

Beyond Energy: Five Functions of Dietary Fat

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Energy from canine diets is derived from three dietary components: protein, fat and carbohydrates. When it comes to dietary composition, we typically focus on protein and fat, featured in the guaranteed analysis statement on pet food to describe the minimum percentage of crude protein and fat that a diet contains — e.g., “26-16” (26% protein and 16% fat) or “30-20” (30% protein and 20% fat). When considering the dietary benefits of fat, energy is often the first that comes to mind. After all, fat contains 9 calories (kcal) per gram and provides twice the energy of protein or carbohydrate fractions. While you likely know that dietary fat is a major contributor to a dog’s total daily energy intake, you may be less aware of the other physiologic benefits. Dietary fat has a long and diverse list of contributions, such as providing energy (immediate and stored), acting as a source of essential fatty acids and fat-soluble vitamins, and supporting cellular functionality and immune function.

Lesser-Known Benefits of Dietary Fat

1. **Hormone production.** Ingested fats (triglycerides) are broken down through digestion into smaller complexes (diglycerides, monoglycerides) to allow absorption. Dietary fats are a secondary source of cholesterol. (Most cholesterol is produced in the liver.) And while cholesterol is often perceived negatively, it’s an important part of the endocrine system that serves as the base for production of many hormones, including testosterone and estrogen.
2. **Vitamin absorption.** Lipids are also a critical component of vitamin status. Vitamins E, D, A and K, along with carotenoids, are fat-soluble nutrients. These nutrients are absorbed with the lipid fraction of a dog’s diet and stored within the adipose tissue.
3. **Support of daily functions.** The composition of the triglycerides is extremely important when it comes to their biological value. By definition, essential fatty acids must be obtained from the diet, because omega-6 and omega-3 fatty acids cannot be produced naturally in sufficient amounts to support the body’s daily functions.

Most fatty acids are classified by the number of carbons that compose the chemical chain, the number of double bonds, and the position of the first double bond from the terminal methyl group. For example, C18:2n-6 represents linoleic acid, an 18-carbon fatty acid with two double bonds (polyunsaturated) and an initial double bond found at the 6-carbon position (omega-6). Fats are also classified by the number of double bonds in the carbon chain. (Saturated fats contain no double bonds, monounsaturated fats contain a single double bond and polyunsaturated fats contain two or more double bonds.)

4. **Immune function.** Fatty acid composition of cell membranes can have dramatic effects on membrane fluidity, lipid raft formation (specialized structures within the lipid bilayer of the membrane), and many other physiologic events, including inflammation. Inflammation is the body’s response to viruses, bacteria, toxins, damaged cells, injuries and other events — and while it’s often considered a health risk, inflammation is more frequently an important defense mechanism for maintaining health. (An immune response to a pathogen is an inflammatory

response, initiated with the release of inflammatory cells: lymphocytes, histocytes, neutrophils and eosinophils). Lipids are also part of the inflammatory response.



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