



Q & A

OMEGA-3 FISH OILS  
FOR DOGS AND CATS

## SALLY PEREA, DVM, MS, DACVN

Dr. Sally Perea holds a Bachelor's degree in Animal Science, a Master's degree in Nutrition, and a Doctorate degree in Veterinary Medicine from the University of California, Davis (UCD). After completing a medical and surgical internship with Veterinary Centers of America in Illinois, she returned to UCD to accomplish a clinical nutrition residency. In 2006, Dr. Perea received board certification by the American College of Veterinary Nutrition. Following her residency she worked as an Assistant Clinical Professor at the University of California Davis Veterinary School, and currently serves as a principle veterinary nutrition consultant for Davis Veterinary Medical Consulting.



## *What are omega-3 fatty acids?*

Omega-3 fatty acids are a type of fat. At room temperature fats can be solid (saturated fats) or liquid (unsaturated fats: monounsaturated or polyunsaturated) depending on their chemical structure. Omega-3 fatty acids are polyunsaturated fats, which provide numerous health benefits for both humans and their dog and cat companions.

The omega-3 fatty acids EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid) are considered Essential Fatty Acids (EFAs) for humans, as well as for dogs and cats, because they cannot be made in the body. In order to maintain optimal health and wellness, these fatty acids must be obtained through diet or supplementation.

EPA and DHA are necessary structural components of cell membranes. These functional, health-promoting fatty acids maintain the cell membrane fluidity and permeability needed for healthy functioning cells.

The two health-promoting omega-3 fatty acids, EPA and DHA, are long chain omega-3 fatty acids and are found abundantly in fish. Flax seed oil contains alpha-linolenic acid, or ALA, a shorter chain omega-3 fatty acid that requires the enzyme delta-6 desaturase to convert it into EPA and DHA in the body.

Humans and dogs have limited ability to convert ALA to EPA and DHA<sup>1</sup>. Cats have even less ability to convert ALA to EPA and DHA<sup>2</sup>. Therefore, supplementation with a high quality omega-3 fish oil is recommended for humans, dogs, and cats.

## *What are the important health benefits of fish-derived omega-3 fatty acids, EPA and DHA, in dogs and cats?*

One of the key functions of the omega-3 fatty acid EPA is supporting the body's natural anti-inflammatory response.

Dogs and cats can suffer from numerous inflammatory conditions that can affect their health and well-being. Studies have shown supplementation of omega-3 fatty acids from fish supports dogs and cats with inflammatory conditions associated with the skin, joints, kidneys, and heart<sup>3-8</sup>.

In addition, EPA promotes healthy triglyceride (fat) levels within the blood of dogs<sup>3</sup>.

In puppies and kittens, the omega-3 fatty acid DHA (docosahexaenoic acid) plays a key role in neurological (brain) and retinal (eye) development<sup>3,10</sup>. Studies have shown that feeding pregnant dogs omega-3 fatty acid-enriched foods during gestation and lactation provides needed DHA to their puppies<sup>10</sup>. Puppies that are weaned onto foods with DHA have improved electroretinographic responses (a measurement of the electrical response of the retina in the eye to light stimulation), and improved responses to training tests<sup>10,11</sup>. Human studies have shown that omega-3 fatty acids may be beneficial in maintaining normal cognitive function later in life<sup>12</sup>.

Finally, essential fatty acid supplementation is known to maintain general skin and coat quality in dogs and cats. Human studies have also shown that omega-3 fatty acid supplementation supports weight loss<sup>9</sup>.

Consult your veterinarian to evaluate the total amount of omega-3 fatty acids your dog/puppy or cat/kitten should receive daily based on species, age, activity level, diet, life stage (growth/reproduction and adult), and health condition of your pet.

### *What results should I expect to see in my dog or cat after omega-3 fatty acid supplementation?*

The results you may see in your dog or cat will vary based on any underlying clinical conditions. In pets with inflammatory conditions, such as allergies, you may notice improvements in clinical signs such as scratching, itching, and redness of the skin. In healthy dogs, outwardly noticeable effects may not be readily apparent, but omega-3 fatty acid supplementation will help to maintain overall health.

### *How long does it take to see results in my dog or cat?*

If your dog or cat is suffering from an inflammatory condition, such as allergies, you may see improvements in clinical signs within two weeks of supplementation. Studies have shown that fatty acid levels reach a steady state within about one month of starting supplementation<sup>13</sup>. Therefore, full results may not be appreciated until this time.

## *Do dogs, cats, and humans metabolize omega-3 fatty acids differently? If so, how does each species metabolize omega-3 fatty acids in their body, and why is this important to know?*

The metabolism of omega-3 fatty acids is similar among humans, dogs, and cats, but there are some differences. The main difference among the three species resides in their ability, or lack of ability, to convert shorter chain omega-3 fatty acids from plants (such as alpha-linolenic acid, or ALA) to longer chain omega-3 fatty acids (such as EPA and DHA) within the body.

Like humans, dogs are able to convert ALA to EPA and DHA within the body, but only to a limited degree<sup>1</sup>. Cats, on the other hand, have even less ability to convert ALA to EPA and DHA within the body<sup>2</sup>. Therefore, cats must receive a direct source of EPA and DHA through diet or supplementation to receive the full benefits of omega-3 fatty acids.

Shorter chain omega-3 fatty acids (such as ALA) are found in plant sources such as flax seed oil. However, longer chain fatty acids (such as EPA and DHA) are found most abundantly in fish oil.

Although dogs do have some ability to convert ALA to EPA and DHA, the conversion is not as effective as supplementation with direct sources of EPA and DHA provided in fish oil<sup>10,13</sup>. Therefore, supplementation with omega-3 fish oil is recommended for humans, dogs, and cats.

## *What is the proper ratio of omega-6 fatty acids to omega-3 fatty acids for dogs and cats?*

In the total diet of dogs and cats, omega-3 and omega-6 fatty acid content is commonly expressed as a ratio of omega-6 to omega-3 fatty acids. Conventional dog diets without omega-3 supplementation generally provide an omega-6 to omega-3 ratio of approximately 20:1. When omega-3 fatty acids are supplemented or added to the diet, this ratio is reduced. A ratio of 5:1 has commonly been used in pet foods as a healthy ratio of omega-6 to omega-3 fatty acids in the diet. Lower ratios have also demonstrated positive results in studies evaluating beneficial effects of omega-3 fatty acid supplementation for clinical conditions.

It should be noted that while the ratio is important to consider, it is also important to consider the source of omega-3 fatty acids in the diet. The long chain omega-3 fatty acids (such as EPA and DHA) are provided by fish and other marine sources, while shorter chain omega-3 fatty acids (such as ALA) are provided by plant sources such as flax seed oil. Supplementation with omega-3 fatty acids provided by fish oil is preferred.

### *Do dogs, cats, and humans have different physiological needs for omega-3 fatty acids?*

The physiological needs for omega-3 fatty acids are very similar among dogs, cats, and humans. For neurological developmental needs, more human and animal foods are being supplemented with DHA. Similarly, both humans and pets can benefit from the positive effects that omega-3 fatty acids have on inflammatory conditions.

### *Are there any side effects my pet may experience when supplementing with omega-3 fatty acids?*

There are no known side effects from omega-3 supplementation, but over-supplementation should be avoided due to potential interference with platelet function<sup>13,14</sup>. *(Please see next question for more information on platelet function.)*

Pets that have sensitive stomachs may be more sensitive to increases in dietary fat. Therefore, any pets with a history of gastrointestinal problems or pancreatitis should also be carefully weaned onto any fatty acid supplementation to ensure that they can tolerate the increased fat level in the diet. Pets that are sensitive to dietary fat may experience some changes in their stool consistency, such as soft stool or diarrhea. If this does occur, supplementation should be stopped, and your veterinarian should be consulted for further direction. It is also important to consult your veterinarian if your pet has an episode of pancreatitis or other gastrointestinal disturbance, as your veterinarian may recommend a temporary change in diet and/or discontinuation of supplements.

## *Are there any safety issues if my pet receives an over-supplementation of omega-3 fatty acids?*

Platelets are a type of blood cell important for formation of a blood clot to stop bleeding if the body is cut or injured. Omega-3 fatty acids can decrease the ability of platelets to stick together and form a blood clot quickly<sup>13,14</sup>.

One study in cats showed that when the diet was supplemented with very high levels of omega-3 fatty acids (omega-6 to omega-3 ratio of 1.3:1), the cats were not able to form a blood clot as quickly as those cats receiving lower levels of omega-3 fatty acid supplementation<sup>14</sup>.

Dogs appear to tolerate higher levels of omega-3 fatty acids better than cats, as increased bleeding has not been reported as a problem in dogs on high omega-3 fatty acid diets. However, this raises the importance of providing a good balance of omega-6 to omega-3 fatty acids in the diet.

Although omega-3 fatty acids have many health benefits, over-supplementation (doses above the levels recommended on the label) should be avoided. If over-supplementation occurs, discontinue supplementation for two to three weeks, and then resume at an appropriate level.

Contact your veterinarian if you have any further concerns. If your pet has any surgical procedures planned, discuss the over-supplementation and all supplements your pet is taking with your veterinarian, as your veterinarian may want to postpone any planned procedures.

## *Are there any known contraindications between omega-3 fatty acids and other medications?*

Omega-3 fatty acids have effects similar to non-steroidal anti-inflammatory medications. You should discuss supplementation with your veterinarian if your pet is on these types of medications, or blood thinners.

Omega-3 fatty acid supplements are generally safe with other medications, but always inform your veterinarian of any supplements you are giving to your pet before starting a new medication.

## *Do omega-3 fatty acid requirements vary with the age of dogs and cats?*

Omega-3 fatty acids are important throughout the life of dogs and cats. DHA is very important for normal neurological (brain) development in both puppies and kittens<sup>3,10</sup>. In addition to the role of DHA in brain development, studies in humans have shown that omega-3 fatty acids may be beneficial in maintaining normal cognitive function later in life<sup>12</sup>.

As your pet ages, omega-3 fatty acid supplementation can support dogs and cats with inflammatory conditions related to the joints, kidneys, and heart<sup>3-8</sup>.

## *Do different breeds of dogs and cats have certain health conditions that would benefit from omega-3 fatty acid supplementation?*

All dog and cat breeds can benefit from omega-3 fatty acid supplementation. Certain health conditions known to benefit from omega-3 fatty acid supplementation are related to skin allergies, joints, kidneys, and the heart<sup>3-8</sup>. Breeds that may be prone to these conditions may benefit from omega-3 fatty acid supplementation. For example, many larger breed dogs, such as Labrador Retrievers and German Shepherd Dogs, are prone to developing joint issues<sup>15</sup>.

Skin allergies can occur in any dog breed, but has been reported in Boxers, Cocker Spaniels, Springer Spaniels, Collies, Dalmatians, German Shepherd Dogs, Lhasa Apsos, Miniature Schnauzers, Retrievers, Chinese Shar-Peis, Soft Coated Wheaten Terriers, Dachshunds, and West Highland White Terriers<sup>15</sup>.

Heart conditions can also occur in many breeds. Studies evaluating omega-3 fatty acids in dogs with heart conditions have included the following breeds: Boxer, Cavalier King Charles Spaniel, Shetland Sheepdog, Airedale Terrier, Golden Retriever, Jack Russell Terrier, Miniature Schnauzer, Portuguese Water Dog, and Toy Poodle<sup>6-8</sup>.

Dogs prone to developing high triglycerides (high fat in the blood), such as Miniature Schnauzers, may also benefit from omega-3 fatty acid supplementation<sup>13</sup>.

## *Do omega-3 fatty acids affect behavior and mood in dogs and cats?*

The effects of omega-3 fatty acids on behavior in dogs and cats have not been well researched. However, one recent study did show that dogs with aggression problems had lower blood levels of DHA and higher omega-6 to omega-3 ratios than dogs without aggression<sup>16</sup>. Although this study does not prove cause and effect, it does suggest that omega-3 fatty acid supplementation may be beneficial for pets with aggressive conditions.

Omega-3 fatty acid supplementation has also been researched in humans with cognitive dysfunction. Results of these studies have suggested that omega-3 fatty acids may be beneficial in maintaining cognitive function<sup>12</sup>. Therefore, improved behavior may be appreciated in older pets, especially those suffering from cognitive dysfunction.

## *What is a good source of omega-3 fatty acids?*

Fish oils are an excellent source of omega-3 fatty acids because they provide long chain polyunsaturated fatty acids, EPA and DHA.

## *What are the differences between omega-3 fatty acids derived from fish oil verses flax seed oil?*

Flax seed oil is rich in ALA, which requires conversion within the body to form EPA and DHA. It has been shown that fish oils, with EPA and DHA, are more effective and efficient in producing health benefits in animals than supplementing with ALA alone<sup>10</sup>.

As mentioned earlier, cats have even less ability to convert ALA to EPA and DHA<sup>2</sup>. Therefore, cats must receive a direct source of EPA and DHA through diet or supplementation.

## *What is cod liver oil? What is fish body oil? What is the difference between the two types of oils?*

Both cod liver oil and fish body oil are oils derived from fish that are rich in omega-3 fatty acids. Cod liver oil is derived specifically from the liver of cod, while fish body oil is derived from the body of fish. Because the liver is a reservoir for vitamin A, cod liver oil is higher in vitamin A content than fish body oil.

The vitamin A concentrations can vary between specific brands of cod liver oil, and some manufacturers will add additional vitamin A to cod liver oil to boost vitamin A levels. Cod liver oil can also provide additional vitamin D. However, both cod liver oil and fish body oils can have high levels of vitamin D. Salmon is a good source of vitamin D; therefore, salmon oils can contain fairly high levels of vitamin D.

Because vitamins A and D are fat-soluble vitamins, and can accumulate in the liver and body, they can have harmful effects when supplemented in excessive levels.

Pet owners should be aware of other foods or treats fed to their pets that may also provide high levels of vitamin A (such as liver), and take all these things into consideration when evaluating the safety of their pet's diet and additional supplements. This also applies to pet owners feeding their pets raw food diets and home-prepared diets.

Consult your veterinarian to evaluate the total amount of omega-3 fatty acids and vitamins A and D your dog/puppy or cat/kitten should receive on a daily basis based on species, age, activity level, diet, life stage (growth/reproduction and adult), and health condition of your pet.

### *When do I supplement my pet with cod liver oil or a fish body oil product?*

Verify with the manufacturer the total percentages (%) or milligrams (mg) of EPA, DHA, and other omega-3 fatty acids per serving. In addition, verify the total international units (I.U.) of vitamins A and D per serving.

## *What are the health benefits of all natural vitamins A and D for dogs and cats?*

Both vitamins A and D are fat-soluble and essential vitamins in the diets of dogs and cats.

Vitamin A is important for normal vision, immune function, fetal development, growth, and cellular differentiation (important for maintaining healthy skin cells, corneal cells, and other cells lining the respiratory, gastrointestinal, and reproductive tracts)<sup>17</sup>.

Vitamin D plays a major role in maintaining normal body calcium levels and facilitating calcium absorption from the gastrointestinal tract. Unlike humans, dogs and cats have an essential dietary requirement for vitamin D due to an inability to adequately form vitamin D in the skin. Vitamin D deficiency is characterized by an inadequate mineralization of the bone and growth plates, also known as rickets<sup>17</sup>.

# SELECTING A QUALITY FISH OIL SUPPLEMENT

Fish oil structure, purity, and freshness dictate quality, function, and efficacy.

Select a company whose fish oil quality (purity and freshness) surpasses the Norwegian Medicinal, European Pharmacopoeia, Council for Responsible Nutrition, and World Health Organization standards. Request third-party laboratory test results on the fish oil from the manufacturer to verify fish oil purity and freshness.

Fish oil should be distilled for purity, without use of chemicals, to effectively remove heavy metals, PCBs, dioxins, and furans while preserving the natural constituents of the oil.

In addition, fish oil should be processed in an oxygen-free environment, which maintains oil freshness and avoids oxidative rancidity. Freshness in fish oils directly correlates to the taste, biological efficacy, and results of the fish oil.

In nature, fish oil occurs in the natural triglyceride form. However, some fish oil products on the market contain omega-3 fatty acids that are produced in the synthetic ethyl ester form. Confirm the fish oil (omega-3 fatty acid) is in the natural triglyceride form. The natural triglyceride form is a more stable form, which ensures optimal freshness and utilization of the oil by the body, delivering maximum benefits for your pet.

Finally, protect our oceans by using fish oil obtained only from sustainably sourced wild fish.

# CLINICAL REFERENCES

1. Dunbar BL, Bauer JE. Conversion of essential fatty acids by delta 6-desaturase in dog liver microsomes. *J Nutr* 2002;132:1701S–1703S.
2. Bauer JE. Fatty acid metabolism in domestic cats (*Felis catus*) and cheetahs (*Acinoyx jubatas*). *Proceedings of the Nutrition Society* 1997;56:1013–1024.
3. Bauer JE. Responses of dogs to dietary omega-3 fatty acids. *J Amer Vet Med Assoc* 2007;11:1657–1661.
4. Brown SA, Brown CA, Crowell WA, *et al*. Effects of dietary polyunsaturated fatty acid supplementation in early renal insufficiency in dogs. *J Lab Clin Med* 2000;135:275–286.
5. Hansen RA, Harris ME, Pluhar GE, *et al*. Fish oil decreases matrix metalloproteinases in knee synovia of dogs with inflammatory joint disease. *J Nutr Biochem* 2008;19(2):101–108.
6. Freeman LM, Rush JE, Kehayias JJ. Nutritional alterations and the effects of fish oil supplementation in dogs with heart failure. *J Vet Intern Med* 1998;12: 440–448.
7. Freeman LM, Rush JE, Markwell PJ. Effects of dietary modification in dogs with early chronic valvular disease. *J Vet Intern Med* 2006;20:1116–1126
8. Smith CE, Freeman LM, Rush, JE, *et al*. Omega-3 fatty acids in Boxer dogs with arrhythmogenic right ventricular cardiomyopathy. *J Vet Intern Med* 2007;21:256–273.
9. Jing-Jing L, Huang CJ, Xie D. Anti-obesity effect of conjugated linoleic acid, docosahexaenoic acid, and eicosapentaenoic acid. *Mol Nutr Food Res* 2008;52:631–645.
10. Heinemann KM, Waldron MK, Bigley KE. Long-chain (n-3) polyunsaturated fatty acids are more efficient than alpha-linolenic acid in improving electroretinogram responses in puppies exposed during gestation, lactation, and weaning. *J Nutr* 2005;135:1960–1966.
11. Kelley R, Lepine A. Improving puppy trainability through nutrition. *Proceedings from lams Clinical Nutrition Symposium* 2005, Seville, Spain.
12. Freemantle E, Vanda M, Tremblay-Mercier J, *et al*. Omega-3 fatty acids, energy substrates, and brain function during aging. *Prostaglandins, Leukotrienes and Essential Fatty Acids* 2006;75:213–220.
13. Logas D, Beale KM, Bauer JE. Potential benefits of dietary supplementation with marine-life oil. *J Am Vet Med Assoc* 1991;199(11):1631–1636.
14. Saker KE, Eddy AL, Thatcher CD, Kalnitsky J. Manipulation of Dietary (n-6) and (n-3) Fatty Acids Alters Platelet Function in Cats. *J Nutr* 1998;128:2645S–2647S.
15. Smith GA, Mayhew PD, Kapatkin AS, *et al*. Reevaluation of risk factors for degenerative joint disease associated with hip dysplasia in German Shepherd Dogs, Golden Retrievers, Labrador Retrievers, and Rottweilers. *J Am Vet Med Assoc* 2001;219:1719–1724.
16. Re S, Zanoletti M, Emanuele E. Aggressive dogs are characterized by low omega-3 polyunsaturated fatty acid status. *Vet Res Commun* 2008;32:225–230.
17. *Nutrient Requirements of Dogs and Cats*. National Research Council of the National Academies. The National Academies Press, Washington, DC, 2006.

DISCLAIMER: This research information is provided as a service by Nordic Naturals, Inc. for informative purposes only. It is not intended as medical advice of any kind. The information in this document is not intended to diagnose, treat, or cure any disease.