

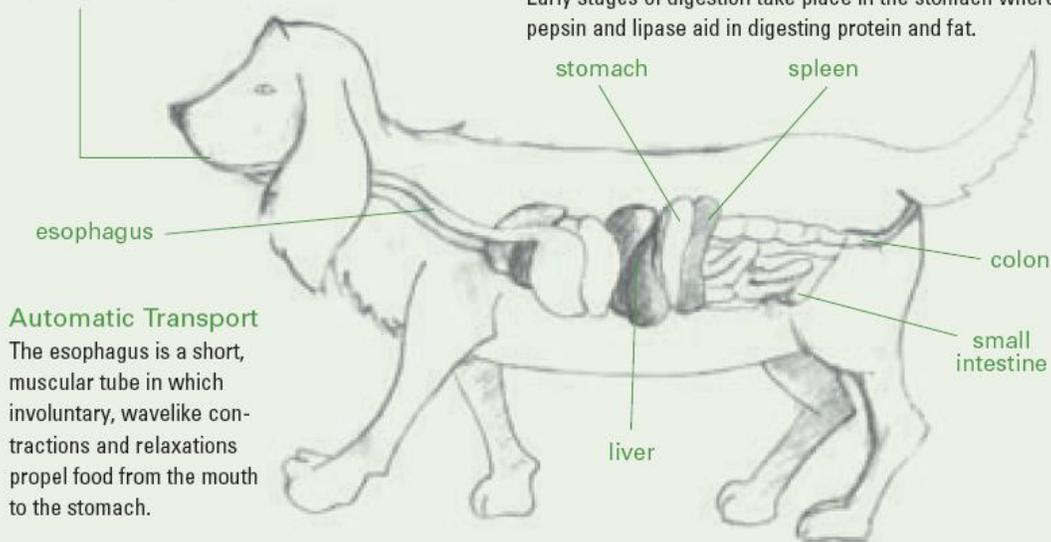
THE DIGESTIVE TRACT

Point of Departure

The mechanical breakdown of food begins in the mouth, where food is ingested, chewed, and swallowed.

Storage and Processing

The stomach acts as a temporary storage and processing facility before emptying its contents into the small intestine. Early stages of digestion take place in the stomach where pepsin and lipase aid in digesting protein and fat.



Automatic Transport

The esophagus is a short, muscular tube in which involuntary, wavelike contractions and relaxations propel food from the mouth to the stomach.

Treatment Facilities

In the small intestine, enzymes break down large, complex food molecules into simpler units that can be absorbed into the bloodstream. The pancreas is an organ that does double duty, secreting digestive enzymes into the gut and hormones, including insulin and glucagon, into the blood. Important for fat metabolism, the liver produces bile and partially stores it in the gall bladder between meals.

End of the Line

The primary function of the large intestine is to absorb electrolytes and water. Also, this is where microbes ferment nutrients that have so far escaped digestion and absorption.

Your dog adds so much to your life, and you want to feed him a healthy food, but with all of the choices out there, how do you know which food is best. First of all, keep in mind that there is no one food that is best for every dog. There is no single food that will give every dog the brightest eyes, the shiniest coat, the most energy, and the best digestion. Dogs are individuals just like people, which means that you could feed a brand of very well-formulated food to a group of dogs and find that most of them do great on it, some not as well, and it may actually cause some gastrointestinal upset in a few dogs. Luckily, there are many well-formulated dog foods to choose from today, and it is fine to try several to determine which one works best for your dog. Dogs exhibit omnivorous feeding behavior and therefore their diet should be comprised of proteins, carbohydrates, fats, vitamins, minerals and water in the correct proportions. A dog food that meets these requirements is called a "Complete" or "Balanced" diet. The amount of food a dog requires depends on the animal's age, breed, gender, activity, temperament, environment and metabolism.

A better understanding of how dogs use the various nutrients in food and how much of them they need can help you choose a healthier diet for your pet.

PROTEINS AND AMINO ACIDS

Dogs cannot survive without protein in their diets. Dietary protein contains 10 specific amino acids that dogs cannot make on their own. Known as essential amino acids, they provide the building blocks for many important biologically active compounds and proteins. In addition, they donate the carbon chains needed to make glucose for energy. High-quality proteins have a good balance of all of the essential amino acids.. Dogs are known to selectively choose foods that are high in protein. Whether this is simply a matter of taste or a complex response to their biological needs for all 10 essential amino acids is not known

FATS AND FATTYACIDS

Dietary fats, mainly derived from animal fats and the seed oils of various plants, provide the most concentrated source of energy in the diet. They supply essential fatty acids that cannot be synthesized in the body and serve as carriers for important fat-soluble vitamins. Fatty acids play a role in cell structure and function. Food fats tend to enhance the taste and texture of the dog's food as well. Essential fatty acids are necessary to keep your dog's skin and coat healthy. Puppies fed ultralow-fat diets develop dry, coarse hair and skin lesions that become increasingly vulnerable to infections. Deficiencies in the so-called "omega-3" family of essential fatty acids may be associated with vision problems and impaired learning ability. Another family of essential fatty acids called "omega-6" has been shown to have important physiologic effects in the body.

DAILY RECOMMENDED ALLOWANCES FORPROTEIN AND FATS

	PUPPIES (Weighing 5.5 kg, 15 kg at maturity)	ADULT DOGS (Weighing 15 kg)	PREGNANT/ NURSING DOGS (Weighing 15 kg with 6 puppies)
Crude Protein	56 g	25 g	69 g /158 g
Total Fat	21 g	14 g	29 g/67 g

AVERAGE DAILY ENERGY NEEDS

TYPE OF DOG	CALORIES PER DAY (Kilocalories per day*)				
	10 lb	30 lb	50 lb	70 lb	90 lb
PUPPIES (10 lb puppy growing to 33 lb at maturity)	990	—	—	—	—
INACTIVE DOGS —dogs with little stimulus or opportunity to exercise.	296	674	989	1,272	1,540
ADULT ACTIVE DOGS —dogs with strong stimulus and ample opportunity to exercise, such as dogs in households with more than one dog, in the country or with a large yard.	404	922	1,353	1,740	2,100
PREGNANT DOGS —from 4 weeks after mating until delivery.	518	1,274	1,940	2,570	3,170
YOUNG ADULT ACTIVE DOGS	436	993	1,451	1,876	2,264
OLDER ACTIVE DOGS	327	745	1,093	1,407	1,700

ENERGY NEEDS IN CALORIES

(Calories per Day for a 33 lb and 50 lb Nursing Dog)

Number of Puppies	Weeks into Lactation							
	1		2		3 (peak)		4	
	33 lb	50 lb	33 lb	50 lb	33 lb	50 lb	33 lb	50 lb
2	1,645	2,328	1,789	2,546	1,897	2,709	1,969	2,818
4	2,185	3,146	2,473	3,581	2,689	3,909	2,833	4,127
6	2,455	3,555	2,815	4,100	3,084	4,509	3,265	4,782
8	2,725	3,964	3,157	4,618	3,481	5,109	3,697	5,437

ENERGY NEEDS OF GROWING PUPPIES:

The growing puppy starts out needing about same as many calories per kg of body weight as an adult dog of the same breed. Owners should start feeding puppies food at approximately 4 weeks after birth, because mother's milk is no longer sufficient. Food is best offered to puppies in multiple, well-spaced meals.

ENERGY NEEDS OF OLDER DOGS

Because of decreased physical activity and slowed metabolism, older dogs need 20% fewer total calories than do middle-aged adult dogs. As dogs age, they tend to become overweight. It may take obese dogs longer for their blood glucose concentrations to return to normal. This disrupted carbohydrate metabolism can lead to diabetes.

ENERGY NEEDS OF LACTATING DOGS

New mothers generally suckle their puppies for at least 6 weeks. The mother's need for calories increase with the number of puppies and the week of lactation, up to 4 weeks. Giant breeds (like Great Danes) have proportionately smaller digestive tracts and may not be able to eat enough to sustain themselves during lactation. Owners of such dogs may need to start feeding puppies supplemental food at an early age.

MINERALS

Twelve minerals in the table are known to be essential nutrients for dogs. Calcium and phosphorus are crucial to strong bones and teeth. Dogs need magnesium, potassium, and sodium for nerve impulse transmission, muscle contraction, and cell signaling. Many minerals that are present only in minute amounts in the body, including selenium, copper, and molybdenum, act as helpers in a wide variety of enzymatic reactions. Dogs can get too much or too little of a specific mineral in their diets. A deficiency of dietary calcium, for instance, causes a condition known as secondary hyperparathyroidism. Recognized clinically for many years in dogs fed meals consisting mainly of meat, this disease results in major bone loss, skeletal abnormalities, and pathological fractures. An excess of calcium, on the other hand, may also cause skeletal abnormalities, especially in growing large-breed puppies.

DAILY RECOMMENDED ALLOWANCES FOR MINERALS

	FUNCTIONS	DAILY RECOMMENDED ALLOWANCE*	SIGNS OF DEFICIENCY/EXCESS
Calcium	Formation of bones and teeth; blood coagulation; nerve impulse transmission; muscle contraction; cell signaling	0.75 g	Nutritional secondary hyperparathyroidism; significant decreases in bone mineral content, which can result in major skeletal abnormalities <i>Different types of skeletal aberrations, especially in growing puppies of large breeds</i>
Phosphorus	Skeletal structure; DNA and RNA structure; energy metabolism; locomotion; acid-base balance	0.75 g	Reduced weight gain; poor appetite; bowing and swelling of forelimbs in puppies
Magnesium	Enzyme functions; muscle and nerve-cell membrane stability; hormone secretion and function; mineral structure of bones and teeth	150 mg	Reduction in weight gain, irritability, and convulsions in puppies; hyperextension of carpal joints and hind-leg paralysis later in life

VITAMINS

Vitamins are organic compounds that take part in a wide range of metabolic activities. Dogs require vitamins in their food, albeit at low concentrations. First noticed in dogs some 75 years ago, vitamin deficiencies can cause a variety of health problems. Clinical signs of vitamin A deficiency, one of the first deficiencies studied in dogs, include motor and vision impairment, skin lesions, respiratory ailments, and increased susceptibility to infections. Dogs fed diets lacking vitamin E show signs of skeletal muscle breakdown, reproductive failure, and retinal degeneration. Thiamin deficiency can lead to brain lesions and other neurological abnormalities if the deprivation is sudden and to heart damage and death if it is chronic. Some vitamins, such as vitamin D, are not only essential in small doses, but also toxic in excess amounts.

DAILY RECOMMENDED ALLOWANCES FOR VITAMINS

	FUNCTIONS	RECOMMENDED ALLOWANCE*	SIGNS OF DEFICIENCY/EXCESS
Vitamin A	Vision; growth; immune function; fetal development; cellular differentiation; transmembrane protein transfer	379 µg	Anorexia; body weight loss; ataxia; conjunctivitis; corneal disorders; skin lesions; respiratory ailments; increased susceptibility to infection Imbalance in bone remodeling processes; artery and vein degeneration; dehydration; central nervous system depression; joint pain
Vitamin D	Maintenance of mineral status; phosphorous balance	3.4 µg	Rickets; lethargy; loss of muscle tone; bone swelling and bending Anorexia; weakness; diarrhea; vomiting; calcification of soft tissue; excessive mineralization of long bones; dehydration; dry and brittle hair; muscle atrophy
Vitamin E	Defense against oxidative damage	8 mg	Degeneration of skeletal muscle; reproductive failure; retinal degeneration

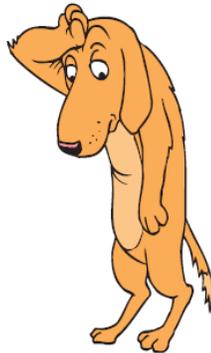
Special diets which have been scientifically formulated for dogs with specific diseases or conditions. These products include diets for dogs with urolithiasis (stones), heart disease, kidney disease, obesity, digestive disturbances, suspected food allergy problems and other conditions. Such specialized foods should only be used under the supervision of your veterinarian.

When introducing a new food to your dog, blend it gradually with the existing diet in increasing amounts over at least 4 days until the new food replaces the old. This process should prevent food rejection and gastrointestinal upset. Free choice fresh and clean water must be available at all times to your dog

Treats, snacks and human food should be limited in dog's diet. In general, dietary balance is maintained when less than 10% of the daily intake consists from treats (snacks, human foods) and the remainder is a complete and balanced food. Excess treat intake may interfere with normal appetite, dietary balance and can contribute to obesity

UNDERWEIGHT OR OVERWEIGHT?

UNDERWEIGHT



Your dog is not getting enough to eat if you can easily see its ribs, vertebrae, and pelvic bones, feel no fat on the bones, and possibly notice some loss of muscle mass. If chronically underfed, adult dogs may experience impaired ability to nurse young and perform work, and increased susceptibility to bacterial infections and parasites; puppies may be stunted in their growth; adult dogs may develop osteoporosis.

IDEAL



Your dog is at an ideal weight if you can easily feel its ribs. The waist should be easily observed behind the ribs when viewed from above. An abdominal tuck is evident when viewed from the side.

OVERWEIGHT



Your dog is overweight if you cannot feel its ribs, see fat deposits over its back and the base of its tail, discern no waist behind the ribs when viewed from above, and see no abdominal tuck in profile. Obesity occurs in one out of four dogs in western societies. Its incidence increases with age and is more common in neutered animals. Health risks include diabetes and osteoarthritis.