



Feeding to Improve Cognitive Function

Omega-3 fatty acids are critical for cognitive development in various animals, including rats,²⁶ humans,²⁷ and dogs.²⁸ Because the decline in learning and memory likely begins in middle-aged dogs,²⁹ researchers at the University of California at Davis were interested in testing the hypothesis that supplementation with antioxidants and omega-3 fatty acids improves learning ability in this age group. This hypothesis was tested by comparing levels of antioxidant capacity, oxidative damage, and cognitive ability in dogs (approximately 5 yrs old) after 6 months of supplementation with Platinum Performance™ Canine and Platinum Antioxidant™.

To test learning ability, 5 dogs in the supplemented group were trained to navigate a maze (Phase 1) and then tested on their recall of the learned behavior (Phase 2). Their performance was compared to 5 control dogs consuming the same commercial dog food without the

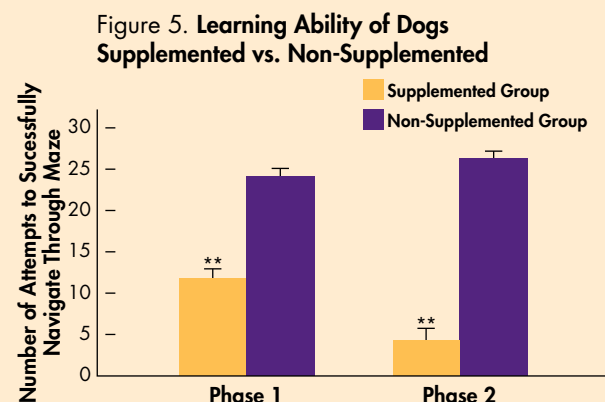


Figure 5. Learning Ability of Dogs Supplemented vs. Non-Supplemented. Number of attempts to successfully navigate through the maze at Phases 1 and 2 in the supplemented and non-supplemented groups. All values are group means ± SEM. **Significantly (p < 0.05) lower than Non-Supplemented value.

supplement. Dogs receiving Platinum Performance™ Canine and Platinum Antioxidant™ learned the maze task quicker than non-supplemented dogs as demonstrated by the fewer attempts in Phase 1 (Figure 5). And supplemented dogs performed better during the recall portion of the test (Phase 2).

Antioxidant Properties

In addition to their well-recognized anti-inflammatory effects, omega-3 fatty acids have antioxidant properties. For example, dietary supplementation with omega-3 fatty acids increased expression of the antioxidant enzymes superoxide dismutase (SOD), glutathione peroxidase, and catalase in laboratory animals.^{24,25} Researchers at the University of California at Davis tested the hypothesis that supplementation with Platinum Performance™ Canine and Platinum Antioxidant™ decreases oxidative

damage in dogs. Following 6 months of supplementation, blood activities of catalase and glutathione peroxidase were 31.5% and 20.3 % higher than values before supplementation (Figure 1 and 2), suggesting an increase in antioxidant capacity. Furthermore oxidative damage was decreased as evidenced by an 11.9% reduction in an indicator of lipid damage (TBARS) and a 42.6% reduction in indicators of protein damage (protein carbonyls) when compared to values before supplementation (Figures 3 and 4).

Figure 1. Catalase Activity Before and After Supplementation

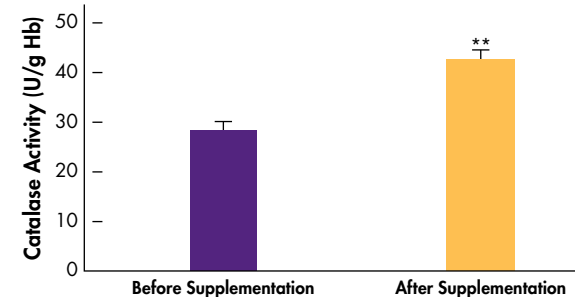


Figure 1. Catalase Activity Before and After Supplementation. Average level of catalase in blood both before and after supplementation with Platinum Performance™ Canine and Platinum Antioxidant™. **Significantly (p < 0.05) greater than Before Supplementation value.

Figure 3. Damaged Fat Content Before and After Supplementation

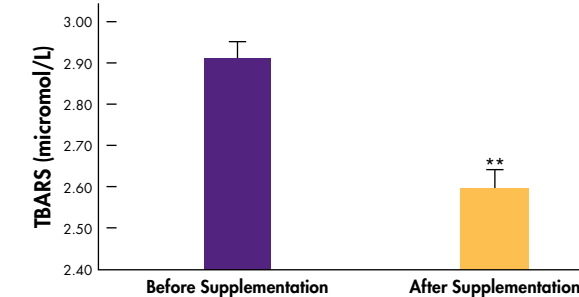


Figure 3. Damaged Fat Content Before and After Supplementation. Average level of indicators of lipid damage (TBARS) in blood both before and after supplementation with Platinum Performance™ Canine and Platinum Antioxidant™. **Significantly (p < 0.05) lower than Before Supplementation value.

Figure 2. Glutathione Peroxidase Activity Before and After Supplementation

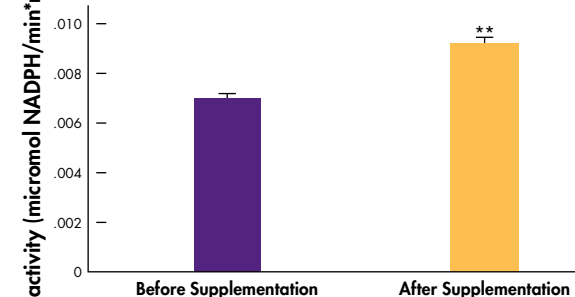


Figure 2. Glutathione Peroxidase Activity Before and After Supplementation. Average level of glutathione peroxidase in blood both before and after supplementation with Platinum Performance™ Canine and Platinum Antioxidant™. **Significantly (p < 0.05) greater than Before Supplementation value.

Figure 4. Damaged Protein Content Before and After Supplementation

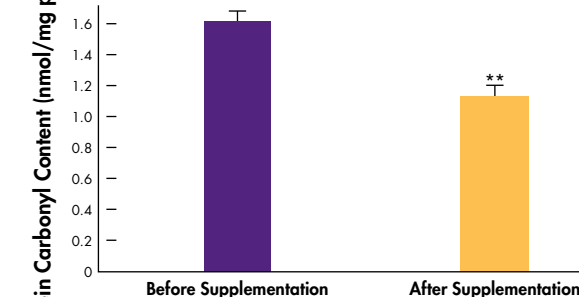


Figure 4. Damaged Protein Content Before and After Supplementation. Average level of indicators of protein damage (protein carbonyls) in blood both before and after supplementation with Platinum Performance™ Canine and Platinum Antioxidant™. **Significantly (p < 0.05) lower than Before Supplementation value.



Conclusion

Although antioxidant supplementation has been recommended to reduce the decline in learning and memory that naturally occurs in elderly dogs, there is evidence that younger dogs benefit from both omega-3 fatty acid and antioxidant supplementation.

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In a controlled study, supplementation with Platinum Performance™ Canine and Platinum Antioxidant™ improved learning and memory in middle-aged dogs, which could have been due to the improvement in antioxidant systems and decrease in levels of damaged lipids and proteins.

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Feeding to Reduce Oxidative Damage and Improve Cognitive Function

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Free radicals are produced either as a result of normal metabolism or as part of the inflammatory response to infections,¹ intense exercise,² ultraviolet light,³ or ingestion of rancid fats.^{4,5} Free radicals damage structures in the body, like proteins, fats, and DNA,⁶ and are associated with several canine diseases, including cataracts,⁷ cancer,⁸ heart disease,^{9,10} renal disease,¹¹ immune-mediated hemolytic anemia,¹² and senility.¹³ For instance, a compensatory increase in antioxidant systems has been reported in female dogs with mammary gland tumors,¹⁴ suggesting a response to free radicals associated with the development or existence of malignant tumors. Oxidative damage of lipids in the heart has been reported in dogs with a decrease in cardiac performance,⁹ and lipid damage in dogs with canine visceral leishmaniasis has been linked to oxidative stress.¹⁵ Although free radicals are believed to increase naturally with the aging process,¹⁶⁻¹⁸ excessive accumulation of free radicals and damage to lipids and proteins may contribute to forms of canine senility, as has been reported for dogs with a canine form of Alzheimer's.¹³

Supplementation Needed

Because the body's natural antioxidant system appears to be unable to counteract all of the free radicals produced during normal metabolism, exercise, or other physical or medical stress,¹⁹⁻²¹ the need for exogenous sources of antioxidants is real. In several studies in dogs, antioxidant supplementation increased antioxidant activity in blood, reduced oxidative damage to DNA, and increased resistance to exercise-induced damage.^{19,20} Furthermore, antioxidant supplementation

improved learning and memory abilities of old dogs,²² which led Head and Zicker²³ to suggest that the decline of various cognitive functions in dogs may be slowed by reducing oxidative damage through supplementation with antioxidants.

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