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KETOPET
S A N C T U A R Y

A Pet Parent's Guide to the
Ketogenic Diet

THE STORY BEHIND KETOPET

There's nothing better than being a pet parent. We get it. At KetoPet, dogs are family, and that's why we are so passionate about helping canines with cancer. Unfortunately, the disease is the leading cause of death in man's best friend, and each year, about 6 million dogs in the US will be diagnosed with a naturally occurring form of cancer. We are committed to changing those statistics.

KetoPet was founded in 2014 as a program under the 501(c)(3) non-profit organization, Epigenix Foundation. The program was started by a group of people with a passion for helping shelter and rescue dogs with cancer who would otherwise be euthanized. KetoPet sanctuary staff placed each dog on a ketogenic diet as a form of cancer treatment, and worked tirelessly to give them a quality of life and a forever home. In addition to nutritional therapy, the sanctuary offered dogs the highest standard of veterinary and oncology care (surgery, chemotherapy and/or radiation), fluorodeoxyglucose positron emission tomography (FDG-PET) imaging (typically used only in humans), metabolic conditioning, hyperbaric oxygen chamber treatments (HBOT), and of course, lots of love.

KetoPet is the first organization that has systematically tested the ketogenic diet in canines. While not a cure, KetoPet has found this metabolic therapy to be effective in improving outcomes when treating canines with cancer. In fact, 55% of the dogs who graduated from the KetoPet program are still going for long walks, enjoying belly rubs, playing catch, and experiencing a quality of life far beyond their original prognosis. A few of our dogs have even been diagnosed with some of the most aggressive forms of cancer in canines (including hemangiosarcoma and mast cell), and today they are thriving, cancer-free. It's also important to note, however, that some of our sanctuary dogs have unfortunately lost their battle to cancer.

When KetoPet was originally established, our team would only work with dogs on site at the sanctuary to maintain perfect control over every aspect of the metabolic therapy protocol. We are now committed to sharing what we've learned with pet parents around the world. To help you get started with the ketogenic diet, we've created this e-book. We understand that formulating a ketogenic meal plan for your dog can be difficult, and we will be there every step of the way.

We hope this helps you in creating a plan for your dog in the comfort of your own home. If you have any questions, please do not hesitate to email us: info@ketopetsanctuary.com.

Our ebook and consulting services are free of charge, but if you would like to make a donation to help us continue our impactful work with dogs in need, please visit www.ketopetsanctuary.com

DONATE TODAY! 

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WHAT IS A KETOGENIC DIET?

A ketogenic diet is one that is high in fat, adequate in protein, and low in carbohydrates (carbs). When non-fibrous carbs are significantly reduced, protein is moderate, and dietary fat is increased, the body will naturally switch its primary fuel source from carbohydrates to fat. Once a person or dog begins using fat for fuel instead of glucose, the liver breaks down those fats into ketone bodies which are then used for energy by tissues throughout the body. This process induces a healthy metabolic state called ketosis.

The ketogenic diet has been used clinically for nearly 100 years as a therapy for children with drug-resistant epilepsy. While it's continued to be prescribed as a treatment for seizures today, the use of this metabolic therapy has expanded exponentially. Not only is the ketogenic diet showing promise in improving human health and performance, but it's being used as a therapy in preclinical studies focused on a variety of diseases including Alzheimer's, amyotrophic lateral sclerosis (ALS), traumatic brain injury (TBI), diabetes, and even cancer. Much of the research currently underway and involving cancer and the ketogenic diet was inspired by a discovery made many decades ago by German biochemist, Otto Warburg. Warburg found that most cancer cells, unlike healthy cells, exhibit an altered energy metabolism where they rely exclusively on sugar (carbohydrates) for energy. This phenomenon, is also known as the Warburg Effect.

Since Warburg's observation, preclinical trials have shown that lowering glucose in the blood (cancer's primary fuel source) can potentially slow tumor progression. Dr. Thomas Seyfried, a scientist and professor at Boston College, pioneered research showcasing the metabolic dysfunction of cancer at a time when most scientists were convinced it was a genetic disease. Building upon Dr. Seyfried's work, University of South Florida researchers, Dr. Dominic D'Agostino and Dr. Angela Poff, found that this weakness in cancer metabolism could be targeted therapeutically using a ketogenic diet in combination with HBOT. These studies (among others), and the metabolic theory of cancer have served as a foundation for KetoPet.

Support KetoPet and their mission to help shelter and rescue dogs with cancer. To donate, please visit www.ketopetsanctuary.com or click below.

For additional information on the ketogenic diet and cancer, please visit www.ketopetsanctuary.com and click on the "Resources" or "Scientific Journal Articles" tab.

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HOW TO FEED YOUR DOG A KETOGENIC DIET

KetoPet dogs are fed a raw ketogenic diet as it's very similar to an ancestral diet and closely replicates how a canine might eat in the wild. It does not include rendered or high heat processed fats or proteins. Most fruits, starchy vegetables like potatoes or corn, and grains like rice typically don't fit into the diet's macronutrient requirements.

Compared to other low carb diets, like Atkins, the ketogenic diet requires the monitoring of protein intake. Too much protein can be turned into sugar and inhibit ketosis. It is important to emphasize that while the ketogenic diet is a low carbohydrate diet, not all low-carbohydrate diets are ketogenic.

The key to getting your dog into ketosis is in how you control their calories and macronutrient intake (proteins, carbohydrates, fats).



LankaVet **DOG Body Condition SCORE CHART**

TOO THIN	1		<ul style="list-style-type: none"> ✦ Ribs, spine and pelvic bones are easily visible ✦ Obvious loss of muscle mass ✦ Ribs can be easily felt
	2		<ul style="list-style-type: none"> ✦ Ribs, spine, pelvic bones and lumbar vertebra obvious with minimal muscle mass ✦ Pronounced abdominal tuck ✦ No palpable fat
	3		<ul style="list-style-type: none"> ✦ Ribs, spine and pelvic bones visible ✦ Obvious waist ✦ Minimal abdominal fat/ribs can be felt easily
	4		<ul style="list-style-type: none"> ✦ Ribs and spine are palpable with minimal fat covering ✦ Obvious waist ✦ Abdominal fat is minimal
IDEAL	5		<ul style="list-style-type: none"> ✦ Well proportioned ✦ Ribs, spine and pelvic bones not visible but easily felt ✦ Obvious waist line ✦ Obvious abdominal tuck
	6		<ul style="list-style-type: none"> ✦ Ribs, spine and pelvic bones not easily felt ✦ Waist and abdominal fat pad is distinguishable but not obvious ✦ Obvious fat deposits covering the spine, chest and base of tail
TOO HEAVY	7		<ul style="list-style-type: none"> ✦ Ribs, spine and pelvic bones not easily felt due to moderate fat covering ✦ Waist is diminished ✦ Rounding of abdomen with moderate abdominal fat pad
	8		<ul style="list-style-type: none"> ✦ Ribs, spine and pelvic bones are not easily felt with excess fat covering ✦ Waist not visible due to excess fat ✦ Obvious rounding of abdomen with excessive fat pad and fat deposits on the base of tail
	9		<ul style="list-style-type: none"> ✦ Massive fat deposits on chest, spine and at the base of tail ✦ Extensive abdominal fat ✦ Heavy fat deposits over face and limbs

Before you begin creating your dog's diet, you'll need to gather the following information:

WEIGHT (LBS)

There are several ways you can determine your dog's weight. You can take your dog to your veterinarian, or if you have had a recent appointment, they may already have this information on hand. If your dog is easily held, you can also weigh him or her yourself at home. Simply pick up your dog and step on a scale. Next, put your dog down beside the scale and weigh yourself again. The number difference is your dog's weight.

BODY CONDITION SCORE (BCS)

Your dog's body condition score is a number that represents how thin or overweight your dog appears. To get this number, look at the chart to the left and pick the image that closest represents your dog's appearance. If you don't feel comfortable scoring your dog, or if you have questions, your veterinarian can help you with the process of determining this number.

ACTIVITY LEVEL

Next, choose your dog's level of activity:

SEDENTARY: Not active. Your dog only moves to go to the bathroom or to their food bowl with limited play time around the house.

AVERAGE: Moves frequently around the house, plays with housemates and goes on a long walk at least 1-2 times per week.

ACTIVE: Long walks daily in addition to being very active around the house, in the backyard, and with housemates.

STEP 1: Figure Out Calories Per Pound

The first step in creating your dog's diet is to figure out how many calories per pound (CPP) you would like to feed your dog when transitioning onto a ketogenic diet. This number will be based upon your dog's body condition score and activity level. It's important to use these numbers as a guide in honestly deciding whether your dog needs to lose weight, maintain weight, or is too thin and needs to gain weight. Just like humans, every dog's metabolism is a little different, as is their starting point. It will be important to monitor your dog closely when they start the diet and adjust their calories based on how their body responds.

At KetoPet, we often start our dogs on the diet at around 15 calories per pound. This starting place is on the lower end of the spectrum as caloric restriction can often be a helpful tool in inducing ketosis. After a week or two on the program, we will either increase, decrease, or keep calories the same depending on how the dog responds. The chart below shows a range of CPP based on activity level and body condition.

Activity Level	Too Thin (BCS 1-3)	Normal (BCS 4-5)	Overweight/Obese (BCS 6-9)
Sedentary	17	15	15
Average	19	17	15
Active	19	19	15

Patience is key when transitioning a dog onto any new diet. Keep in mind, when starting the ketogenic diet, water loss can occur as blood glucose/insulin levels drop. If weight loss happens in the first few days of placing your dog on the diet, don't be alarmed. Monitor them patiently, and if they continue to drop weight past the first week or two, you may need to re-adjust their meal plan. However, if your dog needs to lose weight, monitor their weight loss until they've reached their ideal body condition score. At that point, you can increase their calories a little to prevent further weight loss.



STEP 2: Calculate Total Calories

In this next step, you'll need to figure out the total amount of calories to give your dog per day using his or her weight and CPP. Let's use the following two dogs as an example:



EXAMPLE 1 - Bella
Chow / German Shepherd mix
 9 yrs | 60lbs
 Body Score: 7
 Sedentary

Bella is a nine-year-old chow/German shepherd mix that weighs 60lbs with a body condition score of 7. Bella is overweight and sedentary, so we have decided to start her ketogenic meal plan at **15 calories per pound (CPP)**.

To calculate her total calories:

$$60\text{lbs (dog's weight)} \times 15 \text{ (CPP)} \\ = 900 \text{ calories (kCal) per day}$$



EXAMPLE 2 - Baxter
Dachshund / Chihuahua mix
 4 yrs | 15lbs
 Body Score: 4
 Very Active

Baxter is a four-year-old dachshund/chihuahua mix that weighs 15 pounds with a body condition score of 4. He is very active, and his weight is normal, so we've decided to start his ketogenic meal plan at **19 calories per pound**.

To calculate his total calories:

$$15\text{lbs (dog's weight)} \times 19 \text{ (CPP)} \\ = 285 \text{ calories (kCal) per day}$$

STEP 3: Determine Type of Ketogenic Diet

At KetoPet, our cancer dogs typically start on a meal plan that's 82% fat, 17% protein, and 1% net carbohydrates. We start with these percentages as we've noticed that dogs are able to get into ketosis quickly with this macronutrient distribution, and they handle the transition well. Even though we typically start with these percentages, every dog is different, and some may need a higher percentage of calories from fat to encourage ketone production and/or improve their disease state (ex: a dog may need upwards of 90% of their calories coming from fat for epileptic seizure control).

What are Net Carbohydrates?

When calculating a ketogenic diet, only include grams of non-fibrous carbs toward your total carbohydrate count as fiber is not digested. Look at a food label, and subtract the grams of fiber (not the calories) from the total grams of carbohydrates listed on the panel to determine your "net" carbohydrate number. Net carbohydrates are what will actually be digested by the body and have the potential to cause blood glucose levels to go up. For example, KetoPet uses broccoli, and it contains carbohydrates. However, if you take a closer look at the nutrition facts, a three-ounce serving of broccoli contains 4 grams of total carbohydrates and 2 grams of fiber. To calculate the net carbohydrates, you'll subtract 2 grams from 4 grams (as the 2g of fiber are not digestible) and you'll get 2 grams of "net" carbs.

Here are example macronutrient breakdowns for ketogenic meal plans:

Keto Diet Options	Fat	Protein	Net Carb
Option 1	69%	30%	1%
Option 2	82%	17%	1%
Option 3	87%	12%	1%
Option 4	90%	9%	1%

For dogs without cancer or any history of the disease, we typically use a raw ketogenic diet similar to option 1.

When working with dogs that have received a **cancer diagnosis**, we immediately start them on option 2, and adjust the program as needed depending on their blood glucose and ketone values.

STEP 4: Calculate % of Calories from Macronutrients (Protein, Carbs, and Fats)

To calculate your dog's calories from each macronutrient, you'll want to multiply the percentage of fat, protein, and carb by the total number of calories your dog needs per day. **Our examples both have cancer**, so let's calculate their meal plans using **option 2** (as listed above). We have calculated their calories per pound (CPP), total calories per day, and we've picked the ketogenic percentages we will use to calculate their meal plans. Let's get started!



EXAMPLE 1 - Bella
Chow / German Shepherd mix
 9 yrs | 60lbs
 Body Score: 7
 Sedentary

Calories from Fat Calculation:
 82% of 900 calories (900 x 0.82) = 738 calories.
*Bella will need **738 calories from fat per day.***

Calories from Protein Calculation:
 17% of 900 calories (900 x 0.17) = 153 calories.
*Bella will need **153 calories from protein per day.***

Calories from Net Carbohydrates Calculation:
 1% of 900 calories (900 x 0.01) = 9 calories.
*Bella will need **9 calories from net carbs per day.***



Remember - Bella is going to get 15 CPP, 900 calories per day, and her meal plan starts at 82% of her calories coming from fat, 17% coming from protein, and 1% from carbohydrates.



EXAMPLE 2 - Baxter
Dachshund / Chihuahua mix
 4 yrs | 15lbs
 Body Score: 4
 Very Active

Calories from Fat Calculation:
 82% of 285 calories (285 x 0.82) = 234 calories.
*Baxter will need **234 calories from fat per day.***

Calories from Protein Calculation:
 17% of 285 calories (285 x 0.17) = 49 calories.
*Baxter will need **49 calories from protein per day.***


Calories from Net Carbohydrates Calculation:
 1% of 285 calories (285 x 0.01) = 3 calories. *Baxter will need **3 calories from net carbs per day.***



Remember - Baxter is going to get 19 CPP, 285 calories per day, and his meal plan starts at 82% of his calories coming from fat, 17% coming from protein, and 1% from carbohydrates.

STEP 5: Calculate Grams of Fat, Protein, and Carb

Fat has nine calories per gram, while protein and carbs both have four calories per gram. You'll use these numbers to calculate how many grams of fat, protein, and carbs your dog needs per day.




EXAMPLE 1 - Bella
Chow / German Shepherd mix
 9 yrs | 60lbs
 Body Score: 7
 Sedentary

Grams of Fat: 738 (calories from fat)
 \div 9 calories per gram
= 82 grams of fat needed per day

Grams of Protein: 153 (calories from protein)
 \div 4 calories per gram
= 38 grams of protein needed per day

Grams of Carbs: 9 (calories from carbs)
 \div 4 calories per gram
= 2 grams of net carbs needed per day




EXAMPLE 2 - Baxter
Dachshund / Chihuahua mix
 4 yrs | 15lbs
 Body Score: 4
 Very Active

Grams of Fat: 234 (calories from fat)
 \div 9 calories per gram
= 26 grams of fat needed per day

Grams of Protein: 49 (calories from protein)
 \div 4 calories per gram
= 12 grams of protein needed per day

Grams of Carbs: 3 (calories from carbs)
 \div 4 calories per gram
= 1 gram of net carbs needed per day


HERE'S A RECAP OF THE DAILY TOTALS FOR OUR EXAMPLES



EXAMPLE 1 - Bella
Chow / German Shepherd mix
 9 yrs | 60lbs
 Body Score: 7
 Sedentary

Starting at 15 CPP, 900 kCals and 82% of calories coming from fat.

Fat	Protein	Net Carb
82%	17%	1%
900×0.82	900×0.17	900×0.01
738 kCals	153 kCals	9 kCals
\div 9 calories per gram	\div 4 calories per gram	\div 4 calories per gram
82 grams	38 grams	2 grams



EXAMPLE 2 - Baxter
Dachshund / Chihuahua mix
 4 yrs | 15lbs
 Body Score: 4
 Very Active

Starting at 19 cpp, 285 total kCals and 82% of calories coming from fat.

Fat	Protein	Net Carb
82%	17%	1%
285×0.82	285×0.17	285×0.01
234 kCals	49 kCals	3 kCals
\div 9 calories per gram	\div 4 calories per gram	\div 4 calories per gram
26 grams	12 grams	1 grams

REMINDER

This is a daily total: you can divide these amounts into however many meals you'd like per day.

To keep your dog in ketosis, we don't suggest giving your dog treats.

Support KetoPet and their mission to help shelter and rescue dogs with cancer. To donate, please visit www.ketopetsanctuary.com or click below.

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Now that you've figured out how many grams of fat, protein, and carbs your dog needs per day, it's time to head to the grocery store! This next step will require you to read nutrition labels. You'll need to calculate the amount of food to put in your dog's bowl so that your best friend gets the grams of protein, carbs, and fats that they need in a day.

For more information on ketogenic diets and cancer, please visit:
www.ketopetsanctuary.com/resources

Learn More! ▶

If you need help with any part of the process, please **contact us!** We are happy to walk you through this part of the math.

HOW TO DETERMINE IF YOUR DOG IS IN KETOSIS

One benefit of the ketogenic diet is that it will naturally lower your dog's blood glucose while raising ketone levels. Considering this change in the blood, you don't need to guess whether the diet's working or not. You can validate its effectiveness for yourself by simply **measuring your dog's blood glucose and ketone values before and after beginning the diet.**

Testing your dog to see if he or she is in nutritional ketosis isn't difficult. The easiest option is to purchase a hand-held blood glucose and ketone measuring device and strips. At KetoPet, we use an **Abbott Precision Xtra** blood glucose and ketone monitor. This particular brand can test both blood glucose and blood ketone levels, and has proven to be the most accurate when testing our dogs at the sanctuary. You can purchase the monitor on Amazon.com or Abbottstore.com.



Important note: make sure that you measure both blood glucose and blood ketone levels together as both are important in determining if your dog is in nutritional ketosis. For example, if his or her ketones are high and their glucose is high, that tells one story. However, if your dog's glucose is low and ketones are low that tells another. At the sanctuary, staff aim to keep the dogs' blood glucose levels at or below 75 mg/dL and their blood ketone levels at or above 0.3 mM.

TIP

After you've purchased the Precision Xtra (testing strips are sold separately), please visit www.ketopetsanctuary.com for tips on how to test your dog's blood.

Examples:

Measurement 1: Blood Glucose 110 mg/dL, Blood Ketone 0.1 mM = **Not Ketosis**

Measurement 2: Blood Glucose 75 mg/dL, Blood Ketone 0.3 mM = **Ketosis**

Keep in mind, that these tests only offer a snapshot of your dog's blood levels. It's also important to note that we've found that it is much easier to decrease a dog's blood glucose level than it is to raise blood ketones. Additionally, you may find that your dog's ketone levels will be much lower than what you might see when testing yourself (if you're on a ketogenic diet). We think that dogs may use ketones for fuel more efficiently, and they aren't circulating in the blood like they do in humans. However, this theory has yet to be proven.

As you transition your dog onto the diet, you may want to test their blood glucose and blood ketone levels often (a few times a week) to optimize their meal plan. Once you see numbers consistently where you want them to be, you can reduce testing to once or twice a week. The test strips can get expensive, so measure as often as you can to get a good barometer of their metabolism, but not so frequently that you're breaking the bank. Remember, each dog is different and some dogs may only have a ketone reading average of 0.2 mM. However, if their blood glucose is low, this may be your dog's normal level of ketosis.

If testing blood sounds daunting, you can also take your dog to your veterinarian and ask them to run a blood panel that measures blood glucose and blood ketone levels. Although this is an option, keep in mind that stress can increase blood glucose levels (i.e. going to the vet), and this panel may not accurately reflect what your dog's levels would be if he or she were in the comfort of their own home.

CONCLUSION

A better understanding of the intersection of nutrition, metabolism, and disease is key in helping our best friends live longer, stronger, and more vibrant lives. Encouragingly, people around the world are taking a more active role in improving the health of their canine companions, and although a ketogenic diet in veterinary oncology has not yet gained widespread adoption, it is starting to receive more and more attention.

We hope this ebook helps you understand the fundamentals of a well-formulated ketogenic diet for your dog. Whether your best friend has cancer or you simply want to improve their health, we know this nutritional approach will benefit your dog in many ways. Building a meal plan takes patience and persistence, and we applaud you for being such a great pet parent!

Please be sure to visit www.ketopetsanctuary.com, where you'll find additional resources, frequently asked questions, and videos offering tips. If you need help with any part of the ketogenic process, please fill out the downloadable questionnaire that's also available on our website and email it to: info@ketopetsanctuary.com.

Thank you for taking the time to read our ebook and we look forward to hearing from you soon!

The KetoPet Team

Our ebook and consulting services are free of charge, but if you would like to make a donation to help us continue our impactful work with dogs in need, please visit www.ketopetsanctuary.com.

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