

## **BENEFITS OF OMEGA-3 FATTY ACIDS IN DOGS AND CATS**

Michael Kraun, DVM  
Resident/Instructor, Small Animal Surgery  
Department of Small Animal Clinical Sciences  
College of Veterinary Medicine  
Veterinary Medical Center, Room D-211  
Michigan State University  
East Lansing, MI 48824

If you were asked to list the top ten preventable causes of death of humans in the United States, what sorts of things would you include? Go ahead, don't be shy...give it a shot! Obesity, you say? Yep, that's on there. High blood pressure? Also correct. Smoking? Right at the top of the list. But how about this one: a diet low in omega-3 fatty acids? Believe it or not, it's true. A Harvard study found that a deficiency in omega-3 fatty acids was one of the leading preventable causes of death in the United States. And as additional research is completed, we have found that omega-3s also play a significant role in the health of our pets and patients.

Fats are often viewed as the unhealthy component of the diet, and are more often associated with causing disease than preventing it. In reality, though, fats are incredibly important in proper nutrition of both humans and veterinary species. Fat is the most energy dense of all nutrients. It is also a significant contributor to the texture and palatability of foods, especially pet foods. And perhaps most importantly, dietary fat supplies essential fatty acids and is crucial for absorption of fat-soluble vitamins.

The dietary fatty acids present in a food are largely dependent upon the fat source utilized. When determining the fat source used in a diet, pet food companies may consider multiple factors: content of essential fatty acids, melting point of the fat, effect on palatability, susceptibility to oxidation, and market price, to name a few. The only essential fatty acid listed for dogs is linoleic acid, an omega-6 fatty acid. In contrast, both linoleic acid and its parent fatty acid, alpha-linolenic acid (an omega-3) are considered essential in humans. And all fatty acids are not created equal; over the years, much focus has been placed on the fatty acid composition of diets and its relationship to health and disease states.

The focus on fatty acids began in 1783, when Thomas Percival published the use of cod liver oil for rheumatism in the London Medical Journal. But it wasn't for another 130 years that a true breakthrough occurred in the study of dietary fatty acids. In 1914, August and Marie Krogh traveled to Greenland to study the Eskimos. They observed that the Eskimos ingested large amounts of fat, but did not get diabetes as a result. In 1928, Heinbecker followed up on the Kroghs' research, and noticed that while the Eskimos ate almost only flesh, most of the animals they consumed came from the sea. And in the 1970s, Danish researchers evaluated the plasma lipid and lipoprotein levels of the Eskimos in comparison with Danish controls. The Eskimos were found to have very high levels of membrane-bound, long-chain, omega-3 fatty acids EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid). At the same time, they had low levels of triglycerides and very-low-density lipoproteins. As further research revealed low rates of cardiovascular disease, cancers, and other inflammatory diseases in the Greenland Eskimos, an

association was suspected between their overall health and the high levels of marine-based oils in their diet.

Much of the benefit of omega-3 fatty acids is suspected to result from competitive inhibition of arachidonic acid in cell membranes and production of less inflammatory eicosanoids. A wide range of benefits of dietary omega-3 fatty acids have been described in humans and in animals. Areas affected by fatty acid homeostasis include, but are not limited to: dermatologic conditions, cardiovascular health, neurologic development, renal disease, arthritis and joint health, gastrointestinal health, inflammatory and autoimmune disease, and cancer.

Unfortunately, in recent years, vegetable oils have been added to many diets as a fatty acid source, shifting the balance of fatty acids away from omega-3s and toward omega-6s. This has led to the development of nutritional supplements for humans and animals designed to increase the body's levels of omega-3s. Supplements can be found in a variety of forms. Omega-3 fatty acids naturally found in fish are in a highly absorbable triglyceride form. Processing of fatty acids to create many commercially available supplements results in an ethyl ester form of the fatty acids, which has been shown to be up to 70% less absorbable than the naturally occurring triglyceride form. Only recently have newer supplements become available in a re-esterified, triglyceride form, potentially allowing for improved levels of omega-3s. Preliminary results of recent studies evaluating the clinical effects of omega-3 supplementation have been promising.

#### Selected References/Recommended Reading

1. Ahlstrøm Ø, Krogdahl A, While SG, et al. Fatty Acid composition in commercial dog foods. *J Nutr* 2004;134:2145S–2147S.
2. Bauer JE. Therapeutic use of fish oils in companion animals. *Journal of the American Veterinary Medical Association* 2011;239:1441–1451.
3. Fritsch DA, Allen TA, Dodd CE, et al. A multicenter study of the effect of dietary supplementation with fish oil omega-3 fatty acids on carprofen dosage in dogs with osteoarthritis. *J Am Vet Med Assoc* 2010;236:535–539.
4. Logas D, Beale KM, Bauer JE. Potential clinical benefits of dietary supplementation with marine-life oil. *J Am Vet Med Assoc* 1991;199:1631–1636.
5. Neubronner J, Schuchardt JP, Kressel G, et al. Enhanced increase of omega-3 index in response to long-term n-3 fatty acid supplementation from triacylglycerides versus ethyl esters. *Eur J Clin Nutr* 2010;65:247–254.
6. Roush JK, Dodd CE, Fritsch DA, et al. Multicenter veterinary practice assessment of the effects of omega-3 fatty acids on osteoarthritis in dogs. *J Am Vet Med Assoc* 2010;236:59–66.
7. Vandeweerd J-M, Coisson C, Clegg P, et al. Systematic review of efficacy of nutraceuticals to alleviate clinical signs of osteoarthritis. *J Vet Intern Med* 2012;26:448–456.