCES:

1. "Global Veterinary Topics" quantitative research performed by Kynetec, January 2018.

2. Pan, Y., Kennedy, A. D., Jonsson, T. J., & Milgram N. W. (2018). Cognitive enhancement in old dogs from dietary supplementation with a nutrient blend containing arginine, antioxidants, B vitamins and fish oil. *British Journal of Nutrition*, *119*. doi: 10.1017/S0007114517003464

3. Pan, Y., Araujo, J. A., Burrows, J., de Rivera, C., Gore, A., Bhatnagar, S., & Milgram, N. W. (2013). Cognitive enhancement in middle-aged and old cats with dietary supplementation with a nutrient blend containing fish oil, B vitamins, antioxidants and arginine. *British Journal of Nutrition*, *110*, 40–49. doi: 10.1017/S0007114512004771

4. Pan, Y., Larson, B., Araujo, J. A., Lau, W., de Rivera, C., Santana, R., Gore, A., & Milgram, N. W. (2010). Dietary supplementation with medium-chain TAG has long-lasting cognition-enhancing effects in aged dogs. *British Journal of Nutrition*, *103*, 1746–1754. doi: 10.1017/S0007114510000097

5. Pan, Y., Landsberg, G., Mougeot, I., Kelly, S., Xu, H., Bhatnagar, S., & Milgram, N. W. (2017). Efficacy of a therapeutic diet in dogs with signs of cognitive dysfunction syndrome (CDS): a prospective, double-blinded, placebo-controlled clinical study. Abstract N10: 2017 *American College of Veterinary Internal Medicine (ACVIM) forum*. Available at https://onlinelibrary.wiley.com/doi/epdf/10.1111/jvim.14778.

6. Law, T. H., Davies, E. S., Pan, Y., Zanghi, B., Want, E., & Volk, H. A. (2016). A randomised trial of a medium-chain TAG diet as treatment for dogs with idiopathic epilepsy. *British Journal of Nutrition*, *114*, 1438–1447. Erratum in: *British Journal of Nutrition*, (2016), *115*, 1696.

7. Studzinski, C. M., Christie, L.-A., Araujo, J. A., Burnham, W. M., Head, E., Cotman, C. W., & Milgram, N. W. (2006). Visuospatial function in the beagle dog: an early marker of cognitive decline in a model of human aging and dementia. *Neurobiology of Learning and Memory*, *86*, 197-204.

8. Landsberg, G. M., Nichol, J., & Araujo, J. A. (2012). Cognitive dysfunction syndrome: a disease of canine and feline brain aging. *Veterinary Clinics of North America Small Animal Practice*, *42*, 749-768. doi: 10.1016/j.cvsm.2012.04.003