COMPREHENSIVE GUIDE TO
FAT FOR CANINES

HEY TRIBE,

Ryan, founder of Bones & Co. here with my pup Rigsby.

I am **so excited** that you are interested in learning more about Keto & fueling your dog with fat.

In the mainstream, the word **fat** has a negative connotation…but why? We've been conditioned to think that feeding our dogs fat means they will get fat. This simply isn't true.

Today, we're here to debunk some myths about fat and explain:

- What a biologically-appropriate and metabolically-appropriate approach to dog nutrition looks like
- How using fat for fuel is scientifically superior to using carbs or protein for fuel
- How dogs are fighting metabolic disease using fat for fuel
- Why a high fat diet is not a health concern
- The science behind Keto and how you can fuel your dog with fat, today

My team & I have worked hard to put together some of the best, most up-to-date, and authoritative information about fat for canines in this guide. We've done this so that you'll be able to **feed them right to love them longer.**

Our Keto Raw-volution starts here, with fat. Let's dig in!

Your Grateful Founder,
Ryan Cummings

CHAPTER 1

CANINE TAXONOMY & ANATOMY

THE TAXONOMY OF A DOG

Dogs and wolves are of the same species: Canis lupis. Dogs are a direct ancestor of the gray wolf and, since 1993, have been classified as a subspecies of canis lupis: Canis lupis familiaris.[1]

Dogs and wolves are the same species and are 99.9% genetically similar.[2]

This means that while dogs are phenotypically extremely diverse, they are genetically almost identical to the gray wolf:

> *"Dog domestication research is often controversial, but one point that is* ***universally agreed upon by all parties is the identity of the direct ancestor of all domestic dogs: the gray wolf (Canis lupus).***
>
> *Since 1993, the domestic dog has been taxonomically classified as Canis lupus familiaris, though Canis familiaris is still commonly used. This genetic similarity to the gray wolf is equivalent for all dog breeds from Chihuahua to Great Dane (Vila et al. 1997).*[3]

CARNIVORES, OMNIVORES, AND HERBIVORES

Given the fact that dogs are carnivores, classified taxonomically in the order Carnivora, the ideal diet for a dog is meat and animal flesh. This is different from omnivores (like humans) who can ideally eat meat and plants or herbivores (like rabbits) who should eat plants.

Like wolves, a dog's ideal diet should mainly consist of meat, bones, and organs.

OBLIGATE CARNIVORES VERSUS SCAVENGING CARNIVORES

Some have made the argument that dogs are technically omnivores since they are not obligate carnivores like cats:

- **Obligate carnivores** have an absolute biological necessity for meat or else there will be major health issues. Obligate carnivores are strict meat eaters.
- **Scavenging carnivores** (like dogs) have an ability to eat plant material and are not technically obligate carnivores. Scavenging carnivores can survive off of plant material, but it is not ideal.

Dr. Karen Becker addresses the insinuation that dogs are omnivores because they have the ability to process plant material:

> *"I often see dogs referred to as omnivores rather than carnivores. I strongly disagree with this assumption. Just because dogs fed plant-based diets are able to stay alive doesn't make them omnivores. Taxonomically, dogs are in the Order Carnivora and the family Canidae along with other carnivorous mammals."*[4]

Yes, dogs can survive eating plant matter, but this does not mean that they will thrive. Taking a biologically-appropriate and species-appropriate approach to dog nutrition, dogs should be fed what wolves eat: raw meat. This appropriate food will allow carnivorous canines to thrive.

THE ANATOMY OF A DOG

Aside from a dog's taxonomical classification as a carnivore with a very close genetic relationship to the wolf, dogs are anatomically built to process raw meat as the ideal diet.

The anatomical characteristics of a dog include:

Short GI Tract:[5] dogs have a short GI tract (it takes 6-8 hours to process food) that is highly acidic due to the presence of hydrochloric acid with an average PH of 1, perfect for digesting raw meat and killing bacteria. Vegetables, carbs, and other non-meat foods take longer to process which is not ideal for a carnivore.

Carnivorous Teeth:[6] dogs have sharp, elongated carnivorous teeth. With pointed (not flat) molars, their teeth are perfectly designed to rip apart meet. True omnivores (like humans) have flat molars to chew plant matter.

Wide Jaw:[7] a dog's jaw opens widely which is perfect for gulping up large pieces of raw meat. Their jaws only move up and down while omnivores' jaws can move side-to-side to process plant matter.

Mouth:[8] a dog's saliva does not contain the enzyme amylase that helps break down carbohydrates starting in the mouth (omnivores and herbivores have this enzyme). Amylase is only found in limited quantities in the pancreas, making processing a high amount of carbs highly sub-optimal for dogs. Forcing dogs to eat high-carb diets puts stress on their pancreas to process food that is less-than-ideal. Additionally, dogs' mouths contain an enzyme called lysozyme that fights bad bacteria directly from the mouth, making consumption of raw meat ideal.

CHAPTER 1 TAKEAWAYS

Taxonomically and anatomically dogs are carnivores who should be eating meat in order to thrive.

Everything from a dog's genetic composition to a dog's teeth and jaw indicates that the ideal meal for a dog is raw meat. While a dog is technically a scavenging carnivore, feeding them less-than-ideal plant material puts them in a state of chronic stress.

We should be feeding our dogs appropriate food so that they can thrive. Species-appropriate and biologically-appropriate food for dogs is raw meat, bones, and organs.

CHAPTER 2

NUTRITIONAL REQUIREMENTS FOR CANINES

AAFCO REQUIREMENTS FOR DOGS

AAFCO or The Association of American Feed Control Officials "is a voluntary membership association of local, state and federal agencies charged by law to regulate the sale and distribution of animal feeds and animal drug remedies."[9]

Technically speaking, the FDA is the only organization that has regulatory control. As of now, AAFCO is the organization that sets regulations for pet food and FDA actually enforces said regulations.

In the manual[10] released by AAFCO that explains the standard nutritional adequacy of dog and cat foods, dogs have a nutritional requirement for:

- **Crude Protein:** this includes nutrients like Arginine, Histidine, Isoleucine, Leucine, Lysine, Methionine, Methionine-cystine, Phenylalanine, Phenylalaninetyrosine, Threonine, Trytophan, and Valine
- **Crude Fat:** this includes nutrients like Lineleic acid, alpha-Linolenic acid, Eicosapentaenoic + Docosahexaenoic acid, and (Linoleic + Arachidonic):(alphaLinolenic + Eicosapentaenoic + Docosahexaenoic) acid Ratio
- **Minerals:** this includes nutrients like Calcium, Phosphorus, Potassium, Sodium, Chloride, Magnesium, Iron, Copper, Manganese, Zinc, Iodine, and Selenium
- **Vitamins & Other:** Vitamin A, Vitamin D, Vitamin E, Thiamine, Riboflavin, Pantothenic acid, Niacin, Pyridoxine, Folic acid, Vitamin B12, and Choline

You'll notice that there are no established minimums for carbohydrates. That's because **dogs do not have a biological requirement for carbohydrates,** like they do protein, fat, vitamins, and minerals.

When we feed dogs food high in carbs, they are able to process the food using limited amounts of amylase that they have in their pancreas. These carbohydrates are **fillers,** used by pet food companies to meet the basic requirements of dogs by using cheap, super processed fillers that lower the price of the food.

AGAINST BREED-SPECIFIC NUTRITIONAL REQUIREMENTS

AAFCO establishes nutritional minimums for dry matter in dog food **for all dogs, regardless of breed.** That's because dogs are carnivorous canines, genetically 99.9% similar to wolves. They do not have different nutritional requirements based on breed because they are all, genetically speaking, incredibly similar.

Phenotypically (on the outside), dogs are extremely diverse. To cater to our feelings about our dog's uniqueness, big pet food companies have created "breed-specific" kibble.[11] Supposedly, certain kibbles are optimized to promote well-being in specific kinds of dogs based on the formula and nutrients.

The problem is: we can't seem to find a kibble that we believe actually meets dogs' needs (even if it is breed-specific!). Regardless of formulation, kibble across the board tends to contain biologically-inappropriate carbs and low-quality protein, which is not ideal for dogs.

Dr. Karen Becker puts it best,

> *"Dry pet food with little or no high quality animal protein, minimal moisture, but plenty of grains, carbs, allergenic ingredients, non-nutritional fillers, additives and preservatives is not species-appropriate nutrition for any dog, regardless of breed.*
>
> *Strange as it may seem when comparing a Great Dane to a Maltese, dogs of every size and breed are pretty much identical when it comes to their genetic heritage. They are all canine -- Canis lupus familiaris.*
>
> *Certainly size, energy output and health problems are a consideration when determining any animal's nutritional requirements, but a dog is still a dog – a carnivorous canine."*[12]

At the core, species-inappropriate kibble that contains unnecessary carbohydrates is a sub-optimal and inflammatory source of nutrition for dogs, regardless of breed.

The question here is not of breed-specific nutrition, it is of appropriate or inappropriate nutrition for carnivorous canines. Even if kibble "meets" the standards set by AAFCO, the fact that most dry foods contain high amounts of carbs makes it a highly inappropriate choice for dogs to thrive.

CHAPTER 2 TAKEAWAYS

Dogs, who are carnivorous canines, all have the same minimum nutritional requirements for protein, fat, minerals, and vitamins. Breed-specific nutritional standards are a marketing ploy to get pet owners to purchase biologically-inappropriate high-carb food for their dogs.

Since dogs have **no** biological requirement for carbs, we should not be feeding them carbs just because we can. In order to let dogs thrive, they have to eat better, more substantive food that is not filled with carbs.

CHAPTER 3

DOGS & CARBOHYDRATES

WHAT ARE CARBOHYDRATES?

Simply put, carbohydrates (carbs) are molecules that serve as an energy source for dogs through the use of glucose. There are two types of carbs: simple and complex.

> *"Simple carbohydrates, such as fructose, sucrose, and lactose, require little or no digestive breakdown and are readily absorbed from the small intestine and converted into glucose. These are found in table sugar, honey, and fruits, as just a few examples.*
>
> *Complex carbohydrates are further categorized as either starches or fibers, and are digested more slowly than simple carbohydrates. Starches require additional breakdown by enzymes, produced by the pancreas and intestinal wall, before they are absorbed and utilized by the dog. Starches are contained in grains; vegetables such as potatoes and peas; and beans."*[13]

No matter what the source of the carbohydrate (simple or complex), a dog's body still process the carbs as glucose (sugar).

THE PROBLEM WITH CARBOHYDRATES IN DOG FOOD

When a dog eats carbohydrates (simple or complex), these carbs are processed as glucose in dogs' bodies. Here's a closer look at how dogs use carbs for energy:

> *"Dogs are able to convert certain carbohydrate sources into simple sugars that are easily absorbed...Carbohydrates are broken down in the small intestine into glucose molecules. Glucose is the common energy source that can be used by the majority of body cells...Glucose can be stored in the body for release later in the form of glycogen. If the animal eats too much and exercises too little, this stored glycogen will convert into fatty deposits in the body and cause obesity."*[14]

In a dog's body, glucose is actually the preferred source of energy. Dogs will use glucose stores **first** before ever using stores of fat for energy.

The problem is: in the presence of glucose, a dog's body releases the hormone insulin from the pancreas to regulate blood sugar levels. Then, insulin forces muscles and tissues to soak up excess blood glucose. Over time, the body can only store *so much* glucose before these extra stores are **deposited directly into fat cells.**

This process of...

1. storing **all** fat and
2. storing extra glucose-turned-glycogen as fatty deposits in the body

...leads to an accumulation of fat, a bodily state that leads to diseases like diabetes and obesity.

The point being: when dogs are forced to use biologically-inappropriate carbs for energy, their system is not operating optimally. Dogs have to metabolically work overtime to get nutrients from carbs and find a place to store excess glucose. Over time, much of this glucose is stored as fat.

This accumulation of fat is what makes dogs fat and obese, not the presence of fat itself.

WHEN DO DOGS EAT CARBOHYDRATES?

On what diet do dogs eat the most amount of carbohydrates? **Eating dry dog food, or kibble.**

By its very nature, kibble is composed of carbohydrates because:

> *"Structurally, carbohydrates (starches in particular) are essential to dry pet food processing; commercial extruded pet foods use starches to give the food structure and texture. Even some canned dog foods contain a carbohydrate source...*
>
> *In addition to keeping kibble together, carbohydrate-rich ingredients are included in many commercial dog foods because of their relatively low cost, caloric contribution (4 calories/gram) and ease of sourcing. This helps keep the price of the food attractive to cost-conscious dog owners."*[15]

In order to kibble to be kibble, it has to be held together by starches and processed at very high temperatures in order to kill bacteria (good and bad) from poor-quality meat sources.[16] This is not because carbohydrates are healthy for dogs but because it is convenient for pet owners to feed high-carb kibble.

It's worth repeating: dogs have no biological need for carbs. Yet most dogs eat a diet that contains a large amount of carbs on a daily basis.

DEBUNKING GRAIN-FREE DOG FOOD

Now that you know more about what carbs are and how dogs process carbs, it's important to address the concept of "grain-free" dry food and kibble.

Currently, according to AAFCO standards, pet food companies **do not** have to put the carbohydrate percentage on the label of dog food. Activists are working to change this but for now, this is the status-quo.

The problem is, when large pet food companies don't have to label the carb content on the back of their bags, the consumer can easily mistake "grain-free" for carb-free, which isn't the case.

Here's the thing: the amount of carbs in a dog's food equals the amount of **sugar** in a dog's food since dog's process carbs as glucose. The real problem with the "grain-free" kibble craze is that "grain-free" kibble is still

dry kibble, lacking the moisture of real, raw food. Grain-free food can still be high-carb food, which is highly inappropriate for carnivorous canines.

“Grain-free” is a marketing ploy to trick consumers into thinking that kibble without grains is healthier than kibble with grains, which simply isn’t true. Grain-free kibble still contains a high amount of carbohydrates and a lack of moisture, which is a huge problems for dogs.

CALCULATE THE AMOUNT OF CARBS IN YOUR DOG’S FOOD

Even if you are not currently feeding a kibble or raw food, you might be surprised to learn just how many carbs are in your dog’s food.

Many companies (even some raw companies) **do not** have a truly low-carb recipe since fillers like vegetables are still processed as **glucose** in a dog’s body. Be sure to calculate the actual amount of carbs in your dog’s food to ensure that they are staying away from inflammatory carbohydrates.

Here’s how:

1. Review "Guaranteed Analysis" on the dog food label (PS: the GA is the minimum amounts of the specified nutrient in the bag)

2. Find the fat, protein, ash, and moisture %'s (ash = minerals!)

3. Add those values together to get one total percentage

4. Subtract that number from 100 to get your carb total!

100 - (FAT+ASH+MOISTURE+PROTEIN) = CARB %

COMPARISON: BONES & CO. VERSUS DRY FOOD CARB CONTENT

Bones & Co.

Here is the Guaranteed Analysis for Bones & Co.’s Chicken Patties:

Crude Protein: 15% (min)
Crude Fiber: 2% (max)
Crude Fat: 10% (min)
Moisture: 72% (max)

CALCULATE: 100 – (10 + 2 + 72 + 15) = 1%

Bones & Co.’s Raw Chicken Patties contain only 1% carbohydrates, which is how it is low-carb and Ketogenic!

Nulo

Here is the Guaranteed Analysis for Nulo's Medal Series Adult Grain-Free Kibble Chicken & Peas Recipe:

Crude Protein: 32.00% (Min)
Crude Fat: 17.00% (Min)
Crude Fiber: 5.00% (Max)
Moisture: 10.00% (Max)
Calcium: 1.0% (Min)
Phosphorus: 0.9% (Min)
Vitamin E: 300 IU/kg (Min)
Omega 6 Fatty Acids*: 2.90% (Min)
Omega 3 Fatty Acids*: 0.40% (Min)
Ascorbic Acid (Vitamin C)*: 65 mg/kg (Min)
Bacillus coagulans*: 80,000,000 CFU/lb (Min)

CALCULATE: 100 – (17 + 10.2 + 10 + 32) = 30.8%

This recipe from Nulo contains 30.8% carbohydrates, making it "grain-free" but not carb-free.

CHAPTER 3 TAKEAWAYS

Dogs have no biological requirement for carbohydrates yet many of the foods that they eat contain a high amount of carbs. Carbs wreak havoc on a carnivore's body causing chronic inflammation and metabolic stress, two things that are linked directly with diseases like cancer, diabetes, and obesity.

It's up to pet parents to remain vigilant against marketing tactics like "grain-free" when dogs process all carbs as sugar/glucose. Calculating the percentage of carbs in your dog's food is a good first step to see how biologically appropriate your food is.

CHAPTER 4

DOGS & FATS

WHAT ARE FATS?

Here's a great summary of what fats are and how dogs use them:

> *"Fats are an excellent source of dietary energy; fats yield 2.5 times as much energy as proteins or dietary soluble carbohydrates for dogs, at 8.5 kilocalories of energy per gram of weight.*
>
> *Most dietary fat is made up of triglycerides, which is a group of three fatty acids. Fatty acids are classified by the length of their carbon chain, by the presence or absence of double bonds, the number of double bonds, the position of those bonds along the carbon chain, and by their melting point. Fats with no double bond at all are called saturated fats. Fats containing fatty acid chains with a double bond are called unsaturated fats...*
>
> *Fat digestion is more complex than that of protein or carbohydrates. Still, healthy dogs and cats can digest fats with great efficiency; approximately 90-95 percent of the fat they eat gets metabolized."*[17]

Fats are a highly digestible form of energy for canines. Fat is more complex than carbs or protein; however, dogs can still efficiently process them at 90-95% of the fat they eat gets directly metabolized for energy.

Fats have many vital functions in the body:

> *"Not only do they provide energy, but they are also necessary for the normal development and function of body cells, nerves, muscles, and body tissues. They are important components in the body's production of hormone-like substances called prostaglandins. Prostaglandins work to reduce inflammation, as well as perform many other important functions in the body.*
>
> *Fats are part of the reason that dog foods taste good and smell good too (at least to your dog). Fats and oils also give structure to foods. They help the body to absorb certain vitamins called the fat-soluble vitamins (A, D, E, and K). Fats and oils in the diet keep your dog's coat shiny and healthy and are also important in reproduction."*[18]

To summarize: fats are a form of energy for dogs that regulate normal bodily functions, reduce inflammation, and help with nutrient absorption. **Fats are the most optimal source of energy for canines since:**

1. Dogs get 2.5 times as much energy from fat as they do from carbs.
2. Dogs metabolize 90-95% of fat they eat

We'll cover more about **how dogs process fats** in Chapter 5 about Ketones & Ketogenic food.

CASE STUDY: CANINE MUSCLES & FAT ABSORPTION

Circling back to canine anatomy, not only is fat the most optimal fuel source for dogs on a metabolic level, but fat is also the most optimal fuel source on an anatomical level. Remember: everything about a dog's body points to the fact that they are meant to get fuel from raw meat and fat (see Chapter 1).

Let's zoom in on canine muscles & metabolism, for example:

> *"Canine metabolism is unique. Mammalian muscle fibers have been classified into types I, IIa and IIb based on their metabolism. Type I fibers contain less ATPase activity compared with type II fibers. Types I and IIa are characterized by oxidative metabolism, whereas type IIb fibers are characterized by anaerobic glycolytic metabolism.*
>
> *Canine muscle contains mainly oxidative fibers (Armstrong et al. 1982, Gunn 1978a, Snow 1987). Guy and Snow (1981) describe some low oxidative muscle fibers in dogs but acknowledge that the activity of the oxidative enzyme succinate dehydrogenase in the low oxidative fibers was still greater than that in type IIb fibers from other species. Relative to metabolic body size, dogs also metabolize free fatty acids at twice the rate observed in humans (de Bruijne 1981). Dog muscle is, therefore, more adapted to use fat than human muscle and conclusions derived from human experiments may not be valid in dogs."*[19]

Fat is the best, most efficient, least inflammatory source of fuel for carnivorous canines. By feeding dogs what they are anatomically and biologically supposed to eat, we can give our dogs the chance to thrive.

WHY ISN'T EVERYONE FUELING WITH FAT?

Since fat is the most optimal fuel source for carnivorous canines, why aren't more dog food companies fueling with fat?

1. **Fat is expensive.** Fat is a premium ingredients and costs more money than carbohydrate fillers. Many companies choose a high carbohydrate content to keep dog food cheap, but unhealthy.
2. **People are afraid of fat.** Sometimes, when people hear the term "fat fueled" or hear that dogs should "eat fat," they picture dogs getting fat. Eating fat does not equal gaining weight, especially for carnivorous canines who are meant to digest fat for fuel.

Dogs should be eating raw meat and fat but misconceptions about fat, canine anatomy, and raw food has left many dogs using sugar for fuel with carbs instead of fat for fuel.

FAT FUELED & FAT ADAPTED

In the previous chapter we discussed what happens when dogs are forced to process biologically-inappropriate carbs (inflammation and increased metabolic stress). But what's the alternative?

The answer: raw, fresh, metabolically AND biologically-appropriate food. Food that allows dogs to be **fueled with fat instead of filled with fat.**

On what diet can a dog use their fat for fuel? A Ketogenic diet.

Ketogenic food (like B&C's food) is high fat, adequate protein, and low carb to promote Ketosis: putting dogs in a metabolic position to use their fat for fuel.

We'll discuss more about the science behind Ketogenic food in Chapter 5. Just know that when dogs become fat fueled and fat adapted by eating high fat, adequate protein, and low carb food, they are able to use their fat (their most optimal fuel source) for fuel instead of storing it.

The point: when dogs are allowed to use their fat for fuel by going Keto, they do not have to process biologically-inappropriate carbs. This is optimal. Allowing dogs to live in an optimal state puts them in the best position to live long, healthy, disease-free lives.

CHAPTER 4 TAKEAWAYS

Fat is a premium source of energy for carnivorous canines. Fat is what dogs should be using for energy based on their metabolic system, anatomy, and biology. As opposed to carbs and protein, dogs are able to get 2.5 times more energy from fat and metabolize it at extremely efficient rates. Fat is bioavailable, optimal, anti-inflammatory, and absolutely necessary for a dog to thrive.

CHAPTER 5

FAT-FOR-FUEL

OVERVIEW OF KETOGENIC FOOD

Ketogenic food is food that is high in fat, adequate in protein, and low in carbs. This food shifts a dog's metabolism away from processing inflammatory carbs and toward metabolizing healthy fats.

When in Ketosis, dogs produce energy from fat-derived ketone bodies instead of glucose from carbs. Ketogenic food promotes nutritional Ketosis: a state where dogs have a moderate to high ketone production (0.2-8 mM) and moderate to low glucose production (<75 mg/dL).[20]

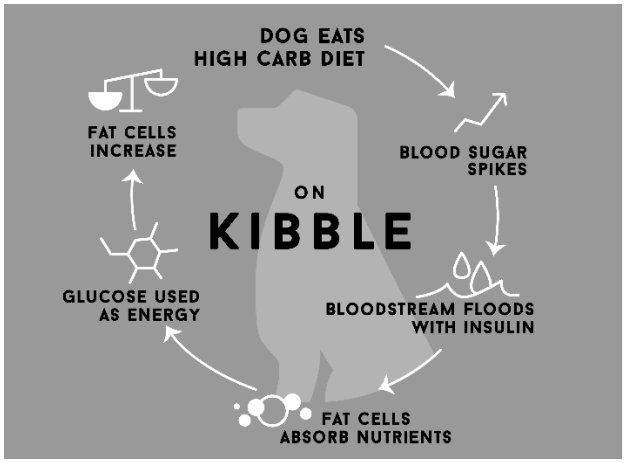
In the state of nutritional Ketosis, dogs begin to use their fat for fuel (fat-burning) instead of using sugar for fuel in Glycolysis. Instead of merely surviving off of biologically-inappropriate carbs, dogs can thrive eating Ketogenic food.

THE SCIENCE BEHIND KETO

Dogs get energy in 1 of 2 ways:

#1: SUGAR (SUB-OPTIMAL)

When a dog eats a high-carb and low-fat diet, they use glucose for energy through a process called Glycolysis. This increases inflammation and metabolic stress in a dog's body.



GNAW ON THIS:

- Carbs are not required for dogs
- Even "premium" kibble is high in carbs & sugar
- Avg carb content is over 33% in leading kibble
- Sugar fuels disease

As you can see from the above graph, getting energy from glucose is a highly inefficient process that involves a series of complex chemical reactions.[21]

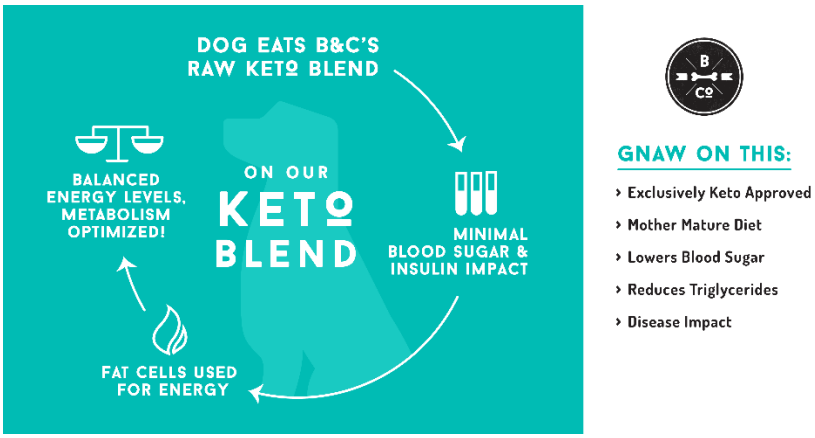
For canines who have **no** biological need for carbs (dogs will get all the natural glucose they need through gluconeogenesis), excess glucose is stored in the body as fat**.** In this state, fat is not being used for fuel. The accumulation of fat during Glycolysis is what makes dogs fat. Not fat itself.

Over time, with insulin spikes and a series of chemical reactions that force dogs' cells to essentially make room for excess fat, dogs are at an increased risk to develop diabetes, obesity, and even to fuel cancer with glucose.[22]

Glucose is a toxic, inefficient, cancer-feeding, fat-storing form of energy that is highly inappropriate for carnivorous canines.

#2: FAT (OPTIMAL)

When a dog eat a high fat, adequate protein, and low carb diet, they burn fat for energy through Ketosis. This reduces inflammation and metabolic stress in a dog's body.



Here's an overview of how Ketosis works:

1. When a dog eats food high in fat, adequate in protein, and low in carbs, they can go into a state called Ketosis
2. In a low-carb environment, a dog's body is programmed to save excess protein (during the transition from Glycolysis to Ketosis) at first and use amino acids in order to create glucose for fuel. Eventually, after time, dogs' bodies will switch metabolic pathways[23] altogether from using glucose to using ketones-from-fat for fuel.
3. On a hormonal level during Ketosis, insulin levels drop and insulin is not released as much as it is during Glycolysis (since there is very little glucose in the body). Instead, glucagon levels rise to regulate low blood glucose levels (to make sure there is enough blood glucose).
4. Typically, certain muscles and tissues rely exclusively on glucose for fuel (such as the brain) and cannot use fatty acids for fuel. During Ketosis, Ketone bodies that are produced in the liver can actually cross the blood-brain barrier (since they are soluble enough) and provide fuel to the brain and other tissues. Additionally, various tissues can actually take ketones and produce acetyl-CoA which enter the Krebs cycle and then this leads to the generation of ATP (energy).
5. In Ketosis, the body adapts to use fat for fuel optimally and efficiently!

THE BENEFITS OF KETO

At the core, Ketogenic food promotes Ketosis, where the body can use its own fat for fuel.

For carnivorous canines whose optimal fuel is fat, eating a diet that promotes Ketosis helps reduce inflammation and metabolic stress, two things which are directly linked with disease.

No longer forced to survive off of inappropriate carbs and sugars, dogs can metabolically and biologically thrive eating a Ketogenic diet.

HIGH FAT DIET HEALTH CONCERNS

Concern #1: Will Eating Fat Make My Dog Fat?

Simply put, NO, they shouldn't.

When a dog eats a Ketogenic diet, they can go into a state of Ketosis where they are using their fat for fuel. Eating a typical dry pet food diet, dogs are in Glycolysis and storing excess fat instead of using it for fuel. Storing fat makes dogs fat, not eating fat and using it for fuel.

The obesity epidemic in dogs[24] (mostly eating kibble) speaks to how carbs make dogs fat, not fat itself.

Concern #2: Will My Dog Get Pancreatitis Eating Fat?

In dogs, Pancreatitis is the:

> *"...inflammation of the pancreas, [that] is commonly seen in dogs and cats and presents a spectrum of disease severities from acute to chronic and mild to severe."*[25]

Pancreatitis is a serious, often life-threatening issue, that can present itself in the presence of high fat. When people hear this, they often think "fat causes pancreatitis." The real problem with Pancreatitis is **inflammation** (not fat), which is caused by many factors. Sure, if a dog is eating a high-carb, high-fat diet, the pancreas will be taxed.

However, if a dog is eating a high-fat, low-carb diet where fat is the fuel, the pancreas will be in a much less inflamed state, lowering the chance of getting Pancreatitis. The real risk for developing chronic Pancreatitis comes from a biologically inappropriate **high-carb** diet that results in elevated metabolic stress and inflammation.

To put dogs in the **best possible position** to avoid developing Pancreatitis and other inflammation-based disorders, feeding dogs metabolically optimal diets (like Keto) and making sure dogs get regular exercise is key.

CHAPTER 5 TAKEAWAYS

Ketogenic food is food high in fat, adequate in protein, and low in carb to promote Ketosis: a state of fat-burning. Since fat is the most optimal fuel source for dogs, Ketogenic food allows dogs to actually use their fat for fuel instead of storing their fat.

Raw Keto for dogs is an anti-inflammatory, metabolically efficient, and biologically-appropriate approach to dog nutrition. Eating raw Keto, dogs can thrive instead of merely survive off of inappropriate and inflammatory carbohydrates.

CHAPTER 6

FIGHTING METABOLIC DISEASE

DISEASE RATES IN DOGS

Dogs are broken. We're currently experiencing an epidemic of canine cancer, diabetes, and obesity. And no one is talking about it.

Here are some stats:

- **Cancer:** "Although true epidemiological data worldwide is lacking in veterinary medicine, we estimate that the incidence of cancer in dogs is around 1 in 3 (and 1 in 4 to 5 in cats) (Pang, et al., 2009).[26]
- **Diabetes:** "In 2011, we reported a 32 percent increase in canine diabetes and a 16 percent increase in feline diabetes since 2006. Unfortunately, diabetes continues to grow in prevalence among dogs. Canine diabetes has increased by 79.7 percent since 2006, while, in felines, the prevalence of diabetes has increased 18.1 percent over the same time frame."[27]
- **Obesity:** "In the October 2017 clinical survey, 56% of dogs and 60% of cats were classified as overweight (body condition score (BCS) 6-7) or obese (BCS 8-9) by their veterinary healthcare professional. These results indicate an estimated 50.2 million dogs and 56.5 million cats are above healthy weight, based on 2017 pet population projections provided by the American Pet Products Association (APPA). In 2016, APOP found 54% of dogs and 59% of cats were overweight or obese in the U.S."[28]

This goes beyond a temporary problem or issue—something is on the whole deeply, metabolically, wrong with our dogs and the way we feed them.

CARBOHYDRATES & DISEASE

Canine disease rates are rising – but why?

Many dogs are currently being fed high carb kibble. As we covered in Chapter 3, dry kibble typically contains a high carb content (even if it's grain-free kibble). Carbohydrates are an inflammatory, metabolically stressful source of fuel for carnivorous canines, who are biologically meant to use fat for fuel.

Looking closer, widespread carbohydrate consumption has **a lot** to do with these rising disease rates.

<u>Cancer</u>

It's been known since the 1920's that cancer cells feed primarily off of glucose. This is a phenomenon known as the Warburg Effect.[29]

Since canines process carbs (sugars) as glucose with the limited enzyme amylase, the primary way that high levels of glucose end up in a dog's body is when dogs eat carbs.

Carbs (sugars) feed cancer.[30] With 1 in 3 dogs developing cancer[31] and 50% of dogs over the age of 10 developing cancer,[32] it is time we reconsider feeding dogs a diet high in carbohydrates and replacing this with a diet low in carbohydrates and high in fats.

Diabetes

Dogs develop diabetes when they become insulin-resistant. How? After years of chronic stress and excess glucose in the bloodstream, the pancreas can no longer regulate glucose levels. Glucose is then stored as fat in the body, weight gain continues, and numerous health problems arise from being severely overweight.

The root cause of diabetes development is excess glucose. Glucose that is in the body **because of carbohydrate consumption.**

Doctors typically recommend that dogs with Type 1 and Type 2 diabetes eat a high carb, low fat diet to keep "a healthy amount of blood sugar up" and to avoid fat as it could "cause heart disease." This doesn't really make sense.

Here's what does make sense:

> *"It has generally been opposed by health agencies because of concern that carbohydrate[s] will be replaced by fat [on low-carb diet], particularly saturated fat, thereby increasing the risk of cardiovascular disease as dictated by the so-called diet-heart hypothesis…in fact, substitution of fat for carbohydrate[s] generally improves cardiovascular risk factors.*
>
> *Removing the barrier of concern about dietary fat makes carbohydrate restriction a reasonable, if not the preferred method for treating type 2 diabetes and metabolic syndrome. We emphasize the ability of low carbohydrate diets to improve glycemic control, hemoglobin A1C and to reduce medication."*
>
> *"Switching to a low-carb, fat-burning ketogenic diet stops the blood sugar spike/crash cycle, because when carbohydrate intake is reduced, basal blood sugars stay normal and steady, and less insulin is needed at mealtime. Smaller doses of insulin mean there is less danger of driving blood sugar too low."*[33]

Dogs are developing diabetes at alarmingly high rates and it appears that a huge culprit of this is high carbohydrate consumption. Instead of forcing dogs to consume inappropriate carbs that turn into toxic glucose, we can capitalize on their natural fat-burning abilities through Ketosis.

Obesity

Obesity and being generally overweight has long been linked to insulin resistance and weight gain. Obesity isn't "random:" it's the over-accumulation of fat in cells.

Metabolically, when dogs eat high-carb kibble, they process carbs as glucose and store fat instead of using fat-for-fuel through Ketosis. When dogs are eating highly-inappropriate, nutrient-deficient, and high-carb kibble, there is a huge increased risk for weight gain and thus obesity.

Even when pet owners are feeding their dogs the "right" amount of kibble and exercising their dogs, many dogs still become obese. The deeper issue here is that it is difficult for dogs to thrive when they are eating inflammatory, carbohydrate-filled dry food.

ADDRESSING METABOLIC DISEASE WITH FAT

The good news is: there is hope for dogs.

At KetoPet Sanctuary outside of Austin, TX, researchers are helping dogs fight cancer with a Ketogenic diet:

> *"While not a cure, KetoPet has found the ketogenic diet to be effective in improving outcomes when treating canines with cancer. In fact, 55% of the dogs who graduated from the KPS program are still going for long walks, enjoying belly rubs, playing catch, and experiencing a quality of life far beyond their original prognosis. Some of these sanctuary dogs are even living cancer-free."*[34]

This is huge.

There is hope for reducing rates of canine cancer by feeding dogs appropriate, high fat Ketogenic food. If we can fight the dogma of fat, we can save dogs' lives and, hopefully, start reducing rates of metabolic diseases in dogs.

CHAPTER 6 TAKEAWAYS

Canine disease rates are at astronomically high levels. There is strong evidence to suggest that widespread, high carbohydrate consumption is at least partially responsible for these rising disease rates.

If we begin, like KetoPet Sanctuary, to feed dogs biologically and metabolically-appropriate foods high in fat (raw Keto), there is hope for reducing rates of canine cancer, diabetes, and obesity.

THE BONES & CO. MISSION

WHY WE FORMULATE KETOGENIC FOOD

As a company, we are not willing to compromise when it comes to doing what's best for our dogs.

Because Ketogenic food helps dogs' bodies use **fat for fuel** instead of carbs-turned-glucose, dogs can thrive metabolically instead of struggle to survive. We prioritize making food that is optimal through Keto because we want to put the power back in pet parents' hands to feed their dogs the right way.

We are not capitalizing on a fad or trend. We are literally fighting for our dogs' lives by making the most biologically and metabolically-appropriate food possible: raw Ketogenic food.

That's why our core mission is to:

1. **EDUCATE** pet parents about the dangers of kibble, the carb-cancer link, and the truth about dog nutrition.
2. **ERUPT** the status quo by putting dogs first and crafting the highest quality, metabolically-appropriate (KETO) food possible for them.
3. **EMPOWER** a community of brave pet parents who ask questions, make sacrifices, and feed raw in order to put their dog's needs above their own.

With our dogs first, business second philosophy, we are on a mission to change the world of dog food, and, ultimately, save dogs' lives by feeding them better.

Thank you for joining us on our #FatFueled journey!

JOIN THE KETO RAW-VOLUTION

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Join: https://www.thebonesandco.com/tribe

Contact us: https://www.thebonesandco.com/contact/

Email us: info@thebonesandco.com

RESOURCES

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