Top 5 Therapeutic Uses of Omega-3 Fatty Acids

Marjorie L. Chandler, DVM, MS, MANZCVSc, DACVN, DACVIM, DECVIM-CA, MRCVS
Vets Now Referrals
Glasgow, Scotland

Top 5 Therapeutic Uses of Omega-3 Fatty Acids

1. Osteoarthritis
2. Inflammatory skin disorders
3. Cardiovascular disorders
4. Renal disease
5. Cognitive function & neurological health

The essential (ie, required) fatty acids in diets include omega-6 and omega-3 fatty acids.

Dietary fatty acids serve many roles; they are a component of triglycerides and also serve as precursors to prostaglandins and other eicosanoids. The essential (ie, required) fatty acids in canine and feline diets include omega-6 and omega-3 fatty acids. The omega-6 acid linoleic acid (LA) is required for dogs and cats, and arachidonic acid (AA) is also required for cats. Omega-3 fatty acids include eicosapentaenoic acid (EPA), docosahexaenoic acid (DHA), and α-linolenic acid (ALA). Marine oil sources provide EPA and DHA, which are more effective in dogs and cats than ALA (which is not significantly converted to EPA or DHA). The eicosanoids produced from omega-3 fatty acids are less inflammatory than those produced from AA. As discussed here, marine oil fatty acids have been useful in many clinical conditions.

1 Osteoarthritis

When a therapeutic food containing omega-3 fatty acids was fed for 6 months to dogs with osteoarthritis (OA), owners reported subjective improvement in clinical signs[1]; study veterinarians did not report improvement. In another study of the same diet, however, the dogs showed objective improvements in lameness, weight bearing scores, and force plate analysis of weight bearing according to clinical assessments.[2]

In a randomized, placebo-controlled clinical trial in 40 cats with radiographic evidence of degenerative joint disease (DJD), a diet high in EPA and DHA, that also contained green-lipped mussel extract and glucosamine chondroitin sulfate, improved measurements of mobility compared with a control diet.[3] A study of 47 cats with DJD fed a DHA-supplemented diet showed improvement in ability to jump and a reduction in stiffness and lameness.[4]

2 Inflammatory Skin Disorders

A controlled study using omega-3 fatty acids in dogs showed improvement in pruritus, self-trauma, coat character, and alopecia compared with administration of a control capsule containing ALA.[5] Another similar study showed the most improvement was in dogs with early atopy (compared with chronic atopy).[6] In a study comparing EPA or flax oil (which contains ALA) compared with mineral oil, the groups receiving EPA and flax oil showed improved clinical skin scores; however, 2.3 times the amount of flax oil as EPA was needed to achieve similar scores.[7]

AA = arachidonic acid, ALA = α-linolenic acid, CKD = chronic kidney disease, DCM = dilated cardiomyopathy, DHA = docosahexaenoic acid, DJD = degenerative joint disease, EPA = eicosapentaenoic acid, GFR = glomerular filtration rate, LA = linoleic acid, OA = osteoarthritis

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3 Cardiovascular Disorders

Dogs with heart failure have a relative deficiency of plasma EPA and DHA compared with healthy dogs. In dogs with dilated cardiomyopathy (DCM), omega-3 fatty acid supplementation reduced proinflammatory interleukin-1 and prostaglandin-E2 production, and it also reduced muscle loss compared with placebo.[8] The decreased production of inflammatory cytokines is also thought to improve food intake in animals with heart failure.

A retrospective study of 108 dogs with DCM or chronic valvular disease indicated improved survival rates with omega-3 fatty acid supplementation.[8] In addition to the effects on inflammation, appetite, and lean body tissue preservation, omega-3 fatty acids also appear to reduce cardiac remodeling and subsequent dysfunction, reduced heart rate and blood pressure, improved endothelial function, and enhanced baroreceptor function.[9]

4 Renal Disease

In dogs with experimentally induced chronic kidney disease (CKD), omega-3 fatty acids reduced proteinuria and renal interstitial cellular infiltrates, prevented glomerular hypertension, and decreased the production of proinflammatory eicosanoids compared to safflower oil (containing omega-6 fatty acids) or beef tallow (containing saturated fats).[10] In a model of canine acute renal ischemia, there was a significant, reversible decrease in glomerular filtration rate (GFR) and urine volume in control animals, whereas no significant effect on renal function or urine volume was observed in animals pretreated with fish oil.[11] Omega-3 fish oils are also likely to be beneficial because of their eicosanoid effects.

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A retrospective study on 146 cats with CKD showed a survival time of 16 months for those on a therapeutic diet, compared with 7 months for the control group. The longest survival time was associated with the highest amounts of dietary EPA, although there were also differences in phosphorus and protein content.[12]

5 Cognitive Function & Neurological Health

A 60-day study of dietary enrichment with antioxidants, mitochondrial cofactors, and 0.01% DHA (dry matter basis) in dogs with age-related behavioral changes showed significant improvements in 14 of 16 behavioral attributes, including better agility and recognition of family members and other animals.[13] There was also improvement in excessive licking and patterned pacing behavior, but the role of DHA in the improvement was not established. DHA does have a neuroprotective effect, which appears to help prevent the onset of human Alzheimer's disease.[14] There is also evidence from studies in humans and animals that suggest changes in brain concentrations of DHA are positively associated with changes in cognitive or behavioral performance and memory.[14]

Feeding bitches a diet enriched with DHA during gestation and lactation is associated with improvements in neurologic development of their puppies; feeding DHA also improves memory and learning in young dogs.[15,16] DHA is also necessary for brain and retinal development in kittens.[17]

A study of 18 aggressive German shepherd dogs showed lower serum DHA concentration and a higher total omega-6 to omega-3 ratio compared to male dogs without behavior disorders; effects of supplementation was not reported, and a breed effect apparently was not examined.[18]

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Closing Thoughts: Dietary Supplementation

Many commercial diets are supplemented with omega-3 fatty acids. They generally include 0.03%–2.5% omega-3 fatty acids (as-fed basis), with more in some diets designed for patients with OA. There is no legal requirement for listing omega-3 fatty acids on pet food labels. When an omega-3 content is listed, it may contain a combination of ALA, EPA, and DHA as well as other minor omega-3 fatty acids. Conversion of ALA to EPA and DHA is low in dogs and virtually nonexistent in cats. The amount to supplement is somewhat empiric and depends on the amount in the diet. Common recommendations are 40 mg/kg EPA plus 25 mg/kg DHA, but the amount in studies also varies.

Potential risk factors include decreased platelet function and coagulation, and possibly suppressed wound healing.[19] The addition of any polyunsaturated fatty acid to a diet requires more vitamin E to prevent lipid peroxidation of body fat[20]; vitamin E is added to most fish oils. The lipids in dry food may also undergo oxidation, so they should be used within expiration dates and stored properly. Other potential effects include soft feces, diarrhea, flatulence, vomiting, and halitosis. Cod liver oil generally should not be used as a fish oil supplement, as most forms contain excessive amounts of vitamins A and D. ■ cb

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Suggested Reading

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