

Raw Feeding for IBD Cats

Healing Can Happen!



Feline Nutrition in Inflammatory Bowel Disease (IBD)

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The Background: The Biological Needs of Cats, a Metabolically Inflexible Hypercarnivore

Given the first records of the domestication of cats dates back to when humans were first settling down to farm (1), it's easy to imagine both human and cat enjoying the benefits of proximity, isn't it? They're magical, entertaining creatures, cats are. And they protected the farmers' grain stores from rodents. It was a win-win! We've been companions ever since. Cats traveled the globe with us. Literally, as it turns out.

It came as quite the surprise when a research team led by geneticist Carlos Driscoll of the National Cancer Institute and scientists at the University of Oxford in England decided to trace the origin of domestic cats – and found that every single one of the 979 cats included in the project from around the world were “virtually indistinguishable” from the African Wildcat at the genetic level. That's right, that purring, kneading bundle of soft, silky fur, born under different circumstances, could be just as at home stalking prey on the great plains of South Africa.



Many assume the influence of living among humans would have had an impact on what cats have the ability to eat and use for sources of energy and nutrition, as appears to be the case for dogs. (2) Nope. Not so. Not at all.

Despite their proximity to humans for at least 10,000 years, cats retain their unique anatomic, physiologic, metabolic, and behavioral adaptations consistent with eating a strictly carnivorous

diet. (3) That is to say that cats, to this very day, remain obligate carnivores – and not just obligate carnivores, but hypercarnivores (4). By their genetic makeup, cats *must* eat the tissue of other animals in order to thrive.

Our kitties delight us with their playful antics well into old age. And as we've brought our cats indoors full-time, we find that to keep them happy and fit, we have to engage them in interactive play. What we are witnessing is their prey drive. That seemingly kitten-like, playful behavior we enjoy from birth to death in our furry friends is unique to cats: **their prey drive is not dependent on hunger.** (5) They are so hard-wired to hunt and engage prey, they don't need to be hungry to hunt - to "play."

In short, *everything* about the cat is defined by its role as an apex hunter. Cats are literally "designed" to eat a *strictly* carnivorous diet. Some examples:

- **Cats are hypercarnivores.** As a hypercarnivore, cats have a higher protein requirement than even most other carnivores. (6)
- **Cats cannot downregulate protein metabolism.** If they do not get enough meat-based protein – the only source of protein that provides them with all of the amino acids they need – they rob their own muscles for it. (7)
- **Cats must have preformed arginine and taurine.** A lack of these in the diet rapidly causes blindness and death: only animal protein provides these at levels cats require. (8)
- **Cats must have preformed omega 3s (EPA and DHA).** Cats lack the digestive enzymes necessary to derive anti-inflammatory benefit from plant-based omega 3s. (9) Flax seed is a current popular addition to cat foods – it is marketed to humans as being one of the plant sources highest in omega 3s, yet cats are unable to access the EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid) within it. The omega 3 in plants is in the form of ALA (alpha-linoleic acid), which humans break down into its anti-inflammatory components. Cats do not possess the digestive enzymes required to make this conversion. According to Dr. Jean Hofve, "while ALA has beneficial effects of its own (particularly on skin and coat health)... [and] even though ALA is technically a precursor of EPA and DHA, dogs and especially cats have an extremely limited capacity for converting it (no more than 1% to 2% for EPA and virtually 0% for DHA after weaning). Only marine-sourced oils (fish oil, krill oil, green-lipped mussel oil, and some algae oils) contain the pre-formed EPA and DHA that our carnivorous animals can absorb and utilize. Cats and dogs must receive EPA and DHA directly." (10) To derive the anti-inflammatory benefits from omega 3s, cats must have them preformed - available only from animal tissue. Many people wonder – where did desert cats get omega 3s? Naturally occurring in their prey. It is our farmed animals that have lower omega 3s than their natural prey. We also do not feed the parts of animals that contain the most omega 3s: neural tissues (brains, eyes, and spinal cord). (11)

- **Cats must have preformed arachidonic acid, an essential fatty acid not found in plants.** This is for the same reason as the requirement for preformed omega 3 fatty acids. Cats have a special need for the omega-6 fatty acid, arachidonic acid (AA), one of the two essential fatty acids in the cat's diet. Many mammals, like dogs and people, can synthesize AA from linoleic acid (LA). Cats cannot make the conversion due to the absence of delta-6 desaturase activity. AA is abundant in animal tissues, particularly organ meats. Plants do not contain AA. (12)
- **Cats must have preformed vitamin A from animal tissue.** Cats also lack the digestive enzymes necessary to derive benefit from plant-based sources of vitamin A. (13) Vitamin A comes from two sources: retinoids (animal-based) and carotenoids (plant-based). Retinol is preformed vitamin A, only available in animal-based sources (e.g. liver is rich in vitamin A). Cats cannot access the vitamin A from common ingredients we see in cat foods such carrots, pumpkin, sweet potato, spinach, and kale. If there is no liver in the cat food, synthetic vitamin A is added.
- **Cats must have preformed vitamin D.** Cats do not synthesize vitamin D from sunlight, (14) and their bodies use vitamin D from animal tissues (cholecalciferol) much more efficiently (13) than plant-based vitamin D (ergocalciferol).
- **Cats appear to have a carb threshold** (15) beyond which they do not derive energy benefit given their high need for protein.
- **Energy from carbohydrates cannot replace needed energy from protein.** (16) Many cats overeat on a high carbohydrate diet. They eat more calories than they need to maintain a healthy weight because they are trying to access enough protein.
- **The sugar transporter in cats' intestines is nonadaptive to changes in dietary carbohydrate levels.** (17) This literally means that anything other than a low-carbohydrate diet stresses their entire GI systems.
- **Salivary amylase, the enzyme used to initiate digestion of dietary starches (carbohydrates) is absent in cats,** (18) and intestinal amylase appears to be exclusively derived from the pancreas. In fact, cats have just one pathway for digesting carbohydrates (compared to dogs and people, who have multiple pathways). Of course, these enzymes are not necessary in a prey-based diet with minimal starch content.
- **The level of pancreatic amylase is only 5% that of dogs.** (19)

The evolutionary history of the cat indicates that it has eaten a purely carnivorous diet throughout its entire development. **It is critical to their long term health that we understand cats are a nutritionally and metabolically inflexible carnivore. This is even more important for cats with IBD. They need food they can best digest and utilize and that supports their proper GI pH to restore colonies of healthy bacteria.** Thus it should come as no surprise that cats

thrive on raw, despite the fears instilled in us by our vets not familiar, the AVMA, the FDA, and the pet food industry. (We refer you to the Food Fur Life articles, [Why Feed Your Cat a Raw Diet](#), [Raw Feeding and IBD in Cats](#), and [Why You SHOULD Feed Your Immune Compromised Cat Raw Food](#)).

Where Things Stand: Current State of Cats' Health

Since moving indoors full-time and becoming completely dependent on us for food, what has happened?

We need convenient food with our busy lifestyles. And most of us do not intuitively understand what cats need – they seem like little aliens to us. They certainly did to me. So we ask our vets. And many of our vets tell us that for dental health, cats need kibble, that to mimic their "natural" pattern of eating many small meals (being hunters of small mammals), we should leave the food out. We didn't know any better, and we trusted our vet to know what's best for Bella. Or we free-feed kibble to our kitties, because that's what and how our parents fed our cats when we were growing up, and those kitties lived long, healthy lives. So 80% of us (20) go to the store and buy a bag of kibble, come home, and pour it into a dish we keep full for Boots, and Socks, and Tigger. And yet we keep Boots and Socks and Tigger indoors exclusively, where our childhood friends were usually indoor-outdoor cats, supplementing their dry diet with healthy, freshly hunted prey. (If your kitty brought you gifts, that most certainly meant he was eating them, as research indicates that kitty only returns one in four hunted animals to present as gifts to his family. (21))

...except cats evolved eating moisture-rich food in the desert. (22) Kibble has virtually no moisture – and cats do not have a thirst-drive that keeps them properly hydrated (23). **This is a clash of momentous impact:** The number one reason for a vet visit by cats is bladder or urinary tract problems (24) – usually crystals and life-taking or life-threatening urinary tract blockages – problems that need not exist if we feed a moisture-rich, meat-based diet. (25) Cats, not designed to use all those carbs, grains, or starches in their food, not designed to derive needed protein from non-meat-based sources, and requiring moisture FROM their food to remain properly hydrated, experience kidney disease *at a rate of seven times more than dogs* (26).

And our kibble fed cats, chronically dehydrated, die most frequently from **kidney disease, the number one cause of death in cats over the age of five** (27).

Yet in the face of this, many of our vets STILL tell us our cats need to eat some kibble for dental health. And despite the fact that 80% of people with cats feed dry food, 85% of cats over the age of three years have dental disease (28). What the.... ????? How can they not notice this dichotomy?

So we put down that bowl of kibble for kitty to “graze.” Except cats aren't herbivores. Cats shouldn't graze. Allowing cats to graze has resulted in a problem of “epidemic proportions.”

58% of our cats are either overweight or obese (29) – an increase of 90% over the past five years (30).

So now we have fat cats. And that means 67% of our cats have arthritis (31).

And being fat increases the risk of diabetes by 300% - 500% (32) - so it shouldn't be surprising that the incidence of diabetes in our cats has DOUBLED in the past five years (33).

As to Inflammatory Bowel Disease? THREE of the top 10 reasons for vet visits by cats in the past several years are related to digestion. Our cats suffer chronic vomiting, diarrhea, and now? Now full-blown Inflammatory Bowel Disease (IBD) makes the "Top 10" list for vet visits (34). Is it any wonder, really, once we understand what they naturally eat compared to what so many of us feed them?

The Nutritional Profile of the Cat's Natural Diet

Wait – Don't Cats Eat ANY Grains, Grasses, or Vegetables?

No. Not naturally, no they don't. Some cats love to chomp grass, eat lettuce, or have a bread obsession. I love donuts – this does not mean it is a good food choice for me. In their natural environment, they don't have access to much but grasses. And those? Well, the studies indicate grass eating is rare: ingested grass is likely incidental while bug hunting. Cats are not natural to many environments, and their impact on those environments is hotly debated, thus there are many feral cat predation studies – which are the same thing as feral domestic cat diet studies. Thanks to those studies, we have a VERY clear picture of what our domestic cats eat in the wild due to the efforts of Dr. Esther Plantinga and colleagues, who analyzed that data. We now know exactly what the average nutritional make-up of that diet is. In a meta-study published in the British Journal of Nutrition in 2011, *Estimation of the dietary nutrient profile of free-roaming feral cats: possible implications for nutrition of domestic cats*, the entire body of feral cat diet studies (of which there is a very large body) was parsed to eliminate studies of Wildcat diets; all studies with a small number of cats; and all studies where cats had access to more than 5% human provided food (even if garbage). (35) This yielded 27 studies. Analysis of those studies found the natural diet of a domestic feral cat, on average, is (on a dry matter basis)

62.7% protein
22.8% fat
11.8% minerals
2.8% carbohydrates

The amount of carbohydrates cats naturally eat is very, very small. Where does it come from?

21 of 27 studies reported small amounts of plant material found in the diet. One of the studies reported that 26% of the cats consumed vegetation consisting mostly of a few strands of grass.

The authors concluded that plant material is a minor component of the diet of feral cats, and that ingestion is likely to occur "incidentally while foraging for invertebrates." So for the most part, carbohydrates from plant matter are not a meaningful or even intentional part of the diet. In fact, those carbs come from what their prey has eaten: "...when consuming whole prey, as cats naturally do, the digesta [stomach contents and nutrients in the intestines] of prey items may contain some starch." The authors note that the digesta mass of mice and rats is a very small component of the cats' diet, being just 0.5% - 2% of the body weight of the prey.

So cats do not naturally - intentionally - eat carbohydrates. The study authors indicate "Almost all of the metabolic adaptations related to the carbohydrate content of the diet indicate the lack of this nutrient in the evolutionary diet. It could be argued that the shift from an obligatory meat-based natural diet to a meat-and-grain-based pet food rich in carbohydrates may place the cat's metabolism under stress, and might have unwanted negative health effects in the long run."

While cats vary exactly what prey they hunt based on where they are, one thing does not deviate: they consume small animals. The summary of what they eat was provided:

- Mammals – 78% (Most often rabbits and rats, though there is a large variation between studies based on location)
- Birds – 16%
- Reptiles/amphibians – 3.7%
- Invertebrates – 1.2%
- Fish – 0.3% of items consumed. Fish-eating was present in just 3 of the 27 studies.

Cats eat small prey mammals. Not grains. Not legumes. Not vegetables. Not fruit. Essentially no fish – not even much “poultry” (birds). So why, then, do so many cat foods contain fish, soy, corn, wheat, rice, peas, spinach, kale, cranberries - tomato?

What are we doing to our cats? How has this happened?

The Problem: Pet Food is Marketed to Humans

If cats were in charge of the pet food industry, cat food instructions would read, “remove mouse or rabbit from freezer: thaw and serve.” But feeding cats what they were meant to eat is not how the industry developed. The first commercial pet food was offered for sale early in the 20th century. It began as an offhand utilization of what was basically considered “meat junk,” the garbage created from human food production. ...except very little was known about the actual nutritional needs of dogs and cats. Most fed table scraps, and cats were allowed outdoors to hunt. And then World War II happened. With food rationing, we could not afford to feed our pets meat and what was considered “food waste” changed. Mark Morris, founder of Hill's Pet, was the first to focus on the role of diet in pet health, focusing on research to determine their nutritional needs – and helped avert a mass euthanization of dogs by

formulating a grain-based food. (36) And thus the species-inappropriate diet was born. It served its purpose. But the low-cost benefit remained, and as more and more people brought pets into their lives and homes, a new field of pet food “science” emerged with the goal of formulating nutritionally adequate food with cheap ingredients that have marketing appeal to people.

Today, multinational cat food companies have a global reach and invest a great deal of money and time in research and development to “build” cat food from ever-cheaper nutrient components, using chemicals to make them as tasty as possible (37) – all with the goal of minimizing costs and maximizing profits. As technology has progressed, more and more of the “waste” from human food production goes back into human foods, leaving true waste products, downed animals and roadkill for pet foods. (38, 39, 40). There are many companies that enter the market seeking to provide “higher quality” foods that are made from organic ingredients, or perhaps ingredients that are more appropriate for an obligate carnivore, responding to growing consumer awareness of what our cats (and dogs) actually need. But this spectrum results in a great variety of cat food – **all** of which is marketed as optimal nutrition, leaving consumers confused, and turning to their vets for information.

Yet our vets receive very little nutritional training. In many Veterinary Universities in the U.S. and the U.K., the classes are often provided not by University staff, but by visiting Veterinary Nutritionists on the staff of the Mark Morris Institute. What is the Mark Morris Institute? Mark Morris founded Hill’s Pet Nutrition, and his son endowed the Institute in his father’s honor, in keeping with the company’s marketing strategy of using the vets to market their food. (41) The Mark Morris Institute pays a dozen veterinarians, whom they send, free of charge, to veterinary schools to teach pet nutrition:

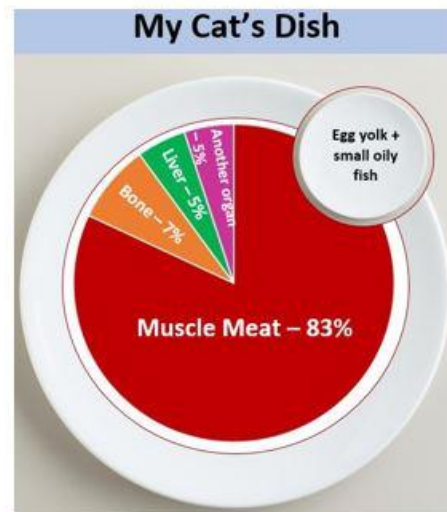
“The Mark Morris Institute University Teaching Program in companion animal clinical nutrition offers current, non-commercial nutrition learning activities at no cost to the hosting school. Mark Morris Institute offers a series of lectures, case-based discussion, labs and video presentations which can be combined to create a customized clinical nutrition course for your institution.” (42)

Hill’s Pet provides the textbook, *Small Animal Clinical Nutrition*, usually free of charge to students. (43). So how can we, as consumers, expect to obtain unbiased information on the best diet to feed our pets from our veterinarians who sell the prescription foods of the company that taught them about nutrition? We certainly mean no offense to our vets, as we are SURE that they recommend only what they think is best for our cats. *But this is a fundamental conflict of interest.* This is akin to our doctors learning about baby nutrition from Nestle, and our doctors selling Nestle baby formula and Gerber’s baby food (which Nestle owns) to us out of their offices. Instead of going shopping for our children at the supermarket, we go to our doctor’s offices – because our doctors warn us of the dangers of making our own food and meals for our babies – after all, the science of their nutrition is complicated, and these foods are scientifically formulated. Our doctors explain to us that fresh food is dangerous for our children. As our children grow, nuts and salads (leafy greens and alfalfa sprouts) are often contaminated with salmonella. It’s best for our children to eat the nutritionally balanced, highly

processed diet despite our concerns over ingredient quality and the use of a long list of synthetic vitamins to make up for what's been destroyed in the process of making the food. Not only that – but then our children go on to eat the adult formulas – and eat nothing but highly processed foods their entire lives.

...except our doctors don't tell us that, do they? They tell us to eat a minimally processed diet with whole fresh foods for our best health. They tell us to eat a balanced diet – balanced meaning, the “right” amount of each food group – protein, fruits, vegetables, grains, and dairy products – based on the USDA food pyramid or the updated “My Plate”. (44) They tell us our nutritional needs will be met if we eat a wide variety of fruits, vegetables, grains, and protein sources.

I wonder why vets don't use something similar for our cats?



Of course, a variety of meats and cuts are usually easy for most of us to obtain. A variety of organs? Not so much. So yes, most homemade raw cat food recipes include some supplementation (though some of that is to account for what is provided by the parts of the animals we don't feed). But the time-tested balanced recipes are all based on this simple prey model – because even when compared to AAFCO and FEDIAF nutrient requirements (which are designed to ensure the very highly processed diets meet cats' needs despite nutrient damage from processing and heat) this is what cats need.

So What Does My IBD Cat Need Nutritionally?

“The justification for nutritional management of IBD is twofold. First, dietary factors may contribute to the initiation or perpetuation of the disease. Second, malnutrition is a common sequela to IBD due to anorexia, malabsorption and increased nutrient losses.”

~ Small Animal Clinical Nutrition, p 1071 (45)

This is a quote from the textbook that forms the basis for recommending “prescription” foods for health problems in our cats. (Please see [Do You Really Need a Prescription Diet For Your Dog's Food](#) for discussion of what “prescription” or “veterinary” diet means in pet food). Yes, of course diet is a factor in IBD – if not in contributing to the gut dysbiosis that is at the heart of IBD – but certainly in managing it, if not helping heal the intestines (no, there is no cure. But a species-appropriate, minimally processed, fresh food diet provides our cats the least inflammatory diet possible containing no irritating fillers and thickeners, implicated in human IBD (46). It also places the least amount of stress on their highly specialized GI systems. We note that because there are studies indicating a cat CAN eat something and derive nutritional benefit from it does not mean they should).

First and foremost, IBD cats need a *species-appropriate* diet comprised of high-quality, meat-based proteins and fats. In fact, according to the *Small Animal Clinical Nutrition* textbook, our IBD cats need (47):

- **A moisture-rich diet.** Dehydration is a frequent problem in cats with IBD. Kibble is not an appropriate food format for any cat, but especially not IBD cats that need the least amount of strain on their inflamed, impaired gastrointestinal systems. Note: raw is a moisture-rich diet.
- **Electrolytes.** With chronic vomiting and/or diarrhea, low circulating serum blood levels of potassium are common. Foods containing 0.8% - 1.0% potassium on a dry matter basis are recommended. Note: a raw diet provides this without supplementation.
- **A medium-to-high energy dense diet is ideal, but often not practical.** These foods enable a smaller volume of food to be fed in order to “minimize GI distension and secretions.” It is noted that unfortunately “energy dense foods are high in fat, and high fat foods can contribute to osmotic diarrhea and GI protein losses.” What they don’t elaborate is that fat is more complicated to digest, and anecdotal evidence suggests that many IBD cats need lower fat diets due to fat malabsorption, often a cause of very stinky bowel movements. Further, ***it is very important to note*** that research published in 2014 (the textbook was written in 2010) indicates that fat digestibility is lower in cats with low vitamin B12. So IBD cats with low B12 will likely do best on a high protein, low fat diet until B12 shots return blood serum levels of B12 to normal. (48) Note: With a

homemade raw diet, we control the amount of fat, and can thus adapt the diet to what our cat needs and tolerates.

- **High Protein: a *minimum* of 35% protein on a dry matter basis.** Protein malnutrition is common in IBD cats due to damage to the GI tract from inflammation and the impaired ability to efficiently metabolize proteins – it is also due to losses from chronic diarrhea and/or chronic vomiting. Note: Obviously a raw diet provides a protein level that a cat naturally consumes.
- **A highly digestible diet.** IBD cats need food that is easy to metabolize, because their intestinal tracts are already impaired. **The minimum protein digestibility recommended is 87%. I note: that rules out ALL dry food.** Experiments conducted to evaluate the protein quality of fresh versus rendered animal by-products commonly used in pet foods found that total essential Amino Acid (AA) digestibility ranged from 93.6 to 96.7 for the raw ingredients, and 79.2 to 84.8% for rendered animal feed ingredients. (49) Please refer to the next section, “*What Does Highly Digestible Mean?*” for more information.
- **Low fiber.** The textbook notes that while fiber can help normalize transit time through the small bowel, the level of fiber required to reduce a “hypermotile” state reduces both energy density and digestibility of the food. It is also noted that in humans with IBD, a “small amount” of fermentable fiber has been shown to promote the growth of healthy bacteria (*Bifidobacterium* and *Lactobacillus*). The problem that isn’t addressed in this textbook? Cats have one of the shortest GI tract-to-body lengths in the animal world. They are not “built” to ferment fiber. Yes, there are studies indicating fiber given to cats promotes the growth of healthy bacteria. We can achieve the same thing with several approaches: 1) simply providing them with known, researched strains of probiotics. Please see *Probiotics for Cats: Human Grade Probiotics Instructions*, here: <http://www.foodfurlife.com/use-probiotics-in-cats.html> But please note, cats naturally consume “probiotics” with every meal by consuming the guts of their prey. They constantly refresh their gut bacteria. And yes, they also consume a little bit of fiber with every meal via the digesta of their prey. (35) The operative words there being “a little bit” – in fact, 2% on an energy basis, or 2.8% on a dry matter basis. But that is not just “fiber,” it is fermented, enzymatically digested fiber, which is very different than “raw” fibers we can easily provide. 2) There is a study in cheetahs – for which we have every reason to expect this has the same results in our domestic cats – that indicates the indigestible solids consumed by eating whole prey act in a very similar manner to fiber in humans (49), and, in fact, it is the cartilage that provides the most benefit in terms of creation of the short chain fatty acids that provide so much benefit to humans, especially in helping reduce the chances of developing intestinal cancers. If we are not feeding whole prey or prey model raw to our cats, or ground with bone, we can provide the benefit of the collagen in the cartilage by adding gelatin to the diet.
- **Nutrient/Vitamin-Rich Food.** Water soluble vitamins are obviously of concern in cats losing moisture via frequent vomiting and diarrhea:

- **B12 (cobalamin).** It is noted that a B12 (cobalamin) deficiency is common in cats with IBD. B12 shots are recommended. **An important note:** research published in 2013 indicates that chronic diarrhea associated with IBD when there is low serum cobalamin (B12) will NOT resolve until B12 levels are normalized. (50)
- **Sufficient thiamine.** It is noted that thiamine deficiency occurs commonly “and can profoundly affect appetite.” Thiamine is very susceptible to heat destruction. A raw diet ensures our kitties get the thiamine they need.
- **Zinc.** A zinc deficiency is “well recognized in people” as a complication of IBD. It is suggested that if cats with IBD have poor coat quality or dermatitis that zinc supplementation be considered. **This should ONLY be done in consultation with your veterinarian,** as cats are very sensitive to zinc and at relatively low levels it is toxic to them and can cause severe anemia and multiple organ failure leading to death. A properly balanced raw diet provides sufficient zinc without supplementation. (51)
- **Omega 3 fatty acids.** While there is little research in dogs and cats regarding the role of omega 3s in IBD, there is clinical evidence in people that not only do omega 3s help control the inflammation of the GI tract, it appears that omega 3 fatty acids act as competitive agonists to pathogenic bacteria. We note that if omega 3 fatty acids are to be supplemented, they need to be in the form of fish oils as discussed and referenced above (cats cannot convert plant-based omega 3s into the usable EPA and DHA). We recommend krill oil or green lipped mussel oil or powders as they are in a phospholipid base which makes them more bioavailable – they also have higher levels of antioxidants than other fish oils and thus are less susceptible to oxidation. Rancid fats and omegas in pet foods are thought to contribute to the development of kidney disease. If you wish to add these to your pet’s diet, as with anything new, please introduce them slowly. If using krill oil or green-lipped mussel oils in place of salmon oil in the balanced raw diets, vitamin D must be supplemented, as the primary source of D in the diet is the salmon oil. Please see the discussion in the Raw Feeding for IBD Cats article, *Balanced Raw Food Recipe with Nutritional Analysis*. (51)

This discussion of the nutritional needs of IBD cats in Small Animal Clinical Nutrition describes raw food. There is no need for a veterinary or special diet. The food cats have evolved to eat IS the food they need, and the culmination of the science conducted and summarized by Hills Pet confirms that – even though they are not aware of this.

What does “highly digestible” mean?

Food digestibility and nutrient bioavailability are at the heart of nutrition. Digestibility is a

measure of how much nutrition a food provides in a given volume. It indicates how much of the food is absorbed by the gut (intestines) into the bloodstream. It is the difference between what your cat eats and what your cat excretes.

Nutrient bioavailability is the proportion of the absorbed nutrients that are carried to target tissues and are available for use by the body. Because a highly digestible food provides a higher proportion of absorbed nutrients than a less digestible food, digestibility provides an important measure of a food's nutritional value and quality. In general, as the quality of ingredients in the food increases, so will the food's digestibility and nutrient bioavailability.

Merriam-Webster defines digestibility as "the percentage of foodstuff taken into the digestive tract that is absorbed by the body." (52) Simply put, it is the difference between how much food your cat eats and how much is excreted in stool. What they can't digest, they excrete.

Example: your cat eats one 5.5 ounce can of food a day. Your cat excretes 0.8 ounces of stool. That means your cat digested 4.7 ounces of the food she ate. 4.7 ounces of food absorbed divided by 5.5 ounces of food eaten = 85%. This food is 85% digestible. Yes, water is a factor, but not one we have to worry about unless comparing canned and kibble. The point is the difference between what they eat and what comes out is what is meant by "digestibility."



On the left:

Food: High protein (meat by-products), low carbohydrate canned with guar gum, food coloring and "natural" flavors

Amount: 4.5 ounces per day.

Frequency of stool: Daily

On the right:

Food: Homemade raw food made with [EZcomplete fur Cats](#) using beef as the boneless muscle meat.

Amount: 4.5 ounces per day

Frequency of stool: Every-other-day

Why does this matter? What does this illustrate?

Let's look at protein, being so important to a cat.

To determine the digestibility of protein (or any individual nutrient), the amount of the individual nutrient in the stool is determined. So if that 5.5 ounce can of food contains 19 grams of protein, and kitty excretes 3 grams of protein in the stool, kitty used, kitty absorbed, kitty metabolized 16 grams of protein. 16 grams of protein absorbed divided by the 19 grams of protein eaten = 84%. The protein in that food is 84% digestible. But different protein sources have differing digestibility due to their biological values, and different foods have varying ingredients that make the protein more or less accessible to the body.

Example: Canned foods 1 and 2 both have 12% protein as listed on the guaranteed analysis. They both have the same moisture content of 72%. This means each 5.5 ounce can of food has about 19 grams of protein.

Food 1 has a digestibility of 90%

Food 2 has a digestibility of 80%

Food 1: 19 grams x 90% = 17 grams of protein absorbed by the body

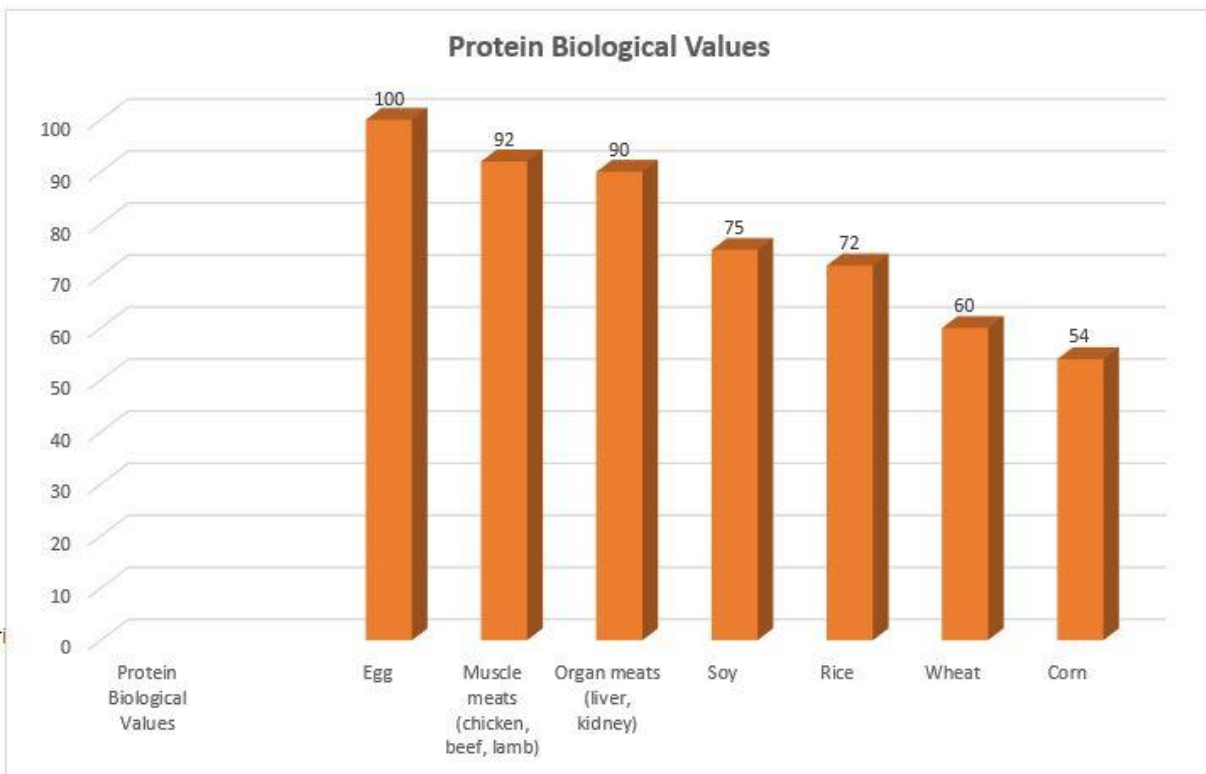
Food 2: 19 grams x 80% = 15 grams of protein absorbed by the body

Even though each can of cat food is labeled as having 12% protein and 72% moisture, and we expect they will provide the same amount of protein to our cat, they don't. Food 1 provides more protein than Food 2.

If we presume both canned foods have the same protein as the main ingredient, how can there be such a big difference in digestibility? Digestibility is impacted by many factors apart from protein sources, though protein quality is an important factor in digestibility of the food and bioavailability of the nutrients. Differences arise from protein source, protein quality, the macronutrient content, other ingredient differences of the foods: the presence (or lack) of fiber, gums or thickeners, particle sizes, processing techniques, the temperatures achieved in processing – and, of course, the age and health of the animal eating the food (53).

What Is a “High Quality” Protein?

First, we need to understand that not all proteins are created equal, especially when feeding an obligate carnivore. As Mark Peterson, DVM (renowned small animal endocrinologist) says, “The biological value of a protein is a measure of that protein's ability to supply amino acids (especially the 11 essential amino acids required by cats) and to supply these amino acids in the proper proportions. It is well-established that animal proteins (e.g., meat, meat by-products) have higher biological values than vegetable proteins (e.g., corn gluten meal, soybean meal, soy protein isolate).” (54)



Note by source: Values in table are approximate as they are taken from several sources and personal communications with nutrition experts

Source: http://www.petmd.com/dog/nutrition/evr_dg_principles_of_dog_nutrition#

High quality protein is animal-based. High quality protein provides the 11 essential amino acids in proper proportions. The highest quality proteins come from fresh, raw human grade meats, not cooked meats, and not pet grade meats, which include diseased and downed animals in both canned and kibble cat foods. (55)

So how do we know which foods are highly digestible and provide the most nutrition to our cats?

Digestibility of Cat Food Formats (Kibble, Canned, Raw)

	Extruded (Kibble)	Canned Food	Commercial Raw	Homemade Raw	P-value
Kerr 2011					
The Food	78.2%	83.8%	86.7%		+/- .001
The Protein	83.9%	88.5%	90.5%		+/- .001
Hamper 2015					
The Food	na	83.8%	90.6%	92.6%	+/- 0.6
The Protein	na	88.9%	94.7%	97.7%	+/- 0.4

Kerr et al 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](#). J Anim Sci 2012, 90:515-522 (Ref 56)

Hamper et al 2015. [Apparent nutrient digestibility of two raw diets in domestic kittens](#), J Feline Med Surg 2015 Sep 23 (Ref 57)

As you can see in the table that summarizes food format research done in cats, raw food – the food format cats naturally eat – is easiest for them to fully utilize. Does that really come as much of a surprise?

When discussing cat food, “high quality food” starts by being a food that is appropriate given the cat’s physiologic and metabolic needs. This is called “species appropriate” or “biologically appropriate” food. It refers to “high” protein, extremely low carbohydrate, low fiber food comprised of fresh, minimally processed meat and organ (a source of calcium and the minimum of other ingredients needed to make it nutritionally complete). This diet, this food will provide the most easily accessible nutrition.

It is even more important for cats with inflammatory bowel disease that they eat high quality, species-appropriate food as that places the least stress on their systems. That diet is

Comprised of whole, fresh human grade animal-based proteins and fat. This means homemade raw or a few commercial raw foods. Homemade cooked is also an option, though cats do best with the naturally occurring enzymes in raw food. Cooking destroys these enzymes and increases stress on the pancreas. Please note, many foods, even canned foods and foods marketed as “grain-free” contain non-meat based proteins such as soy or peas. These cost less than meat and that is the only reason they are there: to increase the apparent protein level of

the food. Almost all commercial canned and kibble cat foods contain pet grade (waste product) meats and other ingredients, regardless of those pretty marketing pictures.

Moisture-rich. Feeding moisture-depleted dry food, especially if it is free-fed, as discussed has resulted in alarming health problems in our cats, with obesity, periodontal disease, lower urinary tract diseases and kidney disease literally plaguing - and killing - our cats. In fact, the heat required to create kibble creates carcinogens – the last thing any cat, *especially* an IBD cat, should eat. (58)

Why No Dry Food. There are a myriad of problems with dry food for pets, especially cats. They are discussed at length by many: Dr. Elizabeth Hodgkins (former head of Technical Affairs for Hill's Pet for over a decade), Dr. Lisa Pierson, Dr. Jean Hofve, and Dr. Karen Becker, to name a few. But there is one over-arching reason to avoid dry food for our cats – especially our IBD cats: **the heat needed to produce kibble creates a compound that in humans is linked to inflammation, rapid aging, Alzheimers, and cancer – notably gastrointestinal cancer and colorectal cancer.** These are a by-product of the Maillard reaction, and are called advanced glycation end-products. As Dr. Becker explains, “When a protein joins with a carbohydrate, the biochemical result is a compound that can cause widespread inflammation and damage in the body.

Advanced glycation end products have been extensively studied in humans, and have been shown to exacerbate diabetes and interfere with kidney function. AGE has also been linked to aging, Alzheimer's disease, cancer, and more recently, neurologic disease such as intervertebral disc disease.

AGE studies in humans have revealed that we make the compound in our bodies, but we also have mechanisms to deal with it. However, if we eat a diet high in processed foods, it increases the level of AGE in our bodies.

A direct link exists between the amount of processed foods consumed and the level of AGE in the blood. The reverse is also true: eat foods low in AGE and AGE blood levels decrease. In fact, studies show that when people with diabetes eat a low AGE diet, it improves insulin sensitivity and kidney function.” This quote is from an article by Dr. Becker who interviewed another vet examining AGEs in pet food. The pilot study, which examined pet foods for AGEs found them –and found that there is a direct link between processing and the presence of advanced glycation end-products. The study found consistently in the pet food examined that “the less processing that occurs, the less heat applied, the more moisture maintained, the lower the AGE.” As IBD increases the risk that our cats will develop intestinal lymphoma, obviously removing potential carcinogens from their diet should be considered important, if not imperative.

Please see reference 58 for further links and information.

Minimally processed. We know from human nutrition it is healthiest if nutrients are consumed in their natural, unprocessed, form. Not only can processing damage nutrients but science is starting to understand the importance of consuming some nutrients at the same time and in the same quantities as they naturally occur. The more we provide nutrients in an unnatural form, the more likely we are providing them in a less than optimal manner just because of things we don't know. It is pure hubris to believe we have anywhere near a complete understanding of feline nutrition, and our cats are suffering because we feed them a highly processed diet with synthetic vitamins replacing those damaged by the process of making their food. We see it time and again in cats with inflammatory bowel disease. We rip out our hair trying to identify a novel protein that doesn't trigger problems – when all along, the problem was the combination of ingredients or the processing of the food, not the protein! When given fresh and human grade, many cats that were “allergic” to chicken are almost magically no longer sensitive to the protein. Yes, some need organic, non-GMO fed meat.

If you opt to feed canned food, it is best for your IBD cat if you look for a food that is

Made with high quality protein. That means no by-products. Named organ (like liver) is actually good for kitty. But look for food that has only named meat, no by-products, best if there is just one type of protein, and it is best to avoid fish.

Low in carbohydrates. Cats will overeat high carbohydrate foods in an attempt to derive enough protein, as energy from carbohydrates cannot replace their need for energy from protein. (59) This puts them at risk for obesity, diabetes, and many GI disorders (principally fatty liver disease, inflammatory bowel disease and pancreatitis).

Low in fiber. Unless a cat has an already damaged intestinal tract, a cat does not need fiber in the diet. Cats have one of the shortest GI tract-to-body lengths in the animal world: unlike humans, they are not physiologically meant to ferment fibers and their natural diet contains almost no plant-based fiber. (60) Fiber produces bulky stools, and cats naturally pass very small, firm, odorless stool.

It is also important the food you choose has

No, or very little fruits and vegetables. If there are any, they are less than 5% of the total food and there only for antioxidant support. Only low glycemic vegetables (that are safer for cats to eat) should be used.

No thickeners or at the very least a bare minimum of thickeners. It is nearly impossible to find a canned food without some form of thickener, whether it is tapioca, potato starch, guar gum, locust bean gum, agar-agar, xanthan gum, carrageenan or the many others used. In humans, many of the thickeners have been linked to the development of inflammatory bowel disease,

via dysregulation of the gut flora. Notable among them are carrageenan, xanthan gum, and maltodextrin (which is generally not used in pet foods, but is in many supplements as a flow agent in small amounts – in human foods it is far more prevalent and in much larger quantities. It is also known as “modified food starch”). (61) Carrageenan is a particularly nasty ingredient. It is a red algae-derived polysaccharide that according to the [International Agency for Research on Cancer](#) (IRAC) shows “sufficient evidence for the carcinogenicity of degraded carrageenan in animals to regard it as posing a carcinogenic risk to humans.” (62) Of course, non-degraded carrageenan is used in human and pet foods. But as you can see from the discussion in the link for the reference, the process of digestion can degrade carrageenan. Not so safe once digested!

Summary

The importance of feeding a cat with inflammatory bowel disease – in fact, all cats - a highly digestible, species appropriate diet cannot be ignored nor overstated, not only for its nutritional aspect, but also for the strain a highly processed diet puts on the entire digestive system of the cat in trying to digest food that is devoid of natural nutrients and enzymes, which ultimately results in inflammation. Of course it makes sense an IBD cat needs the least inflammatory diet possible. Many of the top diseases our cats suffer, including IBD, are directly related to their diets – and if not caused by them, then exacerbated by them - and can often be avoided or mitigated by providing them with whole food-based nutrition.

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