



Taurine-Deficient Dilated Cardiomyopathy in Dogs

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What is this disease?

Dilated Cardiomyopathy (DCM) is a form of heart disease in which the heart muscle becomes weak and the heart becomes enlarged. This results in poor heart function, leading to exercise intolerance, collapse, pale gums, coughing, and panting. Eventually, DCM results in complete heart failure. Many dogs show no symptoms until the disease is quite advanced.

DCM may be caused by a genetic predisposition in many breeds of dogs. However, the current concern is that cardiologists have been diagnosing DCM in breeds of dogs not generally genetically predisposed—especially golden retrievers. In July, the FDA issued a warning that certainly types of diets may be contributing to the development of nutritional deficiencies in dogs. The cases reported to the FDA have been patients who have developed **taurine-deficient DCM**. Taurine is an amino acid that dogs are normally able to synthesize from other amino acids in their food. Many dog foods also add taurine specifically. Cardiologists noticed a trend that pets who were developing taurine-deficient DCM were mainly eating one of three categories of food: **boutique, exotic-ingredient, or grain-free diets**. The common link is that these diets contain one or more suspect ingredients:

Legumes

- Peas
- Chickpeas
- Lentils
- Soybeans
- Beans

Potatoes

- Red potatoes
- White potatoes
- Sweet potatoes

The majority of these companies also do not employ a PhD nutritionist or a veterinary nutritionist, and often these foods have not been subjected to feeding trials on dogs.

We still don't know what is causing dogs to become taurine deficient on these diets!





However, there is now a suspicious correlation noted amongst reports of 160 dogs fed grain-free foods who developed DCM, 39 of which have died. This correlation was strong enough for the FDA to issue the warning that owners should not feed diets that contain legumes or potatoes within the main ingredients (defined as any ingredients that appear before the vitamins/minerals).

The current theory that something within these ingredients is binding taurine or its building blocks within the gut or that they are interfering with normal metabolism of taurine, causing patients to become deficient. The FDA took care to note that the diets themselves have adequate taurine levels, but dogs being fed these diets did not. This means that supplementing taurine without also changing off of a diet with suspect ingredients is unlikely to prevent taurine deficiency!

How do we diagnose taurine deficiency and DCM?

Taurine deficiency is diagnosed using a blood test. Most dogs who develop taurine-deficiency DCM have low taurine levels on a fasted whole blood sample. This may not be true for golden retrievers, as there have been multiple cases of goldens with “normal” taurine levels developing taurine-responsive DCM. Dr. Stern at UC Davis feels comfortable recommending this test as the primary screening test for the majority of dogs.

To Stay Updated...

-  [LHV's Facebook Page](#)
-  Facebook group "[Taurine-Deficient Dilated Cardiomyopathy](#)"
-  UC Davis Cardiology Service (Dr. Stern's lab)
-  Talk to your vet!



DCM can only be diagnosed with an echocardiogram (ultrasound of the heart). DCM can be genetic or can be due to taurine deficiency.

Not all dogs with taurine deficiency have DCM, and not all dogs with DCM have taurine deficiency. BOTH of these tests are ideal if possible for dogs who have been eating a grain free food. However, if your dog is not a golden retriever, the taurine test is generally considered to be an adequate screening test. If levels are deficient, an echocardiogram would be warranted.

A **BNP** test is a blood test that can help screen for heart muscle disease. If a patient has low taurine levels, checking a BNP may be a lower-cost way to screen for DCM than performing an echocardiogram. An abnormal BNP level would be an indication to proceed with an echo.

How do we treat it?

If a dog is determined to have taurine deficiency, the first step is to change to a diet that does not contain any of the suspect ingredients. Next, taurine supplementation should be started to correct the deficiency. Supplementation is continued for at least six months. If a patient is determined to have DCM, the cardiologist would prescribe specific medications to support heart function.

How do you choose a diet?

This is a tough question to answer as we still don't know exactly what is causing taurine-deficient DCM in dogs. However, given that DCM can be fatal, we think it is wise to err on the side of caution and to follow the recommendations of the FDA as the investigation is ongoing. Here are a few guidelines to follow:

- ☆ Choose a diet that does not contain any of the suspect ingredients as a main ingredient ("main ingredients" are any ingredients listed before the vitamins and minerals).
- ☆ Choose a diet that has undergone feeding trials.
- ☆ Diets that have undergone feeding trials have been fed to at least 8 dogs for at least 6 months (although foods labelled for all life stages must be fed for a full year). 6 of 8 dogs have to successfully complete the trial, although dogs can only drop out of the trial for issues related to palatability—not because they aren't doing well on the diet. Dogs have to maintain their body weight, pass a veterinary exam, and have normal blood chemistry parameters at the end of the trial. This is a fairly low bar to meet. Most companies that meet AAFCO feeding trial standards do significantly more research on their diets than the feeding trial itself.
- ☆ Diets that are "formulated to meet AAFCO standards" have had nutrient profiles run through a computer program to ensure that they should meet the minimums and maximums generally deemed appropriate for dogs. This does NOT ensure that these ingredients are digestible or bioavailable to dogs.
- ☆ If a company does not perform feeding trials, ask yourself why such a low standard is not worth the investment for them. Many brands will insist that it is because they meet even higher more rigorous standards, but if there is no oversight from an organization like AAFCO, there is no way to know what kind of research they are performing on their foods.
- ☆ Choose a company that employs a veterinary nutritionist or PhD in animal nutrition.
- ☆ For a more thorough list of questions to ask a specific company to determine if their products are adequately researched and tested, visit <<http://www.wsava.org/nutrition-toolkit>>.



But what if my dog is allergic to grains?

True allergies to grains are rare. Most dogs who have food allergies are reacting to the protein component (i.e. chicken, beef, etc) rather than the carbohydrate component of their diet. If your dog had issues like itchy skin, recurrent ear infections, or chronic GI upset with a grain-containing diet and has done well on grain-free, consider looking for a diet that matches the protein you are currently feeding but that does not have any of the ingredients on the suspect ingredients list. If you cannot find any diets that meet those requirements, prescription diets like hydrolyzed diets can be a nice option. As of the time of this presentation, hydrolyzed foods have not been implicated in any cases of taurine-related cardiomyopathy.

But my dog has been eating this food for years and he looks great! Do I still need to switch diets? What if his taurine levels test normally?

Not all dogs who eat these diets with ingredients of concern will develop taurine deficiency. Not all dogs who are taurine deficient will develop heart disease. Cats who are fed a taurine-free diet only develop DCM 30% of the time! But this doesn't mean that it is okay to feed a nutritionally compromised food simply because not all pets who eat it will develop disease. Remember that DCM is a "silent killer"—often dogs who develop and die of DCM have few or no symptoms. DCM generally does not cause a heart murmur or other physical exam abnormalities, and taurine deficiency will not show up in routine bloodwork screenings. If you elect to continue to feeding one of these diets given what we currently know, you are taking a risk—only you can decide whether that risk is worth the other benefits provided to your dog by feeding that particular diet.

Can raw diets or homemade diets meet these guidelines?

Sure... as long as they are formulated by a veterinary nutritionist! It is still important to ensure that the diet you are feeding is complete and balanced. Also, please be aware that not all veterinary nutritionists will formulate a raw food diet given the risks associated with these products to immunocompromised pets and humans. The best resource we can recommend for formulating a complete and balanced homemade diet is Balancelit.com or a consultation with Dr. Julie Churchill at the U of MN. If you choose a commercial raw diet, we would still advise that it meet the requirements listed above.

Can you please give me a few diets that meet the recommended guidelines?

- Hills
- Purina
- Iams
- Royal Canin
- Maybe Farmina?

Can you list some diets that have been implicated in cases of taurine-deficient DCM?

The FDA has not listed specific brands at this point. However, there is an active Facebook group ("Taurine-Deficient Dilated Cardiomyopathy") that is collecting case information. Diets that have been fed to multiple dogs with taurine deficiency and/or DCM include:

- Zignature
- Acana
- Fromm
- Orijen
- Canidae
- Kirkland Nature's Domain
- Merrick
- Nutrisource
- Purevita
- Natural Balance
- Wellness
- Taste of the Wild

Join the Facebook group if you'd like to view the full table, which gets updated with new cases every few days.

What about cats eating grain-free foods?

Cats have a known dietary requirement for taurine, unlike dogs. Cat foods have been taurine supplemented for several decades. However, there are a handful of cases of cats with taurine-deficient DCM being reported to the FDA since the announcement in July. It is certainly possible that this issue affects cats on grain-free diets as well.



What are pet stores and pet food companies saying about this concern?

Facebook response from Acana/Orijen: “ACANA and ORIJEN are formulated to meet the nutritional levels established by the AAFCO dog food nutrient profiles for all life stages. Cysteine and methionine are used in the dog’s body to produce taurine. These amino acids are present naturally from the abundant meat ingredients in our food. For clinically normal dogs, with the ability to efficiently convert amino acids into taurine, there is no concern for development of taurine deficiency.”

Our response: The FDA clearly noted that the diets implicated are not taurine-deficient in themselves, and it is true that dogs ought to be able to produce taurine from the precursors present in meat-based proteins. Despite that, dogs who are eating diets with suspect ingredients are developing taurine-deficient DCM. In addition, most dogs with DCM will be “clinically normal” until they suddenly develop symptoms of heart failure. This response shows a lack of understanding of the problem as well as a lack of understand of the disease process.

Response from Zignature: “Zignature is aware of the studies and articles that have surfaced in the last few months regarding Dilated Cardiomyopathy (DCM) including the study released by the FDA. In these studies, it states that most of the cases of DCM come from recipes who are plant-based diets with peas, legumes and lentils as the main ingredients and low in Taurine. All Zignature recipes are meat based. The first ingredient in our recipes is always meat followed by a meat meal. We offer 65% meat vs 35% plant-based protein in all our recipes except Zsential. Zsential offers 70% meat vs 30% plant-based protein. Taurine is not an essential amino acid for dogs, which means that healthy dogs can synthesize it internally without requiring it as part of their diet. However, dogs that have certain medical conditions or are predisposed to taurine deficiency, may require taurine supplementation. Those dogs require a specialized diet that should be prescribed by a veterinarian. The highest amounts of taurine are typically found in dark meats and seafood. Based on our consumer feedback, we here at Zignature, decided to add a Taurine supplement to our recipes. There has been .2% Taurine added to every recipe. Our Bags will reflect the addition as you should start seeing Taurine stickers on our bags. We hope you found this information helpful. If you have any further questions, please let us know.”

Our response: If dogs do not have a dietary requirement for taurine, and if they can synthesize it from meat, and Zignature is very high in meat...why does their diet need to be supplemented with taurine? They are not admitting there is a problem and not acknowledging that there is something else about the food leading to taurine deficiency in dogs.

Local pet store #1: “If your dog is healthy, there is no need to be concerned. Also, there is no concern of taurine deficiency with diets that contain high-quality ingredients.”

Our response: Yikes! Again, most owners would not recognize any symptoms of DCM before the disease is very advanced. A physical exam and routine bloodwork will usually not pick up signs of taurine deficiency or DCM. Taurine deficiency can develop no matter how “high-quality” the ingredients are. To make an extreme example, your dog could eat exclusively Kobe beef which would be a very high quality diet but one that would certainly lead to nutritional deficiencies eventually. A high quality food is worthless if it does not provide the nutrients your pet needs to prevent deficiencies.

Local pet store #2: “DCM was seen in cats in the 80’s. Be sure you use a good brand, multiple protein sources are better than a single protein source, and be sure that legumes aren’t the first ingredient. The FDA statement is cautionary, and there isn’t any evidence that diets are causing DCM.”



Our response: Yes, DCM was seen in cats in the 80's caused by taurine deficient diets. Multiple protein sources are no more or less likely to provide sufficient taurine if the issue is due to malabsorption or an ingredient such as legumes interfering with protein metabolism. The FDA statement recommends avoid any diet that has legumes or potatoes as a main ingredient—not just the first ingredient. And while the FDA statement is based on a small number of early cases, it is indeed based on real cases of patient affected by taurine-deficient DCM.

Local pet store #3: “This study has been blown up by the news. DCM in golden retrievers is not caused by legumes, but by a lack of taurine. Diets are okay if they are supplemented with taurine. The issue is a lack of fresh meat or lack of supplementation of taurine. Correlation is not causation. You only need to worry is a patient is a breed predisposed to DCM. If meat is the first ingredient, the diet is fine. If you are concerned, just add some raw food or canned food.”

Our response: Remember that the FDA statement specifically said the diets tested were not deficient in taurine themselves. Dogs do not have a dietary requirement for taurine, so clearly the issue cannot be a lack of taurine in their diet. Correlation is not causation—but in a fast-moving issue like this, correlation will be all we have to go on while the research is ongoing. Breeds known to be predisposed to DCM have a different form of DCM than dogs who develop the disease secondary to taurine deficiency. The reason that cardiologists were first tipped off to diet possibly being a cause is that they were suddenly seeing a large number of cases of DCM in golden retrievers—NOT a breed known to be predisposed to genetic DCM. The issue is not a lack of meat, or poor quality meat, or a lack of raw or canned food. The issue per the FDA is that these diets contain suspect ingredients (legumes and/or potatoes) that may be interfering with taurine absorption or metabolism.

What if I want to learn more?

- ☆ Stay tuned to [LHV's Facebook Page](#)—we'll be posting updates as more official information is released from sources like the FDA.
- ☆ Consider joining the [Facebook group “Taurine-Deficient Dilated Cardiomyopathy.”](#) Participants there are keeping a table of data of dogs that have had taurine levels tested, as well as other information such as brand of food fed, whether they had an echo performed and what the results were, any symptoms noted at the time of testing, and the breed of dog. This is not official data but is an interesting “citizen science” project that hopefully can help researchers identify trends that might allow them to determine the cause of the issue. There are also many files saved to help owners do further research, such as nutritional studies, FDA releases, how to transition to a new diet, and more.
- ☆ Watch for any updates coming out of the UC Davis Cardiology Service. Dr. Stern's lab is the primary source for additional research into this issue.
- ☆ Talk to your vet! We're keeping close tabs on this problem and are eager to learn as much as we can, as well as to share it with all of you.