

The association between pulse ingredients and canine dilated cardiomyopathy: addressing the knowledge gaps before establishing causation

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ABSTRACT

In July 2018, the Food and Drug Administration (FDA) warned about a possible relationship between dilated cardiomyopathy (DCM) in dogs and the consumption of dog food formulated with potatoes and pulse ingredients. This issue may impede utilization of pulse ingredients in dog food or consideration of alternative proteins. Pulse ingredients have been used in the pet food industry for over 2 decades and represent a valuable source of protein to compliment animal-based ingredients. Moreover, individual ingredients used in commercial foods do not represent the final nutrient concentration of the complete diet. Thus, nutritionists formulating dog food must balance complementary ingredients to fulfill the animal's nutrient needs in the final diet. There are multiple factors that should be considered, including differences in nutrient digestibility and overall bioavailability, the fermentability and quantity of fiber, and interactions among food constituents that can increase the risk of DCM development. Taurine is a dispensable amino acid that has been linked to DCM in dogs. As such, adequate supply of taurine and/or precursors for taurine synthesis play an important role in preventing DCM. However, requirements of amino acids in dogs are not well investigated and are presented in total dietary content basis which does not account for bioavailability or digestibility. Similarly, any nutrient (e.g. soluble and fermentable fiber) or physiological condition (e.g. size of the dog, sex, age) that increases the requirement for taurine will also augment the possibility for DCM development. Dog food formulators should have a deep knowledge of processing methodologies and nutrient interactions beyond meeting AAFCO nutrient profiles and should not carelessly follow unsubstantiated market trends. Vegetable ingredients, including pulses, are nutritious and can be used in combination with complementary ingredients to meet the nutritional needs of the dog.

Key words: dilated cardiomyopathy, dogs, feed formulation, grain-free, nutrition, pulse ingredients

INTRODUCTION

In July 2018, the Food and Drug Administration (FDA) issued a statement relating dilated-cardiomyopathy (DCM) in dogs to the consumption of foods that have potatoes and/or pulse ingredients, such as peas and lentils or their co-products, as main ingredients (FDA, 2018). The FDA's statement, as well as media attention, has raised concern in some pet owners, veterinarians, nutritionists, and the pet food manufacturing and retail industry. The underlying cause for concern with pet food and DCM is that there is a link between nutrition that was previously tied to DCM and insufficient circulating taurine (Fascetti et al., 2003; Backus et al., 2006). The result, was an increased need for dietary taurine or its precursor methionine due to higher fermentation of taurine and greater fecal excretion with dietary fermentable fiber (Kim et al., 1996ab). Whether this has any link to dietary pulses or the greater inclusion of pulses in grain-free dog food has yet to be directly demonstrated and mechanistic research is warranted.

Pulses are a subset of legumes, harvested as a dry crop, with low concentrations of lipid. They include peas, lentils, chickpeas, and dry beans (Marinangeli et al. 2017) which have been used as ingredients in dog food for their protein and fiber for more than 2 decades (Butterwick et al., 1994; Rice and Ihle, 1994). As a source of protein, the amino acid (AA) profile in peas, lentils, chickpeas, and beans are generally high in lysine and low in methionine (NRC, 2006) and serve as a complementary protein to both animal and plant-derived ingredients. As an example, soybean meal is derived from defatted soybeans and has an amino acid profile similar to pulses. In a 24-week study that evaluated graded concentrations of soybean meal up to 17 % (as-fed basis) in dog foods, soybean meal inclusion did not affect the nutrient status of dogs as indicated by serum biochemistry analysis (Menniti et al., 2014). However, Yamka et al. (2003) demonstrated that using soybean meal at more than 15 % inclusion on a dry matter basis decreased crude protein digestibility. Based on the authors assessment of current formulas in the market, there is a high likelihood that legume seed use in some foods may be greater than 40 %. This inclusion exceeds concentration of legumes previously investigated in dogs. When used to complement the nutritional profile of other ingredients, pulses can be used as nutrient-rich vehicles to meet the nutritional requirements of dogs and other companion animals. Given that companion animals most often consume static diets for long periods of time, overuse of any ingredient could facilitate higher risk of certain nutrient deficiencies if nutrient balance is not considered in the formulation. Thus, the formulation of static diets that use significant concentrations of a single ingredient, relative to other ingredients in the formulation, requires an in-depth knowledge of nutrient interactions, animal physiology, and effects of processing, beyond that of simply meeting minimum nutrient profiles stipulated in the Official Publication of The Association of American Feed Control Officials (AAFCO, 2018).

The present commentary discusses: 1. The limited data being used to support linkages between DCM and pulse ingredients; 2. The nutritional factors and physiological mechanisms that should

be explored to establish causation between nutritional deficiencies and incidence of DCM; 3. The factors that nutritionists should consider when formulating complete diets destined for long term consumption; and 4. The disadvantages of formulating to protein and minimal AA recommendations rather than to a balanced indispensable AA profile.

The development of canine DCM, historical linkages to taurine deficiency and pulses

Dilated cardiomyopathy is a disease of the myocardium that results in both mechanical dysfunction (enlarged heart cavities and congestion) and/or electrical dysfunction (arrhythmias and sudden death) (Sisson et al., 2000; Maron et al., 2006; Dutton and Alvarez, 2018). Development of DCM is slow and few clinical signs manifest over time. As DCM progresses, signs include lethargy, anorexia, shallow breathing, sudden fainting, and potential death. In some cases, animals may die from irregular heart rhythm without previous signs of the disease. In dogs, DCM can be caused by various factors. Genetic predisposition is thought to play the most important role in the development of DCM in several dog breeds, mostly large and giant breeds. Genetic mutations associated with DCM have been discovered in American lines of Doberman and Boxer dogs (Meurs et al., 2012; Meurs et al., 2013). However, the Doberman variant's association was not upheld in a European population of Dobermans (Owczarek-Lipska et al., 2013). Similarly, a UK population of Boxers did not uphold their published DCM-associated variant (Cattanach et al., 2015). It is becoming increasingly clear that the genetic basis for DCM in dogs is not monogenic, but complex and polygenic. Breeds with the highest prevalence of DCM include Dobermans, Boxers, Great Danes, Newfoundlands, Irish Wolfhounds, English Cocker Spaniels, and Portuguese Water Dogs (Monnet et al., 1995; Borgarelli et al., 2006; Werner et al., 2008; Martin et al., 2009), and the genetic basis of DCM in each of these breeds has been investigated (Dutton and Alvarez, 2018). In addition, Golden Retrievers and American Cocker Spaniels appear to have breed predispositions to taurine deficiency (Kramer et al., 1995; Bélanger et al., 2005). When dogs are not genetically predisposed for developing DCM, diet and physiology are other factors that may be associated with the disease.

The first link between taurine deficiency and DCM was demonstrated in cats in 1987. Cats diagnosed with DCM recovered after taurine supplementation (Pion et al., 1987). Similarly, an inverse association between dietary taurine and the incidence of DCM in a population of foxes was documented by Moise et al. (1991) and established the importance of taurine in the family Canidae. In dogs, DCM diagnoses related to low whole blood taurine concentrations have been reported in Cocker Spaniels, Dalmatians, Boxers, Newfoundlands, Portuguese Water Dogs, English Setters, Alaskan Malamutes, and Scottish Terriers (Freeman et al., 1996; Kittleson et al., 1997; Pion et al., 1998; Alroy et al., 2000; Fascetti et al., 2003; Backus et al., 2006). In all these cases, taurine supplementation improved cardiac function. However, dogs, in contrast to cats, can endogenously synthesize taurine from methionine and cysteine (Figure 1). Therefore, the

abovementioned data does not unequivocally establish taurine intake as the underlying mechanism for the development of DCM in dogs, whether or not they are genetically predisposed. Dietary supply of precursor AAs necessary for taurine synthesis (i.e. methionine and cysteine), metabolic intermediates, and co-factors (such as methyl donors) cannot be ruled out as factors that contribute to the susceptibility of dogs to developing genetic and diet-related DCM. When DCM is diet-related, the formulation and the provision of all nutrients, including indispensable AAs, to facilitate optimum health and wellbeing of dogs should be considered.

Recent reports, including the statement by the FDA (2018), have implicated that lentils, peas and other legumes seeds could be responsible for the development of DCM in dogs not genetically predisposed to this disease. Such statements and associations between pulse ingredients and incidence of DCM are, at the present time, premature. Animals, including dogs, have no minimum or maximum requirements for ingredients. Ingredients serve as the vehicle to providing nutrients to animals. As such, animals have nutrient requirements, not ingredient requirements. In diets that have nutrient deficits, imbalances, or exceed maximums, the final nutrient composition of the diet, not the ingredients, should be critiqued. In addition, animal nutritionists should consider that the nutrient concentration of ingredients can vary, nutrient availability is not 100 %, and diets formulated to marginally meet requirements could actually be deficient. Overall, it is the responsibility of nutritionists to use different ingredients to formulate diets that can be produced and safely meet the nutritional needs of animals.

Taurine deficiency and the development of canine DCM

For dogs, taurine is a dispensable AA synthesized from methionine and cysteine primarily in the liver (Figure 1). Taurine is not incorporated into proteins. Instead, it is used as a mediator for various biological processes and is the most abundant free AA intracellularly (Huxtable, 1992). In the heart, taurine represents ~60% of the total AA free pool (Huxtable, 1992). The high concentration of taurine in cardiac cells may explain the role of a taurine deficiency in the development of DCM. It has been speculated that taurine contributes to the reabsorption of calcium by the sarcoplasmic reticulum and increases the sensitivity of the myofilaments to calcium (Bakker and Berg, 2002). Thus, low dietary taurine intake and/or reduced synthesis of taurine from methionine and cysteine can deplete calcium pools in the cardiac cells and impede proper contraction of the cardiac muscle tissue, resulting in DCM in dogs.

For diagnosing DCM in dogs and cats, among other diagnostic methods including electrocardiograms and echocardiography, it is common to measure taurine concentration in whole blood. Whole blood samples, and not plasma samples, should be used to assess circulating taurine concentrations. In plasma, free taurine concentrations are much lower compared to intracellular taurine. This suggests that the plasma pool is not representative of taurine in other

pools (Schaffer et al., 2010). In platelets, taurine concentration is high and is considered a marker of taurine status. Taurine concentration in platelets is captured when whole blood is analyzed (Huxtable, 1992). However, platelet count can vary depending on the immune status of the animal and whole blood taurine concentration can be affected. In this scenario, whole blood taurine may not represent concentrations of taurine in muscle cells, including cardiac muscle. These additional variables related to the measurement of taurine status may explain why some dogs diagnosed with DCM have normal whole blood taurine concentrations.

As taurine can be synthesized endogenously in dogs, taurine is not considered an indispensable AA for the species Canidae. Thus, there are no recommendations on minimum dietary concentrations of taurine for dogs reported by the National Research Council (NRC, 2006) or AAFCO (2018). The lack of regulation on minimum taurine concentrations in commercial dog foods suggests that endogenous synthesis of taurine can meet the metabolic needs in all dogs and at all life stages. This assumption may not be accurate as studies have determined that synthesis of taurine is related to the size of dog (Ko et al., 2007), and some dietary factors can increase the physiological need for taurine (Story, 1978). Nutritional factors that increase the dietary requirement, reduce the supply, or increase the excretion of taurine in dogs are discussed in subsequent sections of this review and should be considered to avoid taurine deficiency in dogs and the risk of DCM.

Physiological factors can increase taurine utilization in dogs, and endogenous synthesis of taurine could be insufficient for meeting taurine requirements. For example, compared to smaller size dogs, synthesis of taurine in large dog breeds is up to 50% lower per unit of metabolic body weight (Ko et al., 2007). These results demonstrate that larger dogs are at higher risk for insufficient endogenous taurine synthesis, and dietary supplementation or fortification may be required, even when there is no minimum dietary taurine concentration according to current recommendations (AAFCO, 2018). Obesity and diabetes have also been related to lower concentrations of taurine in blood in humans and rats, respectively, (Merheb et al., 2007; Nardelli et al., 2011; Ito et al., 2012) and may increase the requirement for sulfur AAs necessary for endogenous taurine synthesis. This is of importance given that approximately half of dogs in North America are obese (Linder and Mueller, 2014). Data from rats and cats suggests that age and sex could also affect whole body taurine status. Hepatic activity of cysteine sulfonate decarboxylase, the enzyme responsible for taurine synthesis, was shown to be 16× higher in adult male rats versus female rats. In the same study, the activity of cysteine sulfonate decarboxylase was higher in 5-6-week-old kittens compared to 15-month-old cats and in 8-week-old mice compared to 16-week old mice; changes of the enzyme activity in dogs have not been tested (Worden and Stipanuk, 1985). Overall, these studies suggest that, despite some capacity for endogenous synthesis, physiological need of taurine can be heavily dependent on breed, age, sex, and physiological status. These physiological factors could help to predict the risk for developing

DCM when genotypic and environmental factors, such as diet, are simultaneously considered to ensure dogs maintain adequate concentrations of taurine and other sulfur AAs.

Given that there are no recommendations for the minimum concentration of taurine in dog food, the concentration of taurine in dog foods can vary substantially depending on the ingredients used. Taurine is very low in plant-based ingredients (Table 1) but is higher in some algae and fungi species and is ubiquitously found in animal tissues, especially in the heart, brain, and white blood cells (Huxtable, 1992). This is relevant, as many grain-free and/or high legume dog foods attempt to limit the use of animal by-products, which can substantially decrease the levels of dietary taurine. **In the context of providing adequate and preventive nutrition, dog foods should include organ meat or animal by-products or be fortified with taurine and/or its precursors (methionine and/or cysteine) to ensure the delivery of sufficient levels of taurine.**

Effect of dietary fibre on taurine status and risk of canine DCM

Dietary fiber has been shown to affect the taurine status in dogs. For example, commercial diets formulated with lamb meal and rice bran were shown to cause taurine deficiency in part because of low bioavailable cysteine from lamb meal and possibly more importantly due to the effects of rice bran fiber on gastrointestinal metabolism of taurine (Johnson et al., 1998; Tôrres et al., 2003). It has been hypothesized that high fiber diets can increase susceptibility to taurine deficiency by 2 mechanisms of action linked to obligatory bile acid conjugation with taurine in dogs (O'Mádille et al., 1965) and reliance on enterohepatic circulation for the reabsorption of bile acids and taurine. First, high fiber diets may increase fecal output and losses of taurine-conjugated bile. This would require higher synthesis rates of bile in the liver, and consequently, higher utilization of taurine (Story, 1978). Second, high consumption of fermentable fibres may increase the abundance of microbial populations that degrade taurine in the intestinal lumen (Kim et al., 1996ab). **Either alone or together, increased excretion or degradation of taurine from high fibre diets may decrease enterohepatic circulation and recycling of taurine. Given that taurine is the only AA used for bile acid conjugation in dogs, over time, high fiber diets could increase the risk of taurine insufficiency in dogs and lead to DCM.**

This should not be interpreted as dietary fiber being deleterious to the health of dogs. However, there may be a limit to the benefit for soluble fibers. Legume seeds contain an appreciable quantity of oligosaccharides which are known to be fermentable (Tosh and Yada, 2010). Thus, by a similar mechanism as described above, **high levels of legume seed oligosaccharides could ostensibly contribute to taurine depletion via excretion in the feces as bile conjugation and degradation by colonic bacteria.** In addition to the physiological benefits of high fiber diets in certain dogs, formulators should also be cognizant of possible nutritional risks associated with

high concentrations of fiber in dog foods. Consequently, dog foods with high concentrations of dietary fiber should be accompanied with higher supplies of taurine or sulfur AAs for endogenous taurine synthesis. Overall, the digestibility and bioavailability of taurine in ingredients used and the effect of other nutrients in taurine metabolism should be considered to avoid taurine deficiency and the development of DCM.

Carnitine deficiency and risk of canine DCM

Carnitine is not nutritionally indispensable since it is endogenously produced in the liver and kidneys from lysine and methionine; it can also be attained exogenously from animal-based products. Carnitine is highly abundant in skeletal and cardiac muscles. Together, these represent > 95% of the total carnitine in the body. Carnitine is essential for metabolism of fatty acids used for energy production (Hoppel, 2003). In the heart, where 60% of the energy is derived from fatty acid oxidation, carnitine facilitates the uptake of free fatty acids into the mitochondria to produce ATP (Hoppel, 2003). Plant-based ingredients do not contain carnitine (Table 1). Therefore, in commercial dog foods with reduced inclusion of animal-based ingredients, intakes of carnitine could be decreased if diets are not fortified. Reduced dietary carnitine intake translates into increased reliance on endogenous synthesis to meet physiological requirements.

Given that carnitine is required for sufficient energy production in cardiac muscle, it is not surprising that carnitine deficiency is associated with DCM. In 1991, a family of Boxers diagnosed with DCM were also diagnosed with carnitine deficiency (Keene et al., 1991). In dogs, carnitine deficiency can occur with aberrations of carnitine regulation in disorders such as cardiomyopathy (including DCM), diabetes, sepsis, and malnutrition (Flanagan et al., 2010). However, carnitine deficiency as a causative factor in the development of DCM or a consequence of cardiac malfunction remains as a subject of debate (Freeman and Rush, 2006). Despite the interest in this metabolite, little progress has been made on determining the effect of carnitine supplementation on alleviating risk of DCM. However, both taurine and carnitine are often supplemented in supraphysiological concentrations once DCM is diagnosed. This practice is supported by positive clinical outcomes, albeit without comparison groups (Kittleson et al. 1997; Sanderson et al. 2001). Concentrations of carnitine in the plasma are relatively insensitive to dietary carnitine, and more invasive techniques (biopsies) are required to determine the concentration of carnitine in muscle tissue (Flanagan et al., 2010; Rășanu et al., 2012). The invasive nature of testing for carnitine status is likely the reason why carnitine is rarely explored when investigating possible causes of canine DCM.

Preventing diet-mediated DCM in dogs by providing adequate sulfur AAs and maximizing endogenous taurine synthesis

Although taurine is considered a dispensable AA in dogs, endogenous taurine synthesis requires an adequate supply of bioavailable sulfur AA precursors cysteine or methionine (Figure 1). Thus, providing marginal concentrations of these 2 sulfur AAs, or providing sources with lower bioavailability, could increase the risk of taurine deficiency and facilitate the development of DCM. Contrary to taurine, methionine cannot be synthesized endogenously in dogs (NRC, 2006). Therefore, dogs depend on the provision of dietary methionine to meet daily sulfur AA requirements, which includes production of taurine. From an ingredient perspective, methionine and lysine are usually the first or second limiting AAs in dog diets formulated with soybean meal and rendered meats (NRC, 2006). In addition, methionine is particularly susceptible to damage, and subsequent reduction in bioavailability, secondary to heat processing (Marshall et al. 1982; Hurrell et al. 1983). This suggests that the risk of methionine deficiency is more likely than any other indispensable AA in commercial dog diets. Although the primary role for methionine is protein synthesis, in pigs at least 50% of absorbed methionine acts as a methyl donor and a precursor in the production of cysteine, taurine, sulfate, and pyruvate (Robinson et al., 2016a) (Figure 1). These functions of methionine become more crucial when dietary intake of cysteine, taurine, and/or dietary methyl donors (e.g. folate, betaine, and their precursors) is limited (Robinson et al., 2016b), and they need to be considered when nutritionists set criteria for delivery of sulfur AAs in pet foods.

Methionine and cysteine both contribute to the total sulfur AA requirements for humans and animals. For adult dogs at maintenance, the latest guidelines from the NRC (2006) recommend that adult dog foods contain 0.33% (on dry matter basis) methionine when cysteine is provided in excess, and 0.65% for methionine + cysteine. These NRC (2006) recommendations are not based on dose-response studies, but on a 4-year study where adult dogs were fed low-crude protein diets (Sanderson et al., 2001). In that study, the lowest concentration of methionine in the diet that reported no observable deficiencies was used as the recommended requirement. As companion animals are typically fed a single static diet during adulthood, and for most of their lifespan, it is necessary that AA requirements of dogs should be measured empirically (Baker, 1986). In addition to the lack of empirical data corresponding to the AA requirements of dogs, it is equally important to understand how other dietary (e.g. dietary fiber), environmental, other physiological variables, and breed/genotype may alter AA requirements. The lack of recommendations for taurine in commercial dog food puts a higher stress on accurately meeting requirements for sulfur AAs, not only for protein synthesis, but also for the endogenous synthesis of taurine, for support of optimal methyl status, and for the synthesis of secondary metabolites.

Rethinking indispensable AA targets in commercial dog foods

Currently, the ingredients permitted in pet foods and the corresponding nutrient targets are guided by recommendations made by AAFCO (2018). These recommendations are based on the

peer-reviewed scientific literature and represented in the Nutrient Requirement of Dogs and Cats (NRC, 2006). However, AA recommendations made by AAFCO correspond to total AA content within the formulation and do not consider the true ileal digestibility of ingredients. True ileal digestibility of AAs is more representative of nutrient absorption capacity and bioavailability compared to fecal digestibility or total AA content in the diet (Columbus and de Lange, 2012). To account for the reduced digestibility and bioavailability of protein-bound AAs in food ingredients, AAFCO arbitrarily increases AA recommendations relative to those from the NRC to ensure that an adequate supply of AAs is provided, regardless of the ingredients and effects of processing (Table 2). However, this increment is only applied to lysine, threonine, and tryptophan and not applied to other indispensable AAs, including methionine (AAFCO, 2018). For example, the recommended allowance for lysine reported in NRC (2006) is 0.35% for adult dogs at maintenance, while the minimum content of lysine to meet AAFCO (2018) recommendations is 0.63%. Non-ruminant animals, including dogs, absorb AAs from the duodenum to the terminal ileum (Columbus and de Lange, 2012). Hence, feeding diets with lower ileal digestibility coefficients could decrease actual concentrations of available indispensable AAs, even when meeting AAFCO recommendations. This is of special concern for dietary taurine and other sulfur AAs, considering that there is no regulated minimum threshold for taurine in dog foods and that AAFCO (2018) recommendations for sulfur AAs are not increased compared to NRC (2006) recommendations to account for potential ileal digestibility coefficients. There is a dearth of data in this area to justify empirical adjustments based on different dietary variables. As such, future research should pursue how amino acid requirements change under different dietary variables that can affect small intestinal digestibility and whole body availability.

It is worthwhile to note that minimum dietary nutrient contents for dog foods, as reported in AAFCO (2018), only considers differences between growth/reproduction and adult life stages. This lack of data places the pregnant bitch in the same group as growing animals. Moreover, most studies on nutrient requirements in dogs have been established using Beagles as a proxy for all dogs. Using a single breed creates a homogenous sample and likely does not account for nutritional variability across pure and mixed breeds, or those of different sizes. Unpublished data from Shoveller et al. investigated the minimum methionine (with excess cysteine) requirements of Miniature Dachshunds, Beagles, and Labrador Retrievers as proxies for small, medium, and large dog breeds and found that methionine requirements may differ across breeds or size of dogs and be greater than previously estimated. Thus, given the methods of derivation, single indispensable AA requirements for all dog populations, as presented in AAFCO (2018), may not consider variable AA requirements across dog phenotypes. Moreover, it is widely assumed that endogenous synthesis of dispensable AAs, such as taurine in the dog, is sufficient for meeting metabolic demands. However, recent studies suggest that under some metabolic conditions, dispensable AAs may also be required in diets (Hou et al., 2015). Taurine, as described in this commentary, is a clear example of this paradigm shift. Dietary taurine or the capacity for its

adequate endogenous synthesis, especially in circumstances where excessive losses might occur, should be considered in the final formulation of dog foods to decrease the risk of canine DCM.

Nutritionists and regulatory agencies should be aware that, in the spectrum of nutrient requirements, dog populations with higher AA requirements relative to energy intake and other factors could be at a higher risk for a taurine deficiency. More precise categorization of requirements among different canine populations would help to optimize nutritional adequacy and decrease risk of diseases, such as DCM, that are possibly linked to nutrient deficiencies.

Effect of processing on anti-nutritional factors in plant-based ingredients.

Just as understanding the inherent nutritional characteristics and the interaction between ingredients is important for preventing nutritional imbalances in pet foods, the effects of processing on these factors are equally important. Raw cereals and legumes contain anti-nutritional factors such as trypsin inhibitors, phytates, hematoglutinins, and polyphenols that can decrease protein digestion, nutrient absorption, and/or cause illness. Some of these anti-nutritional factors are thermolabile and, under the right conditions, can be effectively destroyed during the extrusion process improving the overall quality of plant-based ingredients and the final diet (Patterson, et al., 2017). Recent reviews across a variety of legumes and legume-derived ingredients show that the activities of trypsin inhibitor, chymotrypsin inhibitor, and hemagglutinating activity were decreased by up to 95 % across a variety of thermal treatment conditions, including extrusion (Patterson, et al., 2017; Aviles-Gaxiola et al. 2018). Extrusion had modest effects on levels of phytate with reductions ranging from 7 to 26 % and varied by legume and extrusion conditions (Patterson, et al., 2017). **Figure 2** highlights the variability between processing methods and thermic conditions for decreasing anti-nutritional factors. For example, when soybeans were subjected to extrusion at increasing temperatures that ranged from 100 to 150 °C, trypsin inhibitor levels were incrementally decreased. At 140 °C, dry extrusion was considerably more effective at decreasing trypsin inhibitors (-91 %) compared to wet extrusion (-44 %). When the dry extrusion temperature was increased to 150 °C, reductions in trypsin inhibitors were further decreased by 94 % (Zilic et al., 2012). Other thermal treatments, such as micronisation, microwave roasting, and autoclaving also facilitated incremental reductions in trypsin inhibitors with increasing temperatures (Zilic et al., 2012). When formulating foods with higher concentrations of plant-based ingredients, consideration should also be given to the processing methods and the parameters used to effectively optimize the nutritional density and decrease anti-nutritional factors.

It is important to mention that, while temperature and pressure processing can greatly decrease anti-nutritional factors, they can also negatively impact bioavailability of amino acids. The Maillard reaction is a well-known example of heat damaged-protein (Teodorowicz et al., 2017).

In this reaction, lysine interacts with reducing sugars present in the diets forming the Maillard product. The complex formed can be digested and absorbed by the animal but cannot be utilized for metabolic processes (e.g. protein synthesis). Thus, in heat damaged proteins, digestibility of amino acids can greatly overestimate bioavailability (Moehn et al., 2005). Other products of heat damage on proteins include racemization of amino acids (alteration from L to D form) and the formation of cross-linked amino acids. Such components can decrease bioavailability of amino acids and digestibility of proteins, and their effects on protein quality cannot usually be determined using conventional methods of amino acid analysis. **Pet foods with higher levels of plant-based ingredients may also require optimization of processing methods to maximize their nutritional density and nutrient bioavailability.**

Recommendations for formulating dog food with novel ingredients

Considering the AA profile of dog foods

Feed formulation for agricultural and companion animals should be based on the ideal protein concept (Baker, 1991; Swanson et al., 2013). The ideal protein is defined as that in which all AAs are in perfect balance compared to the animal's AA requirements (mg/g protein). Hence, all indispensable AAs are equally limiting. However, this is impossible to achieve in practical animal feed formulation, and diets should be formulated considering the first limiting indispensable AA. The first limiting indispensable AA refers to the indispensable AA that is present in the lowest proportion compared to the animal's requirement. By meeting the first indispensable limiting AA requirement, requirements for all other indispensable AAs are also inherently satisfied. Moreover, to avoid the formulation of diets with excessive protein concentration or an excess of indispensable AAs relative to the requirements of dogs, animal nutritionists combine multiple ingredients that are complementary in their AA profiles.

Commonly, dog foods are formulated with a higher proportion of animal-derived ingredients, and a lower proportion of plant-based ingredients to meet nutrient recommendations. More recently, however, cereal grains have been removed in some diet formulations or the proportion of animal-based ingredients has been reduced. The production of these types of formulations are often driven by consumer perception, rather than scientific evidence. Allowing consumers to direct the ingredient composition of dog foods, or other pet foods, could perpetuate nutrient deficits that affect the health of animals in the long term.

In the formulation of grain-free pet foods, cereal grains are replaced with alternative ingredient(s). Animal-derived ingredients are expensive relative to plant-based ingredients. Thus, **pulses, a subset of legumes, are often used as the replacement.** In addition to containing **substantial fiber, pulses also contain significant concentrations of protein** and are used to partly

meet indispensable AA requirements. Of interest, soybean meal and pulses contain 48% and 25% crude protein, respectively, which is substantially greater than the average protein concentration for grains (11%) (Table 1). While the high protein content in soybean meal and pulses is indicative of higher concentration of AAs compared to grains, it does not imply AA balance. Soybean meal and pulses are high in lysine (mg/g protein) but low in sulfur AAs (mg/g protein), while the reverse is true for cereals. Plant-based ingredients tend to have lower ileal digestibility coefficients for protein compared to protein from animal sources (FAO and WHO 1991). Thus, dog foods that contain substantial amounts of pulses, lower proportions of animal-based ingredients, and do not address AA imbalances through the addition of alternate ingredients or fortification, may risk AA deficiencies. To mitigate this risk across the pet food industry and ensure the final pet diets are nutritionally adequate and balanced, it is prudent that the digestibility coefficients of all final pet food products be calculated.

Considering the addition of high fiber ingredients to dog foods

By definition, dietary fiber is carbohydrates that are resistant to digestion by endogenous enzymes in the gastrointestinal tract (NRC, 2006). Typical fibers include arabinoxylan, raffinose, inulin, β -glucan, cellulose, and pectin (NRC, 2006). Common ingredients to increase fiber content in companion animal diets include beet pulp, corn fiber, rice bran, whole grains, and pulse fibers (de Godoy et al., 2013). Achieving an optimal fiber concentration in canine diets has diverse positive physiological effects in the gastrointestinal tract; for example, higher fermentable fiber intake has been shown to slow the transit time of digesta, increasing satiety of the animal (Haber et al., 1977). Moreover, high fiber diets generally have lower energy density making them an important nutritional strategy for controlling body weight (Johnson et al., 2008) and reducing the incidence of diarrhea (Homan et al., 1994). Gut health is also improved with higher consumption of fiber; fermentable fiber can act as a prebiotic and increase the population of health-promoting microbiota including lactobacilli and bifidobacteria (Roberfroid, 2005). Although not required by AAFCO to fulfill the criteria of “complete and balanced”, fiber is an important component of the diet, and depending on the type of fiber and the amount consumed, fiber can increase the gut health status. Adding the necessary amount and type of fiber in the diet is crucial for optimal dog nutrition.

Despite the benefits of fiber in the diet, fiber can also affect enterohepatic recycling of taurine (discussed above). In monogastric species, including humans, high dietary fermentable fiber may also decrease digestibility and availability of dietary AAs (Blackburn and Southgate, 1981; Degen et al., 2007) and, in some cases, increase the risk of DCM in dogs fed diets that marginally meet requirements for sulfur AAs. Moreover, higher concentrations of dietary fiber increase the size of the gastrointestinal tract in pigs and poultry (Nyachoti et al., 2000) increasing nutrient utilization in this organ. It has been determined in pigs that on average the gastrointestinal tract catabolizes 30% of dietary indispensable AAs during absorption, and this utilization represents ~50% for sulfur AAs (Stoll et al., 1998; Mansilla et al., 2018), further

reducing precursor availability for taurine synthesis and increasing the risk for taurine deficiency. For some high fiber diets, fortification of specific nutrients, including taurine and other sulfur AAs, might be beneficial to avoid nutrient deficiencies.

Compared to the pet food industry, in other industries where high fiber ingredients (co-products) are routinely used (e.g. swine industry), the effects of fiber on the absorption of nutrients have been given more attention when formulating diets (NRC, 2012). For example, highly fermentable fiber in swine diets increases the threonine requirement to compensate for the increase in mucus (mucin protein) production in the intestinal cell lining (Lien et al., 1997; Mathai et al., 2016). This has underpinned the development of “requirement models” (NRC, 2012) to tailor nutrient requirements for pigs while accounting for the different nutrient interactions. **In contrast, in the pet food industry, the only concentrations of nutrients used for comparison are those recommended by AAFCO (2018).** Such recommendations are static and may not encompass all the effects of the different nutrient combinations in the final diet. There is a clear need in companion animal nutrition to improve the understanding of the interactions of different ingredients and how these alter nutrient requirements for different breeds, age, and physiological status of dogs.

Other recent publications highlight the need for careful nutrient formulation

Several recent papers, both original research and reviews, likewise highlight the unknowns surrounding grain-free diets (typically legume or pulse-based, but sometimes also with “exotic” ingredients such as kangaroo, bison, or wild boar) and DCM. For example, Adin et al. (2019) examined 48 dogs of many breeds with diagnosed DCM and having a known diet history. Among grain-free diets being consumed in this study, 1 was particularly associated with DCM, possibly underscoring the importance of **specific diet formulation**. Further, 2 dogs switched from that diet to other grain-free diets showed improvement in their DCM; it is unclear if those dogs were taurine deficient or if they also received taurine and/or carnitine supplementation. This suggests that grain-free composition per se may not be the root cause of DCM. Another recently published case series of 24 Golden Retrievers with DCM and known diet histories were evaluated, and an association between grain-free diets and DCM was suggested (Kaplan et al., 2018). Most dogs (15 out of 24) were fed a single diet which was significantly associated with low blood taurine concentrations, again suggesting that specific diet formulation may play an important role. However, as in the previous study, soluble versus insoluble fiber concentrations were not available for the diets, nor were taurine, methionine, or cysteine concentrations, meaning that the true nutrient profiles of the diets could not be assessed and reinforcing the point that diet formulation for nutrients – not ingredients – is essential. It also suggests that nutrient requirements may vary widely based on breed, diet, and other phenotypic data. Indeed, most of the dogs with DCM in the previously described study were consuming less energy compared to their predicted requirements (Kaplan et al., 2018). It also bears pointing out that the numbers in both studies were very low (representing less than 100 DCM-affected dogs between them),

which surely represents a fraction of the dogs consuming grain-free, pulse-based diets. A recent thoughtful review supports these conclusions by reiterating the crucial need for plant-based diets for dogs to be formulated with sufficient quantities of bioavailable methionine and cysteine to support adequate taurine synthesis (Dodd et al., 2018). This can be achieved with the addition of purified amino acids and other sources that are readily available (Gloaguen et al., 2014). Finally, a recent commentary carefully concludes that a true cause-and-effect relationship between grain-free diets and DCM has not been proven, and other factors may ultimately be more important (Freeman et al., 2018). Taken together, these recent publications may point to faulty nutrient formulation in some, but not all, grain-free diets.

CONCLUSIONS

Recently, it has been suggested that pulse ingredients in commercial dog foods are associated with a limited number of cases of DCM. While pulse ingredients have been implicated for having negative effects on the taurine status in dogs (deficiency of which is a known cause of canine DCM) based on the available evidence, the relationship between pulses and canine DCM remains undefined. However, the FDA statement may harm consideration of protein alternatives, such as pulses, as quality ingredients in pet foods and undermine attempts to diversify ingredients used across the food chain as the global population continues to grow. Ingredients do not represent the nutritional composition of the diet, and therefore, nutrient deficiencies should not be attributed to individual ingredients. The authors of this commentary recognize the important role of endogenous, and perhaps exogenous, taurine in the prevention of DCM in some dogs. The assurance of appropriate concentrations of all indispensable sulfur AAs, including methionine and cysteine, is crucial for ensuring adequate endogenous synthesis of taurine and to meet the metabolic demands of dogs. Additional dietary factors, such as methyl donors required for sulfur AA metabolism, carnitine for energy production in muscle, and dietary fiber, as well as animal factors, such as breed, size, and health status, should also be investigated when nutrient deficiency-related DCM is suspected.

It is the responsibility of animal nutritionists to formulate balanced diets for dogs, and other animals, by looking beyond the goal of meeting AAFCO recommendations or satisfying unsubstantiated market trends. Pulses and other plant-based ingredients can be used to formulate nutritionally adequate dog foods, and final product formulations should be assessed for nutrient balance and bioavailability, especially when using a limited number of ingredients. Although dietary factors are important in the prevention of sulfur AA deficiency and development of DCM, empirical data and mechanistic studies are required to better understand the indispensable AA requirements of dogs and preventing DCM. **In diets that contain high concentrations of dietary fiber, compensative inclusion of dietary indispensable sulfur AAs, including exogenous taurine, might be required to offset the possibility of increased fecal excretion or microbial**

assimilation of taurine in the large intestine. Processing conditions may also require adjustments to ensure the presence or effects of anti-nutritional factors are minimized and nutrient bioavailability is not compromised. Greater awareness of AA balance is crucial for ensuring that AA requirements are met for dogs consuming static diets.

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REFERENCES

- AAFCO. 2018. Association of American Feed Control Officials. Oxford, In: Official Publication Association of American Feed Control Inc.
- Adin, D., T. C. DeFrancesco, B. Keene, S. Tou, K. Meurs, C. Atkins, B. Aona K. Kurtz, L. Barron K. Saker. 2019. Echocardiographic phenotype of canine dilated cardiomyopathy differs based on diet type. *J. Vet. Card.* 21:1-9.
- Alroy, J., J. E. Rush, L. Freeman, M. S. Amarendhra Kumar, A. Karuri, K. Chase, S. Sarkar. 2000. Inherited infantile dilated cardiomyopathy in dogs: genetic, clinical, biochemical, and morphologic findings. *Am J Med Genet* 95:57-66.
- Arslan, C. 2006. L-Carnitine and its use as a feed additive in poultry feeding a review. *Revue Med Vet.* 157:134-142.
- attributes, and applications. *Food Research International* 43 (2010) 450–460
- Avilés-Gaxiola, S., C. Chuck-Hernández, S. O. Serna Saldivar. 2018. Inactivation Methods of Trypsin Inhibitor in Legumes: A Review. *J. Food Sci.* 83:17-29. doi: doi:10.1111/1750-3841.13985.
- Backus, R.C., K. S. Ko, A. J. Fascetti, M. D. Kittleson, K. A. MacDonald, D. J. Maggs, Q. R. Rogers. 2006. Low plasma taurine concentration in Newfoundland dogs is associated with low plasma methionine and cyst(e)ine concentrations and low taurine synthesis. *J Nutr.* 136:2525-2533. doi: 10.1093/jn/136.10.2525
- Baker, D. H. 1986. Problems and pitfalls in animal experiments designed to establish dietary requirements for essential nutrients. *J. Nutr.* 116:2339-2349. doi: 10.1093/jn/116.12.2339
- Baker, D. H. 1991. Review Comparative nutrition of cats and dogs. *Annu Rev Nutr.* 11:239-263. DOI: 10.1146/annurev.nu.11.070191.001323
- Bakker, A. J., H. M. Berg. 2002. Effect of taurine on sarcoplasmic reticulum function and force in skinned fast-twitch skeletal muscle fibres of the rat. *J Physiol.* 538:185–194. doi: 10.1113/jphysiol.2001.012872
- Bélangier, M.C., M. Ouellet, G. Queney, and M. Moreau. 2005. Taurine-deficient dilated cardiomyopathy in a family of golden retrievers. *J. Am. Anim. Hosp. Assoc.* 41(5):284-291.
- Blackburn, N.A., Southgate DAT. 1981. Protein digestibility and absorption: effects of fibre and the extent of individual variation. Joint FAO/WHO/UNU Expert Consultation on Energy and Protein Requirements Rome, 5 to 17 October.

- Borgarelli, M., R. A. Santilli, D. Chiavegato, G. D'Agnolo, R. Zanatta, A. Mannelli, A. Tarducci. 2006. Prognostic indicators for dogs with dilated cardiomyopathy. *J. Vet. Intern. Med.* 20:104-110. <https://doi.org/10.1111/j.1939-1676.2006.tb02829.x>
- Butterwick, R. F., P. J. Markwell, C. J. Thorne. 1994. Effect of level and source of dietary fiber on food intake in the dog. *J. Nutr.* 124:2695S-2700S. https://doi.org/10.1093/jn/124.suppl_12.2695S
- Cattanach, B. M., J. Dukes-McEwan, P. R. Wotton, H. M. Stephenson, R. M. Hamilton. 2015. A pedigree-based genetic appraisal of Boxer ARVC and the role of the Striatin mutation. *Vet. Rec.* 176:492. doi: 10.1136/vr.102821.
- Chemical Hazards Emergency Medical Management. Key Principles of Toxicology and Exposure Washington D.C.: U.S. Department of Health and Human Services,; 2017. Available from: <https://chemm.nlm.nih.gov/toxprinciples.htm>.
- Columbus, D., C. F. M. de Lange. 2012. Evidence for validity of ileal digestibility coefficients in monogastrics. *Br. J. Nutr.* 108:S264-S272. doi: 10.1017/S0007114512002334.
- de Godoy, M. R., K. R. Kerr, J. C. Fahey. 2013. Alternative dietary fiber sources in companion animal nutrition. *Nutrients* 5:3099-3117. doi: 10.3390/nu5083099.
- Degen, L., V. Halas, L. Babinszky. 2007. Effect of dietary fibre on protein and fat digestibility and its consequences on diet formulation for growing and fattening pigs: A review. *Act. Agr. Scand. A-AN.* 57:1-9. <https://doi.org/10.1080/09064700701372038>
- Dodd, S. A. S., J. L. Adolphe, A. Verbrugghe. 2018. Plant-based diets for dogs. *J. Am. Vet. Med. Assoc.* 253:1425-1432. <https://doi.org/10.2460/javma.253.11.1425>
- Dutton, E., J. López-Alvarez. 2018. An update on canine cardiomyopathies – is it all in the genes? *J. Small. Anim. Pract.* 59:455-464. <https://doi.org/10.1111/jsap.12841>
- FAO. 1991. Food and Agriculture Organization of the United Nations. Protein Quality Evaluation. Report of Joint FAO/WHO, Expert Consultation. Rome, Italy.
- Fascetti, A. J., J. R. Teed, Q. E. Rogers, R. C. Backus. 2003. Taurine deficiency in dogs with dilated cardiomyopathy: 12 cases (1997-2001). *J. Am. Vet. Med. Assoc.* 223:1137-1141. doi: 10.2460/javma.2003.223.1137
- FDA, Center for Veterinary Medicine. FDA Investigating Potential Connection Between Diet and Cases of Canine Heart Disease. July 12th, 2018. <https://www.fda.gov/animalveterinary/newsevents/cvmupdates/ucm613305.htm>
- Flanagan, J.L., P. A. Simmons, J. V. Vehige, M. D. P. Willcox, Q. Garrett. 2010. Role of carnitine in disease. *Nutr. Metab. (Lond).* 7:30. doi: 10.1186/1743-7075-7-30.

- Freeman, L. M., J. A. Stern, R. Fries, D. B. Adin, J. E. Rush. 2018. Diet-associated dilated cardiomyopathy in dogs: what do we know? *J. Am. Vet. Med. Assoc.* 253:1390-1394. <https://doi.org/10.2460/javma.253.11.1390>.
- Freeman, L.M., J. E. Rush. 2006. Cardiovascular diseases: nutritional modulation. In: *Encyclopedia of Canine Clinical Nutrition*. Pibot, P., V. Biourge, D. Elliott. Aimargues: Aniwa SAS. Pp. 316-347.
- Freeman, L.M., K. E. Michel, D. J. Brown, P. M. Kaplan, M. E. Stamoulis, S. L. Rosenthal, B. W. Keene, J. E. Rush. 1996. Idiopathic dilated cardiomyopathy in Dalmatians: nine cases (1990-1995). *J. Am. Vet. Med. Assoc.* 209:1592-1596.
- Gloaguen, M., N. Le Floc'h, E. Corrent, Y. Primot, J. van Milgen. 2014. The use of free amino acids allows formulating very low crude protein diets for piglets. *J. Anim. Sci.* 92(2):637-44. doi: 10.2527/jas.2013-6514.
- Haber, G. B., K. W. Heaton, D. Murphy, L. F. Burroughs. 1977. Depletion and disruption of dietary fibre. Effects on satiety, plasma glucose, and serum-insulin. *Lancet.* 2:679-682.
- Homan, H. H., M. Kemen, C. Fuessenich, M. Senkal, V. Zumtobel. 1994. Reduction in diarrhea incidence by soluble fiber in patients receiving total or supplemental enteral nutrition. *J. Parenter. Enter. Nutr.* 18:486-490. doi: 10.1177/0148607194018006486
- Hoppel, C. 2003. The role of carnitine in normal and altered fatty acid metabolism. *Am. J. Kidney Dis.* 41:S4-12. doi: 10.1016/S0272-6386(03)00112-4
- Hou, Y., Y. Yin, G. Wu. 2015. Dietary essentiality of "nutritionally non-essential amino acids" for animals and humans. *Exp Biol Med.* 240(8):997-1007. doi: 10.1177/1535370215587913
- Hurrell, R. F., P. A. Finot, J. E. Ford. 1983. Storage of milk powders under adverse conditions. I. Losses of lysine and of other essential amino acids as determined by chemical and microbiological methods. *Br. J. Nutr.* 49(3):343-54. doi: 10.1079/BJN19830043
- Huxtable, R.J. 1992. Physiological actions of taurine. *Physiol. Rev.* 72:101-163. doi: 10.1152/physrev.1992.72.1.101
- Ito, T., S. W. Schaffer, J. Azuma. 2012. The potential usefulness of taurine on diabetes mellitus and its complications. *Amino Acids.* 42(5): 1529-1539. doi: 10.1007/s00726-011-0883-5
- Johnson, L., A. P. Mander, L. R. Jones, P. M. Emmett, S. A. Jebb. Energy-dense, low-fiber, high-fat dietary pattern is associated with increased fatness in childhood. *Am. J. Clin. Nutr.* 87:846-854. doi: 10.1093/ajcn/87.4.846
- Johnson, M. L., C. M. Parsons, G. C. Jr Fahey, N. R. Merchen, C. G. Aldrich. 1998. Effects of species raw material source, ash content, and processing temperature on amino acid digestibility of animal by-product meals by cecectomized roosters and ileally cannulated dogs. *J. Anim. Sci.* 76:1112-1122.

- Kaplan, J. L., J. A. Stern, A. J. Fascetti, J. A. Larsen, H. Skolnik, G. D. Peddle, R. D. Kienle, A. Waxman, M. Cocchiaro, C. T. Gunther-Harrington, T. Klose, K. LaFauci, B. Lefbom, M. Machen Lamy, R. Malakoff, S. Nishimura, M. Oldach, S. Rosenthal, C. Stauthammer, L. O'Sullivan, L. C. Visser, R. William, and E. Ontiveros. 2018. Taurine deficiency and dilated cardiomyopathy in golden retrievers fed commercial diets. *PLoS ONE* 13(12):e0209112. <https://doi.org/10.1371/journal.pone.0209112>
- Keene, B.W., D. P. Panciera, C. E. Atkins, V. Regitz, M. J. Schmidt, A. L. Shug. 1991. Myocardial L-carnitine deficiency in a family of dogs with dilated cardiomyopathy. *J. Am. Vet. Med. Assoc.* 198:647-650.
- Kim, S.W., Q. R. Rogers, J. G. Morris. 1996(a). Dietary antibiotics decrease taurine loss in cats fed a canned heat-processed diet. *J. Nutr.* 126:509–515. DOI: 10.1093/jn/126.2.509
- Kim, S.W., Q. R. Rogers, J. G. Morris. 1996(b). Maillard reaction products in purified diets induce taurine depletion in cats which is reversed by antibiotics. *J Nutr.* 126:195–201. doi: 10.1093/jn/126.1.195
- Kittleson, M. D., B. Keene, P. D. Pion, C. G. Loyer. 1997. Results of the multicenter spaniel trial (MUST): taurine- and carnitine-responsive dilated cardiomyopathy in American cocker spaniels with decreased plasma taurine concentration. *J. Vet. Intern. Med.* 11:204-211. doi: 10.1111/j.1939-1676.1997.tb00092.x
- Ko, K.S., R. C. Backus, J. R. Berg, M. W. Lamé, Q. R. Rogers. 2007. Differences in taurine synthesis rate among dogs relate to differences in their maintenance energy requirement. *J Nutr.* 137:1171–1175. doi: 10.1093/jn/137.5.1171
- Kramer, G.A., M.D. Kittleson, P.R. Fox, J. Lewis, and P.D. Pion. 1995. Plasma taurine concentrations in normal dogs and in dogs with heart disease. *J. Vet. Intern. Med.* 9(4):253-258.
- Lien, K. A., W. C. Sauer, M. Fenton. 1997. Mucin output in ileal digesta of pigs fed a protein-free diet. *Z Ernährungswiss.* 36:182–190. doi: 10.1007/BF01611398
- Linder, D., M. Mueller. 2014. Pet Obesity Management: Beyond Nutrition. *Vet. Clin. N. Am-Small.* 44:789-806. doi: 10.1016/j.cvsm.2014.03.004
- Mansilla, W.D., K. E. Silva, C. Zhu, C. M. Nyachoti, J. K. Htoo, J. P. Cant, C. F. M. de Lange. 2018. Ammonia-nitrogen added to low-crude-protein diets deficient in dispensable amino acid-nitrogen increases the net release of alanine, citrulline, and glutamate post-splanchnic organ metabolism in growing pigs. *J. Nutr.* 148:1081-1087. doi: 10.1093/jn/nxy076.
- Marinangeli, C. P. F., J. Curran, S. I. Barr, J. Slavin, S. Puri, S. Swaminathan, L. Tapsell, C. A. Patterson. 2017. Enhancing nutrition with pulses: defining a recommended serving size for adults. *Nutr Rev.* 75:990-1006. doi: 10.1093/nutrit/nux058.

- Maron, B. J., J. A. Towbin, G. Thiene, C. Antzelevitch, D. Corrado, D. Arnett, A. J. Moss, C. E. Seidman, J. B. Young. 2006. Contemporary definitions and classification of the cardiomyopathies: an American Heart Association Scientific Statement from the Council on Clinical Cardiology, Heart Failure and Transplantation Committee; Quality of Care and Outcomes Research and Functional Genomics and Translational Biology Interdisciplinary Working Groups; and Council on Epidemiology and Prevention. *Circulation*. 113:1807-1816. doi: 10.1161/CIRCULATIONAHA.106.174287
- Marshall, H. F., K. C. Chang, K. S. Miller, L. D. Satterlee. 1982. Sulfur amino acid stability: Effects of processing on legume proteins. *J Food Sci*. 47:1170-4. doi: 10.1111/j.1365-2621.1982.tb07642.x
- Martin, M.W., M. J. Stafford Johnson, B. Celona. 2009. Canine dilated cardiomyopathy: a retrospective study of signalment, presentation and clinical findings in 369 cases. *J. Small Anim. Pract*. 50:23-29. doi: 10.1111/j.1748-5827.2008.00659.x
- Mathai, J. K., J. K. Htoo, J. E. Thomson, K. J. Touchette, H. H. Stein. 2016. Effects of dietary fiber on the ideal standardized ileal digestible threonine:lysine ratio for twenty-five to fifty kilogram growing gilts. *J. Anim. Sci*. 94:4217-4230. doi: 10.2527/jas.2016-0680.
- Menniti, M. F., G. M. Davenport, A. K. Shoveller, J. P. Cant, V. R. Osborne. 2014. Effect of graded inclusion of dietary soybean meal on nutrient digestibility, health, and metabolic indices of adult dogs. *J. Anim. Sci*. 92:2094-2104. doi: 10.2527/jas.2013-7226
- Merheb, M., R. T. Daher, M. Nasrallah, R. Sabra, F. N. Ziyadeh, K. Barada. 2007. Taurine intestinal absorption and renal excretion test in diabetic patients: a pilot study. *Diabetes Care* 30:2652-2654. doi: 10.2337/dc07-0872
- Meurs, K. M., J. A. Stern, D. D. Sisson, M. D. Kittleson, S. M. Cunningham, M. K. Ames, C. E. Atkins, T. DeFrancesco, T. E. Hodge, B. W. Keene, Y. Reina Doreste, M. Leuthy, A. A. Motsinger-Reif, S. P. Tou. 2013. Association of dilated cardiomyopathy with the striatin mutation genotype in boxer dogs. *J. Vet. Intern. Med*. 27:1437-1440. doi: 10.1111/jvim.12163
- Meurs, K. M., S. Lahmers, B. W. Keene, S. N. White, M. A. Oyama, E. Mauceli, K. Lindblad-Toh. 2012. A splice site mutation in a gene encoding for PDK4, a mitochondrial protein, is associated with the development of dilated cardiomyopathy in the Doberman pinscher. *Human Genetics* 131:1319-1325. doi: 10.1007/s00439-012-1158-2
- Moehn, S., R. F. Bertolo, P. B. Pencharz, R. O. Ball. 2005. Development of the indicator amino acid oxidation technique to determine the availability of amino acids from dietary protein in pigs. *J Nutr*. 135(12):2866-70.
- Moise, N.S., L. M. Pacioretty, F. A. Kallfelz, M. H. Stipanuk, J. M. King, R. F. Jr Gilmour. 1991. Dietary taurine deficiency and dilated cardiomyopathy in the fox. *Am. Heart J*. 121:541-547. doi: 10.1016/0002-8703(91)90724-V

- Monnet, E., E. C. Orton, M. Salman, J. Boon. 1995. Idiopathic dilated cardiomyopathy in dogs: survival and prognostic indicators. *J. Vet. Intern. Med.* 9:12-17. doi: 10.1111/j.1939-1676.1995.tb03266.x
- Nardelli, T. R., R. A. Ribeiro, S. L. Balbo, E. C. Vanzela, E. M. Carneiro, A. C. Boschero, M. L. Bonfleur. 2011. Taurine prevents fat deposition and ameliorates plasma lipid profile in monosodium glutamate-obese rats. *Amino Acids.* 41(4):901-908. doi: 10.1007/s00726-010-0789-7
- NRC, National Research Council. 2006. *Nutrient Requirements of Dogs and Cats*. 10th ed. The National Academy Press, Washington, DC.
- NRC, National Research Council. 2012. *Nutrient Requirements of Swine*. 11th ed. The National Academic Press, Washington, DC.
- Nyachoti, C. M., C. F. M. de Lange, B. W. McBride, S. Leeson, H. Schulze. 2000. Dietary influence on organ size and in vitro oxygen consumption by visceral organs of growing pigs. *Livest Prod Sci.* 65:229-237. doi: 10.1016/S0301-6226(00)00157-3
- O'Maille, E. R. L., T. G. Richards, A. H. Short. 1965. Acute taurine depletion and maximal rates of hepatic conjugation and secretion of cholic acid in the dog. *J Physiol.* 1965;180:67-79.
- Owczarek-Lipska, M., T. B. Mausberg, H. Stephenson, J. Dukes-McEwan, G. Wess, T. Leeb. 2013. A 16-bp deletion in the canine PDK4 gene is not associated with dilated cardiomyopathy in a European cohort of Doberman Pinschers. *Anim Genet.* 44:239. doi: 10.1111/j.1365-2052.2012.02396.x
- Patterson, C. A., J. Curran, T. Der. 2017. Effect of Processing on Antinutrient Compounds in Pulses. *Cereal Chemistry.* 94(1):2-10. doi: doi:10.1094/CCHEM-05-16-0144-FI.
- Pion, P. D., M. D. Kittleson, Q. R. Rogers, J. G. Morris. 1987. Myocardial failure in cats is associated with low plasma taurine: a reversible cardiomyopathy. *Science* 237:764-768. doi: 10.1126/science.3616607
- Pion, P. D., S. L. Sanderson, M. D. Kittleson. 1998. The effectiveness of taurine and levocarnitine in dogs with heart disease. *Vet. Clin. North Am. Small Anim. Pract.* 28:1495-1514. doi: 10.1016/S0195-5616(98)50134-9
- Rășanu, T., M. Mehedinți-Hâncu, M. Alexianu, T. Mehedinți, E. Gheorghe, I. Damian. Carnitine deficiency. *Rom J Morphol Embryol.* 2012;53:203-206.
- Rice, J. E., S. L. Ihle. 1994. Effects of diet on fecal occult blood testing in healthy dogs. *Can. J. Vet. Res.* 58:134-137.
- Roberfroid, M. B. 2005. Introducing inulin-type fructans. *Br. J. Nutr.* 93:S13-25.

- Robinson, J. L., L. E. McBreairty, E. W. Randell, J. A. Brunton, R. F. Bertolo. 2016(b). Restriction of dietary methyl donors limits methionine availability and affects the partitioning of dietary methionine for creatine and phosphatidylcholine synthesis in the neonatal piglet. *J. Nutr. Biochem.* 35:81-86. doi: 10.1016/j.jnutbio.2016.07.001.
- Robinson, J. L., S. V. Harding, J. A. Brunton, R. F. Bertolo. 2016(a). Dietary methyl donors contribute to whole-body protein turnover and protein synthesis in skeletal muscle and the jejunum in neonatal piglets. *J. Nutr.* 146: 2007–2012. doi: 10.3945/jn.115.226035
- Sanderson, S.L., K. L. Gross, P. N. Ogburn, C. Calvert, G. Jacobs, S. R. Lowry, K. A. Bird, L. A. Koehler, L. L. Swanson. 2001. Effects of dietary fat and L-carnitine on plasma and whole blood taurine concentrations and cardiac function in healthy dogs fed protein-restricted diets. *Am J Vet Res.* 62:1616-1623. doi: 10.2460/ajvr.2001.62.1616
- Schaffer, S. W., C. J. Jong, K. C. Ramila, J. Azuma. 2010. Physiological roles of taurine in heart and muscle. *J Biomed Sci* 17:S2. doi: 10.1186/1423-0127-17-S1-S2
- Sisson, D. D., W. P. Thomas, B. W. Keene. 2000. Primary myocardial disease in the dog. In: Ettinger SJ, Feldman EC, editors. *Textbook of veterinary internal medicine. Diseases of the dog and cat.* 5th edition. Philadelphia: WB Saunders Co. Pp. 874–895.
- Spitze, A. R., D. L. Wong, Q. R. Rogers, A. J. Fascetti. 2003. Taurine concentrations in animal feed ingredients; cooking influences taurine content. *J. Anim. Physiol.* 87:251-262. OI: 10.1046/j.1439-0396.2003.00434.x
- Stoll, B., J. Henry, P. J. Reeds, H. Yu, F. Jahoor, D. G. Burrin. 1998. Catabolism dominates the first-pass intestinal metabolism of dietary essential amino acids in milk protein-fed piglets. *J Nutr.* 128:606-614. doi: 10.1093/jn/128.3.606
- Story, J.A., D. Kritchevsky. 1978. Bile acid metabolism and fiber. *Am. J. Clin. Nutr.* 31:S199-S202. doi: 10.1093/ajcn/31.10.S199
- Swanson, K. S., R. A. Carter, T. P. Yount, J. Aretz, P. R. Buff. 2013. Nutritional Sustainability of Pet Foods. *Adv Nutr.* 4(2):141–150. doi: 10.3945/an.112.003335
- Teodorowicz, M., J. van Neerven, H. Savelkoul. 2017. Food processing: The influence of the Maillard reaction on immunogenicity and allergenicity of food proteins. *Nutr* 9:835. doi: 10.3390/nu9080835
- Tôrres, C. L., R. C. Backus, A. J. Fascetti, Q. R. Rogers. 2003. Taurine status in normal dogs fed a commercial diet associated with taurine deficiency and dilated cardiomyopathy. *J Anim Physiol Anim Nutr (Berl).* 87:359-372. doi: 10.1046/j.1439-0396.2003.00446.x
- Tosh, S.M. S. Yada. Dietary fibres in pulse seeds and fractions: Characterization, functional
 Werner, P., M. G. Raducha, U. Prociuk, M. M. Sleeper, T. J. Van Winkle, P. S. Henthorn. 2008. A novel locus for dilated cardiomyopathy maps to canine chromosome. *Genomics.* 2008; 91(6):517-521. doi: 10.1016/j.ygeno.2008.03.007

- Worden, J. A., M. H. Stipanuk. 1985. A comparison by species, age and sex of cysteinesulfinatyl decarboxylase activity and taurine concentration in liver and brain of animals. *Comp Biochem Physiol* 82B:233-239. doi: 10.1016/0305-0491(85)90232-9
- Yamka, R. M., U. Jamikorn, A. D. True, D. L. Harmon. 2003. Evaluation of soybean meal as a protein source in canine foods. *Anim. Feed Sci. Technol.* 109:121-132. doi: 10.1016/S0377-8401(03)00203-7
- Žilić, S., I. Bozović, V. H. T. Šukalović. 2012. Thermal Inactivation of Soybean Bioactive Proteins. *International Journal of Food Engineering* 8:1556-3758 doi: <https://doi.org/10.1515/1556-3758.2521>.

Accepted Manuscript

Figure 1. Metabolism of sulfur amino acids. DMG: dimethylglycine, SAH, S-adenosylhomocysteine; SAM, S-adenosylmethionine

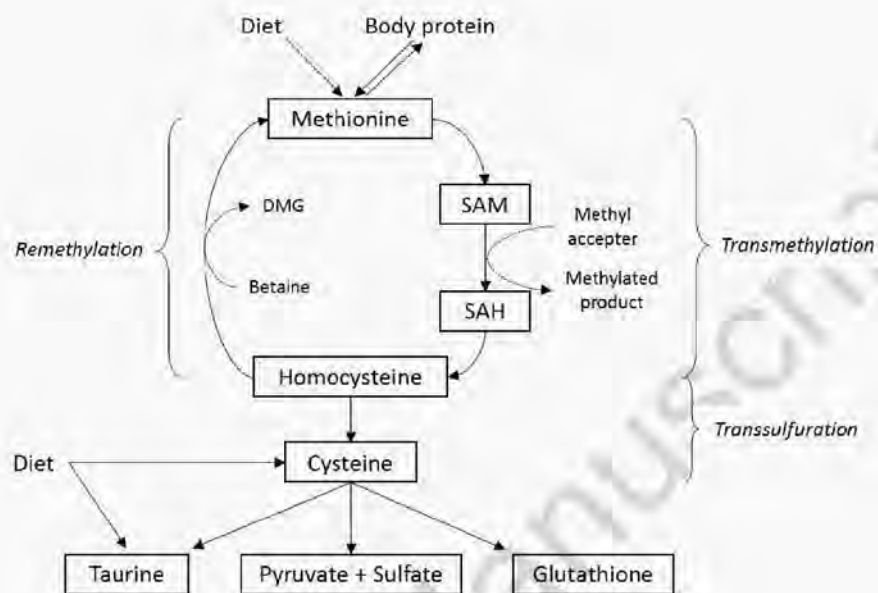


Figure 2. Effect of thermal processing methods on trypsin inhibitor levels (mg/g) soybean kernel. ¹Treatment conditions: None = no treatment; Dry Extrusion for 25 to 30 sec (1=100 °C; 2=125 °C; 3=140 °C; 4= 150 °C); Wet Extrusion for 25 to 30 sec with 6 to 8 % added moisture (1=100 °C; 2=125 °C; 3=140 °C); Micronisation with near-infrared rays wavelength of 1.8 to 3.4 µm for 90 sec (1=100 °C; 2=125 °C; 3=140 °C; 4= 150 °C); Microwave roasting at 800 W and 2450 MHz (1 = 1 min (kernel temp = 57 °C), 2 = 2 min (kernel temp = 88 °C), 3 = 3 min (kernel temp = 108 °C), 4 =4 min (kernel temp =121 °C), 5 = 5 min (kernel temp = 132 °C)); Autoclaving at 120 °C and 1.2 bars (1 = 10 min, 2 = 20 min, 3 = 30 min). Reprinted with permission from Zilic et al. (2012)

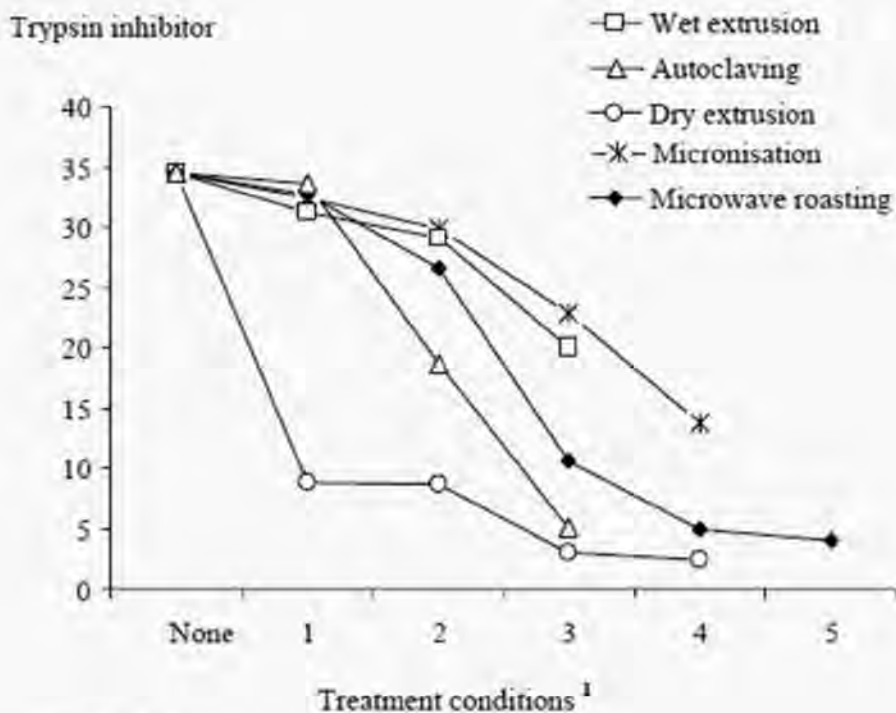


Table 1. Crude protein (CP), fiber, selected amino acids, and carnitine contents in the principal legumes, cereals, and animal-derived ingredients used in dog food formulation.¹

Ingredients	CP, %	Crude fiber, ² %	α -amino acids, mg/g protein ²			Tau, mg/kg ³	Carnitine, mg/kg ⁴	
			Lys	Met	Cys			
Legumes	Fava Beans	27.2	8.55	23.9	7.0	12.5	--	
	Phaseolus beans	22.9	NR	72.9	12.7	12.7	--	
	Kidney beans	20.0	6.40	26.5	14.0	12.0	--	
	Lentils	26.0	NR	65.8	6.9	10.4	--	
	Lupins	32.4	14.25	48.7	6.5	14.2	--	
	Chick peas	20.3	6.16	69.4	14.8	21.6	--	
	Soybean meal	47.7	3.89	62.0	13.8	14.7	--	
Grains	Barley	11.3	3.90	35.3	17.7	22.9	--	
	Corn, yellow dent	8.2	1.98	30.3	21.8	23.1	--	
	Oats	11.2	2.20	43.9	60.9	32.3	--	
	Rice	7.9	0.52	44.5	31.8	22.9	--	
	Rye	11.7	2.71	36.9	13.7	16.3	--	
	Sorghum	9.4	2.14	21.4	17.1	19.2	--	
	Wheat hard, red	14.5	2.57	27.0	15.2	22.8	--	
Animal-derived ingredients	Beef, meat	15.0	--	77.3	28.7	15.3	296	150
	Chicken, meat and skin	17.6	--	81.3	26.7	13.1	159	57
	Chicken, by product	59.0	--	48.1	17.3	16.8	3049	120
	Lamb, ground	16.6	--	88.0	25.9	12.0	473	282.3
	Rendered meat	54.1	2.50	53.8	14.2	11.3	NR	NR

Cys: cysteine, Lys: lysine, Met: methionine, NR: not reported, Tau: taurine.

¹Values are presented in as-fed basis.

²NRC, 2006; NRC, 2012

³Spitze et al. 2003

⁴Arslan, 2006

Table 2. Recommended allowance (RA) and minimum dietary content suggested by AAFCO for crude protein and essential amino acids in dog food, and their physiological roles and potential interactions.

Nutrient	NRC RA ¹ , % DM	AAFCO ² , % DM	Important physiological roles and potential interactions
Crude protein	10	18	Necessary for synthesis of non-essential amino acids
Arginine	0.35	--	Competes with lysine absorption, arginine should be increased when high lysine concentrations in the diet
Histidine	0.19	--	
Lysine	0.35	0.63	Highly reactive to reducing sugars during heating (Maillard reaction), reducing bioavailability
Methionine	0.33	0.33	Requirement increases when methyl donors/acceptors and cysteine are reduced in the diet
Methionine + cystine	0.65	0.65	Requirement is increased with low supply of taurine and during immune challenge
Phenylalanine	0.45	0.45	
Phenylalanine + tyrosine	0.74	0.74	
Threonine	0.43	0.48	Abundant in mucosal proteins (mucin), requirement increases when feeding high fermentable fibers
Tryptophan	0.14	0.16	Precursor for serotonin synthesis. Ratio of Trp: LNAA should be considered; lower ratios may deprive appetite
Valine	0.49	0.49	Abnormal Increment of valine, leucine, or isoleucine (BCAA) will cause catabolism of the other BCAA in the muscle
Isoleucine	0.38	--	
Leucine	0.68	0.68	

AAFCO: The Association of American Feed Control Officials, BCAA: branched chain amino acids, DM: dry matter, NRC: National Research Council, RA: recommended allowance, Trp: LNAA: tryptophan to large neutral amino acid ratio.

¹Recommended Allowance requirements for adult dogs at maintenance, Nutrient Requirements of Dogs and Cats (NRC, 2006).

²Minimum dietary content, AAFCO (2018).

CARDIOLOGY SERVICE UPDATES: DOG FOOD & DILATED CARDIOMYOPATHY

The Cardiology Service has developed this document in response to the alerts from the FDA. These alerts identify an associated risk for some grain-free diets containing certain ingredients (legumes like peas, pea components, lentils; white potatoes, sweet potatoes) and a diagnosis of dilated cardiomyopathy (DCM). The links provided throughout this document can be copied and pasted to obtain additional information.

FDA Alerts found here:

<https://www.fda.gov/AnimalVeterinary/NewsEvents/CVMUpdates/ucm613305.htm>

<https://www.fda.gov/AnimalVeterinary/ResourcesforYou/AnimalHealthLiteracy/ucm616279.htm>

What is Dilated Cardiomyopathy (DCM)?

DCM is a heart muscle disorder that results in a weak pump function and heart chamber enlargement. In the early stages of this disease pets may appear totally healthy with no apparent clinical signs. Later in the course of this disease, dogs may have a heart murmur, an arrhythmia (irregular heart beat), collapse episodes, weakness or tiredness with exercise, and even trouble breathing from congestive heart failure. While there are some breeds of dogs (like Dobermans) that have a genetic predisposition to development of DCM, there are also nutritional factors that may result in this disease.

What should I do?

If you are feeding a diet of concern based upon the FDA alert we recommend that you consult with your veterinarian or veterinary cardiologist. We provide 4 general points for guidance below:

1. An initial step is to **consider whether you are willing or interested in performing additional testing** to assess whether your pet is affected with DCM. If you believe your dog is at risk, showing any of the aforementioned clinical signs or would prefer to simply rule out any heart disease, we recommend that you first have your pet's taurine levels tested (both whole blood and plasma levels) as well as seek an echocardiogram by a board-certified veterinary cardiologist. Low taurine levels are associated with development of DCM in dogs and are sometimes a component of this current issue.

Information on taurine testing can be found here: <https://www.vetmed.ucdavis.edu/labs/amino-acid-laboratory>

2. At this time, **diet change is recommended when possible** and should be considered regardless of the results obtained from any testing. You can consult with your veterinarian in selecting a new diet that avoids the ingredients of concern listed by the FDA. When selecting this diet, we recommend that you choose a diet that is manufactured with rigorous quality control measures and research behind the formulation. A way to ensure that your diet meets these recommendations is to follow the following guidelines that were generated by a large number of the world's leading experts in veterinary nutrition.

Food selection guidelines found here:

<https://www.wsava.org/WSAVA/media/Arpita-and-Emma-editorial/Selecting-the-Best-Food-for-your-Pet.pdf>

3. If your pet is identified through testing to have a low blood taurine level or evidence of DCM by echocardiogram, we urge you to **report this information to the FDA**.

FDA reporting guidelines found here: <https://www.fda.gov/AnimalVeterinary/SafetyHealth/ReportaProblem/ucm182403.htm>

4. **Work with your veterinarian(s)** to determine the best course of action and medical treatments if indicated. In the case of a DCM diagnosis, diet change alone may not be sufficient and additional medications may be prescribed.

Please continue to monitor the FDA website and the UC Davis School of Veterinary Medicine Newsfeeds for updates and recommendations regarding this issue.

Taurine deficiency in dogs with dilated cardiomyopathy: 12 cases (1997–2001)

Andrea J. Fascetti, VMD, PhD, DACVN, DACVIM; John R. Reed, DVM, MS, DACVIM;
Quinton R. Rogers, PhD, DACVN; Robert C. Backus, DVM, PhD

Objective—To determine signalment, history, clinical signs, blood and plasma taurine concentrations, electrocardiographic and echocardiographic findings, treatment, and outcome of dogs with low blood or plasma taurine concentrations and dilated cardiomyopathy (DCM).

Design—Retrospective study.

Animals—12 client-owned dogs with low blood or plasma taurine concentrations and DCM.

Procedure—Medical records were reviewed, and clinical data were obtained.

Results—All 12 dogs were being fed a commercial dry diet containing lamb meal, rice, or both as primary ingredients. Cardiac function and plasma taurine concentration improved with treatment and taurine supplementation. Seven of the 12 dogs that were still alive at the time of the study were receiving no cardiac medications except taurine.

Conclusions and Clinical Relevance—Results suggest that consumption of certain commercial diets may be associated with low blood or plasma taurine concentrations and DCM in dogs. Taurine supplementation may result in prolonged survival times in these dogs, which is not typical for dogs with DCM. Samples should be submitted for measurement of blood and plasma taurine concentrations in dogs with DCM, and taurine supplementation is recommended while results of these analyses are pending. (*J Am Vet Med Assoc* 2003;223:1137–1141)

Large-breed dogs, especially males, are predisposed to developing dilated cardiomyopathy (DCM).¹ Because the long-term prognosis for dogs with this disease is poor, methods for preventing the disease would be beneficial. However, in most affected dogs, the underlying cause is unknown.

In 1987, Pion et al² reported an association between low plasma taurine concentrations and DCM in cats. Oral supplementation of affected cats with taurine sig-

nificantly improved clinical signs, restored myocardial function, and improved survival times.³ Since then, the addition of taurine to commercial diets for cats has resulted in a marked decrease in the number of cats developing this disease.

Traditionally, dogs have not been recognized as having a dietary need for taurine, because they are able to synthesize taurine from the dietary sulfur amino acids methionine and cysteine.⁴ Recently, however, a cardiologist in private practice (JRR) brought to the attention of the authors 4 unrelated, large-breed dogs with DCM. At the time of initial examination, all 4 dogs were found to have low blood taurine concentrations. One common factor among the dogs was consumption of the same lamb meal and rice commercial dry diet. Later, a Border Collie with DCM and low blood taurine concentrations was brought to our attention by a second local cardiologist in private practice. This dog was also consuming a lamb meal and rice diet, but one produced by another manufacturer. The common diet history for these 5 dogs suggested that diet may have had a role in the development of low blood taurine concentrations and DCM in these dogs. The purpose of the study reported here was to determine the signalment, history (including diet history), clinical signs, blood and plasma taurine concentrations, electrocardiographic and echocardiographic findings, treatment, and outcome of dogs with low blood or plasma taurine concentrations and DCM. In addition, we wanted to determine whether diet may have had any role in the development of DCM.

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The authors thank Drs. Sean Delaney, Melanie Morgan, and Lorie Siemens for their assistance.

Address correspondence to Dr. Fascetti.

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Managing dilated cardiomyopathy (Proceedings)

Apr 01, 2010

 By **Barret J. Bulmer, DVM, MS, DACVIM (cardiology)**
 CVC IN WASHINGTON, D.C. PROCEEDINGS

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Etiology

The cause(s) of dilated cardiomyopathy (DCM) in dogs is (are) unknown. Some of the proposed causes of DCM include: genetic defect(s), viral infection, microvascular spasm, chemical toxin(s), dietary deficiency, and immune-mediated processes. There appears to be a familial predisposition to the development of DCM in some breeds of dogs, and many investigators suspect a heritable defect in the metabolic processes of myocardial cells. It is quite possible that DCM is not a single disease, and that there are many etiologies. Taurine deficiency has been convincingly shown to be a reversible cause of DCM in cats and is also a suspected cause of DCM in foxes, but is not an important cause of DCM in dogs-except in Cocker spaniels. A number of chemical toxins (anthracycline antibiotics, gossypol, monensin) have been shown to cause myocardial failure. There is evidence that Adriamycin exerts at least some of its toxic myocardial effects by inducing histamine and catecholamine-mediated microvascular spasm.

One of the most frustrating aspects of attempts to identify the etiology behind DCM is determining if changes in protein expression are primary or secondary in nature. Up-regulation and down-regulation of proteins responsible for cardiac contraction (1, 2, and α receptors), ventricular relaxation (SERCA2, phospholamban) and energy production (carnitine transport, creatine kinase) occur to equivalent degrees in volume overload, pressure overload, and cardiomyopathy. "In this respect the intracellular biochemical specificity of the response of the myocyte to a chronic insult appears to be relatively restricted. The foremost question remains, which, if any, are the true pathogenic alterations and which are cellular adaptations."

Epidemiology

The exact prevalence of DCM is unknown, but it is believed to be the most common cause of cardiac disability in large and giant breed dogs. Although DCM has been identified with increasing frequency in medium size breeds such as English and American cocker spaniels, this disease remains primarily a disease of large and giant purebred dogs. According to the Purdue VMDB the prevalence rate of DCM was highest in Scottish deerhounds (6.0 percent), Doberman pinschers (5.8 percent), Irish wolfhounds (5.6 percent), Great Danes (3.9 percent), Boxer dogs (3.4 percent), Saint Bernards (2.6 percent), Afghan hounds (1.7 percent), Newfoundlands (1.3 percent), and Old English sheepdogs (0.9 percent). The prevalence of DCM was 0.69 percent in English cocker spaniels and 0.34 percent in American cocker spaniels. Dogs of both sexes and all ages may be affected but the disease is most commonly

diagnosed in middle-aged male dogs. The prevalence of DCM increases with age (VMDB). However, because of the lower number of aged dogs examined, the majority of dogs presented for evaluation and treatment of DCM and heart failure are between 4 and 10 years old. The prevalence of DCM in male dogs (0.66 percent) is nearly twice that of female dogs (0.34 percent) according to the VMDB. An autosomal dominant mode of transmission has been reported in the Irish Wolfhound, Newfoundlands, and Doberman Pinschers. In the juvenile Portuguese Water Dog, an autosomal recessive transmission has been documented.

History and clinical signs

Affected dogs are usually presented with rapidly progressing clinical signs that the owner has been aware of for only a few weeks. Weakness and exercise intolerance are often the first signs noticed by the owner. The spectrum of clinical signs exhibited by dogs with DCM is similar in all breeds, but the observed frequency of these signs differs between the various breeds and, to some extent, with the lifestyle of the animal. Right sided heart failure manifested as abdominal distension, anorexia, weight loss, and fatigue often predominates in giant breeds, while signs of left heart failure or syncope are more common in Doberman pinschers and Boxer dogs. More variable signs include anorexia, weight loss, syncope and sudden death. These latter two events appear to be most common in Boxer dogs and Doberman pinschers.

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A broken heart: Risk of heart disease in boutique or grain-free diets and exotic ingredients

vetnutrition.tufts.edu/2018/06/a-broken-heart-risk-of-heart-disease-in-boutique-or-grain-free-diets-and-exotic-ingredients

by Lisa M. Freeman, DVM, PhD, DACVN

June 3, 2018



Earlier this year, Peanut, a 4-year-old male Beagle/Lab mix was diagnosed with a life-threatening heart disease at our hospital. Peanut had been lethargic, not eating well, and occasionally coughing. The veterinary cardiologist seeing him asked what he was eating and found that his owner, in a desire to do the best thing for Peanut, was feeding a boutique, grain-free diet containing kangaroo and chickpeas. Peanut required several medications to treat his heart failure but the owner also changed his diet. And today, now 5 months later, Peanut's heart is nearly normal!

Heart disease is common in our companion animals, affecting 10-15% of all dogs and cats, with even higher rates in Cavalier King Charles Spaniels, Doberman Pinschers, and Boxer dogs. Most nutritional recommendations focus on treating dogs and cats with heart disease and there is much less information on the role of diet in causing heart disease. However, a recent increase in heart disease in dogs eating certain types of diets may shed light on the role of diet in causing heart disease. It appears that diet may be increasing dogs' risk for heart disease because owners have fallen victim to the many myths and misperceptions about pet food. If diet proves

to be the cause, this truly is heart-breaking to me.

In my 20 years as a veterinary nutritionist, I've seen vast improvements in our knowledge about pet nutrition, in the quality of commercial pet foods, and in our pets' nutritional health (other than the unfortunate rise in obesity). However, in the last few years I've seen more cases of nutritional deficiencies due to people feeding unconventional diets, such as unbalanced home-prepared diets, raw diets, vegetarian diets, and boutique commercial pet foods. The pet food industry is a competitive one, with more and more companies joining the market every year. Marketing is a powerful tool for selling pet foods and has initiated and expanded fads, that are unsupported by nutritional science, including grain-free and exotic ingredient diets. All this makes it difficult for pet owners to know what is truly the best food for their pet (as opposed to the one with the loudest or most attractive marketing). Because of the thousands of diet choices, the creative and persuasive advertising, and the vocal opinions on the internet, pet owners aren't able to know if the diets they're feeding have nutritional deficiencies or toxicities – or could potentially even cause heart disease.

Dilated cardiomyopathy

Dilated cardiomyopathy or DCM occurs in cats where it is associated with a nutritional deficiency (see below). DCM is a serious disease of the heart muscle which causes the heart to beat more weakly and to enlarge. DCM can result in abnormal heart rhythms, congestive heart failure (a build-up of fluid in the lungs or abdomen), or sudden death. In dogs, it typically occurs in large- and giant-breeds, such as Doberman pinschers, Boxers, Irish Wolfhounds, and Great Danes, where it is thought to have a genetic component. Recently, some veterinary cardiologists have been reporting increased rates of DCM in dogs – in both the typical breeds and in breeds not usually associated with DCM, such as Miniature Schnauzers or French Bulldogs. There is suspicion that the disease is associated with eating boutique or grain-free diets, with some of the dogs improving when their diets are changed. The US Food and Drug Administration (FDA) Center for Veterinary Medicine and veterinary cardiologists are currently investigating this issue.

Is diet the cause?

It's not yet clear if diet is causing this issue. The first thought was a deficiency of an amino acid called taurine. DCM used to be one of the most common heart diseases in cats but in 1987, it was discovered that feline DCM was caused by insufficient taurine in the diet. It was shown that DCM in cats could be reversed with taurine supplementation, and now all reputable commercial cat foods contain enough taurine to prevent the development of this lethal disease. We still occasionally see taurine deficiency-induced DCM in cats but it is usually when owners are feeding a vegetarian or home-prepared diet, supplemental diets, or a diet made by a manufacturer with inadequate nutritional expertise or quality control.

In dogs, Golden Retrievers and Cocker Spaniels were found to be at risk for DCM caused by taurine deficiency, and one study showed that Cocker Spaniels with DCM improved when given taurine supplementation. Since then, additional studies have shown associations between

dietary factors and taurine deficiency in dogs, such as lamb, rice bran, high fiber diets, and very low protein diets. And certain other breeds were found to be at increased risk for taurine deficiency and DCM, including Newfoundlands, St. Bernards, English Setters, Irish Wolfhounds, and Portuguese Water Dogs. The reasons for taurine deficiency in dogs are not completely understood but could be reduced production of taurine due to dietary deficiency or reduced bioavailability of taurine or its building blocks, increased losses of taurine in the feces, or altered metabolism of taurine in the body.

No matter what the reason, the number of dogs with taurine deficiency and DCM subjectively appeared to decrease since the early 2000's. However, recently, some astute cardiologists noticed higher rates of DCM including Golden retrievers and in some atypical dog breeds. They also noticed that both the typical and atypical breeds were more likely to be eating boutique or grain-free diets, and diets with exotic ingredients - kangaroo, lentils, duck, pea, fava bean, buffalo, tapioca, salmon, lamb, barley, bison, venison, and chickpeas. Even some vegan diets have been associated. It has even been seen in dogs eating raw or home-prepared diets.

So, is this latest rash of DCM caused by taurine deficiency? Most of these affected dogs were eating boutique, grain-free, or exotic ingredient diets. Some of the dogs had low taurine levels and improved with taurine supplementation. But even some of those dogs that were not taurine deficient improved with taurine supplementation and diet change. Fortunately, cardiologists reported the issue to the FDA which is currently investigating this issue. [Note: Dr. Joshua Stern from the University of California Davis is conducting research on taurine deficiency and DCM in Golden Retrievers.

It's not so simple

Currently, it seems that there may be two separate problems occurring - one related to taurine deficiency and a separate and yet unknown problem (with a third group of dogs likely having DCM completely unrelated to diet). Identifying the potential dietary factors contributing to DCM in the non-aurine deficient dogs is more difficult, but the FDA and cardiologists are hard at work trying to solve it. What seems to be consistent is that it does appear to be more likely to occur in dogs eating boutique, grain-free, or exotic ingredient diets.

Exotic ingredients are on the rise

Why are pet owners feeding these exotic ingredients? I think it is primarily because pet owners are falling victim to marketing which portrays exotic ingredients as more natural or healthier than typical ingredients. There is no truth to this marketing - and there is no evidence that these ingredients are any more natural or healthier than more typical ingredients. This is just good marketing that preys on our desire to do the best for our pets.

There is no proof that grain-free is better!

Many pet owners have, unfortunately, also bought into the grain-free myth. The fact is that food allergies are very uncommon, so there's no benefit of feeding pet foods containing exotic ingredients. And while grains have been accused on the internet of causing nearly every disease known to dogs, grains do not contribute to any health problems and are used in pet food as a nutritious source of protein, vitamins, and minerals.

Exotic ingredients are more difficult to use

Not only are the more exotic ingredients unnecessary, they also require the manufacturer to have much more nutritional expertise to be nutritious and healthy. Exotic ingredients have different nutritional profiles and different digestibility than typical ingredients, and also have the potential to affect the metabolism of other nutrients. For example, the bioavailability and metabolism of taurine is different in a lamb-based diet compared to a chicken-based diet or can be affected by the amount and types of fiber in the diet.

Small pet food manufacturers might be better at marketing than at nutrition and quality control

Making high quality, nutritious pet food is not easy! It's more than using a bunch of tasty-sounding ingredients. The right nutrients in the right proportions have to be in the diet, the effects of processing (or not processing) the food need to be considered, and the effects of all the other ingredients in the food need to be addressed, in addition to ensuring rigorous quality control and extensive testing. Not every manufacturer can do this.

How could diet be increasing the risk for DCM?

What is the consistent factor between the diets being implicated in diet-related DCM? It may be related to companies' inadequate nutritional expertise or rigorous quality control. We published a study several years ago in which we measured a single nutrient in 90 canned cat foods that all claimed to be nutritionally complete and balanced. We found that 15% of the diets were deficient in that nutrient (all of those diets were made by small companies). If companies don't have the quality control to ensure all nutrients are at the minimum levels, deficiencies could occur and could contribute to DCM. However, these problems could also be related to problems with bioavailability or interaction with other ingredients in the diet (especially the more exotic ingredients, which are not as well studied or understood). And DCM could even be the result of an ingredient in the diet that is toxic to the heart. The FDA is investigating this potential association between diet and DCM but, in the meantime, there are some things you can do.

What should you do?

- Reconsider your dog's diet. If you're feeding a boutique, grain-free, or exotic ingredient diets, I would reassess whether you could change to a diet with more typical ingredients made by a company with a long track record of producing good quality diets. And do

yourself a favor – stop reading the ingredient list! Although this is the most common way owners select their pets’ food, it is the least reliable way to do so. And be careful about currently available pet food rating websites that rank pet foods either on opinion or on based on myths and subjective information. It’s important to use more objective criteria (e.g., research, nutritional expertise, quality control in judging a pet food). The best way to select what is really the best food for your pet is to ensure the manufacturer has excellent nutritional expertise and rigorous quality control standards (see our “Questions you should be asking about your pet’s food” post).

- If you’re feeding your dog a boutique, grain-free, or exotic ingredient diet, watch for early signs of heart disease – weakness, slowing down, less able to exercise, short of breath, coughing, or fainting. Your veterinarian will listen for a heart murmur or abnormal heart rhythm and may do additional tests (or send you to see a veterinary cardiologist), such as x-rays, blood tests, electrocardiogram, or ultrasound of the heart (echocardiogram).
- If your dog is diagnosed with DCM and eating one of these diets, I’d recommend the following steps:
 - Ask your veterinarian to test whole blood and plasma taurine levels (I recommend the University of California Davis Amino Acid Laboratory)
 - Report it to the FDA. This can be done either online or by telephone. The FDA may be able to help with testing costs for your dog. Reporting it will also help us to identify and solve this current problem.
 - Change your dog’s diet to one made by a well-known reputable company and containing standard ingredients (e.g., chicken, beef, rice, corn, wheat). Changing to a raw or homecooked diet will not protect your dog from this issue (and may increase the risk for other nutritional deficiencies). If your dog requires a homecooked diet or has other medical conditions that require special considerations, be sure to talk to a veterinarian or a veterinary nutritionist (acvn.org) before making a dietary change. You can contact the Cummings Nutrition Service to schedule an appointment (vetnutrition@tufts.edu)
 - Start taurine supplementation. Your veterinarian or veterinary cardiologist can recommend an appropriate dose for your dog. Be sure to use a brand of taurine with good quality control.
 - Any improvements in your dog’s DCM can take 3-6 months. Your dog will need regular monitoring and may require heart medications during this time. There’s no guarantee she’ll improve but is certainly worth a try.
 - Make sure your dog is getting the best combination of medications to treat his heart disease, as this can make a difference in his outcome. You can find a board-certified veterinary cardiologist near you on this website: <http://find.vetspecialists.com/>

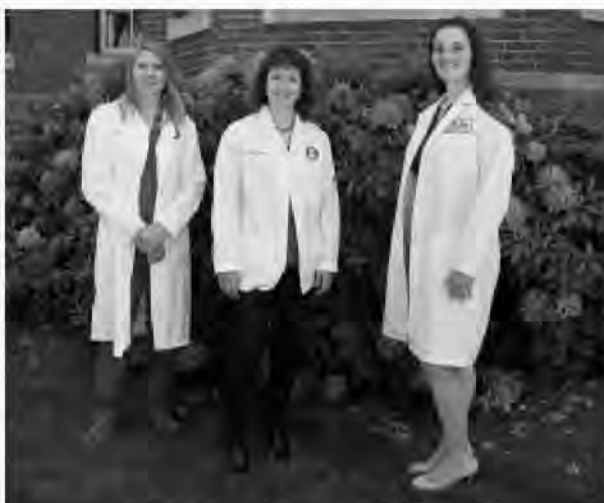
Sometimes, the changes we make in pet nutrition advance our knowledge and the health of our pets. In other cases, we can take a step in the wrong direction when the marketing outpaces the science. Hopefully, identifying this current issue will allow us to set a new, more science-based approach to the optimal nutrition of our pets.

For more information about heart disease in dogs, please see our HeartSmart website.



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As you're on this website right now, we can assume that you love pets and likely have a special dog or cat (or many) in your life. We love them, too! And not only do we love the pets, we also love their people, and you are our reason for making this site.

Learn more about the Clinical Nutrition Team at Tufts

The Clinical Nutrition Service at Foster Hospital for Small Animals offers in-person and telephone appointments to pet owners and case consultations to veterinarians within the Foster Hospital and throughout the country.

MAKE AN APPOINTMENT

The Tufts Obesity Clinic for Animals specializes in customized weight management plans that allow for safe weight loss with expert guidance from a board-certified veterinary nutritionist within the Clinical Nutrition Service.

MAKE AN APPOINTMENT

The Washington Post

Animalia

Grain-free, exotic dog food linked to heart disease

By Kate Furby

August 29

It started with a late-night cough. "He was otherwise fine, but ... something was weird and different," said Verai Ramsammy, who was worried about her miniature schnauzer, Louie. She was a meticulous dog person, the kind who bought special food for her pets. She made a veterinary appointment just to be safe.

Within months, Ramsammy's second dog, Mico, fell ill with the same problem. This made Ramsammy's veterinarians sit up. The two dogs, both mini schnauzers, were unrelated. Their only connection was the home in which they lived.

Their cases helped link a serious, sometimes fatal, heart condition with the latest dog food fad. As more cases were reported from around the country this year, veterinarians and the U.S. Food and Drug Administration (FDA) began investigating a potential link between boutique, grain-free diets and a heart disease called canine dilated cardiomyopathy (DCM), which had been known primarily as a genetic disorder. This summer, the FDA issued a caution against grain-free diets. Since then, many more reports have poured in.

Three weeks after Louie's minor cough and a bronchitis misdiagnosis, Ramsammy said, the 19-pound "typical barkschnauzer" with a rough black coat stopped eating and had trouble breathing.

"It was bad. It just progressed so quickly," said Ramsammy, an intensive-care unit physician who was no stranger to emergencies. She rushed him an hour and a half away to North Carolina State University's veterinary hospital, in Raleigh, for advanced care.

After a sleepless night at the hospital with Louie, Ramsammy saw Mico collapse outside the hospital. "He had this spastic movement, and then he scrambled to his feet," she said. She assumed the stress of travel and hospital visits was getting to the dog, the way it was getting to her.

Inside the hospital, Louie's heart was enlarged, and fluid was filling his lungs. "He was dying," Ramsammy said, "there was nothing I could do." Ramsammy held him as he died, one month after his symptoms began.

Three months later, Mico, a soft-haired, salt-and-pepper-colored schnauzer, was collapsing more frequently. Darcy Adin and her veterinary team at N.C. State found he was also struggling with an enlarged heart. The veterinarians put Mico on heart medication immediately. The dog was "on the verge of going into heart failure the way Louie did, and it's just lucky they caught it in time," Ramsammy said.

Canine DCM weakens the dog's heart, Adin said, preventing it from pumping enough blood, so it enlarges to try to compensate. After a certain point, fluid backs up from the heart into the lungs, causing congestion and coughing. Other symptoms of DCM include difficulty breathing, weakness and lethargy. It can eventually "lead to congestive heart failure signs and, in some cases, sudden death," Adin said.

Across the country at the University of California at Davis, Joshua Stern, another veterinary cardiologist, started to see surprising signs of heart disease in his golden retriever patients. Multiple veterinary groups, working independently at first, started to notice this disturbing trend. The world of veterinary cardiology is small, with about 200 specialists in the United States, Stern said. They alerted the FDA. Together, they began compiling cases and investigating environmental conditions that might affect unrelated dogs within one household. The vets started to find that many of the sick dogs had been on grain-free diets, high in legumes, leading up to their illnesses.

"There was a lot of guilt that it was something I'd done, but I had no idea what it was," Ramsammy said.

On July 12, the FDA put out a cautionary statement. The FDA report stated that canine DCM was typically caused by a genetic predisposition in large breed dogs such as Great Danes and Newfoundlands. The recent cases included "Golden and Labrador retrievers, a Whippet, a Shih Tzu, a Bulldog and Miniature Schnauzers, as well as mixed breeds. Early reports ... indicate that the impacted dogs consistently ate foods containing peas, lentils, other legume seeds or potatoes as main ingredients," said the report. The length of exposure to the diet ranged from months to years.

Before releasing the cautionary statement, the FDA had received 30 reports of dogs affected with DCM and linked to a grain-free diet, said Martine Hartogensis, the deputy director of the FDA's Center for Veterinary Medicine, and the veterinary cardiologists had collected about 150 cases. Since then, the FDA has received reports of an additional 120 dogs sickened with DCM, most involving a grain-free diet. At least 24 dogs have died of the condition.

The FDA is still investigating the link with grain-free pet food. An FDA press officer stated in an email that it "has not determined that the pet food is causally associated with these pet illnesses and deaths." No dog food has been recalled.

"If dozens of babies were getting deathly ill eating a formula, that formula would have been pulled from the shelf a long time ago," Stern said. He has identified 24 golden retrievers affected by this issue over the past one to two years, compared with previous years of just one or two cases total.

The condition is linked to a taurine deficiency. Taurine is an amino acid that most animals, including humans, can create their own. Dogs get a lot of it from their diet. Chicken and beef are high in taurine, while rabbit, lamb, legumes, pea-protein and other ingredients found in some grain-free foods have little or no taurine. If items that are naturally low in taurine are placed in food formulas, they need to be supplemented with taurine, Stern said.

Big brands of dog food have the resources to test their products extensively in the lab and in feeding trials, Stern said. The FDA and federal law have mandated that pet food be safe and properly labeled. However, in a statement to The Washington Post, the agency said: "It is the manufacturer's responsibility to ensure that the animal food products it produces are safe. ... The FDA has the authority to take action when animal food is unsafe or if a label is inaccurate or misleading." The FDA "does not have premarket approval authority" for pet food formulas before the bags of kibble appear on store shelves.

There are important things to look for on dog food labels. For example, the phrase "complete and balanced" is a specific term meaning that the dog food has met the minimum requirements set forth by the Association of American Feed Control Officials (AAFCO). Although it does not have regulatory authority, AAFCO monitors the sale and distribution of pet food as well as recommending nutrient profiles for cats and dogs.

Dog food trends may track with pet owner tendencies. Stern likened grain-free dog food to the cave man diet for humans. "As the push for raw ingredients and organic growing grew in the human market, it similarly grew in the pet market," he said.

Stern said dogs do not need just the "chicken cutlet," as some pet food advertises, even if this sounds more appealing to the average (human) American family. Byproducts on pet food labels are defined as organ meat, lungs, liver, etc. These are all great for dogs to eat, Stern said.

Some dog owners may think their dogs have allergies, but Stern and Adin said it's important to know that the most common allergies for dogs are not to grains but to meat. Chicken is a common allergen for dogs. While a dog can be allergic to corn or wheat, it would be a very rare coincidence to find a dog allergic to all "grains."

Dogs, unlike wolves, are omnivores and can consume up to 50 percent of their diet as carbohydrates. Ramsammy had chosen a grain-free diet for her dogs based on a friend's suggestion. She said, of her reasoning at the time, "it's probably like carbohydrates for humans, too much really isn't healthy for them."

"The truth is from a genetic perspective, dogs really aren't that much like wolves anymore. Dogs evolved and so have their digestive tracts," Stern said. "We're not looking at a bunch of little wolves running around eating kibble."

"I'm sitting here with my golden retriever's head lying on my foot, and I don't think she could be any further from a wolf," Stern added.

The pet food industry response to the canine DCM increases has been varied. Mars Petcare, the manufacturers of such brands as Pedigree and Whiskas, said: "We take any pet concern seriously. Along with the broader pet food industry, we are working with the FDA to better understand any potential link between ingredients and DCM."

Ramsammy fed her two mini schnauzers two flavors of California Natural dog food (kangaroo and red lentil as well as venison and green lentil) before they got critically ill. The company posted a message on its website that it is out of business as of summer 2018. The website offers alternatives to its dog food: "As you look to transition to a new food, please consider Nutro™ Limited Ingredient Diet, which ... offers a range of grain free recipes with 10 key ingredients or less, ideal for pets with food sensitivities."

With dogs genetically predisposed to DCM, the condition is irreversible. However, in these new cases, adding taurine to the dogs' diet (and taking them off legumes) can reverse the disorder if caught early enough, Stern and Adin said.

Mico is one such case. He has been on heart medications since May 2017 and is doing very well, Ramsammy said. A typical monthly bill for Mico is \$110 in medications.

"I told him he's going to have to get a job" Ramsammy said.



Kate Furby

Kate Furby reports on science and the environment. Before joining The Washington Post, she worked as an ecologist and science communicator. She is the owner of

The Washington Post

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From: Darcy Adin <dbadin@ncsu.edu>
To: Jones, Jennifer L
Sent: 2/2/2018 12:08:56 PM
Subject: Re: dog food concern

Hi Jennifer,

The Fromm food has several protein sources - I've copied the ingredient list below. 4Health is another one that has popped up for us that we could investigate depending on what you are finding so far?

Thank you!
Darcy



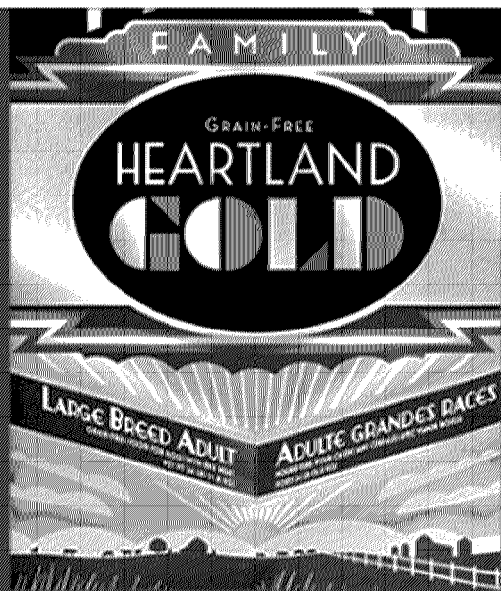
B6



7:05 AM

91%

frommfamily.com



breeds with adult weights exceeding 50 pounds.

Naturally formulated with beef, pork, and lamb. Enhanced with probiotics to

aid digestion

INGREDIENTS

Beef, Pork Meat Meal, Peas, Lentils, Chickpeas, Potatoes, Dried Sweet Potatoes, Dried Tomato Pomace, Pork Liver, Dried Whole Egg, Flaxseed, Pork Fat, Salmon Oil, Pea Flour, Cheese, Lamb, Brewers Dried Yeast, Alfalfa Meal, Potassium Chloride, Carrots, Lettuce, Celery, Salt, Monosodium Phosphate, L-

On Feb 2, 2018, at 6:58 AM, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov> wrote:

Good morning Darcy,
What is the flavor (e.g. chicken and lentil, etc.) for the Fromm Grain free food you submitted?
Thank you and have a nice weekend,
Jen

Jennifer Jones, DVM
Veterinary Medical Officer
Tel: 240-402-5421
<[image001.png](#)> <[image002.png](#)>

From: Jones, Jennifer L
Sent: Tuesday, January 23, 2018 1:58 PM
To: 'Darcy Adin' <dbadin@ncsu.edu>
Subject: RE: dog food concern

Thank you, Darcy! I'll share this with my team working on the case.

With regards to your question, I don't have access to any sales information. If you find anything online, I'd be interested to read it.

Jennifer Jones, DVM
Veterinary Medical Officer
Tel: 240-402-5421
<[image001.png](#)> <[image003.png](#)>

From: Darcy Adin [<mailto:dbadin@ncsu.edu>]
Sent: Tuesday, January 23, 2018 1:53 PM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>
Subject: Re: dog food concern

Thanks for chatting today Jennifer

B5

B5

Do you have access to sales estimates for Grain free diets and California natural diets in particular? I am not able to find this on the web. All I can say is that CN does not come up as one of the "top" diets on websites that discuss Grain free benefits.

Thank you!
Darcy

On Tue, Jan 23, 2018 at 8:49 AM, Darcy Adin <dbadin@ncsu.edu> wrote:
Hi Jennifer,

I wondered if I could speak with you sometime today about the diets and some data we have compiled? My office is [919-513-6032](tel:919-513-6032) and my cell is B6 Alternatively, we could email - just let me know!

Take care
Darcy

On Fri, Jan 12, 2018 at 8:01 AM, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov> wrote:
Thank you, Darcy. My colleague mentioned that *Kogia* whales (pygmy sperm whales) get cardiomyopathy. Several tests have been done to determine an etiology. Just as an FYI-not sure it would be applicable here.
I'll forward the feed results when they are back.
Have a nice weekend,
Jen

Jennifer Jones, DVM
Veterinary Medical Officer
Tel: [240-402-5421](tel:240-402-5421)
<[image001.png](#)> <[image003.png](#)>

From: Darcy Adin [<mailto:dbadin@ncsu.edu>]
Sent: Wednesday, January 10, 2018 6:13 PM

To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>
Subject: Re: dog food concern

Thank you Jennifer - we will be on the lookout for it.

As additional information, one of our cardiologist colleagues in B6 posted a question about this association today on our list serve. She has seen 4 cases of DCM in dogs eating kangaroo and lentil (I assume B5 but not sure) in the last year - 2 were housemates but related.

Take care
Darcy

On Jan 10, 2018, at 8:05 AM, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov> wrote:

Thank you, Darcy. We're sending the kit this week. It should arrive by close of business Friday.

Jennifer Jones, DVM
Veterinary Medical Officer
Tel: [240-402-5421](tel:240-402-5421)
<[image001.png](#)> <[image006.png](#)>

From: Darcy Adin [mailto:dbadin@ncsu.edu]
Sent: Tuesday, January 09, 2018 11:27 AM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>
Subject: Re: dog food concern

Hi Jennifer,

That is great! I've attached a picture of the food sample - the weight is 0.36 kg. We sent blood samples off from 2 dogs to test for selenium; one was in the reference range and the other a bit high.

Thank you!
Take care
Darcy

On Tue, Jan 9, 2018 at 10:07 AM, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov> wrote:
Good morning Darcy,

We'd like to collect some of the food from your current case (California Naturals Kangaroo). I'm going to send it with the archived sample of food from the B6 case. Based on a new article [V. Marinescu & P. McCullough- Nutritional and micronutrient determinants of idiopathic dilated cardiomyopathy: diagnostic and therapeutic implications: Expert Rev. Cardiovasc. Ther. 9(9), 1161–1170 (2011)] about human idiopathic DCM, we're going to test both samples for: Co, Ca, P, Mg, Cu, Fe, Mg, Se, Zn.

Please let me know the size/weight of the sample you have, and I'll send a box to collect it.

Thank you,
Jen

Jennifer Jones, DVM
Veterinary Medical Officer
Tel: [240-402-5421](tel:240-402-5421)
<image001.png> <image003.png>

From: Darcy Adin [mailto:dbadin@ncsu.edu]
Sent: Thursday, January 04, 2018 2:47 PM

To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>
Subject: Re: dog food concern

I also have a food sample for our current inpatient (same food - California Naturals kangaroo and lentil). I'll hang on to this in case we would like to analyze this in the future.

On Thu, Jan 4, 2018 at 2:39 PM, Darcy Adin <dbadin@ncsu.edu> wrote:

The myocardium is from B6 Maybe we will wait to see what the blood levels show.

B5

B5

Thanks!
Darcy

On Thu, Jan 4, 2018 at 2:14 PM, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov> wrote:
Thank you for the update. I'll let you know the selenium concentration from [B6] food after the results are back.
The frozen myocardium, is it from the [B6] case?

Jennifer Jones, DVM
Veterinary Medical Officer
Tel: 240-402-5421
<[image001.png](#)> <[image004.png](#)>

From: Darcy Adin [<mailto:dbadin@ncsu.edu>]
Sent: Wednesday, January 03, 2018 3:10 PM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>
Subject: Re: dog food concern

Hi Jennifer,

Thank you! We have not tested for selenium in any of the dogs. We have stored blood samples from several dogs and have an inpatient right now that we can submit blood from [B4] (uns this). We will probably start with looking at blood samples from 2 dogs as a screening. We also have frozen myocardium from one dog - do you think this should also be evaluated?

Thank you!
Darcy

On Wed, Jan 3, 2018 at 2:30 PM, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov> wrote:
Good afternoon Darcy,
Happy New Year! Thank you for the additional information. I discussed the information you provided below and from the previous case ([B6] Miniature Schnauzers-800.218) with my colleagues.

Based on our discussions, I will test some leftover food from the 800.218 case, for Selenium content. Have any of the dogs with DCM had blood or tissue selenium levels tested?
Thank you kindly,
Jen

Jennifer Jones, DVM
Veterinary Medical Officer
Tel: 240-402-5421
<[image001.png](#)> <[image005.png](#)>

From: Darcy Adin [<mailto:dbadin@ncsu.edu>]
Sent: Wednesday, January 03, 2018 11:31 AM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Subject: dog food concern

Hi Dr. Jones,

I'm hoping that you recall our communications over the summer regarding food testing for unrelated housemate dogs that developed DCM. These dogs were eating California Naturals Kangaroo and Lentil diet and we were not able to identify a cause of the DCM, dietary or infectious or toxic.

I wanted to reach out again because we continue to see DCM in non-genetically predisposed breeds and it seems that this diet is a relatively common theme. We have been increasingly better about recording a diet history in dogs that are presented to cardiology or ER at our hospital with DCM in the last 6 months. Most of the dogs have been tested for taurine and carnitine deficiency and have been within the reference range. About half of them are alive and half died close to the time of diagnosis.

I also searched our records for this diet (knowing that recording of diet in the MR history has been spotty at best) and found another pair of unrelated housemate dogs eating California naturals kangaroo and lentil that were diagnosed with DCM 6 months apart.

We will continue to record the cases we see but since last june we have seen 7 dogs eating California Naturals diet (5 kangaroo and lentil) in addition to the pair of housemates from 2016 (so total of 9). We also have 4 dogs eating Acana (3/4 are dobermans though) and 1 each of 4Health and Iams - so maybe these are not necessarily related.

Have you had any other reports of such an association? If you have any other thoughts or testing suggestions, I would be all ears!

Thank you!

Darcy

--

Darcy B. Adin, DVM, DACVIM (Cardiology)
Clinical Assistant Professor of Cardiology
North Carolina State University
NC State Veterinary Hospital
1060 William Moore Drive
Raleigh, NC 27607
919-513-6032

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Clinical Assistant Professor of Cardiology
North Carolina State University
NC State Veterinary Hospital
1060 William Moore Drive
Raleigh, NC 27607

From: Jones, Jennifer L </o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=0f6ca12eaa9348959a4cbb1e829af244-Jennifer.Jo>
To: 'Darcy Adin'
Sent: 2/2/2018 1:09:13 PM
Subject: RE: dog food concern

Excellent, thank you. The sample results are currently pending. I'll keep you updated.

Jennifer Jones, DVM
Veterinary Medical Officer
Tel: 240-402-5421



From: Darcy Adin [mailto:dbadin@ncsu.edu]
Sent: Friday, February 02, 2018 7:09 AM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Subject: Re: dog food concern

Hi Jennifer,

The Fromm food has several protein sources - I've copied the ingredient list below. 4Health is another one that has popped up for us that we could investigate depending on what you are finding so far?

Thank you!
Darcy



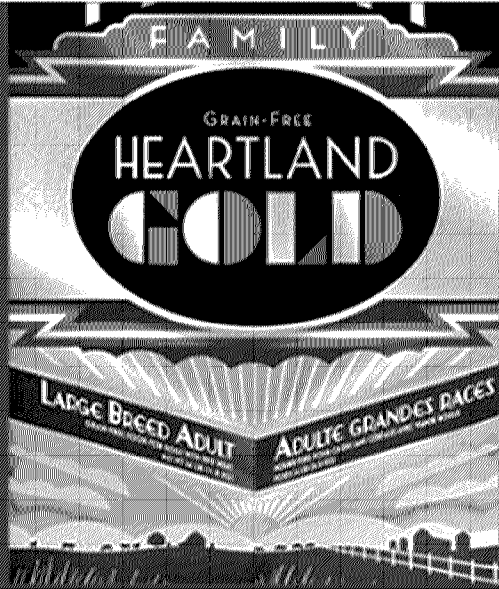
B6



7:05 AM

91%

frommfamily.com



breeds with adult weights exceeding 50 pounds.

Naturally formulated with beef, pork, and lamb. Enhanced with probiotics to

aid digestion

INGREDIENTS

Beef, Pork Meat Meal, Peas, Lentils, Chickpeas, Potatoes, Dried Sweet Potatoes, Dried Tomato Pomace, Pork Liver, Dried Whole Egg, Flaxseed, Pork Fat, Salmon Oil, Pea Flour, Cheese, Lamb, Brewers Dried Yeast, Alfalfa Meal, Potassium Chloride, Carrots, Lettuce, Celery, Salt, Monosodium Phosphate, L-

On Feb 2, 2018, at 6:58 AM, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov> wrote:

Good morning Darcy,
What is the flavor (e.g. chicken and lentil, etc.) for the Fromm Grain free food you submitted?
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Jennifer Jones, DVM
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<[image001.png](#)> <[image002.png](#)>

From: Jones, Jennifer L
Sent: Tuesday, January 23, 2018 1:58 PM
To: 'Darcy Adin' <dbadin@ncsu.edu>
Subject: RE: dog food concern

Thank you, Darcy! I'll share this with my team working on the case.

With regards to your question, I don't have access to any sales information. If you find anything online, I'd be interested to read it.

Jennifer Jones, DVM
Veterinary Medical Officer
Tel: 240-402-5421
<[image001.png](#)> <[image003.png](#)>

From: Darcy Adin [<mailto:dbadin@ncsu.edu>]
Sent: Tuesday, January 23, 2018 1:53 PM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>
Subject: Re: dog food concern

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B5

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Take care
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Tel: [240-402-5421](tel:240-402-5421)
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From: Darcy Adin [mailto:dbadin@ncsu.edu]
Sent: Tuesday, January 09, 2018 11:27 AM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>
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Please let me know the size/weight of the sample you have, and I'll send a box to collect it.

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Tel: [240-402-5421](tel:240-402-5421)
<[image001.png](#)> <[image004.png](#)>

From: Darcy Adin [<mailto:dbadin@ncsu.edu>]
Sent: Wednesday, January 03, 2018 3:10 PM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>
Subject: Re: dog food concern

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Based on our discussions, I will test some leftover food from the 800.218 case, for Selenium content. Have any of the dogs with DCM had blood or tissue selenium levels tested?
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Subject: dog food concern

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I wanted to reach out again because we continue to see DCM in non-genetically predisposed breeds and it seems that this diet is a relatively common theme. We have been increasingly better about recording a diet history in dogs that are presented to cardiology or ER at our hospital with DCM in the last 6 months. Most of the dogs have been tested for taurine and carnitine deficiency and have been within the reference range. About half of them are alive and half died close to the time of diagnosis.

I also searched our records for this diet (knowing that recording of diet in the MR history has been spotty at best) and found another pair of unrelated housemate dogs eating California naturals kangaroo and lentil that were diagnosed with DCM 6 months apart.

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Have you had any other reports of such an association? If you have any other thoughts or testing suggestions, I would be all ears!

Thank you!
Darcy

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From: Darcy Adin <dbadin@ncsu.edu>
To: Jones, Jennifer L
Sent: 2/12/2018 4:54:50 PM
Subject: Re: dog food concern
Attachments: lentil toxin lectin.pdf; mannose binding lectin cardiomyopathy.pdf

Hi Jennifer,

B5

Thank you for your thoughts!

Darcy

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Excellent, thank you. The sample results are currently pending. I'll keep you updated.

Jennifer Jones, DVM

Veterinary Medical Officer

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Sent: Friday, February 02, 2018 7:09 AM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>

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Thank you!

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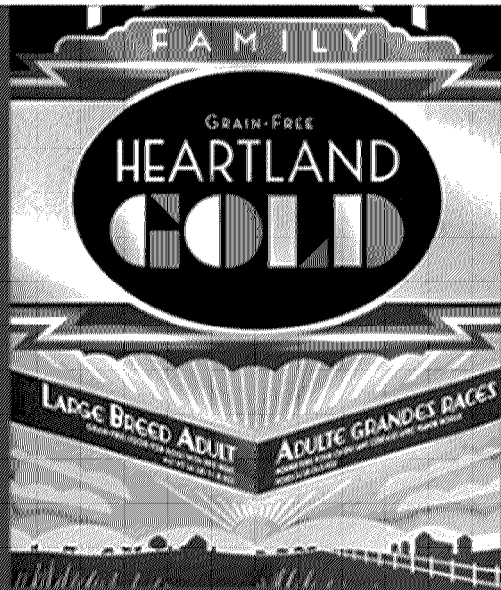
B6



7:05 AM

91%

frommfamily.com



breeds with adult weights exceeding 50 pounds.

Naturally formulated with beef, pork, and lamb. Enhanced with probiotics to

aid digestion

INGREDIENTS

Beef, Pork Meat Meal, Peas, Lentils, Chickpeas, Potatoes, Dried Sweet Potatoes, Dried Tomato Pomace, Pork Liver, Dried Whole Egg, Flaxseed, Pork Fat, Salmon Oil, Pea Flour, Cheese, Lamb, Brewers Dried Yeast, Alfalfa Meal, Potassium Chloride, Carrots, Lettuce, Celery, Salt, Monosodium Phosphate, L-

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From: Jones, Jennifer L </o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=0f6ca12eaa9348959a4cbb1e829af244-Jennifer.Jo>
To: 'Darcy Adin'
Sent: 2/13/2018 6:55:01 PM
Subject: RE: dog food concern

Thank you, Darcy. I'm not sure. I'll have to do some research. Hopefully the results will be back soon on the case samples you provided.

Jennifer Jones, DVM
Veterinary Medical Officer
Tel: 240-402-5421



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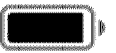
B6



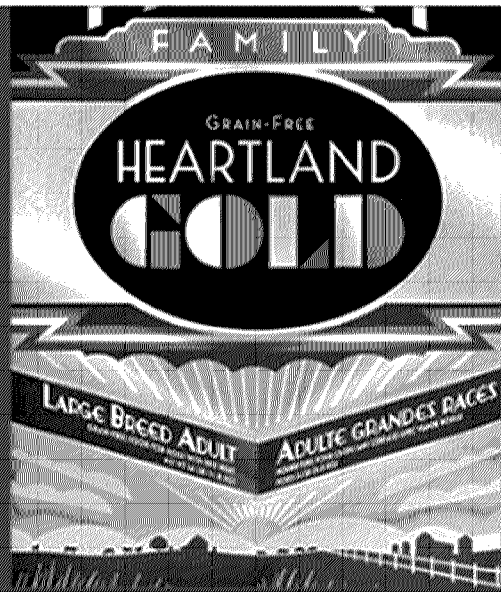
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91%



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breeds with adult weights exceeding 50 pounds.

Naturally formulated with beef, pork, and lamb. Enhanced with probiotics to

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INGREDIENTS

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From: Darcy Adin [<mailto:dbadin@ncsu.edu>]
Sent: Wednesday, January 10, 2018 6:13 PM

To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>
Subject: Re: dog food concern

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From: Darcy Adin <dbadin@ncsu.edu>
To: Jones, Jennifer L
Sent: 2/13/2018 6:58:17 PM
Subject: Re: dog food concern

Thank you Jennifer! We've seen 3 more cases this week so I am waiting with bated breath :)

On Tue, Feb 13, 2018 at 1:55 PM, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov> wrote:

Thank you, Darcy. I'm not sure. I'll have to do some research. Hopefully the results will be back soon on the case samples you provided.

Jennifer Jones, DVM

Veterinary Medical Officer

Tel: [240-402-5421](tel:240-402-5421)



From: Darcy Adin [<mailto:dbadin@ncsu.edu>]
Sent: Monday, February 12, 2018 11:55 AM

To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Subject: Re: dog food concern

Hi Jennifer,

Would there be a way to test the diets for

B5

B5

Thank you for your thoughts!

Darcy

On Fri, Feb 2, 2018 at 8:09 AM, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov> wrote:

Excellent, thank you. The sample results are currently pending. I'll keep you updated.

Jennifer Jones, DVM

Veterinary Medical Officer

Tel: 240-402-5421



From: Darcy Adin [mailto:dbadin@ncsu.edu]

Sent: Friday, February 02, 2018 7:09 AM

To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>

Subject: Re: dog food concern

Hi Jennifer,

The Fromm food has several protein sources - I've copied the ingredient list below. 4Health is another one that has popped up for us that we could investigate depending on what you are finding so far?

Thank you!

Darcy

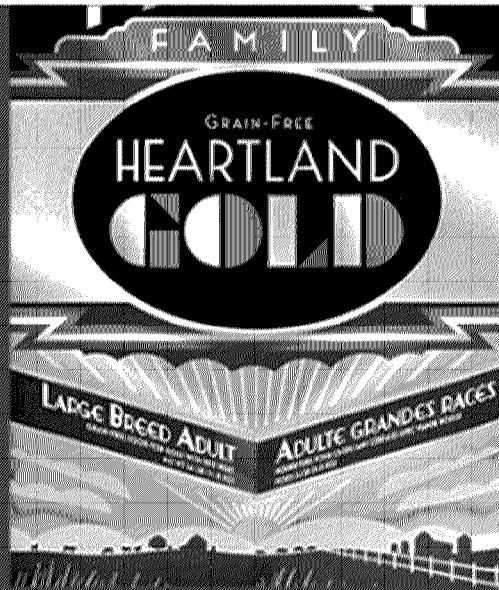


B6

7:05 AM

91%

frommfamily.com



breeds with adult weights exceeding 50 pounds.

Naturally formulated with beef, pork, and lamb. Enhanced with probiotics to

aid digestion

INGREDIENTS

Beef, Pork Meat Meal, Peas, Lentils, Chickpeas, Potatoes, Dried Sweet Potatoes, Dried Tomato Pomace, Pork Liver, Dried Whole Egg, Flaxseed, Pork Fat, Salmon Oil, Pea Flour, Cheese, Lamb, Brewers Dried Yeast, Alfalfa Meal, Potassium Chloride, Carrots, Lettuce, Celery, Salt, Monosodium Phosphate, L-

On Feb 2, 2018, at 6:58 AM, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov> wrote:

Good morning Darcy,

What is the flavor (e.g. chicken and lentil, etc.) for the Fromm Grain free food you submitted?

Thank you and have a nice weekend,

Jen

Jennifer Jones, DVM

Veterinary Medical Officer

Tel: [240-402-5421](tel:240-402-5421)

<[image001.png](#)> <[image002.png](#)>

From: Jones, Jennifer L

Sent: Tuesday, January 23, 2018 1:58 PM

To: 'Darcy Adin' <dbadin@ncsu.edu>

Subject: RE: dog food concern

Thank you, Darcy! I'll share this with my team working on the case.

With regards to your question, I don't have access to any sales information. If you find anything online, I'd be interested to read it.

Jennifer Jones, DVM

Veterinary Medical Officer

Tel: [240-402-5421](tel:240-402-5421)

<[image001.png](#)> <[image003.png](#)>

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Cc: Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>

Subject: Re: dog food concern

Thanks for chatting today Jennifer!

B5

B5

Do you have access to sales estimates for Grain free diets and California natural diets in particular? I am not able to find this on the web. All I can say is that CN does not come up as one of the "top" diets on websites that discuss Grain free benefits.

Thank you!

Darcy

On Tue, Jan 23, 2018 at 8:49 AM, Darcy Adin <dbadin@ncsu.edu> wrote:

Hi Jennifer,

I wondered if I could speak with you sometime today about the diets and some data we have compiled? My office is [919-513-6032](tel:919-513-6032) and my cell is **B6** Alternatively, we could email - just let me know!

Take care

Darcy

On Fri, Jan 12, 2018 at 8:01 AM, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov> wrote:

Thank you, Darcy. My colleague mentioned that *Kogia* whales (pygmy sperm whales) get cardiomyopathy. Several tests have been done to determine an etiology. Just as an FYI-not sure it would be applicable here.

I'll forward the feed results when they are back.

Have a nice weekend,

Jen

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From: Jones, Jennifer L </O=FDA/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=JENNIFER.JONESAA8>
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Clinical Assistant Professor of Cardiology
North Carolina State University
NC State Veterinary Hospital
1060 William Moore Drive
Raleigh, NC 27607
919-513-6032

From: Darcy Adin <dbadin@ncsu.edu>
To: Jones, Jennifer L
CC: Ceric, Olgica; Nemser, Sarah
Sent: 1/9/2018 4:27:11 PM
Subject: Re: dog food concern
Attachments: IMG_6990 (1).JPG

Hi Jennifer,

That is great! I've attached a picture of the food sample - the weight is 0.36 kg. We sent blood samples off from 2 dogs to test for selenium; one was in the reference range and the other a bit high.

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Take care
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Tel: [240-402-5421](tel:240-402-5421)



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To: 'Darcy Adin'
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UPS NEXT DAY AIR

TRACKING #: 1Z A44 20T 01 9190 2873

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Veterinary Medical Officer
Tel: 240-402-5421



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Cc: Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>

Subject: Re: dog food concern

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Veterinary Medical Officer

Tel: 240-402-5421

<image001.png> <image003.png>

From: Darcy Adin [mailto:dbadin@ncsu.edu]

Sent: Thursday, January 04, 2018 2:47 PM

To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>

Cc: Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>

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To: 'Darcy Adin'
Sent: 1/17/2018 12:00:19 PM
Subject: RE: dog food concern

Yes, we can resend the kit. I'll forward the tracking information.

Jennifer Jones, DVM
Veterinary Medical Officer
Tel: 240-402-5421



From: Darcy Adin [mailto:dbadin@ncsu.edu]
Sent: Tuesday, January 16, 2018 3:09 PM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Subject: Re: dog food concern

Hi Jennifer,

Unfortunately it looks like it was delivered on thursday but we are not able to find it. Would it be possible to send another box? I am so sorry....

Thanks

Darcy

On Tue, Jan 16, 2018 at 11:27 AM, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov> wrote:
Thank you, Darcy. Here is the tracking info:

UPS NEXT DAY AIR

TRACKING #: 1Z A44 20T 01 9190 2873

Jennifer Jones, DVM
Veterinary Medical Officer
Tel: [240-402-5421](tel:240-402-5421)



From: Darcy Adin [mailto:dbadin@ncsu.edu]
Sent: Tuesday, January 16, 2018 11:18 AM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Subject: Re: dog food concern

Thank you Jennifer! Very interesting...

We have not received the box - do you have a tracking number that we can look into? We have had some FedEx delays both friday and today.

Thank you!

Darcy

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To: 'Darcy Adin'
Sent: 1/23/2018 6:58:10 PM
Subject: RE: dog food concern

Thank you, Darcy! I'll share this with my team working on the case.

With regards to your question, I don't have access to any sales information. If you find anything online, I'd be interested to read it.

Jennifer Jones, DVM
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From: Darcy Adin [mailto:dbadin@ncsu.edu]
Sent: Tuesday, January 23, 2018 1:53 PM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>
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Thanks for chatting today Jennifer!

B5

B5

Do you have access to sales estimates for Grain free diets and California natural diets in particular? I am not able to find this on the web. All I can say is that CN does not come up as one of the "top" diets on websites that discuss Grain free benefits.

Thank you!
Darcy

On Tue, Jan 23, 2018 at 8:49 AM, Darcy Adin <dbadin@ncsu.edu> wrote:
Hi Jennifer,

I wondered if I could speak with you sometime today about the diets and some data we have compiled? My office is [919-513-6032](tel:919-513-6032) and my cell is B6. Alternatively, we could email - just let me know!

Take care
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B5

B5

Do you have access to sales estimates for Grain free diets and California natural diets in particular? I am not able to find this on the web. All I can say is that CN does not come up as one of the "top" diets on websites that discuss Grain free benefits.

Thank you!
Darcy

On Tue, Jan 23, 2018 at 8:49 AM, Darcy Adin <dbadin@ncsu.edu> wrote:
Hi Jennifer,

I wondered if I could speak with you sometime today about the diets and some data we have compiled? My office is 919-513-6032 and my cell is **B6** Alternatively, we could email - just let me know!

Take care
Darcy

On Fri, Jan 12, 2018 at 8:01 AM, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov> wrote:

Thank you, Darcy. My colleague mentioned that *Kogia* whales (pygmy sperm whales) get cardiomyopathy. Several tests have been done to determine an etiology. Just as an FYI-not sure it would be applicable here.

I'll forward the feed results when they are back.

Have a nice weekend,

Jen

Jennifer Jones, DVM

Veterinary Medical Officer

Tel: [240-402-5421](tel:240-402-5421)



From: Darcy Adin [mailto:dbadin@ncsu.edu]

Sent: Wednesday, January 10, 2018 6:13 PM

To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>

Cc: Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>

Subject: Re: dog food concern

Thank you Jennifer - we will be on the lookout for it.

As additional information, one of our cardiologist colleagues in B6 posted a question about this association today on our list serve. She has seen 4 cases of DCM in dogs eating kangaroo and lentil (I assume B5 but not sure) in the last year - 2 were housemates but related.

Take care

Darcy

On Jan 10, 2018, at 8:05 AM, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov> wrote:

Thank you, Darcy. We're sending the kit this week. It should arrive by close of business Friday.

Jennifer Jones, DVM

Veterinary Medical Officer

Tel: [240-402-5421](tel:240-402-5421)

<[image001.png](#)> <[image006.png](#)>

From: Darcy Adin [<mailto:dbadin@ncsu.edu>]
Sent: Tuesday, January 09, 2018 11:27 AM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>
Subject: Re: dog food concern

Hi Jennifer,

That is great! I've attached a picture of the food sample - the weight is 0.36 kg. We sent blood samples off from 2 dogs to test for selenium; one was in the reference range and the other a bit high.

Thank you!

Take care

Darcy

On Tue, Jan 9, 2018 at 10:07 AM, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov> wrote:

Good morning Darcy,

We'd like to collect some of the food from your current case (California Naturals Kangaroo). I'm going to send it with the archived sample of food from the **B6** case. Based on a new article [V. Marinescu & P. McCullough- Nutritional and micronutrient determinants of idiopathic dilated cardiomyopathy: diagnostic and therapeutic implications: Expert Rev. Cardiovasc. Ther. 9(9), 1161–1170 (2011)] about human idiopathic DCM, we're going to test both samples for: Co, Ca, P, Mg, Cu, Fe, Mg, Se, Zn.

Please let me know the size/weight of the sample you have, and I'll send a box to collect it.

Thank you,
Jen

Jennifer Jones, DVM

Veterinary Medical Officer

Tel: [240-402-5421](tel:240-402-5421)

<[image001.png](#)> <[image003.png](#)>

From: Darcy Adin [mailto:dbadin@ncsu.edu]

Sent: Thursday, January 04, 2018 2:47 PM

To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>

Cc: Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>

Subject: Re: dog food concern

I also have a food sample for our current inpatient (same food - California Naturals kangaroo and lentil). I'll hang on to this in case we would like to analyze this in the future.

On Thu, Jan 4, 2018 at 2:39 PM, Darcy Adin <dbadin@ncsu.edu> wrote:

The myocardium is from B6 Maybe we will wait to see what the blood levels show.

B5

Thanks!

Darcy

On Thu, Jan 4, 2018 at 2:14 PM, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov> wrote:

Thank you for the update. I'll let you know the selenium concentration from B6 food after the results are back.

The frozen myocardium, is it from the B6 case?

Jennifer Jones, DVM

Veterinary Medical Officer

Tel: [240-402-5421](tel:240-402-5421)

[<image001.png>](#) [<image004.png>](#)

From: Darcy Adin [mailto:dbadin@ncsu.edu]

Sent: Wednesday, January 03, 2018 3:10 PM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>
Subject: Re: dog food concern

Hi Jennifer,

Thank you! We have not tested for selenium in any of the dogs. We have stored blood samples from several dogs and have an inpatient right now that we can submit blood from [REDACTED] (B4 runs this). We will probably start with looking at blood samples from 2 dogs as a screening. We also have frozen myocardium from one dog - do you think this should also be evaluated?

Thank you!

Darcy

On Wed, Jan 3, 2018 at 2:30 PM, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov> wrote:

Good afternoon Darcy,

Happy New Year! Thank you for the additional information. I discussed the information you provided below and from the previous case [REDACTED] (B6 Miniature Schnauzers-800.218) with my colleagues.

Based on our discussions, I will test some leftover food from the 800.218 case, for Selenium content. Have any of the dogs with DCM had blood or tissue selenium levels tested?

Thank you kindly,

Jen

Jennifer Jones, DVM

Veterinary Medical Officer

Tel: [240-402-5421](tel:240-402-5421)

<[image001.png](#)> <[image005.png](#)>

From: Darcy Adin [<mailto:dbadin@ncsu.edu>]
Sent: Wednesday, January 03, 2018 11:31 AM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Subject: dog food concern

Hi Dr. Jones,

I'm hoping that you recall our communications over the summer regarding food testing for unrelated housemate dogs that developed DCM. These dogs were eating California Naturals Kangaroo and Lentil diet and we were not able to identify a cause of the DCM, dietary or infectious or toxic.

I wanted to reach out again because we continue to see DCM in non-genetically predisposed breeds and it seems that this diet is a relatively common theme. We have been increasingly better about recording a diet history in dogs that are presented to cardiology or ER at our hospital with DCM in the last 6 months. Most of the dogs have been tested for taurine and carnitine deficiency and have been within the reference range. About half of them are alive and half died close to the time of diagnosis.

I also searched our records for this diet (knowing that recording of diet in the MR history has been spotty at best) and found another pair of unrelated housemate dogs eating California naturals kangaroo and lentil that were diagnosed with DCM 6 months apart.

We will continue to record the cases we see but since last june we have seen 7 dogs eating California Naturals diet (5 kangaroo and lentil) in addition to the pair of housemates from 2016 (so total of 9). We also have 4 dogs eating Acana (3/4 are dobermans though) and 1 each of 4Health and Iams - so maybe these are not necessarily related.

Have you had any other reports of such an association? If you have any other thoughts or testing suggestions, I would be all ears!

Thank you!

Darcy

--

Darcy B. Adin, DVM, DACVIM (Cardiology)

Clinical Assistant Professor of Cardiology

North Carolina State University

NC State Veterinary Hospital

1060 William Moore Drive

Raleigh, NC 27607

919-513-6032

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919-513-6032

Component	Unit	Eurofins sample #			
		7650639 800.240-sub 1 Bag B	7650640 800.240-sub 4	7650641 800.215-sub 5	7650642 800.240-sub 3
Choline Chloride	mg/100g	307	305	311	304
Choline	mg/100g	229	227	232	227
Taurine	mg/g	na	na	na	na
Cystine	mg/g	na	na	na	na
Methionine	mg/g	na	na	na	na
Moisture	%	7.15	6.65	6.76	6.42
Starch	%	36.1	31.4	35.2	36.9
Soluble Fiber	%	1.17	1.04	2.0	1.24
Insoluble Fiber	%	6.38	5.97	8.3	6.06
Fat	%	14.1	17.3	10.6	14.8
Resistant Starch	%	<2.00	<2.00	<2.00	<2.00
Total Dietary Fiber	%	7.55	7.01	10.3	7.3
Protein	%	26	28.1	28	25.2
Crude Fiber	%	1.78	1.92	3.77	1.92
Vitamin E	mcg/g	100.44	113.57	707.58	96.882

7650643	7650644	7650645	7650646	7650647	7650648	7650649	7650650
800.261-sub 1	800.218-sub 2	800.267-sub 2A	800.267-sub 7A	800.267-sub 5	800.267-sub 3A	800.267-SS- sub 1	800.267-SS- sub 4
244	309	304	211	231	245	302	365
182	230	227	157	172	183	225	272
0.313	1.06	1.32	0.348	2.18	1.12	0.576	1.08
<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
0.227	2.23	0.466	0.152	<0.100	1.38	1.07	<0.100
7.25	6.65	7.67	8.5	6.56	6.35	7.81	7.28
20.3	29.5	27.9	23.4	18.4	26.7	35.1	29.4
1.4	<1.00	3.62	<1.00	<1.00	<1.00	<1.00	<1.00
12.4	12.5	11.1	10.9	8.46	9.09	6.43	7.02
15.7	15.2	13.4	15.7	15.8	14.6	13.9	17.5
<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00
13.8	13	7.48	11	9.17	9.75	6.2	7.88
27.4	24	26.5	28	33.3	29	23.2	23.3
4.37	3.91	4.74	3.75	3.55	3.86	2.58	1.45
131.29	297.85	115.97	82.26	370.9	327.77	106.41	572.43

7650651	7650652	7650653	7650654	7650655	7650656
800.267-SS- sub 3	800.267-sub 10A	800.267-EON- 360243	800.267-sub 18A	800.267-sub 16A	800.267- EON- 361853
305	220	241	280	113	187
228	164	180	209	84.1	139
0.642	0.965	1.05	1.88	0.578	0.724
<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
<0.100	0.101	<0.100	2.22	0.276	0.231
8.09	5.32	6.57	6.05	6.0	7.6
14.5	31.2	13.6	19.2	26.9	22.4
<1.00	<1.00	1.0	1.3	2.0	<1.00
8.4	9.63	24.7	10.6	12.1	9.17
15.5	13.2	14.6	17.3	15.4	18
<2.00	<2.00	<2.00	<2.00	<2.00	<2.00
8.69	9.4	25.7	11.9	14.1	10
34.2	25.6	26.6	30.7	25.4	28.7
2.61	3.6	14	3.88	4.21	3.14
713.19	253.13	91.596	124.83	190.22	149.3

	lams		lams	
	lams Proactive Mini Chunk Adult	Proactive Small and Toy Adult	Wellness Small Healthy Wt Turkey & Rice	Proactive Health Grass Fed Lamb
	7650639	7650640	7650641	7650642
	800.240-sub 1 Bag B	800.240-sub 4	800.215-sub 5	800.240-sub 3

	DMB				
Dry Matter	%	92.85	93.36	93.24	93.58
Protein	%	28	30.1	30.03	26.93
Fat	%	15.19	18.5	11.37	15.82
Total Dietary Fiber	%	8.13	7.51	11.05	7.8
Crude Fiber	%	1.92	2.06	4.04	2.05
Soluble Fiber	%	1.26	1.11	2.15	1.33
Insoluble Fiber	%	6.87	6.39	8.9	6.48
Total Digestible Fiber		pending			
Starch	%	38.88	33.63	37.75	39.4
Resistant Starch	%	<2.15	<2.14	<2.15	<2.14
Choline Chloride	ppm	3306	3267	3335	3249
Choline	ppm	2466	2432	2488	2426
Free Taurine	%	nd	nd	nd	nd
Total Taurine	%	0.1	0.11	0.21	0.11
Free Cystine	%	0.01	0.01	0.01	0.01
Total Cystine	%	0.29	0.31	0.31	0.29
Free Methionine	%	0.04	0.03	0.01	0.04
Total Methionine	%	0.55	0.62	0.63	0.56
Free Cys + Met	%	0.05	0.04	0.02	0.05
Total Cys + Met	%	0.84	0.93	0.94	0.85
Met: Cys		1.90	2.00	2.03	1.93
Cys : Met		0.53	0.50	0.49	0.52
Met: Met + Cys		0.65	0.67	0.67	0.66
Vitamin E-synthetic?	IU/kg	120	135	843	115
Vitamin E-natural?	IU/kg	161	182	1133	155

Key

Grain containing food

~~Grain containing food~~

Tau deficient dog

Tau deficient dog

Borderline Tau deficient dog

*previously tested same brand but different bag for Total Tau, Cys, or Met values

<i>Zignature Kangaroo</i>	<u>California Naturals Kangaroo</u>	<i>Fromm Heartland Gold*</i>	<i>Acana Lamb & Apple</i>	<i>Victor Salmon & Sweet Potato</i>	<i>Earthborn Meadow</i>	<i>4Health Large Breed Adult Grain Free</i>
7650643	7650644	7650645	7650646	7650647	7650648	7650652
800.261-sub 1	800.218-sub 2	800.267-sub 2A	800.267-sub 7A	800.267-sub 5	800.267-sub 3A	800.267-sub 10A
92.75	93.35	92.33	91.5	93.44	94.65	94.68
29.54	25.71	28.7	30.6	35.64	30.64	27.04
16.93	16.28	14.5	17.16	16.91	15.43	13.94
14.88	13.93	8.1	12.02	9.81	10.3	9.93
4.71	4.19	5.13	4.1	3.8	4.08	3.8
1.51	<1.07	3.92	<1.09	<1.07	<1.06	<1.06
13.37	13.39	12.02	11.91	9.05	9.6	10.17
21.89	31.6	30.22	25.57	19.7	28.21	32.95
<2.16	<2.14	<2.17	<2.19	<2.14	<2.11	<2.11
2631	3310	3293	2306	2472	2588	2324
1962	2464	2459	1716	1841	1933	1732
0.03	0.11	0.14	0.04	0.23	0.12	0.1
0.05	0.11	0.2	pending			
0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.32	0.25	0.34	pending			
0.02	0.24	0.05	0.02	0.01	0.15	0.01
0.39	0.59	0.51	pending			
0.03	0.25	0.06	0.03	0.02	0.16	0.02
0.71	0.84	0.85	pending			
1.22	2.36	1.5	pending			
0.82	0.42	0.67	pending			
0.55	0.70	0.60	pending			
157	355	140	100	441	385	297
211	476	187	134	592	517	399

B5

Zignature Whitefish	Nature's Variety Raw Boost Healthy Wt Chicken	Whole Hearted Lamb & Lentil	Nutrisource Chicken & Pea	lams Sens Skin & Stomach Salmon & Lentil	Hills Ideal Balance Chicken & Potato	Purina Proplan Savor Turkey & Chicken
7650653	7650654	7650655	7650656	7650649	7650650	7650651
800.267- EON- 360243	800.267-sub 18A	800.267-sub 16A	800.267- EON-361853	800.267-SS- sub 1	800.267-SS-sub 4	800.267-SS- sub 3
93.43	93.95	94	92.4	92.19	92.72	91.91
28.04	32.68	27.02	31.06	25.17	25.13	37.21
15.63	18.41	16.38	19.48	15.08	18.87	16.86
27.51	12.67	15	10.82	6.73	8.5	9.45
15	4.13	4.48	3.4	2.8	1.56	2.84
1.07	1.38	2.13	<1.08	<1.08	<1.08	<1.09
26.44	11.28	12.87	9.92	6.97	7.57	9.14
14.56	20.44	28.62	24.24	38.07	31.71	15.78
<2.14	<2.13	<2.13	<2.16	<2.17	<2.16	<2.18
2579	2980	2002	2024	3276	3937	3318
1927	2225	393	1504	2441	2934	2481
0.11	0.2	0.06	0.08	0.06	0.12	0.07
0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.24	0.03	0.03	0.12	0.01	0.01
0.02	0.25	0.04	0.04	0.13	0.02	0.02
109	148	225	180	128	686	862
146	198	302	241	172	921	1158

B5

		Eurofins sample #	7650639	7650640	7650641	7650642
			800.240-sub	800.240-sub	800.215-sub	800.240-sub
Component	Unit		1 Bag B	4	5	3
Choline Chloride	mg/100g		307	305	311	304
Choline	mg/100g		229	227	232	227
Taurine	mg/g		na	na	na	na
Cystine	mg/g		na	na	na	na
Methionine	mg/g		na	na	na	na
Moisture	%		7.15	6.65	6.76	6.42
Starch	%		36.1	31.4	35.2	36.9
Soluble Fiber	%		1.17	1.04	2.0	1.24
Insoluble Fiber	%		6.38	5.97	8.3	6.06
Fat	%		14.1	17.3	10.6	14.8
Resistant Starch	%		<2.00	<2.00	<2.00	<2.00
Total Dietary Fiber	%		7.55	7.01	10.3	7.3
Protein	%		26	28.1	28	25.2
Crude Fiber	%		1.78	1.92	3.77	1.92
Vitamin E	mcg/g		100.44	113.57	707.58	96.882

Missing: Total Dig FibeTotal Dig FibeTotal Dig FibeTotal Dig Fibe

7650643	7650644	7650645	7650646	7650647	7650648	7650649	7650650
800.261-sub 1	800.218-sub 2	800.267-sub 2A	800.267-sub 7A	800.267-sub 5	800.267-sub 3A	800.267-SS- sub 1	800.267-SS- sub 4
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<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
0.227	2.23	0.466	0.152	<0.100	1.38	1.07	<0.100
7.25	6.65	7.67	8.5	6.56	6.35	7.81	7.28
20.3	29.5	27.9	23.4	18.4	26.7	35.1	29.4
1.4	<1.00	3.62	<1.00	<1.00	<1.00	<1.00	<1.00
12.4	12.5	11.1	10.9	8.46	9.09	6.43	7.02
15.7	15.2	13.4	15.7	15.8	14.6	13.9	17.5
<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00
13.8	13	7.48	11	9.17	9.75	6.2	7.88
27.4	24	26.5	28	33.3	29	23.2	23.3
4.37	3.91	4.74	3.75	3.55	3.86	2.58	1.45
131.29	297.85	115.97	82.26	370.9	327.77	106.41	572.43
Total Dig Fibe	Total Dig Fibe	Total Dig Fibe	Total Dig Fibe	Total Dig Fibe	Total Dig Fibe	Total Dig Fibe	Total Dig Fibe
Total Tau	Total Tau	Total Tau	Total Tau	Total Tau	Total Tau	Total Tau	Total Tau
Total Cys, Me	Total Cys, Me	Total Cys, Me	Total Cys, Me	Total Cys, Me	Total Cys, Me	Total Cys, Me	Total Cys, Me

7650651	7650652	7650653	7650654	7650655	7650656
800.267-SS- sub 3	800.267-sub 10A	800.267-EON- 360243	800.267-sub 18A	800.267-sub 16A	800.267- EON- 361853

305	220	241	280	113	187
228	164	180	209	84.1	139
0.642	0.965	1.05	1.88	0.578	0.724
<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
<0.100	0.101	<0.100	2.22	0.276	0.231
8.09	5.32	6.57	6.05	6.0	7.6
14.5	31.2	13.6	19.2	26.9	22.4
<1.00	<1.00	1.0	1.3	2.0	<1.00
8.4	9.63	24.7	10.6	12.1	9.17
15.5	13.2	14.6	17.3	15.4	18
<2.00	<2.00	<2.00	<2.00	<2.00	<2.00
8.69	9.4	25.7	11.9	14.1	10
34.2	25.6	26.6	30.7	25.4	28.7
2.61	3.6	14	3.88	4.21	3.14
713.19	253.13	91.596	124.83	190.22	149.3

Total Dig Fibe	Total Dig Fibe	Total Dig Fibe	Total Dig Fibe	Total Dig Fibe	Total Dig Fibe
Total Tau	Total Tau	Total Tau	Total Tau	Total Tau	Total Tau
Total Cys, Me	Total Cys, Me	Total Cys, Me	Total Cys, Me	Total Cys, Me	Total Cys, Me

Certificate of Analysis

Food and Drug Administration - CVM - Invoice Denise Durham

8401 Muirkirk Rd.
Laurel Maryland 20708 United States

Sample Name:	800.216-food-sub 1	Covance Sample:	6366432
Project ID	FDA_CVM-20170724-0006	Receipt Date	24-Jul-2017
PO Number	HHSF223201610005I HHSF22301002T	Receipt Condition	Ambient temperature
Sample Serving Size	100 g	Login Date	24-Jul-2017
		Online Order	20

Analysis	Result
Fat by Acid Hydrolysis	
Fat	11.8 g/Serving Size
Protein (N x 6.25) Kjeldahl method	
Protein	28.3 g/Serving Size
Thiamin by Fluorometric Method	
Thiamin	2.01 mg/Serving Size
Taurine	
Taurine	240 mg/Serving Size
Moisture by M100_T100	
Moisture	4.06 g/Serving Size

Method References	Testing Location
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Fat by Acid Hydrolysis (FAT_AH_S)	Covance Laboratories - Madison
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Food Products that are not Dairy, Egg or Cheese Products

Official Methods of Analysis of AOAC INTERNATIONAL, 18th Ed., Methods 922.06 and 954.02, AOAC INTERNATIONAL, Gaithersburg, MD, USA, (2005). (Modified)

Cheese and Cheese Products

Official Methods of Analysis of AOAC INTERNATIONAL (2005) 18th Ed., AOAC INTERNATIONAL, Gaithersburg, MD, USA, Official Method 933.05. (Modified)

Egg, Egg Products, and Mayonnaise

Official Methods of Analysis of AOAC INTERNATIONAL (2005) 18th Ed., AOAC INTERNATIONAL, Gaithersburg, MD, USA, Official Method 925.32. (Modified)

Moisture by M100_T100 (M100T100_S)	Covance Laboratories - Madison
-------------------------------------------	---------------------------------------

Official Methods of Analysis of AOAC INTERNATIONAL, 18th Ed., Methods 925.09 and 926.08, AOAC INTERNATIONAL, Gaithersburg, MD, USA,(2005). (Modified).

Protein (N x 6.25) Kjeldahl method (PGEN_S)	Covance Laboratories - Madison
----------------------------------------------------	---------------------------------------

Official Methods and Recommended Practices of the American Oil Chemists' Society, Champaign, IL, Official Methods Ac 4-91 (2011). (Modified)

Certificate of Analysis

Food and Drug Administration - CVM - Invoice **B6**

8401 Muirkirk Rd.
Laurel Maryland 20708 United States

Method References

Testing Location

Taurine (TAUR_LC_S)

Covance Laboratories - Madison

R. Schuster, "Determination of Amino Acids in Biological, Pharmaceutical, Plant and Food Samples by Automated Precolumn Derivatization and HPLC", Journal of Chromatography., 1988, 431, 271-284, Henderson, J.W., Ricker, R.D. Bidlingmeyer, B.A., Woodward, C., "Rapid, Accurate, Sensitive, and Reproducible HPLC Analysis of Amino Acids, Amino Acid Analysis Using Zorbax Eclipse-AAA columns and the Agilent 1100 HPLC," Agilent Publication, 2000, and Barkholt and Jensen, "Amino Acid Analysis: Determination of Cysteine plus Half-Cystine in Proteins after Hydrochloric Acid Hydrolysis with a Disulfide Compound as Additive," Analytical Biochemistry, 177, 318-322 (1989).

Thiamin by Fluorometric Method (BIDE_S)

Covance Laboratories - Madison

Official Methods of Analysis, Methods 942.23, 953.17, and 957.17, AOAC INTERNATIONAL (Modified).

Testing Location(s)

Released on Behalf of Covance by

Covance Laboratories - Madison

Edward Ladwig - Director

Covance Laboratories Inc.
3301 Kinsman Blvd
Madison WI 53704
800-675-8375



2918.01

These results apply only to the items tested. This certificate of analysis shall not be reproduced, except in its entirety, without the written approval of Covance.

Certificate of Analysis

Food and Drug Administration - CVM - Invoice Denise Durham

8401 Muirkirk Rd.
Laurel Maryland 20708 United States

Sample Name:	800.216-food-sub 2	Covance Sample:	6366433
Project ID	FDA_CVM-20170724-0006	Receipt Date	24-Jul-2017
PO Number	HHSF223201610005I HHSF22301002T	Receipt Condition	Ambient temperature
Sample Serving Size	100 g	Login Date	24-Jul-2017
		Online Order	20

Analysis	Result
Fat by Acid Hydrolysis	
Fat	11.7 g/Serving Size
Protein (N x 6.25) Kjeldahl method	
Protein	28.4 g/Serving Size
Thiamin by Fluorometric Method	
Thiamin	0.94 mg/Serving Size
Taurine	
Taurine	216 mg/Serving Size
Moisture by M100_T100	
Moisture	3.76 g/Serving Size

Method References	Testing Location
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Fat by Acid Hydrolysis (FAT_AH_S)	Covance Laboratories - Madison
------------------------------------------	---------------------------------------

Food Products that are not Dairy, Egg or Cheese Products

Official Methods of Analysis of AOAC INTERNATIONAL, 18th Ed., Methods 922.06 and 954.02, AOAC INTERNATIONAL, Gaithersburg, MD, USA, (2005). (Modified)

Cheese and Cheese Products

Official Methods of Analysis of AOAC INTERNATIONAL (2005) 18th Ed., AOAC INTERNATIONAL, Gaithersburg, MD, USA, Official Method 933.05. (Modified)

Egg, Egg Products, and Mayonnaise

Official Methods of Analysis of AOAC INTERNATIONAL (2005) 18th Ed., AOAC INTERNATIONAL, Gaithersburg, MD, USA, Official Method 925.32. (Modified)

Moisture by M100_T100 (M100T100_S)	Covance Laboratories - Madison
-------------------------------------------	---------------------------------------

Official Methods of Analysis of AOAC INTERNATIONAL, 18th Ed., Methods 925.09 and 926.08, AOAC INTERNATIONAL, Gaithersburg, MD, USA, (2005). (Modified).

Protein (N x 6.25) Kjeldahl method (PGEN_S)	Covance Laboratories - Madison
----------------------------------------------------	---------------------------------------

Official Methods and Recommended Practices of the American Oil Chemists' Society, Champaign, IL, Official Methods Ac 4-91 (2011). (Modified)

Certificate of Analysis

Food and Drug Administration - CVM - Invoice Denise Durham

8401 Muirkirk Rd.
Laurel Maryland 20708 United States

Method References

Testing Location

Taurine (TAUR_LC_S)

Covance Laboratories - Madison

R. Schuster, "Determination of Amino Acids in Biological, Pharmaceutical, Plant and Food Samples by Automated Precolumn Derivatization and HPLC", *Journal of Chromatography*, 1988, 431, 271-284, Henderson, J.W., Ricker, R.D. Bidlingmeyer, B.A., Woodward, C., "Rapid, Accurate, Sensitive, and Reproducible HPLC Analysis of Amino Acids, Amino Acid Analysis Using Zorbax Eclipse-AAA columns and the Agilent 1100 HPLC," Agilent Publication, 2000, and Barkholt and Jensen, "Amino Acid Analysis: Determination of Cysteine plus Half-Cystine in Proteins after Hydrochloric Acid Hydrolysis with a Disulfide Compound as Additive," *Analytical Biochemistry*, 177, 318-322 (1989).

Thiamin by Fluorometric Method (BIDE_S)

Covance Laboratories - Madison

Official Methods of Analysis, Methods 942.23, 953.17, and 957.17, AOAC INTERNATIONAL (Modified).

Testing Location(s)

Released on Behalf of Covance by

Covance Laboratories - Madison

Edward Ladwig - Director

Covance Laboratories Inc.
3301 Kinsman Blvd
Madison WI 53704
800-675-8375



2918.01

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Certificate of Analysis

Food and Drug Administration - CVM - Invoice Denise Durham

8401 Muirkirk Rd.
Laurel Maryland 20708 United States

Sample Name:	800.218	Covance Sample:	6406524
Project ID	FDA_CVM-20170804-0007	Receipt Date	04-Aug-2017
PO Number	HHSF223201610005I/HHSF22301002T	Receipt Condition	Ambient temperature
Sample Serving Size	100 g	Login Date	04-Aug-2017
		Online Order	20

Analysis	Result
L-Carnitine *	
L-Carnitine	69900 ppb
Taurine	
Taurine	231 mg/Serving Size

Method References **Testing Location**

L-Carnitine (CARNITNE_S) **Covance Laboratories - Madison**

STAREY ET AL.: JOURNAL OF AOAC INTERNATIONAL VOL. 91, NO.1, 2008. (Modified).

Taurine (TAUR_LC_S) **Covance Laboratories - Madison**

R. Schuster, "Determination of Amino Acids in Biological, Pharmaceutical, Plant and Food Samples by Automated Precolumn Derivatization and HPLC", Journal of Chromatography., 1988, 431, 271-284, Henderson, J.W., Ricker, R.D, Bidlingmeyer, B.A., Woodward, C., "Rapid, Accurate, Sensitive, and Reproducible HPLC Analysis of Amino Acids, Amino Acid Analysis Using Zorbax Eclipse-AAA columns and the Agilent 1100 HPLC," Agilent Publication, 2000, and Barkholt and Jensen, , "Amino Acid Analysis: Determination of Cysteine plus Half-Cystine in Proteins after Hydrochloric Acid Hydrolysis with a Disulfide Compound as Additive," Analytical Biochemistry, 177, 318-322 (1989).

Testing Location(s) **Released on Behalf of Covance by**

Covance Laboratories - Madison

Edward Ladwig - Director

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3301 Kinsman Blvd
Madison WI 53704
800-675-8375



2918.01

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*** This analysis is not ISO accredited.**

Printed: 15-Aug-2017 10:41 am

Page 1 of 1

From: Freeman, Lisa <Lisa.Freeman@tufts.edu>
To: Jones, Jennifer L
Sent: 8/20/2018 10:17:48 PM
Subject: updates

Hi Jen

I forgot to note on the report I submitted today that I have a food sample and UPC code for the Acana food that the 2 Dobies were eating.

Also, for B6 whose heart has improved significantly, I just got a sample from the owner who found some food remaining at her summer house – it is not fresh but I'm saving for you in case you want

Thanks

Lisa

Lisa M. Freeman, DVM, PhD, DACVN
Board Certified Veterinary Nutritionist™
Professor
Cummings School of Veterinary Medicine
Friedman School of Nutrition Science and Policy
Tufts Clinical and Translational Science Institute
Tufts University
www.petfoodology.org

From: PFR Event <pfpreventcreation@fda.hhs.gov>
To: Cleary, Michael *; HQ Pet Food Report Notification; B6
Sent: 8/20/2018 8:44:25 PM
Subject: Acana Free Run Poultry dry: Lisa Freeman - EON-362878
Attachments: 2053969-report.pdf; 2053969-attachments.zip

A PFR Report has been received and PFR Event [EON-362878] has been created in the EON System.

A "PDF" report by name "2053969-report.pdf" is attached to this email notification for your reference. Please note that all documents received in the report are compressed into a zip file by name "2053969-attachments.zip" and is attached to this email notification.

Below is the summary of the report:

EON Key: EON-362878

ICSR #: 2053969

EON Title: PFR Event created for Acana Free Run Poultry dry; 2053969

AE Date	08/06/2018	Number Fed/Exposed	2
Best By Date		Number Reacted	1
Animal Species	Dog	Outcome to Date	Stable
Breed	Doberman Pinscher		
Age	B6 Years		
District Involved	PFR-New England DO		

Product information

Individual Case Safety Report Number: 2053969

Product Group: Pet Food

Product Name: Acana Free Run Poultry dry

Description: Taken to RDVM for lameness. Dilated cardiomyopathy and CHF diagnosed 8/6/18. Started on meds (B6 We saw at Tufts 8/16/18. Clinically improved but still has significant DCM and CHF plus arrhythmia. We added B6 (instead of B6), fish oil, and taurine. WB taurine pending. Another dog in household (also a Doberman) was eating the same food but was echoed today and has no signs of DCM.

Submission Type: Initial

Report Type: Adverse Event (a symptom, reaction or disease associated with the product)

Outcome of reaction/event at the time of last observation: Stable

Number of Animals Treated With Product: 2

Number of Animals Reacted With Product: 1

Product Name	Lot Number or ID	Best By Date
Acana Free Run Poultry dry		

Sender information

Lisa Freeman
200 Westboro Rd
North Grafton, MA 01536
USA

Owner information

B6
USA

To view this PFR Event, please click the link below:

<https://eon.fda.gov/eon//browse/EON-362878>

To view the PFR Event Report, please click the link below:

<https://eon.fda.gov/eon//EventCustomDetailsAction!viewReport.jspa?decorator=none&e=0&issueType=12&issueId=379612>

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Failure to adhere to the above provisions could result in removal from the approved distribution list. If you think you received this email in error, please send an email to FDAREportableFoods@fda.hhs.gov immediately.

Report Details - EON-362878

ICSR: 2053969
 Type Of Submission: Initial
 Report Version: FPSR.FDA.PETF.V.V1
 Type Of Report: Adverse Event (a symptom, reaction or disease associated with the product)
 Reporting Type: Voluntary
 Report Submission Date: 2018-08-20 16:33:06 EDT

Reported Problem:
Problem Description: Taken to RDVM for lameness. Dilated cardiomyopathy and CHF diagnosed 8/6 /18. Started on meds [B6] We saw at Tufts 8/16 /18. Clinically improved but still has significant DCM and CHF plus arrhythmia. We added [B6] (instead of [B6] fish oil, and taurine. WB taurine pending. Another dog in household (also a Doberman) was eating the same food but was echoed today and has no signs of DCM.
Date Problem Started: 08/06/2018
Concurrent Medical Problem: Yes
Pre Existing Conditions: [B6]
Outcome to Date: Stable

Product Information:
Product Name: Acana Free Run Poultry dry
Product Type: Pet Food
Lot Number:
UPC: 6499250125
Package Type: BAG
Package Size: 25 Pound
Possess Unopened Product: No
Possess Opened Product: Yes
Product Use Information:
Description: Fed to 2 Dobermans in household.
First Exposure Date: 09/01/2016
Last Exposure Date: 08/16/2018
Product Use Stopped After the Onset of the Adverse Event: Yes
Adverse Event Abate After Product Stop: Unknown
Product Use Started Again: No
Perceived Relatedness to Adverse Event: Probably related
Other Foods or Products Given to the Animal During This Time Period: Yes
Manufacturer /Distributor Information:
Purchase Location Information:

Animal Information:
Name: [B6]

	Type Of Species: Dog
	Type Of Breed: Doberman Pinscher
	Gender: Male
	Reproductive Status: Neutered
	Weight: 45 Kilogram
	Age: B6 years
	Assessment of Prior Health: Excellent
	Number of Animals Given the Product: 2
	Number of Animals Reacted: 1
	Owner Information:
	Owner Information provided: Yes
	Contact: Name: B6
	Phone: B6
	Email: B6
	Address: B6
	United States
	Healthcare Professional Information:
	Practice Name: Tufts Cummings School of Veterinary Medicine
	Contact: Name: Lisa Freeman
	Phone: (508) 887-4523
	Email: lisa.freeman@tufts.edu
	Address: 200 Westboro Rd North Grafton Massachusetts 01536 United States
Sender Information:	Name: Lisa Freeman
	Address: 200 Westboro Rd North Grafton Massachusetts 01536 United States
	Contact: Phone: 5088874523
	Email: lisa.freeman@tufts.edu
	Permission To Contact Sender: Yes
	Preferred Method Of Contact: Email
	Reported to Other Parties: None
Additional Documents:	Attachment: B6 ;cardio report 8-16-18.pmx.pdf
	Description: Cardio report
	Type: Sonogram
	Attachment: B6 ;discharge 8-16-18.pdf
	Description: Discharge report
	Type: Other

Attachment:	B6	cxr rdvm 8-6-18 prnx.pdf
Description:	Chest rads from rdvm	
Type:	Radiographs	
Attachment:	B6	profile 8-16-18.prx.pdf
Description:	Chemistry profile	
Type:	Laboratory Report	

B6

Patient ID: B6
B6 Canine
B6 Years Old Male (Neutered) Doberman
Black/Tan

Cardiology Appointment Report

Date: B6

Attending Cardiologist:

John E. Rush DVM, MS, DACVIM (Cardiology), DACVECC

B6

Cardiology Resident:

B6

Cardiology Technician:

B6

Presenting Complaint:

Work up of DCM/CHF

Concurrent Diseases:

B6

General Medical History:

Owner has had him for 5 years. Was obese and behavioral issues. Owner has worked well with the behavior issues. Owner has noticed that he used to be energetic and play a lot, and now he is not, however, after starting medications, is slightly better.

Diet and Supplements:

Acana

Cardiovascular History:

Prior CHF diagnosis?	YES
Prior heart murmur?	YES
Prior ATE?	NO
Prior arrhythmia?	NO
Monitoring respiratory rate and effort at home?	YES
Cough?	YES (hacking, throat clearing)
Shortness of breath or difficulty breathing?	YES

Syncope or collapse? NO
Sudden onset lameness? YES (LFL)
Exercise intolerance? YES

Current Medications Pertinent to CV System:

B6

Cardiac Physical Examination:

B6

Muscle condition:

- Normal
- Mild muscle loss
- Moderate cachexia
- Marked cachexia

Cardiovascular Physical Exam:

Murmur Grade:

- None
- I/VI
- II/VI
- III/VI
- IV/VI
- V/VI
- VI/VI

Murmur location/description: systolic; left apical systolic

Jugular vein:

- Bottom 1/3 of the neck
- Middle 1/3 of the neck
- 1/2 way up the neck
- Top 2/3 of the neck

Arterial pulses:

- Weak
- Fair
- Good
- Strong
- Bounding
- Pulse deficits
- Pulsus paradoxus
- Other:

Arrhythmia:

- None
- Sinus arrhythmia
- Bradycardia
- Tachycardia

Premature beats

Gallop:

- Yes
- No
- Intermittent

- Pronounced
- Other:

Pulmonary assessments:

- Eupneic
- Mild dyspnea
- Marked dyspnea
- Normal BV sounds
- Pulmonary crackles
- Wheezes
- Upper airway stridor

Abdominal exam:

- Normal
- Hepatomegaly
- Abdominal distension
- Mild ascites
- Marked ascites

Problems:

murmur, shortness of breath, lameness, historical ascites and pleural effusion)

Differential Diagnoses:

DCM, DMVD, CHF secondary to DCM

Diagnostic plan:

- Echocardiogram
- Chemistry profile
- ECG
- Renal profile
- Blood pressure
- Dialysis profile
- Thoracic radiographs
- NT-proBNP
- Troponin I
- Other tests: Taurine level

B6

Assessment and recommendations:

DCM with signs of active CHF, although he is better than prior to starting medication (no more ascites). However, given that there is still some pleural effusion, the diuretic dose that the patient is on right now is not sufficient. We are therefore going to increase the to 80mg BID and keep at the same dose. The is currently at a higher dose than needed, so we are going to decrease it to 10mg BID. Given the interaction between , we are going to try for management instead. Start fish oil for arrhythmia control. Recheck fluid status and renal values in 2 weeks. Recheck echocardiogram in 3-4 months.

Final Diagnosis:

DCM with CHF

Heart Failure Classification Score:

ISACHC Classification:

- Ia
- Ib
- II
- IIIa
- IIIb

ACVIM Classification:

- A
- B1
- B2
- C
- D

2D

SA LA

Ao Diam

SA LA / Ao Diam

IVSd

LVIDd

LVPWd

EDV(Teich)

IVSs

LVIDs

LVPWs

ESV(Teich)

EF(Teich)

%FS

SV(Teich)

LVLd A4C

LVEDV MOD A4C

LVLs A4C

LVESV MOD A4C

LVEF MOD A4C

SV MOD A4C

B6

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M-Mode

IVSd

LVIDd

LVPWd

IVSs

LVIDs

LVPWs

%FS

Ao Diam

LA Diam

LA/Ao

Max LA

EPSS

B6

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%

cm

cm

cm

cm

cm

Doppler

MV E Vel
MV DecT
MVA Vel
MV E/A Ratio
PV Vmax
PV maxPG
AV Vmax
AV maxPG

B6

m/s
ms
m/s

m/s
mmHg
m/s
mmHg

B6

Final Report for Exam ID: B6

Patient ID	B6	Patient Name	B6
Sex:	M ALTERED	Birthdate:	B6
Weight:	95		

Hospital Name: B6

Doctor Name:	B6	Date of Exam:	20180806
Report Date:		Report ID:	2386236
Reader:	B6		

History

Consult Type: FILMINTERP, SIG: DOB: B6, Age: B6 Y, Sex: M ALTERED, Wt: 95lbs, Breed: Doberman, Species: CANINE, Images: 3, Case Details: Referred for potential toe mass. Chest X-rays revealed significant pleural effusion with suspected cardiomegaly. Echo confirmed cardiac disease with failure. Primary concern is cardiac disease and not neoplasia. Current meds = B6

Findings

Three lateral radiographic projections of the thorax dated 8/6/2018.

There is fluid opacity within the plural space causing partial partial border effacement of the ventral cardiac silhouette and diaphragm and retraction of the ventral lung margins. The thoracic trachea is dorsally displaced. The cranial lobar vasculature is unremarkable. The caudal lobar vasculature is not well delineated. There is an increase in interstitial opacity within the caudodorsal lung. The caudal vena cava is not identified.

In the limited view of the cranial abdomen there is caudal displacement of the gastric axis. On two of the projections there are a few thin wispy soft tissue streaks superimposed with the cranioventral abdomen. There are multiple sites of spondylosis deformans within the visible spine. There are degenerative changes of the sternum.

Conclusion

Cardiomegaly consistent with patient history of cardiac disease. Pleural effusion and hepatomegaly with suspected mild peritoneal effusion is most concerning for right-sided cardiac dysfunction given patient history and constellation of radiographic findings

Increased interstitial opacity in the caudodorsal lung has differentials to include artifact secondary to partial atelectasis and superimposition of pleural fluid, however mild pulmonary edema cannot be ruled out. If clinically indicated a dorsoventral projection of the thorax could be considered for further evaluation of the caudal lung fields and vasculature.

Degenerative changes of the spine and sternum.

B6

CXR Report - 8/6/2018

Recommendations

Continued radiographic monitoring of the thorax to assess response to treatment for heart failure are recommended to evaluate response to treatment and better evaluate for comorbidities.

Read By:

B6

8/7/2018 11:22:52 AM UTC

To contact me: If you have any questions or concerns regarding this report or would like to discuss this case please contact me via email at:

B6

Patient ID B6

Patient Name B6

Page2

Discharge Instructions

Patient

Name: B6

Species: Canine

Black/Tan Male (Neutered) Doberman

Birthdate: B6

Owner

Name: B6

Address: B6

Patient ID: B6

Attending Cardiologist:

John E. Rush DVM, MS, DACVIM (Cardiology), DACVECC

B6

Cardiology Resident:

B6

Cardiology Technician:

B6

Admit Date: B6 11:40:18 AM

Discharge Date: B6

Diagnoses: Biventricular congestive heart failure secondary to dilated cardiomyopathy (DCM)

Case summary:

B6 has been diagnosed with a primary heart muscle disease called dilated cardiomyopathy (DCM). This disease is more common in large and giant breed dogs and is characterized by thinning of the walls of the heart, reduced cardiac pump function, and enlargement of the upper chambers of the heart. Many dogs with DCM will also have significant arrhythmias which can be life-threatening and also require medical management. B6 had occasional ventricular premature beats (VPCs) seen today, but not enough right now to warrant additional therapy. We do however, want to keep monitoring this.

The heart enlargement has now progressed to the point of congestive heart failure, meaning that fluid is backing up into the lungs and belly. Unfortunately this is a progressive disease and we cannot reverse the changes to the heart muscle, however we can use cardiac medications and some changes to the diet to make your dog comfortable and have him breathing easier.

Monitoring at home:

- We would like you to monitor your dog's breathing rate and effort at home, ideally during sleep or at a time of rest. The doses of drugs will be adjusted based on the breathing rate and effort.
- In general, most dogs with heart failure that is well controlled have a breathing rate at rest of less than 35 breaths per minute. In addition, the breathing effort, noted by the amount of belly wall motion used for each breath, is fairly minimal if heart failure is controlled.
- An increase in breathing rate or effort will usually mean that you should give an extra dose of B6. If difficulty breathing is not improved by within 30-60 minutes after giving extra B6 then we recommend that a recheck exam be scheduled and/or that your dog be evaluated by an emergency clinic.

- o There are instructions for monitoring breathing, and a form to help keep track of breathing rate and drug doses, on the Tufts HeartSmart web site (<http://vet.tufts.edu/heartsmart/at-home-monitoring/>).
- o We also want you to watch for weakness or collapse, a reduction in appetite, worsening cough, or distention of the belly as these findings indicate that we should do a recheck examination.
- o If you have any concerns, please call or have your dog evaluated by a veterinarian. Our emergency clinic is open 24 hours/day.

Medications:

NEW MEDICATIONS:

B6

Diet suggestions:

We would like to change B6 diet to a low sodium diet. A few diet options would be:

Dry Food:

Royal Canin Early Cardiac diet

Purina proplan bright mind small breed formula

Purina proplan adult weight management (this does not have low calories in spite of the name of the food)

Canned Food:

Hills Science diet adult beef and barley entree

Exercise Recommendations:

For the first 7 to 10 days after starting medications for heart failure we recommend very limited activity. Leash walking only is ideal, and short walks to start. Once the heart failure is better controlled, then slightly longer walks are acceptable.

However, if you find that B6 is lagging behind or needs to stop on a walk then this was too long a walk and shorter walks are advised in the future. Repetitive or strenuous high energy activities (repetitive ball chasing, running fast off-leash, etc.) are generally not advised at this stage of heart failure.

Recheck Visits:

A recheck visit is recommended in 1-2 weeks for bloodwork which can be done at your primary care veterinarian.

A recheck has been scheduled for B6 on

Tuesday, November 20, 2018 at 11:00am with B6

Thank you for entrusting us with B6 care. Please contact our Cardiology liaison at (508)-887-4626 or email us at cardiovet@tufts.edu for scheduling and non-emergent questions or concerns.

Please visit our HeartSmart website for more information

<http://vet.tufts.edu/heartsmart/>

Prescription Refill Disclaimer:

For the safety and well-being of our patients, your pet must have had an examination by one of our veterinarians within the past year in order to obtain prescription medications.

Ordering Food:

Please check with your primary veterinarian to purchase the recommended diet(s). If you wish to purchase your food from us, please call 7-10 days in advance (508-887-4629) to ensure the food is in stock. Alternatively, veterinary diets can be ordered from online retailers with a prescription/veterinary approval.

Clinical Trials:

Clinical trials are studies in which our veterinary doctors work with you and your pet to investigate a specific disease process or a promising new test or treatment. Please see our website: vet.tufts.edu/cvnc/clinical-studies

Case: B6

Owner: B6

Discharge Instructions

Client: **B6**
 Veterinarian: **B6**
 Patient ID: **B6**
 Visit ID: 2492791

Patient: **B6**
 Species: Canine
 Breed: Doberman
 Sex: Male (Neutered)
 Age: **B6** Years Old

Lab Results Report

Chemistry 21 (Cobas)		B6	1:29:21 PM	Accession ID: B6
Test	Results	Reference Range	Units	
GLUCOSE	B6	67 - 135	mg/dL	
UREA		8 - 30	mg/dL	
CREATININE		0.6 - 2	mg/dL	
PHOSPHORUS		2.6 - 7.2	mg/dL	
CALCIUM2		9.4 - 11.3	mg/dL	
T. PROTEIN		5.5 - 7.8	g/dL	
ALBUMIN		2.8 - 4	g/dL	
GLOBULINS		2.3 - 4.2	g/dL	
A/G RATIO		0.7 - 1.6		
SODIUM		140 - 150	mEq/L	
CHLORIDE		106 - 116	mEq/L	
POTASSIUM		3.7 - 5.4	mEq/L	
NA/K		29 - 40		
T BILIRUBIN		0.1 - 0.3	mg/dL	
D.BILIRUBIN		0 - 0.1	mg/dL	
I BILIRUBIN		0 - 0.2	mg/dL	
ALK PHOS		12 - 127	U/L	
ALT		14 - 86	U/L	
AST		9 - 54	U/L	
CHOLESTEROL		82 - 355	mg/dL	
OSMOLALITY (CALCULATED)	291 - 315	mmol/L		
COMMENTS (CHEMISTRY)		0 - 0		

From: Freeman, Lisa <Lisa.Freeman@tufts.edu>
To: Jones, Jennifer L
Sent: 8/23/2018 4:25:40 PM
Subject: Re: updates
Attachments: image001.png; image002.png

Hi Jen. They gave permission to report so i think it would be fine til contact but I can specifically check if you'd prefer
Lisa

Sent from my iPhone

On Aug 23, 2018, at 11:57 A Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov> wrote:

Hi Lisa,
Do we have permission to contact [B6] about the 2 dobermans?
Thank you,
Jen

Jennifer Jones, DVM
Veterinary Medical Officer
Tel: 240-402-5421
<image001.png> <image002.png>

From: Freeman, Lisa [mailto:Lisa.Freeman@tufts.edu]
Sent: Monday, August 20, 2018 6:18 PM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Subject: updates

Hi Jen
I forgot to note on the report I submitted today that I have a food sample and UPC code for the Acana food that the 2 Dobies were eating.

Also, for [B6] whose heart has improved significantly, I just got a sample from the owner who found some food remaining at her summer house – it is not fresh but I'm saving for you in case you want
Thanks
Lisa

Lisa M. Freeman, DVM, PhD, DACVN
Board Certified Veterinary Nutritionist™
Professor
Cummings School of Veterinary Medicine
Friedman School of Nutrition Science and Policy
Tufts Clinical and Translational Science Institute
Tufts University
www.petfoodology.org

From: Jones, Jennifer L </o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=0f6ca12eaa9348959a4cbb1e829af244-Jennifer.Jo>
To: Rotstein, David; Queen, Jackie L; Palmer, Lee Anne; Carey, Lauren
CC: Peloquin, Sarah; Ceric, Olgica; 'Reimschuessel, Renate (Renate.Reimschuessel@fda.hhs.gov)'
Sent: 9/20/2018 2:27:03 PM
Subject: RE: 800.267-EON-362878; **B6** Acana Free Run Poultry dry
Attachments: MRx.zip

Interview pending, Cough since early 2017! Norm Tau; Housemate **B6** -also Tau norm, maybe got echo (checking)

B6 -7 yr MC Doberman Pinscher

Hx: **B6** as of 2/8/2017-report of nonproductive hacking cough recently-O thought after sniffing dust, eating Valor Freeze dried food; 3/10/2017-PD, morning cough-o thinks allergies, MAP crytalsàrecheck had none-rare **B6** occ little cough but normal for him, on Grandma Lucy raw and Earthborne; 2/14/2018-Grandma Lucy and Acana poultry

PCC 8/1/2018-inappetant a few days-resolved, on **B6** joint supp, limping LF-began July 4th, abd seems large w/ more prominent spine

B6

Tx: **B6**

8/7: nonproductive dry hack, same last 5 yr, slight inc am, periodically t/o day, inc panting but hot weather, change boody appearance

B6

X-rad 8/6: cardiomeg, pl eff, hepatomeg, sus mild perit eff, degen spine/sternum changes, inc cd-dorsal interstitial opacity

Echo-cardiac dz w/ CHF

Tx: **B6**

8/16 Cardiologist: o had 5 yr, **B6** issues, dec energy/exercise intol, on Acana, cough, dyspnea, sudden onset LF lame,

PE: mild mm loss, Gr II/VI L apic sys murmur, jug v middle 1/3 neck, fair pulse, tachycard, prem beats, pronounced gallop, mild dyspnea

Echo: dec LV thick, inc LV dil, dec contractility, mod inc LA, mild pl effusion, mild MV/TV thick, 1-2+ MR, 1+ TR

ECG-sinus tachy w/ 1 VPC, CI 101, rest chem nsf

Tau-whole blood: **B6**

Tx: d/c **B6** fish oil, 1g Tau bid, diet change

9/10: on RC early cardiac, diarrhea once, some cough, inc snuggly, 5lb weight loss

B6

B6 Housemate

8/20/2018 WB Tau: **B6**

Jennifer Jones, DVM
Veterinary Medical Officer
Tel: 240-402-5421



From: PFR Event <preventioncreation@fda.hhs.gov>
Sent: Monday, August 20, 2018 4:44 PM
To: Cleary, Michael * <Michael.Cleary@fda.hhs.gov>; HQ Pet Food Report Notification <HQPetFoodReportNotification@fda.hhs.gov> [B6]
Subject: Acana Free Run Poultry dry: Lisa Freeman - EON-362878

A PFR Report has been received and PFR Event [EON-362878] has been created in the EON System.

A "PDF" report by name "2053969-report.pdf" is attached to this email notification for your reference. Please note that all documents received in the report are compressed into a zip file by name "2053969-attachments.zip" and is attached to this email notification.

Below is the summary of the report:

EON Key: EON-362878

ICSR #: 2053969

EON Title: PFR Event created for Acana Free Run Poultry dry; 2053969

AE Date	08/06/2018	Number Fed/Exposed	2
Best By Date		Number Reacted	1
Animal Species	Dog	Outcome to Date	Stable
Breed	Doberman Pinscher		
Age	[B6] Years		
District Involved	PFR-New England DO		

Product information

Individual Case Safety Report Number: 2053969

Product Group: Pet Food

Product Name: Acana Free Run Poultry dry

Description: Taken to RDVM for lameness. Dilated cardiomyopathy and CHF diagnosed 8/6/18. Started on meds [B6]. We saw at Tufts 8/16/18. Clinically improved but still has significant DCM and CHF plus arrhythmia. We added [B6], fish oil, and taurine. WB taurine pending. Another dog in household (also a Doberman) was eating the same food but was echoed today and has no signs of DCM.

Submission Type: Initial

Report Type: Adverse Event (a symptom, reaction or disease associated with the product)

Outcome of reaction/event at the time of last observation: Stable

Number of Animals Treated With Product: 2

Number of Animals Reacted With Product: 1

Product Name	Lot Number or ID	Best By Date
Acana Free Run Poultry dry		

Sender information

Lisa Freeman

200 Westboro Rd
North Grafton, MA 01536
USA

Owner information

B6 USA

To view this PFR Event, please click the link below:

<https://eon.fda.gov/eon//browse/EON-362878>

To view the PFR Event Report, please click the link below:

<https://eon.fda.gov/eon//EventCustomDetailsAction!viewReport.jspx?decorator=none&e=0&issueType=12&issuelid=379612>

=====
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E B6

B6

To Jennifer Jones Date 9.17.18 Fr **B6**
Fax # 301 210 4685 # of Pages _____

Comments:

Medical records for **B6**

This facsimile contains confidential information intended only for the addressee. Do not read, copy or disseminate it unless you are the addressee. If you have received this facsimile in error please contact the sender immediately at the above phone number.
Thank You



B6

B6

Acct No. : **B6**

B6
Species: **B6**
Breed : Doberman Pinscher
D.O.B. : **B6**

B6

B
Sex MN
Color Black/Rust
Weight 90.7lbs.

MEDICAL RECORD

Catalyst One

09/10/2018 05:21 PM

GLU	B6	70-143 mg/dL
CREA	B6	0.5-1.8 mg/dL
BUN	B6	7-27 mg/dL
BUN/CREA	B6	
TP	B6	5.2-8.2 g/dL
ALB	B6	2.2-3.9 g/dL
GLOB	B6	2.5-4.5 g/dL
ALB/GLOB	B6	
ALT	B6	10-125 U/L
ALKP	B6	23-212 U/L

B6

Sep 10, 2018	Chem 10 (Current Invoice)
Sep 10, 2018	Blood Draw-Technician (Current Invoice)
Sep 10, 2018	Blood Draw-Technician
Sep 10, 2018	Chem 10

1
1
1
1

History, Physical Exam Findings, Assessment, and Recommendations

Client: **B6**
Patient: **B6**
Sex: MN
Breed: Canine
D.O.B.: **B6**



B6

Weight: 90.7lbs.

Performed: Sep 10, 2018 by: **B6**

OBSERVATIONS:

Medical Examination:

reck renal panel/poss sr bldwk after being on meds for 1 month
dx w/CHF recently

fr. w. **B6** 20mg 1 t bid

B6 g 1 t bid
10mg 1.5 t sid

owner will call w/ meds dosing it has changed since being seen initially on 8-16
fish oil capsules cys 7 daily

B6

switched from purina proplan gradually didn't want to eat it
now on rc early cardiac 2 c 1/2 can bid
1 can midday
owner monitors wt closely
seems to be improving
reck now pleural effusion present
renal bldwk
drinking and urinating a ton
little bit of diarrhea 2 days ago just one time
no v/s
a little bit of coughing
no e/n disch

B6

at this point he is pretty much himself
does seem more snuggly lately
kr

Weight: 90.7 lbs BS5

5# wt loss

Temperature: 101.5 F (normal=100.5-102.5F)

Patient Physical Examination

Hydration Status:	Normal
Mental Status:	Normal
Ears:	Normal
Eyes:	Normal
Nose/Throat:	Normal
Mouth/Teeth/Gums:	Normal mmpink, crt 1s
Skin/Haircoat:	Normal
Heart/Cardiovascular:	Normal HR120, borderline murmur; strong N pulse
Lungs/Trachea:	Normal, clear, no dyspnea RR20



B6

GI/Abdominal Palpation: Normal
 Musculoskeletal: Normal
 Urinary/Reproductive: Normal
 Nervous System: Normal
 Lymph nodes/Thyroid gland: Normal
 Lab and Diagnostic Tests Performed:
 Chem 10 results:

FINDINGS:

stable cardiomyopathy; on many meds per Tufts
 guarded long term Px - could decompensate at any time, incl sudden death poss

RECOMMENDATIONS:

Medical examination performed today.

- 1: *cont all meds per Tufts
- 2: exercise restriction
- 3: RC early cardiac diet
monitor closely - has recheck at Tufts sch
- 4: in house bldwk Chem 10 profile run in house.-all WNL - TC LMOM report results mm

Sep 10, 2018	Patient Weight	1
Sep 10, 2018	Examination-Medical (Illness)	1
Sep 10, 2018	Medical Waste/Consumables/Disinfection	1
Aug 24, 2018	B6	60

Give one (1) capsule orally twice daily or as directed by Tufts.
 Aug 15, 2018 **B6** 1

Give 1 tablet orally 2 times daily for life unless otherwise directed.

08/15/2018: **B6** CVT

NOTES:

I emailed the xrays and US images we had on file to
 cardiovet@tufts.edu **B6**

08/13/2018: **B6** CVT

NOTES:

phoned in **B6** 30mg/ml 2 month supply
 give 1/2 ml oral twice daily #60ml 2 refills **B6**



B6

kr

Take Home Instructions No. 2 B6
Aug 11, 2018 B6 20 mg 100.0
B6 20 mg 100.0

Give 1 tablet orally 2 times daily for life unless otherwise directed.

08/10/2018 B6 CVT

NOTES:

Faxed med records/labs from last two years, emailed radiographs of foot and ultrasound images from B6 to liasons@tufts.edu B6 5:13pm

08/09/2018 B6

NOTES:

pc B6 it is in call when ready to be filled B6

B6
Ultrasound images from B6
Case #0
Problem #0

Aug 07, 2018 B6 28.0
B6

Give 2 tablets orally twice a day for life unless otherwise directed.

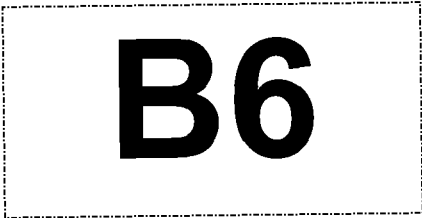
History, Physical Exam Findings, Assessment, and Recommendations

Client: B6
Patient: B6
Sex: MN
Breed: Canine
D.O.B.: B6
Weight: 90.7lbs.
Performed: Aug 07, 2018 by: B6

OBSERVATIONS:

Consult:
Cough History

Is it a productive cough, and if yes, what does the pet cough up?
non productive dry hack - same in last 5yrs
Has your pet been recently boarded or around other/new pets?
no
Is there a time of day or situation when the cough is more prominent?
no



: O has noticed sl incr C - in am waking up throat clearing and periodically during day gag type breathing has not changed, just panting more, but hot weather lately has noticed body looks different

T 101.2

Patient Physical Examination

Hydration Status: Normal
 Mental Status: Normal BAR
 Ears: Normal
 Eyes: Normal
 Nose/Throat: Normal
 Mouth/Teeth/Gums: Normal mmpink crt 1s
 Skin/Haircoat: Normal
 Heart/Cardiovascular: HR140, N ryhtm, no murmur
 Lungs/Trachea: mostly panting; when mouth held closed RR40-50 and miild dyspnea, no rales or fluid
 GI/Abdominal Palpation: **mod ascites
 Musculoskeletal: Normal LF lame - sore toe
 Urinary/Reproductive: Normal
 Nervous System: Normal
 Lymph nodes/Thyroid gland: Normal

Weight: diff -varies a lot on scale today lbs

FINDINGS:

consult at length; Dx via cardiologist and echo - CHF-DCM mod to severe; cardiologist did not consult with O - gave no inf guarded Px discuss at lengh, incl QOL

RECOMMENDATIONS:

Consult appointment performed today.

B6 dispensed today. Please refer to label and VPR information sheet for more information.
B6 dispensed today. Please refer to label and VPR information sheet for more information.
B6 dispensed today. Please refer to label and VPR information sheet for more information.

low salt diet
recheck 2weeks, sooner if worse; poss rads and chem mm

Aug 07, 2018 **B6** 60.0
B6 40mg 60.0

Give 1 tablets orally 2 times daily for life unless otherwise directed.
 Aug 07, 2018 **B6** 10 mg 1.00



B6

B6 mg 1.00

Give one and one-half (1-1/2) tablets orally twice daily for heart disease.

Aug 07, 2018	Patient Weight	1
Aug 07, 2018	Examination-Extended Consult	1
Aug 07, 2018	Medical Waste/Consumables/Disinfection	1

08/02/2018 **B6**

NOTES:

B6

Zoasis - Superchem, Complete Blood Count, T4, Urinalysis-Complete, Accuplex 4

08/02/2018 03:23 AM

Accession Result ID

B6

Superchem

Total Protein

5.0-7.4 g/dL

Albumin

2.7-4.4 g/dL

Globulin

1.6-3.6 g/dL

A/G Ratio

0.8-2.0

AST (SGOT)

15-66 IU/L

ALT (SGPT)

12-118 IU/L

Alk Phosphatase

5-131 IU/L

GGTP

Total Bilirubin

0.1-0.3 mg/dL

Urea Nitrogen

6-31 mg/dL

Creatinine

0.5-1.6 mg/dL

BUN/Creatinine Ratio

4-27

Phosphorus

2.5-6.0 mg/dL

B6

B6



B6

Glucose	70-138 mg/dL
Calcium	8.9-11.4 mg/dL
Corrected Calcium	
Magnesium	1.5-2.5 mEq/L
Sodium	139-154 mEq/L
Potassium	3.6-5.5 mEq/L
Na/K Ratio	27-38
Chloride	102-120 mEq/L
Cholesterol	92-324 mg/dL
Triglycerides	29-291 mg/dL
Amylase	290-1125 IU/L
PrecisionPSL	24-140 U/L

B6

B6

B6

CPK **B6** 59-895 IU/L

Comment

B6 No significant interference.

Complete Blood Count

WBC	4.0-15.5 $10^3/\mu\text{L}$
RBC	4.8-9.3 $10^6/\mu\text{L}$
Hemoglobin	12.1-20.3 g/dL
Hematocrit	36-60 %
MCV	58-79 fL
MCH	19-28 pg
MCHC	30-38 g/dL
Platelet Count	170-400 $10^3/\mu\text{L}$
Platelet EST	
Neutrophils	60-77 %
Bands	0-3 %
Lymphocytes	12-30 %
Monocytes	3-10 %
Eosinophils	2-10 %
Basophils	0-1 %
Absolute Neutrophils	2060-10600 $/\mu\text{L}$
Absolute Lymphocytes	690-4500 $/\mu\text{L}$

B6

B6



B6

Absolute Monocytes
Absolute Eosinophils
Absolute Basophils
T4
T4
Urinalysis-Complete
Collection Method

B6

0-840 / μ L
0-1200 / μ L
0-150 / μ L
0.8-3.5 μ g/dL

B6

Not Stated

Color
Appearance
Specific Gravity
pH
Protein

B6

1.015-1.050
5.5-7.0

B6

Glucose
Ketone
Bilirubin
Blood
WBC
RBC
Casts
Struvite Crystals
Bacteria
Squamous Epithelia
Accuplex 4

B6

B6



B6

Anaplasma Phagocytophilum

B6

B6

Aug 01, 2018
Aug 01, 2018
Aug 01, 2018
Aug 01, 2018

B6

1
1
1
30.00

B6
B6

Give 1 1/2 tablets orally once a day Give Medication with a meal Call if any vomiting or diarrhea

History, Physical Exam Findings, Assessment, and Recommendations

Client: B6
Patient: B6
Sex: MN
Breed: Canine
D.O.B.: B6
Weight: 90.7lbs.
Performed: Aug 01, 2018 by: B6

OBSERVATIONS:

B6



B6

B6



B6

B6

Page 12 of 35



B6

B6



B6

B6



B6

B6



B6

B6

History, Physical Exam Findings, Assessment, and Recommendations

Client: B6
Patient: B6
Sex: MN
Breed: Canine
D.O.B.: B6
Weight: 90.7lbs.
Performed: Feb 14, 2018 by: B6

OBSERVATIONS:

Annual Examination:

Do you have any concerns today?

gained weight- hasn't been out during the winter

What kind of food are you feeding? How much are you feeding and how many times a day?

Grandma Lucy's Freeze dried

Acana poultry

B6



B6

B6

B6

Patient Physical Examination

Hydration Status:	Normal
Mental Status:	Normal
Ears:	Normal
Eyes:	Normal
Nose/Throat:	Normal
Mouth/Teeth/Gums:	Normal
Skin/Haircoat:	Normal
Heart/Cardiovascular:	Normal
Lungs/Trachea:	Normal
GI/Abdominal Palpation:	Normal
Musculoskeletal:	Normal
Urinary/Reproductive:	Normal
Nervous System:	Normal
Lymph nodes/Thyroid gland:	Normal

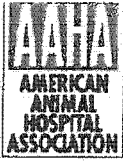
B6

Body Condition:

Your pet's body condition score is five. This is considered an ideal body score. This score indicates your pet is well-proportioned, minimal abdominal fat that is tucked up and palpable ribs without excess fat covering them.

Lab and Diagnostic Tests Performed:

B6



B6

FINDINGS:

A1. Healthy

B6



B6

B6

History, Physical Exam Findings, Assessment, and Recommendations

Client: B6
Patient: B6
Sex: MN
Breed: Canine
D.O.B.: B6
Weight: 90.7lbs.
Performed: Jul 26, 2017 by: B6

OBSERVATIONS:

6 Month Senior Exam:

What kind of food are you feeding? How much are you feeding and how many times a day?

Grandma Lucy (frozen raw diet) and Earth Bourne kibble. 1 cup of raw and 1 cup of kibble twice per day and a few treats in the afternoon.

Are there any changes in their eating or drinking habits?

No

Any vomiting?diarrhea?coughing?sneezing?

Seasonal allergies and occasionally a little cough but for him it is normal. This spring and summer the allergies have gotten worse.

Any eye/nasal discharge?



B6

B6



B6

B6



B6

B6



B6

B6



B6

B6





B6

B6



B6

B6



B6

B6



B6

B6



B6

B6

B6

Patient Physical Examination

Hydration Status: Normal
 Mental Status: Normal
 Ears: Normal
 Eyes: Normal
 Nose/Throat: Normal
 Mouth/Teeth/Gums: Normal
 Skin/Haircoat: Normal
 Heart/Cardiovascular: Normal
 Lungs/Trachea: Normal
 GI/Abdominal Palpation: Normal
 Musculoskeletal: Normal
 Urinary/Reproductive: Normal
 Nervous System: Normal
 Lymph nodes/Thyroid gland: Normal

B6

Body Condition:

Your pet's body condition score is five. This is considered an ideal body score. This score indicates your pet is well-proportioned, minimal abdominal fat that is tucked up and palpable ribs without excess fat covering them.



B6

B6



B6

B6



B6

B6



B6

B6



B6

B6

B6

Patient ID: B6

B6 Canine

B6 Years Old Male (Neutered) Doberman
Black/Tan

Cardiology Appointment Report

Date: B6

Attending Cardiologist:

John E. Rush DVM, MS, DACVIM (Cardiology), DACVECC

B6

Cardiology Resident:

B6

Cardiology Technician:

B6

Presenting Complaint:

Work up of DCM/CHF

Concurrent Diseases:

B6

General Medical History:

Owner has had him for 5 years. Was obese and behavioral issues. Owner has worked well with the

B6

Owner has noticed that he used to be energetic and play a lot, and now he is not, however, after starting medications, is slightly better.

Diet and Supplements:

Acana

Cardiovascular History:

Prior CHF diagnosis?	YES
Prior heart murmur?	YES
Prior ATE?	NO
Prior arrhythmia?	NO
Monitoring respiratory rate and effort at home?	YES
Cough?	YES (hacking, throat clearing)
Shortness of breath or difficulty breathing?	YES

Syncope or collapse?
Sudden onset lameness?
Exercise intolerance?

NO
YES (LFL)
YES

Current Medications Pertinent to CV System:

B6

Cardiac Physical Examination:

B6

Muscle condition:

- Normal
- Mild muscle loss
- Moderate cachexia
- Marked cachexia

Cardiovascular Physical Exam:

Murmur Grade:

- None
- I/VI
- II/VI
- III/VI
- IV/VI
- V/VI
- VI/VI

Murmur location/description: systolic; left apical systolic

Jugular vein:

- Bottom 1/3 of the neck
- Middle 1/3 of the neck
- 1/2 way up the neck
- Top 2/3 of the neck

Arterial pulses:

- Weak
- Fair
- Good
- Strong
- Bounding
- Pulse deficits
- Pulsus paradoxus
- Other:

Arrhythmia:

- None
- Sinus arrhythmia
- Bradycardia
- Tachycardia

Premature beats

Gallop:

- Yes
- No
- Intermittent

- Pronounced
- Other:

Pulmonary assessments:

- Eupneic
- Mild dyspnea
- Marked dyspnea
- Normal BV sounds
- Pulmonary crackles
- Wheezes
- Upper airway stridor

Abdominal exam:

- Normal
- Hepatomegaly
- Abdominal distension
- Mild ascites
- Marked ascites

Problems:

murmur, shortness of breath, lameness, historical ascites and pleural effusion)

Differential Diagnoses:

DCM, DMVD, CHF secondary to DCM

Diagnostic plan:

- Echocardiogram
- Chemistry profile
- ECG
- Renal profile
- Blood pressure
- Dialysis profile
- Thoracic radiographs
- NT-proBNP
- Troponin I
- Other tests: Taurine level

B6

Assessment and recommendations:

DCM with signs of active CHF, although he is better than prior to starting medication (no more ascites). However, given that there is still some pleural effusion, the diuretic dose that the patient is on right now is not sufficient. We are therefore going to increase f B6 at the same dose. The B6 is currently at a higher dose than needed, so we are going to decrease it to 10mg BID. Given the interaction between B6 and B6 we are going to try B6 for B6. Recheck fluid status and renal values in 2 weeks. Recheck echocardiogram in 3-4 months.

Final Diagnosis:

DCM with CHF

Heart Failure Classification Score:

ISACHC Classification:

- Ia
- Ib
- II
- IIIa
- IIIb

ACVIM Classification:

- A
- B1
- B2
- C
- D

2D

- SA LA
- Ao Diam
- SA LA / Ao Diam
- IVSd
- LVIDd
- LVPWd
- EDV(Teich)
- IVSs
- LVIDs
- LVPWs
- ESV(Teich)
- EF(Teich)
- %FS
- SV(Teich)
- LVLd A4C
- LVEDV MOD A4C
- LVLs A4C
- LVESV MOD A4C
- LVEF MOD A4C
- SV MOD A4C

B6

cm
cm

cm
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%
ml

M-Mode

- IVSd
- LVIDd
- LVPWd
- IVSs
- LVIDs
- LVPWs
- %FS
- Ao Diam
- LA Diam
- LA/Ao
- Max LA
- EPSS

B6

cm
cm
cm
cm
cm
cm
%
cm
cm
cm
cm

Doppler

MV E Vel
MV DecT
MV A Vel
MV E/A Ratio
PV Vmax
PV maxPG
AV Vmax
AV maxPG

B6

m/s
ms
m/s

m/s
mmHg
m/s
mmHg

B6

Final Report for Exam ID: 2546992

Patient ID 29966

Patient Name B6

Sex: M ALTERED

Birthdate: B6

Weight: 95

Hospital Name: B6

Doctor Name: B6

Date of Exam: 20180806

Report Date:

Report ID: 2386236

Reader:

History

Consult Type: FILMINTERP, SIG: DOB: B6 Age: B6 Y, Sex: M ALTERED, Wt: 95lbs, Breed: Doberman, Species: CANINE, Images: 3, Case Details: Referred for potential toe mass. Chest X-rays revealed significant pleural effusion with suspected cardiomegaly. Echo confirmed cardiac disease with failure. Primary concern is cardiac disease and not neoplasia. Current meds = B6

Findings

Three lateral radiographic projections of the thorax dated 8/6/2018.

There is fluid opacity within the plural space causing partial partial border effacement of the ventral cardiac silhouette and diaphragm and retraction of the ventral lung margins. The thoracic trachea is dorsally displaced. The cranial lobar vasculature is unremarkable. The caudal lobar vasculature is not well delineated. There is an increase in interstitial opacity within the caudodorsal lung. The caudal vena cava is not identified.

In the limited view of the cranial abdomen there is caudal displacement of the gastric axis. On two of the projections there are a few thin wispy soft tissue streaks superimposed with the cranioventral abdomen. There are multiple sites of spondylosis deformans within the visible spine. There are degenerative changes of the sternum.

Conclusion

Cardiomegaly consistent with patient history of cardiac disease. Pleural effusion and hepatomegaly with suspected mild peritoneal effusion is most concerning for right-sided cardiac dysfunction given patient history and constellation of radiographic findings

Increased interstitial opacity in the caudodorsal lung has differentials to include artifact secondary to partial atelectasis and superimposition of pleural fluid, however mild pulmonary edema cannot be ruled out. If clinically indicated a dorsoventral projection of the thorax could be considered for further evaluation of the caudal lung fields and vasculature.

Degenerative changes of the spine and sternum.

B6

- CXR Report - 8/6/2018

Recommendations

Continued radiographic monitoring of the thorax to assess response to treatment for heart failure are recommended to evaluate response to treatment and better evaluate for comorbidities.

Read By:

B6 DVM, DACVR

8/7/2018 11:22:52 AM UTC

To contact me : If you have any questions or concerns regarding this report or would like to discuss this case please contact me via email at B6

Patient ID 29966

Patient Name

B6

Page2

Discharge Instructions

Patient

Name: B6

Species: Canine

Black/Tan Male (Neutered) Doberman

Birthdate: B6

Owner

Name: B6

Address: B6

Patient ID: B6

Attending Cardiologist:

John E. Rush DVM, MS, DACVIM (Cardiology), DACVECC

B6

Cardiology Resident:

B6

Cardiology Technician:

B6

Admit Date: B6 11:40:18 AM

Discharge Date: B6

Diagnoses: Biventricular congestive heart failure secondary to dilated cardiomyopathy (DCM)

Case summary:

B6 has been diagnosed with a primary heart muscle disease called dilated cardiomyopathy (DCM). This disease is more common in large and giant breed dogs and is characterized by thinning of the walls of the heart, reduced cardiac pump function, and enlargement of the upper chambers of the heart. Many dogs with DCM will also have significant arrhythmias which can be life-threatening and also require medical management. B6 had occasional ventricular premature beats (VPCs) seen today, but not enough right now to warrant additional therapy. We do however, want to keep monitoring this.

The heart enlargement has now progressed to the point of congestive heart failure, meaning that fluid is backing up into the lungs and belly. Unfortunately this is a progressive disease and we cannot reverse the changes to the heart muscle, however we can use cardiac medications and some changes to the diet to make your dog comfortable and have him breathing easier.

Monitoring at home:

- We would like you to monitor your dog's breathing rate and effort at home, ideally during sleep or at a time of rest. The doses of drugs will be adjusted based on the breathing rate and effort.
- In general, most dogs with heart failure that is well controlled have a breathing rate at rest of less than 35 breaths per minute. In addition, the breathing effort, noted by the amount of belly wall motion used for each breath, is fairly minimal if heart failure is controlled.
- An increase in breathing rate or effort will usually mean that you should give an extra dose of B6 if difficulty breathing is not improved by within 30-60 minutes after giving extra B6 then we recommend that a recheck exam be scheduled and/or that your dog be evaluated by an emergency clinic.

- o There are instructions for monitoring breathing, and a form to help keep track of breathing rate and drug doses, on the Tufts HeartSmart web site (<http://vet.tufts.edu/heartsmart/at-home-monitoring/>).
- o We also want you to watch for weakness or collapse, a reduction in appetite, worsening cough, or distention of the belly as these findings indicate that we should do a recheck examination.
- o If you have any concerns, please call or have your dog evaluated by a veterinarian. Our emergency clinic is open 24 hours/day.

Medications:

B6

Diet suggestions:

We would like to change B6 diet to a low sodium diet. A few diet options would be:

Dry Food:

Royal Canin Early Cardiac diet

Purina proplan bright mind small breed formula

Purina proplan adult weight management (this does not have low calories in spite of the name of the food)

Canned Food:

Hills Science diet adult beef and barley entree

Exercise Recommendations:

For the first 7 to 10 days after starting medications for heart failure we recommend very limited activity. Leash walking only is ideal, and short walks to start. Once the heart failure is better controlled, then slightly longer walks are acceptable.

However, if you find that B6 is lagging behind or needs to stop on a walk then this was too long a walk and shorter walks are advised in the future. Repetitive or strenuous high energy activities (repetitive ball chasing, running fast off-leash, etc.) are generally not advised at this stage of heart failure.

Recheck Visits:

A recheck visit is recommended in 1-2 weeks for bloodwork which can be done at your primary care veterinarian.

A recheck has been scheduled for B6 on

Tuesday, November 20, 2018 at 11:00am with B6

Thank you for entrusting us with B6's care. Please contact our Cardiology liaison at (508)-887-4626 or email us at cardiovet@tufts.edu for scheduling and non-emergent questions or concerns.

Please visit our HeartSmart website for more information

<http://vet.tufts.edu/heartsmart/>

Prescription Refill Disclaimer:

For the safety and well-being of our patients, your pet must have had an examination by one of our veterinarians within the past year in order to obtain prescription medications.

Ordering Food:

Please check with your primary veterinarian to purchase the recommended diet(s). If you wish to purchase your food from us, please call 7-10 days in advance (508-887-4629) to ensure the food is in stock. Alternatively, veterinary diets can be ordered from online retailers with a prescription/veterinary approval.

Clinical Trials:

Clinical trials are studies in which our veterinary doctors work with you and your pet to investigate a specific disease process or a promising new test or treatment. Please see our website: vet.tufts.edu/cvnc/clinical-studies

Case: B6

Owner: B6

Discharge Instructions

Client: **B6**
 Veterinarian: **B6**
 Patient ID: **B6**
 Visit ID: 2492791

Patient: **B6**
 Species: Canine
 Breed: Doberman
 Sex: Male (Neutered)
 Age: **B6** Years Old

Lab Results Report

Chemistry 21 (Cobas)		B6	7:29:21 PM	Accession ID: B6
Test	Results	Reference Range	Units	
GLUCOSE	B6	67 - 135	mg/dL	
UREA		8 - 30	mg/dL	
CREATININE		0.6 - 2	mg/dL	
PHOSPHORUS		2.6 - 7.2	mg/dL	
CALCIUM2		9.4 - 11.3	mg/dL	
T. PROTEIN		5.5 - 7.8	g/dL	
ALBUMIN		2.8 - 4	g/dL	
GLOBULINS		2.3 - 4.2	g/dL	
A/G RATIO		0.7 - 1.6		
SODIUM		140 - 150	mEq/L	
CHLORIDE		106 - 116	mEq/L	
POTASSIUM		3.7 - 5.4	mEq/L	
NA/K		29 - 40		
T BILIRUBIN		0.1 - 0.3	mg/dL	
D.BILIRUBIN		0 - 0.1	mg/dL	
I BILIRUBIN		0 - 0.2	mg/dL	
ALK PHOS		12 - 127	U/L	
ALT		14 - 86	U/L	
AST		9 - 54	U/L	
CHOLESTEROL		82 - 355	mg/dL	
OSMOLALITY (CALCULATED)	291 - 315	mmol/L		
COMMENTS (CHEMISTRY)	0 - 0			

From: Carey, Lauren </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=F0226BD682844FA2B71EA3750D4FCB82-LAUREN.CARE>
To: Peloquin, Sarah; Palmer, Lee Anne; Rotstein, David
Sent: 10/24/2018 11:54:01 AM
Subject: RE: 800.267 DCM -- did we get reports from these cases?

I don't see them. Jen asked about **B6** back in August and we hadn't received it. I don't see where any **B6** report has come in since then. We can't search well by names, so if the reporters have the ICSR #, we can try to look that way.

We have not received any new PFR reports since the weekend. EON is not delivering reports to us, so if they're new reports they are probably trapped somewhere within the bowels of the internet with all the other reports.

I'll keep an eye out.

Thanks,
Lauren.

From: Peloquin, Sarah
Sent: Wednesday, October 24, 2018 7:49 AM
To: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>
Subject: 800.267 DCM -- did we get reports from these cases?

Did we receive PFR reports from any of the following cases from Tufts?

• **B6**
•

Let me know. Thanks!!

Sarah K. Peloquin, DVM
Veterinary Medical Officer

U.S. Food & Drug Administration
Center for Veterinary Medicine
Veterinary Laboratory Investigation and Response Network
tel: 240-402-1218
fax: 301-210-4685
e-mail: sarah.peloquin@fda.hhs.gov



From: PFR Event <pfpreventcreation@fda.hhs.gov>
To: Cleary, Michael *; HQ Pet Food Report Notification; B6
Sent: 2/24/2019 11:24:38 PM
Subject: Taste of the Wild Sierra Mountain Dry: Lisa Freeman - EON-380714
Attachments: 2063118-report.pdf; 2063118-attachments.zip

A PFR Report has been received and PFR Event [EON-380714] has been created in the EON System.

A "PDF" report by name "2063118-report.pdf" is attached to this email notification for your reference. Please note that all documents received in the report are compressed into a zip file by name "2063118-attachments.zip" and is attached to this email notification.

Below is the summary of the report:

EON Key: EON-380714

ICSR #: 2063118

EON Title: PFR Event created for Taste of the Wild Sierra Mountain Dry; 2063118

AE Date	01/14/2019	Number Fed/Exposed	7
Best By Date		Number Reacted	2
Animal Species	Dog	Outcome to Date	Stable
Breed	Retriever - Golden		
Age	5 Years		
District Involved	PFR-New England DO		

Product information

Individual Case Safety Report Number: 2063118

Product Group: Pet Food

Product Name: Taste of the Wild Sierra Mountain Dry

Description: BEG diet being fed to 7 dogs. We evaluated her other dog B6 who had a murmur and elevated BNP, with reduced contractility and elevated troponin found on exam (see previous report - 2061171). Owner worried about this dog's breathing so we screened her and found reduced contractility, elevated troponin, but normal BNP. Changing diet on both dogs to Pro Plan Sensitive Skin/Stomach Salmon and will recheck in 3 months Other dogs we have not screened B6 Labrador 5 years old B6 Golden 3 1/2 years old B6 Golden 3 years old B6 Golden 3 years 5 months B6 Golden 3 years 9 months

Submission Type: Initial

Report Type: Adverse Event (a symptom, reaction or disease associated with the product)

Outcome of reaction/event at the time of last observation: Stable

Number of Animals Treated With Product: 7

Number of Animals Reacted With Product: 2

Product Name	Lot Number or ID	Best By Date
Taste of the Wild Sierra Mountain Dry		

Sender information

Lisa Freeman
200 Westboro Rd
North Grafton, MA 01536
USA

Owner information

B6
USA

To view this PFR Event, please click the link below:

<https://eon.fda.gov/eon//browse/EON-380714>

To view the PFR Event Report, please click the link below:

<https://eon.fda.gov/eon//EventCustomDetailsAction!viewReport.jspx?decorator=none&e=0&issueType=12&issueId=397723>

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Failure to adhere to the above provisions could result in removal from the approved distribution list. If you think

you received this email in error, please send an email to FDAREportableFoods@fda.hhs.gov immediately.

Report Details - EON-380714	
ICSR:	2063118
Type Of Submission:	Initial
Report Version:	FPSR.FDA.PETF.V.V1
Type Of Report:	Adverse Event (a symptom, reaction or disease associated with the product)
Reporting Type:	Voluntary
Report Submission Date:	2019-02-24 18:16:40 EST
Reported Problem:	Problem Description: BEG diet being fed to 7 dogs. We evaluated her other dog, [B6], who had a murmur and elevated BNP, with reduced contractility and elevated troponin found on exam (see previous report - 2061171). Owner worried about this dog's breathing so we screened her and found reduced contractility, elevated troponin, but normal BNP. Changing diet on both dogs to Pro Plan Sensitive Skin/Stomach Salmon and will recheck in 3 months. Other dogs we have not screened: [B6] Labrador 5 years old, [B6] Golden 3 1/2 years old, [B6] Golden 3 years old, [B6] Golden 3 years 5 months, [B6] Golden 3 years 9 months
	Date Problem Started: 01/14/2019
	Concurrent Medical Problem: No
	Outcome to Date: Stable
Product Information:	Product Name: Taste of the Wild Sierra Mountain Dry
	Product Type: Pet Food
	Lot Number:
	Package Type: BAG
	Product Use Information:
	Description: Please see diet history for additional information
Manufacturer /Distributor Information:	
Purchase Location Information:	
Animal Information:	Name: [B6]
	Type Of Species: Dog
	Type Of Breed: Retriever - Golden
	Gender: Female
	Reproductive Status: Neutered
	Weight: 25.8 Kilogram
	Age: 5 Years
	Assessment of Prior Health: Excellent
	Number of Animals Given the Product: 7
	Number of Animals Reacted: 2
	Owner Information:
	Owner Information provided: Yes
	Contact:
Name: [B6]	
Phone: [B6]	
Email: [B6]	
Address:	
[B6]	
United States	
Healthcare Professional	
Practice Name: Tufts Cummings School of Veterinary Medicine	

	Information:	<table border="1"> <tr> <td>Contact: Name:</td> <td>Lisa Freeman</td> </tr> <tr> <td>Phone:</td> <td>(508) 887-4523</td> </tr> <tr> <td>Email:</td> <td>lisa.freeman@tufts.edu</td> </tr> <tr> <td>Address:</td> <td>200 Westboro Rd</td> </tr> <tr> <td></td> <td>North Grafton</td> </tr> <tr> <td></td> <td>Massachusetts</td> </tr> <tr> <td></td> <td>01536</td> </tr> <tr> <td></td> <td>United States</td> </tr> </table>	Contact: Name:	Lisa Freeman	Phone:	(508) 887-4523	Email:	lisa.freeman@tufts.edu	Address:	200 Westboro Rd		North Grafton		Massachusetts		01536		United States
Contact: Name:	Lisa Freeman																	
Phone:	(508) 887-4523																	
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Address:	200 Westboro Rd																	
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	01536																	
	United States																	
Sender Information:	<table border="1"> <tr> <td>Name:</td> <td>Lisa Freeman</td> </tr> <tr> <td>Address:</td> <td>200 Westboro Rd North Grafton Massachusetts 01536 United States</td> </tr> <tr> <td>Contact: Phone:</td> <td>5088874523</td> </tr> <tr> <td>Email:</td> <td>lisa.freeman@tufts.edu</td> </tr> <tr> <td>Permission To Contact Sender:</td> <td>Yes</td> </tr> <tr> <td>Preferred Method Of Contact:</td> <td>Email</td> </tr> </table>	Name:	Lisa Freeman	Address:	200 Westboro Rd North Grafton Massachusetts 01536 United States	Contact: Phone:	5088874523	Email:	lisa.freeman@tufts.edu	Permission To Contact Sender:	Yes	Preferred Method Of Contact:	Email					
Name:	Lisa Freeman																	
Address:	200 Westboro Rd North Grafton Massachusetts 01536 United States																	
Contact: Phone:	5088874523																	
Email:	lisa.freeman@tufts.edu																	
Permission To Contact Sender:	Yes																	
Preferred Method Of Contact:	Email																	
Additional Documents:		<table border="1"> <tr> <td>Attachment:</td> <td>rpt_medical_record_preview.pdf</td> </tr> <tr> <td>Description:</td> <td>Medical records</td> </tr> <tr> <td>Type:</td> <td>Medical Records</td> </tr> </table>	Attachment:	rpt_medical_record_preview.pdf	Description:	Medical records	Type:	Medical Records										
Attachment:	rpt_medical_record_preview.pdf																	
Description:	Medical records																	
Type:	Medical Records																	

From: Related PFR Event <pfrsignificantactivitycreation@fda.hhs.gov>
To: Carey, Lauren; Cleary, Michael *; HQ Pet Food Report Notification;
B6
Sent: 6/11/2019 6:00:45 PM
Subject: Taste of the Wild Sierra Mountain Dry: Lisa Freeman - EON-390196
Attachments: 2068087-report.pdf; 2068087-attachments.zip

A PFR Report has been received and Related PFR Event [EON-390196] has been created in the EON System.

A "PDF" report by name "2068087-report.pdf" is attached to this email notification for your reference. Please note that all documents received in the report are compressed into a zip file by name "2068087-attachments.zip" and is attached to this email notification.

Below is the summary of the report:

EON Key: EON-390196

ICSR #: 2068087

EON Title: Related PFR Event created for Taste of the Wild Sierra Mountain Dry; 2068087

AE Date	01/14/2019	Number Fed/Exposed	7
Best By Date		Number Reacted	2
Animal Species	Dog	Outcome to Date	Better/Improved/Recovering
Breed	Retriever - Golden		
Age	5 Years		
District Involved	PFR-New England DO		

Product information

Individual Case Safety Report Number: 2068087

Product Group: Pet Food

Product Name: Taste of the Wild Sierra Mountain Dry

Description: BEG diet being fed to 7 dogs. We evaluated her other dog, B6, who had a murmur and elevated BNP, with reduced contractility and elevated troponin found on exam (see previous report - 2061171). Owner worried about this dog's breathing so we screened her and found reduced contractility, elevated troponin, but normal BNP. Changing diet on both dogs to Pro Plan Sensitive Skin/Stomach Salmon and will recheck in 3 months. Other dogs we have not screened: B6 Labrador 5 years old, B6 Golden 3 1/2 years old, B6 Golden

3 years old **B6** Golden 3 years 5 months **B6** Golden 3 years 9 months

Submission Type: Followup

Report Type: Adverse Event (a symptom, reaction or disease associated with the product)

Outcome of reaction/event at the time of last observation: Better/Improved/Recovering

Number of Animals Treated With Product: 7

Number of Animals Reacted With Product: 2

Product Name	Lot Number or ID	Best By Date
Taste of the Wild Sierra Mountain Dry		

This report is linked to:

Initial EON Event Key: EON-380714

Initial ICSR: 2063118

Sender information

Lisa Freeman
200 Westboro Rd
North Grafton, MA 01536
USA

Owner information

B6
USA

To view this Related PFR Event, please click the link below:

<https://eon.fda.gov/eon//browse/EON-390196>

To view the Related PFR Event Report, please click the link below:

<https://eon.fda.gov/eon//EventCustomDetailsAction!viewReport.jsps?decorator=none&e=0&issueType=10100&issueId=407468&parentIssueTypeId=12>

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Report Details - EON-390196

ICSR:	2068087
Type Of Submission:	Followup
Report Version:	FPSR.FDA.PETF.V.V1
Type Of Report:	Adverse Event (a symptom, reaction or disease associated with the product)
Reporting Type:	Voluntary
Report Submission Date:	2019-06-11 13:56:24 EDT
Initial Report Date:	02/24/2019
Parent ICSR:	2063118
Follow-up Report to FDA Request:	Yes

Reported Problem:	Problem Description:	BEG diet being fed to 7 dogs. We evaluated her other dog, B6 who had a murmur and elevated BNP, with reduced contractility and elevated troponin found on exam (see previous report - 2061171). Owner worried about this dog's breathing so we screened her and found reduced contractility, elevated troponin, but normal BNP. Changing diet on both dogs to Pro Plan Sensitive Skin/Stomach Salmon and will recheck in 3 months. Other dogs we have not screened: B6 Labrador 5 years old, B6 Golden 3 1/2 years old, B6 Golden 3 years old, B6 Golden 3 years 5 months, B6 Golden 3 years 9 months
	Date Problem Started:	01/14/2019
	Concurrent Medical Problem:	No
	Outcome to Date:	Better/Improved/Recovering

Product Information:	Product Name:	Taste of the Wild Sierra Mountain Dry
	Product Type:	Pet Food
	Lot Number:	
	Package Type:	BAG
	Product Use Information:	Description: Please see diet history for additional information
	Manufacturer /Distributor Information:	
	Purchase Location Information:	

Animal Information:	Name:	B6							
	Type Of Species:	Dog							
	Type Of Breed:	Retriever - Golden							
	Gender:	Female							
	Reproductive Status:	Neutered							
	Weight:	25.8 Kilogram							
	Age:	5 Years							
	Assessment of Prior Health:	Excellent							
	Number of Animals Given the Product:	7							
	Number of Animals Reacted:	2							
	Owner Information:	Owner Information provided: Yes							
		Contact:	<table border="1"> <tr> <td>Name:</td> <td>B6</td> </tr> <tr> <td>Phone:</td> <td>B6</td> </tr> <tr> <td>Email:</td> <td>B6</td> </tr> </table>	Name:	B6	Phone:	B6	Email:	B6
	Name:	B6							
Phone:	B6								
Email:	B6								
	Address:	B6							

B6

United States

Healthcare Professional Information:

Practice Name: Tufts Cummings School of Veterinary Medicine

Contact Name: Lisa Freeman

Phone: (508) 887-4523

Email: lisa.freeman@tufts.edu

Address: 200 Westboro Rd
North Grafton
Massachusetts
01536
United States

Sender Information:

Name: Lisa Freeman

Address: 200 Westboro Rd
North Grafton
Massachusetts
01536
United States

Contact Phone: 5088874523

Email: lisa.freeman@tufts.edu

Permission To Contact Sender: Yes

Preferred Method Of Contact: Email

Additional Documents:

Attachment: Follow-up medical records pt 2.pdf

Description: Med records

Type: Medical Records

Attachment: Follow-up medical records pt 1.pdf

Description: Med records

Type: Medical Records

Client: **B6**
 Patient: **B6**

Diet Hx 5/3/2019

395550

CARDIOLOGY DIET HISTORY FORM
 Please answer the following questions about your pet

Pet's name: **B6** Owner's name: **B6** Today's date: 5/3/19

1. How would you assess your pet's appetite? (mark the point on the range below that best represents your pet's appetite)
 Example: Poor | Excellent
 Poor | Excellent

2. Have you noticed a change in your pet's appetite over the last 1-2 weeks? (check all that apply)
 Eats about the same amount as usual Eats less than usual Eats more than usual
 Seems to prefer different foods than usual Other: _____

3. Over the last few weeks, has your pet (check one)
 Lost weight Gained weight Stayed about the same weight Don't know

1. Please list below ALL pet foods, people food, treats, snack, dental chews, rawhides, and any other food item that your pet currently eats and that you have fed in the last 2 years.

Please provide enough detail that we could go to the store and buy the exact same food - examples are shown in the table

Food (include specific product and flavor)	Form	Amount	How often?	Dates fed
Nutra Grain Free Chicken, Lentil, & Sweet Potato Adult	dry	1 1/2 cup	2x/day	Jan 2016-present
85% lean hamburger	microwaved	3 oz	1x/week	June -Aug 2016
Pupperoni original beef flavor	treat	1/2	1x/day	Sept 2016-present
Rawhide	treat	6 inch twist	1x/week	Dec 2018-present
<u>Purina Pro Plan</u>	<u>dry</u>	<u>1 1/2</u>	<u>2x/day</u>	<u>Jan 2019 - present</u>
<u>dental chews & Chews</u>	<u>treat</u>	<u>1</u>	<u>3x/week</u>	<u>Jan 2019 - present</u>
<u>Wholesome Dog Biscuit</u>	<u>treat</u>	<u>5 treats</u>	<u>daily</u>	<u>Jan 2019 - present</u>

*Any additional diet information can be listed on the back of this sheet

2. Do you give any dietary supplements to your pet (for example: vitamins, glucosamine, fatty acids, or any other supplements)? Yes No If yes, please list which ones and give brands and amounts:

	Brand/Concentration	Amount per day
Taurine	<input type="checkbox"/> Yes <input type="checkbox"/> No _____	_____
Carnitine	<input type="checkbox"/> Yes <input type="checkbox"/> No _____	_____
Antioxidants	<input type="checkbox"/> Yes <input type="checkbox"/> No _____	_____
Multivitamin	<input type="checkbox"/> Yes <input type="checkbox"/> No _____	_____
Fish oil	<input type="checkbox"/> Yes <input type="checkbox"/> No _____	_____
Coenzyme Q10	<input type="checkbox"/> Yes <input type="checkbox"/> No _____	_____
Other (please list): Example: Vitamin C	<u>Nature's Bounty</u>	<u>500 mg tablets - 1 per day</u>

3. How do you administer pills to your pet?
 I do not give any medications
 I put them directly in my pet's mouth without food
 I put them in my pet's dog/cat food
 I put them in a Pill Pocket or similar product
 I put them in foods (list foods): _____

Client: **B6**
Patient:

Idexx NT-proBNP 5/3/2019

IDEXX Reference Laboratories

Client: **B6** Patient: **B6**

Client: **B6**
Patient: **B6**
Species: CANINE
Breed: LABRADOR RETRIE
Gender: FEMALE SPAYED
Age: 5Y

Date: **B6**
Requisition #: **B6**
Accession #: **B6**
Ordered by: **B6**

IDEXX VetConnect 1-888-433-9967

TUFTS UNIVERSITY
200 WESTBORO RD
NORTH GRAFTON, Massachusetts 01536
508-839-5395

Account #88333

CARDIOPET proBNP - CANINE

Test	Result	Reference Range	Unit	Method	Flag
CARDIOPET proBNP - CANINE	B6	0-900 pmol/L			B6

Comments:

B6

Client: **B6**
Patient: **B6**

Troponin 5/31/2019



Gastrointestinal Laboratory
Dr. J.M. Steiner
Department of Small Animal Clinical Sciences
Texas A&M University
4474 TAMU
College Station, TX 77843-4474



Website User ID: lisa.freeman@tufts.edu OR **B6**@tufts.edu

GI Lab Assigned Clinic ID: 23523

B6
Tufts Cummings School of Vet Med - Cardiology/Nutrition
200 Westboro Road
North Grafton, MA 01536
USA

Phone: 508 887 4696
Fax: **B6**
Animal Name: **B6**
Owner Name: **B6**
Species: Canine
Date Received: **B6**

Tufts Cummings School of Vet Med -
Cardiology/Nutrition Tracking Number:
395550

GI Lab Accession: **B6**

Test	Result	Reference Interval	Assay Date
Ultra-Sensitive Troponin I Fasting	B6 ng/mL	≤0.06	B6

B6

Comments:

GI Lab Contact Information

Phone: (979) 862-2861
Fax: (979) 862-2864

Email: glab@cvm.tamu.edu
vetmed.tamu.edu/gilab

Cummings Veterinary Medical Center

AT TUFTS UNIVERSITY

Cardiology Liaison: 508-887-4696

B6

Patient ID: B6

B6

Canine

Years Old Female (Spayed) Labrador

Retriever

Yellow

Cardiology Appointment Report DCM STUDY

Date: B6

Attending Cardiologist:

John E. Rush DVM, MS, DACVIM (Cardiology), DACVECC

B6

Cardiology Resident:

B6

Cardiology Technician:

B6

Student: B6 V20

Presenting Complaint: 3 month recheck - DCM study

General Medical History:

Initially presented in Jan. 2019 for heart screen; no murmur or arrhythmias ausculted, strong femoral pulses, no concerns at home but had been on BEG diet. Echo showed hypocontractility, VPCs, LAE, right heart enlargement. Marginally low taurine levels. Hx of bilateral TPLO

Doing well at home. Very active, no changes since last visit.

Diet and Supplements: Purina sensitive stomach

Cardiovascular History:

Prior CHF diagnosis? N

Prior heart murmur? N

Prior ATE? N

Prior arrhythmia? Y

Monitoring respiratory rate and effort at home? N

Cough? N

Shortness of breath or difficulty breathing? N

Syncope or collapse? N

Sudden onset lameness? N

Exercise intolerance? N

Current Medications Pertinent to CV System:

none

Cardiac Physical Examination:

B6

Cardiovascular Physical Exam:

Murmur Grade:

- | | |
|------------------------------------------|--------------------------------|
| <input checked="" type="checkbox"/> None | <input type="checkbox"/> IV/VI |
| <input type="checkbox"/> I/VI | <input type="checkbox"/> V/VI |
| <input type="checkbox"/> II/VI | <input type="checkbox"/> VI/VI |
| <input type="checkbox"/> III/VI | |

Murmur location/description:

Jugular vein:

- | | |
|------------------------------------------------------------|----------------------------------------------|
| <input checked="" type="checkbox"/> Bottom 1/3 of the neck | <input type="checkbox"/> 1/2 way up the neck |
| <input type="checkbox"/> Middle 1/3 of the neck | <input type="checkbox"/> Top 2/3 of the neck |

Arterial pulses:

- | | |
|--------------------------------------------|-------------------------------------------|
| <input type="checkbox"/> Weak | <input type="checkbox"/> Bounding |
| <input type="checkbox"/> Fair | <input type="checkbox"/> Pulse deficits |
| <input type="checkbox"/> Good | <input type="checkbox"/> Pulsus paradoxus |
| <input checked="" type="checkbox"/> Strong | <input type="checkbox"/> Other: |

Arrhythmia:

- | | |
|-------------------------------------------|--------------------------------------|
| <input checked="" type="checkbox"/> None | <input type="checkbox"/> Bradycardia |
| <input type="checkbox"/> Sinus arrhythmia | <input type="checkbox"/> Tachycardia |
| <input type="checkbox"/> Premature beats | |

Gallop:

- | | |
|----------------------------------------|-------------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> Pronounced |
| <input checked="" type="checkbox"/> No | <input type="checkbox"/> Other: |
| <input type="checkbox"/> Intermittent | |

Pulmonary assessments:

- | | |
|---------------------------------------------|-----------------------------------------------|
| <input checked="" type="checkbox"/> Eupneic | <input type="checkbox"/> Pulmonary crackles |
| <input type="checkbox"/> Mild dyspnea | <input type="checkbox"/> Wheezes |
| <input type="checkbox"/> Marked dyspnea | <input type="checkbox"/> Upper airway stridor |
| <input type="checkbox"/> Normal BV sounds | |

Abdominal exam:

- | | |
|--------------------------------------------|-----------------------------------------|
| <input checked="" type="checkbox"/> Normal | <input type="checkbox"/> Mild ascites |
| <input type="checkbox"/> Hepatomegaly | <input type="checkbox"/> Marked ascites |

Abdominal distension

Problems:

Hx of VPCs

Hypocontractility, LAE, right heart enlargement seen on previous echo

Differential Diagnoses:

Mildly reduced LV contractility - diet-associated vs. primary

Diagnostic plan:

- Echocardiogram
- Chemistry profile
- ECG
- Renal profile
- Blood pressure

- Dialysis profile
- Thoracic radiographs
- NT-proBNP
- Troponin I
- Other tests:

B6

Mitral inflow:

- Summated
- Normal
- Delayed relaxation

- Pseudonormal
- Restrictive

ECG findings:

Heart rate: 88bpm

Normal sinus rhythm during echocardiogram.

Assessment and recommendations:

Reduced contractile function and BNP levels are stable compared to last exam. Considering that LA is stable in size, recommend recheck echocardiogram in 3 months or sooner if patient develops clinical signs consistent with worsening of the disease.

Final Diagnosis:

Mildly reduced LV contractile function R/O diet related vs variation of normal.

Heart Failure Classification Score:

ISACHC Classification:

- Ia
- Ib
- II
- IIIa
- IIIb

ACVIM Classification:

- A
- C

B1
 B2

D

M-Mode

IVSd
LVIDd
LVPWd
IVSs
LVIDs
LVPWs
EDV(Teich)
ESV(Teich)
EF(Teich)
%FS
SV(Teich)
Ao Diam
LA Diam
LA/Ao
Max LA
Time
HR
CO(Teich)
CI(Teich)
EPSS

B6

cm
cm
cm
cm
cm
ml
ml
%
%
ml
cm
cm

cm
ms
BPM
l/min
l/minm
cm

M-Mode Normalized

IVSdN
LVIDdN
LVPWdN
IVSsN
LVIDsN
LVPWsN
Ao Diam N
LA Diam N

B6

{0.290 - 0.520} !
{1.350 - 1.730} !
{0.330 - 0.530} !
{0.430 - 0.710} !
{0.790 - 1.140} !
{0.530 - 0.780} !
{0.680 - 0.890}
{0.640 - 0.900} !

2D

SA LA
Ao Diam
SA LA / Ao Diam
IVSd
LVIDd
LVPWd
EDV(Teich)
IVSs
LVIDs

B6

cm
cm

cm
cm
cm
ml
cm
cm

LVPWs
ESV(Teich)
EF(Teich)
%FS
SV(Teich)
LV Major
LV Minor
Sphericity Index
LVld AIC
LVEDV MOD AIC
LVLS AIC
LVESV MOD AIC
LVEF MOD AIC
SV MOD AIC

B6

cm
ml
%
%
ml
cm
cm

cm
ml
cm
ml
%
ml

Doppler
MV E Vel
MV DecT
MV Dec Slope
MV A Vel
MV E/A Ratio
E'
E/E'
A'
IVRT
AV Vmax
AV maxPG
PV Vmax
PV maxPG
PR Vmax
PR maxPG
PRend Vmax
PRend PG
TR Vmax
TR maxPG

B6

m/s
ms
m/s
m/s

m/s

m/s
ms
m/s
mmHg
m/s
mmHg
m/s
mmHg
m/s
mmHg
m/s
mmHg

From: Related PFR Event <pfrsignificantactivitycreation@fda.hhs.gov>
To: Rotstein, David; Cleary, Michael *; HQ Pet Food Report Notification;
B6
Sent: 6/11/2019 6:08:45 PM
Subject: Taste of the Wild Sierra Mountain dry: Lisa Freeman - EON-390197
Attachments: 2068089-report.pdf; 2068089-attachments.zip

A PFR Report has been received and Related PFR Event [EON-390197] has been created in the EON System.

A "PDF" report by name "2068089-report.pdf" is attached to this email notification for your reference. Please note that all documents received in the report are compressed into a zip file by name "2068089-attachments.zip" and is attached to this email notification.

Below is the summary of the report:

EON Key: EON-390197

ICSR #: 2068089

EON Title: Related PFR Event created for Taste of the Wild Sierra Mountain dry; 2068089

AE Date	01/02/2019	Number Fed/Exposed	7
Best By Date		Number Reacted	1
Animal Species	Dog	Outcome to Date	Stable
Breed	Retriever - Golden		
Age	3 Years		
District Involved	PFR-New England DO		

Product information

Individual Case Safety Report Number: 2068089

Product Group: Pet Food

Product Name: Taste of the Wild Sierra Mountain dry

Description: Eating Taste of the Wild Sierra Mountain since June 2018 (Acana Heritage Poultry before that). This diet was fed to multiple dogs - have not screened other dogs yet so unknown whether they are also affected. Echo showed reduced contractility and mild left atrial enlargement. BNP and troponin mildly elevated, troponin B6 Taurine WNL B6 Changing to Pro Plan Sensitive Skin/Stomach dry and will recheck in 3 months

Submission Type: Followup

Report Type: Adverse Event (a symptom, reaction or disease associated with the product)

Outcome of reaction/event at the time of last observation: Stable

Number of Animals Treated With Product: 7

Number of Animals Reacted With Product: 1

Product Name	Lot Number or ID	Best By Date
Taste of the Wild Sierra Mountain dry		

This report is linked to:

Initial EON Event Key: EON-376361

Initial ICSR: 2061171

Sender information

Lisa Freeman
200 Westboro Rd
North Grafton, MA 01536
USA

Owner information

B6

USA

To view this Related PFR Event, please click the link below:

<https://eon.fda.gov/eon//browse/EON-390197>

To view the Related PFR Event Report, please click the link below:

<https://eon.fda.gov/eon//EventCustomDetailsAction!viewReport.jsps?decorator=none&e=0&issueType=10100&issueId=407469&parentIssueTypeId=12>

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Report Details - EON-390197

ICSR:	2068089
Type Of Submission:	Followup
Report Version:	FPSR.FDA.PETF.V.V1
Type Of Report:	Adverse Event (a symptom, reaction or disease associated with the product)
Reporting Type:	Voluntary
Report Submission Date:	2019-06-11 14:02:24 EDT
Initial Report Date:	01/14/2019
Parent ICSR:	2061171
Follow-up Report to FDA Request:	Yes

Reported Problem:	Problem Description:	Eating Taste of the Wild Sierra Mountain since June 2018 (Acana Heritage Poultry before that). This diet was fed to multiple dogs - have not screened other dogs yet so unknown whether they are also affected. Echo showed reduced contractility and mild left atrial enlargement, BNP and troponin mildly elevated, troponin = B6 Taurine WNL B6 Changing to Pro Plan Sensitive Skin /Stomach dry and will recheck in 3 months
	Date Problem Started:	01/02/2019
	Concurrent Medical Problem:	No
	Outcome to Date:	Stable

Product Information:	Product Name:	Taste of the Wild Sierra Mountain dry
	Product Type:	Pet Food
	Lot Number:	
	Package Type:	BAG
	Product Use Information:	Description: See diet history for more details. TOTW fed June, 2018 to present; Acana Heritage Free Run Poultry before that
	Manufacturer /Distributor Information:	
	Purchase Location Information:	

Animal Information:	Name:	B6
	Type Of Species:	Dog
	Type Of Breed:	Retriever - Golden
	Gender:	Female
	Reproductive Status:	Intact
	Pregnancy Status:	Not Pregnant
	Lactation Status:	Not lactating
	Weight:	30.4 Kilogram
	Age:	3 Years
	Assessment of Prior Health:	Excellent
	Number of Animals Given the Product:	7
	Number of Animals Reacted:	1
	Owner Information:	Owner Information provided: Yes
		Contact: Name: B6 Phone: Email: B6

		Address: B6 United States
Healthcare Professional Information:	Practice Name:	Tufts Cummings School of Veterinary Medicine
	Contact:	Name: Lisa Freeman Phone: (508) 887-4523 Email: lisa.freeman@tufts.edu
	Address:	200 Westboro Rd North Grafton Massachusetts 01536 United States
Sender Information:	Name:	Lisa Freeman
	Address:	200 Westboro Rd North Grafton Massachusetts 01536 United States
	Contact:	Phone: 5088874523 Email: lisa.freeman@tufts.edu
	Permission To Contact Sender:	Yes
	Preferred Method Of Contact:	Email
Additional Documents:	Attachment:	Follow-up medical records pt 2 pdf.pdf
	Description:	Med records
	Type:	Medical Records
	Attachment:	Follow-up medical records pt 1.pdf
	Description:	Med records
	Type:	Medical Records

From: PFR Event <pfpreventcreation@fda.hhs.gov>
To: Cleary, Michael *; HQ Pet Food Report Notification; B6
Sent: 2/25/2019 1:05:02 PM
Subject: Wellness CORE Grain-Free Ocean Whitefish dry-Wellness Core grain free turkey: Lisa Freeman - EON-380743
Attachments: 2063134-report.pdf; 2063134-attachments.zip

A PFR Report has been received and PFR Event [EON-380743] has been created in the EON System.

A "PDF" report by name "2063134-report.pdf" is attached to this email notification for your reference. Please note that all documents received in the report are compressed into a zip file by name "2063134-attachments.zip" and is attached to this email notification.

Below is the summary of the report:

EON Key: EON-380743

ICSR #: 2063134

EON Title: PFR Event created for Wellness CORE Grain-Free Ocean Whitefish dry Wellness Core grain free turkey chicken liver and turkey liver formula canned Wellness Core Hearty Cuts grain-free in gravy chicken and turkey recipe; 2063134

AE Date	02/01/2019	Number Fed/Exposed	6
Best By Date		Number Reacted	3
Animal Species	Dog	Outcome to Date	Stable
Breed	Bulldog		
Age	8 Years		
District Involved	PFR-New England DO		

Product information

Individual Case Safety Report Number: 2063134

Product Group: Pet Food

Product Name: Wellness CORE Grain-Free Ocean Whitefish dry Wellness Core grain free turkey, chicken liver, and turkey liver formula canned Wellness Core Hearty Cuts grain-free in gravy chicken and turkey recipe

Description: Housemate (half sister; B6) - (ICSR) of 2063133) diagnosed with DCM and CHF so screened by RDVM for BNP which was elevated. Evaluated at Tufts 2/1/19. ARVC/diet-induced DCM with

ventricular arrhythmia. Diet changed to Royal Canin Early Cardiac and will re-evaluate in 3 months I have diet sample. 3 other dogs in household (1 had normal BNP, other 2 not yet evaluated)

Submission Type: Initial

Report Type: Adverse Event (a symptom, reaction or disease associated with the product)

Outcome of reaction/event at the time of last observation: Stable

Number of Animals Treated With Product: 6

Number of Animals Reacted With Product: 3

Product Name	Lot Number or ID	Best By Date
Wellness CORE Grain-Free Ocean Whitefish dry Wellness Core grain free turkey, chicken liver, and turkey liver formula canned Wellness Core Hearty Cuts grain-free in gravy chicken and turkey recipe		

Sender information

Lisa Freeman
200 Westboro Rd
North Grafton, MA 01536
USA

Owner information

B6 USA

To view this PFR Event, please click the link below:
<https://eon.fda.gov/eon//browse/EON-380743>

To view the PFR Event Report, please click the link below:
<https://eon.fda.gov/eon//EventCustomDetailsAction!viewReport.jspx?decorator=none&e=0&issueType=12&issueId=397752>

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Report Details - EON-380743

ICSR: 2063134
 Type Of Submission: Initial
 Report Version: FPSR.FDA.PETF.V.V1
 Type Of Report: Adverse Event (a symptom, reaction or disease associated with the product)
 Reporting Type: Voluntary
 Report Submission Date: 2019-02-25 07:58:43 EST

Reported Problem:
Problem Description: Housemate (half sister; [B6]) - (ICSR) of 2063133) diagnosed with DCM and CHF so screened by RDVM for BNP which was elevated. Evaluated at Tufts 2/1/19. ARVC/diet-induced DCM with ventricular arrhythmia. Diet changed to Royal Canin Early Cardiac and will re-evaluate in 3 months I have diet sample. 3 other dogs in household (1 had normal BNP, other 2 not yet evaluated)
Date Problem Started: 02/01/2019
Concurrent Medical Problem: Yes
Pre Existing Conditions: Spinal trauma as puppy
Outcome to Date: Stable

Product Information:
Product Name: Wellness CORE Grain-Free Ocean Whitefish dry Wellness Core grain free turkey, chicken liver, and turkey liver formula canned Wellness Core Hearty Cuts grain-free in gravy chicken and turkey recipe
Product Type: Pet Food
Lot Number:
Product Use Information: **Description:** Please see diet history for more info (and refer to [B6] diet history for more complete info - all dogs eat same diets)
Manufacturer /Distributor Information:
Purchase Location Information:

Animal Information:
Name: [B6]
Type Of Species: Dog
Type Of Breed: Bulldog
Gender: Male
Reproductive Status: Neutered
Weight: 22.1 Kilogram
Age: 8 Years
Assessment of Prior Health: Good
Number of Animals Given the Product: 6
Number of Animals Reacted: 3
Owner Information: **Owner Information provided:** Yes
Contact: **Name:** [B6]
Phone: [B6]
Email: [B6]
Address: [B6]
 United States
Healthcare Professional Practice Name: Tufts Cummings School of Veterinary Medicine

	Information:	Contact:	Name: Lisa Freeman
			Phone: (508) 887-4523
			Email: lisa.freeman@tufts.edu
		Address:	200 Westboro Rd North Grafton Massachusetts 01536 United States

Sender Information:	Name:	Lisa Freeman	
	Address:	200 Westboro Rd North Grafton Massachusetts 01536 United States	
	Contact:	Phone:	5088874523
		Email:	lisa.freeman@tufts.edu
	Permission To Contact Sender:	Yes	
Preferred Method Of Contact:	Email		

Additional Documents:	Attachment:	rpt_medical_record_preview.pdf
	Description:	Medical record
	Type:	Medical Records

Client: **B6**
Address: **B6**

All Medical Records

Patient: **B6**
Breed: English Bulldog
DOB: **B6**

Species: Canine
Sex: Male
(Neutered)

Home Phone: **B6**
Work Phone: () -
Cell Phone: **B6**

Referring Information

B6

Client: **B6**
Patient: **B6**

Initial Complaint:

Initial Complaint:

Initial Complaint:

Initial Complaint:

Client:
Patient:

B6

Initial Complaint:

Scanned Record

Initial Complaint:

Cardiology DCM study - will come fasted - u/f samples

SOAP Text Feb 1 2019 11:50AM - Rush, John

Disposition/Recommendations

Client:
Patient:

B6

Client: **B6**
Patient:

Cummings
Veterinary Medical Center
AT TUFTS UNIVERSITY

Foster Hospital for Small Animals

55 Willard Street
North Grafton, MA 01536
(508) 839-5395

Client: **B6**
Veterinarian:
Patient ID: **B6**
Visit ID:

Patient:	B6
Species:	Canine
Breed:	English Bulldog
Sex:	Male (Neutered)
Age:	B6 Years Old

Lab Results Report

Accession ID:			
Test	Results	Reference Range	Units



Client: **B6**
Patient: **B6**

IDEXX Hematology 1/24/19



B6
PET OWNER: **B6**
SPECIES: Canine
SEX:
GENUS: Male
AGE: 8 Years
PATIENT ID: **B6**

B6
ATTENDING VET: **B6**

LAB ID: 2302815220
ORDER ID: 38459535
COLLECTION DATE: 1/23/19
DATE OF RECEIPT: 1/24/19
DATE OF RESULT: 1/24/19

IDEXX Services: Senior Profile with Fecal Dx™ Profile, Giardia, Lab 4Dx® Plus and Reflex Quant C6® and UPC Select, SAMPLE/TEST INFO NEEDED, Cardiotest® proBNP-Canine Add-on*

Hematology

1/24/19 (Order Received)
1/24/18 11:05 AM (Last Updated)

B6

TEST	RESULT	REFERENCE VALUE
RBC		5.39 - 8.7 M/ μ L
Hematocrit		38.3 - 56.5 %
Hemoglobin		13.4 - 20.7 g/dL
MCV		59 - 76 fL
MCH		21.9 - 26.1 pg
MCHC		32.6 - 39.2 g/dL
% Reticulocyte		%
Reticulocytes		10 - 110 K/ μ L
Reticulocyte Hemoglobin		22.3 - 29.6 pg
WBC		4.9 - 17.6 K/ μ L
% Neutrophils		%
% Lymphocytes		%
% Monocytes		%
% Eosinophils		%
% Basophils		%
Neutrophils		2.94 - 12.67 K/ μ L
Lymphocytes		1.06 - 4.95 K/ μ L
Monocytes		0.13 - 1.15 K/ μ L
Eosinophils		0.07 - 1.49 K/ μ L
Basophils		0 - 0.1 K/ μ L
Platelets		143 - 448 K/ μ L
Remarks	Slide reviewed microscopically. No parasites seen	

Client: **B6**
Patient:

IDEXX Hematology 1/24/19



B6

RET/GWZER **B6**

DATE OF RESULT: 1/24/19

LAB ID: 2302815220

Chemistry

1/24/19 (Order Received)
1/24/19 11:05 AM (Last Updated)

3/2/17

TEST	RESULT	REFERENCE VALUE
Glucose		63 - 114 mg/dL
IDEXX SDMA		0 - 14 µg/dL
Creatinine		0.5 - 1.5 mg/dL
BUN		9 - 31 mg/dL
BUN: Creatinine Ratio		
Phosphorus		2.5 - 6.1 mg/dL
Calcium		8.4 - 11.8 mg/dL
Sodium		142 - 152 mmol/L
Potassium		4.0 - 5.4 mmol/L
Na: K Ratio		28 - 37
Chloride		108 - 119 mmol/L
TCO2 (Bicarbonate)		13 - 27 mmol/L
Anion Gap		11 - 26 mmol/L
Total Protein		5.5 - 7.5 g/dL
Albumin		2.7 - 3.9 g/dL
Globulin		2.4 - 4.0 g/dL
Albumin: Globulin Ratio		0.7 - 1.5
ALT		18 - 121 U/L
AST		16 - 55 U/L
ALP		5 - 160 U/L
GGT		0 - 13 U/L
Bilirubin - Total		0.0 - 0.3 mg/dL
Bilirubin - Unconjugated		0.0 - 0.2 mg/dL
Bilirubin - Conjugated		0.0 - 0.1 mg/dL
Cholesterol		131 - 345 mg/dL
Amylase		337 - 1,469 U/L
Lipase		138 - 755 U/L
Creatine Kinase		10 - 200 U/L

B6

B6

Client: **B6**
Patient:

IDEXX Hematology 1/24/19



B6 PET OWNER: **B6** DATE OF RESULT: 1/24/19 LAB ID: 2302815220

Chemistry (continued)

TEST	RESULT	REFERENCE VALUE
Hemolysis Index	B6	B6
Lipemia Index	B6	
Cardiopet proBNP - Canine		0 - 900 pmol/L B6

- a BOTH SODIUM AND CREATININE ARE WITHIN THE REFERENCE INTERVAL which indicates kidney function is likely good. Evaluate a complete urinalysis and confirm there is no other evidence of kidney disease.
- b Index of N, 1+, 2+ exhibits no significant effect on chemistry values.
- c Index of N, 1+, 2+ exhibits no significant effect on chemistry values.
- d Cardiopet proBNP >1600pmol/L Abnormal. NT-proBNP concentration is compatible with increased stretch and stress on the myocardium. Clinically significant heart disease is likely at this time. For dogs (<30kg) with mitral valve disease (MVD), there is increased risk of heart failure within the next 12 months. If clinical signs (i.e. respiratory and/or exercise intolerance) are present, they are likely due to heart failure. Additional diagnostics including thoracic radiographs, electrocardiogram and echocardiogram are strongly recommended to diagnose and assess severity of cardiac disease.

Please note: Complete interpretive comments for all concentrations of Cardiopet proBNP are available in the online directory of services. Serum specimens received at room temperature may have decreased NT-proBNP concentrations.

Endocrinology

1/24/19 (Order Received)
1/24/19 11:05 AM (Last Updated)

B6

TEST	RESULT	REFERENCE VALUE
Total T4	B6	1 - 4 µg/dL B6

- a Dogs with no clinical signs of hypothyroidism and results within the reference interval are likely euthyroid. For dogs on thyroid supplement, recommended therapeutic levels are 2.1-5.4 µg/dL.

Serology

1/24/19 (Order Received)
1/24/19 11:05 AM (Last Updated)

TEST	RESULT
Heartworm Antigen	B6

Client: **B6**
Patient:

IDEXX Hematology 1/24/19



B6

RETQAMES **B6**

DATE OF RESULT: 1/24/19

LAB ID: 2302815220

Serology (continued)

TEST	RESULT
Ehrlichia canis / ewingii	B6
Lyme (Borrelia burgdorferi)	
Anaplasma phagocytophilum / platys	

- a If tick-borne disease is still suspected based on clinical signs, the Tick/Vector Comprehensive RealPCR Panel Add-on (test code 28701) may be useful for detection of early infection prior to seroconversion.
- b A positive result indicates the presence of antibodies against Anaplasma phagocytophilum or A. platys, but does not confirm the presence of disease. Submission of a fresh whole blood sample for an IDEXX CBC Select, test code 200, is recommended to identify abnormalities consistent with infection. The Tick/Vector Comprehensive RealPCR Panel Add-on (preferred, test code 28701) or Anaplasma spp RealPCR Test (test code 2839), may be useful to confirm infection and evaluate for co-infections, especially in clinically sick animals. For more information on the diagnosis and management of Tick/Vector-borne diseases, see www.idexx.com/4DxGuide.

Other

1/24/19 (Order Received)
1/24/19 11:05 AM (Last Updated)

TEST	RESULT
More Information Needed	A urine sample was not received. The remainder of requested testing has been performed. Thank you. A fecal specimen was not received. The remainder of requested testing has been performed. Thank you.

Client: **B6**
 Patient: **B6**

cbc and profile 2/1/19

Cummings School of Veterinary Medicine

Clinical Pathology Laboratory
 200 Westboro Road
 North Grafton, MA 01536

Name/DOB: **B6**
 Patient ID: **B6**
 Phone number:
 Collection Date: 2/1/2019 11:52 AM
 Approval date: 2/1/2019 12:57 PM

Sex: CM
 Age: 8
 Species: Canine
 Breed:

Provider: Dr. John Rush
 Order Location: V320559: Investigation into
 Sample ID: 1902010102

TEST NAME	RESULT	RANGE	UNITS	REFERENCE RANGE
	IN RANGE	OUT OF RANGE		

CBC, Comprehensive, Sm Animal (Research)

CSTCYR

WBC (ADVIA)	B6	B6	K/uL	4.40-15.10
RB C (Advia)			M/uL	5.80-8.50
Hemoglobin (ADVIA)			g/dL	13.3-20.5
Hematocrit (Advia)			%	39-55
MCV (ADVIA)			fL	64.5-77.5
MCH (ADVIA)			pg	21.3-25.9
CHCM			g/dl	
MCHC (ADVIA)			g/dL	31.9-34.3
RDW (ADVIA)				11.9-15.2
Platelet Count (Advia)			B6	K/uL
Mean Platelet Volume (Advia)		fL	8.29-13.20	

02/01/19 12:12 PM

B6

Platelet Cnt
 02/01/19 12:12 PM

B6

B6

% 0.129-0.403

B6

PDW
 Reticulocyte Count (Advia)
 Absolute Reticulocyte Count (Advia)
 CHr
 MCVr
 Comments (Hematology)

B6

B6

B6

%
 % 0.20-1.60
 K/uL 14.7-113.7
 pg
 fl

B6

Microscopic Exam of Blood Smear (Advia)

CSTCYR

Seg Neuts (%)	B6	B6	%	43-86
Lymphocytes (%)			%	7-17
Monocytes (%)			%	1-15
Eosinophils (%)			%	0-16
Seg Neutrophils (Abs) Advia			K/uL	2.800-11.500
Lymphs (Abs) Advia			K/uL	1.00-4.80
Mono (Abs) Advia			K/uL	0.10-1.50
Eosinophils (Abs)			K/uL	0.00-1.40

Sample ID: 19020101021
 This report continues. (Final)

Reviewed by: _____

Client: **B6**
 Patient: **B6**

cbc and profile 2/1/19

Cummings School of Veterinary Medicine

Clinical Pathology Laboratory
 200 Westboro Road
 North Grafton, MA 01536

Name/DOB: B6	Sex: CM	Provider: Dr. John Rush
Patient ID: B6	Age: 8	Order Location: V320559: Investigation into
Phone number:	Species: Canine	Sample ID: 1902010102
Collection Date: 2/1/2019 11:52 AM	Breed:	
Approval date: 2/1/2019 12:57 PM		

TEST NAME	RESULT	RANGE	UNITS	REFERENCE RANGE
	IN RANGE	OUT OF RANGE		

Microscopic Exam of Blood Smear (Advia) (cont'd)

CSTCYR

Advia
 WBC Morphology
 RBC Morphology

B6

Research Chemistry Profile - Small Animal (Cobas)

SMACHUNSKI

Glucose
 Urea
 Creatinine
 Phosphorus
 Calcium 2
 Magnesium 2+
 Total Protein
 Albumin
 Globulins
 A/G Ratio
 Sodium
 Chloride
 Potassium
 tCO2(Bicarb)
 AGAP
 NA/K
 Total Bilirubin
 Alkaline Phosphatase
 GGT
 ALT
 AST
 Creatine Kinase
 Cholesterol
 Triglycerides
 Amylase
 Osmolality (calculated)

B6

B6

B6

B6

mg/dL	67-135
mg/dL	8-30
mg/dL	0.6-2.0
mg/dL	2.6-7.2
mg/dL	9.4-11.5
mEq/L	1.8-3.0
g/dL	5.5-7.8
g/dL	2.8-4.0
g/dL	2.3-4.2
	0.7-1.6
mEq/L	140-150
mEq/L	106-116
mEq/L	3.7-5.4
mEq/L	14-28
	8.0-19.0
	29-40
mg/dL	0.10-0.30
U/L	12-127
U/L	0-10
U/L	14-86
U/L	9-54
U/L	22-422
mg/dL	82-355
mg/dl	30-338
U/L	409-1250
mmol/L	291-315

Sample ID: 19020101022
 END OF REPORT (Final)

Reviewed by: _____
 Page 2

Client: **B6**
Patient: **B6**

NT-proBNP 2/1/19

IDEXX Reference Laboratories

Client: **B6** Patient: **B6**

Client: **B6**
Patient: **B6**
Species: CANINE
Breed: ENGLISH_BULLDOG
Gender: MALE NEUTERED
Age: 8Y

Date: 02/01/2019
Requisition #: 438225
Accession #: **B6**
Ordered by: **B6**

IDEXX VetConnect 1-888-433-9967
TUFTS UNIVERSITY
200 WESTBORO RD
NORTH GRAFTON, Massachusetts 01536
508-839-5395
Account: **B6**

CARDIOPET proBNP- CANINE

Test	Result	Reference Range	Unit	Meaning	Flag
CARDIOPET proBNP - CANINE	B6	0 - 900 pmol/L	HIGH	B6	

Comments:

1 **B6**

Please note: Complete interpretive comments for all concentrations of Cardiotet proBNP are available in the online directory of services. Serum specimens received at room temperature may have decreased NT-proBNP concentrations.

Client: **B6**
Patient:

CBC/CHEM



Tufts Cummings School Of Veterinary Medicine

200 Westboro Road
North Grafton, MA 01536

DUPLICATE

Name/DOB: Patient ID:	B6	Sex: CM	Provider: Dr. John Rush
Phone number:		Age: 8	Order Location: V320559: Investigation into
Collection Date: 2/1/2019 11:52 AM		Species: Canine	Sample ID: 1902010102
Approval date: 2/1/2019 12:57 PM		Breed:	

CBC, Comprehensive, Sm Animal (Research)

		Ref. Range/Males
CSTCYR		
WBC (ADVIA)	B6	4.40-15.10 K/uL
RBC (Advia)		5.80-8.50 M/uL
Hemoglobin (ADVIA)		13.3-20.5 g/dL
Hematocrit (Advia)		39-55 %
MCV (ADVIA)		64.5-77.5 fL
MCH (ADVIA)		21.3-25.9 pg
CHCM		
MCHC (ADVIA)		31.9-34.3 g/dL
RDW (ADVIA)		11.9-15.2
Platelet Count (Advia)		173-486 K/uL
Mean Platelet Volume (Advia)	8.29-13.20 fl	

02/01/19 12:12 PM	B6	
Platelet Crit	B6	0.129-0.403 %
02/01/19 12:12 PM	B6	

PDW	B6	
Reticulocyte Count (Advia)		0.20-1.60 %
Absolute Reticulocyte Count (Advia)		14.7-113.7 K/uL
CHr		
MCVr		
Comments (Hematology)	B6	estimated count of >500,000/uL

Microscopic Exam of Blood Smear (Advia)

		Ref. Range/Males
CSTCYR		
Seg Neuts (%)	B6	43-86 %
Lymphocytes (%)		7-47 %
Monocytes (%)		1-15 %
Eosinophils (%)		0-16 %
Seg Neutrophils (Abs) Advia		2.800-11.500 K/uL
Lymphs (Abs) Advia		1.00-4.80 K/uL
Mono (Abs) Advia	0.10-1.50 K/uL	
Eosinophils (Abs) Advia	0.00-1.40 K/uL	
WBC Morphology	B6	
RBC Morphology		

Research Chemistry Profile - Small Animal (Cobas)

Sample ID: 19020101021
This report continues... (Final)

Reviewed by: _____

Client: **B6**
Patient:

CBC/CHEM



Tufts Cummings School Of Veterinary Medicine

200 Westboro Road
North Grafton, MA 01536

DUPLICATE

Name/DOB:	B6	Sex:	CM	Provider:	Dr. John Rush
Patient ID:	B6	Age:	8	Order Location:	V320559: Investigation into
Phone number:		Species:	Canine	Sample ID:	1902010102
Collection Date:	2/1/2019 11:52 AM	Breed:			
Approval date:	2/1/2019 12:57 PM				

Research Chemistry Profile - Small Animal (Cobas) (cont'd)

		Ref. Range/Males
SMACHUNSK		
Glucose		67-135 mg/dL
Urea		8-30 mg/dL
Creatinine		0.6-2.0 mg/dL
Phosphorus		2.6-7.2 mg/dL
Calcium 2		9.4-11.3 mg/dL
Magnesium 2+		1.8-3.0 mEq/L
Total Protein		5.5-7.8 g/dL
Albumin		2.8-4.0 g/dL
Globulins		2.3-4.2 g/dL
A/G Ratio		0.7-1.6
Sodium		140-150 mEq/L
Chloride		106-116 mEq/L
Potassium		3.7-5.4 mEq/L
tCO2(Bicarb)		14-28 mEq/L
AGAP		8.0-19.0
NA/K		29-40
Total Bilirubin		0.10-0.30 mg/dL
Alkaline Phosphatase		12-127 U/L
GGT		0-10 U/L
ALT		14-86 U/L
AST		9-54 U/L
Creatine Kinase		22-422 U/L
Cholesterol		82-355 mg/dL
Triglycerides		30-338 mg/dl
Amylase		409-1250 U/L
Osmolality (calculated)		291-315 mmol/L

Sample ID: 1902010102/2
REPRINT: Orig. printing on 2/1/2019 (Final)

Reviewed by: _____
Page 2

Client:
Patient:

B6

Taurine level

27291 PLD
WBS @

B6

Amino Acid Laboratory Sample Submission Form

Amino Acid Laboratory, 1089 Veterinary Medicine Drive, Davis, Ca 95616

Telephone: 530-752-5058, Fax: 530-752-4698

Email: ucd.aminoacid.lab@ucdavis.edu

www.vetmed.ucdavis.edu/labs/amino-acid-laboratory

B6 pat Race
11:54 AM
PANEL w ICE PACKS, TAURINE
Lithium Heparin
RUSH

Veterinarian Contact: **B6**

Clinic/Company Name: Tufts Cummings School of Vet. Med. - Clinical Pathology Laboratory

Address: 200 Westboro Road, North Grafton, MA, 015369

Email: Clinpath@tufts.edu cardiovet@tufts.edu

Telephone: 508-887-4669 Fax: 508-839-7936

Billing Contact: **B6** Email: **B6**

Billing Contact Phone: **B6** Tax ID: _____

Patient Name: **B6** Species: CANINE

Breed: English Bulldog Owner's Name: **B6**

Current Diet: Wellness Core

Sample type: Plasma Whole Blood Urine Food Other _____

Test: Taurine Complete Amino Acids Other: _____

Taurine Results (lab use only)

Plasma: **B6** Whole Blood: **B6** Urine: _____ Food: _____

	Plasma (nMol/ml)		Whole Blood (nMol/ml)	
	Normal Range	No known risk for deficiency	Normal Range	No known risk for deficiency
Cat	80-120	>40	300-600	>200
Dog	60-120	>40	200-350	>150

* Please note with the recent increase in the number of dogs screened for taurine deficiency, we are seeing dogs with values within the reference ranges (or above the "no known risk for deficiency range") yet are still exhibiting signs of cardiac disease. Veterinarians are welcome to contact our laboratory for assistance in evaluating your patient's results.

Client: **B6**
 Patient: **B6**

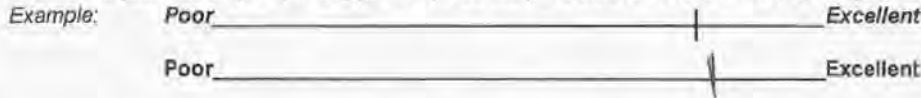
Diet history 2/1/19

CARDIOLOGY DIET HISTORY FORM

Please answer the following questions about your pet's diet.

Pet's name: **B6** Owner's name: **B6** Today's date: **02-01-19**

1. How would you assess your pet's appetite? (mark the point on the line below that best represents your pet's appetite)



2. Have you noticed a change in your pet's appetite over the last 1-2 weeks? (check all that apply)
 Eats about the same amount as usual Eats less than usual Eats more than usual
 Seems to prefer different foods than usual Other _____

3. Over the last few weeks, has your pet (check one)
 Lost weight Gained weight Stayed about the same weight Don't know

4. Please list below ALL pet foods, people food, treats, snack, dental chews, rawhides, and any other food item that your pet currently eats. Please include the brand, specific product, and flavor so we know exactly what your pet is eating.

Examples are shown in the table – please provide enough detail that we could go to the store and buy the exact same food.

Food (include specific product and flavor)	Form	Amount	How often?	Fed since
Nutro Grain Free Chicken, Lentil, & Sweet Potato Adult	dry	1 1/2 cup	2x/day	Jan 2018
85% lean hamburger	microwaved	3 oz	1x/week	Jan 2015
Pupperoni original beef flavor	treat	1/2	1x/day	Aug 2015
Rawhide	treat	6 inch twist	1x/week	Dec 2015
Wellness Core Camed chicken	wet	4 oz	1x/day	Dec 2015
Wellness Core fish	dry	1/4 cup	2x/day	Dec 2015
Wellness Core	treat	3 pcs	1x/day	"
(See B6 copy for exact brands/amounts)				

*Any additional diet information can be listed on the back of this sheet

5. Do you give any dietary supplements to your pet (for example: vitamins, glucosamine, fatty acids, or any other supplements)? Yes No If yes, please list which ones and give brands and amounts:

	Brand/Concentration	Amount per day
Taurine	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	_____
Carnitine	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	_____
Antioxidants	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	_____
Multivitamin	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	_____
Fish oil	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	_____
Coenzyme Q10	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	_____
Other (please list):		
Example: Vitamin C	Nature's Bounty	500 mg tablets – 1 per day
_____	_____	_____
_____	_____	_____
_____	_____	_____

6. How do you administer pills to your pet?
 I do not give any medications
 I put them directly in my pet's mouth without food
 I put them in my pet's dog/cat food
 I put them in a Pill Pocket or similar product
 I put them in foods (list foods): _____

CHANGING DIET TO ROYAL CANIN EARLY ON/DIET

Client: **B6**
Patient:

Troponin 2/1/19



Gastrointestinal Laboratory
Dr. J.M. Steiner
Department of Small Animal Clinical Sciences
Texas A&M University
4474 TAMU
College Station, TX 77843-4474



Website User ID: clinpath@tufts.edu

GI Lab Assigned Clinic ID: 11405

Dr. Freeman
Tufts University Clinical Pathology Lab
Attn: **B6**
200 Westboro Road
North Grafton, MA 01536
USA

Phone: 508 887 4669
Fax: 9 508 839 7936
Animal Name:
Owner Name:
Species:
Date Received:

508 887 4669
9 508 839 7936

B6

Canine

Feb 12, 2019

GI Lab Accession: 6969

Test	Result	Control Range	Assay Date
Ultra-Sensitive Troponin I Fasting	B6 ng/mL	≤0.06	B6

B6

Comments:

Client:
Patient:

B6

Troponin 2/1/19

**Important
Notices:**

Internal Medicine Conference

Join us for a unique continuing education event in Phuket, Thailand Oct 7th - 11th, 2019. For details see <http://texasimconference.tamu.edu>

Ongoing studies

Cobalamin Supplementation Study- Dogs and cats with cobalamin deficiency with normal PLI, and either normal or low (consistent with EPI) TLI to compare the efficacy of oral vs parenteral cobalamin supplementation. Contact Dr. Chang at chchang@cvm.tamu.edu for further information.

Chronic Pancreatitis with Uncontrolled Diabetes Mellitus- Seeking dogs with chronic pancreatitis and uncontrolled diabetes mellitus for enrollment into a drug trial (medication provided at no cost). Contact Dr. Sue Yee Lim at slim@cvm.tamu.edu or Dr. Sina Marsilio at smarsilio@cvm.tamu.edu

Dogs with Primary Hyperlipidemia- Prescription diet naive dogs newly diagnosed with primary hyperlipidemia are eligible to be enrolled in a dietary trial. Contact Dr. Lawrence at ylawrence@cvm.tamu.edu for more information.

Dogs with Chronic Pancreatitis- Dogs with chronic pancreatitis (cPLI >400 µg/L) and hypertriglyceridemia (>300 mg/dl) are eligible to be enrolled in a dietary trial. Contact Dr. Lawrence at ylawrence@cvm.tamu.edu

Chronic enteropathies in dogs- Please fill out this brief form <http://tinyurl.com/tbd-enroll> to see if your patient qualifies.

Feline Chronic Pancreatitis- Cats with chronic pancreatitis for more than 2 weeks and fPLI >10 µg/L are eligible for enrollment into a treatment trial investigating the efficacy of prednisolone or cyclosporine. Please contact Dr. Yamkate for further information at pyamkate@cvm.tamu.edu

We can not accept packages that are marked "Bill Receiver"

Use our preprinted shipping labels to save on shipping. Call 979-862-2861 for assistance. The GI Lab is not here to accept packages on the weekend. Samples may be compromised if you ship for arrival on Saturday or Sunday or if shipped via US Mail.

GI Lab Contact Information

Phone: (979) 862-2861

Fax: (979) 862-2864

Email: giab@cvm.tamu.edu

vetmed.tamu.edu/gilab

Client:
Patient:

B6

Vitals Results

2/1/2019 11:00:04 AM	Weight (kg)	22.1000
----------------------	-------------	---------

Patient History

01/28/2019 03:52 PM	Appointment
02/01/2019 08:05 AM	UserForm
02/01/2019 08:05 AM	UserForm
02/01/2019 10:37 AM	UserForm
02/01/2019 10:38 AM	UserForm
02/01/2019 10:44 AM	Purchase
02/01/2019 11:00 AM	Vitals
02/01/2019 12:03 PM	UserForm
02/01/2019 12:50 PM	Appointment
02/01/2019 12:58 PM	Prescription
02/20/2019 12:08 PM	Patient Merge
02/21/2019 04:32 PM	Purchase
02/21/2019 04:32 PM	Purchase

B6

B6

B6

Male (Neutered)

Canine English Bulldog Brown/White

Patient ID: **B6**

STANDARD CONSENT FORM

I am the owner, or agent for the owner, of the above described animal and have the authority to execute consent. I hereby authorize the Cummings School of Veterinary Medicine at Tufts University (herein after Cummings School) to prescribe for treatment of said animal according to the following terms and conditions.

Cummings School and its officers, agents and employees will provide such veterinary medical care as they deem reasonable and appropriate under the circumstances.

Cummings School and its officers, agents, and employees will use all reasonable care in the treatment of the above mentioned animal, but will not be liable for any loss or accident that may occur or any disease that may develop as a result of the care and treatment provided.

I understand that the above identified animal may be treated by Cummings School students under the supervision and assistance of Cummings School staff members.

In executing this form, I hereby expressly acknowledge that risks, benefits and alternative forms of treatment have been explained to me. I understand said explanation, and I consent to treatment. Should any additional treatments or diagnostics be required during the continued care of my animal, I understand that I will be given the opportunity to discuss and consent to these additional procedures. I understand that further or additional treatment may be required without an opportunity for discussion and consideration by me, in the case of the development of any life-threatening emergency during the continued care of my animal and I expressly consent to all such reasonable treatment as required. I realize and understand that results cannot be guaranteed.

If any equipment is left with the animal, it will be accepted with the understanding that Cummings School assumes no responsibility for any loss of equipment that may occur.

I agree to pick up the animal when notified that it is ready for release.

In the event the animal is not picked up, and if ten (10) days have expired since a registered letter was sent to the address given above, notifying me to call for the animal, the animal may be sold or otherwise disposed of in a humane manner and the proceeds applied to the charges incurred in caring and treating the animal. Failure to remove said animal will not and does not relieve me from obligation for the costs of services rendered.

I hereby grant to the Cummings School of Veterinary Medicine at Tufts University, its officers and employees (collectively referred to herein as Cummings School), and its agents and assigns (the Grantees) the irrevocable rights to photograph / videotape the operation or procedure to be performed, including appropriate and otherwise use such photographs and images for, and in connection with, a Grantee's medical, scientific, educational, and publicity purposes, by any means, methods and media (print and electronic) now known or, in the future, developed that the Grantee deems appropriate (provided that such photographs and images may not be used in for-profit commercials, unless such commercials are publicizing educational programs at Cummings School). As medical and surgical treatment necessitates the removal of tissue, cells, fluids or body parts of my animal, I authorize the Grantees to dispose of or use these tissues, cells, fluids or body parts for scientific and educational purposes.

I understand that a FINANCE CHARGE will be applied to all accounts unpaid after 30 days. The FINANCE CHARGE is computed on a monthly rate of 1.33% per month, which is an annual percentage rate of 16% applied to the average daily balance outstanding, with a minimum fee of \$.50.

I do further agree that should any payment, or the full amount of the sum stated above, become overdue more than 20 days from the above-agreed upon time of payment or payments, the entire balance shall be considered in default and become due and payable. I further agree to be responsible for any or all collection agency and/or attorney fees necessary to collect the full amount.

I do further agree to comply with hours of visitation in conjunction with our Hospital's policy.

I have read, understand, and agree to accept the terms and conditions herein.

Owner's name: Date: 2/1/2019

Owner's address:

B6

Date: 01-02-19

If the individual admitting the animal is someone other than the legal owner, please complete the portion below:

The owner of the animal, has granted me authority to obtain medical treatment and to bind this owner to pay the veterinary medical services provided at Cummings School pursuant to the terms and conditions described above.

Authorized Agent - Please Print

Agent's Signature

Street Address

Date

Town/City State Zip

B6

Patient ID: B6
B6 Canine
B6 Years Old Male (Neutered) English
Bulldog
Body Weight: Weight (kg) 0.00

Brachycephalic Consent Form ***Anesthesia, Sedation and Hospitalization***

Brachycephalic is a term for "short-nosed". Several dog breeds may experience difficulty breathing due to the shape of their head, muzzle and throat. Shorter nosed dogs include English Bulldogs, French Bulldogs, Pugs, Boston Terriers and many other breeds. The shorter than average nose and face in proportion to their body size can cause problems for these breeds at times. Owners with brachycephalic breeds must pay extra attention to their animals during exercise, heat and while obtaining veterinary care.

Overview

The purpose of this form is to inform you of the risks associated with anesthesia/sedation and occasionally hospitalization, which are inherent for dogs with shorter noses (brachycephalic). Not all of these problems may apply to your dog, but these are part of the brachycephalic syndrome. Please discuss any specific concerns with your attending veterinarian.

Respiratory problems

Brachycephalic dogs have a shortened skull, resulting in a compressed nasal passage and abnormal throat anatomy. The abnormal upper airway anatomy causes increased negative pressure while taking a breath, leading to inflammation, deformation of throat tissues, and obstruction of breathing. We encourage corrective surgery in moderate to severely affected dogs.

Cooling problems

As dogs cool by panting, dogs with narrowed airways may have difficulty cooling themselves. This may be made worse by anxiety or stress.

Stomach and intestinal problems

Brachycephalic dogs may swallow a lot of air which can lead to increased vomiting or regurgitation, and this could lead to pneumonia. If possible, we pre-treat brachycephalic dogs with medications to reduce stomach acids, and to promote stomach emptying.

Restraint challenges

Due to their airway, and in some bulldogs, their intrinsic personality as "tough" dogs, it may be difficult to restrain them safely. This is a particularly significant problem with more aggressive dogs. We

occasionally need to sedate them, or ask family members to help with some routine procedures to avoid unnecessary stress on the patient.

Sedation and anesthesia

While sedation and anesthesia are commonly performed in brachycephalic breeds, especially bulldogs, recovery from anesthesia may be more difficult for these patients due to a narrowed airway. We have our anesthesia team very closely involved in sedation and anesthesia of brachycephalic breeds especially bulldogs. They have found that careful monitoring is essential to a good outcome. In fact, many dog owners travel some distance in order to ensure that a Tufts board-certified anesthesiologist is present during anesthesia or sedation to minimize the risk of complications.

We consider brachycephalic dogs a high risk population. Please be sure you talk with your doctor about the following:

- 1. Any medical and/or surgical treatment alternatives for your pet**
- 2. Sufficient details of this consent form and how they apply to your dog**
- 3. How fully your pet might respond or recover and how long it could take**
- 4. The most common complications and how serious they might be**

I grant permission for my pet to undergo general anesthesia/sedation/hospitalization at Tufts Foster Hospital for Small Animals at the Cummings School of Veterinary Medicine.

I am aware that my pet has physical characteristics that make anesthesia and sedation more challenging and possibly more risky than for the average dog with a longer nose.

I am aware that brachycephalic breeds, such as the English and French bulldog, Boston Terrier, Pug, and Pekingese have a shortened skull, resulting in a compressed nasal passage and abnormal throat anatomy. The abnormal upper airway anatomy causes increased negative pressure while taking a breath, leading to inflammation, deformation of throat tissues, and obstruction of breathing.

I am aware that if my brachycephalic pet undergoes sedation or general anesthesia the potential complications include partial or complete airway obstruction during recovery and regurgitation/vomiting which could lead to aspiration pneumonia/respiratory distress. With airway surgery, death has been reported as a rare complication in <3% of cases.

I am aware that anesthetizing or sedating a brachycephalic animal for any reason can lead to the development of significant complications as described in this document.

Please answer YES or NO to the following questions:

My pet has demonstrated difficulty breathing, exercise intolerance, and/or collapse episodes.

YES NO

My pet has demonstrated difficulty eating, such as gagging, vomiting, and regurgitation.

YES NO

My pet is receiving or has recently received a non-steroidal anti-inflammatory drug (e.g., Rimadyl)

YES NO

Your signature indicates that you have read and understand the above information and give your consent for treatment.

Owner signature

B6

Date:

Discharge Instructions

Patient

Name: B6
Species: Canine
Browny/White Male (Neutered) English
Bulldog
Birthdate: B6

Owner

Name: B6
Address: B6

Patient ID: B6

Attending Cardiologist:

Intra E. Rush DVM, MS, DACVIM (Cardiology), DACVIM (EC) **B6**

Cardiology Resident:

B6

Cardiology Technician:

B6

Veterinary Nutritionist : Dr. Lisa Freeman

Student: B6 /19

Admit Date: 2/1/2019 10:36:11 AM

Discharge Date: 2/1/2019

Diagnoses: Arrhythmogenic right ventricular cardiomyopathy (ARVC) with marked right heart enlargement, ventricular premature depolarizations, and left ventricular dysfunction; possible component of diet-related cardiomyopathy

Clinical findings: B6 has been diagnosed with a primary heart muscle disease called arrhythmogenic right ventricular cardiomyopathy (ARVC). This disease is common in bulldogs and is characterized by replacement of the normal heart muscle by fat and/or scar tissue which may result in serious ventricular arrhythmias (abnormal heart rhythms originating from the lower chamber of the heart), cardiac enlargement and congestive heart failure, or both. Dogs with ARVC may experience syncope (fainting) or sudden death as the result of ventricular arrhythmia. Though we cannot reverse the changes in the heart muscle, we can control the heart disease with medical management.

The following diagnostic test results were obtained today:

ECG findings: The ECG shows a number of premature ventricular contractions (VPCs) originating from the right ventricle.

Echocardiogram findings: The right ventricle is moderate to markedly enlarged. The left ventricle is mildly dilated with the left ventricular free wall thinned. There is reduced vigor of contraction of the left ventricle. The left atrium is mildly to moderately enlarged. The right atrium is moderately to markedly enlarged. There is some mitral and tricuspid valve regurgitation. The hepatic veins are markedly distended.

Monitoring at home: Please monitor for any signs of lethargy, weakness, pale gums, cough, shortness of breath, inappetence, or collapse. If a collapsing episode is noted, please check your dog's gum color and try to get a sense of whether the heart rate is slow or fast. If you have an iPhone or Android smartphone device, you may want to explore the

option of purchasing the Kardia Mobile device which will allow you to monitor the heart rate and rhythm at home (www.alivetec.com). If you have any concerns, please call or have your dog evaluated by a veterinarian. Our emergency clinic is open 24 hours/day.

B6 may also benefit from wearing a Holter EKG, which is a harnessed EKG that he would wear for 24 hours. We can place that here, and send him home for the 24 hours duration. He would then return here the next day where we can remove the Holter and analyze his heart rhythm to fully assess his arrhythmia. Call if you decide to do this test.

Recommended Medications:

B6

Diet suggestions: Dogs with ARVC may benefit from the addition of omega-3 fatty acids (fish oil) to the diet. Diets such as the Royal Canin Boxer or Early Cardiac diet, or Hill's j/d have ample fish oil and may not require much (or any) additional supplementation. Additional information on supplements such as fish oil or other supplements that you might have questions about may be found on the Tufts HeartSmart web site: (<http://vet.tufts.edu/heartsmart/diet/>).

- The FDA is currently investigating an apparent association between diet and a type of heart disease called dilated cardiomyopathy. The exact cause is still unclear, but it appears to be associated with boutique diets and those containing exotic ingredient or are grain-free. Therefore, we are currently recommending that dogs do not eat these types of diets.
- We recommend switching B6 to commercial diet made by a well-established company that is not grain-free and does not contain any exotic ingredients, such as kangaroo, duck, lamb, venison, lentils, peas, beans, buffalo, tapioca, barley, and chickpeas.
- The FDA issued a statement regarding this issue (<https://www.fda.gov/AnimalVeterinary/NewsEvents/CVMUpdates/uom613305.htm>) and a recent article published by Dr. Lisa Freeman on the Cummings School's Pet Foodology blog can further explain these findings (<http://vetnutrition.tufts.edu/2018/06/a-broken-heart-risk-of-heart-disease-in-boutique-or-grain-free-diets-and-exotic-ingredients/>).
- Our nutritionists have compiled a list of dog foods that are good options for dogs with heart disease.

Dry Food Options:

Royal Canin Early Cardiac (veterinary diet)

Royal Canin Boxer

Purina Pro Plan Adult Weight Management

Purina Pro Plan Bright Mind Adult Small Breed Formula

Canned Food Options:

Hill's Science Diet Adult Beef and Barley Entree

Hill's Science Diet Adult 1-6 Healthy Cuisine Roasted Chicken, Carrot, and Spinach Stew

Royal Canin Mature 8+

We recommend slowly introducing one of the diets on the above list as follows: 25% of the new diet mixed with 75% old diet for 2-3 days, then 50:50, etc.

Hopefully you can find a diet on the list that B6 will enjoy!

If your dog has special nutritional needs or requires a homecooked diet, we recommend you schedule an appointment with our nutritionists (508-887-4696).

Exercise recommendations: Generally we recommend limited activity for dogs with heart disease – Leash walk only is ideal. Repetitive or strenuous high energy activities (repetitive ball chasing, running fast off-leash, etc.) are not recommended as these activities may result in worsened arrhythmia or even sudden death.

Recheck visits: We would like to recheck B6 in 3 months, at which point we can discuss additional medications and

treatments as needed (such as antiarrhythmics). We will likely recommend recheck ECGs every 3 months, or you can purchase the AliveCor and send us an ECG about once a month.

Thank you for entrusting us with [B6] care. Please contact our Cardiology liaison at (508)-887-4696 or email us at cardiovet@tufts.edu for scheduling and non-emergent questions or concerns. Please visit our HeartSmart website for more information.

Please visit our HeartSmart website for more information
<http://vet.tufts.edu/heartsmart/>

Prescription Refill Disclaimer:

For the safety and well-being of our patients, your pet must have had an examination by one of our veterinarians within the past year in order to obtain prescription medications.

Ordering Food:

Please check with your primary veterinarian to purchase the recommended diet(s). If you wish to purchase your food from us, please call 7-10 days in advance (508-887-4629) to ensure the food is in stock. Alternatively, veterinary diets can be ordered from online retailers with a prescription/veterinary approval.

Clinical Trials:

Clinical trials are studies in which our veterinary doctors work with you and your pet to investigate a specific disease process or a promising new test or treatment. Please see our website: vet.tufts.edu/cvmc/clinical-studies

Case: [B6]

Owner: [B6]

Discharge Instructions

Cummings Veterinary Medical Center

AT TUFTS UNIVERSITY

Cardiology Liaison: 508-887-4696

B6

Patient ID: **B6**

B6 Canine

B6 Years Old Male (Neutered) English Bulldog
Brown/White

Cardiology Appointment Report Enrolled in DCM Study

Date: 2/1/2019

Attending Cardiologist:

John E. Rush DVM, MS, DACVIM (Cardiology), DACVECC

B6

Cardiology Resident:

B6

Cardiology Technician:

B6

Student: **B6** V19

Presenting Complaint: Here for possible entry to DCM study. Half-sister **B6** came in last month for CHF. **B6** had high proBNP on bloodwork **B6**

Concurrent Diseases:

B6 } on IDEXX panel.

History of **B6** when young.

General Medical History:

Had **B6** as puppy, had a **B6** -O says seen at Tufts.

Sedentary lifestyle, but healthy. Half-sister **B6** here last month in CHF, which is what started concerns for DCM.

Fasted today.

Had reason for concern of DCM based on diet and sister, came in based on NTproBNP level.

Diet and Supplements:

Grain free diet- Wellness Core. Chicken and Turkey wet food 4oz BID. Fish dry food 1/4 cup BID.

No supplements or treats.

Cardiovascular History:

Prior CHF diagnosis? N

Prior heart murmur? N

Prior ATE? N

Prior arrhythmia? N

Monitoring respiratory rate and effort at home? N, but taking notice more after sister's CHF. O thinks 20-30 at rest.

Cough? N

Shortness of breath or difficulty breathing? Sounds raspy when anxious.

Syncope or collapse? N

Sudden onset lameness? N

Exercise intolerance? N- Normally low energy.

Current Medications Pertinent to CV System:

B6

Cardiac Physical Examination:

B6

Muscle condition:

- Normal
- Mild muscle loss
- Moderate cachexia
- Marked cachexia

Cardiovascular Physical Exam:

Murmur Grade:

- None
- I/VI
- II/VI
- III/VI
- IV/VI
- V/VI
- VI/VI

Murmur location/description:

Jugular vein:

- Bottom 1/3 of the neck
- Middle 1/3 of the neck
- 1/2 way up the neck
- Top 2/3 of the neck

Arterial pulses:

- Weak - obese and difficult to palpate
- Fair
- Good
- Strong
- Bounding
- Pulse deficits
- Pulsus paradoxus
- Other:

Arrhythmia:

- None
- Sinus arrhythmia
- Premature beats infrequent
- Bradycardia
- Tachycardia

Gallop:

- Yes
- Pronounced

- No
- Intermittent

Other:

Pulmonary assessments:

- Eupneic
- Mild dyspnea
- Marked dyspnea
- Normal BV sounds
- Pulmonary crackles
- Wheezes
- Upper airway stridor

Abdominal exam:

- Normal
- Hepatomegaly
- Abdominal distension mostly adipose tissue?
- Mild ascites
- Marked ascites

Problems:

Related dog with DCM
Has a high NT-proBNP

Differential Diagnoses: DCM vs other

Diagnostic plan:

- Echocardiogram
- Chemistry profile
- ECG
- Renal profile
- Blood pressure
- Dialysis profile
- Thoracic radiographs
- NT-proBNP
- Troponin I
- Other tests: Study bloodwork

Echocardiogram Findings:

B6

Mitral inflow:

- Summated
- Normal
- Delayed relaxation
- Pseudonormal
- Restrictive

B6

Assessment and recommendations:

Findings are consistent with ARVC with concurrent LV dysfunction which is either related to ARVC or could have a component of diet-related cardiomyopathy. There was not enough arrhythmia seen today to clearly trigger antiarrhythmic therapy, but a 24 hour Holter monitor could be performed for a better assessment of arrhythmia burden, or Alivecor tracings could be evaluated serially. Recommend starting **B6** 5mg PO BID. Recommend switching the diet. Dog was enrolled in the DCM study, and troponin, NTproBNP, taurine levels, CBC/Chem were submitted via the study. Recheck echo, ECG, and blood work in

3, 6, and 9 months for the study. Discussed pros and cons of starting **B6** treatment today, or **B6** owner leaning toward fewer drugs at this stage.

Final Diagnosis:

ARVC with LV dysfunction (possible component of diet associated cardiomyopathy)

Heart Failure Classification Score:

ISACHC Classification:

- | | |
|----------------------------------------|-------------------------------|
| <input type="checkbox"/> Ia | <input type="checkbox"/> IIIa |
| <input checked="" type="checkbox"/> Ib | <input type="checkbox"/> IIIb |
| <input type="checkbox"/> II | |

ACVIM Classification:

- | | |
|----------------------------------------|----------------------------|
| <input type="checkbox"/> A | <input type="checkbox"/> C |
| <input type="checkbox"/> B1 | <input type="checkbox"/> D |
| <input checked="" type="checkbox"/> B2 | |

M-Mode

IVSd	B6	cm
LVIDd		cm
LVPWd		cm
IVSs		cm
LVIDs		cm
LVPWs		cm
EDV(Teich)		ml
ESV(Teich)		ml
EF(Teich)		%
%FS		%
SV(Teich)		ml
Ao Diam		cm
LA Diam		cm
LA/Ao		
Max LA		cm
TAPSE		cm

M-Mode Normalized

IVSdN	B6	(0.290 - 0.520) !
LVIDdN		(1.350 - 1.730)
LVPWdN		(0.330 - 0.530)
IVSsN		(0.430 - 0.710)
LVIDsN		(0.790 - 1.140)
LVPWsN		(0.530 - 0.780) !
Ao Diam N		(0.680 - 0.890) !
LA Diam N		(0.640 - 0.900) !

SALA
Ao Diam
SALA / Ao Diam
IVSd
LVIDd
LVPWd
EDV(Teich)
IVSs
LVIDs
LVPWs
ESV(Teich)
EF(Teich)
%FS
SV(Teich)
LV Major
LV Minor
Sphericity Index
LVld LAX
LVAd LAX
LVEDV A-L LAX
LVEDV MOD LAX
LVls LAX
LVAs LAX
LVESV A-L LAX
LVESV MOD LAX
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B6

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MR maxPG
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MV DecT
MV Dec Slope
MV A Vel
MV E/A Ratio
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AV maxPG
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TR maxPG

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Cummings
Veterinary Medical Center
AT TUFTS UNIVERSITY

B6

Foster Hospital for Small Animals
55 Willard Street
North Grafton, MA 01536
Telephone (508) 839-5395
Fax (508) 839-7951
<http://vetmed.tufts.edu/>

B6 Male (Neutered)
Canine English Bulldog
Brown/White
B6

2/12/2019

Dear **B6**

Thank you for referring **B6** with their pet **B6**

If you have any questions, or concerns, please contact us at 508-887-4988.

Thank you,

John Rush DVM, DACVIM (Cardiology), DACVECC

From: PFR Event <pfpreventcreation@fda.hhs.gov>

To: Cleary, Michael *; HQ Pet Food Report Notification; [B6]

Sent: 2/25/2019 1:20:54 PM

Subject: Wellness CORE Grain-Free Ocean Whitefish dry-Wellness Core grain free turkey: Lisa Freeman - EON-380745

Attachments: 2063135-report.pdf; 2063135-attachments.zip

A PFR Report has been received and PFR Event [EON-380745] has been created in the EON System.

A "PDF" report by name "2063135-report.pdf" is attached to this email notification for your reference. Please note that all documents received in the report are compressed into a zip file by name "2063135-attachments.zip" and is attached to this email notification.

Below is the summary of the report:

EON Key: EON-380745

ICSR #: 2063135

EON Title: PFR Event created for Wellness CORE Grain-Free Ocean Whitefish dry Wellness Core grain free turkey chicken liver and turkey liver formula canned Wellness Core Hearty Cuts grain-free in gravy chicken and turkey recipe; 2063135

AE Date	[B6]	Number Fed/Exposed	6
Best By Date		Number Reacted	3
Animal Species	Dog	Outcome to Date	Stable
Breed	Bulldog		
Age	[B6] Years		
District Involved	PFR-New England DO		

Product information

Individual Case Safety Report Number: 2063135

Product Group: Pet Food

Product Name: Wellness CORE Grain-Free Ocean Whitefish dry Wellness Core grain free turkey, chicken liver, and turkey liver formula canned Wellness Core Hearty Cuts grain-free in gravy chicken and turkey recipe

Description: Eating BEG diet - 2 other dogs in household diagnosed with DCM [B6] and [B6] - (already reported) RDVM screened this dog with NT-proBNP which was elevated so we evaluated at Tufts

B6 Probable ARVC/diet-associated DCM but no arrhythmia detected (enlarged right ventricle, reduced contractility) Changing diet to Royal Canin Early Cardiac and will re-evaluate in 3 months. Taurine and troponin pending

Submission Type: Initial

Report Type: Adverse Event (a symptom, reaction or disease associated with the product)

Outcome of reaction/event at the time of last observation: Stable

Number of Animals Treated With Product: 6

Number of Animals Reacted With Product: 3

Product Name	Lot Number or ID	Best By Date
Wellness CORE Grain-Free Ocean Whitefish dry Wellness Core grain free turkey, chicken liver, and turkey liver formula canned Wellness Core Hearty Cuts grain-free in gravy chicken and turkey recipe		

Sender information

Lisa Freeman
200 Westboro Rd
North Grafton, MA 01536
USA

Owner information

B6

USA

To view this PFR Event, please click the link below:

<https://eon.fda.gov/eon//browse/EON-380745>

To view the PFR Event Report, please click the link below:

<https://eon.fda.gov/eon//EventCustomDetailsAction!viewReport.jspa?decorator=none&e=0&issueType=12&issueId=397754>

This email and attached document are being provided to you in your capacity as a Commissioned Official with the U.S. Department of Health and Human Services as authorized by law. You are being provided with this information pursuant to your signed Acceptance of Commission.

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Failure to adhere to the above provisions could result in removal from the approved distribution list. If you think you received this email in error, please send an email to FDAREportableFoods@fda.hhs.gov immediately.

Report Details - EON-380745

ICSR: 2063135
 Type Of Submission: Initial
 Report Version: FPSR.FDA.PETF.V.V1
 Type Of Report: Adverse Event (a symptom, reaction or disease associated with the product)
 Reporting Type: Voluntary
 Report Submission Date: 2019-02-25 08:12:41 EST

Reported Problem:
Problem Description: Eating BEG diet - 2 other dogs in household diagnosed with DCM (B6) and (B6) - already reported) RDVM screened this dog with NT-proBNP which was elevated so we evaluated at Tufts 2/20/19 Probable ARVC/diet-associated DCM but no arrhythmia detected (enlarged right ventricle, reduced contractility) Changing diet to Royal Canin Early Cardiac and will re-evaluate in 3 months. Taurine and troponin pending
Date Problem Started: 02/20/2019
Concurrent Medical Problem: Yes
Pre Existing Conditions: B6
Outcome to Date: Stable

Product Information:
Product Name: Wellness CORE Grain-Free Ocean Whitefish dry Wellness Core grain free turkey, chicken liver, and turkey liver formula canned Wellness Core Hearty Cuts grain-free in gravy chicken and turkey recipe
Product Type: Pet Food
Lot Number:
Product Use Information: **Description:** Please see diet history for more info (and also see (B6) diet history for exact diets)
Manufacturer /Distributor Information:
Purchase Location Information:

Animal Information:
Name: (B6)
Type Of Species: Dog
Type Of Breed: Bulldog
Gender: Female
Reproductive Status: Neutered
Weight: 24.2 Kilogram
Age: (B6) Years
Assessment of Prior Health: Good
Number of Animals Given the Product: 6
Number of Animals Reacted: 3
Owner Information: **Owner Information provided:** Yes
Contact: **Name:** (B6)
Phone: (B6)
Email: (B6)
Address: (B6)
 United States

	Healthcare Professional Information:	Practice Name: Tufts Cummings School of Veterinary Medicine Contact: Name: Lisa Freeman Phone: (508) 887-4523 Email: lisa.freeman@tufts.edu Address: 200 Westboro Rd North Grafton Massachusetts 01536 United States
Sender Information:		Name: Lisa Freeman Address: 200 Westboro Rd North Grafton Massachusetts 01536 United States Contact: Phone: 5088874523 Email: lisa.freeman@tufts.edu Permission To Contact Sender: Yes Preferred Method Of Contact: Email
Additional Documents:		Attachment: rpt_medical_record_preview.pdf Description: Med records Type: Medical Records

Client: **B6**
Address: **B6**

All Medical Records

Patient: **B6**
Breed: English Bulldog
DOB: **B6**

Species: Canine
Sex: Female
(Spayed)

Home Phone: **B6**
Work Phone: **B6**
Cell Phone: **B6**

Referring Information

B6

Client: **B6**
Patient: **B6**

Initial Complaint:

New **B6** - DCM study

SOAP Text Feb 20 2019 3:37PM **B6**

Disposition/Recommendations

Client:
Patient:

B6

Client: **B6**
Patient:

Cummings
Veterinary Medical Center
AT TUFTS UNIVERSITY

Foster Hospital for Small Animals

55 Willard Street
North Grafton, MA 01536
(508) 839-5395

Client: **B6**
Veterinarian:
Patient ID: **B6**
Visit ID:

Patient:	B6
Species:	Canine
Breed:	English Bulldog
Sex:	Female (Spayed)
Age:	B6 Years Old

Lab Results Report

Accession ID:			
Test	Results	Reference Range	Units



3/21

B6

Printed Monday, February 25, 2019

Client: **B6**
Patient: **B6**

CBC/CHEM



Tufts Cummings School Of Veterinary Medicine

200 Westboro Road
North Grafton, MA 01536

DUPLICATE

Name/DOB: **B6** Sex: SF Provider: **B6**
Patient ID: **B6** Age: 8 Order Location: V320539 Investigation into
Phone number: Species: Canine Sample ID: 1902200170
Collection Date: 2/20/2019 3:39 PM Breed:
Approval date: 2/20/2019 5:50 PM

CBC, Comprehensive, Sm Animal (Research)

02/20/19 5:50 PM **B6** platelets per 100x field (estimated count of 200,000-500,000/uL)

		Ref. Range/Females
SMACHUNSKI		
WBC (ADVIA)	B6	4.40-15.10 K/uL
RBC (Advia)	B6	5.80-8.50 M/uL
Hemoglobin (ADVIA)	B6	13.3-20.5 g/dL
Hematocrit (Advia)	B6	39-55 %
MCV (ADVIA)	B6	64.5-77.5 fL
MCH (ADVIA)	B6	21.3-25.9 pg
CHCM		
MCHC (ADVIA)	B6	31.9-34.3 g/dL
RDW (ADVIA)	B6	11.9-15.2
Platelet Count (Advia)	B6	173-486 K/uL
Mean Platelet Volume (Advia)	B6	8.29-13.20 fl

02/20/19 3:56 PM **B6**

Platelet Crit **B6** 0.129-0.403 %

02/20/19 3:56 PM **B6**

PDW **B6**

Reticulocyte Count (Advia) 0.20-1.60 %

Absolute Reticulocyte Count (Advia) 14.7-113.7 K/uL

CHr

MCVr

Microscopic Exam of Blood Smear (Advia)

		Ref. Range/Females
SMACHUNSKI		
Seg Neuts (%)	B6	43-86 %
Lymphocytes (%)	B6	7-47 %
Monocytes (%)	B6	1-15 %
Eosinophils (%)	B6	0-16 %
Seg Neutrophils (Abs) Advia	B6	2.800-11.500 K/uL
Lymphs (Abs) Advia	B6	1.00-4.80 K/uL
Mono (Abs) Advia	B6	0.10-1.50 K/uL
Eosinophils (Abs) Advia	B6	0.00-1.40 K/uL
WBC Morphology	B6	
RBC Morphology	B6	
Poikilocytosis	B6	

Research Chemistry Profile - Small Animal (Cobas)

Sample ID: 19022001701
This report continues... (Final)

Reviewed by: _____

Client: **B6**
Patient:

CBC/CHEM



Tufts Cummings School Of Veterinary Medicine

200 Westboro Road
North Grafton, MA 01536

DUPLICATE

Name/DOB:	B6	Sex:	SF	Provider:	B6
Patient ID:		Age:	8	Order Location:	V320559: Investigation into
Phone number:		Species:	Canine	Sample ID:	1902200170
Collection Date:	2/20/2019 3:39 PM	Breed:			
Approval date:	2/20/2019 5:50 PM				

Research Chemistry Profile - Small Animal (Cobas) (cont'd)

		Ref. Range/Females
DNOYES		
Glucose		67-135 mg/dL
Urea		8-30 mg/dL
Creatinine		0.6-2.0 mg/dL
Phosphorus		2.6-7.2 mg/dL
Calcium 2		9.4-11.3 mg/dL
Magnesium 2+		1.8-3.0 mEq/L
Total Protein		5.5-7.8 g/dL
Albumin		2.8-4.0 g/dL
Globulins		2.3-4.2 g/dL
A/G Ratio		0.7-1.6
Sodium		140-150 mEq/L
Chloride		106-116 mEq/L
Potassium		3.7-5.4 mEq/L
tCO2(Bicarb)		14-28 mEq/L
AGAP		8.0-19.0
NA/K		29-40
Total Bilirubin		0.10-0.30 mg/dL
Alkaline Phosphatase		12-127 U/L
GGT		0-10 U/L
ALT		14-86 U/L
AST		9-54 U/L
Creatine Kinase		22-422 U/L
Cholesterol		82-355 mg/dL
Triglycerides		30-338 mg/dl
Amylase		409-1250 U/L
Osmolality (calculated)		291-315 mmol/L

Sample ID: 19022001702
REPRINT: Omg. printing on 2/20/2019 (Final)

Reviewed by: _____
Page 2

Client: **B6**
Patient: **B6**

IDEXX BNP - 2/20/2019

IDEXX Reference Laboratories

Client: **B6** Patient: **B6**

Client: **B6**
Patient: **B6**
Species: CANINE
Breed: BULLDOG
Gender: FEMALE S PAVED
Age: 6Y

Date: **B6**
Requisition #: **B6**
Accession #: **B6**
Ordered by: **B6**

IDEXX VetConnect 1-888-433-9967
TUFTS UNIVERSITY
200 WESTBORO RD
NORTH GRAFTON, Massachusetts 01536
508-839-5395
Account: **B6**

CARDIOPET proBNP - CANINE

Test	Result	Reference Range	Unit	Method	Flag
CARDIOPET proBNP - CANINE	B6	0 - 900 pmol/L	HIGH		B6

Comments:

1 **B6**

Please note: Complete interpretive comments for all concentrations of CardioPET proBNP are available in the online directory of services. Serum specimens received at room temperature may have decreased NT-proBNP concentrations.

03

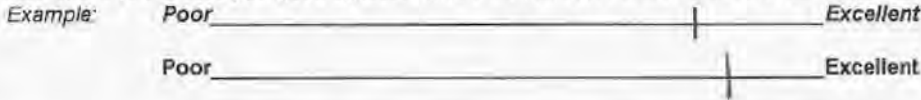
Client: **B6**
 Patient: **B6**

Diet history 2/20/19

CARDIOLOGY DIET HISTORY FORM
 Please answer the following questions about your pet

Pet's name: **B6** Owner's name: **B6** Today's date: 2/20/19

1. How would you assess your pet's appetite? (mark the point on the line below that best represents your pet's appetite)



2. Have you noticed a change in your pet's appetite over the last 1-2 weeks? (check all that apply)
 Eats about the same amount as usual Eats less than usual Eats more than usual
 Seems to prefer different foods than usual Other _____

3. Over the last few weeks, has your pet (check one)
 Lost weight Gained weight Stayed about the same weight Don't know

1. Please list below ALL pet foods, people food, treats, snack, dental chews, rawhides, and any other food item that your pet currently eats and that you have fed in the last 2 years.

Please provide enough detail that we could go to the store and buy the exact same food - examples are shown in the table

Food (include specific product and flavor)	Form	Amount	How often?	Dates fed
Nutra Grain Free Chicken, Lentil, & Sweet Potato Adult	dry	1 1/2 cup	2x/day	Jan 2016-present
85% lean hamburger	microwaved	3 oz	1x/week	June -Aug 2016
Pupperoni original beef flavor	treat	1/2	1x/day	Sept 2016-present
Rawhide	treat	6 inch twist	1x/week	Dec 2018-present
<u>SAME AS</u> B6				

*Any additional diet information can be listed on the back of this sheet

2. Do you give any dietary supplements to your pet (for example: vitamins, glucosamine, fatty acids, or any other supplements)? Yes No If yes, please list which ones and give brands and amounts:

	Brand/Concentration	Amount per day
Taurine <input type="checkbox"/> Yes <input type="checkbox"/> No	_____	_____
Carnitine <input type="checkbox"/> Yes <input type="checkbox"/> No	_____	_____
Antioxidants <input type="checkbox"/> Yes <input type="checkbox"/> No	_____	_____
Multivitamin <input type="checkbox"/> Yes <input type="checkbox"/> No	_____	_____
Fish oil <input type="checkbox"/> Yes <input type="checkbox"/> No	_____	_____
Coenzyme Q10 <input type="checkbox"/> Yes <input type="checkbox"/> No	_____	_____
Other (please list): Example: Vitamin C	_____	_____
<u>Kim Botic</u>	<u>Nature's Bounty</u>	<u>500 mg tablets - 1 per day</u>
_____	<u>Nature's Bounty</u>	<u>50 billion</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

3. How do you administer pills to your pet?
 I do not give any medications
 I put them directly in my pet's mouth without food
 I put them in my pet's dog/cat food
 I put them in a Pill Pocket or similar product
 I put them in foods (list foods): _____

CHANGE TO
RECRADISE

Client: B6
Patient:

Vitals Results

2/20/2019 3:00:08 PM	Weight (kg)	24.2000
----------------------	-------------	---------

Client:
Patient:

B6

ECG from cardio

B6

2/20/2019 4:05:01 PM

Tufts University
Tufts Cummings School of Vet Med
Cardiology

B6

Client:
Patient:

B6

ECG from cardio

B6

2/20/2019 4:05:13 PM

Page 1 of 2

Tufts University
Tufts Cummings School of Vet Med
Cardiology

B6

Client:
Patient:

B6

ECG from cardio

B6

2/20/2019 4:05:13 PM

Page 2 of 2

Tufts University
Tufts Cummings School of Vet Med
Cardiology

B6

Client:
Patient:

B6

ECG from cardio

B6

2/20/2019 4:05:43 PM

Tufts University
Tufts Cummings School of Vet Med
Cardiology

12 Lead: Standard Placement

B6

Client:
Patient:

B6

Patient History

02/08/2019 09:18 AM	Appointment
02/12/2019 10:57 AM	Appointment
02/13/2019 09:14 AM	Appointment
02/13/2019 10:56 AM	Appointment
02/20/2019 02:30 PM	UserForm
02/20/2019 02:56 PM	Treatment
02/20/2019 02:57 PM	Treatment
02/20/2019 03:00 PM	Vitals
02/20/2019 03:00 PM	Purchase
02/20/2019 03:19 PM	Purchase
02/20/2019 03:19 PM	Purchase
02/20/2019 03:47 PM	UserForm
02/20/2019 10:42 PM	Email
02/22/2019 05:15 PM	Appointment

B6

Discharge Instructions

Patient

Name: B6

Species: Canine

Brown/White Female (Spayed) English

Bulldog

Birthdate: B6

Owner

Name: B6

Address: B6

Patient ID: B6

Attending Cardiologist:

John E. Rush DVM, MS, DACVIM (Cardiology), DACVECC

B6

Cardiology Resident:

B6

Cardiology Technician:

B6

Student: B6 V19

Date: 2/20/2019

Diagnoses:

Mild cardiac changes that could be consistent with early arrhythmogenic right ventricular cardiomyopathy (ARVC) or a component of nutritional cardiomyopathy

Clinical Findings:

Thank you for bringing B6 to the Tufts cardiology service today for evaluation of her heart as part of a study on DCM. You report that other than an elevated BNP, there has been no indication that B6 has had any heart issues. Her breathing rate and activity levels at home have appeared normal.

To evaluate the health of her heart, we performed an echocardiogram (echo). We also evaluated B6 heart rhythm with an electrocardiogram (EKG). On echo, B6 had mildly decreased contractile function of the left ventricle. Her left atrium was mildly enlarged. Her right heart, however, was more significantly enlarged, which is something we can see with ARVC. No arrhythmias were detected on the EKG today, but we cannot rule out intermittent arrhythmia. Overall, B6 changes do not clearly require medication at this stage, but we will want to monitor for progression over time. It is unclear whether the changes to B6 heart are related to ARVC, nutrition, or some combination of things.

A blood sample was also collected for bloodwork for the study, and we will contact you as the results come in.

At this time, we will only treat B6 with the taurine supplement. We do recommend periodic echo rechecks to make sure there have been no changes to her heart over time and for the DCM study that she has been enrolled in.

Monitoring at Home:

Please monitor B6 at home for any concerning cardiac signs such as increased breathing rate or effort, exercise intolerance, or collapsing episodes. If she collapses, evaluate her gums for any darker coloration. If this occurs, please have B6 seen by a veterinarian immediately.

Please obtain a Kardia/Alivecor ECG reading from B6 at home once every few weeks. You can email this result to cardiovet@tufts.edu.

Diet Suggestions:

We recommend feeding B6 a commercial dog food diet, as directed by Dr Freeman.

Exercise Recommendations:

B6 may continue her regular exercise regimen.

Recommended Medications:

Taurine supplement: Please give 500 mg by mouth twice daily.

We may not need to continue this once we get B6 taurine results back.

Recheck Visits: Please call to schedule an appointment for about 3 months for a recheck echocardiogram as part of the DOM study.

Thank you for entrusting us with B6 care. She is such a sweet girl, and was an excellent patient to work with!

Please contact our Cardiology liaison at (508)-887-4696 or email us at cardiovet@tufts.edu for scheduling and non-emergent questions or concerns.

Please visit our HeartSmart website for more information

<http://vet.tufts.edu/heartsmart/>

Prescription Refill Disclaimer:

For the safety and well-being of our patients, your pet must have had an examination by one of our veterinarians within the past year in order to obtain prescription medications.

Ordering Food:

Please check with your primary veterinarian to purchase the recommended diet(s). If you wish to purchase your food from us, please call 7-10 days in advance (508-887-4629) to ensure the food is in stock. Alternatively, veterinary diets can be ordered from online retailers with a prescription/veterinary approval.

Clinical Trials:

Clinical trials are studies in which our veterinary doctors work with you and your pet to investigate a specific disease process or a promising new test or treatment. Please see our website: vet.tufts.edu/cvmc/clinical-studies

Case: B6

Owner: B6

Discharge Instructions

Cummings Veterinary Medical Center

AT TUFTS UNIVERSITY

Cardiology Liaison: 508-887-4696

B6

Patient ID: **B6**

B6 Canine

B6 Years Old Female (Spayed) English Bulldog
Brown/White

Cardiology Appointment Report

Date: 2/20/2019

Attending Cardiologist:

John E. Rush DVM, MS, DACVIM (Cardiology), DACVECC

B6

Cardiology Resident:

B6

Cardiology Technician:

B6

Student: **B6** V'19

Presenting Complaint:

DCM Study

Concurrent Diseases:

None

General Medical History:

Elevated BNP (**B6**)

Had surgery for **B6** finished pain meds about a week ago.

B6

Diet and Supplements:

CORE Wellness grain-free diet (dry (fish) and wet (turkey and chicken)) - 3 ounces of wet food BID, 1/4 cup dry BID

Probiotic for chronic enteritis

Cardiovascular History:

Prior CHF diagnosis? N

Prior heart murmur? N

Prior ATE? N

Prior arrhythmia? N

Monitoring respiratory rate and effort at home? Y, owner thinks no higher than 40 at rest, usually 20-30

Cough? N

Shortness of breath or difficulty breathing? Not when at rest

Syncope or collapse? N

Sudden onset lameness? N

Exercise intolerance? Yes, when taken for long walks

Current Medications Pertinent to CV System:

None at this time

Cardiac Physical Examination:

B6

Muscle condition:

- | | |
|----------------------------------------------------------------------------------|--------------------------------------------|
| <input type="checkbox"/> Normal | <input type="checkbox"/> Moderate cachexia |
| <input checked="" type="checkbox"/> Mild muscle loss: mild wasting over epaxials | <input type="checkbox"/> Marked cachexia |

Cardiovascular Physical Exam:

Murmur Grade:

- | | |
|------------------------------------------|--------------------------------|
| <input checked="" type="checkbox"/> None | <input type="checkbox"/> IV/VI |
| <input type="checkbox"/> I/VI | <input type="checkbox"/> V/VI |
| <input type="checkbox"/> II/VI | <input type="checkbox"/> VI/VI |
| <input type="checkbox"/> III/VI | |

Jugular vein:

- | | |
|------------------------------------------------------------|----------------------------------------------|
| <input checked="" type="checkbox"/> Bottom 1/3 of the neck | <input type="checkbox"/> 1/2 way up the neck |
| <input type="checkbox"/> Middle 1/3 of the neck | <input type="checkbox"/> Top 2/3 of the neck |

Arterial pulses:

- | | |
|---------------------------------|---------------------------------------------------------------------------------|
| <input type="checkbox"/> Weak | <input type="checkbox"/> Bounding |
| <input type="checkbox"/> Fair | <input type="checkbox"/> Pulse deficits |
| <input type="checkbox"/> Good | <input type="checkbox"/> Pulsus paradoxus |
| <input type="checkbox"/> Strong | <input checked="" type="checkbox"/> Other: difficult to assess due to trembling |

Arrhythmia:

- | | |
|------------------------------------------------------|--------------------------------------|
| <input type="checkbox"/> None | <input type="checkbox"/> Bradycardia |
| <input checked="" type="checkbox"/> Sinus arrhythmia | <input type="checkbox"/> Tachycardia |
| <input type="checkbox"/> Premature beats | |

Gallop:

- | | |
|----------------------------------------|-------------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> Pronounced |
| <input checked="" type="checkbox"/> No | <input type="checkbox"/> Other: |
| <input type="checkbox"/> Intermittent | |

Pulmonary assessments:

- Eupneic
- Mild dyspnea
- Marked dyspnea
- Normal BV sounds

- Pulmonary crackles
- Wheezes
- Upper airway stridor

Abdominal exam:

- Normal
- Hepatomegaly
- Abdominal distension

- Mild ascites
- Marked ascites

Problems:

No cardiac anomalies to report

Diagnostic plan:

- Echocardiogram
- Chemistry profile
- ECG
- Renal profile
- Blood pressure

- Dialysis profile
- Thoracic radiographs
- NT-proBNP
- Troponin I
- Other tests:

Echocardiogram Findings:

B6

Mitral inflow:

- Summated
- Normal
- Delayed relaxation

- Pseudonormal
- Restrictive

ECG findings:

NSR, HR 100-120 bpm

Assessment and recommendations:

Echocardiogram reveals structural changes that could be consistent with ARVC, but no arrhythmia was documented today. 24 hour Holter monitor could be considered to rule out intermittent arrhythmia. Owner has a Kardia at home and will obtain monthly readings. No cardiac medications are clearly indicated based on today's exam, but recommend supplementing with taurine until blood levels return from the lab. Patient was enrolled in the DCM study. Recheck echo in 3 and 6 months for the study.

Final Diagnosis:

Possible early ARVC; r/o nutrition related cardiomyopathy or a combination

Heart Failure Classification Score:

ISACHC Classification:

- Ia
- Ib
- IIIa
- IIIb

II

ACVIM Classification:

- A
- B1
- B2

- C
- D

M-Mode

- IVSd
- LVIDd
- LVPWd
- IVSs
- LVIDs
- LVPWs
- EDV(Teich)
- ESV(Teich)
- EF(Teich)
- %FS
- SV(Teich)
- Ao Diam
- LA Diam
- LA/Ao
- Max LA
- TAPSE
- EPSS

B6

- cm
- cm
- cm
- cm
- cm
- cm
- ml
- ml
- %
- %
- ml
- cm
- cm
- cm
- cm
- cm
- cm

M-Mode Normalized

- IVSdN
- LVIDdN
- LVPWdN
- IVSsN
- LVIDsN
- LVPWsN
- Ao Diam N
- LA Diam N

B6

- (0.290 - 0.520)
- (1.350 - 1.730)
- (0.330 - 0.530)
- (0.430 - 0.710)
- (0.790 - 1.140)
- (0.530 - 0.780)
- (0.680 - 0.890) !
- (0.640 - 0.900) !

2D

- SA LA
- Ao Diam
- SA LA / Ao Diam
- IVSd
- LVIDd

B6

- cm
- cm
-
- cm
- cm

LVPWd
EDV(Teich)
IVSs
LVIDs
LVPWs
ESV(Teich)
EF(Teich)
%FS
SV(Teich)
LV Major
LV Minor
Sphericity Index
LVld LAX
LVAd LAX
LVEDV A-L LAX
LVEDV MOD LAX
LVLs LAX
LVA_s LAX
LVESV A-L LAX
LVESV MOD LAX
HR
EF A-L LAX
LVEF MOD LAX
SV A-L LAX
SV MOD LAX
CO A-L LAX
CO MOD LAX

Doppler
MV E Vel
MV DecT
MV Dec Slope
MV A Vel
MV E/A Ratio
E'
E/E'
A'
S'
AV Vmax
AV maxPG
PV Vmax
PV maxPG
TR Vmax
TR maxPG

B6

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Cummings
Veterinary Medical Center
AT TUFTS UNIVERSITY

B6

Foster Hospital for Small Animals
55 Willard Street
North Grafton, MA 01536
Telephone (508) 839-5395
Fax (508) 839-7951
<http://vetmed.tufts.edu/>

B6 Female (Spayed)
Canine English Bulldog
Brown/White
B6

2/21/2019

Dear **B6**

Thank you for referring **B6** with their pet **B6**

If you have any questions, or concerns, please contact us at 508-887-4988.

Thank you,

B6 DVM (Cardiology)

From: Related PFR Event <pfrsignificantactivitycreation@fda.hhs.gov>
To: Carey, Lauren; Cleary, Michael *; HQ Pet Food Report Notification; [B6]
Sent: 6/11/2019 6:52:47 PM
Subject: Wellness CORE Grain-Free Ocean Whitefish dry-Wellness Core grain free turkey: Lisa Freeman - EON-390203
Attachments: 2068095-report.pdf; 2068095-attachments.zip

A PFR Report has been received and Related PFR Event [EON-390203] has been created in the EON System.

A "PDF" report by name "2068095-report.pdf" is attached to this email notification for your reference. Please note that all documents received in the report are compressed into a zip file by name "2068095-attachments.zip" and is attached to this email notification.

Below is the summary of the report:

EON Key: EON-390203

ICSR #: 2068095

EON Title: Related PFR Event created for Wellness CORE Grain-Free Ocean Whitefish dry Wellness Core grain free turkey chicken liver and turkey liver formula canned Wellness Core Hearty Cuts grain-free in gravy chicken and turkey recipe; 2068095

AE Date	02/20/2019	Number Fed/Exposed	6
Best By Date		Number Reacted	4
Animal Species	Dog	Outcome to Date	Stable
Breed	Bulldog		
Age	[B6] Years		
District Involved	PFR-New England DO		

Product information

Individual Case Safety Report Number: 2068095

Product Group: Pet Food

Product Name: Wellness CORE Grain-Free Ocean Whitefish dry Wellness Core grain free turkey, chicken liver, and turkey liver formula canned Wellness Core Hearty Cuts grain-free in gravy chicken and turkey recipe

Description: Eating BEG diet - 2 other dogs in household diagnosed with DCM [B6] -

already reported) RDVM screened this dog with NT-proBNP which was elevated so we evaluated at Tufts 2/20/19 Probable ARVC/diet-associated DCM but no arrhythmia detected (enlarged right ventricle, reduced contractility) Changing diet to Royal Canin Early Cardiac and will re-evaluate in 3 months. Low plasma and whole blood taurine levels - started taurine supplement 3/1/2019 Troponin - [B6] ng/mL [B6]

Submission Type: Followup

Report Type: Adverse Event (a symptom, reaction or disease associated with the product)

Outcome of reaction/event at the time of last observation: Stable

Number of Animals Treated With Product: 6

Number of Animals Reacted With Product: 4

Product Name	Lot Number or ID	Best By Date
Wellness CORE Grain-Free Ocean Whitefish dry Wellness Core grain free turkey, chicken liver, and turkey liver formula canned Wellness Core Hearty Cuts grain-free in gravy chicken and turkey recipe		

This report is linked to:

Initial EON Event Key: EON-380745

Initial ICSR: 2063135

Sender information

Lisa Freeman
200 Westboro Rd
North Grafton, MA 01536
USA

Owner information

[B6]

USA

To view this Related PFR Event, please click the link below:

<https://eon.fda.gov/eon//browse/EON-390203>

To view the Related PFR Event Report, please click the link below:

<https://eon.fda.gov/eon//EventCustomDetailsAction!viewReport.jspa?decorator=none&e=0&issueType=10100&issueId=407475&parentIssueTypeId=12>

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