

# Raw Meat and Bone Diets for Dogs: It's Enough to Make You BARF

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Some of the most rewarding interactions we have with our pets involve food. Most dogs respond with gratifying enthusiasm to being fed, and this activity is an important part of the human-animal bond. Providing food is also part of the parent/child dynamic that in many ways characterises our relationships with our pets. Giving food is an expression of affection and a symbol of our duty of care to our pets.

Because of these emotional resonances, pet owners are often very concerned about giving their pets the “right” food to maintain health and, if possible, to prevent or treat disease. This has allowed the development of a large, and profitable commercial pet food industry that aggressively markets diets with health-related claims. This industry resembles in some ways the pharmaceutical industry. It is regulated by the FDA, and also by individual states, according to a somewhat Byzantine set of standards established by the FFDC (the guiding document governing the FDA) and by the Association of American Feed Control Officials (AAFCO), a private organisation made up primarily of state and federal feed control officials. Thanks to this regulatory structure, imperfect though it is, there is a good deal of solid science and research behind the products and claims the industry produces.

Like all for-profit concerns, the pet food industry also has its share of flaws. Some of these are relatively subtle, such as the probably unavoidable tendency for industry-funded research to come up with findings favourable to the funder's products. Others are more serious, including rare but devastating instances of malfeasance. One example of the latter is the incident in 2007 in which melamine was substituted for wheat gluten as a protein source in pet food manufacturing, leading to the deaths of hundreds, possibly thousands of pets who ate contaminated commercial foods. And like “Big Pharma,” the pet food industry is often demonised by those who wish to promote unscientific or alternative veterinary medical treatments or theories. Anyone who has ever accepted a dime in research funding or a bagel at a conference (with or without cream cheese) from a pet food company is automatically an industry lackey whose opinion is worthless regardless of their credentials or expertise. This demonisation of the pet food manufacturers is often used as a marketing tool for alternative nutritional theories and products.

One of the most popular unscientific notions sold to pet owners these days is that of feeding diets based on raw meat, typified by the BARF diet. According to the a leading proponent of this idea, Dr. Ian Billinghurst, BARF stands for Bones and Raw Foods or Biologically Appropriate Foods (though I confess other interpretations have occurred to me). Raw diets are frequently recommended by veterinarians and other who practice homeopathy, “holistic” veterinary medicine, and other forms of CAM. This is not surprising since, as you will see, the arguments and types of reasoning used to promote the BARF concept are also commonly used to defend other forms of alternative veterinary medicine. Let's take a look at the arguments some BARF proponents make for this diet.

## Dogs are Wolves

Dr. Billinghurst refers to the principle behind the BARF diet as “evolutionary nutrition.”

“It is now generally agreed that the ancestor of the modern dog is the wolf...[the] process of domestication where our ancestors removed the ‘wildness’ from the wolf, involved thousands of years of selective breeding...In this process, our ancestors produced hundreds of ‘different looking wolves’...our ancestors made only two basic changes to the wolf. They changed the wolf's appearance and they changed its mind. What they did not change, was the basic internal workings or physiology of the wolf...As a result, the basic workings or physiology of modern dogs is no different or very little different to their ancestor the wolf...The basic environment which the modern dog requires in terms of food and exercise is exactly the same as it was (and still is) for the wolf.”

Having established that, despite appearances, dogs are essentially wolves, Dr. Billinghurst goes on to describe the wolf diet.

“Raw bones with meat are a major part of their diet... They eat offal such as liver and heart. They eat raw eggs. They eat decaying material... They eat a wide variety of foodstuffs. Insects, bark, soil, birds – complete with their tiny bones and feathers – whatever. Every meal they eat is totally raw. Not one skerrick of it is cooked. Ever. They eat vegetables including herbs, from the gut of their prey. This vegetable material is raw, totally crushed and partly digested. They eat faeces. A wolf’s diet contain almost no grains... For a wolf – not one single meal consists of dry dog food. They don’t eat canned dog food either”.

Finally, he makes the connection between this version of canine natural history and the feeding of pet dogs.

“How do you feed a dog properly? You feed it the diet that it evolved to eat. It’s [sic] evolutionary diet. A Biologically Appropriate Raw Food diet. A BARF diet... A biologically appropriate diet for a dog is one that consists of raw whole foods similar to those eaten by the dogs’ wild ancestors. The food fed must contain the same balance and type of ingredients as consumed by those wild ancestors... Please note that modern dogs of any breed are not only capable of eating the food of their wild ancestors, but actually require it for maximum health. This is because their basic physiology has changed very little with domestication despite obvious and dramatic changes in their current physical appearance and mindset...”

Certainly a clear, simple, and pretty persuasive argument on the face of it. Taxonomically and phylogenetically, dogs are carnivores and their ancestors ate live prey and carrion, so they must be designed for a diet as close as reasonably possible to that for which they were designed by evolution.

Some raw diet advocates extend this basic argument by claiming that the domestic dog’s gastrointestinal tract is anatomically identical to that of the wolf and so the same dietary needs can be assumed. Others contribute additional arguments in favour of raw foods, such as the well-known homeopathic and holistic veterinarian Dr. Richard Pitcairn:

“All processed pet foods... are missing something that seems to me to be the most important “nutrient” of all. This key ingredient is practically ignored by nutritional scientists, but we can sense it when it’s there. It is a quality found only in freshly grown, uncooked whole foods: Life energy”.

But while there are variations on the theme, and there are frequent and often bitter arguments over precisely which ingredients are best, and in what form or proportion, the basic “evolutionary nutrition” argument is advanced by all proponents of raw diets.

### **Processed Commercial Diets are Unhealthy**

The other major component to the argument for raw diets is that the commercial diets most of us feed our dogs are inadequate, and possibly outright unhealthy. According to Dr. Billinghurst’s web site,

“as a practicing veterinary surgeon, I constantly see the enormous difference in health between pets raised on commercial pet food compared to those raised on a biologically appropriate raw food diet. I see the enormous change for good in the health of pets switched from cooked to a raw whole food diet... Most degenerative disease processes in pet animals are the direct result of a lifetime being fed cooked and/or processed foods...”

He goes on to claim that the nutritional deficiency diseases seen in the early 20th century, when most pets were fed table scraps, were simple and easily treated, but thanks to processed foods these have been replaced by “vast array of complex and insidious degenerative diseases which now afflict our pets and fill our textbooks and waiting rooms.” He further claims that,

“Processed pet foods contain barely adequate levels of the known vitamins...Many contain biologically inappropriate antioxidants, enormous levels of refined sugars and masses of salt together with other chemicals used as colourings and flavourings. This chemical cocktail is a lethal brew which is a major factor in producing the epidemic of degenerative disease leading to the early death and suffering we see in pet animals fed such rubbish, including cancer, arthritis and a range of allergies and auto immune diseases...Cooking renders these products biologically inappropriate in a fundamental way...The vast majority of these products are based on cooked grains. This makes them biologically inappropriate. At no time in their evolutionary history (except in the last 50 to 150 years) have cats and dogs been subjected to cooked grain in any amount, and certainly not as the basis of their diet.”

Commercial foods are also denigrated for a variety of supposedly dangerous ingredients, including (according to Dr. Pitcairn):

- Toxic products from spoiled foodstuffs
- Drug residues
- Hormone levels comparable to amounts that have produced cancer in laboratory animals
- Artificial colours, flavours, and preservatives, all of which he claims are responsible for an epidemic of cancer and degenerative diseases
- And even euthanised dogs and cats, which he claims “are routinely rendered by veterinary hospitals or shelters and recycled into pet food.”(1)

Cancer, arthritis, allergies, autoimmune disease, and many other conditions are frequently claimed to be the result of eating commercial pet foods. But, of course, proponents of raw diets don't always limit their critique of commercial foods to claims about nutrition and health which could be empirically examined. Some also paint commercial pet food manufacturers as villains killing pets for profit and veterinarians as their willing, or at least duped, accomplices.

A blog entry on Dr. Billinghursts website asks,

“What is the primary motive of kibble manufactures? Is it profit or nutritional value? ... The inferior quality and poor utilisation of ingredients is masked by the addition of heat, flavour enhancers, and harmful fat sprays. The kibble manufactures are aware of the potential dangers and potential harm to our dogs but it all boils down to producing an inexpensive product that can sustain and maintain the life of our dogs...for the kibble manufactures it all boils down to profit with a capital P.”

Another proponent of raw diets, Dr. Tom Lonsdale, claims he is

“selling plenty of his book Raw Meaty Bones in the US but the Australian media seems to have blacked [sic] him out because the multinational pet food companies don't want their dodgy doggy tucker exposed (web article 1)...Natural pet food is cheaper, pets live healthier longer lives, vet bills reduce [sic] and the environment gets a better deal. Except for the artificial pet food companies and their veterinary allies it's a win, win, win situation...junk food is responsible for the majority of pet diseases there are both upstream and downstream implications worth \$billions. Upstream those that run the systems – pet-food makers, veterinary profession, veterinary schools, animal welfare bodies, governments, retailers, and consumers — conspire to maintain the racket... The full extent of the junk pet-food fraud may never be fully known. [web article 2]

### **Some Inconvenient Truths**

Now let's have a look at the problems with this raw dog food marketing propaganda. To begin with, the concept of “evolutionary nutrition” ignores the simple fact that taxonomy and phylogeny are not destiny, nor do they reliably predict the specific details of a species' biology, including its nutritional needs. Sure, dogs are in the order Carnivora, but so are giant pandas, which are almost exclusively herbivorous. Functionally, dogs are omnivores or facultative carnivores, not obligate carnivores, and they are well-suited to an omnivorous diet regardless of their taxonomic classification or ancestry.

Domestic dogs did branch off from a wolf ancestor, and current DNA evidence suggests this occurred some 100,000-135,000 years ago (2,3). Though the data are unclear as to what morphologic or ecological changes might have occurred following this initial divergence, and while it is likely that there was much ongoing genetic exchange between dogs and wolves even after they diverged, it is still the case that dogs have not been wolves for a very long time. However, a distinct phenotypic divergence of dogs and wolves followed the development of more sedentary agricultural habits by many human groups some 10-15,000 years ago, which placed new selection pressures on our canines companions(31).

Since then numerous anatomic and behavioural changes that have occurred first as a result of living with humans and sharing our food. And even more dramatic changes have been wrought on dogs in the last about 3000 years as a consequence of intensive selective breeding. Domestic dogs exhibit many features of neoteny, the retention of juvenile characteristics into adulthood. They have smaller and less robust skulls and dentition, and numerous features of their skeleton, GI tract, and other anatomic structures are significantly different from wolves (4-6).

Of course, anatomy does not always correlate with function anyway. All humans have essentially the same GI tract from an anatomical perspective, but when someone who is lactose intolerant chugs a glass of milk, he or she may be treated to a visceral demonstration of the fact that anatomy doesn't necessarily predict function.

But in the case of dogs and wolves, the claim that they are anatomically identical with respect to what is an appropriate diet is simply not true. If you try to picture a pack of Chihuahuas bringing down and savaging an elk, the impact of thousands of years of artificial selection is obvious. Other breeds may be more like wolves in appearance, but they are none of them truly wolves. Dogs have lived with humans, eaten our table scraps, and been intensively bred for features we desire, none of which is likely to make them ideally designed for the diet of a wolf.

Of course, even if BARF advocates could demonstrate that dogs were functionally equivalent to wolves in terms of diet, the evolutionary nutrition argument would still fail because at its heart it is nothing but a form of the naturalistic fallacy.

The average life expectancy of wolves in the wild is considerably lower than that of captive wolves, and disease, parasitism, and malnutrition are important factors in the mortality of wild populations (7-9). Captive wolves live longest and are healthiest when fed — guess what? — commercial dog food! This is the recommendation of the leading specialists in captive wolf husbandry and medicine, and it is largely the result of evidence that the previous practice of feeding raw meat based diets to captive wolves led to poorer quality nutrition and health than the current practices. Certainly, raw meat and bones are often used as enrichment items or bait for husbandry purposes, but always with an awareness of the risks they pose, and never as the primary diet (10-12).

BARF proponents persistently confound ingredients with nutrients. They imagine that because wild canids get their nutrients from raw whole carcasses that this must be the only appropriate source of nutrition for all canids, including domestic dogs despite the fact they have been eating our cooked leftovers for tens of thousands of years. This is contradicted, however, by extensive research in canine nutrition and by the generations of dogs who have lived long, healthy lives eating commercial pet foods.

Which leads to the second pillar of the BARF argument, the safety and nutritional adequacy of commercial pet foods. Like all knowledge based on science, our understanding of the nutritional needs of dogs is incomplete and always evolving. However, admitting that we do not know everything is not tantamount to admitting we know nothing. The basic nutrient requirements of our pets are well-established by decades of research, and despite the claims of BARF proponents there is no evidence that nutritional disease are widespread among pets fed balanced commercial diets.

Commercial dog foods are formulated according to AAFCO standards based on extensive nutritional research. These foods are tested through laboratory methods for nutrient content before and after processing, and many are subjected to feeding trials to determine their digestibility and the adequacy of their nutritional content as fed to healthy dogs.

These reference standards and limited feeding trials are, like the basic pharmacology and preclinical testing of pharmaceuticals, not perfect, and it is certainly likely that advances in our understanding of dogs' nutritional needs as well as epidemiological studies of dogs fed commercial diets will uncover changes that need to be made in the formulations of commercial diets. But the data we do have strongly supports the nutritional appropriateness of these foods (13,14).

By contrast, homemade and commercial raw diets are seldom tested for nutritional adequacy, and when they have been tested they have usually failed to meet known nutrient requirements (15-18). The knowledge of established nutritional science concerning the adequacy of commercial pet diets, imperfect though it may be, is certainly superior to the near total ignorance of the nutritional adequacy of most homemade of commercial raw diets.

There are many specific criticisms of commercial dog foods made in support of the BARF concept, but there is little evidence to support most of them, and some are clearly false. There are far more than I can deal with in a reasonable space, but I will address a few of the more common of these claims.

1. *Commercial Dog Food Makes Dogs Sick:* There is no evidence to support the claim that degenerative and immune-mediated diseases or cancers are caused by commercial pet foods. These conditions are the usual targets of alternative medicine proponents because the gaps in our knowledge about the etiology of these diseases leave room for them to insert their favourite bogeymen, in this case commercial pet food. The likelihood is that the prevalence of these categories of disease reflects, at least to some extent, the ageing of the pet population, which is the result of the reduction in historic causes of mortality such as infectious diseases, trauma, and of course malnutrition.
2. *Commercial Dog Foods are Toxic:* The insinuation that commercial pet foods are full of "toxins" is also unsupported. Common preservatives, such as ethoxyquin, butylated hydroxytoluene, and others with scary-sounding chemical names, have been in use in human and animal foods for decades and studied extensively, and there is no published evidence to support the many claims and anecdotes that indicate these are responsible for disease (19,20). Synthetic preservatives are more effective than "natural" anti-oxidants, and they are an important tool for reducing food-borne illness.

Anti-vaccine activists have mercury, aluminium, and anti-freeze, and BARF advocates have preservatives and artificial flavouring and colouring agents. What neither have is solid evidence to support their fear-mongering regarding these substances

3. *Dogs Can't Digest Grain:* It is frequently claimed, based primarily on the fallacious logic of "evolutionary nutrition," that dogs are incapable of digesting grains or that these make poor nutrient sources in dog foods. Extensive evidence from laboratory research and feeding trials illustrates this is false and that cooked grains are excellent energy sources and can also provide protein and other important nutrients to dogs (21,23). Grains are also often blamed for food allergies, but while some dogs may develop allergies to plant proteins, the evidence suggests that the vast majority of food sensitivities in dogs are to animal proteins (24).

4. *Cooking Destroys Nutrients:* BARFers like to claim that cooking destroys nutrients, so processed foods must be nutrient deficient. It is true that some nutrients are destroyed by cooking, but the relationship between temperature and cooking time and the final level of these nutrients in the food is well established, and commercial foods are supplemented to account for this and extensively tested in vitro and in vivo to ensure adequate nutrient levels. Other nutrients, particularly carbohydrates, are made more available by cooking( 22,23). And cooking destroys many parasites and bacterial organisms responsible for serious food borne illness.

Our ancestors ate raw food for millennia prior to the discovery of fire, and our nearest living relatives, chimpanzees, don't cook their food. Yet for some reason even most advocates of BARF diets for dogs don't eat primarily raw plants, insects, and the occasional bit of scavenged or deliberately killed raw meat that "evolutionary nutrition" would suggest they should be eating.

5. *Commercial Dog Food is Made from Dead Pets:* One of the most repulsive accusations made concerning commercial diets is that manufacturers routinely include the rendered carcasses of euthanised pets in their products. Such a practice would be illegal and has been specifically disavowed by dog food manufacturers and the plants that slaughterhouses and rendering plants that provide them with their ingredients. The FDA has investigated this story and has not found evidence to support it.

It is true that minuscule levels of pentobarbital, an aesthetic used to euthanise animals, have been found in some foods. The source of this has not been identified, though no trace of dog or cat DNA was found in the contaminated food. The most likely source of the contaminant is horses who were euthanised with pentobarbital and improperly rendered along with approved sources of meat for pet foods, though this has not been clearly proven. And it is also true that a few rare cases of dog remains being processed by rendering plants that also supplied pet food manufacturers with ingredients have been documented. However, for this to be a common practice, rather than a rare exception, would require a truly enormous and perfect conspiracy of manufacturers, rendering plants, and government, and as of yet no whistle-blower, journalist, or undercover animal rights activist has yet come forward to reveal evidence of any such conspiracy.

### **The Bottom Line**

The argument that dogs are designed by their evolutionary history to eat raw meat based diets is riddled with errors and fallacies and ignores the impact of tens of thousands of years of domestication and cohabitation with humans on the physiology of our canine friends. The accusations that commercial dog foods are nutritionally inadequate or unsafe are not supported by any objective or scientific evidence, only anecdotes, intuition, and conspiracy theories. There is, in contrast, significant evidence that commercial dog foods are nutritious and healthy and that they have contributed to greater longevity and reduced nutritional and infectious disease morbidity of dogs fed these diets.

The benefits promised by advocates of BARF diets for dogs are numerous. Greater health, less disease, better quality of life, and much more. Dr. Billinghurst's web site even claims, "Eating bones for a dog is a joyous experience. It is so enjoyed by dogs that it actually of itself boosts their immune system." However, there is absolutely no scientific evidence to support these claims. BARF proponents have no shortage of opinions and anecdotes to demonstrate the benefits of their diets, but they have a severe shortage of data.

The risks of raw meat based diets, however, are well-documented. Homemade diets and commercial BARF diets are often demonstrable unbalanced and have severe nutritional deficiencies or excesses (16-18). Dogs have been shown to acquire and shed parasitic organisms and potentially lethal infectious diseases associated with raw meat, including pathogenic strains of *E. coli* and *Salmonella* (25-27). Many other pathogens have been identified in raw diets or raw meat ingredients, and these represent a risk not only to the dogs fed these diets but to their owners, particularly children and people with compromised immune systems (29-30). The bones often included in such diets can cause fractured teeth and gastrointestinal diseases, including obstructed or perforated intestines, and the FDA recently warned pet owners against feeding bones to their canine companions.

So with a dodgy theory behind it, no sound evidence of benefits, and clear risks, there is no justification for recommending raw meat based diets for dogs. As always, I remain open to the possibility that new evidence may emerge to document benefits from such diets that might justify the risks they present, but for now this feeding approach appears to be simply another form of CAM mythology supported only by anecdote and unsound logic.

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Prior to becoming a veterinarian, Dr. McKenzie completed a Master’s Degree in animal behaviour, studying captive chimpanzees and working as a specialist in environmental enrichment for captive primates. He reads too much, with a predilection for science fiction, philosophy, linguistics, and of course skepticism. He travels too much and has climbed Mt. Kilimanjaro and run with the bulls in Pamplona. He also plays the Irish penny whistle and the mandolin and has been known to wear the kilt on occasion, though he does not claim to do any of these well.

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