



## RESEARCH PROGRESS REPORT SUMMARY

**Grant 02661:** Investigation into Diet-Associated Dilated Cardiomyopathy in Dogs

**Principal Investigator:** Darcy Adin, DVM

**Research Institution:** University of Florida

**Grant Amount:** \$211,521

**Start Date:** 4/1/2019      **End Date:** 9/30/2022

**Progress Report:** End-Year 2

**Report Due:** 3/31/2021      **Report Received:** 3/1/2021

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### **Original Project Description:**

Dilated cardiomyopathy (DCM) is a serious disease of the heart muscle whereby the heart becomes enlarged with weak contractions. DCM can result in abnormal heart rhythms, congestive heart failure or sudden death. In dogs, DCM most often occurs in large- and giant-breeds, such as Doberman Pinschers, Boxers, Irish Wolfhounds, and Great Danes; in these dogs, survival time after diagnosis is often only months, even with aggressive medical therapy. Recently, veterinary cardiologists have recognized DCM more frequently in all breeds of dogs including mixed breeds, and even those not usually associated with DCM. There is suspicion that the disease in some dogs is associated with boutique, exotic ingredient, or grain-free (BEG) diets. Some affected dogs on such diets have shown reversal or improvement of their disease after changing their diet, supporting a potential association between consumption of a BEG diet and development of DCM. A specific cause, however, has not been identified, despite extensive nutritional testing of the dog foods and the canine patients. Moreover, the extent of the problem is unknown because only dogs that are symptomatic for DCM have been reported. It is possible that more dogs may be affected but not yet showing signs of heart disease. To investigate the extent of diet-associated heart problems in dogs, this multi-institutional team of veterinary cardiologists and nutritionists will prospectively screen a large population of apparently healthy dogs for DCM and compare important cardiac disease measures, including ultrasound of the heart, blood biomarker and taurine concentrations, and the frequency of DCM in dogs eating BEG versus non-BEG diets.



### **Publications:**

Adin D, Freeman L, Stepien R, Rush J, Tjostheim S, Kelliham H, Aherne M, Vereb M, Goldberg R. Effect of Diet Type on Circulating Taurine Concentrations, Cardiac Biomarkers, and Echocardiograms in Four Dog Breeds. *J Vet Intern Med*, 2021:35 (early view) 1-9. <https://doi.org/10.1111/jvim.16075>.

### **Presentations:**

A presentation by Dr. Adin on nutritional DCM is planned for April 15, 2021 virtually. This is titled "Puzzling out the nutritional DCM issue in the US" and will be directed to UK cardiologists. Data from the current study will be presented in this CE event.

### **Report to Grant Sponsor from Investigator:**

The study titled "Investigation into Subclinical Diet-Associated Dilated Cardiomyopathy in Four Dog Breeds" is progressing on schedule and nearing completion. Enrollment for the first part of the study is complete and a peer-reviewed manuscript describing the results has been published in the *Journal of Veterinary Internal Medicine* (DOI: 10.1111/jvim.16075). The results of this part of the study showed higher levels for cardiac troponin I in dogs eating grain-free dog foods or foods that have peas, lentils or potatoes in the top 10 ingredients. Cardiac troponin I is a blood marker that indicates injury to the heart muscle. Even mild elevations can be important but future studies will be needed to determine with certainty that this is the case in these dogs. We did not find echocardiographic (heart ultrasound) differences between dogs eating grain-free and grain-inclusive foods. If the low-level elevation of cardiac troponin I truly indicates low-level heart muscle injury then it may be too early in these healthy dogs to manifest as echocardiographic differences.

We are also following dogs enrolled at UF that have bloodwork or echocardiographic abnormalities for a year after a diet change is enacted, to determine if any of the abnormalities will improve with nutritional intervention. We do not know if any or all of these abnormalities in these dogs are related to food and so the role of follow-up is critical to this assessment. The number of dogs being followed at this time is 17. We anticipate that this follow-up data will result in a 2nd publication. Data collection will be complete by the summer and we will then plan to analyze the data.

We will be submitting blood samples to determine if metabolic pathways in the body are different in dogs eating grain-free diets compared to dogs eating grain inclusive diets and to determine if this will change after dogs eating grain-free diets are transitioned to grain-inclusive diets. This will help us understand the changes that could be occurring in the body of dogs eating different diet types. This analysis is planned for summer 2021 and we expect this to also result in a publication.