

RAW DIETS FOR DOGS: AN OVERVIEW

WHAT IS A RAW DIET?

A 'raw diet' is any diet that consists primarily of raw meat and raw bones. There are many variations of this diet, ranging from home-made raw diets based on feeding whole prey or large raw meaty bones and organ meats, to commercially-prepared complete raw meals that feature ground raw meat, ground raw bone, raw vegetables, extra vitamins and minerals. This diet offers much flexibility, customization, and more variety than most commercial diets.

WHY FEED A RAW DIET?

- **Better digestibility** — a recent study demonstrated that a raw meat diet had a 15% improvement in protein digestion compared to commercially processed food¹. Additionally, the fecal output (i.e. poop volume) for the raw meat diet was HALF that of the commercial food. Folks who feed raw already know this simply from cleaning up dog poop (in fact, it is the first thing they notice!), but it is nice to see it scientifically tested and published. The stools of raw-fed dogs are much, much smaller than that of dogs being fed a commercial food, even if it is a "premium kibble". This photo to the right shows the actual stool size of a 95-pound, raw-fed German Shepherd Dog that eats about two pounds of raw meaty bones per day. Smaller, well-formed stool generally indicates a higher digestibility.



- **Species Appropriate Diet**—Dogs and cats are both carnivorous predators, a fact that is well-established (yet ignored!) in zoological, anthropological, and even veterinary literature, as well as in studies sponsored by pet food companies. A recent review article in the *Journal of Nutrition* clearly discussed the evolutionary basis for the diets of dogs and cats, and firmly established that a) the wolves from which dogs were domesticated subsisted primarily on hunted prey animals, and b) domestic dogs still share not only characteristic carnivore taste patterns, but also behaviors consistent with a carnivorous lifestyle². This study was funded in part by Waltham Centre of Pet Nutrition, the makers of Pedigree, Whiskas, and Royal Canin kibbled pet foods. In spite of this knowledge of the domestic dog's carnivorous heritage, most commercial pet foods are formulated for a grain-eating omnivore instead of a carnivore.
- **Biologically and Physiologically Appropriate Diet**—While domesticated dogs do differ from wolves in several key ways—including behavior, skull shape, number of teeth—they still have the basic anatomy and physiology of an animal suited for a raw meat-based diet. Dogs are equipped with teeth designed for grabbing, ripping, and tearing meat; these teeth generally are situated in a "scissors bite" that allows them to quickly shear off meat. They even have a specialized upper premolar and lower molar—called 'carnassial teeth'—that are very prominent, and are used for the purpose of shearing meat and crushing bone. Their mandibular joint (jaw joint) has a deep, C-shaped fossa that allows only up-and-down movement of the jaw, rather than the side-to-side movement required for disposing of vegetation. Dogs have the taste patterns of a carnivore, including a low sensitivity to salt, a substance which is plentiful in the bodies of their prey². Their digestive tracts are very short and simple, with a relatively short foregut and a smooth unsacculated colon that allows for raw meat and bone to be pushed through quickly. Their intestines are not designed for allowing food to sit and ferment, unlike the intestines of larger omnivores and herbivores (as plant material needs more time to be broken down).

- **Extensive Physical Evidence of the Benefits**—While there are some outrageous claims associated with raw diets that make it sound like the “miracle cure” for whatever ails a dog, there are several easily observed and recordable benefits that can be seen in dogs eating a raw diet. Benefits that I personally have witnessed in multiple raw-fed dogs (not just my own), and that other raw-feeding owners, breeders, veterinarians, trainers, and even police K9 handlers have seen in their dogs are:
 - cleaner teeth and better breath
 - improved muscle tone and better weight control
 - improved energy levels (particularly for middle-aged and older dogs)
 - improved skin and coat condition
 - bitches in whelp maintaining better condition during and after pregnancy
 - higher amounts of milk and prolonged milk production in nursing females
 - better muscle tone and neuromuscular control in puppies weaned onto raw
 - improvement of runny eyes and waxy, yeasty ears

Critics say there is no real evidence that raw diets are any better for dogs, but the physical, tangible, living evidence is there for anyone to see and compare. All they have to do is seek out and interact with a raw-fed dog or two, or better yet, with a breeder who has bred multiple generations of raw-fed dogs.

RAW DIET GUIDELINES

1. **The bulk of the diet should be raw meaty bones and raw meat in one form or another** (either whole or ground). Whole raw meaty bones provide the benefit of chewing and teeth-cleaning action, and help promote healthy teeth and gums. A raw diet should contain 40-50% raw meaty bones, 5% organ meat, 45% muscle meat, and the rest as any extras like eggs or green tripe. Examples of appropriate raw meaty bones include: half-chickens, chicken leg quarters, bone-in chicken breasts, turkey necks, lamb breast, and more. Other appropriate meats include beef, lamb or mutton, bison, venison, elk, fish (see #6), goat, rabbit. Safest meat sources tend to be those approved for human consumption.
2. **Small amounts of organ meats (liver, kidney, spleen, etc.) must be included** in order to provide a balance of vitamins and minerals. Liver is especially nutrient-rich, and should not be neglected. Feed organ meats in small amounts, as they are very rich. They can be fed a few times per week.
3. **Feed approximately 2-3% of your dog’s ideal weight per day.** This can be broken up into two smaller meals, or can be fed as one large meal. When first transitioning to raw, feed two smaller meals (less than your dog would normally eat overall) for the first few days, then increase the food to the proper amounts. Build variety slowly, rather than offering many different foods all at once.
4. **Feed a variety of meats from different species.** The domestication of dogs has created a species that thrives on variety and that utilizes multiple food sources to achieve balanced nutrition. Even if you feed a commercial raw diet, rotate the diet regularly between two or three different protein sources or brands of raw food.
5. Should you so choose, you can include **small amounts of fruit and vegetable matter** in your animal’s diet. However, the vegetables must be processed in some form for the dog to achieve any sort of nutrition from them; they must either be pureed or blended, steamed and then chopped, or somehow broken down. Even so, vegetable matter should not make up a substantial portion of the domestic dog’s natural diet, and it should not take the place of raw organ meats. Grains should be fed very sparingly, if at all!

6. **Avoid raw Pacific salmon** or other Pacific salmonids, as these can carry a bacteria that causes salmon poisoning in dogs. Also avoid plants and foods known to be toxic to dogs, such as onions and raisins.
7. **Never, EVER, feed cooked bones.** Also avoid feeding weight-bearing leg bones of large animals, as these can break teeth. Avoid feeding small cut or sawed bones (such as those found in T-bone steaks).
8. **Get connected with a network of “raw-feeders”**, whether it be online or in person. There are several excellent networking groups out there that offer support, encouragement, and advice to people new to raw diets. When challenging the misguided conventional way of feeding, it helps to have the support of other raw feeders.

COMMON CRITICISMS OF A RAW DIET

- **No scientific basis to the purported benefits**

The proclaimed benefits of raw diets are often dismissed as being “anecdotal”, meaning they are observed and reported by individuals feeding a raw diet to their animals, but are not scientifically tested in a controlled study. Critics view the results of an AAFCO feeding trial—which consists of six to eight dogs eating the same commercial food for six months—as evidence of commercial kibble’s scientific validation and superiority, rather than investigate and personally view the evidence of multiple individuals performing real-life feeding trials with raw food over a period of many years—even decades!—and with multiple generations of dogs. However, a recent scientific study has verified that raw meat diets are more digestible than commercial diets¹, using a sample size of dogs larger than that required for AAFCO trials, and providing validation of an easily observed fact among raw-fed animals. But critics remain firm in the belief that raw diet claims are unsubstantiated and unproven, even though the real-life feeding trials many pet owners, breeders, and working dog handlers have performed with their own dogs are much more extensive and intensive than any AAFCO feeding trial.

All of this eyewitness testimony and experience can be personally observed, verified, recorded, and compared, yet it is ignored because it is mere “anecdotal” evidence—even though a large part of science involves verifiable, repeatable observations and results. Many of the people feeding raw diets have done so for multiple years and over multiple generations of dogs, and have clearly seen a difference from when their dogs ate a commercially processed food and when their dogs consumed a raw diet. The experiences of veteran raw feeders should not be ignored, and it is a powerful, easily observable piece of evidence. It is relatively simple to compare teeth, breath, muscle tone, coat condition, skin condition, ears, eyes, and stool sizes between dogs, should critics bother to locate raw-fed dogs for comparison and first-hand observation.

- **Risk of bacterial contamination in raw meat**

Raw meat can harbor *Salmonella* and other bacteria. So can commercial kibbles. In the past two years alone, more than three dozen recalls of commercial foods have been issued because of bacterial contamination, with several additional foods recalled due to nutritional imbalances or deficiencies³. This does not include the enormous number of commercial foods recalled in 2007 due to melamine contamination⁴, nor the current recalls of multiple widely-distributed pet foods due to deadly aflatoxin contamination⁵ (not to mention previous aflatoxin recalls, such as the one in 2006⁶). More dogs have been sickened and killed by commercial kibble than by any raw diet; since 2005, contaminated commercial kibbles have killed hundreds of dogs, with more than 200 of these deaths being linked to the 2007 outbreak of melamine-contaminated foods⁷.

One of the claims of raw diet advocates is that dogs are more uniquely equipped to deal with bacteria. Critics claim that there is no evidence of this, despite the previously-mentioned carnivorous adaptations dogs have, which includes the presence of high amounts of lysozyme—a bacteria-killing enzyme—in their saliva. Additionally, up to 36% of dogs (including those fed commercial kibble) regularly shed various *Salmonella* species in their feces, but remain unaffected⁸. In fact, the majority of dogs exposed to *Salmonella* remain subclinical, meaning they show no symptoms whatsoever of salmonellosis⁸⁻⁹. This includes dogs purposely fed *Salmonella*-contaminated meats⁹! *E. coli*, another problematic bacteria, has been found in all types of diets—including commercial kibble—and yet when consumed by dogs, the animals demonstrated no ill effects¹⁰.

Few studies have documented that *Salmonella* transmission can occur between dogs and humans, although it can happen. Of these cases, outbreaks were linked to contaminated pig ears, contaminated commercial kibble, and to a drug-resistant *Salmonella* outbreak in veterinary facilities¹⁰. From 2006 to 2008, 80 people were sickened due to contact with dry commercial pet foods contaminated with *Salmonella*¹⁰. Thus, there is evidence of zoonotic *Salmonella* transmission, but no scientific studies demonstrate that *Salmonella* infections occur more frequently in owners of raw-fed pets, or have ever occurred in raw-feeding households.¹⁰ While feeding raw meat is frequently cited as a risk to human health, nearly all reported *Salmonella* illnesses involving humans and dogs have been linked to dry processed kibble or various dog treats. Yet critics continue to encourage feeding commercial pet foods over raw diets because of bacterial concerns.

What conclusions can be drawn from all the evidence? First, bacteria like *Salmonella* is present in raw meat and raw meat diets, but can also be found in processed kibble diets as well as various dog treats. Thus, it is recommended that appropriate sanitation measures be taken when handling any dog food (including raw meat) and dog waste. Second, dogs do seem to be uniquely equipped to deal with *Salmonella*-containing raw meat, but are not as well-equipped to handle processed foods contaminated with such bacteria (as evidenced by the number of dogs sickened or even killed by *Salmonella*-contaminated kibble). Third, there are more documented reports of animals sickened from *Salmonella* in processed dry kibble than from raw meat diets. And fourth, there is no current evidence to support the assertion that humans are more likely to contract salmonellosis from feeding their pets a raw diet; in fact, the documented evidence of cross-contamination is quite to the contrary (no doubt helped along by the fact that the majority of people feed a commercial kibble to their pets, and that they are more likely to wash their hands after handling raw meat).

- **Not nutritionally balanced**

Veterinary literature documents several instances of animals suffering from nutritional imbalances due to improperly prepared raw diets¹⁰. Additionally, in one study, several commercial raw diets were found to be lacking in certain vitamins and minerals. It is important to note that even commercial kibbles can be nutritionally unbalanced, as evidenced by a number of recalls of kibbled foods for nutritional deficiencies³. However, there is some validity to this criticism of imbalance. For example, raw diets based primarily on ground meat or meat off the bone are not balanced. Raw diets based primarily on one protein source also run the risk of nutritional deficiency. Owners cannot feed one food source to their dogs and expect it to be a ‘balanced diet’.

Dogs need appropriate amounts of the following vitamins: Vitamin A, Vitamin D, Vitamin E, Vitamin K, Vitamin B1, Riboflavin, Vitamin B6, Niacin, Pantothenic Acid, Vitamin B12, Folic Acid, and Choline. They also need proper amounts of calcium, phosphorus, magnesium, sodium, potassium, chlorine, iron, copper, zinc, manganese, selenium, and iodine¹¹. ALL of these vitamins and minerals

can be found in different muscle meats, organ meats, and raw meaty bones¹²⁻¹³. A properly constructed raw diet can adequately meet these nutrient profiles.

The nutrient profiles of meat will differ based on type or source (turkey, chicken, beef, lamb, venison, etc.). There are significant differences in nutrient content even among different cuts of meat. Thus, a proper raw diet **must** include a variety of muscle meats and organ meats from different species. A balanced raw diet must also include raw bones in one form or another (as consumable raw meaty bones or as ground bone), as bones are a primary source of calcium as well as other trace minerals.

Feeding one “complete and balanced” food for a dog’s entire life is a relatively new concept. The natural history of our domestic dogs included a wide variety of different food sources, not just one homogenized, pelleted, complete and balanced feed. Early dogs had many options for food, ranging from wild prey to scraps from humans (both raw and cooked scraps). Yet somehow, the shift since the 1950s has been toward a homogenous, highly processed, “complete” diet without any variety—the absolute antithesis of the domesticated dog’s original dietary needs.

- **Dogs ate cooked food for most of their existence**

Dogs were domesticated from the Gray wolf—an avid hunter and meat-eating predator—between 14,000 and 40,000 years ago¹⁴, with some estimates placing the initial domestication process at over 100,000 years ago. By contrast, commercial kibbled dog food has only been around for the last 100 years, but with most of its development occurring much later in the 1950s. Clearly it is commercial food that is the new “fad” on the scene! How much internal physiological change has occurred in the last 14,000 years, particularly when humans began to intensively and selectively breed dogs? What did dogs actually eat during the long domestication process, and did this prepare them for a lifetime of cooked, processed food? Anthropological evidence provides many clues, but no definitive answers.

The earliest dog fossil is dated approximately 14,000 years ago, placing the dog as a companion to Early Modern Humans (once known as Cro-Magnon Man) during the late Paleolithic era¹⁵. The diet of Early Modern Humans was very meat-based; in certain parts of the world, they hunted as many as nine different species of ungulates, including reindeer, red deer, horses, chamois, and roe deer¹⁶ (Coincidentally, these animals were also hunted by the ancestor of the dog, the wolf.). However, Early Modern Humans also ate some plant material, mainly nuts, berries, and fruits¹⁷. All other plant material was usually cooked in order to increase its digestibility and deactivate certain toxins found in the raw plants and roots in their diets. But when did humans begin cooking meat? In some areas of the world, the habit of boiling or roasting meat emerged as late as 5,000 B.C., well after dogs were domesticated¹⁸. Would early man have bothered with feeding cooked food to their dogs, or did they simply let the dogs have the leftover carcasses after they were butchered? Chances are it was a little bit of both, which is certainly still a far cry from the processed, 100%-cooked, grain-based diets of today.

FOOTNOTES:

1. K.R. Kerr, B.M. Vester Boler, C.L. Morris, K.J. Liu, and K.S. Swanson. 2012. “Apparent total tract energy and macronutrient digestibility and fecal fermentative end-product concentrations of domestic cats fed extruded, raw beef-based, and cooked beef-based diets.” *Journal of Animal Science*: 90: 515-522.
2. John W.S Bradshaw. “The Evolutionary Basis for the Feeding Behavior of Domestic Dogs (*Canis familiaris*) and Cats (*Felis catus*)”. *Journal of Nutrition*. July 2006 vol. 136 no. 7 1927S-1931S
3. U.S. Food and Drug Administration. *Animal and Veterinary Recalls and Withdrawals*. <http://www.fda.gov/animalveterinary/safetyhealth/recallswithdrawals/default.htm>

4. U.S. Food and Drug Administration. “Melamine contaminated Pet Foods—2007 Recall List.” www.accessdata.fda.gov/scripts/petfoodrecall/#Dog
5. Dr. Karen Becker. “More Dog Food Recalled for Toxic Contaminants”. 10 January 2012. <http://healthypets.mercola.com/sites/healthypets/archive/2012/01/10/pet-food-with-toxic-corn.aspx>
6. MSNBC News. “Toxic Pet Food May Have Killed Dozens of Dogs”. 10 May 2006. http://www.msnbc.msn.com/id/10771943/ns/health-pet_health/t/toxic-pet-food-may-have-killed-dozens-dogs/
7. Maggie Fox, with Reuters Health. “Tainted Pet Food Killed 200 dogs and cats: a study.” <http://www.medicinenline.com/news/12/10369/Tainted-pet-food-killed-200-dogs-and-cats-study.html>
8. Dr. Christopher W. Olsen. “Selected Zoonotic Agents of Gastroenteritis That Can be Acquired from Dogs and Cats—Salmonella”. Department of Pathobiological Studies, School of Veterinary Medicine, University of Wisconsin. 30 December 2004. <http://www.vetmed.wisc.edu/pbs/zoonoses/gikofel/salmonella.html>
9. Rita Finley, Carl Ribble, Jeff Aramini, Meredith Vandermeer, Maria Popa, Marcus Litman, Richard Reid-Smith. “The risk of salmonellae shedding by dogs fed Salmonella-contaminated commercial raw food diets”. *Canadian Veterinary Journal*. 2007 January; 48(1): 69–75.
10. Daniel P. Schlesinger and Daniel J. Joffe. “Raw food diets in companion animals: A critical review”. *Canadian Veterinary Journal*. 2011 January; 52(1): 50–54.
11. The National Academies. “Your Dog’s Nutritional Needs: A Science-Based Guide for Pet Owners”. Based on Nutrient Requirements of Dogs and Cats, 2006. http://dels-old.nas.edu/dels/rpt_briefs/dog_nutrition_final.pdf
12. Bruce Dwyer. “Dog Nutrition—meat v vegetable, vitamins and minerals v AAFCO guidelines.” <http://www.healthydogtreats.com.au/dog-treats-articles/65-dog-food-nutrition.html>
13. USDA National Agricultural Library. <http://ndb.nal.usda.gov/ndb/foods/list>.
14. John Roach. “Where Did Dogs Become Our “Best Friends”?” *National Geographic News*. August 3, 2009
15. Nobis G. Der älteste Haushunde lebte vor 14000 Jahren. 1979;79:610. [The oldest domestic dog lived 14,000 years ago.] *Umschau*,
16. University Of Washington. “Bones From French Cave Show Neanderthals, Cro-Magnon Hunted Same Prey.” *ScienceDaily*, 23 Sep. 2003. <http://www.sciencedaily.com/releases/2003/09/030923065212.htm>
17. MacDonald, NA. *Meat in the Diet of Man*. 1987. <http://livestocklibrary.com.au/handle/1234/19510>
18. Kenneth F. Kiple and Kriemhild Conee Ornelas. *Cambridge World History of Food*. Cambridge University Press: Cambridge. 2000. (p. 1571)

ABOUT THE AUTHOR

Carissa Kuehn graduated from Colorado State University with a Bachelor of Science degree in Zoology and in Biology, with a concentration in Anatomy and Physiology. She worked concurrently at the James L. Voss Veterinary Teaching Hospital as a work study veterinary technician for four years, later pursuing a secondary teaching credential in Biological Sciences from Humboldt State University, CA. She has been a secondary instructor in Biology and Geology since 2006. She continues to research and study raw diets, and has traveled throughout the western U.S. and into Canada to make first-hand observations of the differences diet can make in competition dogs, working police K9s, litters of puppies, nursing bitches, bitches in whelp, and pet dogs. Her current dog is a fourth-generation raw-fed, working German Shepherd Dog.

Carissa has over 20 years of experience with dogs, and has been feeding a raw diet to her animals since 2004. She also trains and competes in Schutzhund/IPO, a rigorous three-phase canine sport. Through Schutzhund, she has had extensive interaction with multiple breeds of dogs fed a wide variety of diets. Her first-hand observations and experiences with the raw diet, coupled with extensive research and her training in both Zoology and Biology, have led her to one single conclusion: a varied raw diet is the most biologically, physiologically, and evolutionarily appropriate diet for dogs and cats. She neither sells nor promotes any particular product, nor has any financial interest in promoting raw diets. Her interest is purely in supporting the overall health and well-being of domesticated carnivores through a proper, varied raw diet.