

**Understanding Your Dog's**

# **Nutritional Needs**



## What is the best food for your dog?

Veterinarian-recommended extruded kibble? Baked kibble? Canned? Moist? Freeze-dried? Home-cooked? Raw? Barf? Prey model? High-protein? Low-carb? Low-fat? Grain-free? Holistic?

The number of options is ever-growing, and so is both controversy and confusion. And that is before you get down to individual brands. Trying to understand your dog's nutritional needs can be daunting.

# Breathe

**Dogs can do well on many of the options.**

For example, take a look at what the world's longest-living dogs ate.<sup>1</sup>

<b>Bluey</b> <i>Australian cattle dog/Australia</i> lived to almost 30 years of age	Blue ate a fresh [raw] diet of kangaroo and emu
<b>Bramble</b> <i>Blue Merle Collie/UK</i> 27 years	Vegan diet of rice, lentils, and organic vegetables
<b>Pusuke</b> <i>Shiba mix/Japan</i> 26 years	Diet undisclosed but owner believes Pusuke's longevity was due to supplements
<b>Max</b> <i>Beagle mix/USA</i> almost 30 years	Extruded kibble diet
<b>Chilla</b> <i>Black Lab mix/Australia</i> 32 years	Left-overs supplemented once a week with canned pet food.

<sup>1</sup> <https://www.planetpaws.ca/2015/09/20/best-diet-dogs/>

## Basic requirements

Your dog's food needs to provide

- energy
- building blocks for tissues
- and components necessary for body functions

Energy can come from fats, carbohydrates, or proteins. Proteins can be broken down for energy or used as building blocks to repair and maintain tissues and become functional proteins such as enzymes, antibodies, etc.



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### ***Minerals***

Minerals fulfill a variety of functions. For example, they provide building blocks for the growth and maintenance of healthy bones. But minerals are also involved in maintaining fluid balance, pH regulation, nerve transmission, muscle function, blood clotting, immune function, energy metabolism, and more.<sup>2</sup>

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<sup>2</sup> <https://www.uofmhealth.org/health-library/ta3912>

### ***Vitamins***<sup>3</sup>

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Vitamins can be water- or fat-soluble. They don't provide energy but are essential for cell function, growth, and development.

Water-soluble – B vitamins work with enzymes to facilitate:

- metabolism
- nerve function
- digestive function
- immune function
- skin health
- growing new cells

Note: vitamin C belongs under water-soluble vitamins, but a healthy dog's body can make its own vitamin C.

Fat-soluble – vitamins A, D, E, and K support:

- immune function
- vision
- healthy skin and mucous membranes
- mineral absorption
- blood clotting
- protection from free radicals

### **Specific nutritional requirements for dogs**

In the USA, nutritional requirements, legal definitions, and labeling requirements for dog food were established by the Association of American Feed Control Officials (AAFCO).

The guidelines list essential nutrients and required amounts and proportions of proteins and amino acids, fats, minerals, and vitamins. Interestingly, reviewing the table, you will find no mention of carbohydrate requirements—carbohydrates are not essential nutrients for dogs.

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3 <https://www.uofmhealth.org/health-library/ta3868>

### **AAFCO Nutrient Requirements for Dogs<sup>4</sup>**

Nutrient (% or per kg of diet)	Growth and Reproduction Minimum	Adult Maintenance Minimum	Adult Maintenance Maximum
<b>Protein (%)</b>	22.0	18.0	
Arginine (%)	0.62	0.51	
Histidine (%)	0.22	0.18	
Isoleucine (%)	0.45	0.37	
Leucine (%)	0.72	0.59	
Lysine (%)	0.77	0.63	
Methionine + cystine (%)	0.53	0.43	
Phenylalanine + tyrosine (%)	0.89	0.73	
Threonine (%)	0.58	0.48	
Tryptophan (%)	0.20	0.16	
Valine (%)	0.48	0.39	
<b>Fat (%)</b>	8.0	5.0	
Linoleic acid (%)	1.0	1.0	
<b>Minerals</b>			
Calcium (%)	1.0	0.6	2.5
Phosphorus (%)	0.8	0.5	1.6
Ca:P ratio	1:1	1:1	2:1
Potassium (%)	0.6	0.6	
Sodium (%)	0.3	0.06	
Chloride (%)	0.45	0.09	
Magnesium (%)	0.04	0.04	0.3
Iron (mg/kg)	80	80	3,000
Copper (mg/kg)	7.3	7.3	250
Manganese (mg/kg)	5.0	5.0	
Zinc (mg/kg)	120	120	1,000
Iodine (mg/kg)	1.5	1.5	50
Selenium (mg/kg)	0.11	0.11	2
<b>Vitamins</b>			
Vitamin A (IU/kg)	5,000	5,000	250,000
Vitamin D (IU/kg)	500	500	5,000
Vitamin E (IU/kg)	50	50	1,000
Thiamine (mg/kg)	1.0	1.0	
Riboflavin (mg/kg)	2.2	2.2	
Pantothenic acid (mg/kg)	10	10	
Niacin (mg/kg)	11.4	11.4	
Pyridoxine (mg/kg)	1.0	1.0	
Folic acid (mg/kg)	0.18	0.18	
Vitamin B12 (mg/kg)	0.022	0.022	
Choline (mg/kg)	1,200	1,200	

*Nutrient requirements are indicated on a dry-matter basis and are per kg of diet, not per kg of animal body weight. These AAFCO nutrient profiles for dog foods presume an energy density of 3.5 kcal ME/g dry matter. Rations >4 kcal/g should be corrected for energy density.*

<sup>4</sup> <https://www.merckvetmanual.com/multimedia/table/v54951012>

Most nutrients list minimum amounts; only a few include maximum. Why? In life, health is about balance. Both nutrient deficiencies and excesses lead to trouble. Some nutrients, in excess, can be toxic, such as with fat-soluble vitamins, especially vitamin A and D.

### ***How did AAFCO come up with these guidelines?***

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The original Canine and Feline Nutrition Expert Subcommittees convened in 1990 to establish practical nutrient profiles for dog and cat foods based on commonly used ingredients. Over time, these guidelines underwent updates and revisions in cooperation with other agencies. The National Research Council (NRC) maintains nutritional requirements for dogs based on research with purified diets and/or highly bioavailable nutrient sources. These, however, are deemed as not practical to use in commercial dog foods. Make of it what you may.

Interestingly, as I found from Sean Delaney, DVM, MS, DACVN, a Diplomate of the American College of Veterinary Nutrition, none of these values were based on analysis of what natural canine diet in the wild would be. Wouldn't that be the most straightforward and most logical approach?

However, dog foods that follow the AAFCO guidelines are the "golden standard" and provide adequate nutrition.





## Logical view on canine nutrition needs

If dogs lived in a Zoo, their diet would try to approximate one of their wild counterparts.

Many animals at the Zoo receive whole prey in their diets. Reptiles, birds and smaller mammal species are fed whole prey including mice, rabbits and fish. African lions, cheetahs, vultures and other carnivores are fed portions of whole carcasses.<sup>5</sup>

Why wouldn't this approach make sense for dogs? The argument is that domesticated dogs share lives with humans for a long time. Their bodies adapted to the food they received. For example, dogs evolved to tolerate much higher levels of carbohydrates.<sup>6</sup>

That is no surprise—did you look at what percentage of nutrients in most dog food are carbohydrates? Do you remember that the AAFCO guidelines list zero requirements for carbs in dog nutrition? It boils down to what is practical and affordable. Carbohydrates in dog nutrition are a controversial issue further complicated because most ingredients that provide carbs also supply protein. And now we can start a debate about how beneficial plant-source proteins are.

However, dogs have adapted to what humans feed them.

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5 [Smithsonian's National Zoo](#)

6 [The genomic signature of dog domestication reveals adaptation to a starch-rich diet](#)

## The most dangerous way to feed your dog

To offer the best nutrition to their dogs, many well-meaning dog parents make a critical mistake. Feeding a dog mostly muscle meat leads to severe deficiencies. How could that be? Whether you believe that dogs are carnivores or omnivores, muscle meat provides limited nutrition.

### ***A simple rule to understanding your dog's nutritional needs***

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The organ has what the organ needs. In other words, the heart feeds the heart, the liver feeds the liver, muscle feeds the muscle, and so on. If you want to feed the whole dog, you need to either:

- feed whole pray, bones and organs and everything
- feed as many parts as you can and supplement for the missing nutrients

It is not impossible to do, but it requires education, determination, and a strong stomach. But if you couldn't do it right, don't do it at all and stick to commercial diets. The selection on today's market is broad and ought to satisfy any feeding believes you hold.

## What might be more important than the type of food you feed

Regardless of what you feed, there is a way to help your dog live longer and healthier—feed less.<sup>7</sup>

The results of a study of 48 Labrador Retrievers that evaluated the effects of diet restriction might surprise you. Simply feeding less significantly increased the life span and delayed onset of chronic disease than the control group of dogs.

And, if you feed less, you can afford higher-quality food too.

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<sup>7</sup> [Diet restriction and aging in the dog: major observations over two decades](#)



## How to pick a commercial dog food

Admittedly, making sense of the available variety of dog foods out there isn't an easy task either. Pick the best quality food you can afford. Look back at the various diets of the longest-living dogs. They ate anything from a vegan diet, leftovers to commercial kibble.

Generally, though not always, the price tag corresponds with the quality. On the upside, though, the more expensive food is typically more nutritious, and you can feed much less of it than the cheap alternative.

Learn how to read dog food labels. It is tricky but not impossible to decipher. Lean toward products that use whole-food ingredients.

## By-products and dog nutrition

Should you stay away from foods that use animal byproducts as an ingredient?

AAFCO definition of by-products states that meat by-products are the non-rendered, clean parts, other than meat, derived from slaughtered mammals. It includes, but is not limited to:<sup>8</sup>

- lungs
- spleen
- kidneys
- brain
- livers
- blood
- bone
- partially de-fatted low temperature fatty tissue
- stomachs and intestines freed of their contents

It does not include:

- hair
- horns
- teeth and hoofs

How do you feel about that list? Those are all excellent, nutritious ingredients. However, if they are listed simply as by-products, how would you know which ones and in what proportions are included?

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<sup>8</sup> [AAFCO What's in the Ingredients List?](#)

In other words, there is nothing wrong with animal by-products in dog food as long as the manufacturer adheres to the guidelines. It is, however, much better if they care to list them individually, and some do.

The same applies to protein sources listed simply as meat.

### ***Meat***

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AFFCO defines meat as primarily muscle tissue of the animal but may include fat, gristle, and other tissues typically accompanying the muscle, including:

- overlying fat and portions of the skin
- sinew
- nerve and blood vessels which normally accompany the flesh

Muscle tissue includes skeletal muscle as well as:

- heart
- tongue
- esophagus
- diaphragm

All of that is nutritious stuff great for your dog. However, if the ingredients list simple “meat: hat animal or animals does it come from? There is no way to tell.

Therefore, it is much better if the manufacturer lists the source they used. Look for specific ingredients and try to avoid foods that simply list “meat” or “byproducts” if you can.

## What doesn't belong in dog food?

You likely heard the advice to avoid foods that list ingredients that don't sound English. That is relatively true, but not everything is bad just because you don't know what it means. For example, mixed tocopherols are compounds present in vitamin E. Dog food manufacturers use them as natural preservatives.

Before you get worked up over weird-sounding ingredients, learn what they are.

There are, however, things that you should try and avoid in your dog's food, such as:

- coloring agents (dogs don't care about the color of their food)
- artificial flavors
- artificial preservatives such as BHA, BHT or ethoxyquin
- monosodium glutamate (MSG)

## Note about semi-moist foods

Semi-moist foods look attractive as they come in patties, chunks, and other appealing shapes. They look fresh. However, it generally contains the same ingredients as extruded kibble and goes through the same extrusion process. Once processed, to keep them moist, the manufacturer adds agents called "humectants." such as:

- sugar
- sodium chloride
- sorbate
- propylene glycol

However yummy these products might look, I recommend you stay away from them.

## Can dogs eat people-food?

Why not? Does people food grow on “different trees” than dog food?

Yes, dogs can eat people-food as long as you offer the right kind and the right amount. The reasons you should be thoughtful about what you share from your pot or plate are:

- disturbing nutritional balance
- some people foods are toxic to dogs

Otherwise, most healthy foods for you are healthy for your dog, and you can use them as treats or an occasional substitute meal if you run out of dog food. Junk food is equally bad for you and your dog.

If you want to home-cook for your dog, make sure you have recipes that provide complete and balanced nutrition.

### ***Dog-friendly people-foods***

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- lean meats
- organ meats
- cooked fish
- eggs
- most veggies
- most fruits

### ***People-foods toxic to dogs:***

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- xylitol
- grapes and raisins
- onions
- chocolate
- caffeinated items
- madadamia nuts
- alcohol and yeast dough
- fruit pits and seeds
- rotten or moldy foods

Source: Foods You Should Never Feed Your Dog

### ***Foods that are not toxic but could harm your dog:***

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- fatty foods, especially pan drippings
- foods high in sugar, salt, or spices
- corncobs
- cooked bones
- raw fish

## How do your dog's nutritional needs change over time?<sup>6</sup>

It is essential to understand how your dog's nutritional needs change through their life stages. For example, can you feed your dog the same food from puppyhood to old age?

### ***Nutritional needs of puppies***

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Naturally, puppies' nutritional needs are different from adult dogs—their food needs to support healthy growth. Therefore, puppy food needs to be high-calorie and nutritionally dense. Generally, you can switch to adult food when the puppy reaches about 90% of its adult size.

Special measures apply to large-breed dogs. A large-breed dog needs to grow at a relatively slow, steady rate to develop into healthy adults and avoid orthopedic disease. Therefore, diets for large-breed dogs need to be lower in energy and have reduced calcium and phosphorus levels at a strict ratio.

### ***Adult maintenance nutrition***

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Unless your adult dog is pregnant or their lifestyle or health circumstances dictate dietary adjustments, they can eat most of the food options that are out there.

### ***Mature adult and senior dog nutrition***

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Depending on their diet, you may need to make adjustments as your dog ages. The criteria to consider for your older dog include:

- maintaining optimal weight by lowering fat content
- adjusting the amount and type of protein to maintain muscle mass without taxing the kidneys
- increased levels of anti-oxidants and anti-inflammatory nutrients

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9 [Why Your Dog's Health Depends on Life Stage Diets](#)

## Summary

Your dog can do well on most foods available. Diet is not the sole factor in health and longevity. Pick the best food you can afford.

However, should you want to make your dog's food yourself, make sure you end up with a complete and balanced diet. Get good recipes and stick with them.

**Note:** Variety is healthy and helps to deal with deficiencies, excesses, or contaminants. However, dogs who ate the same formula for a long time need time to gradually adjust to any change.