
From: Jones, Jennifer L </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=0F6CA12EAA9348959A4CBB1E829AF244-JENNIFER.JO>
To: [REDACTED] **B6**
CC: Peloquin, Sarah
Sent: 1/30/2019 6:01:47 PM
Subject: 800.267-cc-210-EON-375111-FDA Case Investigation for [REDACTED] **B6**

Good afternoon

[REDACTED] **B6**

I'm sorry to hear that [REDACTED] **B6** passed away. We've been following his case since Dr. Freeman reported it. As a follow-up to our discussion, we'd like to send you a box to collect the fixed formalin heart tissue. To send the box, I need to know the approximate size and weight of the fixed formalin container. Please send me that information.

Then, I'll ship you a box with everything needed to package the sample. You'll reuse the box, package the sample, use the prepaid shipping label we provide, and call UPS for the pick-up. Please return ship the box to us on a Monday through Wednesday.

***If for some reason we are furloughed again mid-February, please do not ship during the government shutdown. ***

We will process the tissue for histopathology and send you the results.

Please email or call with any questions.

Thank you,

Dr. Jones

Jennifer L. A. Jones, DVM

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From: Darcy Adin <dbadin@ncsu.edu>
To: Jones, Jennifer L
CC: Freeman, Lisa; Joshua A Stern [B6]
Sent: 8/14/2018 11:59:53 PM
Subject: a few NCSU cases
Attachments: [B6].pdf

Hi Jennifer,

I wanted to follow up on the case where NCSU sent you necropsy samples ([B6] 3 yr Fs Great Dane). I've attached her whole blood and plasma taurine concentrations for your records, which were normal.

One of my residents saw a littermate pair of Dobermans back for their 3 month recheck after being diagnosed with DCM while eating Acana. Taurines were normal on these dogs back in April and I honestly didn't have a ton of hope for these dogs (WB 342 and 335) because they were dobermans and their genetic tests were abnormal (the female is homozygous positive for one mutation and negative for a 2nd, the male was heterozygous positive for one mutation and negative for a 2nd). But, 3 months after a diet change to Purina grain-based (and no taurine supplementation), they both have shown significant improvement (the less severely affected female has near normalized and the severely affected male (who was in heart failure) has also significantly improved.

I have asked our resident to report these dogs to the FDA using the portal ([B6] and [B6]) so hopefully you will see these soon. She will also be submitting a taurine deficient Golden eating Acana (WB 5! maybe the lowest I've ever seen).

Thank you!
Darcy

--

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

From: PFR Event <pfpreventcreation@fda.hhs.gov>
To: Cleary, Michael *; HQ Pet Food Report Notification; B6
Sent: 5/20/2019 2:57:23 PM
Subject: Natural Balance Venison: Darcy Adin - EON-388246
Attachments: 2067170-report.pdf

A PFR Report has been received and PFR Event [EON-388246] has been created in the EON System.

A "PDF" report by name "2067170-report.pdf" is attached to this email notification for your reference.

Below is the summary of the report:

EON Key: EON-388246

ICSR #: 2067170

EON Title: PFR Event created for Natural Balance Venison Sweet Potatoes, Pedigree chicken and rice, Dr. Lyon's dental treat (mint), Smart Bones Smart Sticks (peanut butter), Cosequin DS; 2067170

AE Date	04/03/2019	Number Fed/Exposed	1
Best By Date		Number Reacted	1
Animal Species	Dog	Outcome to Date	Stable
Breed	Sheepdog - Shetland		
Age	10 Years		
District Involved	PFR-Florida DO		

Product information

Individual Case Safety Report Number: 2067170

Product Group: Pet Food, Other

Product Name: Natural Balance Venison, Sweet Potatoes, Pedigree chicken and rice, Dr. Lyon's dental treat (mint), Smart Bones Smart Sticks (peanut butter), Cosequin DS

Description: B6 was referred to UF Cardiology after her primary care veterinarian noted a Grade 2/6 left systolic murmur. She has been slowing down some over the past year, but still runs and plays regularly. B6 has a sinus arrhythmia. Patient was diagnosed with primary mitral regurgitation with systolic dysfunction.

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: 1

Number of Animals Reacted With Product: 1

Product Name	Lot Number or ID	Best By Date
Natural Balance Venison, Sweet Potatoes		
Dr. Lyon's dental treat (mint)		
Pedigree chicken and rice		
Cosequin DS		

Sender information

Darcy Adin
2015 SW 16th Ave
2015 SW 16th Avenue
Gainesville, FL 32608
USA

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

B6

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

B6

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From: Rotstein, David </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=0A3B17EBFCF14A6CB8E94F322906BADD-DROTSTEI>
To: Palmer, Lee Anne; Queen, Jackie L; Carey, Lauren; Jones, Jennifer L; Nemser, Sarah; Ceric, Olgica; Glover, Mark
CC: Rotstein, David
Sent: 4/12/2018 6:00:27 PM
Subject: another DCM: FW: Kirkland Signature Nature's Domain Turkey Meal and Sweet Potato Dog Food: **B6** - EON-351034
Attachments: 2045680-report.pdf

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM Vet-LIRN Liaison
CVM OSC/DC/CERT
7519 Standish Place

B6 (BB)



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From: PFR Event [<mailto:pfpreventcreation@fda.hhs.gov>]
Sent: Thursday, April 12, 2018 1:56 PM
To: Cleary, Michael * <Michael.Cleary@fda.hhs.gov>; HQ Pet Food Report Notification <HQPetFoodReportNotification@fda.hhs.gov>; **B6**
Subject: Kirkland Signature Nature's Domain Turkey Meal and Sweet Potato Dog Food: **B6**
EON-351034

A PFR Report has been received and PFR Event [EON-351034] has been created in the EON System.

A "PDF" report by name "2045680-report.pdf" is attached to this email notification for your reference.

Below is the summary of the report:

EON Key: EON-351034

ICSR #: 2045680

EON Title: PFR Event created for Kirkland Signature Nature's Domain Turkey Meal and Sweet Potato Dog Food; 2045680

AE Date	08/04/2016	Number Fed/Exposed	1
Best By Date		Number Reacted	1

Animal Species	Dog	Outcome to Date	Stable
Breed	Retriever - Golden		
Age	11 Years		
District Involved	PFR B6 DO		

Product information

Individual Case Safety Report Number: 2045680

Product Group: Pet Food

Product Name: Kirkland Signature Nature's Domain Turkey Meal and Sweet Potato Dog Food

Description: **B6** was diagnosed with dilated cardiomyopathy and left sided congestive heart failure by the cardiology service at **B6** 8/4/2016. Her disease has been stable. Due to reports of DCM related to taurine deficiency on grain free diets, a whole blood taurine level was submitted on 3/2/2018 by the cardiology service. Whole blood taurine was 57 (ref range 200-350, critical <150). owner was advised to stop current diet and start taurine supplementation.

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: 1

Number of Animals Reacted With Product: 1

Product Name	Lot Number or ID	Best By Date
Kirkland Signature Nature's Domain Turkey Meal and Sweet Potato Dog Food		

Sender information

B6

USA

Owner information

B6

USA

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B6

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

<https://eon.fda.gov/eon/>

B6

B6

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Echocardiographic phenotype of canine dilated cardiomyopathy differs based on diet type[☆]

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KEYWORDS

Nutritional;
Heart failure;
Dog;
Taurine

Abstract *Introduction:* Canine dilated cardiomyopathy (DCM) can result from numerous etiologies including genetic mutations, infections, toxins, and nutritional imbalances. This study sought to characterize differences in echocardiographic findings between dogs with DCM fed grain-free (GF) diets and grain-based (GB) diets.

Animals: Forty-eight dogs with DCM and known diet history.

Methods: This was a retrospective analysis of dogs with DCM from January 1, 2015 to May 1, 2018 with a known diet history. Dogs were grouped by diet (GF and GB), and the GF group was further divided into dogs eating the most common grain-free diet (GF-1) and other grain-free diets (GF-o). Demographics, diet history, echocardiographic parameters, taurine concentrations, and vertebral heart scale were compared between GB, all GF, GF-1, and GF-o groups at diagnosis and recheck.

Results: Dogs eating GF-1 weighed less than GB and GF-o dogs, but age and sex were not different between groups. Left ventricular size in diastole and systole

Presented in abstract form at the American College of Veterinary Internal Medicine Forum, Seattle, WA, June 2018.

[☆] A unique aspect of the Journal of Veterinary Cardiology is the emphasis of additional web-based materials permitting the detailing of procedures and diagnostics. These materials can be viewed (by those readers with subscription access) by going to <http://www.sciencedirect.com/science/journal/17602734>. The issue to be viewed is clicked and the available PDF and image downloading is available via the Summary Plus link. The supplementary material for a given article appears at the end of the page. To view the material is to go to <http://www.doi.org> and enter the doi number unique to this paper which is indicated at the end of the manuscript.

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was greater, and sphericity index was less for GF-1 compared with GB dogs. Diastolic left ventricular size was greater for all GF compared with that of GB dogs. Fractional shortening, left atrial size, and vertebral heart scale were not different between groups. Taurine deficiency was not identified in GF dogs, and presence of congestive heart failure was not different between groups. Seven dogs that were reevaluated after diet change (6 received taurine supplementation) had clinical and echocardiographic improvement.

Conclusions: Dietary-associated DCM occurs with some GF diets and can improve with nutritional management, including diet change. The role of taurine supplementation, even without deficiency, is uncertain.

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Abbreviations

CHF	congestive heart failure
GF	grain-free
GB	grain-based
GF-1	most common grain-free diet
GF-o	other grain-free diets
IFA	immunofluorescence assay
LVIDdN	normalized left ventricular internal diastolic diameter
LVIDsN	normalized left ventricular internal systolic diameter
PCR	polymerase chain reaction

Introduction

Dilated cardiomyopathy (DCM) is a common cause of congestive heart failure (CHF) in dogs and is historically more common in male, large-breed dogs with certain breed predilections including Doberman Pinschers, Great Danes, and Irish Wolfhounds [1–5]. Ventricular dilation and impaired contractility in the absence of primary valvular or vascular diseases are the hallmark findings of DCM [1]. A number of disease processes can lead to the development of systolic dysfunction, which is the major pathophysiologic driver for clinical signs including dyspnea, tachypnea, syncope, and sudden death. Genetic mutations associated with DCM have been suspected or identified in some predisposed breeds [3–5]. Additionally, systemic disease, toxins, and a variety of infectious agents have been reported to cause myocardial failure resembling DCM and leading to CHF [6–9]. Nutritional causes of DCM, such as taurine and carnitine deficiency, are especially important to identify in clinical patients, as there appears to be a degree of reversibility associated with supplementation of these compounds [10–14]. Although taurine and L-

carnitine deficiencies have been associated with DCM in some dogs, with suspected breed predispositions, little is known about other diet-related etiologies [13–15]. In people, macronutrient or micronutrient deficiencies (e.g. selenium, zinc, thiamine, copper, iron, taurine, and carnitine) as well as nutrient toxicities (e.g. iron and cobalt) have also been associated with DCM [16–19]. Nutrient imbalances may promote inefficient myocardial energy expenditure and could cause or exacerbate DCM.

This study was initiated because of increased recognition of DCM in dogs without a known breed or demographic predilection, and an observation that many of these dogs were eating specialty meat-based grain-free (GF) diets. We hypothesized that among dogs diagnosed with DCM, those eating meat-based GF diets would have more advanced left ventricular systolic dysfunction and remodeling than those eating meat and grain-based (GB) diets. We also hypothesized that dogs eating one particular brand of most common grain-free diet (GF-1) would have more advanced disease than dogs eating other brands of grain-free diet (GF-o).

Animal, materials, and methods

Medical records at the North Carolina State University, College of Veterinary Medicine, were retrospectively evaluated for the diagnosis of canine DCM from January 1, 2015 to May 1, 2018. Dogs were included if the food brand and variety were known and an echocardiographic diagnosis of DCM was made based on fractional shortening $\leq 25\%$, normalized left ventricular internal diastolic diameter (LVIDdN) ≥ 1.8 , and normalized left ventricular internal systolic diameter (LVIDsN) ≥ 1.2 [1,20]. Exclusion criteria were congenital heart disease, primary valve disease,

unknown diet history, or vegan, vegetarian, or home-cooked diets.

Dogs were grouped by diet type into GF and GB based on label ingredients as reported by the manufacturer. Foods were considered GB if wheat, rice, oats, cornmeal, barley, bulgur, millet, rye, or spelt were listed as ingredients and GF if none of these grain products were listed. The GF group was subdivided into dogs fed GF-1 and GF-o. Demographic information (age, breed, weight in kilograms [kg], and sex) was recorded. The recorded diet represented the main calorie source as reported by the owner. Echocardiographic parameters that were independent of or normalized for body weight (fractional shortening, LVIDdN by M-mode, LVIDsN by M-mode, ratio of the left atrial dimension to the aortic annulus dimension by 2-D right parasternal short-axis view [21], and diastolic left ventricular sphericity index [SI] as previously described [22,23]) were recorded from each included case. In addition, records were evaluated for the presence or absence of CHF at the time of diagnosis, and radiographic vertebral heart scale [24] was evaluated and recorded. Echocardiograms were reviewed by one investigator (DA). Results of ancillary testing such as whole blood or plasma taurine concentrations, plasma L-carnitine concentrations, blood selenium concentrations, infectious disease testing (Bartonella immunofluorescence assay [IFA] and polymerase chain reaction [PCR], Rickettsia IFA and PCR, Anaplasma IFA and PCR, Babesia PCR, Ehrlichia IFA and PCR, Mycoplasma PCR, Lyme IFA, Trypanosoma cruzi PCR, and Leishmania IFA), and necropsies were recorded where available. The established reference range for laboratories^{a,b,c} and published studies were utilized for interpretation of tests [14,25,26].

Dogs that were diagnosed with DCM and underwent a diet change had serial echocardiographic information collected at each recheck during the study period.

Statistical analysis was performed using commercially available software^d. Data collected from each group were tested for normality using the Kolmogorov-Smirnov test and presented as median and 95% confidence intervals. Demographic data, echocardiographic parameters, whole blood taurine concentrations, and radiographic vertebral

heart scale at the time of diagnoses were compared between groups using one-way analysis of variance if data were normally distributed or Kruskal-Wallis test if data were not normally distributed. Post hoc testing was performed where indicated (Tukey's or Dunn's respectively). The presence or absence of CHF and sex were compared between groups using Fisher's exact test. Data from dogs with follow-up evaluations after diet change were assessed for echocardiographic changes using a 2-tailed, paired *t*-test.

Results

Dogs

A total of 91 dogs were diagnosed with DCM at the North Carolina State University, College of Veterinary Medicine, from January 1, 2015 to May 1, 2018. Forty-three dogs were excluded from group comparisons because of the lack of a diet history (41) or vegan or vegetarian diet (2). All dogs were treated with standard medications at recommended doses for CHF or for preclinical heart disease using a combination of pimobendan, enalapril, and furosemide if indicated.

Diets

Twelve of the included dogs were eating GB at the time of DCM diagnosis, and 36 were eating GF. Of the GF dogs, 14 were eating GF-1, and 22 were eating GF-o. There were two pairs of unrelated housemates included (both eating GF-1) and one pair of related housemate dogs included in the GF group. Seven brands of GB diets were represented, and 13 brands of GF were represented. The number of dogs eating each GB brand ranged from 1 to 3. The number of dogs eating each GF brand ranged from 1 to 5 for GF-o with 14 dogs eating GF-1.

A diet change from GF to GB manufactured by a major brand pet food company with veterinary nutritionists on staff was consistently recommended for all dogs in the GF group after June 2017 but was not recommended for the GB group and inconsistently recommended for the GF group before this time. Two dogs in the GF group were switched to a major brand food that was GF. All but one dog in the GF group received supplementation with taurine (30 mg/kg twice daily) after diagnosis and diet change, even if whole blood taurine concentrations were within or above the reference range.

^a Metabolic Analysis Labs, Inc. Madison, WI.

^b Amino Acid Laboratory, Davis, CA.

^c Michigan State University, Veterinary Diagnostic Laboratory, Lansing, MI.

^d GraphPad Prism 6, La Jolla, CA, USA.

Table 1 Median and 95% confidence intervals for weight, age, percentage male, percentage of dogs with congestive heart failure (CHF) at diagnosis, and vertebral heart scale.

	GB (n = 12)	All GF (n = 36)	GF-1 (n = 14)	GF-o (n = 22)	P value
Weight (kg)	36.5 (25.3–41.2)	30 (23.3–33.7)	21.0 (13.0–26.5) ^{a,b}	31.7 (27.1–39.9)	0.01
Age (yrs)	7.5 (4.7–9.7)	5.0 (4.9–6.9)	5.0 (4.6–7.6)	5.0 (4.5–8.0)	0.6
Male (%)	75	56	57	55	0.65
CHF (%)	67	78	93	68	0.32
VHS	11.4 (11.1–12.3)	12.4 (12.0–12.8)	12.5 (12.3–13.5)	11.9 (11.5–12.5)	NS

GB, grain-based diets; All GF, all grain-free diets, GF-1, most common grain-free diet, GF-o, other grain-free diets; VHS, vertebral heart scale.

^a Significantly different from GB.

^b significantly different from GF-o. VHS was significantly different between groups ($p=0.04$); however, this significance was lost after multiple comparison testing.

Demographic and radiographic data

Breeds of dogs eating GB diets included Doberman Pinscher (4), Labrador Retriever (2), Chihuahua (1), Weimaraner (1), Australian Shepherd (1), Cavalier King Charles Spaniel (1), Bouvier des Flandres (1), and German shepherd (1). Breeds of dogs eating GF diets included Doberman Pinscher (6), Golden Retriever (5), Great Dane (4), Labrador Retriever (4), mixed breed (4), Miniature Schnauzer (2), Yorkshire Terrier (1), Miniature Poodle (1), Standard Poodle (1), Malti-poo (1), Shetland Sheepdog (1), Old English Sheepdog (1), Chesapeake Bay Retriever (1), German Shorthaired Pointer (1), German Shepherd (1), Miniature Pinscher (1), and Boxer (1).

Table 1 summarizes demographic information (age, sex, and weight) and presence or absence of CHF at the time of diagnosis. There was no difference in age or sex between groups, but GF-1 dogs weighed less than GF-o dogs and less than GB dogs ($p=0.01$). No differences were identified between groups with regard to the presence of CHF at the time of diagnosis ($p=0.3$) or radiographic heart size as assessed by vertebral heart scale ($p=0.04$ between groups but not significant after multiple comparison testing).

Echocardiographic data

Table 2 shows the echocardiographic variables for each diet group. There was no difference in fractional shortening ($p=0.9$) between groups, but GF-1 dogs had higher LVIDdN ($p=0.003$) and LVIDsN ($p=0.01$) than GB dogs. Additionally, all GF dogs, regardless of brand, had higher LVIDdN compared with GB ($p=0.003$). Left ventricular diastolic SI was lower for GF-1 compared with GB diets indicating a more spherical left ventricular shape ($p=0.02$). Left atrial size, as assessed by the ratio of the left atrial dimension to the aortic annulus dimension, was not different between groups ($p=0.5$).

Ancillary testing

Figure 1 shows whole blood taurine and L-carnitine concentrations from dogs that were tested (21 [61%] of GF dogs and 5 [42%] of GB dogs had taurine testing, 4 [11%] of GF dogs had L-carnitine testing). No taurine (as assessed by whole blood or plasma concentrations) or plasma L-carnitine deficiencies were identified among the GF dogs tested (21 taurine, 4 L-carnitine) when utilizing the reference ranges supplied by the testing laboratory, and there was no difference in whole blood taurine

Table 2 Median and 95% confidence intervals for echocardiographic variables at diagnosis.

	GB (n = 12)	All GF (n = 36)	GF-1 (n = 14)	GF-o (n = 22)	P value
FS (%)	13.0 (11.1–17.8)	15.5 (13.8–16.9)	14.5 (11.9–18.2)	16.5 (13.6–17.3)	0.9
LVIDdN	2.13 (2.01–2.20)	2.36 (2.28–2.48) ^a	2.49 (2.36–2.64) ^a	2.22 (2.15–2.42)	0.003
LVIDsN	1.71 (1.57–1.79)	1.85 (1.80–1.99)	1.91 (1.86–2.16) ^a	1.77 (1.68–1.93)	0.01
SI	1.34 (1.30–1.58)	1.27 (1.26–1.37)	1.23 (1.19–1.30) ^a	1.32 (1.30–1.44)	0.02
LA:Ao	1.98 (1.74–2.16)	2.02 (1.88–2.15)	2.11 (1.89–2.39)	1.94 (1.78–2.10)	0.5

FS (%), percent fractional shortening; LVIDdN, normalized left ventricular internal diameter in diastole; LVIDsN, normalized left ventricular diameter in systole; SI, diastolic left ventricular sphericity index; LA:Ao, left atrial to aortic ratio; GB, grain-based diets; All GF, all grain-free diets, GF-1, most common grain-free diet, GF-o, other grain-free diets.

^a Significantly different from GB.

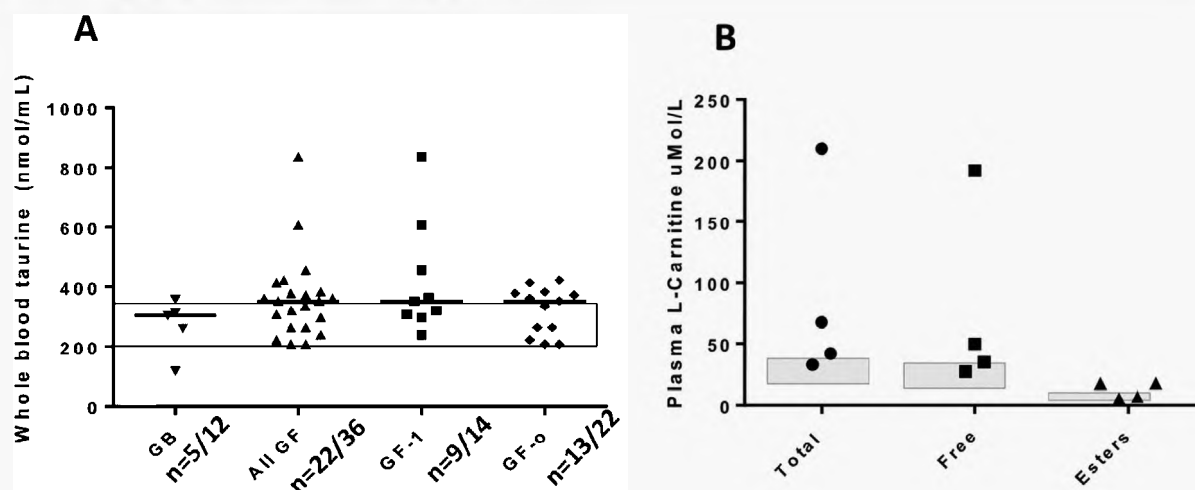


Fig 1 A) Dot plot for whole blood taurine concentrations for each group. The shaded area represents the reference range. The central line is the median. The number of dogs in each group with blood taurine concentrations evaluated is listed on the x-axis next to the group. $P = 0.4$ between groups. (B) Dot plot for plasma L-carnitine concentrations (total, free and esters) for 4 dogs in the GF group (2 GF-1 and 2 GF-o). The shaded area represents the reference range. GB, grain-based diets; All GF, all grain-free diets; GF-1, most common grain-free diet; GF-o, other grain-free diets.

concentrations between groups ($p=0.4$). Three dogs in the GF group had whole blood taurine concentrations that were within the reference range (200–350 nmol/mL) but in the 25th percentile reported for normal dogs (whole blood 208, 208 and 222 nmol/mL) [25]. Twelve GF dogs and one GB dog had whole blood taurine concentrations above the reference range. Taurine deficiency was identified in two dogs being fed GB (whole blood 118 nmol/ml and plasma 38 nmol/ml). One of these GB died in-hospital (German shepherd), and the other dog clinically, radiographically, and echocardiographically improved with a diet change and taurine supplementation (Bouvier des Flandres), similar to previous reports of taurine-responsive DCM [10,12].

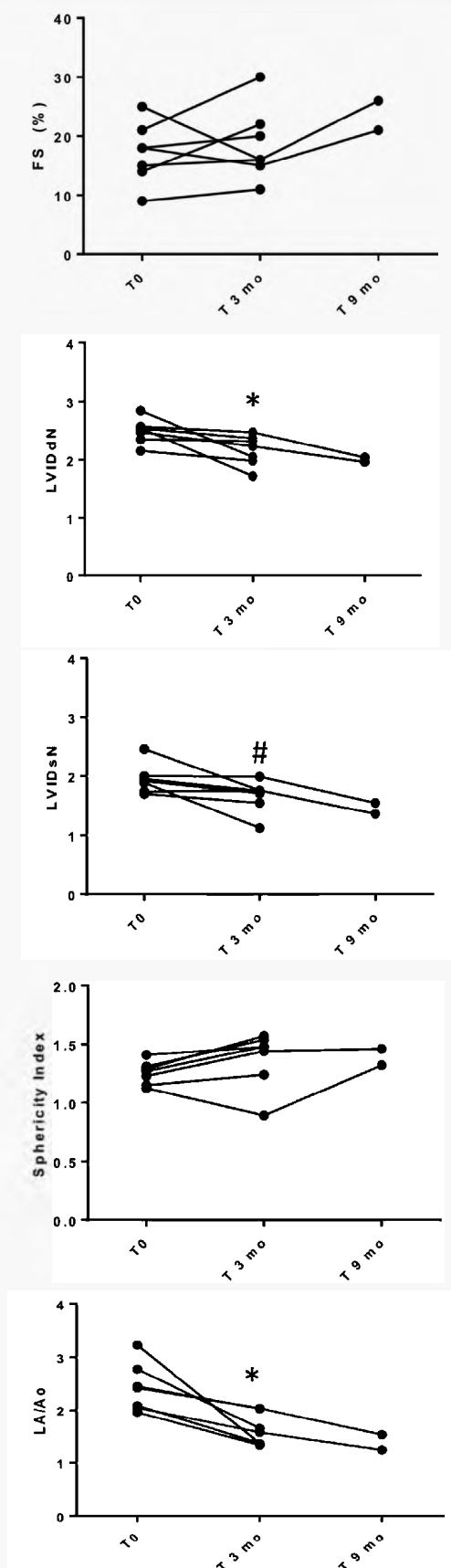
Four dogs in the GB group and eight dogs in the GF group had cardiac troponin I evaluated, and values were not different between groups ($p=0.2$, GB median = 0.37 ng/mL, range <0.20–0.83 ng/mL; GF median = 0.88 ng/mL, range = 0.26–14.30 ng/ml; reference range <0.2 ng/mL). Two dogs in the GF group were negative for selenium deficiency (serum = 331 ng/mL for one dog, reference range = 200–300 ng/mL, and whole blood = 405 ng/ml for another dog, reference range = 200–400 ng/mL). Five GF dogs were tested for infectious diseases with all negative results.

Three dogs in the GF group had myocardial histopathology performed as part of necropsy; findings were unremarkable in one dog, disclosed

mild myocardial fibrosis with myofiber degeneration in a second dog, and myofiber vacuolar degeneration and atrophy with moderate sub-endocardial fibroelastosis and interstitial edema in a third dog. No specific etiology for DCM was evident on necropsy in any case.

Serial echocardiographic evaluations

Seven GF dogs had follow-up echocardiograms 3 months after DCM diagnosis and a diet change, and 2/7 dogs had another follow-up echocardiogram 9 months after diagnosis and a diet change. Six of these seven dogs were eating GF-1 at the time of diagnosis, and one was eating GF-o. The diet was changed from GF to GB in 5/7 dogs and to a major brand GF diet in 2/7 dogs. Taurine was supplemented in 6/7 dogs despite whole blood taurine concentrations that were within or above the reference range (5 dogs), or because taurine was not measured at presentation (1 dog). One of the seven dogs did not receive taurine supplementation because whole blood taurine concentration was above the reference range. Figure 2 shows the change in echocardiographic parameters between diagnosis and 3 months after diagnosis for seven dogs and 9 months after diagnosis for two of these dogs. There was a decrease in LVIDdN ($p=0.02$), LVIDsN ($p=0.05$), and ratio of the left atrial dimension to the aortic annulus dimension ($p=0.02$) at the 3-month recheck. Fractional shortening ($p=0.9$) and SI ($p=0.2$) did not change



at the 3-month recheck. Two dogs were rechecked a second time 9 months after diet change. One of these dogs received taurine supplementation and showed progressive improvement at both 3 and 9 months. The other dog did not receive taurine supplementation because whole blood taurine concentrations were high, and this dog showed improvement at 9 months that was not evident at 3 months. One of the seven dogs had a normal echocardiogram 2 years prior to presentation with CHF due to DCM, and this dog also showed echocardiographic improvement 3 months after DCM diagnosis, diet change, and taurine supplementation.

Serial clinical evaluations

No GF dogs experienced new onset or recurrent CHF after diet change, but one dog died suddenly 4 months after diagnosis (1 month after the 3-month recheck which showed echocardiographic improvement). No GF dogs required an increase in diuretic dosage, and furosemide was discontinued in three dogs 6–9 months after diagnosis and diet change.

Discussion

This retrospective study showed that body weight and some echocardiographic variables differ between dogs with DCM depending on the diet-type being fed. The lower median weight for GF-1 dogs compared with GB dogs supports causes other than genetic because small breed dogs are not considered typically predisposed to the development of DCM [2]. For their size, dogs eating all GF diets had larger left ventricular diastolic diameters than dogs eating GB diets. Additionally, dogs eating the GF-1 in this study not only had larger left

Fig 2 Echocardiographic parameters are shown for seven dogs eating GF diets at the time of diagnosis and at subsequent recheck evaluations after diet change and taurine supplementation in 6/7 dogs. Seven dogs were reevaluated 3 months after they were switched to a GB diet (5 dogs) or major brand GF diet (2 dogs). Two of these dogs were evaluated again 9 months after diagnosis. * $p < 0.05$ compared to baseline. # $p = 0.05$ compared to baseline. FS (%), percent fractional shortening; LVIDdN, normalized left ventricular internal diameter in diastole; LVIDsN, normalized left ventricular diameter in systole; SI, diastolic left ventricular sphericity index; LA:Ao, left atrial to aortic ratio; T 0, time 0 months (baseline); T 3 mo, time 3 months; T 9 mo, time 9 months.

ventricular end diastolic diameters but also had larger left ventricular end systolic diameters and lower sphericity indices compared with dogs eating GB, indicating more advanced myocardial dysfunction and remodeling in these dogs. These findings do not appear to be explained by differences in disease stage because the number of dogs with CHF in each group was not statistically different. Significant differences in echocardiographic variables were not found between GF-o and GB. It is possible that the differences between all GF and GB are mainly due to the dramatic effect of GF-1 values, but small numbers and inadequate statistical power may have also influenced these results.

The clinical and echocardiographic improvement observed in seven dogs that were eating GF diets following a diet change deserves emphasis. The improvement in GF dogs after diet change supports potential causality, and the finding of two affected pairs of unrelated housemates eating GF-1 also causally supports diet as a common environmental factor for the development of DCM in these dogs.

The differences in echocardiographic variables suggest a unique pathologic remodeling process occurring in dogs eating GF diets and especially GF-1, but the cause of this presumed diet-related DCM is not known. The predominant legumes in these diets are peas or lentils, and it is possible that the processing, sourcing, or interactions of these or other ingredients could have resulted in deficiency or toxicity of important nutrients in a manner that did not occur with GB diets. The predominance of one particular GF diet (GF-1) in these dogs with DCM suggests that there are differences within the category of GF diets, and that there may be a separate, unidentified mechanism other than GF composition that is responsible for disease. Additionally, the clinical and echocardiographic improvement seen in two GF-1 dogs that were switched to a major brand GF diet suggests that factors besides GF composition or legume type are important, again raising the possibility that sourcing, processing, or interaction of ingredients may be problematic for some diets. Although most of the group differences in echocardiographic parameters appear attributable to GF-1 diet, one of the dogs that responded to a diet change was eating GF-o, supporting a similar pathophysiologic process and reversibility for GF-o diets.

Most dogs eating GF diets in this study received taurine supplementation in addition to undergoing a diet change, even though whole blood taurine concentrations were normal or elevated in the

dogs that were evaluated. The role of taurine supplementation in this condition is, therefore, uncertain. Taurine may have contributed to improvement in these dogs as a result of its antioxidant effects, calcium handling effects, or positive inotropic effects [27–29]. Oxidative damage and negative energy balance in the failing myocardium may be improved with taurine supplementation, and it is possible that whole blood concentrations within the reference range provide insufficient support for the failing heart, essentially rendering it a conditionally required amino acid [27,28]. While it is difficult to draw conclusions from low case numbers, the single dog that did not receive taurine supplementation showed minimal echocardiographic improvement at 3 months but did improve 9 months after diagnosis, potentially suggesting slower improvement compared with dogs that were supplemented with taurine. Variability between dogs may also account for this slower improvement. We noted that several dogs eating GF diets had very high whole blood taurine concentrations. These dogs were not supplemented before the diagnosis of DCM; therefore, these values are unexpected in light of studies of taurine concentrations of normal dogs and dogs with DCM [25,26]. Elevated whole blood taurine has been reported in people after myocardial infarction because taurine is rapidly taken up by platelets after myocardial release into the bloodstream with cardiomyocyte injury and death [30,31]. The high values noted in some GF dogs may have been related to myocardial injury. Although some dogs also had cardiac troponin I evaluated, there were too few dogs with both tests performed to meaningfully explore a correlation. The possibility of masked taurine deficiency could be investigated in the future by assessing paired plasma and whole blood taurine concentrations in affected dogs.

This study had several limitations inherent in its retrospective design. The presence of a detailed diet history was inconsistent in our medical records during this study period, which reduced the number of included dogs and could have introduced bias. Dietary intake beyond the commercial dog food that was reported by the owner as the major source of calories, such as treats and supplements, was not recorded and could play an important role in the development of nutritionally based DCM. Additionally, the length of time that dogs had been eating their commercial food before presentation was not consistently recorded. Ancillary testing was not always performed. Although a relatively large number of GF dogs underwent taurine testing which was normal or

elevated, not all dogs had taurine assessed, and we may have missed some deficient dogs. Although our data are most supportive of a causation with one particular diet (GF-1), other GF diets were fed to dogs in the GF group, some to as many as four or five dogs with DCM and some only to a single dog. Because these numbers are small, it is difficult to interpret a role for causation for some less represented diets. Additionally, the improvement noted in two dogs that were switched from GF-1 to a major brand of dog food that was also GF raises the possibility that GF composition may not be the problem. Thus, our group divisions into GF and GB may be irrelevant and subject to refinement in the future, pending ongoing investigations. Additionally, group divisions could be incorrect if the underlying cause of this nutritional cardiomyopathy is related to unusual protein sources or specific manufacturing practices. Some of the dogs in this study were breeds that have a known predisposition to DCM, and follow-up was not obtained for most of the dogs, so it is possible that diet was independent of their disease process. While we cannot discount this possibility for many dogs, one dog that showed echocardiographic improvement was a Great Dane eating GF-o, indicating a probable role for diet in his disease process.

Grain-free diets are rapidly growing in popularity, and it is impossible to determine the prevalence of DCM in dogs eating GF diets without broadly screening populations of dogs by echocardiography. Although we identified 36 dogs with DCM eating GF diets during a 30-month period, this is no doubt a vanishingly small percentage of dogs eating GF diets. Factors such as age, exercise, genetic predisposition, dietary or microbiota modification of gene expression, or other unknown factors may clearly also influence the manifestation of disease in some dogs. A specific and possibly even variable milieu, to which some GF diets may contribute, may be responsible for the clinical development of DCM. Additionally, the length of time necessary for disease development on a specific diet is unknown.

Despite these limitations, this study reveals morphologic differences between the echocardiograms of dogs eating GF and GB diets that point to a potential association between some GF diets and DCM in dogs. Additionally, the echocardiographic differences between GF-1 and GF-o suggest brand differences that could be related to ingredient bioavailability, processing, sourcing, or interactions. This descriptive study should serve as a springboard for future studies to mechanistically explore this relationship and also to encourage clinicians to incorporate dietary history as part of

every examination. Food analysis is underway to investigate possible nutrient deficiency or toxicity that could promote the development of DCM possibly related to legume sourcing or processing or interactions with absorption of other nutrients. Dietary trials to determine the risk of DCM associated with certain GF diets would also be useful.

Conclusions

This study shows compelling evidence that a nutritionally based, partially reversible cardiomyopathy occurs in some dogs fed non-major brand GF diets and may be associated with factors other than the omission of grains. The echocardiographic changes seen in these dogs indicate more advanced disease or a diet-enhanced pathophysiology compared with dogs eating GB diets. Importantly, clinical and echocardiographic improvement was noted in a subset of dogs that were reevaluated after a diet change. The role of taurine supplementation despite adequate blood concentrations is uncertain, but it may be therapeutically additive. Dietary-induced DCM associated with some GF diets remains unproven but should be considered a potential underlying cause or contributor in dogs with DCM, regardless of signalment.

Conflicts of interest statement

Dr. Adin has received/acknowledges research support from Nestlé Purina PetCare. None of the other authors have a conflict of interest to disclose that relate to this study.

Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jvc.2018.11.002>.

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B6

B6

Patient Information

Patient: **B6** Age: 11 years Referring Veterinarian: **B6**
Patient Number: 229844 Weight:(kg) 29.90 Cardiologist: **B6** DVM, DACVIM
Breed: Blue Heeler Mix Sex: FS Client Number: 152979
Exam Date: 06/28/2018 08:07 BSA: 0.97

History: **B6** was presented as an emergency appointment for evaluation of an intermittent, persistent cough, first documented five weeks ago. After the cough did not respond to a course of doxycycline and "cough tabs," Hycodan was added with no improvement. Regular veterinarian thoracic radiographs taken on 6/22/18 showed cardiomegaly. The owner describes the cough as "dry and harsh," which is worse in the evening and when **B6** is in sternal recumbency. **B6** is a very active dog, without any exercise intolerance or weakness. She is fed 4Health grain free, and tends to graze throughout the day, though has been slower to finish her meals in the last 2-3 days. The owner reports that **B6** has lost a noticeable amount of weight the last four weeks. **B6** has a history of being Lyme positive and is not currently on any heartworm prevention.

Physical Examination: Temp: 101.8 Heart Rate: 110 bpm. RR: Pant. Quiet/muffled heart sounds with gallop and grade 2-3/6 systolic left apical murmur. Regular rhythm. Poor femoral pulse quality. Normal lung sounds with frequent harsh cough. Normal abdominal palpation. mm pink, normal refill, well hydrated. Normal PLNs.

Diagnostic Tests: Blood pressure: 150 mmHg with 4 cm cuff on right forelimb.
Taurine level pending
Echocardiogram: See below. ECG during echo showed a sinus tachycardia.

Echocardiographic Report

B6

Left Ventricle: Moderate dilation with poor global contractility.
Left Atrium: Moderate to severe dilation.

Right Ventricle: Moderate dilation with poor global contractility.

Right Atrium: Moderate dilation.

Mitral Valve: 2-3+ central jet of regurgitation.

Aortic Valve: Normal.

Tricuspid Valve: 2+ central jet of regurgitation. TR velocity is mildly elevated suggestive of mild pulmonary hypertension.

Pulmonic Valve: Reduced outflow velocity. Normal valve morphology. Mild dilation of pulmonary artery.

Aorta: Normal.

Pericardium: Normal.

Diagnosis

Dilated cardiomyopathy - This is a disease characterized by weakening of the heart muscle and dilation of the heart chambers. As the disease progresses, it can lead to congestive heart failure (fluid in the lungs causing shortness of breath and cough). Abnormal heart rhythms are common and can result in sudden death. Most commonly this is an inherited disease, though it can occur secondary to a deficiency in an amino acid called taurine. We have also become concerned that there may be a link between grain free and/or unusual protein source diets and dilated cardiomyopathy in some animals.

Recommendations

Please give all medications as directed:

Furosemide (Lasix, Salix) 40mg tablets- Give 1 tablet by mouth every 12 hours. DUE: 7pm

This is a diuretic (water pill), that prevents the body from retaining excessive sodium and water. It will cause your pet to drink and urinate more frequently. It is important that fresh water is always available.

Pimobendan (Vetmedin) 10mg tablets- Give 1 tablet (10mg) by mouth in the morning and 1/2 tablet (5mg) by mouth in the evening, at 12 hour intervals. DUE: 7pm

This is a drug that is approved for the treatment of congestive heart failure secondary to dilated cardiomyopathy or chronic valve disease (endocardiosis). However, two studies of dogs with dilated cardiomyopathy, one in Doberman Pinschers (PROTECT) and one in Irish Wolfhounds, have shown a delay in the onset of heart failure in preclinical dogs treated with Vetmedin compared to placebo. Recently, another study (EPIC) has shown significant prolongation of the asymptomatic period in animals with progressive disease and heart enlargement from chronic valve disease, prior to the onset of congestive heart failure, as well. This is off-label use of this medication. In our experience, side effects are uncommon, but it is important that you advise us if you feel your pet is having any potential adverse effects from this medication. The reported potential side effects listed for this medication are increased heart rate, vomiting, diarrhea, inappetence, uneasiness, incoordination, convulsions, increased drinking and increase urinating.

Spirolonactone (Aldactone) 50mg tablets- Give 1 tablet by mouth every 24 hours. DUE: 7pm.

This is a diuretic (water pill) that also blocks a hormone that can injure the heart muscle. It works well in combination with the furosemide and enalapril.

Benazepril 10mg tablet- Give 1 tablet by mouth every 12 hours. DUE: 7 pm.

This medication is a strong drug that dilates blood vessels, permitting the heart to pump blood more efficiently. It can lower blood pressure (hypotension) and cause changes in kidney function and electrolyte values. If your pet develops weakness or depression, decrease the drug dose by 1/2 and call. A kidney panel and blood pressure should be reevaluated 7-10 days after beginning this medication.

Taurine supplementation - Give 1000mg of taurine by mouth every 12 hours. Please refer to the handout titled "Canine Dilated Cardiomyopathy Nutrition Recommendations" for information on recommended brands. L-carnitine supplementation is optional at this time (doses on this handout), but is strongly recommended if we confirm taurine deficiency.

One thing that can be very helpful for home monitoring is checking sleeping or resting respiratory rates. A recent study showed that even pets with severe heart disease rarely have resting respiratory rates greater than 30 breaths per minute unless they are starting to decompensate for that disease. Elevated respiratory rates at home may be even more sensitive than chest radiographs at picking up early decompensation. Count your pet's respiratory rate when he/she is at rest or sleeping (not within 20 minutes of being active). If his/her respiratory rate is greater than 30 breaths per minute, recheck again in a couple of hours. If persistently elevated above this level, call.

With advanced heart disease, our biggest dietary concerns are adequate calorie content and low sodium content. We aim for less than 80mg sodium per 100 kilocalories (kcal) in patients that have developed congestive heart failure, and less than 100mg/100kcal in animals that have advanced heart disease without heart failure. We do not advise protein restriction unless there is concurrent kidney disease (i.e. kidney diets are not advised unless there is concurrent kidney disease). Please refer to the recommended diet handout for our recommendations.

Exercise is also a concern in advanced heart disease. While cage rest is ideal with active heart failure, some exercise is permissible in asymptomatic disease. However, vigorous or extended exercise should be avoided.

We would like re-evaluate **B6** in 10-14 days. At that time we will recheck a blood pressure, kidney panel with electrolytes and a thorough physical exam +/- chest radiographs. Please call if you do not see a significant improvement in her cough within 72 hours or if at any time she seems like she is getting worse.

B6

DVM, DACVIM (Cardiology)

(Electronically Signed)

Final Date: 28 June 2018 21:17

B6

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B6

Notes to our clients

- Please bring all medications to your pet's scheduled appointments.
- We require a 48 hour notice for all refills. When you call to request a refill, please leave the pharmacy phone number or clearly indicate if you plan on picking up the medication at our facility. **PRESCRIPTION REFILLS ARE NOT AVAILABLE AFTER **B6** REGULAR BUSINESS HOURS (Evenings, Fridays, holidays and weekends).**
- Check out WWW.GOODRX.COM and enter your local zip code to search for the best prices on your medications at your local pharmacies.
- If an emergency arises with your pet, **B6** is a 24 hour facility.

CARDIOLOGY DIET HISTORY FORM

Please answer the following questions about your pet

Pet's name: **B6** Owner's name: **B6** Today's date: 6-28-18

1. How would you assess your pet's appetite? (mark the point on the line 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

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 you pet is eating.

Food (include specific product and flavor) Form Amount How often? Fed since
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
<u>4 ACQUITH GRAIN FREE</u>	<u>DRY</u>	<u>4 CUPS</u>	<u>DAILY</u>	<u>LATE 2016</u>
<u>RAWHIDE CHEWS (WALMART)</u>	<u>BOWTIE</u>	<u>1</u>	<u>2-3 WEEK</u>	<u>YEAR</u>
<u>VARIOUS Ham, Chicken, Beef</u>	<u>COOKED</u>	<u>TABLE SCRAPS</u>	<u>2-3 WEEK</u>	<u>YEAR</u>
<u>CANINE CARROT TREATS</u>	<u>DRY</u>	<u>3-4 PCS</u>	<u>3+ WEEK</u>	<u>YEAR</u>

*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	<u>Nature's Bounty</u>	<u>500 mg tablets - 1 per day</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

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): _____

Information below to be completed by the veterinarian: oops! sorry!

Current body weight: 65 LB. kg Current body condition score (1-9): 8 /9

Muscle Condition Score: normal muscle mild muscle loss moderate muscle loss severe muscle loss

Name: B6 ID: 229844 Client: B6

Age: 9 Yrs. 0 Mos. DOB: B6

Breed: Blue Heeler, Australian Mix Sex: Spayed Female Lyme + 5/22/18

wt - 29.9kg
+ - 10.8
P 110
R - Pant
BP

Current History: good health until coughing about 5 wks ago.
weight loss -> initially concern for kennel cough, but
Concurrent Condition: x-rays b/22 -> Cardomegly. Cough is dry & harsh. LTR

Respiratory symptoms (cough, difficulty breathing, voice changes):
- Panting w/ cold weather -> not new.
Exercise tolerance (activity level, lameness, weakness/lethargy):
- nothing, very active.

Heartworm prevention (seasonal vs. year round, brand, last heartworm test):
- Hwt 5/22/18 -> no prevention.
Ownership period (rescue/breeder):
- Since 6 wks of age from friend

Diet (brand, canned vs. dry, appetite):
- 4 Health grain-free about a year now. ELD fine, tends to graze 2-3 days ago, ↓ Appetite.
Indoor and/or Outdoor (feline patients):
-
Travel History:
- nothing.

Abnormal weight loss/gain:
 Yes No Explain: lost 6# in 4 wks, per O

Current Medications:
Refills needed? (30 vs. 90 day supply): off cough tabs & Hycodan ≈ 2 wks ago. Finished Doxy ≈ 3 wks ago.

- Diagnostic Plan:
- | | | | |
|---|---|--|---------------------------------------|
| <input type="checkbox"/> Blood pressure | <input type="checkbox"/> Holter/Event | <input type="checkbox"/> CBC | <input type="checkbox"/> Digoxin |
| <input type="checkbox"/> Thoracic Radiographs | <input type="checkbox"/> Echocardiogram | <input type="checkbox"/> Profile | <input type="checkbox"/> T4 |
| <input type="checkbox"/> ECG | <input type="checkbox"/> PCV/TP | <input type="checkbox"/> Renal | <input type="checkbox"/> TSH |
| <input type="checkbox"/> Sedation | <input type="checkbox"/> U/A | <input type="checkbox"/> Urine culture | <input type="checkbox"/> Abdominal US |

Other diagnostics: _____

Technician:
Veterinarian:

~~Small~~ small lump on thorax 3 years, no change.

B6

11-21-2016

PENDING

CC-147575-[B6]-BlueRidgeBeef-kitten deaths – currently no Vet-LIRN action
CC-147708-[B6]-Purina-FrostyPaws – No diagnostic sample available – NFA?
EON pending [B6]-Dog DCM-vegan – Tufts is working on the case and will submit
EON-288439-[B6]-dead-MRx-hold food – NFA?
EON-291123-[B6]-CesarClassic-dog – waiting for response from owner
No CC-3 dead-dog food-outdoors-[B6] – waiting for complaint

CASE FOLLOW UP

Signed and need to file

800.175 – Final Report - Ceric
800.180 – Final Report – Jones
800.184 – Final Report- Jones

Submitted for Signature

800.169 – Final Report
800.173 – Final Report - Ceric
800.185 – Final Report - Nemser

Sent to RR for review

Working on Final Report

800.179 – Final Report - Nemser
800.183 – Final Report - Nemser
800.186 – Final Report - Jones
800.187 – Final Report - Jones
800.193- Final Report - Jones

Pending cases

B4, B5, B6

Document properties

Author: Nemser, Sarah
Company: US FDA
Template: Normal.dotm
Page count: 1
Paragraph count: 34
Line count: 38
Word count: 166
Character count (spaces excluded): 1254
Character count (spaces included): 1416

From: Jones, Jennifer L </O=FDA/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=JENNIFER.JONESAA8>
To: Rotstein, David; Palmer, Lee Anne; Carey, Lauren
CC: Ceric, Olgica; 'Reimschuessel, Renate (Renate.Reimschuessel@fda.hhs.gov)'; Nemser, Sarah
Sent: 6/3/2016 11:56:28 AM
Subject: CC-145856-**B6** Acana Grain Free Heritage Meats
Attachments: CC-145856-**B6** Acana GF Heritage Meats.pdf.html; CC-145856-**B6** case summary-6.3.2016.doc.html

Vet-LIRN Case Summary Document

Vet-LIRN Case Number:	
EON/CC #:	CC-145856
Vet-LIRN Initiation Date:	6.3.2016
MedRec: Requested:	6.3.2016
MedRec: Received:	
MedRec: Significant finding:	
Vet-LIRN Tests (planned):	MRx review & owner interview-then decide
Vet-LIRN Test Results:	
Result Interpretation:	
IF NFA, justification:	

COMPLAINT: On 6/2/16, a complainant reported illness in her three dogs after she introduced Acana Grain Free Heritage Meats Formula with Angus Beef, Yorkshire Pork & Suffolk Lamb Dry Dog Food (Champion Pet Foods). The complainant explained that she has three pugs; **B6** a 3-year-old, 17-pound female; **B6** a 4-year-old, 19-pound male; and **B6** a 9-year-old, 18-pound female. The dogs have no pre-existing health conditions, except for **B6** environmental allergies. They are primarily indoor dogs. **B6** and **B6** received a quarter cup of the food twice daily, while **B6** gets a little bit less than a quarter cup twice daily. The food they were provided prior to this introduction was a Fromm Family Pet Food dry recipe, which they received for 3-months with no problems. The new food was gradually introduced to the dogs over a week's time, beginning on 5/17/16. On 5/19/16 (2-days) **B6** began exhibiting a lack of appetite, lethargy and vomiting. She was taken to the vet and underwent testing of blood, urine and X-rays and was diagnosed with pancreatitis. She received Clavomox and was started on a low fat/ protein diet. She then recovered after 5-days. **B6** who is older, was taken off the food at the same time as **B6** as a precaution. She also appeared lethargic at the time. On 5/21/16 (5-days), **B6** began suffering the same symptoms and the complainant called and conferred with the vet and started him on the same low fat/ protein diet as **B6**. He recovered after several days.

The complainant, who is employed at the pet food store where the Acana was purchased, was speaking to the receptionist at the vet clinic about the illness and the new food. The receptionist told her she had visited the same store and purchased the Acana Heritage Free-Run Poultry Formula Grain-Free Dry Dog Food in the same 2-week period as the complainant and her five English bulldogs became ill with the same symptoms. She had three of the dogs tested and they also were diagnosed with pancreatitis. It was at this point that the complainant decided to inform the FDA of the issue.

Signalment: 3 pugs: unknown reproductive status a **B6** 3yo F, **B6** 4yo M, **B6** 9yo F

Signs: lethargy, vomiting, inappetance

Food: Acana Grain Free Heritage Meats Formula with Angus Beef, Yorkshire Pork & Suffolk Lamb Dry Dog food

B6

B6

Narrative from the complaint: see above

Vet-LIRN PLAN OF ACTION: MRx review and owner interview, then decide

FINAL CONCLUSION: pending

Follow-up:

JJ-Emailed District officer for last digit of owner's phone number. Will call this afternoon to arrange interview & request MRx (PST).

B5, B6

Jennifer L. A. Jones, DVM

Veterinary Medical Officer

U.S. Food & Drug Administration

Center for Veterinary Medicine

Office of Research

Veterinary Laboratory Investigation and Response Network (Vet-LIRN)

8401 Muirkirk Road, G704

Laurel, Maryland 20708

new tel: 240-402-5421

fax: 301-210-4685

e-mail: jennifer.jones@fda.hhs.gov

Web: <http://www.fda.gov/AnimalVeterinary/ScienceResearch/ucm247334.htm>

From: Rotstein, David </O=FDA/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=DAVID.ROTSTEIN>
To: Reimschuessel, Renate; Nemser, Sarah; Carey, Lauren; Ceric, Olgica; CVM Vet-LRN-OR; Palmer, Lee Anne; Queen, Jackie L
Sent: 11/13/2014 7:43:50 PM
Subject: [B6] RE: Possible Necropsy? EON-186243-ICSR-1036619 [B6] Nature's Variety Instinct Raw boost; Duck meal & Turkey meal formula. Grain free edition:

[B6]

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM OSC/DC/ICERT
7519 Standish Place, RM 120
240-276-9213 (Office and Fax)

[B6]

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From: Reimschuessel, Renate
Sent: Thursday, November 13, 2014 2:43 PM
To: Nemser, Sarah; Rotstein, David; Carey, Lauren; Ceric, Olgica; CVM Vet-LRN-OR; Palmer, Lee Anne; Queen, Jackie L
Subject: RE: Possible Necropsy? EON-186243-ICSR-1036619 [B6] Nature's Variety Instinct Raw boost; Duck meal & Turkey meal formula. Grain free edition:

Which state!?

Renate Reimschuessel
Phone and fax- 301-210-4024
Alternate FAX 301-210-4685
renate.reimschuessel@fda.hhs.gov
Vet-LIRN
<http://www.fda.gov/AnimalVeterinary/ScienceResearch/ucm247334.htm>

From: Nemser, Sarah
Sent: Thursday, November 13, 2014 2:31 PM
To: Reimschuessel, Renate; Rotstein, David; Carey, Lauren; Ceric, Olgica; CVM Vet-LRN-OR; Palmer, Lee Anne; Queen, Jackie L
Subject: RE: Possible Necropsy? EON-186243-ICSR-1036619 [B6] Nature's Variety Instinct Raw boost; Duck meal & Turkey meal formula. Grain free edition:

The vet emailed yesterday that they will do the necropsy when the body is returned from the crematorium. So I am not sure at this point if it has been returned yet, but is on the way to the vet.

S

From: Reimschuessel, Renate
Sent: Thursday, November 13, 2014 2:28 PM
To: Rotstein, David; Carey, Lauren; Ceric, Olgica; CVM Vet-LRN-OR; Palmer, Lee Anne; Queen, Jackie L
Subject: RE: Possible Necropsy? EON-186243-ICSR-1036619 [B6] Nature's Variety Instinct Raw boost; Duck meal & Turkey meal formula. Grain free edition:

Where is the animal?

Renate Reimschuessel
Phone and fax- 301-210-4024
Alternate FAX 301-210-4685
renate.reimschuessel@fda.hhs.gov
Vet-LIRN
<http://www.fda.gov/AnimalVeterinary/ScienceResearch/ucm247334.htm>

From: Rotstein, David
Sent: Thursday, November 13, 2014 2:08 PM
To: Carey, Lauren; Reimschuessel, Renate; Ceric, Olgica; CVM Vet-LRN-OR; Palmer, Lee Anne; Queen, Jackie L
Subject: RE: Possible Necropsy? EON-186243-ICSR-1036619- [B6] Nature's Variety Instinct Raw boost; Duck meal & Turkey meal formula. Grain free edition:

J bonesaw I can handle, it's the bandsaw that still freaks me out!!!

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM OSC/DC/ICERT
7519 Standish Place, RM 120
240-276-9213 (Office and Fax)

[B6]

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From: Carey, Lauren
Sent: Thursday, November 13, 2014 2:05 PM
To: Rotstein, David; Reimschuessel, Renate; Ceric, Olgica; CVM Vet-LRN-OR; Palmer, Lee Anne; Queen, Jackie L
Subject: RE: Possible Necropsy? EON-186243-ICSR-1036619- [B6] Nature's Variety Instinct Raw boost; Duck meal & Turkey meal formula. Grain free edition:

Ah! I see. Just thinking to my days in the back room with just a blade and some formalin jars + 1 tech staring on. No bone saw for me!

From: Rotstein, David
Sent: Thursday, November 13, 2014 2:03 PM
To: Carey, Lauren; Reimschuessel, Renate; Ceric, Olgica; CVM Vet-LRN-OR; Palmer, Lee Anne; Queen, Jackie L
Subject: RE: Possible Necropsy? EON-186243-ICSR-1036619- [B6] Nature's Variety Instinct Raw boost; Duck meal & Turkey meal formula. Grain free edition:

Lauren,

Yes-it would be the whole CNS. I figured that the [B5]

[B5]

There maybe a few things going on here and it may be better if we could get the [B5]
Vet-LIRN lab...or to any interested pathologists .."hint" J

[B5]

d.

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM OSC/DC/ICERT
7519 Standish Place, RM 120
240-276-9213 (Office and Fax)

[B6]

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sender immediately at david.rotstein@fda.hhs.gov.

From: Carey, Lauren
Sent: Thursday, November 13, 2014 2:00 PM
To: Reimschuessel, Renate; Rotstein, David; Ceric, Olgica; CVM Vet-LRN-OR; Palmer, Lee Anne; Queen, Jackie L
Subject: RE: Possible Necropsy? EON-186243-ICSR-1036619- [B6] Nature's Variety Instinct Raw boost; Duck meal & Turkey meal formula. Grain free edition:

Sorry, just finally read the MRx. The seizures do not fit Wobbler's

[B5]

[B5]

From: Reimschuessel, Renate
Sent: Thursday, November 13, 2014 5:42 AM
To: Rotstein, David; Ceric, Olgica; CVM Vet-LRN-OR; Palmer, Lee Anne; Carey, Lauren; Queen, Jackie L
Subject: RE: Possible Necropsy? EON-186243-ICSR-1036619- [B6] Nature's Variety Instinct Raw boost; Duck meal & Turkey meal formula. Grain free edition:

Olga – either you or Dave should discuss with vet the need and potential options.

I'm at White Oak today – in meetings – you guys work out between yourselves who should call.

Renate Reimschuessel
Phone and fax- 301-210-4024
Alternate FAX 301-210-4685
renate.reimschuessel@fda.hhs.gov
Vet-LIRN
<http://www.fda.gov/AnimalVeterinary/ScienceResearch/ucm247334.htm>

From: Rotstein, David
Sent: Wednesday, November 12, 2014 10:51 PM
To: Reimschuessel, Renate; Ceric, Olgica; CVM Vet-LRN-OR; Palmer, Lee Anne; Carey, Lauren; Queen, Jackie L
Subject: RE: Possible Necropsy? EON-186243-ICSR-1036619- [B6] Nature's Variety Instinct Raw boost; Duck meal & Turkey meal formula. Grain free edition:

My thought is:

[B5]

[B5]

I'm glad to talk to the vet. I think if the vet could

[B5]

[B5]

[B5]

d.

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM OSC/DC/ICERT
7519 Standish Place, RM 120
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[B6]

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From: Reimschuessel, Renate

Sent: Wednesday, November 12, 2014 9:44 PM

To: Rotstein, David; Ceric, Olgica; CVM Vet-LRN-OR; Palmer, Lee Anne; Carey, Lauren; Queen, Jackie L

Subject: RE: Possible Necropsy? EON-186243-ICSR-1036619; **B6** Nature's Variety Instinct Raw boost; Duck meal & Turkey meal formula. Grain free edition:

B5

Renate Reimschuessel

Phone and fax- 301-210-4024

Alternate FAX 301-210-4685

renate.reimschuessel@fda.hhs.gov

Vet-LIRN

<http://www.fda.gov/AnimalVeterinary/ScienceResearch/ucm247334.htm>

From: Rotstein, David

Sent: Wednesday, November 12, 2014 9:42 PM

To: Ceric, Olgica; Reimschuessel, Renate; CVM Vet-LRN-OR; Palmer, Lee Anne; Carey, Lauren; Queen, Jackie L

Subject: Re: Possible Necropsy? EON-186243-ICSR-1036619; **B6** Nature's Variety Instinct Raw boost; Duck meal & Turkey meal formula. Grain free edition:

B5

Sent from BlackBerry

From: Ceric, Olgica

Sent: Wednesday, November 12, 2014 07:30 PM Eastern Standard Time

To: Reimschuessel, Renate; Rotstein, David; CVM Vet-LRN-OR; Palmer, Lee Anne; Carey, Lauren; Queen, Jackie L

Subject: RE: Possible Necropsy? EON-186243-ICSR-1036619; **B6** Nature's Variety Instinct Raw boost; Duck meal & Turkey meal formula. Grain free edition:

Attached are the medical records from **B5, B6** They will be performing necropsy.

Dog was a new patient-two pages only. **Veterinarian suspected Wobblers syndrome (cervical spondylopathy).**

I will contact primary veterinarian tomorrow, they have additional medical records.

B5, B6

will also send bloodwork and x-rays (done at primary vet, sending by fax tomorrow).

Olgica Ceric, DVM, PhD

Veterinary Medical Officer

U.S. Food & Drug Administration

Center for Veterinary Medicine

Office of Research

Veterinary Laboratory Investigation and Response Network (Vet-LIRN)

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fax: 301-210-4685

e-mail: olgica.ceric@fda.hhs.gov

Web: <http://www.fda.gov/AnimalVeterinary/ScienceResearch/ucm247334.htm>

From: Ceric, Olgica

Sent: Tuesday, November 11, 2014 12:18 PM

To: Reimschuessel, Renate; Rotstein, David; CVM Vet-LRN-OR; Palmer, Lee Anne; Carey, Lauren; Queen, Jackie L

Subject: Re: Possible Necropsy? EON-186243-ICSR-1036619-**B6** Nature's Variety Instinct Raw boost; Duck meal & Turkey meal formula. Grain free edition:

One more save at the last moment :)

Olgica Ceric

From: Reimschuessel, Renate

Sent: Tuesday, November 11, 2014 12:10 PM

To: Ceric, Olgica; Rotstein, David; CVM Vet-LRN-OR; Palmer, Lee Anne; Carey, Lauren; Queen, Jackie L

Subject: Re: Possible Necropsy? EON-186243-ICSR-1036619-**B6** Nature's Variety Instinct Raw boost; Duck meal & Turkey meal formula. Grain free edition:

Excellent ! Thanks

RR-----

Sent using BlackBerry

From: Ceric, Olgica

Sent: Tuesday, November 11, 2014 11:18 AM Eastern Standard Time

To: Rotstein, David; CVM Vet-LRN-OR; Palmer, Lee Anne; Carey, Lauren; Queen, Jackie L

Subject: RE: Possible Necropsy? EON-186243-ICSR-1036619-**B6** Nature's Variety Instinct Raw boost; Duck meal & Turkey meal formula. Grain free edition:

Update: I arranged necropsy.

Body was sent to crematorium but clinic contacted them and put the hold on cremation. Crematorium is returning the body to clinic (body is frozen) **B6**

Olgica Ceric, DVM, PhD

Veterinary Medical Officer

U.S. Food & Drug Administration

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e-mail: olgica.ceric@fda.hhs.gov

Web: <http://www.fda.gov/AnimalVeterinary/ScienceResearch/ucm247334.htm>

From: Rotstein, David

Sent: Tuesday, November 11, 2014 10:29 AM

To: Ceric, Olgica; CVM Vet-LRN-OR; Palmer, Lee Anne; Carey, Lauren; Queen, Jackie L

Subject: RE: Possible Necropsy? EON-186243-ICSR-1036619-**B6** Nature's Variety Instinct Raw boost; Duck meal & Turkey meal formula. Grain free edition:

Thanks Olga!!

David Rotstein, DVM, MPVM, Dipl. ACVP

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240-276-9213 (Office and Fax)

B6

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From: Ceric, Olgica

Sent: Tuesday, November 11, 2014 10:14 AM

To: Rotstein, David; CVM Vet-LRN-OR; Palmer, Lee Anne; Carey, Lauren; Queen, Jackie L

Subject: RE: Possible Necropsy? EON-186243-ICSR-1036619; **B6** Nature's Variety Instinct Raw boost; Duck meal & Turkey meal formula. Grain free edition:

Vet-LIRN Case Summary Document

Vet-LIRN Case Number:	
EON/CC #:	EON-186243
Vet-LIRN Initiation Date:	11.11.2014
MedRec: Requested:	yes
MedRec: Received:	
MedRec: Significant finding:	
Vet-LIRN Tests (planned):	MRx, necropsy
Vet-LIRN Test Results:	
Result Interpretation:	
IF NFA, justification:	

11.11.2014

Dog: 21 months **B6** male, neutered

Received new bag of dog food (same variety/flavor as always) **B6** Fed normal feeding that evening. Next couple days dog did not show interest in eating, then finally a small amount mid week, then nothing for few more days. Noticed lethargic behavior. Some drooling. Reported concerns to the distributor **B6** who assured me it would be reported to manufacturer immediately. Provided all information from bag. Purchased **B6** a new bag, different flavor and from a different supplier as well as some wet food of the same. At time of purchase, a representative of manufacturer was in the store and also took a report who assured me I would be contacted. This did not happen. Dog ate wet food well. Little of the new dry. But continued to be lethargic and increasingly ill. Visit to veterinarian, including a sample of food for testing on **B6** Dog showing signs of paralysis. Again to different veterinarian for further treatment **B6** Passed away on **B6**

Plan: necropsy if possible, MRx

Follow up: OC-called the owner and discussed the case with her. Dog passed away **B6** and was taken to veterinarian on Monday. Owner will call veterinarian and find out if they still have the body or if it was cremated already. If body is available she will ask them to hold it.

Additional information from owner: no vomiting or diarrhea noted. Dog was urinating normally (kept in the kennel during the day while family is at work). Dog was taken to regular veterinarian and new veterinarian (owner will provide email and contact information for other veterinarian). Blood work was done. Owner still has the food with original package, no other pets. No raisins, grapes, chocolate. No vitamins and supplements. Dog was previously healthy. No table scraps. Dog was given one treat each day (Doggy Delirious Peanut butter):

<http://www.amazon.com/Doggy-Delirious-Peanut-Butter-1-Pound/dp/B006SU4RMI>

Olgica Ceric, DVM, PhD

Veterinary Medical Officer
U.S. Food & Drug Administration
Center for Veterinary Medicine
Office of Research
Veterinary Laboratory Investigation and Response Network (Vet-LIRN)
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e-mail: olgica.ceric@fda.hhs.gov
Web: <http://www.fda.gov/AnimalVeterinary/ScienceResearch/ucm247334.htm>

From: Ceric, Olgica
Sent: Monday, November 10, 2014 10:09 PM
To: Rotstein, David; CVM Vet-LRN-OR; Palmer, Lee Anne; Carey, Lauren; Queen, Jackie L
Subject: Re: Possible Necropsy? EON-186243-ICSR-1036619- [B6] Nature's Variety Instinct Raw boost; Duck meal & Turkey meal formula. Grain free edition:

I will contact owner and vet tomorrow and see about necropsy, will request med.records.
Olgica Ceric

From: Rotstein, David
Sent: Monday, November 10, 2014 10:01 PM
To: CVM Vet-LRN-OR; Palmer, Lee Anne; Carey, Lauren; Queen, Jackie L
Subject: Possible Necropsy? EON-186243-ICSR-1036619- [B6] Nature's Variety Instinct Raw boost; Duck meal & Turkey meal formula. Grain free edition:

21 MO MN [B6]

DOD [B6]

Recc: necropsy if possible, med records, talk to vet about what testing was done.

Signs are a bit vague—lethargy to paralysis—differential list is wide unless there is bloodwork. Can't think that the neurologic form of Listeria would be that fast & in a monogastric. But would have to be on the list.

Raw diet--<http://www.naturesvariety.com/Instinct/dog/kibble/rawboost/all>

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM OSC/DC/ICERT
7519 Standish Place, RM 120
240-276-9213 (Office and Fax)

[B6]

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From: PFR Event [<mailto:pfreventcreation@fda.hhs.gov>]
Sent: Monday, November 10, 2014 9:52 PM
To: [B6] HQ Pet Food Report Notification;

[B6]

Subject: Nature's Variety Instinct Raw boost; Duck meal & Turkey meal formula. Grain free edition: Ivy Fischer

A PFR Report has been received and PFR Event [EON-186243] has been created in the EON System

A "PDF" report by name "1036619-report.pdf" is attached to this email notification for your reference.

Below is the summary of the report

EON Key: EON-186243

EON Title: PFR Event created for Nature's Variety Instinct Raw boost; Duck meal & Turkey meal formula. Grain free edition; 1036619

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

B6

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

B6

Product information

Individual Case Safety Report Number: 1036619

Product Group: Pet Food

Product Name: Nature's Variety Instinct Raw boost; Duck meal & Turkey meal formula. Grain free edition

Description: Received new bag of dog food (same variety/flavor as always) **B6** Fed normal feeding that evening. Next couple days dog did not show interest in eating, then finally a small amount mid week, then nothing for few more days. Noticed lethargic behavior. Some drooling. Reported concerns to the distributor **B6** who assured me it would be reported to manufacturer immediately. Provided all information from bag. Purchased **B6** a new bag, different flavor and from a different supplier as well as some wet food of the same. At time of purchase, a representative of manufacturer was in the store and also took a report who assured me I would be contacted. This did not happen. Dog ate wet food well. Little of the new dry. But continued to be lethargic and increasingly ill. Visit to veterinarian, including a sample of food for testing on **B6** Dog showing signs of paralysis. Again to different veterinarian for further treatment **B6** Passed away on **B6**

Submission Type: Initial

Report Type: Both

Outcome of reaction/event at the time of last observation: Died Euthanized

Number of Animals Treated With Product: 1

Number of Animals Reacted With Product: 1

B6

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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26346

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

Veterinarian Contact: B6

Clinic/Company Name: B6

B6

B6

Tax ID: _____

Species: canine

B6

Breed: Chihuahua

Current Diet: solid Gold Weebites

Sample type: Plasma Whole Blood Urine Food Other _____

Test: Taurine Complete Amino Acids Other: _____

Taurine Results (lab use only)

Plasma: _____ Whole Blood: 335 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:
Patient:

B6

Diet Hx 4/5/19

338315

CARDIOLOGY DIET HISTORY FORM

Please answer the following questions about your pet

Pet's name: **B6** Owner's name: **B6** Today's date: 4/5/19

1. How would you assess your pet's appetite? (mark the point on the line 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
Nutro 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
rice cake - salt free (1/4 cube)	treat		1x day	
Solid Gold Mighty Mini - Sweet Potato + Appr recipe	dry	1/4 cup	split 2x daily	prior to 1-2-19
Royal Canin - Early Cardio	dry	1/4 cup	split 2x daily	Jan 19 - present

*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 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
_____	_____	_____
_____	_____	_____
_____	_____	_____

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 (liquid)
- 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:
Patient:

B6

NT-proBNP 4/5/19

B4, B6

Client **B6**

B4, B6

Client: **B6**
Patient:
Species: CANINE
Breed: CHIHUAHUA
Gender:
Age: 9Y

Date: 04/05/2019
Requisition #: 338315
Accession #: **B6**
Ordered by: **B6**

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

Account: **B6**

CARDIOPET proBNP - CANINE

Test	Result	Reference Range	Low	Normal	High
CARDIOPET proBNP - CANINE	B6	0 - 900 pmol/L	HIGH		

Comments:

1. Cardiopet, proBNP: **B6**
Abnormal. **B6**

B6

Please note: Complete interpretive comments for all concentrations of **B6** are available in the online directory of services. Serum specimens received at room temperature may have decreased NT-proBNP concentrations.

B6

B4, B6

Client: **B6**

Address: **B6**

Home Phone: **B6**

Work Phone:

Cell Phone: **B6**

All Medical Records

Patient: **B6**

Breed: Great Dane

DOB: **B6**

Species: Canine

Sex: Female
(Spayed)

Referring Information

B6
B6

B6
B6

B6
B6

B6
B6

Client: **B6**

Patient: **B6**

Initial Complaint:

Scanned Record

Initial Complaint:

New **B6** murmur

SOAP Text **B6** 2:50PM - Rush, John

Disposition/Recommendations

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

Client: B6
Patient: B6

B6

B4, B6

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

Patient:	B6
Species:	Canine
Breed:	Great Dane
Sex:	Female (Spayed)
Age:	3.6 Years Old

Lab Results Report

Accession ID:

Test	Results	Reference Range	Units
------	---------	-----------------	-------



3/21

B6

B6

Printed Monday, October 08, 2018

Client: B6
Patient: B6

rDVM: B6 hx 5/21/15-7/17/18

07/17/2018 05:44

B6

B6 ANIMAL HOSPIT

PAGE 02/05

B6

MEDICAL RECORD

OWNER	B6		
PET'S NAME		SPECIES <i>Y9</i>	AGE B6
			SEX <i>S</i>
DATE	WEIGHT	PHYSICAL EXAMINATION	

B6

Client: B6

Patient: B6

rDVM: B6 hx 5/21/15-7/17/18

07/17/2018 05:44

B6

B6

PAGE 03/06

B6

MEDICAL RECORD

B6

Client: **B6**

Patient: **B6**

rDVM **B6** hx 5/21/15-7/17/18

07/17/2018 05:44

B6

B6 ANIMAL HOSPIT

PAGE 04/06

B6

B6

Client: B6

Patient: B6

rDVM: B6 hx 5/21/15-7/17/18

07/17/2018 05:44 B6

B6

PAGE 05/06

Client: B6

Patient Name: B6

Species: Canine

Breed: Great Dane

Gender: Female/Spayed

Weight:

Age: 3 Years

Doctor: B6

B6

Test	Results	Reference Interval	LOW	NORMAL	HIGH
SNAP Pro (July 17, 2018 3:02 PM)					
AP_spp	B6				
EC-EE					
HW					
Lyme					

B6

Printed: July 17, 2018 3:02 PM

Page 1 of 1

B4, B6

Client: B6

Patient: B6

rDVM: B6 hx 5/21/15-7/17/18

07/17/2018 05:44 B6

B6

PAGE 05/05

Client: B6
Patient Name: B6
Species: Canine
Breed: Great Dane

Gender: Female Spayed
Weight:
Age: 2 Years
Doctor: B6

B6

Test	Results	Reference Interval	LOW	NORMAL	HIGH
------	---------	--------------------	-----	--------	------

SNAP Pro (June 21, 2017 3:31 PM)

AP_spp
EC-EE
HW
Lyme

B6

5/21/16
9:53 AM

B6

Printed: June 21, 2017 3:31 PM

Page 1 of 1

B4, B6

Client: B6

Patient: B6

B4, B6 10/4/18

B4, B6

Client: B6 Patient: B6

Client: B6
Patient: B6
Species: CANINE
Breed: GREAT_DANE
Gender: FEMALE S PAVED
Age: 3Y

Date: 10/04/2018
Requisition #: B6
Accession #: B6
Ordered by: RUSH, JOHN

B4, B6
B6
Account: B6

B4, B6 CANINE

Test	Result	Reference Range	Low	Normal	High
B4, B6 -CANINE	B6	0 - 900 pmol/L	HIGH		

Comments:

1. B4, B6
Abnormal B6

B6

Please note: Complete interpretive comments for all concentrations of B4, B6 are available in the online directory of services. Serum specimens received at room temperature may have decreased NT-proBNP concentrations.

Client: B6
Patient: B6

Vitals Results

B6	50:15 PM	Weight (kg)	42.2000
	53:56 PM	Sedation	5.6mg midazolam and 8.6mg butorphanol IV in cardio - k. antoon

Patient History

B6	03:46 PM	Appointment	B6
	04:46 PM	Appointment	
	02:28 PM	UserForm	
	02:33 PM	UserForm	
	02:49 PM	Purchase	
	02:49 PM	Purchase	
	02:50 PM	Vitals	
	02:50 PM	Treatment	
	02:59 PM	UserForm	
	03:33 PM	Vitals	
	03:34 PM	Purchase	
	04:08 PM	Purchase	
	04:08 PM	Purchase	
	04:10 PM	Prescription	
	04:10 PM	Purchase	
	04:11 PM	Purchase	
04:13 PM	Purchase		

B6

B6

B6

B6

Female (Spayed)

Canine Great Dane Black

Patient ID:

B6

STANDARD CONSENT FORM

B6

B6

Owner's name:

Date: 10/4/2018

Owner's address:

B6

10/4/18
Date

**If the individual admitting the animal is someone other than the legal owner,
please complete the portion below:**

B6

Authorized Agent - Please Print

Agent's Signature

Street Address

Date

Town/City State Zip

B6

B4, B6

Discharge Instructions

Patient

Name: B6

Species: Canine

Black Female (Spayed) Great Dane

Birthdate: B6

Owner

Name: B6

Address: B6

Patient ID: B6

Attending Cardiologist:

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

B6

Cardiology Resident:

B4, B6

B4, B6

Cardiology Technician:

B4, B6

Student: B6 V19

Admit Date: B6 2:27:50 PM

Discharge Date: B6

Diagnoses: Dilated cardiomyopathy (DCM) with mitral regurgitation

Clinical Findings:

B6

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.

In general, most dogs 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 you notice fast or labored breathing then a chest x-ray should be performed.

We 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.

If you have any concerns, please call or have your dog evaluated by a veterinarian. Our emergency clinic is open 24 hours/day.

Diet Suggestions:

Today we discussed the fact that there seem to be a relationship between grain free diet, diets with exotic protein sources, and DCM. We recommend switching from a grain free diet. At this moment we are unsure of the cause of the connection, some studies have indicated low taurine levels in the food. If taurine is the cause, there is potential for some reversal of her heart disease. We have checked her taurine levels today, and results are pending. If results are low, supplementation long term may be required.

Some Diet Change Recommendations

Canned Options

Hills Science Diet Adult Beef & Barelly Entree

Hills Science Diet Adult 1-6 Healthy Cuisine Roasted Chicken, Carrots & Spinach Stew

Dry Options

Royal Canin Early Cardiac

Purina Pro Plan Adult Weight Management

A sheet that has suggestions for low sodium, heart healthy, treats and diets can also be found on the HeartSmart web site

B6

Here is a link to a blog by our nutritionist with more information about the association between diet and DCM on Petfoodology.

"A broken heart risk of heart disease in boutique or grain free diets and exotic ingredients"

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

If it is possible for you to bring a sample of her food to us for analyzing and reporting to the FDA.

Exercise Recommendations:

B6 can continue with her normal activity level, we recommend that she not exercise to the point of exhaustion.

Recommended Medications:

Finobendan 10mg Tablet - Give 1 tablet by mouth every 12 hours.

Finobendan is a drug that increases the vigor of contraction of the heart. Side effects are uncommon but can include excitability or intestinal upset.

NEXT DOSE DUE: Tonight

Taurine 1000mg by mouth every 12 hours. You can purchase this at your local pharmacy or GNC. We recommend using *Twinklabs, Swanson, NOW or GNC brands of taurine for quality control reasons*

Recheck Visits: B6

B6

Thank you for entrusting us with **B6** care. Please contact our Cardiology liaison at **B6** or email us at **B6** for scheduling and non-emergent questions or concerns.

Please visit our HeartSmart website for more information

B6

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 **B6** 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 **B6***

Case: **B6**

Owner: **B6**

Discharge Instructions

B6

B6

Patient ID: B6

B6 Canine

3.59 Years Old Female (Spayed) Great Dane
Black

Cardiology Appointment Report

Date: B6

Attending Cardiologist:

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

B6

Cardiology Resident:

B6

B6

Cardiology Technician:

B6

Student: B6 V19

Presenting Complaint: Murmur II/VI

First heard: B6 zero change in behavior, has always been happy and healthy. No other concerns.

Concurrent Diseases: No other diseases

General Medical History:

Other wise normal, UTD on HWP (heartgard) and vaccines.

Diet and Supplements:

Acana, Fromm, dry food, Kongs with peanut butter, carrots
no supplements

Cardiovascular History:

Prior CHF diagnosis? N

Prior heart murmur? Y

Prior ATE? N

Prior arrhythmia? N

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:

No medications

Cardiac Physical Examination:

General PE: Nervous/excitable

MM Color and CRT: pigmented, moist

BCS (1-9): 5/9

BW (kg): 42.2

Heart rate: 150

Respiratory rate: panting

Temp (if possible): Not taken

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: Left apical II/VI has a musical component - also heard III/VI on right side low frequency rumbling murmur

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
- Premature beats
- Bradycardia
- Tachycardia

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
- Mild ascites
- Marked ascites

Abdominal distension

Problems:

Hx: Murmur II/VI (rDVM)

Differential Diagnoses:

Valvular disease (dysplasia vs degenerative) vs pulmonic stenosis vs aortic stenosis vs DCM

Diagnostic plan:

- | | |
|---|---|
| <input checked="" type="checkbox"/> Echocardiogram | <input type="checkbox"/> Dialysis profile |
| <input checked="" type="checkbox"/> Chemistry profile | <input type="checkbox"/> Thoracic radiographs |
| <input type="checkbox"/> ECG | <input type="checkbox"/> NT-proBNP |
| <input type="checkbox"/> Renal profile | <input type="checkbox"/> Troponin I |
| <input type="checkbox"/> Blood pressure | <input type="checkbox"/> Other tests: |

Echocardiogram Findings:

General/2-D findings:

Patient given 5.6mg midazolam and 8.6mg butorphanol IV for echocardiogram. Recommend either gabapentin or trazodone for future visits.

****Echocardiogram performed on the table with butorphanol and midazolam****

Thin LV walls with reduced contractile function (better side to side motion). The LV cavity is moderately to markedly dilated. The LA is moderately to markedly enlarged. The MV is slightly thickened with no obvious prolapse or ruptured chordae. The PA is smaller than the aorta. No obvious subaortic ridge visualize. No ASD, VSD, or PDA. The RH is subjectively enlarged as well. No pleural or pericardial effusion. No B-lines visualized.

Doppler findings:

1-2+ MR although it was hard to visualize due to the constant panting and tachycardia.

No TR

ECG findings:

Sinus tachycardia during the echocardiogram. No evidence of VPCs or APCs.

Assessment and recommendations:

Echocardiogram findings are consistent with dilated cardiomyopathy. The patient was very tachycardiac during the echocardiogram. Because today's findings are consistent with DCM and the patient is on a grain-free diet, the DCM protocol is recommended. Blood was pulled and submitted for a taurine level today. Discussed with the owner that the patient should not be on a grain free diet anymore and taurine supplementation should be started while we are waiting for the result of the test. Pimobendan 10 mg PO BID should be started. Recheck echocardiogram in 3 months or sooner if the patient develops clinical signs consistent with worsening heart disease such as increased RR/RE, cough, exercise intolerance, or syncope.

Final Diagnosis:

- Occult DCM r/o genetic vs. diet related.
- Murmur due to secondary mitral regurgitation

Heart Failure Classification Score:

ISACH Classification:

- | | |
|--|-------------------------------|
| <input type="checkbox"/> Ia | <input type="checkbox"/> IIIa |
| <input checked="" type="checkbox"/> Ib | <input type="checkbox"/> IIIb |

II

ACVIM Classification:

- A
- B1
- B2

- C
- D

M-Mode

IVSd

LVIDd

LVPWd

IVSs

LVIDs

LVPWs

%FS

Ao Diam

LA Diam

LA/Ao

Max LA

EPSS

cm

cm

cm

cm

cm

cm

%

cm

cm

cm

cm

M-Mode Normalized

IVSdN

LVIDdN

LVPWdN

IVSsN

LVIDsN

LVPWsN

Ao Diam N

LA Diam N

{0.29 - 0.52} !

{1.35 - 1.73} !

{0.33 - 0.53}

{0.43 - 0.71}

{0.79 - 1.14} !

{0.53 - 0.78}

{0.68 - 0.89}

{0.64 - 0.90} !

B6

2D

IVSd

LVIDd

LVPWd

EDV(Teich)

IVSs

LVIDs

LVPWs

ESV(Teich)

EF(Teich)

%FS

SV(Teich)

LVld LAX

LVAd LAX

LVEDV A-L LAX

LVEDV MOD LAX

cm

cm

cm

ml

cm

cm

cm

ml

%

%

ml

cm

cm

ml

ml

LVI_s 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
LV Diameter
LV Length

Doppler

MR V_{max}
MR maxPG
AV V_{max}
AV maxPG



cm
cm
ml
ml
BPM
%
%
ml
ml
l/min
l/min
cm
cm

m/s
mmHg
m/s
mmHg

B6

B6

B4, B6

B6

B6 Female (Spayed)
Canine Great Dane Black

B6

10/5/2018

Dear B6

Thank you for referring B6 with their pet B6

If you have any questions, or concerns, please contact us at B6

Thank you,

John Rush DVM, DACVIM (Cardiology), DACVECC

From: PFR Event <pfpreventcreation@fda.hhs.gov>

To: [B6] HQ Pet Food Report Notification; [B6]

Sent: 10/6/2018 5:20:24 AM

Subject: Blue Buffalo Wilderness- High Protein Grain Free -Natures Evolutionary Diet- with Chicken Life Source bits- Senior; [B6] - EON-367745

Attachments: 2055738-report.pdf

A PFR Report has been received and PFR Event [EON-367745] has been created in the EON System.

A "PDF" report by name "2055738-report.pdf" is attached to this email notification for your reference.

Below is the summary of the report:

EON Key: EON-367745

ICSR #: 2055738

EON Title: PFR Event created for Blue Buffalo Wilderness- High Protein Grain Free ?Natures Evolutionary Diet- with Chicken Life Source bits- Senior; 2055738

AE Date	[B6]	Number Fed/Exposed	2
Best By Date		Number Reacted	1
Animal Species	Dog	Outcome to Date	Worse/Declining/Deteriorating
Breed	Dachshund - Miniature		
Age	13 Years		
District Involved	PFR [B6] DO		

Product information

Individual Case Safety Report Number: 2055738

Product Group: Pet Food

Product Name: Blue Buffalo Wilderness- High Protein Grain Free ?Natures Evolutionary Diet- with Chicken Life Source bits- Senior

Description: [B6] has developed canine dilated cardiomyopathy suddenly. His health has been excellent even though he's 13. Up u til now, he had lots of life and energy left in him. Literally in a matter of 48 hours he developed CDM. I have fed him the same kibble brand, Blue Buffalo, the majority of his life. I read an article on the FDA site that you're investigating possible links between CDM and CDM. Please let me know if there's any way I can help.

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: Worse/Declining/Deteriorating

Number of Animals Treated With Product: 2

Number of Animals Reacted With Product: 1

Product Name	Lot Number or ID	Best By Date
Blue Buffalo Wilderness- High Protein Grain Free ?Natures Evolutionary Diet- with Chicken Life Source bits- Senior		

Sender information

B6

USA

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

B6

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

B6

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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.

From: PFR Event <prevention@fda.hhs.gov>
To: [B6] HQ Pet Food Report Notification; [B6]
Sent: 10/8/2018 3:48:32 AM
Subject: Fromm Four Star Salmon a la Veg dog food; [B6] - EON-367810
Attachments: 2055752-report.pdf

A PFR Report has been received and PFR Event [EON-367810] has been created in the EON System.

A "PDF" report by name "2055752-report.pdf" is attached to this email notification for your reference.

Below is the summary of the report:

EON Key: EON-367810

ICSR #: 2055752

EON Title: PFR Event created for Fromm Four Star Salmon a la Veg dog food; 2055752

AE Date	[B6]	Number Fed/Exposed	1
Best By Date		Number Reacted	1
Animal Species	Dog	Outcome to Date	Died Euthanized
Breed	Retriever - Golden		
Age	7 Years		
District Involved	PFR [B6] DO		

Product information

Individual Case Safety Report Number: 2055752

Product Group: Pet Food

Product Name: Fromm Four Star Salmon a la Veg dog food

Description: After fetching tennis balls at the park, [B6] had a big drink of water at home and then collapsed. He had difficulty standing and his back legs seemed to not support him. His breathing was labored and we took him to the emergency vet. He was found to have fluid around his heart. The vet drained it but the blood continued to immediately fill again and his breathing was very labored. The recommendation was to euthanize him at that time, about 4 hours from the time that he initially collapsed. We have read articles about Dilated Cardiomyopathy (DCM) in dogs related to diet. We don't know that [B6] had DCM but wanted to report his sudden death. At his annual vet checkup in April 2018, he was found to be an extremely fit and healthy dog with no known health issues or concerns. We were feeding him Fromm 4 Star Salmon a la Veg food two times per day

since he was about a year old.

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: Died Euthanized

Number of Animals Treated With Product: 1

Number of Animals Reacted With Product: 1

Product Name	Lot Number or ID	Best By Date
Fromm Four Star Salmon a la Veg dog food		

Sender information

B6

USA

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

B6

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

B6

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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.

From: PFR Event <pfpreventcreation@fda.hhs.gov>
To: [B6] HQ Pet Food Report Notification; [B6]
Sent: 10/8/2018 7:28:33 PM
Subject: Pro Plan Savory dry - chicken: Lisa Freeman - EON-367850
Attachments: 2055797-report.pdf; 2055797-attachments.zip

A PFR Report has been received and PFR Event [EON-367850] has been created in the EON System.

A "PDF" report by name "2055797-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 "2055797-attachments.zip" and is attached to this email notification.

Below is the summary of the report:

EON Key: EON-367850

ICSR #: 2055797

EON Title: PFR Event created for Pro Plan Savory dry - chicken beef or lamb (1 cup TID); 2055797

AE Date	[B6]	Number Fed/Exposed	1
Best By Date		Number Reacted	1
Animal Species	Dog	Outcome to Date	Stable
Breed	Retriever - Labrador		
Age	7 Years		
District Involved	PFR-New England DO		

Product information

Individual Case Safety Report Number: 2055797

Product Group: Pet Food

Product Name: Pro Plan Savory dry - chicken, beef, or lamb (1 cup TID)

Description: Presented to ER on [B6] for CHF and DCM (had rads at RDVM for cough). Full echo on [B6] Unlikely to be associated with diet but reporting because he is sometimes fed the lamb formula Pro Plan. Taurine WNL

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: 1

Number of Animals Reacted With Product: 1

Product Name	Lot Number or ID	Best By Date
Pro Plan Savory dry - chicken, beef, or lamb (1 cup TID)		

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:

B6

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

B6

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From: PFR Event <pfpreventcreation@fda.hhs.gov>
To: [B6]; HQ Pet Food Report Notification; [B6]
Sent: 10/8/2018 6:44:41 PM
Subject: Rawz meal free dry food limited recipe wild salmon dry; Lisa Freeman - EON-367845
Attachments: 2055793-report.pdf; 2055793-attachments.zip

A PFR Report has been received and PFR Event [EON-367845] has been created in the EON System.

A "PDF" report by name "2055793-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 "2055793-attachments.zip" and is attached to this email notification.

Below is the summary of the report:

EON Key: EON-367845

ICSR #: 2055793

EON Title: PFR Event created for Rawz meal free dry food limited recipe wild salmon dry; 2055793

AE Date	[B6]	Number Fed/Exposed	1
Best By Date		Number Reacted	1
Animal Species	Dog	Outcome to Date	Stable
Breed	Mixed (Dog)		
Age	10 Years		
District Involved	PFR-New England DO		

Product information

Individual Case Safety Report Number: 2055793

Product Group: Pet Food

Product Name: Rawz meal free dry food limited recipe wild salmon dry

Description: DCM and atrial fibrillation diagnosed 10/5/18

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: 1

Number of Animals Reacted With Product: 1

Product Name	Lot Number or ID	Best By Date
Rawz meal free dry food limited recipe wild salmon 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:

B6

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From: PFR Event <pfpreventcreation@fda.hhs.gov>
To: [B6] HQ Pet Food Report Notification; [B6] com
Sent: 10/8/2018 6:20:46 PM
Subject: Taste of the Wild High Forest dry; [B4, B6] EON-367841
Attachments: 2055791-report.pdf; 2055791-attachments.zip

A PFR Report has been received and PFR Event [EON-367841] has been created in the EON System.

A "PDF" report by name "2055791-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 "2055791-attachments.zip" and is attached to this email notification.

Below is the summary of the report:

EON Key: EON-367841

ICSR #: 2055791

EON Title: PFR Event created for Taste of the Wild High Forest dry; 2055791

AE Date	01/25/2018	Number Fed/Exposed	1
Best By Date		Number Reacted	1
Animal Species	Dog	Outcome to Date	Stable
Breed	Mixed (Dog)		
Age	3.18 Years		
District Involved	PFR-New England DO		

Product information

Individual Case Safety Report Number: 2055791

Product Group: Pet Food

Product Name: Taste of the Wild High Forest dry

Description: Feeding Taste of the Wild High Prairie Grain Free (Pine Forest before that). Diagnosed with DCM and CHF this past winter. Owner willing to provide additional information. Our records do not include echo from [B6] ([B6]) from Feb, 2018. They also ran taurine at [B6] which was reported to be normal. I am getting those records from [B6] and will submit as soon as I have them.

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: 1

Number of Animals Reacted With Product: 1

Product Name	Lot Number or ID	Best By Date
Taste of the Wild High Forest 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:

B6

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

B6

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From: Jones, Jennifer L </o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=0f6ca12eaa9348959a4cbb1e829af244-Jennifer.Jo>
To: [REDACTED] B6
Sent: 4/5/2018 3:55:43 PM
Subject: FDA Case investigation for [REDACTED] B6 -8 yr MI Bull Terrier (EON-350263)
Attachments: 02-Vet-LIRN-NetworkProceduresVets-12.22.2015.pdf; 03-Vet-LIRN-NetworkProceduresOwners-12.22.2015.pdf

Good morning [REDACTED] B6

Thank you for submitting your consumer complaint to FDA. I'm sorry to hear about [REDACTED] B6 illness. As part of our investigation, we'd like to request:

- **Full Medical Records**

- Please email (preferred) or fax (301-210-4685) a copy of [REDACTED] B6 entire medical history (not just this event).
- Do you have any information on the Grain Free Food, including lot or best by date?
 - Additionally, is there any open or unopened product available?

I attached a copy of our Vet-LIRN network procedures. The procedures describe how Vet-LIRN operates and how veterinarians help with our case investigations.

Please respond to this email so that we can initiate our investigation.

Thank you kindly,
Dr. Jones

Jennifer L. A. Jones, DVM

Veterinary Medical Officer
U.S. Food & Drug Administration
Center for Veterinary Medicine
Office of Research
Veterinary Laboratory Investigation and Response Network (Vet-LIRN)
8401 Muirkirk Road, G704
Laurel, Maryland 20708
new tel: 240-402-5421
fax: 301-210-4685
e-mail: jennifer.jones@fda.hhs.gov
Web: <http://www.fda.gov/AnimalVeterinary/ScienceResearch/ucm247334.htm>



From: Jones, Jennifer L </o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=0f6ca12eaa9348959a4cbb1e829af244-Jennifer.Jo>
To: [REDACTED] B6
Sent: 1/23/2018 6:53:51 PM
Subject: FDA Case Investigation for [REDACTED] B6 dogs (800.218)
Attachments: 02-Vet-LIRN-NetworkProceduresVets-12.22.2015.pdf; 03-Vet-LIRN-NetworkProceduresOwners-12.22.2015.pdf

Good afternoon [REDACTED] B6

Thank you for submitting your consumer complaint to FDA. I'm sorry to hear about the dogs' illnesses. As part of our investigation, we'd like to request:

- **Test Remaining OPEN product from** [REDACTED] B6
 - Testing for Co, Ca, P, Mg, Cu, Fe, Mg, Se, Zn, Taurine, Methionine, and Cysteine.
 - Please send me the size of the bag/approximate weight.
 - We will coordinate the testing through your office.

In the unfortunate event that any of the dogs from these reports die or are euthanized, we may be able to offer cardiac histopathology (fixed formalin) and metals/aminoacids (fresh frozen) testing. Please contact me if this occurs and the owners are interested.

I attached a copy of our Vet-LIRN network procedures. The procedures describe how Vet-LIRN operates and how veterinarians help with our case investigations.

Please respond to this email so that we can initiate our investigation.

Thank you kindly,
Dr. Jones

Jennifer L. A. Jones, DVM

Veterinary Medical Officer
U.S. Food & Drug Administration
Center for Veterinary Medicine
Office of Research
Veterinary Laboratory Investigation and Response Network (Vet-LIRN)
8401 Muirkirk Road, G704
Laurel, Maryland 20708
new tel: 240-402-5421
fax: 301-210-4685
e-mail: jennifer.jones@fda.hhs.gov
Web: <http://www.fda.gov/AnimalVeterinary/ScienceResearch/ucm247334.htm>



From: Jones, Jennifer L </o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=0f6ca12eaa9348959a4cbb1e829af244-Jennifer.Jo>
To: [B6] @cvcavets.com'
Sent: 4/5/2018 4:36:07 PM
Subject: FDA Case Investigation for [B6] (11 yr FS Afghan Hound)

Good afternoon Dr. [B6]

Thank you for submitting your consumer complaint to FDA. I'm sorry to hear about [B6]'s illness.

As part of our investigation, we'd like to request:

- **Full Medical Records**

- Please email (preferred) or fax (301-210-4685) a copy of [B6] **entire** medical history (not just this event).
- Do you have any information on the Grain Free Food, including lot or best by date?
 - Additionally, is there any open or unopened product available?

I attached a copy of our Vet-LIRN network procedures. The procedures describe how Vet-LIRN operates and how veterinarians help with our case investigations.

Please respond to this email so that we can initiate our investigation.

Thank you kindly,

Dr. Jones

Jennifer L. A. Jones, DVM

Veterinary Medical Officer
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Veterinary Laboratory Investigation and Response Network (Vet-LIRN)
8401 Muirkirk Road, G704
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new tel: 240-402-5421
fax: 301-210-4685
e-mail: jennifer.jones@fda.hhs.gov
Web: <http://www.fda.gov/AnimalVeterinary/ScienceResearch/ucm247334.htm>



314074

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

B6

Today's date: 4/24/19

1. How would you assess your pet's appetite? (mark the point on the line 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)
[X] 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 [X] 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

Table with 5 columns: Food (include specific product and flavor), Form, Amount, How often?, Dates fed. Contains handwritten entries for various pet foods like Nutro Grain Free Chicken, Hills Ideal Balance, etc.

*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 [X] No If yes, please list which ones and give brands and amounts:

Table for dietary supplements with columns: Brand/Concentration, Amount per day. Includes handwritten entry for Nature's Bounty Vitamin C.

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
[X] 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): _____

B4, B6

GI Lab Assigned Clinic ID: 23523

B6

B6

Species: Canine

Date Received: May 30, 2019

B6

GI Lab Accession: **B6**

<u>Test</u>	<u>Result</u>	<u>Reference Interval</u>	<u>Assay Date</u>
Ultra-Sensitive Troponin I Fasting	B6	≤0.06	05/31/19

Interpretation: Increased troponin I value. If clinical signs of heart disease are present, additional diagnostic work-up is recommended. Patients who are being supplemented with biotin may exhibit a slightly higher ultra-sensitive troponin result (10% or lower); however, the ability of the assay to detect serial increases or decreases of ultra-sensitive troponin is maintained.

Comments:

B4, B6

From: Rotstein, David </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=0A3B17EBFCF14A6CB8E94F322906BADD-DROTSTEI>
To: Carey, Lauren; Ceric, Olgica; Glover, Mark; Jones, Jennifer L; Nemser, Sarah; Palmer, Lee Anne; Peloquin, Sarah; Queen, Jackie L; Rotstein, David
Sent: 1/28/2019 1:38:48 PM
Subject: DCM-Lisa Freeman
Attachments: 4Health grain=free beef and potato: Lisa Freeman - EON-375111; 4Health whitefish and potato dry: Lisa Freeman - EON-376448; Acana Free Run Poultry dry: Lisa Freeman - EON-374786; Annamaet chicken and rice dry + Honest kitchen beef: Lisa Freeman - EON-376360; Homecooked diet - see diet history in medical record: Lisa Freeman - EON-374789; Orijen Adult Original dry (until Aug 2018): Lisa Freeman - EON-375110; Orijen grain free original dry: Lisa Freeman - EON-375114; Orijen Original dry: Lisa Freeman - EON-374783; Taste of the Wild Sierra Mountain dry: Lisa Freeman - EON-376361; Zignature - various flavors (venison: Lisa Freeman - EON-376446; Zignature kangaroo dry: Lisa Freeman - EON-376363

Here is the Freeman Collection

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM Vet-LIRN Liaison
CVM OSC/DC/CERT
7519 Standish Place

B6 (BB)



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RESEARCH

Open Access



Dietary beet pulp decreases taurine status in dogs fed low protein diet

Kwang Suk Ko^{1,2*} and Andrea J. Fascetti²

Abstract

Background: It is known that large dogs who are fed lamb and rice diets are at increased risk to develop taurine-deficiency-induced dilated cardiomyopathy. Since dogs obligatorily conjugate bile acids (BA) with taurine, we determined whether rice bran (RB) or other fibers (cellulose; CL, beet pulp; BP) would affect BA excretion and/or the taurine status of dogs.

Results: Eighteen medium/large mixed-breed dogs were given purified diets containing CL, BP, or RB for 12 weeks. Taurine concentrations in plasma and whole blood were significantly decreased at week 12. The BP group, compared to the CL or RB groups, showed significantly lower taurine concentrations in plasma (6.5 ± 0.5 vs 20.4 ± 3.9 and 13.1 ± 2.0 $\mu\text{mol/L}$, respectively, $P < 0.01$, mean \pm SEM) and in whole blood (79 ± 10 vs 143 ± 14 and 127 ± 14 $\mu\text{mol/L}$, respectively, $P < 0.01$), lower apparent protein digestibility (81.9 ± 0.6 vs 88.8 ± 0.6 and 88.1 ± 1.2 %, respectively, $P < 0.01$), and higher BA excretions (5.6 ± 0.1 vs 3.4 ± 0.5 and 3.4 ± 0.4 $\mu\text{mol/g}$ feces, respectively, $P < 0.05$) at week 12.

Conclusions: These results do not support the hypothesis that RB is likely to be a primary cause of lamb meal and rice diets, increasing the risk of taurine deficiency in large dogs. However these indicate that BP may contribute to a decrease taurine status in dogs by increasing excretion of fecal BA and decreasing protein digestibility, thus decreasing the bioavailability of sulfur amino acids, the precursors of taurine.

Keywords: Taurine deficiency, Bile acid excretion, Fiber, Dogs, Dilated cardiomyopathy

Background

It is known that dogs, under normal dietary conditions, synthesize taurine via the activities of two key enzymes, cysteine dioxygenase and cysteine sulfinic acid decarboxylase [1]. Taurine is synthesized from its precursor cysteine, resulting in sufficient quantities to meet their metabolic needs. However in recent years there were several reports that dogs may develop taurine deficiency-induced dilated cardiomyopathy (DCM). This has become more common in large dogs fed certain diets [2] and/or belonging to certain breeds [3, 4]. The main ingredients in the dog food fed to the taurine deficient dogs were lamb meal and rice, including rice bran [5]. Lamb meal has been reported to have a particularly low bioavailability of cysteine in dogs [6]. In a study where cats were fed a diet

containing full fat stabilized rice bran, the cats had a lower blood taurine concentration compared to cats fed the same diet with cornstarch substituted for the rice bran [7]. Therefore, rice bran, in addition to lamb meal, may play a role in the development of taurine deficiency in dogs.

Various investigators have reported that the consumption of diets containing full fat rice bran results in reducing cholesterol concentrations in both liver and blood of several species; eg, in rats [8, 9], hamsters [10], and humans [11, 12]. One of the possible mechanisms for this effect is the high fermentability of rice bran, resulting in enhanced bile acid (BA) excretion and/or degradation (by increased microflora activity in the gut). According to the report of Gestel et al. [13], full fat rice bran fed to rats increased both BA excretion and bacterial activity, compared to controls fed a starch-based diet. Supporting evidence for the role of gut microflora in taurine loss has been reported for other species. Kim et al. [14, 15] reported a significant decrease in fecal cholytaurine hydrolase activity (an enzyme produced by intestinal bacteria), and total fecal BA excretion with the addition of dietary

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²Department of Molecular Biosciences, School of Veterinary Medicine, University of California Davis, One Shield Ave, Davis, CA 95616, USA



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antibiotics in cats. The administration of antibiotics resulted in the repletion of taurine in taurine-deficient cats within 3 weeks of treatment. It has been reported that dogs fed a lamb meal and rice diet showed higher urinary taurine excretion when antibiotics were added to their diet [16]. This suggests that highly populated microflora in the gut interferes with normal entero-hepatic re-utilization of taurine (taurocholic acid), which in turn prevents the maintenance of taurine homeostasis and decreases the quantity of taurine available for other metabolic functions and for renal excretion.

We postulate that dietary full-fat rice bran binds BA in the small intestine in dogs and thereby increases BA excretion, interfering with the entero-hepatic recycling of taurine-conjugated bile salts and lowering total body taurine status in dogs.

In the present study, the effects of dietary full fat rice bran on taurine status and BA excretion in dogs fed a diet near-limiting in sulfur amino acids were compared to those of dogs fed beet pulp, another common fiber source in dog food. Cellulose was used as the control fiber. Since an excess of dietary sulfur amino acids in dogs may mask the effects of marginally limiting sulfur amino acid metabolites such as taurine and glutathione, dogs were restricted in the amount of protein intake to 20–25 % above their minimum maintenance requirement described in National Research Council [17].

Methods

Animals and diets

The husbandry and treatments of the animals for the study were approved by the Animal Use and Care Administrative Advisory Committee at the University of California at Davis and the dogs in this study were taken care of in compliance with the National Research Council [18] guidance for laboratory animals. Eighteen intact male, mixed-breed dogs (Covance Stock and Broodstock Colony, Kalamazoo, MI, USA) were used for the study. Mean body weight (BW) of the 1–6 years old dogs at the initiation of the study was 29.1 ± 0.7 Kg (mean \pm SEM). Six animals were assigned to each of the three experimental groups: cellulose (CL), beet pulp (BP) and rice bran (RB), based on similar BW of the dogs. The dogs were housed individually in indoor wire-mesh enclosures with coated rod-bottom floors at commercial facilities (Covance Research Products, Kalamazoo, MI, USA), providing a 12 h dark-light cycle and temperature control at 18–29 °C. Observations for general health and appearance were done three times a day at the discretion of the veterinarians and daily monitoring for food consumption was provided throughout the study. Weekly BW and body condition score (BCS, 9 point scale) were measured for each dog [19]. Food for all of the dogs for the study was provided once a day between 7 AM and

9 AM and water was given *ad-libitum* throughout the experiment.

Four complete, balanced diets were provided by a commercial laboratory animal food company (TestDiet®/LabDiet®, Purina, St. Louis, MI, USA). The ingredients and chemical compositions of the diets for the study are shown in Table 1. For the adaptation period, a pre-feeding (PF) diet, a complete and balanced dry expanded diet with 29.5 % protein containing 0.58 % methionine and 0.46 % cyst(e)ine (as-fed basis) was prepared to maintain an excess production of taurine for the maintenance of taurine homeostasis in these dogs. For the experimental period, three purified diets with the three different fiber sources, CL, BP and RB, were prepared, which, by design, included 12 % protein containing 0.23 % methionine and 0.12 % cyst(e)ine (as-fed basis). This prevented an excess of substrates for taurine synthesis that might overwhelm the effects of fibers on taurine metabolism studied. Twelve percent protein is higher than the minimum requirement of protein for maintenance of dogs described in National Research Council [17] and 0.35 % of sulfur amino acid concentration in the diets is within the range of total sulfur amino acid requirement (0.2–0.4 % of diets) for maintenance of adult dogs as determined by short-term nitrogen balance experiments [20–22]. Ten percent full-fat RB was used for the RB diet and the amounts of the fibers used in the other two diets were formulated, by calculation, to have the same amount of total dietary fiber (TDF) as that in the RB diet. Chromium oxide (0.02 %) was added to the experimental diets to use in determining apparent protein digestibility. The leftover and spilled food was collected daily and used to calculate food intake of each dog. The amounts of the food provided were adjusted weekly, based on changes of BW and BCS to aim toward an ideal BCS (5 out of 9 on the 9 point scale).

Design and treatments

During the adaptation period the dogs were given the PF diet for 8 weeks to ensure that they were not taurine deficient. The last two weeks of the adaptation period were included for sample collections as week 0, which was the initiation of the measurements. Then, dogs were assigned to one of three experimental groups (CL, BP, or RB group, respectively) to establish similar mean BW among the experimental groups. During the experimental period (from week 2 to week 12), the three different experimental diets were given to the designated groups. Throughout the experiment, including the last two weeks of the adaptation period, blood was collected on the last day of each 2 week-period, urine was collected biweekly on a day before blood collection, and feces were collected during the last 5 days of each 2 week-period. Plasma (PL) taurine, whole blood (WB)

Table 1 Chemical composition and ingredients of the diets for the experiment^{b,c}

	Units	PF Diet ^{a,d}	CL Diet ^a	BP Diet ^a	RB Diet ^a
Protein	%	29.5	11.8	11.7	11.7
Methionine + Cystine	%	1.04	0.35	0.35	0.34
Taurine	%	0.04	-	-	-
Fat	%	18.5	20.3	20.3	20.3
Fibers	%	2.0 ^e	2.51 ^f	1.98 ^f	2.68 ^f
Insoluble dietary fibers ^f	%	-	1.83	1.98	1.81
Soluble dietary fibers ^f	%	-	0.68	0.00	0.87
Metabolizable Energy ^c	kJ/g	15.0	19.2	18.7	17.5
Casein - vitamin free	%	-	5.00	6.7	3.00
Soy protein isolate	%	-	7.90	5.62	8.38
Corn starch	%	-	37.61	35.55	33.76
Sucrose	%	-	20.00	20.00	20.00
Lard	%	-	20.18	20.6	18.18
Cellulose – powdered ^g	%	-	2.15	-	-
Beet pulp– dried ^g	%	-	-	4.70	-
Rice bran – full fat ^g	%	-	-	-	10.00
Mineral/Vitamin ^h	%	-	6.84	6.94	6.36
Chromium oxide	%	-	0.02	0.02	0.02
Choline chloride	%	-	0.30	0.30	0.30
Total	%	-	100.00	100.00	100.00

Notes: ^aPF Pre-feeding, CL Cellulose, BD Beet pulp, RB Rice bran. ^bThe values were based on as-fed basis and provided from Purina Mills, LLC (St. Louis, MO) except where otherwise mentioned. All diets were formulated by the manufacturer to meet or exceed AAFCO (Association of American Feed Control Officials) requirements for macro and micronutrients for dogs. ^cThe values were calculated, based on the latest (as of March 2005) ingredient analysis information by Purina Mills, LLC (St. Louis, MO) except where otherwise mentioned. Since nutrient composition of natural ingredients varies, analysis will differ accordingly. ^dPF diet; ingredients: ground corn, ground brown rice, poultry by-product meal, poultry meal, corn gluten meal, dehulled soybean meal, animal fat preserved with BHA (butylated hydroxyanisole), poultry fat preserved with ethoxyquin, wheat middlings, poultry digest, calcium carbonate, dried whole eggs, dried beet pulp, brewers dried yeast, soybean oil, dicalcium phosphate, salt, lecithin, pyridoxine hydrochloride, choline chloride, potassium chloride, menadione dimethylpyrimidinol bisulfate, biotin, cholecalciferol, vitamin A acetate, di-alpha tocopheryl acetate, inositol, DL-methionine, folic acid, calcium pantothenate, thiamin mononitrate, ethoxyquin, nicotinic acid, riboflavin, cyanocobalamin, manganous oxide, ferrous sulfate, cobalt carbonate, copper sulfate, zinc oxide, sodium selenite. ^eCrude fiber. ^fTotal dietary fibers (TDF), dry-matter basis, analyzed by Dr. George C. Fahey Jr. in the Department of Animal Sciences, University of Illinois, Urbana, IL 61801. ^gAmount of the ingredients was decided by calculation based on the amount of TDF equal to the amount of TDF in the rice bran diet with 10 % full fat rice bran. ^hProvided the following amounts of minerals and vitamins/kg diet: calcium 10 g, phosphorous 6.6 g, potassium 7 g, magnesium 0.5 g, sodium 4.6 g, chloride 6.7 g, fluoride 48 mg, iron 365 mg, manganese 55 mg, copper 12 mg, cobalt 0.4 mg, iodine 1.5 mg, chromium 2.3 mg, molybdenum 1.23 mg, selenium 0.46 mg, vitamin A 10,900 IU, vitamin D-3 2,200 IU, vitamin E 44 IU, menadione 0.68 mg, thiamin hydrochloride 10.9 mg, riboflavin 4.9 mg, niacin 64 mg, pantothenic acid 20 mg, folic acid 4.0 mg, pyridoxine 12.4 mg, biotin 0.2 mg, vitamin B-12 28 µg, choline chloride 2.1 g

taurine, urine taurine, BA excretion, apparent protein digestibility, blood thiols and PL complete amino acid profiles (CAAP) were measured. To assure the health conditions of the dogs, blood chemistries and complete blood cell counts were performed on the samples taken on the last day of the adaptation period (IDEXX Preclinical Research Services, Westbrook, ME, USA) and the concentrations of total protein and albumin of PL were done from the PL drawn on the last day of the experimental periods (Veterinary Medicine Teaching Hospital of the School of Veterinary Medicine, University of California, CA, USA).

Sample collections and measurements

Blood (approximately 6 mL) was taken at the end of each 2 week-period to measure taurine, thiols, and amino acids.

Every blood drawing was performed prior to feeding through cephalic vein by venipuncture using heparinized syringes (20 µL of sodium heparin solution, 1000 USP units/mL). Urine for assays of taurine and creatinine concentrations was collected, biweekly, for 14 h in an individual metabolic cage, one day before the blood was collected. The urine was collected in a container held in ice water.

A portion of WB (approximately 2 mL) was stored frozen (-20 °C) for WB taurine assay. Another portion of WB collected (approximately 4 mL) was immediately centrifuged (~1,200 × g for 10 min) to obtain PL. An aliquot of PL or urine (approximately 0.5 mL) was mixed with an equal volume of 0.24 mol/L of 5-sulfosalicylic acid, centrifuged at 15,800 × g for 15 min at 4 °C and the supernatant was collected. The resulting deproteinized PL or urine samples were assayed for taurine and for PL

CAAP. The PL samples remaining were stored at -20°C for determination of PL thiols. The frozen WB samples were thawed and frozen three times to lyse the blood cells, to release intracellular taurine, then diluted with an equal volume of double deionized water (DDIW) and deproteinized by the same method as described for PL.

Feces were stored at -20°C . Each feces sample was mixed with DDIW to obtain a slurry homogenate. Approximately 100 g of the homogenate slurry of feces was frozen at -20°C for BA and protein assay.

Taurine concentrations of deproteinized PL, WB and urine were measured using an amino acid analyzer (Beckman 7300 Analyzer C7 Model, Beckman Instruments, Fullerton, CA, USA). To normalize urinary taurine concentration, urinary creatinine concentrations were determined with a commercial kit (Cold Stable, Pointe Scientific Inc., Canton, MI, USA). Deproteinized PL CAAP was measured using an amino acid analyzer (Biochrom 30, Biochrom Ltd., Cambridge, UK). In order to quantify the concentrations of total cyst(e)ine (free plus that bound to protein), cysteinyl-glycine and homocysteine in PL and the concentrations of total glutathione (GSH + GSSG) in WB, the combined and modified HPLC method of Ubbink et al. [23] and Gilfix et al. [24] was used. All of the volumes of reagents and samples were scaled down to one-fourth to quantify thiol concentrations in PL and WB and, for WB total glutathione concentrations. WB blood was diluted with an equal volume of DDIW before assay. Bile acid concentrations in feces were measured using a commercial kit (Bile Acid Kit No. 450-A, Trinity Biotech USA, Jamestown, NY, USA) and BA in feces was extracted by the method of Porter et al. [25] Apparent digestibility of dietary protein was measured by calculation using dietary and fecal nitrogen concentrations. The concentrations of nitrogen, protein and chromium in the diets and feces were analyzed at Analytical Laboratory at the University of California Davis. Total nitrogen and total crude protein were measured by a nitrogen gas analyzer (LECO FP-528, LECO Corporation, St Joseph, MI, USA). Chromium concentration was determined by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES).

Statistical analysis

Significance of the data among three experimental groups at each time point for all of the variables was analyzed by mixed regression. Comparison of the variables between two time points in a group was done by paired t-test. All data were analyzed using SAS program [26]. All data in the report were expressed as mean \pm SEM unless otherwise mentioned. For all analyses, differences were considered significant at $P < 0.05$. Probability values in the range of $0.05 \leq P < 0.1$ were considered as an indicator of a noteworthy trend.

Results

During the experimental period, one dog in the BP group ingested insufficient food to maintain BW and, therefore, was removed from the experiment at week 10 (BCS was 3 out of 9; BW was 82 % of week 0 at week 3). All of the data from the BP group were obtained from the remaining five dogs after week 10. Except for that dog, all of the dogs maintained BW and had normal blood chemistries and completed blood cell counts at the beginning of the experiment. However, at the end of the experiment, the mean PL albumin concentrations were 29 ± 2 , 28 ± 1 and 29 ± 2 g/L for the CL, BP and RB group, respectively, which are below of the lower end of the reference range for PL albumin concentration of normal dogs (30–44 g/L). The mean PL total protein concentrations, at the end of the experiment, were 66 ± 4 , 62 ± 5 and 66 ± 3 g/L for the CL, BP and RB group, respectively. These values are within the normal reference range for PL total protein concentration of normal dogs (54–76 g/L). There were no significant differences among the groups in PL albumin and total protein concentrations.

Mean food intakes (FI) of the dogs to maintain a BCS of 5/9 were 515 ± 35 , 543 ± 43 , and 566 ± 70 g/day for CL, BP and RB groups, respectively during the adaptation period and were 426 ± 11 , 443 ± 14 , and 425 ± 10 g/day for CL, BP and RB groups, respectively, during the experimental period. No significant differences among the groups were found throughout the study. Mean BW of the dogs at the end of the study were 24.8 ± 0.4 , 27.1 ± 1.4 and 28.1 ± 1.3 kg for CL, BP and RB groups, respectively. No statistical differences in BW occurred among the groups during the experiment except that the CL group had lower BW than the RB group from week 9 to week 12 ($P < 0.05$). The BCS of all dogs were maintained between 4 and 6 throughout the study.

Plasma taurine concentrations decreased to under $40 \mu\text{mol/L}$ for all the groups (Fig. 1a) during the experimental period. The BP group decreased taurine concentrations lower than the other 2 groups from week 4 to the end of the experiment ($P < 0.01$) and the CL group maintained the highest mean PL taurine concentrations from week 6, but was significantly higher than the other two groups only at week 10 ($P < 0.01$). Whole blood taurine concentrations showed a similar pattern as those of PL taurine concentrations but the rates of decrease were slower (Fig. 1b). From week 6, the WB taurine concentration in BP group was lower than the other two groups ($P < 0.01$) with no statistical differences between the CL and RB groups. Urinary taurine excretions were markedly decreased from week 0; 3981 ± 790 , 8880 ± 4496 and 5858 ± 910 nmol/ml/mg creatinine to week 12; 85 ± 7 , 101 ± 23 and 120 ± 19 nmol/ml/mg creatinine for CL, BP and RB groups, respectively (ie, at week 12, only 2.1, 0.8 and 0.8 %, respectively of the week 0 values).

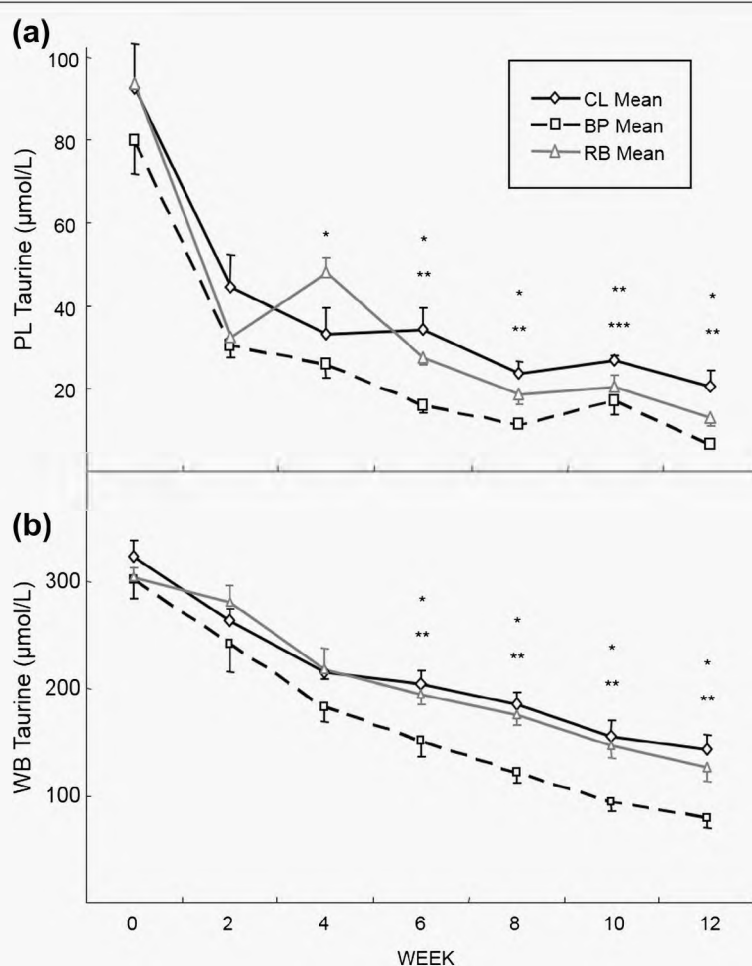


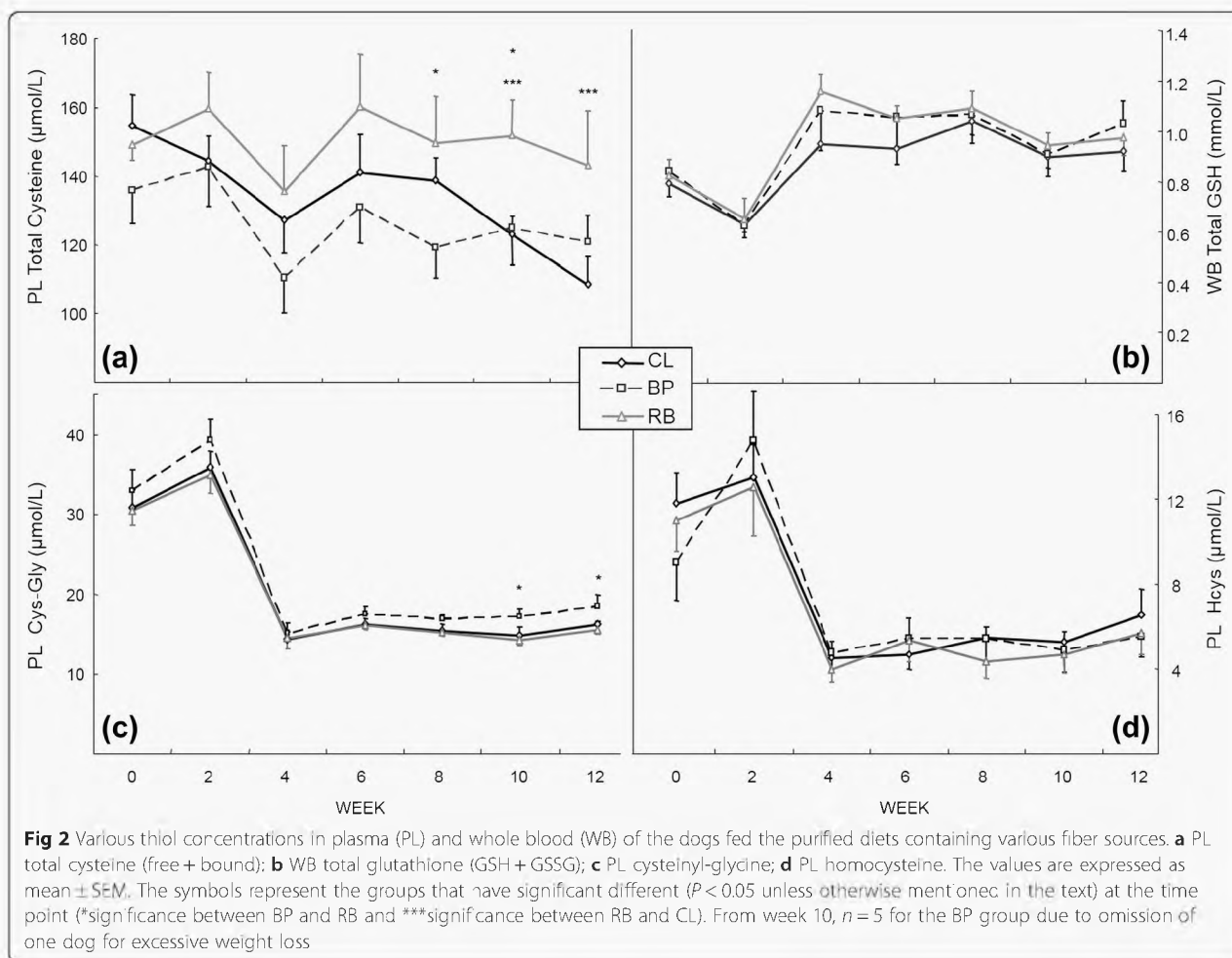
Fig 1 Concentrations of plasma (PL) and whole blood (WB) taurine among groups during 12 weeks of the experiment. **a** and **b** show taurine concentrations in PL and WB of dogs, respectively, fed the purified diets containing different fiber sources. The values are expressed as mean \pm SEM. The symbols represent the groups that have significant differences ($P < 0.05$ unless otherwise mentioned in the text) at the time point (*significance between BP and RB, **significance between BP and CL, and ***significance between RB and CL). From week 10, $n = 5$ for the BP group due to omission of one dog for excessive weight loss.

However no statistical differences were found among the 3 groups at any time point.

Mean apparent protein digestibilities of the diets for the dogs were 88.8 ± 0.6 , 81.9 ± 0.6 and 88.1 ± 1.2 % for CL, BP and RB groups, respectively. The BP group had the lowest protein digestibility from week 2 to week 12 ($P < 0.001$) and the RB group had a protein digestibility lower than the CL group but higher than the BP group at week 2, 4 and 8 ($P < 0.05$).

The concentrations of thiols in PL or WB of the 3 groups are shown in Fig. 2. Plasma total cyst(e)ine concentrations (Fig. 2a) for RB group appeared to be maintained better than the other two groups which decreased during the experimental period. At week 8, the PL total cyst(e)ine concentration was significantly higher in the RB group than the BP group; at week 10, higher in the

RB group than the BP and the CL group; and at week 12, higher in the RB than the CL group ($P < 0.05$). Total glutathione (GSH + GSSG) in WB (Fig. 2b) did not show any significant differences among the groups. However, the mean concentrations of total glutathione in WB at week 12 of the CL, BP and RB groups increased by 46, 65, and 49 % from those at week 2 ($P < 0.01$). Plasma cysteinyl-glycine (Fig. 2c) and homocysteine (Fig. 2d) had similar patterns. The concentrations decreased between week 2 and week 4 and remained low until the end of the experiment. Only PL cysteinyl-glycine concentrations at weeks 10 and 12 between BP and RB, developed statistical differences ($P < 0.05$). The PL cysteinyl-glycine concentrations at week 12 were approximately 45, 47, and 45 % of those at week 2 ($P < 0.01$) and in PL homocysteine concentrations at week 12 were approximately 50, 37, and



45 % of those at week 2 ($P < 0.01$) for the CL, BP and RB group, respectively.

Plasma free cysteine (not including that bound to plasma proteins) and methionine concentrations were determined with the PL CAAP. At week 2, PL free cysteine in the BP group was significantly lower than the RB group ($P < 0.05$) with a noteworthy trend lower than the CL group ($p = 0.08$, 34 ± 3 , 26 ± 4 and 36 ± 3 $\mu\text{mol/L}$ for CL, BP and RB groups, respectively). However, at week 12, PL free cysteine concentrations among the two groups did not show any significant differences (23 ± 1 , 25 ± 4 and 28 ± 5 $\mu\text{mol/L}$ for CL, BP and RB groups, respectively). Plasma methionine concentrations did not show any significant differences among groups or with time. The mean PL methionine concentrations for CL, BP and RB group at week 0 were 53 ± 4 , 56 ± 6 and 64 ± 7 $\mu\text{mol/L}$, respectively and at week 12 were 60 ± 2 , 56 ± 2 and 51 ± 6 $\mu\text{mol/L}$, respectively.

Bile acid excretions of the dogs for the study are shown in Table 2. Throughout the study, the BP group had higher BA excretion than those of CL and RB regardless of the method of expression ($P < 0.01$).

Discussion

Food intake of the dogs decreased when the diets were changed from the PF diet to the experimental purified diets. Average FI of the dogs for the last two weeks of the adaptation period for the PF diet was 26 % higher than that for the experimental period for the purified diets. Decrease of FI after changing diets was mainly due to the characteristic differences of the diets. Purified diets have higher digestible energy as compared to the diets consisting of natural food ingredients. In this study, the energy (Table 1) of the PF diet (15.0 kJ/g diet) was about 20–25 % lower than those of the three purified diets (19.2 kJ/g diet, 18.7 kJ/g diet and 17.5 kJ/g diet for CL, BP and RB diet, respectively). However, the dogs throughout the study maintained BCS levels between 4 and 6. Food intake and protein intake throughout the study appeared to be adequate to maintain BW, even though the protein content of the purified diets was limited to about 12 % of their diets. However, the decrease in PL albumin below the normal reference range for all of three groups indicates that either total protein or an

Table 2 Bile acid excretion in dogs fed the purified diets containing various fiber sources^c

Time	μmol/g feces (DM ^e -basis)			μmol/5 day		
	CL ^e	BP ^e	RB ^e	CL ^e	BP ^e	RB ^e
Week 0	5.17 ± 0.64 ^a	7.03 ± 0.71 ^b	5.76 ± 0.38 ^{ab}	1123 ± 155	869 ± 120	1008 ± 67
Week 2	5.27 ± 0.62	6.56 ± 0.48	5.96 ± 0.21	944 ± 165	1145 ± 104	1047 ± 237
Week 4	4.53 ± 0.51 ^a	7.40 ± 0.27 ^b	5.17 ± 1.12 ^{ab}	597 ± 119 ^a	1053 ± 104 ^b	721 ± 97 ^a
Week 6	4.21 ± 0.63	4.18 ± 0.89	2.96 ± 0.39	684 ± 80	948 ± 241	514 ± 71
Week 8	2.69 ± 0.33 ^a	5.34 ± 0.65 ^b	4.93 ± 0.75 ^b	487 ± 95 ^a	868 ± 141 ^b	693 ± 71 ^{ab}
Week 10	3.32 ± 0.32 ^{ab}	4.63 ± 0.84 ^a	2.62 ± 0.34 ^b	562 ± 92 ^{ab}	^d 737 ± 146 ^a	401 ± 52 ^b
Week 12	3.43 ± 0.54 ^a	5.60 ± 0.14 ^b	3.42 ± 0.35 ^a	513 ± 111 ^a	^d 946 ± 177 ^b	555 ± 64 ^a

Notes: ^{a,b}The letters superscripted represent significant differences between groups ($P < 0.05$). ^cThe values are expressed as mean ± SEM, $n = 6$ for each group.

^d $n = 5$ due to omission of one dog for excessive weight loss. ^eDM Dry matter, CL Cellulose, BP Beet pulp, RB Rice bran

essential amino acid may have been slightly limiting for normal albumin homeostasis. Except for branched chain amino acids, none of the concentrations of essential amino acids in the PL during the experimental period were lower than those at week 0 (data not shown) and all were within the normal range for dogs [27]. The branched chain amino acids for weeks 8 and 12 were about 64–69 % of the concentrations found at week 0 (for PF diet) which were about at the first quartile of normal concentrations for dogs [27]. It would therefore appear that cyst(e)ine (60 % of the first quartile of the normal cyst(e)ine concentration) was the most limiting amino acid for protein synthesis as well as for taurine synthesis.

Mean taurine concentrations (Fig. 1) of the dogs at week 12 were 20.4 ± 3.9 , 6.7 ± 0.5 and 13.1 ± 1.0 μmol/L for PL and 143 ± 14 , 79 ± 10 and 127 ± 14 μmol/L for WB for the CL, BP and RB groups, respectively. Since the lower limits for PL and WB taurine concentration for preventing a risk for DCM in dogs are 40 μmol/L and 180 μmol/L, respectively [3], all of dogs that were participating in this study were taurine deficient by study's end. There appears to be three reasons for the taurine deficiency in this study.

The first is protein digestibility (sulfur amino acid bioavailability). The BP group showed the lowest protein digestibility throughout the study among the three experimental groups and, therefore it would be predicted that less sulfur amino acids were available for taurine synthesis. The digestibility of protein in animals fed diets containing BP has been reported by various researchers. Several have reported no effect of BP on protein digestibility in horses [28], cats [29], and even in dogs [30]. In contrast, reports in pigs [31] and in chickens [32], indicate that protein digestibility was decreased when fed BP. It is known that taurine is a non-essential amino acid that is synthesized in most mammals from cyst(e)ine [33]. Our results indicate that when protein, and thus sulfur amino acids, are low yet sufficient for nitrogen balance and glutathione homeostasis, taurine synthesis is inadequate and that a decrease in protein digestibility may be a part

of this process. Therefore, the key to a diet providing adequate taurine synthesis in dogs would be an adequate quantity of “bio-available” sulfur amino acids. That quantity appears to be more than we had in the diets of the present experiment.

The second possible reason is the effects of fibers that would interfere with the entero-hepatic recycling of BA, the recycling route for the major taurine metabolite to maintain taurine status. Fibers have various physiological effects on the metabolism of animals, including satiety, slowing gastric emptying, thus delaying or interfering with nutrient absorption that, in turn, results in improvement of glucose tolerance and lowering serum cholesterol [34]. There are several hypotheses regarding the cholesterol-lowering effect of fiber, which include increasing BA excretion through feces. Since most dogs diagnosed with DCM had been fed lamb and rice (including RB) diets, we postulated that RB may contribute to the low taurine status of these dogs [5]. In general, BAs are synthesized in liver from cholesterol and conjugated with glycine or taurine to make these strong detergents, glycocholic acid or taurocholic acid. These detergents play an important role in the small intestine to emulsify various kinds of lipids to enhance their absorption by forming water soluble micelles. After functioning, the bile salts are recycled via passive diffusion in the small intestine and via receptor-mediated transport in the lower ileum with approximately 99 % of recycling efficiency [33]. Dogs, like cats, obligatorily conjugate BA with taurine, ie, the liver enzyme responsible for conjugation, cholesteryl-CoA:*N*-acyltransferase, is specific for taurine in dogs [34]. An interference with entero-hepatic recycling of bile salts would result in the depletion of the taurine pool of dogs if a limited quantity of taurine or its precursors are available. Therefore, fecal BA excretion was determined as an indicator of the efficiency of entero-hepatic recycling of bile salts of the dogs fed the various fibers. Fecal BA excretions, on a dry matter basis, gradually decreased in all 3 groups ($P < 0.01$), apparently the result of switching from commercial diet to the purified diets. However, the

excretion of BA/5 days by week 12 for the BP group was nearly twice that of the CL or RB group. Possible reason for decrease of fecal BA excretion with time may be the limited amount of protein in the diets. The synthesis and secretion of BA are reported to be enhanced by the hormonal stimulation of cholecystokinin whose release is evoked by fats and amino acids in the digestive tracks of the animals [35]. That is, the lower consumption of protein by the dogs may have led to less release of cholecystokinin and, in turn, less BA production and secretion. However, it is clear that the BP group had the highest BA excretion regardless of the method of expression. Even though the initial fecal BA excretion of the BP group on a dry matter basis was the highest, the BA excretions at week 12 were 64, 80, and 59 % of the BA excretions at week 0 for CL, BP and RB groups, respectively, showing that the BP group had the lowest percentage decrease. By analyses, the TDF of the CL, BP and RB diets (Table 1) were 2.51, 1.98, and 2.68 %, respectively, demonstrating that the BP fiber effect was not the result of more dietary fiber. Moreover, all had about the same percentage of insoluble dietary fiber, 1.83, 1.98 and 1.81 % for CL, BP and RB diets, respectively and all had about 1 % crude fiber. Thus, it does not appear that it is the quantity of the various fibers, but the nature of the fiber that is contributing to the different response of the BP on BA excretion and taurine depletion.

The third possible reason for the decrease in taurine status in the present study is the interaction of fiber with the small intestinal microbes. Thus, the difference between the overall effects of the three dietary treatments on taurine status may reside in the difference in fermentability of the fibers by the small intestinal microbes. If an increased microbial fermentation occurs as the result of an increased consumption of BP fiber as compared to the fiber in CL or RB, then it would be expected that more taurine would be destroyed, similar to the increase catabolism of taurine that occurs in cats that have more microbial fermentation [13–15, 36]. Sunvold et al. [37] have reported that BP supports a greater rate of fermentation than CL, and even if BP has no soluble fiber (ie, 100 % insoluble fiber), it is still considerably more fermentable than CL. Thus, although we could not rule out some microbial fermentation by the CL or RB groups because we had no control diet without fiber, the results still support the idea that BP, not RB, fiber may contribute to a significant loss of endogenous taurine in dogs.

With the possible exception of free and total PL cyst(e)ine, there is no indication that there was an effect of fiber on body thiol status (Fig. 2). Although total PL cyst(e)ine (free + bound) was somewhat lower in the BP group at 4 of the time points, it was never significantly lower than the CL group, suggesting that it was not a decrease in PL cyst(e)ine alone that was the cause of the

lower PL taurine in the BP group, even though it is apparent that there was not enough dietary sulfur amino acids (more specifically, hepatic cysteine) for any group to synthesize adequate taurine. Plasma free cysteine (cysteine not bound to protein) concentrations in the current experiment were already depleted in the BP group ($26 \pm 4 \mu\text{mol/L}$) at week 2 and were maintained until the end of the study ($25 \pm 4 \mu\text{mol/L}$), whereas the other 2 groups, although decreasing at week 2 ($34 \pm 3 \mu\text{mol/L}$ and $36 \pm 3 \mu\text{mol/L}$ for CL and RB group, respectively), were not as depleted as the BP group until week 12 ($23 \pm 1 \mu\text{mol/L}$ and $28 \pm 5 \mu\text{mol/L}$ for CL and RB group, respectively) supporting the idea that dietary BP decreases the bioavailability of cysteine in the diet, thus contributing to the depletion of taurine in dogs.

Whole blood was chosen for total glutathione assay since red blood cells contain the higher concentration of glutathione. Although glutathione is known as a reservoir for cysteine [38], it is interesting that in the present experiment glutathione did not decrease after feeding the low protein diets but actually increased about 20 % in all groups. According to Stipanuk et al. [38] glutathione concentration is regulated by the activity of glutamate-cysteine ligase (known as γ -glutamyl-cysteine synthetase) whose activity is regulated by the cellular concentration of cysteine. When cellular cysteine is decreased, glutamate-cysteine ligase is up-regulated to increase synthesis of glutathione and when cellular cysteine is in excess, cysteine dioxygenase is up-regulated to catabolize excess cysteine to maintain a narrow range of tissue cysteine concentrations. In this study, the concentrations of total cysteine in PL at week 12 were approximately 75, 85 and 90 % of those of week 2 for CL, BP and RB group, respectively. Free cysteine concentrations in PL at the end of the study were 62, 49, and 46 % of those of week 0 for CL, BP and RB group, respectively, perhaps indicating that free cyst(e)ine is a better indicator of cysteine availability for metabolic needs (including taurine synthesis) than total cyst(e)ine (free plus that bound to protein via sulfhydryl bonding).

It is interesting that metabolic regulation conserves glutathione rather than taurine, perhaps simply because the dietary excess of sulfur amino acids goes through the liver first where the majority of the enzymes involved are located and because of the *K_m*s of the enzymes involved. That is, the priority for the use of cysteine in dogs in our experiment appears to be first for glutathione, second for general protein synthesis and finally for taurine synthesis. The apparent anomaly (ie, of glutathione being a reservoir for cyst(e)ine) here is that there appeared to be insufficient albumin synthesis or increased albumin breakdown under the conditions of our experiment, even though the dogs appeared to be in nitrogen balance (ie, maintaining BW) and WB total glutathione actually increased.

Conclusion

In summary, rather than RB, dietary BP showed the most significant effect in lowering PL and WB taurine concentrations, in part, by decreasing the protein digestibility (sulfur amino acid bioavailability), by enhancing fecal excretion of BA and possibly, by enhancing degradation of taurine by gut microflora in dogs. These effects may result from the greater effect of BP fiber than RB or CL on intestinal bacterial fermentation that cleaves taurocholic acid and destroys the taurine released. In conclusion, since CL was the control fiber, and RB caused similar responses as CL, we conclude that RB is unlikely the cause of the increased risk of taurine deficiency in dogs fed lamb and rice diets.

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Availability of data and materials

All data and materials to generate this manuscript are available with authors.

Authors' contributions

KS KO designed and performed the major part of experiments and wrote the manuscript. AJF cooperated in analyses and writing the manuscript. All authors read and approved the final manuscript.

Competing interests

The authors declare that they have no competing interest.

Consent for publication

All authors agree for this manuscript to be published.

Ethics approval and consent to participate

The husbandry and treatments of the animals for the study were approved by the Animal Use and Care Administrative Advisory Committee at the University of California, Davis and the dogs in this study were taken care of in compliance with the National Research Council [18] guidance for laboratory animals.

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The Optimum Methionine to Methionine Plus Cystine Ratio for Growing Pigs Determined Using Plasma Urea Nitrogen and Nitrogen Balance

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ABSTRACT : The objective of this study was to determine the optimum ratio of methionine to methionine plus cystine for growing pigs. A nitrogen balance trial was conducted using a total of 21 barrows (Large White×Landrace) over two replicates. The initial body weight was 20.36 ± 1.22 kg (mean±SD) in the first replicate and 23.54 ± 1.02 kg (mean±SD) in the second. For each replicate, the 21 pigs were randomly assigned to one of seven dietary treatments with three observations per treatment. The diets included a methionine and cystine-deficient basal diet with all other essential nutrients meeting nutrient requirements and six diets formulated with graded levels of DL-methionine (0.00, 0.03, 0.06, 0.10, 0.13, 0.16%) and L-Cystine·HCl·H₂O (0.19, 0.15, 0.11, 0.07, 0.04, 0.00%). This resulted in ratios of methionine to methionine plus cystine of 41.3, 29.6, 35.3, 41.2, 46.0, 51.6 and 57.5%. Each experimental period lasted 12 days consisting of a seven-day adaptation period followed by a five-day total collection of urine and feces. During the collection period, pigs were fed 900 g/day for the first replicate and 1,200 g/day for the second replicate. The feed was provided in three equal portions at 0800, 1500, and 2200 h daily. Pigs had *ad libitum* access to water after feeding. There was a linear ($p < 0.01$) and quadratic ($p < 0.01$) effect on daily gain and feed conversion as the ratio of methionine to methionine plus cystine increased. Pigs receiving the diets providing a methionine to methionine plus cystine ratio of 51.6% had the best daily gain and feed conversion. Plasma urea nitrogen was also lowest for this treatment. Nitrogen retention increased ($p < 0.01$) as the relative proportion of methionine increased up to 51.6% and then a downward trend occurred at 57.5%. The quadratic regression model, as well as one- and two- slope regression line models, were used to determine the optimum ratio of methionine to methionine plus cystine. Eliminating the 35.3% methionine to methionine plus cystine treatment resulted in R^2 values in excess of 0.92. The optimal ratio of methionine to methionine plus cystine was estimated to be 54.15% for nitrogen retention and 56.72% for plasma urea nitrogen. (**Key Words :** Pigs, Methionine, Cystine, Ratio, Nitrogen Retention, Plasma Urea Nitrogen)

INTRODUCTION

The sulfur containing amino acids methionine and cystine are often the third or fourth limiting amino acids in practical diets fed to growing pigs (Russell et al., 1983). Methionine is essential for normal growth as it cannot be synthesized in the body, but cystine can be converted from methionine as needed, hence it is considered dispensable. As a result, the amount of methionine needed in the diet depends on the amount of cystine also present (Chung and Baker, 1992; Yang et al., 1997; Zimmermann et al., 2005). The absolute amounts of methionine and cystine are important but so is the ratio between methionine and cystine. Therefore, nutritionists need to consider not only

methionine but also methionine plus cystine requirements when formulating pig diets.

Previous studies with growing pigs have shown that the minimum methionine to methionine plus cystine ratio ranged between 30 and 70% (Wang and Fuller, 1989; Fuller et al., 1989). Part of this variability is due to differences in response criteria (i.e., nitrogen balance vs. growth performance), the bioavailability of the amino acids in the basal diet, and weight of pigs used in the experiments. In a nitrogen balance study with growing gilts (40-80 kg) fed varying ratios of methionine to cystine diets, Reijmers et al. (2002) found the minimum methionine to methionine plus cystine ratio at which protein deposition was maximized was 55%. This value is within the range of values reported in the literature (NRC 1998, Roth and Kirchgessner, 1989).

There is very limited data about the required methionine to methionine plus cystine ratio for maximal protein

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Table 1. Ingredient composition of experimental diets formulated to determine the effects of various methionine to methionine plus cystine ratios on pig performance and nitrogen balance (% as fed)

Ingredients	Methionine to methionine plus cystine ratio						
	41.3	29.6	35.3	41.2	46.0	51.6	57.5
Corn	39.90	39.90	39.90	39.90	39.90	39.90	39.90
Field peas	24.79	24.79	24.79	24.79	24.79	24.79	24.79
Peanut meal	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Corn starch	8.90	8.71	8.72	8.73	8.73	8.73	8.74
Wheat barn	7.00	7.00	7.00	7.00	7.00	7.00	7.00
Sucrose	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Dicalcium phosphate	1.28	1.28	1.28	1.28	1.28	1.28	1.28
Limestone	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Vitamin and mineral premix ^a	0.50	0.50	0.50	0.50	0.50	0.50	0.50
NaCl	0.41	0.41	0.41	0.41	0.41	0.41	0.41
Choline chloride (50%)	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Soybean oil	0.20	0.20	0.20	0.20	0.20	0.20	0.20
L-lysine HCl (98.5%)	0.49	0.49	0.49	0.49	0.49	0.49	0.49
L-threonine (99%)	0.23	0.23	0.23	0.23	0.23	0.23	0.23
L-valine (99.5%)	0.14	0.14	0.14	0.14	0.14	0.14	0.14
L-isoleucine (99%)	0.14	0.14	0.14	0.14	0.14	0.14	0.14
L-tryptophan (98%)	0.09	0.09	0.09	0.09	0.09	0.09	0.09
DL-methionine (99%)	-	-	0.03	0.06	0.10	0.13	0.16
L-cystine-HCl-H ₂ O ^b (99.1%)	-	0.19	0.15	0.11	0.07	0.04	-

^a Provided per kilogram of complete feed: vitamin A, 5,512 IU; vitamin D₃, 2,200 IU; vitamin E, 66.1 IU; riboflavin, 5.5 mg; D-pantothenic acid, 13.8 mg; niacin, 30.3 mg; vitamin B₁₂, 27.6 µg; Mn, 100 mg; Fe, 100 mg; Cu, 23.4 mg; Zn, 100 mg; I, 0.3 mg; Se, 0.3 mg; Co, 1.0 mg.

^b 1 kg of L-cystine-HCl-H₂O (99.1%) contained 0.851 kg of L-cystine.

deposition in 20 to 30 kg growing pigs. Therefore, the objective of the current study was to establish the optimum dietary ratio of methionine to methionine plus cystine for growing pigs using the nitrogen balance technique and plasma urea nitrogen.

MATERIALS AND METHODS

Animals and diets

A nitrogen balance trial was conducted in the Metabolism Laboratory of the Animal Science and Technology College located on the campus of China Agriculture University (Beijing, China). The trial, conducted in two replicates, utilized 21 barrows (Large White×Landrace) obtained from the Haudu Group (Beijing, China). The initial bodyweight of the pigs averaged 20.36±1.22 kg in the first replicate and 23.54±1.02 kg in the second replicate. In each replicate, the 21 pigs were randomly allocated to one of seven different dietary treatments with three observations per treatment. The basal diet was formulated to meet the requirements for all amino acids except methionine and cystine (NRC, 1998). All other nutrients were formulated to meet or exceed requirements (NRC, 1998). Batches of each feed ingredient were obtained before the start of the study, sampled and analyzed in order to adjust the nutrient composition of the diets.

The content of methionine and cystine in the basal diet was determined to be 0.19 and 0.27%, respectively.

Crystalline DL-methionine (0.0, 0.03, 0.06, 0.10, 0.13 and 0.16%) and L-Cystine-HCl-H₂O (0.19, 0.15, 0.11, 0.07, 0.04 and 0.0%) were added to the basal diet by replacing corn starch resulting in seven treatments with ratios of methionine to methionine plus cystine ranging from 29.6 to 57.5% (41.3, 29.6, 35.3, 41.2, 46.0, 51.6 and 57.55%). The ingredient composition of all the diets is presented in Table 1.

For all experimental diets, the vitamin-trace mineral mix and synthetic amino acids were premixed with 10 kg corn before addition to the mixer. A basal mix was manufactured and aliquots of this mix were used to manufacture the final feed.

Experimental procedures

Each replicate consisted of a seven day adjustment period followed by a five day total collection of feces and urine. The pigs were kept in individual metabolic crates and separate collection of feces and urine was accomplished by fitting adhesive feces collection bags onto the back of pigs (Van Kleef et al., 1994). Each stainless steel crate (0.6×0.3×0.5 m) was equipped with plastic slotted flooring and contained a 0.25 m³ round bottom single feeder at the front. The temperature and humidity of the room were controlled within the range of 22 to 25°C and 55 to 70%, using the environmental control system.

The daily ration was divided into three feedings per day, with approximately one third of the ration being fed at

Table 2. Chemical analysis for experimental diets formulated to determine the effects of various methionine to methionine plus cystine ratios on pig performance and nitrogen balance (% as fed)^a

	Methionine to methionine plus cystine ratio						
	41.3	29.6	35.3	41.2	46.0	51.6	57.5
Chemical analysis							
Dry matter	89.62	90.10	88.98	88.28	89.20	88.94	90.12
Ash	4.83	4.93	5.01	4.81	5.01	4.81	47.56
Crude protein	14.92	15.02	14.82	14.71	15.01	14.68	14.08
Crude fibre	2.28	2.51	2.36	2.29	2.37	2.89	2.40
Ether extract	3.45	3.68	3.81	3.69	3.76	3.72	3.68
Analyzed amino acids							
Arginine	1.18	1.21	1.17	1.11	1.15	1.17	1.18
Cystine	0.27	0.45	0.42	0.37	0.34	0.30	0.27
Histidine	0.34	0.36	0.36	0.35	0.37	0.35	0.36
Isoleucine	0.63	0.62	0.65	0.63	0.63	0.62	0.63
Leucine	1.07	1.11	1.10	1.08	1.09	1.09	1.11
Lysine	1.03	1.10	1.07	1.10	1.02	1.06	1.06
Methionine	0.19	0.19	0.23	0.26	0.29	0.32	0.38
Phenylalanine	0.68	0.67	0.69	0.68	0.66	0.67	0.68
Threonine	0.68	0.68	0.69	0.68	0.70	0.70	0.65
Tryptophan	0.23	0.26	0.20	0.22	0.22	0.23	0.21
Valine	0.82	0.78	0.78	0.76	0.74	0.73	0.79

8,000, 1,500 and 2,200 h. The daily feed allowance of the experimental animals was adjusted according to the feed intake observed in the last three days of the acclimation period. This was the amount of feed that pigs could consume within 20 minutes based on our observations.

From d 4 until the end of the 12-d experimental period, the same amount of feed was fed which exceeded 2.6 times the pig's maintenance energy requirements. This energy intake has been shown not to limit protein deposition (Möhn et al., 2000; De Lange et al., 2001). The feeding rate ranged from 4% to 5.5% of body weight (900 g/d/pig for the first replicate and 1,200 g/d/pig for the second replicate). In the collection period, the wasted feed for each pig was collected, dried and recorded on a dry matter basis.

The animals were weighed at the start of every quantitative feeding period and again at the termination of the trial. Weighing was conducted at 0800 to 0900 h with no feed available. After feeding, water was provided *ad libitum* in the feeding trough.

Sample collection

Feces were collected in the morning, afternoon and evening for five consecutive days taking care to avoid contamination with urine. The total weight of the raw feces for each pig was recorded daily. After collection, feces were placed into labeled plastic bags and frozen at approximately -20°C. At the end of each trial, each pig's daily samples were combined into a single composite sample. From that, a 5% sub-sample was preserved for laboratory analysis. Sub-samples were dried to a constant weight in a forced-air oven at 65°C, equilibrated at room temperature for 24 h, and ground through a 0.45 mm mesh screen.

The urine of individual pigs was collected in plastic containers containing 50 ml of 6 N HCl to maintain the pH of the urine below 3. The total amount of urine excreted by each pig was measured once a day at approximately 1,530 h and recorded on a daily basis. After being filtered through glass wool, a fixed proportion of the urine from each pig was preserved in screw-capped polyethylene containers and frozen at approximately -20°C. When the collection for all five days was completed, each pig's daily samples were thawed and combined into a single sample. A 100 ml composite sample was obtained and then frozen until needed for nitrogen analysis.

At the end of each replicate, 7 ml of blood was collected from the jugular vein of each pig using heparinized vacutainer tubes (Greiner Bio-One Company), approximately 1 h after feeding. All blood samples were chilled and then centrifuged at 3,000×g for 15 min at 4°C within 1 h after collection (Ciji 800 Model Centrifuge, Surgical Instrument Factory, Shanghai, China). An aliquot of plasma was stored at -20°C until analyzed for plasma urea nitrogen.

Chemical analysis

Samples of the feed ingredients were collected before the diets were manufactured, while samples of complete feeds were collected at the start of the trial for analyses. The chemical composition and the amino acid content of all ingredients was analyzed in duplicate in the laboratory of the Ministry of Feed Industry Center (Beijing, China). Moisture, crude protein, crude fiber, ether extract and ash were determined following standard methods (AOAC, 1995).

Table 3. Performance and plasma urea nitrogen for growing pigs fed varying ratios of methionine to methionine plus cystine

	Methionine to methionine plus cystine ratio							SEM ^a	Linear	Quadratic
	41.3	29.6	35.3	41.2	46.0	51.6	57.5			
Weight gain (g/day)	368	375	375	397	395	422	422	36.92	0.01	0.01
Feed intake (g/day)	924	923	923	927	925	924	927	59.36	0.96	0.99
Feed conversion	2.56	2.47	2.51	2.33	2.39	2.20	2.22	0.27	0.01	0.01
Plasma urea nitrogen (mg/dl)	12.50	12.33	12.67	11.83	10.17	9.33	10.17	1.96	0.14	0.33

^aSEM = Standard error of the mean.

Table 4. Nitrogen balance response for growing pigs fed varying ratios of methionine to methionine plus cystine

	Methionine to methionine plus cystine ratio							SEM ^a	Linear	Quadratic
	41.3	29.6	35.3	41.2	46.0	51.6	57.5			
Nitrogen intake (g/day)	24.79	24.73	26.11	25.60	26.14	26.16	26.07	1.65	0.58	0.80
Fecal nitrogen (g/day)	3.12	3.56	3.54	3.43	3.00	3.19	2.81	0.48	0.18	0.41
Urinary nitrogen (g/day)	9.62	8.85	10.49	7.88	7.66	6.91	7.88	1.29	0.17	0.37
Retained nitrogen (g/day)	12.05	12.32	12.09	14.29	15.49	16.05	15.38	1.23	0.01	0.01
Nitrogen retained (%)	48.61	51.07	46.64	56.61	60.00	62.05	59.57	4.53	0.02	0.05
Nitrogen digestibility (%)	88.74	86.01	86.62	86.76	88.48	88.09	89.30	1.38	0.04	0.13

^aSEM = Standard error of the mean.

The amino acid content of the diets was determined by High Performance Liquid Chromatography (Hitachi L-8800 Amino Acid Analyzer, Tokyo, Japan). All samples were hydrolyzed for 24 h at 110°C with 6 N HCl prior to analysis. Sulfur-containing amino acids were analyzed after cold formic acid oxidation for 16 h before acid hydrolysis. Tryptophan was determined after alkaline hydrolysis (4 N NaOH) for 22 h at 110°C. The chemical composition of the diets is listed in Table 2.

Plasma urea nitrogen was determined on a fully automatic Biochemical Analyzer (Technicon RA 1000) and by enzymatic UV test (Ureaza method/GLDH) based on the report of Kerschner and Ziegenhorn (1985). A urea kit produced by Zhong Sheng Beikong Bio-technology and Science Inc. (Beijing, China) was used for this analysis. Fecal and urinary nitrogen were analyzed with a semi-automatic analyzer (Kjeltec™ 2100 Distillation Unit) by the Kjeldahl method (AOAC, 1990).

Statistical analysis

Data from the two replicates were analyzed using the General Linear Model (GLM) procedure of the SAS statistical package (SAS, 2002) using the pig as the experimental unit. The experimental data were subjected to analysis of variance using a model that included the effect of diet and the two replicates. The results were considered significant if $p < 0.05$.

The optimal ratio between methionine and methionine plus cystine of the growing pigs was estimated with a quadratic regression model as well as one- and two- slope regression line models (Coma et al., 1995a) using nitrogen retention and plasma urea nitrogen as the dependent variables regressed against dietary level of methionine to methionine plus cystine ratio. The appropriate GLM and NLIN procedures of SAS (2002) were used for these

estimates. The applied quadratic model was:

$$Y = b_0 + b_1X + b_{11}X^2$$

Where Y = the response parameter (nitrogen retention, plasma urea nitrogen) and X_1 = the ratio of methionine to methionine plus cystine b_0 , b_1 , b_{11} = the coefficients of the equation. The ratio at which the response reached 95% of the maximum response was estimated as the optimal value.

The regression of the one-slope and two-slope models used in the present experiment are described as follows:

$$Y = L + U(R - X_{LR});$$

$$Y = L + U(R - X_{LR}) + V(X_{GR} - R)$$

Where L = the ordinate; R = the abscissa of the breakpoint (the estimated requirement). X_{LR} means X less than R; X_{GR} means X greater than R. U = the slope of the line at $X < R$, and V = the slope of the line at $X > R$. By definition, $(R - X_{LR})$ is zero when X greater than R, and $(X_{GR} - R)$ is zero when X less than R. The ratio at which the breakpoint was achieved was estimated as the optimal value (Robbins et al., 1979; Coma et al., 1995a). The mean square error (MSE) and the coefficient of determination (R^2) were used to assess the goodness of fit for the different models (Coma et al., 1995a).

RESULTS

The results showed no significant replicate × treatment interaction ($p > 0.05$) for any of the studied variables. Therefore, data from the two replicates were pooled for analysis.

Since the level of feed intake was controlled, feed intake

Table 5. Asymptotic characteristics of plasma urea nitrogen and nitrogen retention responses to relative proportions of methionine to methionine plus cystine

Variable	Model	Requirement	R ²	MSE
Nitrogen retention	Quadratic	54.15	0.99	0.095
	One-slope broken line	51.24	0.96	0.192
	Two-slope broken line	53.96	0.98	0.159
Plasma urea nitrogen	Quadratic	56.17	0.92	0.563
	One-slope broken line	53.94	0.94	0.233
	Two-slope broken line	56.72	0.99	0.113

was similar among all dietary treatments. As the relative proportion of methionine to methionine plus cystine increased from 29.6 to 57.5%, average daily gain and feed conversion improved linearly ($p = 0.01$) and quadratically ($p = 0.01$). The poorest weight gain and feed utilization was observed for pigs fed the basal diet. The best daily gain and feed conversion was observed for pigs fed the diet in which the methionine to methionine plus cystine ratio was 51.6%. For plasma urea nitrogen, the lowest and highest values occurred for pigs fed the 51.6 and 35.3% methionine to methionine plus cystine ratio diets (Table 3).

Increasing the relative proportion of methionine to methionine plus cystine resulted in a significant linear ($p = 0.02$) and quadratic ($p = 0.05$) increase in nitrogen retention (Table 4). Nitrogen digestibility increased linearly ($p = 0.04$) with increased proportions of methionine to methionine plus cystine.

Three statistical models were fitted to the nitrogen retention and plasma urea nitrogen data (Tables 3 and 4). Based on the nitrogen retention response to the ratio of methionine to methionine plus cystine, three regression equations were obtained using the quadratic regression, one- and two- slope regression models, respectively:

$$Y = -18.19 + 1.20X - 0.011X^2$$

$$Y = 15.72 - 0.26 \times (51.24 - X_{LR})$$

$$Y = 16.42 - 0.26 \times (53.96 - X_{LR}) - 0.10 \times (X_{GR} - 53.96)$$

Based on the corresponding equations, the optimal ratios of methionine to methionine plus cystine were determined to be 54.15, 51.24 and 53.96%, respectively.

When plasma urea nitrogen was considered as the dependent variable, the optimal ratios of methionine to methionine plus cystine were estimated to be 56.17, 53.94 and 56.72%. The corresponding regression equations were listed as followed:

$$Y = 33.951 - 0.816 X - 0.0069 X^2$$

$$Y = 9.75 + 0.19 \times (53.94 - X_{LR})$$

$$Y = 9.22 + 0.19 \times (56.72 - X_{LR}) - 0.13 \times (X_{GR} - 56.72)$$

DISCUSSION

In the present study, the optimal ratio of methionine to methionine plus cystine was estimated in 20 to 30 kg growing pigs using the nitrogen balance technique. Based on our design, the six test diets contained varying levels of methionine and cystine but the total content of methionine plus cystine was similar across treatments and was close to the value recommended by the NRC (1998). Moreover, all other essential nutrients, especially energy and other amino acids were designed to be at or above requirement (NRC, 1998).

For growing animals, amino acids are basically used for protein accretion and maintenance and deposited protein relies on the level of the first limiting amino acid. Assuming our dietary formulation was accurate and the methionine plus cystine content of the test diets did not exceed the requirements of growing pigs, whole-body protein synthesis should theoretically occur at a level determined by the optimal ratio of methionine to cystine. If the dietary ratio of methionine to cystine is below the optimal value, more cystine and less methionine will be consumed. Protein synthesis will be determined by the level of dietary methionine, which leads to less protein deposition. When the ratio in the test diets is above the value, methionine will be in relative excess and cystine will be in relative deficiency. However, the deficiency in cystine can be overcome by conversion from methionine via the trans-sulfuration pathway. In fact, cysteine (1/2 cystine) is the genuine element used to incorporate into protein. Cystine (the dimmer form of cysteine), is produced when cysteine is in solution (Lewis, 2003). Because of the molecular weight difference between methionine and cysteine, the efficiency of methionine in meeting the biological need for cysteine on a weight basis is 80% (Chung and Baker, 1992). Thus, an excess of methionine is not sufficient to make up for a deficiency in cystine in this condition. Protein synthesis will also be reduced due to the low cystine intake. From this, it can be concluded that increasing the relative proportion of methionine will result in greater protein synthesis until the optimal ratio of methionine to cystine is attained, and subsequently, when the relative proportion of methionine is above its optimal value, protein synthesis will be reduced with further increases in methionine intake.

Because of conversion from methionine, a deficiency of cystine will lead to relatively less of a change in protein synthesis than a deficiency of methionine in the presence of a constant methionine plus cystine content. This has been confirmed by Roth and Kirchgessner (1989). In a similar experiment for 30 to 60 and 60 to 90 kg pigs, they found that pigs with a predominant proportion of methionine obtained higher performance than those with a predominant proportion of cystine. Here, the parameters of performance reflect the status of protein synthesis. According to the current experimental design and statistical analysis, when the optimal ratio of methionine to cystine is fed, maximal protein synthesis occurs.

The status of protein synthesis can be measured using biological response criteria such as growth, nitrogen retention and plasma urea. In fact, an inherent relationship exists between several criteria. Nitrogen retention is a direct indicator of protein synthesis. Here, protein deposition (synthesis) can be calculated as nitrogen retained \times 100/16 (Möhn et al., 2000). For young pigs with minimal fat deposition, growth is almost directly proportional to lean tissue deposition which primarily relies on protein deposition.

When protein synthesis is limited due to an unsuitable ratio of methionine to cystine, excess amino acids (including methionine or cystine) are catabolized to their metabolic end-products which for all amino acids include bicarbonate and ammonia. Ammonia enters the nitrogen pool of the body and is excreted primarily as urea in mammals. The status of urea in the body is therefore reflected by plasma urea. The measurement of these excreta provides an indirect and inverse measurement of changes in protein synthesis. As the relative proportion of methionine increases towards its optimal value, more protein is synthesized which leads to increased nitrogen retention, improved animal performance and decreased plasma urea. The inverse changes of nitrogen retention, animal performance and plasma urea occur when there is a continuous increase in the relative proportion of methionine from its optimal value. The inverse relationship between plasma urea (nitrogen) and lean growth (growth for young pigs) was also detected in previous reports published by Coma et al. (1995b).

So, based on maximal nitrogen retention or minimal plasma urea, the optimal ratio of methionine to cystine can be determined for the growing pigs in the present study. This estimation can be conducted by applying suitable statistical modeling techniques to the chosen biological response. We observed nitrogen retention and plasma urea nitrogen exhibited an anticipative change tendency from 35.3 to 57.5% methionine to methionine plus cystine (Tables 3 and 4). However, nitrogen retention and plasma urea nitrogen in the 29.6% treatment were superior to those

in the 35.3% methionine to methionine plus cystine treatments, which meant that an increase in the relative proportion of methionine towards its optimal value caused a decrease in those variables. The reason for this is not known.

The quadratic and broken-line regression analyses were used to determine the relation between methionine and cystine in our study. For nitrogen retention and plasma urea nitrogen, when the values generated from the treatment for 29.6% of methionine to methionine plus cystine were removed, those models fitted the data very well.

Using the quadratic regression, as well as the one- and two- slope broken-line regression models, the required ratios of methionine to methionine plus cystine were estimated to be 54.15, 51.24 and 53.96% for nitrogen retention. However, when considering the plasma urea nitrogen variable, using the corresponding statistical models, the required ratios of methionine to methionine plus cystine were estimated to be 56.17, 53.94 and 56.72%. Obviously, the plasma urea nitrogen assay resulted in higher values than the nitrogen retention assay using the corresponding statistical models.

These differences may be attributed to an imbalance of electrolytes in the diets, where the chloride existing in the crystalline cystine (L-Cystine-HCl-H₂O) would tend to decrease the cation:anion ratio. Several reports in pigs have indicated that a diet with excess anion or chloride resulted in markedly lower plasma urea nitrogen concentrations (Slagle and Zimmerman, 1979; Honeyfield et al., 1985). However, total nitrogen excretion in pigs was found to be constant, although the excess cation intake resulted in significantly greater urea excretion (Cai et al. 1992). This was explained by Welbourne et al. (1986) who suggested that with the maintenance of acid-base balance in the body, urea was isochronously synthesized with ammonia production so that nitrogen excretion remained constant. Thus, the addition of various levels of L-Cystine-HCl in the test diets influenced plasma urea nitrogen but not nitrogen retention, which may have produced the difference between the estimated results from the two variables. So the result from the nitrogen retention assay is more reasonable and acceptable.

For the nitrogen retention response, we found that the quadratic regression model had lower MSE and higher R² than either of the broken-line regression models (Figures 1-3). So the nitrogen retention response is better described by the quadratic regression model than by the broken-line regression models. Therefore, the determined value 54.15% is considered to be the estimated required ratio methionine to methionine plus cystine according to the nitrogen retention response. Similarly, for the plasma urea nitrogen response, we observed that the two-slope broken-line regression model tended to fit the data better than the other two regression models. The determined value 56.72% is

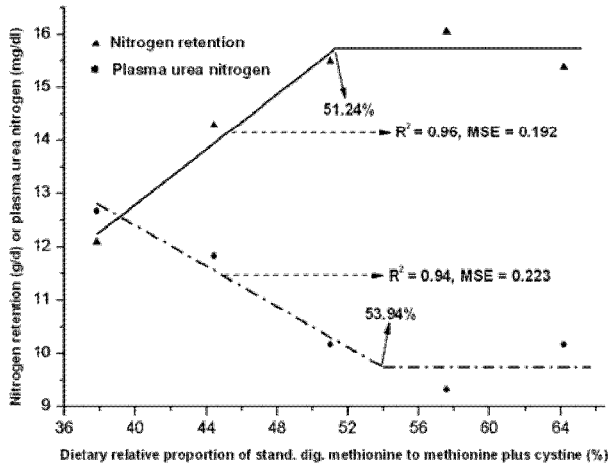


Figure 1. Use of the one-slope, broken-line regression model to describe the responses of nitrogen retention and plasma urea nitrogen to the proportion of methionine to methionine plus cystine in 20-50 kg growing pigs.

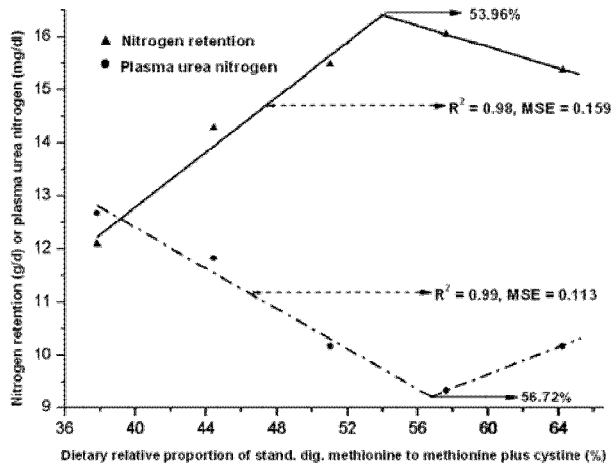


Figure 2. Use of the two-slope, broken-line regression model to describe the responses of nitrogen retention and plasma urea nitrogen to the relative proportion of methionine to methionine plus cystine in 20-50 kg growing pigs.

considered to be the estimated required ratio when the plasma urea nitrogen response was considered (Figures 1-3).

Referring to the dietary amino acid requirements for 20 to 50 kg growing pigs (NRC 1998), the recommended methionine and methionine plus cystine levels are 0.25% and 0.54%, respectively. Therefore, the ratio of methionine to methionine plus cystine is 46.29%. Obviously, our determined value is higher than this value. However, in a recent nitrogen balance experiment for 40 to 80 kg growing gilts, Reijmers et al. (2002) found the ratio of digestible methionine to methionine plus cystine for maximal body protein deposition was 55%. This value is very close to our evaluation of 54.15% based on maximal nitrogen retention.

These results agree with the studies conducted by

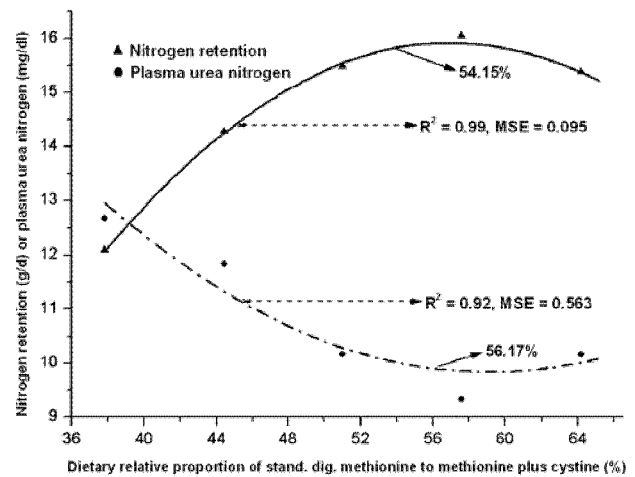


Figure 3. Use of the quadratic model to describe the responses of nitrogen retention and plasma urea nitrogen to the relative proportion of methionine to methionine plus cystine in 20-50 kg growing pigs.

Schutte et al. (1991) and Chung and Baker (1992), who indicated in growing pigs (respectively 20 to 50 kg and 10 to 20 kg) that methionine should contribute more than 50% of the total methionine and cystine requirement. In a previous growth assay for 30 to 60 kg and 60 to 90 kg pigs, Roth and Kirchgessner (1989) found that the ratio of methionine to methionine plus cystine, at maximal weight gain or feed efficiency, was more than 55%. This is somewhat higher than either of our estimated values. Several factors may have contributed to the differences in the relative proportion of methionine to methionine plus cystine estimates of growing pigs in the above studies including: 1) use of a different experimental design, i.e. nitrogen balance vs. growth assay, 2) use of different response criteria, i.e., nitrogen retention, plasma urea nitrogen or performance, 3) differing methionine plus cystine content employed in the diets. In addition, young animals use more amino acids for protein accretion than for maintenance compared with older ones. Protein accretion in pigs requires a greater proportion of methionine (Fuller et al., 1989; Mahan and Shields, 1998), while maintenance in pigs requires a greater proportion of cystine (Fuller et al., 1989; NRC, 1998). So the estimated result may also be influenced by age of pig.

For the present experiment, there are some additional factors which may have affected our results. In our design, the test diets were provided with constant levels of methionine plus cystine and varying levels of methionine and cystine. Lewis (2003) indicated that the molecular weight of methionine (149) is greater than that of cysteine (121), and equal weights of these two amino acids provide only 81% as many moles of methionine as cysteine ($121/149 = 0.81$). Thus, on a weight basis, increasing the

methionine to cystine ratio provides a decreasing number of moles of sulfur containing amino acids. In our study, the content of methionine plus cystine was not constant when expressed on a molar basis, which possibly influenced the results to some extent. However, we found that previous experiments also ignored this effect (Roth and Kirchgessner, 1989; Reijmers et al., 2002).

In practical swine diets containing sufficient amounts of the sulfur amino acids, generally cystine is more in excess than methionine. A high cystine intake increased the requirement of methionine plus cystine in pigs, but there was no evidence that excess cystine interferes with methionine (Lewis, 2003). When low protein diets are used in young pigs, perhaps methionine will be lacking. In this case, methionine should be added to meet its requirement, even though methionine plus cystine may appear to be adequate.

CONCLUSION

In the present nitrogen balance trial with an equal feed intake, nitrogen retention and plasma urea nitrogen variables were used to determine the optimum methionine to methionine plus cystine ratio. The data from the two variables were analyzed to fit a quadratic regression, as well as one- and two- slope regression models. By comparing the estimated results from three regression models, the two most precise values, 54.15 and 56.72%, were concluded to be the optimal relative proportion of methionine for nitrogen retention and plasma urea nitrogen responses, respectively. Due to the influence of added crystalline cystine on plasma urea nitrogen, the value 54.15% estimated by nitrogen retention assay, was considered to be the more reasonable result.

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B6

Client: B6
Address: B6

All Medical Records

Patient: B6
Breed: Doberman
DOB: B6

Species: Canine
Sex: Female
(Spayed)

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

Referring Information

B6

Client: B6
Patient: B6

Initial Complaint:

Cardiology Study Appointment

SOAP Text Aug 20 2018 1:58PM - B6

Initial Complaint:

Recheck - B6 - DCM study

SOAP Text Dec 12 2018 12:23PM - B6

Disposition/Recommendations

Client:
Patient:

B6

Client: **B6**
Patient:

Cummings
Veterinary Medical Center
AT TEXAS UNIVERSITY

B6

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

Patient:	B6
Species:	Canine
Breed:	Doberman
Sex:	Female (Spayed)
Age:	B6 Years Old

Lab Results Report

Accession ID:			
Test	Results	Reference Range	Units

B4

3/28

B6

Printed Thursday, December 27, 2018

Client: **B6**
Patient:

Best Available Copy

UCDavis Taurine Level

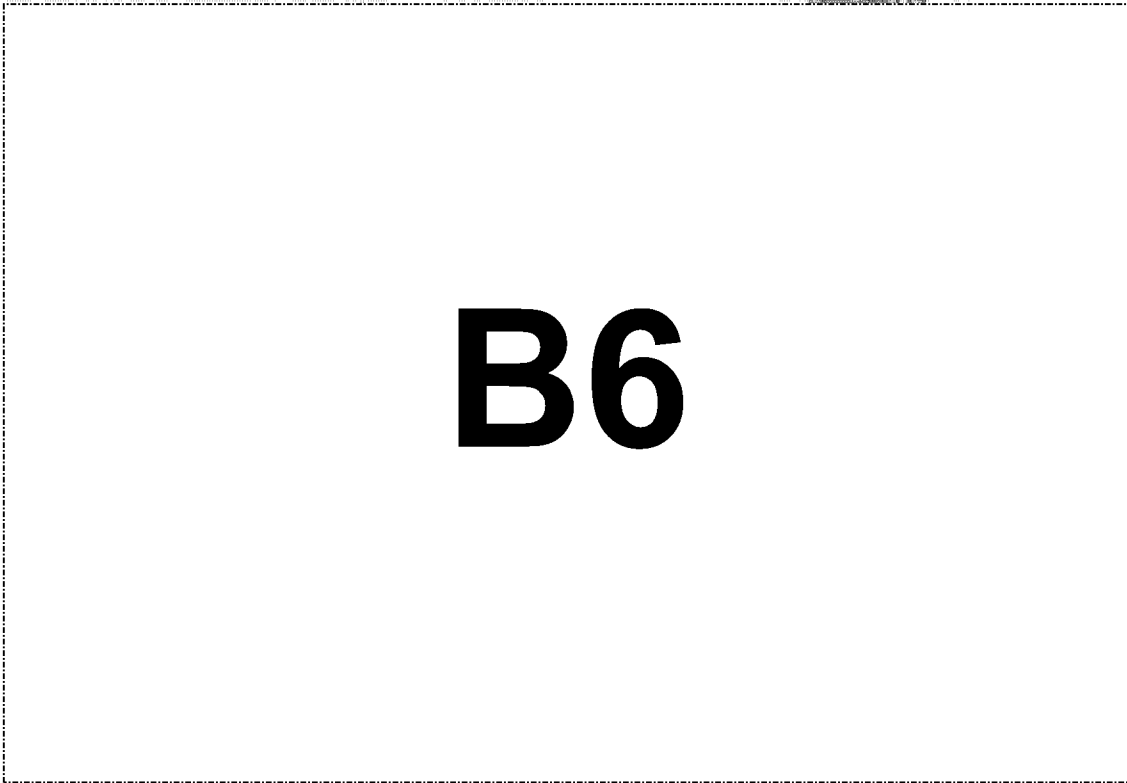
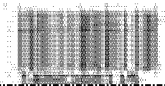
20404

B4

Sample Submission Form

Animal Health Laboratory
University of California, Davis
2020 West Mead Dr
2020 Veterinary Medicine Drive
Davis, CA 95616
Tel: (530) 752-2266 Fax: (530) 752-4444

LABORATORY USE ONLY
Accession Number: _____
Date: _____



B6

Reference Ranges (mmol/L)

	Horses		Horses	
	Normal Range	Low Values May Indicate Taurine Deficiency	Normal Range	High Values May Indicate Taurine Deficiency
Urea	2.0-3.0	1-4	3.0-5.0	>5.0
Crp	0.0-0.2	1-4	2.0-4.0	>4.0

Client:
Patient:

B6

Best Available Copy

Lab Results **B4, B6** CARDIOPET proBNP 12/12/18

B6

Client: **B6**
Patient:

Diet history 12/12/18

Best Available Copy

CARDIOLOGY DIET HISTORY FORM

B6

Please answer the following questions about your pet.

Pet's name: **B6** Owner's name: **B6** Today's date: 12/12/18

- 1. How would you assess your pet's appetite? On a scale of 1 (10) with 1 being poor and 10 being excellent: 10
- 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 changed weight?
 Lost weight Gained weight Stayed about the same weight Don't know
- 4. Please list below (ALL pet foods, people food, treats, snacks, dental chews, chews, and any other food item that your pet currently eats. Please include the brand, variety product, and flavor so we know exactly what your pet is eating.

Food includes specific product and flavor: Farm Amount: 1 bag How often? daily Fed about: Jan 2018
(Examples are given 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 about
Mary Green Free Chicken, Lamb & Sweet Potato Adult	dry	7.5 cups	daily	Jan 2018
80% lean hamburger	moist	4 oz	3x/week	Jan 2018
Phosphor enriched beef bones	meat	1/2	daily	Aug 2018
Beef bones	bone	2 (not sure)	3x/week	Jan 2018
Arma Pet Free Range Turkey Adult	dry	1.5 cups	daily	August 2018
Arma Pet Free Range Turkey Adult (1-2 cups daily) 1 bag Turkey	dry	1 bag	daily	Oct 2018
Arma Pet Free Range (1 Chicken/10 Bones/Adult)	dry	1 bag	daily with 1 bag	August 2018
Ogami and the Super Pet joint butter	softener	1 teaspoon	daily or less	since 2016
Ogami stress relief	softener	1 to 2 teaspoons	daily or less	2017
Steara	meat	1/2 (not sure)	daily or less	since 2016
the Natural essential	dry	1 bag	occasionally	since 2016

*Any additional diet information can be listed at the bottom of this sheet

- 5. Do you give any dietary supplements to your pet (for example: vitamins, glucosamine, fatty acids, or any other supplement)? Yes No. If yes, please list what, how and give brand and volume:

Taurine	<input type="checkbox"/> Yes <input type="checkbox"/> No	Amount per day: _____
CoQ10	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
Artichoke	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
Melatonin	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
Fish oil	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (if necessary, specify amount)	1 tsp for 20 lbs, 2 tsp for 40 lbs
Colony's Q10	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
Other (please list):		
Example: vitamin C		
Thromin	1 bag	1 bag 100 mg tablets - 1 per day 1 tablet once 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 Pucker or similar product
 I put them in food (not food) (not the product) or the half of peanut butter and one tablet. The rest of pills which supply are in it
- Additional diet or supplement information: _____
- Information below to be completed by the veterinarian:
Current body weight: _____ kg Current body condition score (1-5): _____
Muscle Condition Score: normal muscle mild muscle loss moderate muscle loss severe muscle loss

Client:
Patient:

B6

Best Available Copy

Diet history 8/20/18

CARDIOLOGY DIET HISTORY FORM

Answer the following questions about your pet

Pet's name: **B6** Owner's name: **B6** Today's date: **8/20/18**

1. How would you assess your pet's appetite? (mark the point on the line 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

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 you pet is eating.

Food include specific product and flavor Form Amount How often? Fed since
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
Aspen Grain Free Chicken, Lentil & Sweet Potato Adult	dry	1 1/2 cups	Twice	Jan 2018
95% lean hamburger	refrigerated	3oz	Twice	Jan 2018
Purina original beef flavor	meal	1/2	Twice	Aug 2018
Rawhide	meal	4 inch long	twice	Jan 2018
Mina Food Inc. Turkey		1.5 cups	2x/day	9/18
Bluebonnet's gelatinous		handful	twice/day	1/18
Apples - organic pumpkin		"	twice/day	1/18
Macaroni		1/2 cup	twice	1/18
Organic french butter		1 teaspoon	twice	1/18
Boiled eggs		1 slice	twice	1/18
Crackers		20	twice	1/18

*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	_____
Cartilage	<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 regular food
- I put them in a Pill Pocket or similar product
- I put them in foods (not foods) in french butter / brownie / ground food

Client: **B6**
Patient:

Vitals Results

B6

Client:
Patient:

B6

ECG from Cardio

B6

4/22/2019 1:28:13 PM Page 9 of 10
Full Name:
Full Name (last, first, middle)
Address:

B6

Client:
Patient:

B6

ECG from Cardio

B6

ADDITIONAL INFORMATION: Page 2 of 2
Call to: 1-800-368-7000
For more information, visit: www.fda.gov
3/20/2019

B6

Client:
Patient:

B6

ECG from Cardio

B6

4/27/2014 11:25:45 AM
Name: [Redacted]
Title: [Redacted]
[Redacted]

B6

Client:
Patient:

B6

Patient History

B6	12:48 PM	UserForm
	01:07 PM	Treatment
	01:20 PM	UserForm
	01:25 PM	Vitals
	01:26 PM	Purchase
	01:27 PM	Purchase
	01:27 PM	Purchase
	09:42 AM	Appointment
	07:22 PM	Appointment
	11:04 AM	UserForm
	11:07 AM	Treatment
	11:59 AM	Purchase
	11:59 AM	Purchase
	12:09 PM	UserForm
	12:24 PM	Purchase
12:47 PM	Appointment	

B6

B6

Discharge Instructions

B6

Admit Date: [Redacted]
Discharge: **B6** 3/19/16

Diagnosis: Apparently healthy animal!

Clinical Findings: On physical exam, her heart rate had mild irregularities called an arrhythmia. Her arrhythmia is called sinus arrhythmia, which happens when the heart rate decreases and increases with respiration. This is a normal finding in dogs. On auscultation, there was no murmur heard at this time. Her physical exam was within normal limits.

Electrocardiogram (ECG) Findings:

The electrocardiogram today found no evidence of Unilateral Cardiac Hypertrophy at this time. She does have slight decreased contractility of the heart, which is something that does not need to be treated at this time; however, it is something to monitor in the future. The ECG showed a sinus arrhythmia, which is consistent with our auscultation.

Monitoring at Home:

B6

Diet Suggestions:
We would like to change **B6** to a low sodium diet. A low diet option would be:

Dry Food:

Royal Canin Early Cardiac diet

Purina Canin 6367

(Nutrena Pet Adult Weight Management (this does not have low calories in spite of the name of the food))

B6

Please visit our HeartSmart website for more information:
<http://vet.aafp.org/heartsmart/>

B6

B6

For change instructions

Cummings Veterinary Medical Center

AT TUFTS UNIVERSITY

Cardiology Hours: 508-857-4676

B6

Patient ID: **B6**

B6
B6

Gender:

Years Old Female (Spayed) Doberman

Black/Tan

Cardiology Appointment Report

Date: 8/20/2018

Attending Cardiologist:

B6

Cardiology Resident:

B6

Cardiology Technician:

B6

Student:

B6

B6

Shortness of breath or difficulty breathing? No

Syncope or collapse? No

Sudden onset fatigue? No

Exercise intolerance? No

Current Medications Pertinent to CV System:

Medications: Thyro-Tab (0.5 mg tablets)

Formulation/Tab Size: 1 tab PO BID

Administration Frequency: q 12 hrs

Need refills? No

Cardiac Physical Examinations:

General PE:

MIM Color and CRT: pink and moist,

CRT < 2 seconds.

B/S (1-9): 4/9

BW (kg): 38.1

Heart rate: 104 bpm

Respiratory rate: panting, normal effort.

Temp (if possible):

Muscle conditions:

Normal

Mild muscle loss

Moderate cachexia

Marked cachexia

Cardiovascular Physical Exam:

Murmur Grade:

None

1/6

2/6

3/6

4/6

5/6

6/6

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

Pulsus deficit

Pulsus paradoxus

Other:

Arrhythmias:

None

Sinus arrhythmia

Inappropriate brady

Bradycardia

Tachycardia

Gallop:

Yes

No

Intermittent

Intermittent

Other:

Pulmonary auscultation:

Normal

Mild dyspnea

Marked dyspnea

Pulmonary crackles

Wheezes

Upper airway stridor

Normal IV cavities

Abdominal issues:

- Normal
- Hepatomegaly
- Abdominal distension

- Mild ascites
- Marked ascites

Problems:

Apparently healthy animal
Genetic predisposition to DCM

Differential Diagnosis:

DCM

Diagnostic plan:

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

Echocardiogram Findings:

General/2-D findings:

Normal LV wall thicknesses with normal IV cavity size and no LA enlargement. Mild thickening of the MV. Mildly decreased contractile function.

Doppler findings:

WNI

Mitral inflow:

- Summated
- Normal
- Delayed relaxation
- Pseudonormal
- Restricted flow

ECG findings:

sinus arrhythmia

Assessment and recommendations:

Normal cardiac structure, although the contractile function is mildly decreased. This may be indicative of early cardiomyopathy. Taurine levels were submitted for analysis, and the patient will be switched off of the grain free diet. If contractile function is not improved at the 4 month recheck despite change in diet, then we should submit a NT-proBNP to help us diagnose if the change is indicated of primary DCM and not diet related.

Final Diagnosis:

Mild MMVD

R/O diet-related vs. primary DCM related mild decrease in contractile function vs normal variation

Heart Failure Classification Score:

ISACH Classification:

- I_a
- II_{ts}

- I5
- I1

I1b

ACVIM Classifications:

- A
- B1
- B2

- C
- D

M-Mode

- IVSd
- IVId
- IVPWd
- IVSs
- IVIs
- IVPWS
- AVDiam
- LA Diam
- LA/Ao
- Max LA

B6

- cm
- cm
- cm
- cm
- cm
- cm
- %
- cm
- cm
- cm

M-Mode Normalized

- IVSdN
- IVIdN
- IVPWdN
- IVSsN
- IVIsN
- IVPWSN
- AVDiam N
- LA Diam N

B6

- (0.29 - 0.52)
- (1.35 - 1.73)
- (0.33 - 0.53)
- (0.43 - 0.71)
- (0.79 - 1.14)
- (0.53 - 0.78)
- (0.68 - 0.89)
- (0.64 - 0.90)

2D

- SA LA
- AVDiam
- SA LA / AVDiam
- IVId AAC
- IVIdV MOD AAC
- IVIs AAC
- IVIsV MOD AAC
- IVET MOD AAC
- SV MOD AAC

B6

- cm
- cm
-
- cm
- ml
- cm
- ml
- ml
- %
- ml

Doppler

- MV E Vel
- MV DecT
- MV A Vel
- MV E/A Ratio
- E'

B6

- m/s
- ms
- m/s
-
- m/s

A'
L/E'
PV Vmax
PV maxPG
AV Vmax
AV maxPG

B6

m/s
m/s
mmHg
m/s
mmHg

B6

Discharge Instructions

B6

Admit Date: 8/1/23 PM
Discharge Date: **B6**

Diagnosis:
Mild decreased contractile function

B6

B6

Diet Recommendations:

Please continue feeding **B6** a Purina Pro Plan Weight Management dry food and 10% Sodium Diet adult beef and barley kibble. These foods are low in sodium and do not have low calories despite the name.

Exercise Recommendations:

B6 does not need any exercise restriction at this time.

Recommended Medications:

B6 does not need any cardiac medications at this time.

Recheck Visits:

A recheck appointment scheduled with Dr. [redacted] **B6** at this time we will schedule an echocardiogram.

Thank you for entrusting us with **B6** care. Please contact our Cardiology team at (304)-787-4674 or email us at cardiovet@tulane.edu for scheduling and non-emergent questions or concerns.

Sincerely,

B6

Please visit our HeartSmart website for more information:
<http://www.tulane.edu/heartsmart/>

B6

B6

B6

B6 10yr Old Female (Spayed) Doberman
Black/Tan

Cardiology Appointment Report

Date: 12/12/2018

B6

Presenting Complaint:

Mild MMVD

Mild decreased contractile function R/O diet-related vs. primary DCM related mild decrease in contractile function vs normal variation

DCM Study

B6

B6

Current Medications Pertinent to CV System:

Medication: Thyro-Tabs 115 mg tablets

Formulation/Tab Size: 1 tab P/B/B

Administration Frequency: q 12 hrs

Need refill? No

Cardiac Physical Examination:

General PE: 2 small S2 murmurs, 1

mitral regurg, 1 S1 murmur 1 flank

MM Color and CRT: pink, CRT <2s

ICS (L-9): 4/9

BW (kg): 35.1

Heart rate: 146

Respiratory rate: 110 (panting, NE)

Temp (if possible):

Muscle condition:

Normal

Mild muscle loss

Moderate contract

Marked contract

Cardiovascular Physical Exam:

Murmur Grade:

None

1/6

1/4

3/4

N/A

1/6

1/4

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

Pulse paradoxus

Other:

Arrhythmic:

None

Sinus arrhythmia

Premature beats

Bradycardia

Tachycardia

Gallop:

Yes

(Pre-systolic)

- No
- Inconsistent

Other:

Pulmonary assessments:

- Eupnea:
- Mild dyspnea
- Marked dyspnea
- Normal RV sounds

- Pulmonary crackles
- Wheezes
- Upper airway stridor

Abdominal exam:

- Normal
- Hepatomegaly
- Abdominal distension

- Mild ascites
- Marked ascites

Problems:

Mild MMVD

Mildly decreased contractile function r/o diet related vs. primary DCM related mild decrease in contractile function vs normal variation

Diagnostic plan:

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

- EKG compatible
- Thoracic radiographs
- NT-proBNP
- Troponin I
- Other tests

Echocardiogram Findings:

B6

ECG findings:

Sinus rhythm during the echocardiogram.

Assessment and recommendations:

B6

B6

Final Diagnosis:

- Very early (MMV)
- Mild decreased contractile function c/o diet-related vs. primary DCM related mild decrease in contractile function vs normal variation

Heart Failure Classification Score:

ISACH Classification:

- | | |
|--|---|
| <input type="checkbox"/> Ia | <input type="checkbox"/> IIa |
| <input checked="" type="checkbox"/> Ib | <input checked="" type="checkbox"/> IIb |
| <input type="checkbox"/> II | |

ACVIM Classification:

- | | |
|--|---------------------------------------|
| <input type="checkbox"/> A | <input type="checkbox"/> C |
| <input checked="" type="checkbox"/> B1 | <input checked="" type="checkbox"/> D |
| <input checked="" type="checkbox"/> B2 | |

M-Mode

IVSd

IVIdd

LVFWd

IVSs

IVIdc

LVFWs

LVV(Teich)

ESV(Teich)

EF(Teich)

WPS

SV(Teich)

Ao Diam

LA Diam

LA/Ao

Max LA

B6

ZD

SA LA

Ao Diam

SA LA / Ao Diam

IVSd

IVIdd

LVFWd

LVV(Teich)

IVSs

IVIdc

B6

LVPMs
ESV(Teich)
LF(Teich)
NFS
SV(Teich)
LVld AAC
LVEIN MOD AAC
LVLs AAC
LVESV MOD AAC
LVEI MOD AAC
IV MOD AAC

B6

mmHg
mmHg
mmHg
mmHg
mmHg
mmHg
mmHg
mmHg
mmHg
mmHg
mmHg

Diastolic
MV E Vel
MV DecT
MV Dec Slope
MVA Vel
MV E/A Ratio
E'
E/E'
A'
AV Vmax
AV meanPG
PV Vmax
PV meanPG

B6

m/s
m/s
m/s
m/s

m/s

m/s
m/s
mmHg
m/s
mmHg

B6

B6

B6 Female (Spayed)
Color: Cobweb or Black/Tan
4/26/19

8/24/2018

B6

Cummings
Veterinary Medical Center
AT TUFTS UNIVERSITY

B6

B6

B6

Female (Spayed)

Case: Dobberman Black/Tan

406154

12/19/2011

B6

B6

Client:
Address:

B6

All Medical Records

Patient: **B6**
Breed: Irish Wolfhound
DOB: **B6**

Species: Canine
Sex: Male

Referring Information

B6

Client: **B6**
Patient:

Initial Complaint:

Emergency

SOAP Text Mar 28 2016 10:34PM - **B6**

B6

Exam:

Client: B6
Patient:

B6

Referral Diagnostics:

Diagnostics Completed:

Diagnostics Pending:

Treatments Completed:

0.2mg/kg butorphanol SQ as an antitussive

Assessment (A)

A1: Infectious tracheobronchitis - recent exposure to other dogs, young dog

Plan (P)

TGH

600 doxycycline PO BID

10mg hycodan PO BID PRN for coughing

Communication Summary: Owner was concerned for pneumonia - discussed with owner that all of B6 signs were upper respiratory and that while infectious tracheobronchitis can progress to pneumonia, B6 does not show any signs of that at this time. He seems very stable and I recommended treating with oral antibiotics and antitussive to keep him from coughing so much. Owner ok with this plan, discussed reasons he would need to be rechecked or signs that B6 was getting worse.

Additional requests submitted:

Estimate given: \$

Deposit collected: \$

Initial Complaint:

Emergency

SOAP Text Jun 7 2017 10:44PM - B6

6/8/2017 5:57:00 AM EXAM, GENERAL

Ingestion of wooden skewer this evening

Subjective (S)

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

B6

Objective (O)

B6

Assessment (A)

A1: Skewer Ingestion

Plan (P)

B6

SOAP completed by **B6** DVM

6/7/2017 10:45:00 PM

B6

Initial Complaint:

wooden skewer ingestion

SOAP Text Jun 8 2017 12:55PM - **B6**

6/8/2017 12:57:58 PM NEW VISIT (ER)

Doctor: **B6**

Student: ---

Presenting complaint: Ate wooden skewer ~12 inches, with beef teriyaki, doesn't think he chewed it ~12-18 hours ago

Referral visit? seen by ER last night

Diagnostics completed prior to visit -

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

HISTORY:

B6 2yo IM Wolfhound presenting for ingestion of ~12" wooden skewer 12-18 hours ago. Seen by ER last night right after, attempted to induce emesis with apomorphine - no emesis. Discussed with them imaging vs. endoscopy vs. surgery - at the time owner didn't have money for a deposit and sent home with high fiber diet and instructions to monitor. Since discharge **B6** vomited small amount last night, had decreased appetite this morning. Owner got together money for a deposit today is is interested in addressing the issue now.

EXAM:

B6

Assessment (A)
A1: Skewer Ingestion

PLAN:

B6

SOAP approved (DVM to sign): **B6** DVM MS

Initial Complaint:
New - echo, low taurine

SOAP Text Nov 8 2018 12:33PM - **B6**

Client:
Patient:

B6

Disposition/Recommendations

Client:
Patient:

B6

Client: **B6**
 Patient:

B6

Client: **B6**
 Veterinarian:
 Patient ID: 337144
 Visit ID:

Patient: **B6**
 Species: Canine
 Breed: Irish Wolfhound
 Sex: Male
 Age: **B6** Years Old

Lab Results Report

Nova Full Panel-ICU **6/8/2017 1:13:25 PM** **Accession ID: B6**

Test	Results	Reference Range	Units
SO2%	B6	94 - 100	%
HCT (POC)		38 - 48	%
HB (POC)		12.6 - 16	g/dL
NA (POC)		140 - 154	mmol/L
K (POC)		3.6 - 4.8	mmol/L
CL(POC)		109 - 120	mmol/L
CA (ionized)		1.17 - 1.38	mmol/L
MG (POC)		0.1 - 0.4	mmol/L
GLUCOSE (POC)		80 - 120	mg/dL
LACTATE		0 - 2	mmol/L
BUN (POC)		12 - 28	mg/dL
CREAT (POC)		0.2 - 2.1	mg/dL
TCO2 (POC)		0 - 0	mmol/L
nCA		0 - 0	mmol/L
nMG		0 - 0	mmol/L
GAP		0 - 0	mmol/L
CA/MG		0 - 0	mol/mol
BEeef		0 - 0	mmol/L
BEb		0 - 0	mmol/L
A		0 - 0	mmHg
NOVA SAMPLE		0 - 0	



Client: **B6**
Patient:

FiO2	B6	0 - 0	%
PCO2		36 - 44	mmHg
PO2		80 - 100	mmHg
PH		7.337 - 7.467	
PCO2		36 - 44	mmHg
PO2		80 - 100	mmHg
HCO3		18 - 24	mmol/L

Nova Full Panel-ICU **11/8/2018 3:31:21 PM** **Accession ID: **B6** 9454**

Test	Results	Reference Range	Units
Troponin I Research - FHSA	B6	0 - 0.08	mg/dl



8/74

B6

Printed Monday, December 03, 2018

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

Administrative Adjustment Form

B6

FOSTER HOSPITAL FOR SMALL ANIMALS
REQUEST FOR DISCOUNT

Date: 04-04-16 Patient ID No: 337144
Requested by: **B6** Client Name: **B6**
Animal Name: _____
TYPE OF DISCOUNT:
 Courtesy Allowance (26) Travis (5)
 Professional Discount (25) Travis Intern Account (5A)
 Administrative Adjustment (27)

Clinician to be assigned the deduction _____
(Must be filled in by Hospital Administration)

Zeus Veris Fund (8): _____
Dr. Lisa Barber / Dr. Kristina Burgess Date **B6**

Justification:
Client unhappy with diagnosis & dog
next day at another hospital did have
pneumonia
We were extremely busy here when dog
presented, would have needed sedation for chest
xrays, & not a definite indication at that time.

Reason for Adjustment (Code 2, 3, 4, 5 as noted below): 1, 3

Owner Contacted: Yes () By Whom: **B6**

Hospital Administrator: Richard Harding Date _____ Codes:
Medical Director: Dr. William Reusch Date _____ 1) Communication
Assoc. Medical Directors: **B6** Site de Laforcade 04-04-16 Date _____ 2) Misc. Errors / Issues
Accounting Manager: Dorothy Dawson Date _____ 3) Medical Treatment
Billing Coordinator II: Nancy Cronin Date _____ 4) Financial Aest. Only
Accounting Asst. Supv: _____ Date _____ 5) Unfunded / Goodwill Only
(Less than \$100)

Client
Patient

B6

B6

AH records

B6

Patient Chart

B6

B6

B6

B6

B6

Client: **B6**
Patient:

B6 AH records

B6 **B6** Page 11

Date	By	Code	Description	On (Mechanical) Notes
09-17-19				
10-07-19				
09-11-19				
09-25-19				
09-28-19				
09-27-19				

B6

Test Results Chart Date: 09/27/19 2:00p

Test	Result	Chart	Normal Range	Notes
WBC				
RBC				
MCV				
MCHC				
HCT				
Hemoglobin				

B6

Client:
Patient:

B6

B6 AH records

Date	By	Code	Description	Qty (Actual)	Price
B6					
B6					
B6					

Client:
Patient:

B6

B6

AH records

B6

Client: **B6**
Patient:

B6 AH records

B6

ASSESSMENT SECTION

INDEX

B6

DIAGNOSES
Clinical

PLAN SECTION

NOTES

00-20-19

00-20-19

B6

Client: **B6**
Patient:

B6 AH records

B6

10/21/17 TC: 0000 Amplitude
10/25/17 **B6**
10/26/17
10/27/17
10/28/17
10/29/17
10/30/17
10/31/17
11/01/17
11/02/17
11/03/17
11/04/17
11/05/17
11/06/17
11/07/17
11/08/17
11/09/17
11/10/17
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12/24/17
12/25/17
12/26/17
12/27/17
12/28/17
12/29/17
12/30/17
12/31/17

B6

Client: **B6**
Patient:

B6 AH records

B6

B6

B6

B6

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

B6 AH records

B6 **B6**
Date: Day Code Description On (Medical) Plan Page 17

B6

OBJECTIVE SECTION

DEFINITIONS

B6

ASSESSMENT SECTION

B6

PLAN SECTION

ASSESS

B6

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

B6 AH records

Date	Time	Description	City (Address) Phone
01-17-17		B6	B6
01-17-17		B6	
01-17-17		B6	
01-17-17		B6	

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

B6 AH records

Date	By	Code	Description	City (Address)	Phone
04-08-17		785078	By: Dr. Dr. 300		
B6					
04-08-17		785078	By: Dr. Dr. 300		
B6					
04-11-17		785078	By: Dr. Dr. 300		
B6					
04-11-17		785078	By: Dr. Dr. 300		
B6					
04-11-17		785078	By: Dr. Dr. 300		
B6					
04-11-17		785078	By: Dr. Dr. 300		
B6					

Client: **B6**
Patient:

B6 AH records

Date	By	Code	Description	On (Medical) Place
02-11-17			B6	
02-20-17			B6	
02-21-17			B6	
02-22-17			B6	
02-23-17			B6	
02-24-17			B6	
02-25-17			B6	
02-26-17			B6	
02-27-17			B6	
02-28-17			B6	
02-29-17			B6	

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

B6 AH records

B6 **B6** **B6**

Date	By	Code	Description	On (Medical) Photo
Apr 20			Weight 151.12 Temp 101.00 Pulse 88/50 CRP 1.00	

SUBJECTIVE SECTION

B6

SUBJECTIVE SECTION

B6

LABORATORIES
Albumin

B6

B6

ASSESSMENT SECTION

HOUSING

B6

DIAGNOSIS
Dermatitis

PLAN SECTION

Client: B6
Patient: B6

B6 AH records

B6 B6 Page 22

Date By Code Description Qty (Medical) Photo

ENCLOS

B6

12-11-19 Management of B6 (Ammonium) [117] 1-12550-64-0000 (PAC)

B6

12-08-19 WASTE By: DIV. Lab Services

B6

12-06-19 WASTE By: DIV. Lab Services

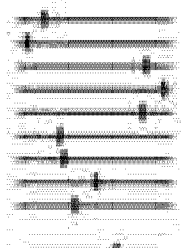
12-05-19 WASTE By: DIV. Lab Services

12-05-19 AV 50000 Amphotericin
22 First Author (Amph)
ABX1 Last Author (Amph)
PATENT: US 2015/0113018 A1

Test Result Use Normal Range Minimum

CHEM 18-04-NORM 12-05-19 7:52a

Test	Result	Use	Normal Range	Minimum
ALP				
ALT				
ALBUMIN				
TOTAL BILIRUBIN				
CREATININ				
BUN				
CHOLESTEROL				
GLUCOSE				
ALBUMIN/DENAT				
BILIRUBIN FRACTION				
UREA				



B6

Test Result Use Normal Range Minimum

REF: STANDARD 12-05-19 7:52a

B6

Client: **B6**
Patient:

B6 AH records

Client: [Redacted] Page: 11

Item	Qty	Code	Description	Qty (Normal)	Units
WBC					
HGB					
HCT					
MCV					
MCH					
MCHC					
% NEUTROPHILS					
% LYMPHOCYTES					
% MONOCYTES					
% EOSINOPHILS					
% BASOPHILS					
PLATELET					
WBC DIFFERENTIAL					
LYMPHOCYTE					
MONOCYTE					
EOSINOPHIL					
BASOPHIL					
Text					
PLATELET PLUS 10 PLATELET					
HEMATOCRIT					
PLATELET COUNT					
WBC					
PLATELET COUNT					

B6

B6

B6

Item	Result	Units	Normal Range	Measure
------	--------	-------	--------------	---------

Client: **B6**
Patient:

B6 AH records

Page 11

B6	B6			
Date	By	Code	Description	Organizational Place
B6				

Page 11 of 24
SUBJECTIVE SECTION

B6

OBJECTIVE SECTION
APPENDICES

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

B6 AH records

B6 **B6** **Page 11**
Date: 11/07/18 Time: 10:20a
Name: By: Code: Description: City: Address: Phone:

B6

ASSESSMENT SECTION

11/07/18

B6

11/07/18

PLAN SECTION

11/07/18

B6

11/07/18

Client:
Patient:

B6

B6

AH records

B6

B6

Date	By	Code	Description	City (Optional)	Phone
06-17-16					
06-16-16					
06-15-16					

B6

B6

B6

B6

Client: **B6**
Patient:

B6 AH records

Client: **B6** Page: 11

Date	By	Code	Description	City (Address) Phone
------	----	------	-------------	----------------------

INTERPRETATION

B6

ASSESSMENT SECTION

NOTES

B6

PLAN SECTION

NOTES

B6

00-00-10

00-00-10

Client: **B6**
Patient:

B6 AH records

B6 **B6** Page 111

Date: By: Code: Description: City (Address) Phone:
Age: 12m - Weight: 100.00 - Temp: 102.50
HR: 120 - RR: 20 - SpO2: 95

ADJECTIVE SECTION

B6

OBJECTIVE SECTION

B6

ASSESSMENT SECTION

DISPOSITION:

- 06-22-18
- 06-23-18
- 06-24-18
- 06-25-18
- 06-26-18

B6

Client:
Patient:

B6

B6 AH records

B6

Client: [Redacted]

Page: 28

Date	By	Code	Description	City (Address) State
06/28/18				
06/28/18				
06/28/18				

B6

Agar Test: [Redacted]
BCG: [Redacted]

SUBJECTIVE SECTION

B6

PROBABLE LIST

Common: [Redacted]

SUBJECTIVE SECTION

B6

Client: **B6**
Patient:

B6 AH records

B6 **B6**
Date: 11/07/18 Time: 10:20a
Page: 30

Date	By	Code	Description	Qty (Actual)	Price
------	----	------	-------------	--------------	-------

Injection
F. Dental Anest.

B6

PLAN 521

TREATMENT PLAN

B6

06-17-18

B6

06-17-18

06-25-18

04-19-18

01-24-18

04-05-18

03-29-18

01-28-18

B6

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

B6 AH records

B6 **B6**
Date: 11/07/18 Time: 10:26 AM Page: 27
Date: By Code Description Qty (Annotated) Price

02-17-18

02-15-18

B6

Age: 10 Weight: 127.00

SUBJECTIVE SECTION

At work, stress every

02/07/18

Complaints: Internal

12-02-18

10-01-18

08-03-18

06-25-18

07/02/18

04/03/18

01/16/18

02/08/18

02/02/18

B6

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

Taurine results from UC Davis

Verizon 7:55 PM

Done T_22325.pdf

Veterinarian Contact: Dr. [B6]

Clinic/Company Name: [B6]

Address: [B6]

Email: [B6]

Telephone: [B6] Fax: [B6]

Billing Contact: [B6] Email: [B6]

Patient Name: [B6] Species: Cat

Breed: Irish Wolfhound Owner's Name: [B6]

Current Diet: Acana Lamb & Apple Singles

Sample type: Plasma Whole Blood Urine Food Other Tissue

Test: Taurine Complete Amino Acids Other: _____

Taurine (Plasma only)

Plasma: [B6] Whole Blood: _____ Urine: _____ Food: _____

	Plasma (nmol/ml)		Whole Blood (nmol)	
	Normal Range	No known risk for deficiency	Normal Range	No known risk for deficiency
Cat	80-120	>40	300-600	
Dog	60-120	>40	200-350	

* Please note with the recent increase in the number of dogs screened for taurine we are seeing dogs with values within the reference ranges (or above the "No known risk 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]

[B6] - 11/8/2018

Client: [B6]
Name: [B6]
Species: [B6]
Sex: [B6]
Age: [B6]

Base: [B6]
Supplement: [B6]
Accession: [B6]
Ordered by: [B6]

100.00 %
100.00 %
100.00 %
100.00 %
100.00 %

CARDIOPULMONARY CANINE

CARDIOPULMONARY CANINE [B6] [B6]

[B6]

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

B6 Troponin



B6



Website/Email ID: Cardiovet@ufl.edu OR clinpath@ufl.edu

CLIA Lab Assigned Clinic ID: 11466

Dr. Name:
B6

Phone:
Fax:
Animal Name:
Client Name:
Species:
Date Received:

B6

B6

Case:
Mon 02, 2019

CLIA Lab Location: 888888

Test	Result	Reference Interval	Assay Date
Ultra-Sensitive Troponin I (Fasting)	B6	0.005	1/2/2019

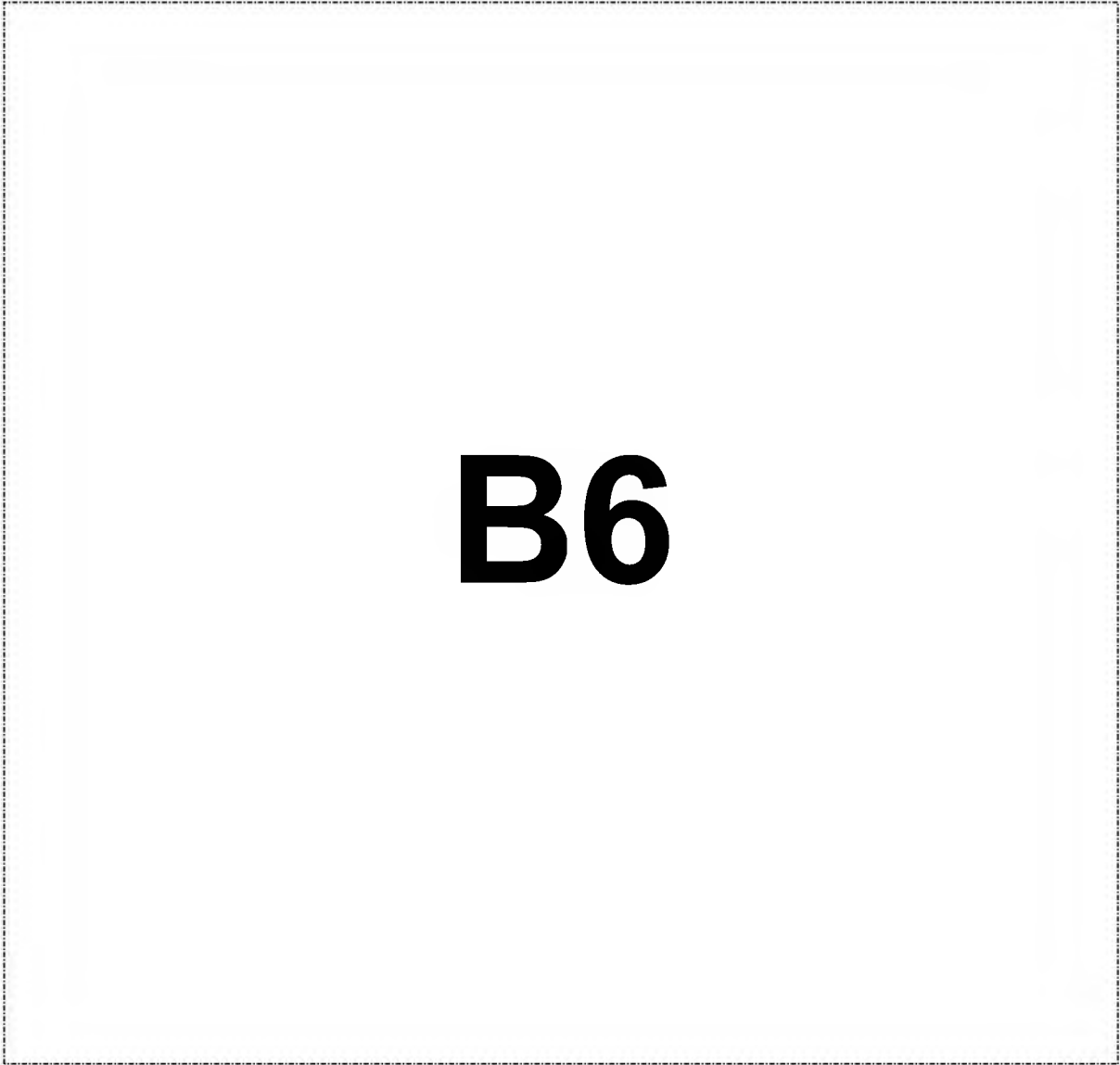
B6

Comments:

B6

Client: **B6**
Patient:

B6 Troponin



B6

Client: **B6**
Patient:

UCDavis Taurine Level

2019

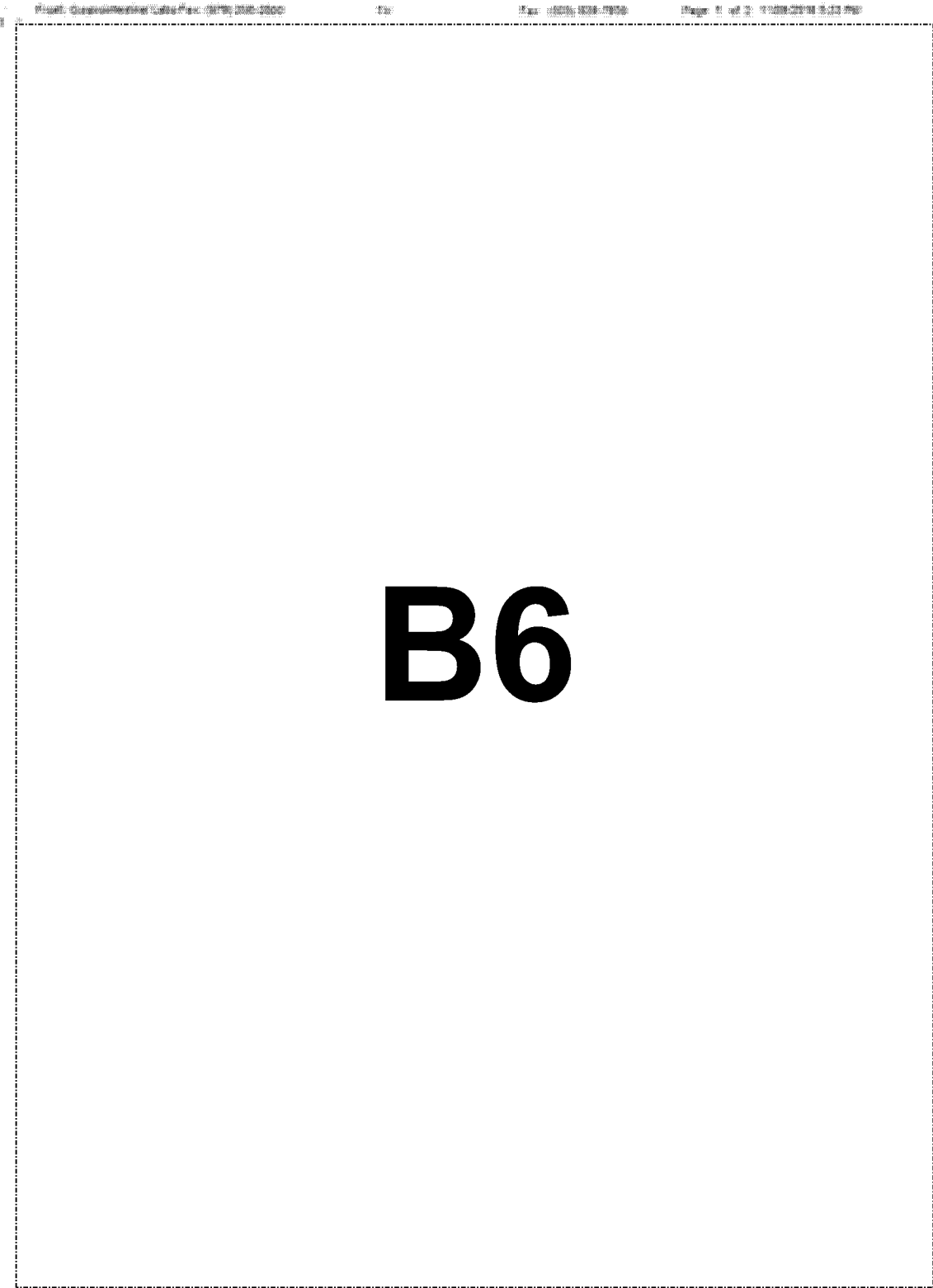
B6

	Plasma (mMol/L)		Whole Blood (mMol/L)	
	Normal Range	No known risk for deficiency	Normal Range	No known risk for deficiency
Cat	60-120	>40	300-600	>300
Dog	60-120	>40	300-350	>190

* Please note with the recent increase in the number of dogs screened for taurine deficiency, we are seeing dogs with values within the reference range 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:

Gastrointestinal Lab: **B6** 11/08/18



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

Gastrointestinal Lab **B6** 11/08/18

From: Gastrointestinal Lab Fax: (202) 205-2020 To: B6 Page 2 of 2 11/08/2018 10:17 AM

B6

Important
Notice:

Internal Medicine Conference

Join us for a unique continuing education event in Pattaya, Thailand Oct 29 through Nov 2, 2018. For details see <http://www.imconference.tamu.edu>

B6

GI Lab Contact Information

From: **B6**
To: **B6**

From: **B6**
To: **B6**

Client:
Patient:

B6

Lab Results Amino Acid Lab 11/08/18

B6

Client: **B6**
Patient:

Lab Results Amino Acid Lab 11/08/18

UNIVERSITY OF CALIFORNIA, DAVIS



B6

FREQUENTLY REQUESTED INFORMATION REGARDING TAIKINE & DELATED
CARDIOMYOPATHY IN GOLDEN RETRIEVERS

B6

Page 1 of 1

Client: **B6**
Patient:

Lab Results Amino Acid Lab 11/08/18

Clinical Recommendations for Amino Acids Based on Sample Levels:

B6

Client: **B6**
Patient:

Lab Results Amino Acid Lab 11/08/18

Printed on: 11/08/18 10:00 AM

B6

Client: **B6**
Patient:

Lab Results Amino Acid Lab 11/08/18



CARDIOLOGY SERVICE UPDATES: DOG FOOD & DILATED CARDIOMYOPATHY

B6

Client: B6
 Patient: B6

Diet history 11/8/18

CARDIOLOGY DIET HISTORY FORM

Please answer the following questions about your pet.

33-3144

Pet's name: B6 Owner's name: B6 Today's date: 11/8/18

1. How would you assess your pet's appetite? (mark the point on the line 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)
 Same about the same amount as usual Only less than usual More than usual
 I usually prefer different foods from 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, snacks, 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.

Food (include specific product and flavor) _____ Form _____ Amount _____ How often? _____ Fed since _____
 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
Mixto Grain Free Chicken, Lamb, & Sweet Potato Adult	dry	1 1/2 cup	daily	Jan 2018
ROYAL CANIN DIET	moistened	3 oz	Twice	Jan 2018
Purina ProPlan Soft Food	Wet	5	twice	Aug 2018
Rawhide	chew	2 each week	Twice	Jan 2018
<i>Mixto Grain Free Chicken & Sweet Potato Adult</i>	<i>dry</i>	<i>1 1/2 cup</i>	<i>daily</i>	<i>Jan 2018</i>
<i>Purina ProPlan Soft Food</i>	<i>Wet</i>	<i>5</i>	<i>twice</i>	<i>Aug 2018</i>
<i>ROYAL CANIN DIET</i>	<i>moistened</i>	<i>3 oz</i>	<i>Twice</i>	<i>Jan 2018</i>

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

5. Do you give any dietary supplements to your pet (ie essential vitamins, glucosamine, fatty acids, or any other supplements)? Yes No. If yes, please list what you give and give brand and amount.

	Brand/Concentration	Amount per day
Taurine	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	_____
Carbonyl	<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	Brand's Brand	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 regular food.
 I put them in a Pill Pocker or similar product.
 I put them in treats (dog treats).

Client: **B6**
Patient:

Vitals Results

B6	7:44 PM	Nursing note	B6
	1:36 PM	Heart Rate (/min)	
	1:37 PM	Respiratory Rate	
	1:38 PM	Temperature (F)	
	0:04:53 AM	Weight (kg)	

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

ECG from Cardio

B6

B6

B6

B6

Client:
Patient:

B6

ECG from Cardio

B6

03/26/2009 10:00:07 AM

Page 3 of 4

B6

B6

Client:
Patient:

B6

ECG from Cardio

00000000 000000

11/24/2004 10:00:00 AM

B6

B6

Client: **B6**
Patient:

Patient History

	08:35 PM	UserForm	
	08:36 PM	Purchase	
	10:53 PM	Treatment	
	10:55 PM	Prescription	
	11:03 PM	UserForm	
	11:04 PM	Purchase	
	11:04 PM	Prescription	
	11:04 PM	Purchase	
	11:04 PM	Purchase	
	06:01 AM	UserForm	
	06:01 AM	Email	
	11:12 PM	Purchase	
	11:25 PM	UserForm	
	11:38 PM	Purchase	
	11:38 PM	Treatment	
	11:30 PM	UserForm	
B6	11:34 PM	Treatment	B6
	11:34 PM	Deleted Reason	
	11:34 PM	Treatment	
	11:34 PM	Vitals	
	11:41 PM	Vitals	
	11:41 PM	Vitals	
	11:41 PM	Vitals	
	11:38 AM	UserForm	
	11:38 AM	Email	
	11:40 AM	Appointment	
	11:04 AM	UserForm	
	11:04 AM	Vitals	
	11:07 AM	Treatment	
	11:14 AM	UserForm	
	11:30 AM	Purchase	
	11:31 PM	Labwork	
	11:34 PM	Purchase	
	11:34 PM	Purchase	
	11:34 PM	Purchase	

Best Available Copy

Best Available Copy

Best Available Copy



Cummings School of
Veterinary Medicine

Making Animals, Helping Humans, Transforming Global Health

B6

Case: W014444

Roller: 01:337144

STANDARD CONSENT FORM

B6

B6

Owner's name:

B6

Owner's address:

Owner's Name: Signature

Date

If the individual submitting the animal is someone other than the legal owner, please complete the portion below.

The owner of the animal, Terr Kostello, has granted me authority to obtain medical treatment and to bind the owner to pay the veterinary medical services provided at Cummings School pursuant to the terms and conditions

B6

B6

Owner's Signature

3/28/16

Date

B6



Cummings School of
Veterinary Medicine

Helping Animals. Helping Humans. Advancing Global Health.

Emergency & Critical Care: Extension (508) 887-4745

Polina Hospital for Small Animals
55 Willow Street
North Andover, MA 01856
Telephone: (508) 879-5345
Fax: (508) 879-8779
<http://vetmed.tufts.edu/>

Patient

Name: B6

Species: Canine

Sex:

Weight:

Birthdate: B6

Contact Clinician:

Alternate Clinician:

Student:

Owner

Name: B6

Address: B6

Patient ID: 337144

B6

Discharge Instructions:

Admit Date: 3/28/2016 8:36:02 PM

Discharge Date: 3/28/2016

Diagnosis:

1. Productive cough and sneezing, with nasal discharge

Procedures:

1. Exam

Medications:

Depo-medrol

B6

CASE SUMMARY

B6

Patient care instructions:

B6

B6

B6

b

6

c

Cummings Veterinary Medical Center

AT TUFTS UNIVERSITY

Eastern Hospital for Small Animals
55 Wilbur Street
North Andover, MA 01845
Telephone: (978) 833-5275
Fax: (978) 833-8739
<http://vetmed.tufts.edu/>

Emergency & Critical Care: Latham (978) 837-4245

Patient

Name:

Signalment:

B6
6 years Old female Male
W/Wound

Owner

Name:

Address:

B6

Patient ID:

117144

Emergency Clinician:

B6

Consulting Clinician:

B6

Discharge Instructions

Admit Date: 6/7/2017 8:46:06 PM

Check Out Date: 6/8/2017

Case Summary

Diagnosis:

1. Ingestion of wooden sliver

General Summary:

B6

Prescription Refill Disclaimer:

For the safety and well-being of our patients, your pet must have had an identification system of our institution within the past year in order to obtain prescription medications.

Ordering Feed:

B6

B6

B6

B6

Ultrasound Request & Report

Patient

Name: B6

Species: Canine

Breed: Male Weimaraner

Birthdate: B6

Owner

Name: B6

Address: B6

Patient ID: 337944

Date of request: 6/8/2017

Attending: (Species: Mini Cattle / PM (Small Animal/Herding Interns)

Student:

Date of exam: 6/8/17

Patient Location: Ward/Cage: 117

Weight (kg)

- Inpatient
- Outpatient Time:
- Emergency

Scheduling and Patient Notes (e.g., waiting for charts, procedures, need spina, etc.)

Examination Desired

- Abdomen
- Thorax
- Other:
- Ripsey or FNA
Indicate organ(s):
- Cystocentesis

Permission for sedation

- Yes
- No (study may be changed)

Permission for tissue sampling (if indicated)

- Yes
- No

Sedation protocol

- BA (to client/kg or to sed/kg) max 2ml
- OBA (to client/kg or to sed/kg) max 2ml
- 1/2 dose OBA
- Client from home/has up hours of
(weight based sedation protocol)
- Anesthetics to
sedate/analgesic/
- Clinician to provide

B6

Radiologists

Primary: [B6] DVM

Dates

Reported: 6.8.2017

B6

B6

Emergency & Critical Care

B6

Patient

Name:

Signature:

B6

Owner

Name:

Address:

B6

Patient ID:

157144

Emergency Contact:

B6

B6

Discharge Instructions:

Admit Date: 6/5/2017 12:10:40 PM

Check Out Date: 6/5/2017

Care Summary:

Diagnosis:

1. Wooden sliver ingestion

General Summary:

B6

Patent Confidentiality

B6

Sincerely,

B6

(b) (6)

B6

B6

B6

Radiology Request & Report

Patient

Name: B6

Species: Canine

Breed: Male: Weimaraner

Birthdate: B6

Owner

Name: B6

Address: B6

Patient ID: 317144

Date of request: 6/6/2017

Attending Clinician: B6

Student:

Date of exam: 6/8/17

Patient Location: Ward/Cage:

Weight (kg): 0.00

- Inpatient
 Outpatient Time:
 Waiting
 Emergency

Sedation

- IMAG
 ORAG
 1/2 dose ORAG
 Dex/Dumitor/Butorphanol
 Anesthesia to sedate/anesthetize

Examination Desired: lateral abdomen**Presenting Complaint and Clinical Questions you wish to answer:**

Emergency

Pertinent History:**Findings:**

ABDOMEN, LATERAL: There is a small amount of gas within the stomach. The small intestines, colon, liver, spleen, kidneys, and bladder are normal. The included thorax and musculoskeletal structures are normal.

Conclusions:

Normal limited abdomen. No evidence of ingested foreign body.

Radiologists

Primary: B6 DVM

Reviewing: B6 DVM, DACVR

Dates

Reported: 6.8.2017

Finalized: 6.12.2017

B6

Discharge Instructions

Patient:

Name: B6

Species: Canine

Breed: Male Irish Wolfhound

Birthdate: B6

Owner:

Name: B6

Address: B6

Patient ID: 337144

Allergies/Contraindications:

B6

Current Medications:

B6

B6

Status: B6

Discharge Date: 11/9/2018

Diagnosis: Mildly low calcium

Clinical Findings:

B6

B6

B6

B6

B6

B6

Cardiology Appointment Report

Date: 11/8/2018

Attending Cardiologist:

B6

Cardiology Resident:

B6

Cardiology Technician:

B6

Student:

B6

Presenting Complaint: Screen for DCM

Concurrent Diseases:

HA of Anaplasmosis Dec. 2016, Dec. 2017

HA of chronic diarrhea - stable

General Medical History:

[B6] has history of chronic diarrhea since puppyhood - owner suspects it's when she changed from puppy food to adult food. Owner acquired [B6] as a puppy. Owner reports that [B6] pants a lot, but owner feels it is increased. Owner sent sputum to a diagnostic lab to find out allergies and sensitivities. Eating and drinking normally. No c/s/v/PUPD, diarrhea currently resolved with metronidazole. [B6] Mitramate was recently diagnosed with DCM about 6 months ago and was also on a grain free diet. Owner requested taurine levels by IVM - owner sent blood sample (plasma) to [B6] for taurine levels, plasma level was 42. Currently being treated for diarrhea, lost weight during bout of diarrhea and diet change, but has gained weight back.

Diet and Supplements:

B6

Heartgard and Seresto collar

Cardiovascular History:

Prior CHF diagnosis? No

Prior heart murmur? No

Prior ATE? No

Prior arrhythmia? No

Monitoring respiratory rate and effort at home? Normal effort, pants all the time except when sleeping

Cough? No

Swallowing or breath or difficulty breathing? No

Syncope or collapse? No

Sudden onset lameness? No

Exercise intolerance? No

Current Medications Pertinent to CV System:

None

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

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 pulse:

Weak

Fair

Good

Strong

Bounding

Pulse deficits

Pulse paradoxus

Other:

Arrhythmic:

None

Sinus arrhythmia

Premature beats

Bradycardia

Tachycardia

Gallop:

Yes

Pre-murmural

- No
- Intermittent

Other:

Pulmonary assessments:

- No signs:
- Mild dyspnea
- Moderate dyspnea
- Normal R/L sounds

- Pulmonary crackles
- Wheezes
- Upper airway stridor

Abdominal exam:

- Normal
- High/low pitch
- Abdominal distension

- Mild ascites
- Marked ascites

Problems:

Low plasma taurine (47, ref range 60-120)

Differential Diagnoses:

R/o dietary induced taurine deficiency -> DCM

Diagnostic plan:

- ECG
- Chemistry profile
- FCG
- Renal profile
- Blood protein
- Taurine profile
- Thoracic radiographs
- NT-proBNP
- Troponin I
- Other tests

Echocardiogram Findings:

General/2-D findings:

Echo performed standing; reduced quality due to panting.

LV walls are normal in thickness; with adequate contractile function. LV cavity is normal in size. LA is normal to mildly dilated. RH is dilated. RA appears normal. No masses or diverticula visible. No pleural or pericardial effusion. No aneurys.

Doppler findings:

AV Vmax 2 m/s

Mitral inflow:

- Summated
- Normal
- Delayed relaxation
- Pseudonormal
- Restrictive

ECG findings:

NSR, HR 80 bpm

Assessment and recommendations:

Echocardiogram reveals relatively normal cardiac structure and function. The LV contractile function is low normal, so early DCM cannot be definitively ruled out. Patient was enrolled in the DCM study, and whole blood and plasma taurine were submitted; recommend supplementing taurine 1000mg PO BID until these results are back. Recheck per study protocol in 3 and 6 months.

Final Diagnosis:

Low plasma taurine
No clear evidence of ICM

Heart Failure Classification Score:

ACC/AHA Classifications:

- A C
- B1 D
- B2

M-Modes

IVSd
EVIEd
EVIWd
IVSs
EVIes
EVIWs
%FS

B6

UM
UM
UM
UM
UM
UM
%

M-Modes Normalized

IVSdN
EVIEdN
EVIWdN
IVSsN
EVIesN
EVIWsN

B6

2D

SA LA
Ao Diam
SA LA / Ao Diam
IVSd
EVIEd
EVIWd
EVIW(Teich)
IVSs
EVIes
EVIWs
ESV(Teich)
EF(Teich)
%FS
SV(Teich)
EVIed A2C
EVIW MOD A2C
EVIes A2C
EVIsv MOD A2C
EVIef MOD A2C
SV MOD A2C
EVIed LAX
EVIed LAX

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LVLDV MID LAX
LVLS LAX
LVAS LAX
LVESV A-L LAX
LVESV MID LAX
HR
EF A-L LAX
LVEF MID LAX
SV A-L LAX
SV MID LAX
CD A-L LAX
CD MID LAX

Doppler
MV E Vel
MV Dec T
MV A Vel
MV E/A Ratio
E'
A'
E/C'
AV Vmax
AV maxAG

B6

ml
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cm/s
%
%
ml
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l/min

B6

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ml/s

ml/s
mmHg

Cummings
Veterinary Medical Center
AT TUFTS UNIVERSITY

B6

B6

B6

Male
Official Breeder

317144

4/8/2017

Dear Dr. **B6**

B6

If you have any questions, or concerns, please contact us at **B6**

Thank you,

B6

(Emergency & Critical Care)

B6

B6

B6

B6

Ms. [REDACTED]
Central Veterinary Health
317144

6/9/2017

Dear Dr. [REDACTED]

Thank you for referring [REDACTED] with their pet [REDACTED]. Please see attached discharge for [REDACTED].

If you have any questions, or concerns, please contact us at [REDACTED].

Thank you.

B6

B6

B6

B6

Male

**Case: 276 Wolfwood Bridge
27/14**

11/11/2018

Dear Dr. **B6**

Thank you for referring **B6** with their pet **B6**

If you have any questions, or concerns, please contact us at **B6**

Thank you,

B6 (Cardiology)

Foster Hospital for Small Animals

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

All Medical Records

Client: **B6**

Address: **B6**

Patient: **B6**

Breed: Golden Retriever

DOB: **B6**

Species: Canine

Sex: Female
(Spayed)

Home Phone: **B6**

Work Phone: () -

Cell Phone: **B6**

Referring Information

B6

Client: **B6**

Patient: **B6**

Initial Complaint:

Emergency

SOAP Text **B6** 5:44PM - Clinician, Unassigned **B6**

Subjective

NEW VISIT (ER)

Doctor: **B6** DVM

Student: **B6**

Presenting complaint: Referral for suspected pericardial effusion

Referral visit? **B6**

Diagnostics completed prior to visit: right lateral CXR, CBC/Chemistry

HISTORY:

Current history:

B6 is a 9 yo FS Golden retriever who presented to the Tufts ER as a referral for pericardial effusion. She was seen by her rDVM yesterday to evaluate 6 months of weight loss (62# to 58#). Owner noticed a mild dry cough for the past 2 weeks, no specific time of day, sometimes more with excitement, but usually no eliciting cause. rDVM obtained CXR and were concerned about a globoid heart and pericardial effusion. O report no episodes of exercise intolerance, collapse, or respiratory distress. Owners say that she has a great appetite and now begs for food more, despite losing weight. Owner waited for blood work results before bringing her in today. Eating and drinking normally. No sneezing,

Client: B6
Patient: B6

vomiting, or diarrhea. One episode of regurgitation after coughing last week. Not PU/PD at home. She is heart worm tested yearly and receives heart worm prevention every month (Hartguard). She has been on Zigniture Kangaroo Diet for the last 6-8 months. She has no other medical concerns at this time and is not currently receiving medications.

Prior medical history: Has had TPLO elsewhere 1 year ago. Hx of UTI, had an AUS of abdomen several years ago. Hx of pruritis, does well with limited ingredient diet. Anaplasma positive since 2011.

Current medications: None

Diet: Zigniture kangaroo 1 cup BID dry for the past 6-8 months

Vaccination status/flea & tick preventative use: Seresto, heartgard all year round

Travel history: None

EXAM:

B6

ASSESSMENT:

A1: Cardiomegaly (right >> left ventricular enlargement) - DCM (taurine deficiency vs primary cardiomyopathy) v MVD

A2: Intermittent, non-productive cough - tracheal compression from enlarged heart vs CHF vs primary pulmonary disease (inflammatory v infectious v neoplastic)

A3: Weight loss - suspect cardiac cachexia v other

PLAN:

B6

Client: B6
Patient: B6

Diagnostics completed @ rDVM 4/10:

CBC - WNL

Chem - CK 342 (H), otherwise WNL

T4 - 1.5

4DX - anaplasma +, history of + since 2011

Right lateral CXR (in ER email) - enlarged right heart, enlarged left atrium with dorsal tracheal compression

Diagnostics completed @ Tufts:

- Left lateral and VD CXR - generalized cardiomegaly, mild pulmonary vessel enlargement, +/- enlarged caudal vena cava, full report pending

- BP 125 mmHg

Client communication: Discussed exam findings with owner - let O know that she did not have evidence of PCE based on our TFAST, but that her contractile function was slightly diminished and that she had right and left ventricular enlargement (R >> L).

B6

B6

Deposit & estimate status: B6

Resuscitation code (if admitting to ICU): Yellow

SOAP approved (DVM to sign): B6 DVM (B6 Intern)

SOAP Text B6 7:21AM - Clinician, Unassigned: B6

Subjective

Exam, cardiology

B6 is a 9yr old FS Golden retriever who presented to the Tufts ER as a referral for pericardial effusion. rDVM obtained CXR and were concerned about a globoid heart and pericardial effusion. She has a 6 mo hx of weight loss, and 2 week hx of dry cough, and hx of UTI. She has been on Zigniture Kangaroo Diet for the last 6-8 months

Diet: Zignature Kangaroo 8/2017-4/2018. Acana duck& pear, Pork & squash 11/2015-7/2017

B6

Client: B6
Patient: B6

B6

Assessments

A1: enlarged right heart r/o- DCM, taurine deficiency from diet, DMVD

A2: hx of a cough r/o- CHF, enlarged heart pressing on trachea, primary pulmonary disease (inflammatory vs infectious vs neoplasia)

Plan

P1: Echo

P2: UA (culture)

P3: CBC/CHEM

SOAP completed by: B6

SOAP reviewed by: B6

Initial Complaint:

Recheck: B6

SOAP Text B6 10:54AM B6

Initial Complaint:

Emergency

SOAP Text B6 3:19AM B6

Subjective

NEW VISIT (ER)

Doctor: B6

Student: ---

Presenting complaint: Coughing

Referral visit? No

Diagnostics completed prior to visit

HISTORY:

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

Signalment: 10 yo SF Golden

Current history:

Owners went to bed and was woken up in middle of night. Sounded like she was trying to vomit and wasn't bringing anything up. Suspect that she was possibly coughing instead. On drive in, no coughing but when she got here she began coughing again. No other concerns at home. Has been doing well at home since last Cardiology visit.

History of eating objects. Owners are concerned she may have eaten an item on Christmas.

Prior medical history: Diagnosed with DCM in April 2018

Current medications: Enalapril, pimobendan, and taurine. Have not needed to give furosemide.

Diet: unknown

Vaccination status/flea & tick preventative use: unknown

Travel history: unknown

EXAM:

B6

ASSESSMENT:

A1: Coughing-- r/o CHF vs bronchial compression vs pneumonia vs bronchitis vs other

PLAN:

Radiographs-- 3 view thorax, 2 view abdomen

Sedation

Butorphanol 1mL IM

TFAST

Furosemide 2mg/kg IM

Discharge

Diagnostics completed:

TFAST-- no PCE, La: Ao 1, LV and RV dilation with R>>>L

Radiographs-- 3 view thorax, 2 view abdomen-- cardiac silhouette enlargement, no pulmonary edema, unremarkable

Client:
Patient:

abdomen

Diagnostics pending:
None

Client communication:

B6

Deposit & estimate status: n/a

Resuscitation code (if admitting to ICU): n/a

SOAP approved (DVM to sign): DVM

Initial Complaint:

Recheck

Disposition/Recommendations

Client: B6
Patient: B6

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

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:	Golden Retriever
Sex:	Female (Spayed)
Age:	B6 Years Old

Lab Results Report

Nova Full Panel-ICU **4/10/2018 7:40:25 PM** **Accession ID: **B6****

Test	Results	Reference Range	Units
SO2%	B6	94 - 100	%
HCT (POC)		38 - 48	%
HB (POC)		12.6 - 16	g/dL
NA (POC)		140 - 154	mmol/L
K (POC)		3.6 - 4.8	mmol/L
CL(POC)		109 - 120	mmol/L
CA (ionized)		1.17 - 1.38	mmol/L
MG (POC)		0.1 - 0.4	mmol/L
GLUCOSE (POC)		80 - 120	mg/dL
LACTATE		0 - 2	mmol/L
BUN (POC)		12 - 28	mg/dL
CREAT (POC)		0.2 - 2.1	mg/dL
TCO2 (POC)		0 - 0	mmol/L
nCA		0 - 0	mmol/L
nMG		0 - 0	mmol/L
GAP		0 - 0	mmol/L
CA/MG		0 - 0	mol/mol
BEeef		0 - 0	mmol/L
BEb		0 - 0	mmol/L
A		0 - 0	mmHg
NOVA SAMPLE	0 - 0		



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

FiO2	B6	0 - 0	%
PCO2		36 - 44	mmHg
PO2		80 - 100	mmHg
PH		7.337 - 7.467	
PCO2		36 - 44	mmHg
PO2		80 - 100	mmHg
HCO3		18 - 24	mmol/L

Nova Full Panel-ICU			
	B6	11:06:27 PM	Accession ID: B6
Test	Results	Reference Range	Units
TS (FHSA)	B6	0 - 0	g/dl
PCV **		0 - 0	%
TS (FHSA)		0 - 0	g/dl

Nova Full Panel-ICU			
	B6	9:43:01 AM	Accession ID: B6
Test	Results	Reference Range	Units
TAURINE P	B6	60 - 120	nmol/mL
TAURINE WB		200 - 350	nmol/mL

Nova Full Panel-ICU			
	B6	9:44:12 AM	Accession ID: B6
Test	Results	Reference Range	Units
WBC (ADVIA)	B6	4.4 - 15.1	K/uL
RBC(ADVIA)		5.8 - 8.5	M/uL
HGB(ADVIA)		13.3 - 20.5	g/dL
HCT(ADVIA)		39 - 55	%
MCV(ADVIA)		64.5 - 77.5	fL
MCH(ADVIA)		21.3 - 25.9	pg
MCHC(ADVIA)		31.9 - 34.3	g/dL
RDW (ADVIA)		11.9 - 15.2	
PLT(ADVIA)		173 - 486	K/uL
MPV (ADVIA)		8.29 - 13.2	fL
PLTCRT		0.129 - 0.403	%
RETIC(ADVIA)		0.2 - 1.6	%
RETICS (ABS) ADVIA		14.7 - 113.7	K/uL

Nova Full Panel-ICU			
	B6	9:44:27 AM	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
MAGNESIUM 2+		1.8 - 3	mEq/L
T. PROTEIN		5.5 - 7.8	g/dL



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

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
tCO2 (BICARB)		14 - 28	mEq/L
AGAP		8 - 19	
NA/K		29 - 40	
T BILIRUBIN		0.1 - 0.3	mg/dL
D.BILIRUBIN	B6	0 - 0.1	mg/dL
I BILIRUBIN		0 - 0.2	mg/dL
ALK PHOS		12 - 127	U/L
GGT		0 - 10	U/L
ALT		14 - 86	U/L
AST		9 - 54	U/L
CK		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

Nova Full Panel-ICU **B6** 9:44:10 AM Accession ID: **B6**

Test	Results	Reference Range	Units
SEGS%		43 - 86	%
LYMPHS%		7 - 47	%
MONOS%		1 - 15	%
EOS%		0 - 16	%
SEGS (AB)ADVIA	B6	2.8 - 11.5	K/uL
LYMPHS (ABS)ADVIA		1 - 4.8	K/uL
MONOS (ABS)ADVIA		0.1 - 1.5	K/uL
EOS (ABS)ADVIA		0 - 1.4	K/uL
WBC MORPHOLOGY		0 - 0	
No Morphologic Abnormalities	B6		
CRENATION		0 - 0	
H-J BODIES		0 - 0	



Client: B6

Patient: B6

rDVM: B6 Referral and hx 2/23/09-4/10/18



REFERRAL FORM

TUFTS UNIVERSITY
Cummings School of Veterinary Medicine
Henry and Lois Foster Hospital for Small Animals
Hospital for Large Animals
200 Westboro Road, Route 30
North Grafton, MA 01586
508-839-5395

Service to Which Referred: Cardiology Appointment Date: Time:

OWNER INFORMATION:

Name: B6 Daytime Phone: B6 Evening Phone:
Address: B6 City: B6 State: B6 Zip Code: B6

PATIENT INFORMATION:

Registered Name/ID: B6
Species: Canine Breed: Golden Ret Sex: F Age: 9Y

CASE HISTORY

Chief Concern/Provisional Diagnosis: Heart Disease, Pericardial Effusion with cough

Vaccination History: Rabies - 7-7-16 3x
Dist - 7-7-16 3x

Other History:

Diagnostic Test Results (if possible, please attach results):

Are Radiographs enclosed? No - Imaging

Current Therapy & Medication (include dosages): ADMIX 1.0
Pib 2

Special Comments/Requests:

REFERRING VETERINARIAN INFORMATION

Name: B6 DVM Clinic/Hospital: B6
Phone: B6 Fax: B6
Address: B6 City: B6 State: B6 Zip Code:

If an animal is being referred which has had lab work done at TVDL, please include copies of the lab results or the TVDL accession number. If you are faxing us information about a clinical case which has been referred, please use fax number (508) 839-7951.

Client: B6
Patient: B6

rDVM: B6 Referral and hx 2/23/09-4/10/18

04-10-2018 7:41 AM

B6

B6

D1

B4

B4

B4



B6

PET OWNER: B6

B6

SPECIES: CANINE

BREED:

GENDER: FEMALE SPAYED

AGE:

B6

ACCOUNT #:

B6

ORDERED BY:

B6

ACCESSION #:

B6

REQUISITION #:

B6

DATE OF COLLECTION: 04/10/2018

DATE OF RECEIPT: 04/10/2018

DATE OF REPORT: 04/10/2018

B4 SERVICES: 9999 SAMPLE/TEST INFO NEEDED, 24483999 SENIOR PROF STD FECAL 4DX

HEMATOLOGY

TEST	RESULT	REF. RANGE
RBC ^a		(5.38 - 8.76) MA/L
Hematocrit		(28.3 - 56.5) %
Hemoglobin		(13.4 - 20.7) g/dL
MCV		(59 - 76) fL
MCH		(21.8 - 26.1) pg
MCHC		(32.8 - 38.2) g/dL
% Reticulocyte		%
Reticulocyte		(10 - 110) K/uL
WBC		(4.8 - 17.0) K/uL
% Neutrophil	B6	%
% Lymphocyte		%
% Monocyte		%
% Eosinophil		%
% Basophil		%
Neutrophil		(2940 - 12670)
Lymphocyte		(1080 - 4850) /uL
Monocyte		(130 - 1150) /uL
Eosinophil		(70 - 1480) /uL
Basophil		(0 - 100) /uL
Platelet		(143 - 448) K/uL

CHEMISTRY

TEST	RESULT	REF. RANGE
Glucose		(83 - 114) mg/dL
IDEXX SDMA ^b		(0 - 14) ug/dL
Creatinine		(0.5 - 1.5) mg/dL
BUN		(8 - 31) mg/dL
BUN:Creatinine Ratio		
Phosphorus		(2.5 - 8.1) mg/dL
Calcium	B6	(8.4 - 11.8) mg/dL
Sodium		(142 - 152)
Potassium		(4.0 - 5.4) mmol/L
Na:K Ratio		(28 - 37)
Chloride		(108 - 118)
TCO2 (Bicarbonate)		(13 - 27) mmol/L
Anion Gap		(11 - 26) mmol/L
Total Protein		(5.5 - 7.5) g/dL

Albumin		(2.7 - 3.8) g/dL
Globulin		(2.4 - 4.0) g/dL
Alb:Glob 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 - 346) mg/dL
Amylase		(337 - 1469) U/L
Lipase		(138 - 755) U/L
H Creatine Kinase		(10 - 200) U/L
Hemolysis Index ^c		
Lipemia Index ^d		

ENDOCRINOLOGY

TEST	RESULT	REF. RANGE
Total T4 ^e	B6	(1.0 - 4.0) ug/dL

SEROLOGY

TEST	RESULT	REF. RANGE
Heartworm Antigen		
Ehrlichia canis / ewingii		
Lyme (Borrelia burgdorferi)	B6	
Anaplasma phagocytophilum / platys		

Get deeper insights: For complete access to this patient's diagnostic results, including historic values and images, login to
Final report generated April 10, 2018

B4

PAGE 1 of 3

Client: B6
Patient: B6

rDVM: B6 Referral and hx 2/23/09-4/10/18

B6	B6	D2
B4	B4	B4
B6	PET OWNER: B6	DATE OF REPORT: 04/10/2018
B6	ACCESSION #	B6
B4	9999 SAMPLE/TEST INFO NEEDED, 24483999 SENIOR PROF STD FECAL 4DX	

OTHER

SAMPLE / TEST INFO NEEDED

A fecal specimen was not received. The remainder of requested testing has been performed. Thank you.

A urine specimen was not received. The remainder of requested testing has been performed. Thank You.

NOTES

B6

Get deeper insights: For complete access to this patient's diagnostic results, including historic values and images, login to
Final report generated April 10, 2018

B4
PAGE 2 of 3

Client: B6
Patient: B6

rDVM B6 Referral and hx 2/23/09-4/10/18

B6

B6

D3

B4

B4

B4

B6

PET OWNER: B6

DATE OF REPORT: 04/10/2018

ADMISSION #: B6

B4

9999 SAMPLE/TEST INFO NEEDED, 24483999 SENIOR PROF STD FECAL 4DX

B6

Get deeper insights: For complete access to this patient's diagnostic results, including historic values and images, login to
Final report generated April 10, 2018

B4
PAGE 3 of 3

Client: B6
Patient: B6

rDVM B6 Referral and hx 2/23/09-4/10/18

Owner's Name			Animal's Name			Page		
DATE			TREATMENT					
MO.	DAY	YR.						
4	9	18	B6					

Client: B6
Patient: B6

rDVM B6 Referral and hx 2/23/09-4/10/18

Patient History Report

Client: B6 Patient: B6
Phone: B6 Species: CANINE Breed: RETRIEVER/GOLDE N
Address: B6 Age: 9 Yrs 8 Mos Sex: Spayed Female
Color: Gold

Date Type Staff History

4/10/2018 L 1 Hematology results from B6 Reference Laboratory Requisition ID: B6 Posted Final

Test	Result	Reference Range
HCT		38.3 - 56.5
HGB		13.4 - 20.7
MCHC		32.6 - 39.2
WBC		4.9 - 17.6
EOS		
RBC		5.39 - 8.70
MCV		59 - 76
MCH		21.9 - 26.1
LYMPHS		
MONOS		
BASO		
NEUT SEG		
PLATELETS		143 - 448
RETIC CNT		
ABS BASO		0 - 100
ABS EOS		70 - 1490
ABS LYMPHS		1060 - 4950
ABS MONOS		130 - 1150
ABS NEUTS		2940 - 12670
ABS RET		10 - 110

Ascn: B6
AUTOMATED CBC

4/10/2018 L 1 Chemistry results from B6 Reference Laboratory Requisition ID: B6 Posted Final

Test	Result	Reference Range
ALKP		5 - 160
ALT		18 - 121
AST		16 - 55
AMYL		337 - 1469
BUN/UREA		9 - 31
ALB		2.7 - 3.9
Ca		8.4 - 11.8
Chloride		108 - 119
CHOL		131 - 345
CK		10 - 200
CREA		0.5 - 1.5
GGT		0 - 13
GLU		63 - 114
LIPA		138 - 755
PHOS		2.5 - 6.1
Potassium		4.0 - 5.4
Sodium		142 - 152

B Billing, C Med note, CB Call back, CK Check in, CM Communications, D Diagnosis, DH Declined to history, E Examination, ES Estimates, I Departing instr, L Lab result, M Image cases, P Prescription, PA PVI Accepted, PB Problems, PF PVI Performer, PR PVI Recommended, R Correspondence, T Images, TC Temporary med note, VMI Signs

B6

Page 1 of 17

Date: 4/10/2018 2:06 PM

Client: B6
Patient: B6

rDVM: B6 Referral and hx 2/23/09-4/10/18

Patient History Report

Client:	B6	Patient:	B6	Breed:	RETRIEVER/GOLDE N
Phone:	B6	Species:	CANINE	Sex:	Spayed Female
Address:	B6	Age:	9 Yrs. 8 Mos.	Color:	Gold

Date	Type	Staff	History
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TBIL	B6	0.0 - 0.3
TP	B6	5.5 - 7.5
GLOB	B6	2.4 - 4.0
DBIL	B6	0.0 - 0.1
SDMA	B6	0 - 14
ANION GAP	B6	11 - 26
BICARB	B6	13 - 27
IBIL	B6	0.0 - 0.2
A/G Ratio	B6	0.7 - 1.5
B/C Ratio	B6	
Na/K Ratio	B6	28 - 37

B6

4/10/2018 L 1

Endocrinology results from B6 Reference
Laboratory Requisition ID: B6 Posted Final
Test Result Reference Range
T4 B6 1.0 - 4.0
Ascn: B6

B6

B: Billing, C: Med note, CR: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimates, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vial signs

B6

Page 2 of 17

Date: 4/10/2018 2:06 PM

Client: B6

Patient: B6

rDVM: B6 Referral and hx 2/23/09-4/10/18

Patient History Report

Client: B6	Patient: B6	Breed: RETRIEVER/GOLDE N
Phone: B6	Species: CANINE	Sex: Spayed Female
Address: B6	Age: 9 Yrs. 8 Mos.	
	Color: Gold	

Date	Type	Staff	History
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4/10/2018	L	1	
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B6

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimates, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vital signs

B6

Page 3 of 17

Date: 4/10/2018 2:06 PM

Client: B6
Patient: B6

rDVM B6 Referral and hx 2/23/09-4/10/18

Patient History Report

Client:	B6	Patient:	B6	Breed:	RETRIEVER/GOLDE N
Phone:		Species:	CANINE	Sex:	Spayed Female
Address:	B6	Age:	9 Yrs. 8 Mos.	Color:	Gold

Date	Type	Staff	History
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B6

4/10/2018 L 1

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Decked to history, E: Examination, ES: Estimates,
L: Departing visit, L Lab result, M: Image cases, P: Prescription, PA: PVA: Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended,
R: Correspondence, T: Images, TC: Tentative med note, V: Vital signs

B6

Page 4 of 17

Date: 4/10/2018 2:06 PM

Client: B6
Patient: B6

rDVM: B6 Referral and hx 2/23/09-4/10/18

Patient History Report

Client: B6 Patient: B6
Phone: B6 Species: CANINE Breed: RETRIEVER/GOLDE N
Address: B6 Age: 9 Yrs. 8 Mos. Sex: Spayed Female
Color: Gold

Date	Type	Staff	History
------	------	-------	---------

4/10/2018	PP	1	
4/10/2018	PP	1	
4/9/2018	T	1	
4/9/2018	PP	1	
4/9/2018	B	1	
4/9/2018	B	1	
4/9/2018	B	1	
4/9/2018	B	1	
10/2/2017	L	1	

10/2/2017	CK	1	
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10/2/2017	B	1	
10/2/2017	B	1	
10/2/2017	B	1	
10/2/2017	B	1	
10/2/2017	B	1	
10/2/2017	B	1	
10/2/2017	B	1	
6/29/2017	B	B6	
3/31/2017	P	160	

3/31/2017	B	160	
3/23/2017	P	16	

3/23/2017	P	16	
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B6

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimates, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, I: Images, TC: Tentative med note, V: Vitals signs

B6

Page 5 of 17

Date: 4/10/2018 2:06 PM

Client: B6

Patient: B6

rDVM: B6

Referral and hx 2/23/09-4/10/18

Patient History Report

Client:	B6	Patient:	B6	Breed:	RETRIEVER/GOLDE N
Phone:		Species:	CANINE	Sex:	Spayed Female
Address:	B6	Age:	9 Yrs. 8 Mos.	Color:	Gold

Date	Type	Staff	History
3/23/2017	V	B6	<h1>B6</h1>
3/23/2017	B	15	
3/23/2017	B	16	
3/23/2017	B	16	
3/23/2017	B	16	
2/6/2017	P	11	
2/6/2017	P	11	
2/6/2017	B	11	
2/6/2017	B	11	
2/6/2017	B	11	
1/20/2017	P	1	
1/20/2017	P	1	
1/20/2017	P	1	
1/20/2017	P	1	
1/20/2017	P	1	
1/20/2017	B	1	
1/20/2017	B	1	
1/20/2017	B	1	
1/20/2017	B	1	
1/20/2017	B	1	
1/20/2017	B	1	
1/20/2017	B	1	
1/20/2017	B	1	
1/20/2017	B	1	
1/19/2017	L	15	

B Billing, C Med note, CB Call back, CK Check-in, CM Communications, D Diagnosis, D? Declined to history, E Examination, ES Estimates, I Departing instr, L Lab result, M Image cases, P Prescription, PA PVL Accepted, PB problems, PP PVL Performed, PR PVL Recommended, R Correspondence, T Images, TC Tentative med note, V Vital signs

B4

Page 6 of 17

Date: 4/10/2018 2:06 PM

Client: B6

Patient: B6

rDVM: B6 Referral and hx 2/23/09-4/10/18

Patient History Report

Client: B6	Patient: B6	Breed: RETRIEVER/GOLDE N
Phone: B6	Species: CANINE	Sex: Spayed Female
Address: B6	Age: 9 Yrs. 8 Mos.	
	Color: Gold	

Date	Type	Staff	History
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ALKP =	B6	23 - 212
ALT =		10 - 100
AMYL =		500 - 1500
BUN/UREA =		7 - 27
ALB =		2.2 - 3.9
Ca =		7.9 - 12.0
CHOL =		110 - 320
CREA =		0.5 - 1.8
GLU =		70 - 143
PHOS =		2.5 - 6.8
TBIL <		0.0 - 0.9
TP =		5.2 - 8.2
GLOB =		2.5 - 4.5

1/19/2017 B	1
1/9/2017 B	1
12/7/2016 P	1
12/7/2016 P	15
12/7/2016 T	B6
12/7/2016 T	15
12/7/2016 B	15
12/7/2016 B	15
12/7/2016 B	15
12/7/2016 B	15
11/9/2016 P	11
11/9/2016 B	11
7/7/2016 L	1
7/7/2016 P	1

B6

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimates, I: Departing instr, L: Lat result, M: Image cases, P: Prescription, PA/PVL: Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Image, TC: Tentative med note, V: Vital signs

B6

Page 7 of 17

Date: 4/10/2018 2:06 PM

Client: B6
Patient: B6

rDVM B6 Referral and hx 2/23/09-4/10/18

Patient History Report

Client: B6 Patient: B6
Phone: B6 Species: CANINE Breed: RETRIEVER/GOLDE
Address: B6 Age: 9 Yrs. 8 Mos. Sex: Spayed Female
Color: Gold

Date	Type	Staff	History
7/7/2016	P	1	B6
7/7/2016	B	1	
7/7/2016	B	1	
7/7/2016	B	1	
7/7/2016	B	1	
7/7/2016	B	1	
7/7/2016	B	1	
7/7/2016	B	1	
7/7/2016	B	1	
7/7/2016	B	1	
7/7/2016	B	1	
7/7/2016	B	1	
2/29/2016	V	B6	
2/29/2016	B	1	
2/16/2016	P	1	
2/16/2016	F	1	
2/16/2016	B	1	
2/16/2016	B	1	
2/16/2016	B	1	
2/16/2016	B	1	
9/16/2015	P	1	
9/16/2015	T	B6	
9/16/2015	T	1	
9/16/2015	B	1	
9/16/2015	B	1	
9/16/2015	B	1	
9/16/2015	B	1	
8/20/2015	B	13	

B: Billing, C: Med note, CB: Call back, CK: Checkin, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimates, ID: Imaging Instl, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med. note, V: Vital signs

B6

Page 5 of 17

Date: 4/10/2018 2:06 PM

Client: B6

Patient: B6

rDVM: B6 Referral and hx 2/23/09-4/10/18

Patient History Report

Client: B6	Patient: B6	Breed: RETRIEVER/GOLDE N
Phone: B6	Species: CANINE	Sex: Spayed Female
Address: B6	Age: 9 Yrs. 8 Mos.	Color: Gold

Date	Type	Staff	History
8/3/2015	P	13	B6
8/3/2015	P	13	
8/3/2015	P	13	
8/3/2015	P	13	
8/3/2015	L	13	
8/3/2015	B	13	
8/3/2015	B	13	
8/3/2015	B	13	
8/3/2015	B	13	
8/3/2015	B	13	
8/3/2015	B	13	
8/3/2015	B	13	
8/3/2015	B	13	
8/3/2015	B	13	
8/3/2015	B	13	
9/29/2014	P	11	
9/29/2014	B	11	
8/12/2014	B	B6	
8/12/2014	B	B6	
8/1/2014	B	B6	
7/22/2014	B	B6	

B Billing, C/Mec note, CB Call back, CK Check-in, CM Communications, D Diagnosis, DH Declined to history, E Examination, ES Estimates, I Departing inst, L Lab result, M Image cases, P Prescription, PA PVL Accepted, PB problems, PP PVL Performed, PR PVL Recommended, R Correspondence, T Images, TG Tentative med note, V Vital signs

B6

Client: B6
Patient: B6

rDVM: B6 Referral and hx 2/23/09-4/10/18

Patient History Report

Client: B6 Patient: B6
Phone: B6 Species: CANINE Breed: RETRIEVER/GOLDE
Address: B6 Age: 9 Yrs. 8 Mos. Sex: Spayed Female
Color: Gold

Date Type Staff History

7/11/2014 B
7/11/2014 B
6/30/2014 B
6/30/2014 B
6/30/2014 B
6/16/2014 P

B6

1

6/16/2014 P

1

6/16/2014 V

B6

6/16/2014 L

1

B6

6/16/2014 B
6/16/2014 B
6/16/2014 B
6/16/2014 B
6/16/2014 B
6/16/2014 B
6/16/2014 B
6/16/2014 B
6/16/2014 B
6/16/2014 B
3/12/2014 P

1
1
1
1
1
1
1
1
1
1
11

3/12/2014 B
8/14/2013 P

11
B6

B Billing, C Med note, CB Call back, CK Check-in, CM Communications, D Diagnosis, DM Declined to history, E Examination, ES Estimates, I Departing instr, L Lab result, M Image cases, P Prescription, PA/PVL Accepted, PB problems, PP/PVL Performed, PR/PVL Recommended, R Correspondence, T Images, TC Tentative medication, V Vital signs

B6

Page 10 of 17

Date: 4/10/2018 2:06 PM

Client: B6
Patient: B6

rDVM: B6 Referral and hx 2/23/09-4/10/18

Patient History Report

Client: B6 Patient: B6
Phone: B6 Species: CANINE Breed: RETRIEVER/GOLDE
Address: B6 Age: 9 Yrs, 8 Mos. Sex: Spayed Female
Color: Gold

Date	Type	Staff	History
------	------	-------	---------

8/14/2013	B	B6	
5/23/2013	B	1	
5/23/2013	B	1	
5/23/2013	B	1	
5/14/2013	P	10	
5/14/2013	B	10	
5/14/2013	B	10	
4/22/2013	P	1	
4/22/2013	P	1	
4/22/2013	V	B6	
4/22/2013	L	11	
4/22/2013	B	1	
4/22/2013	B	1	
4/22/2013	B	1	
4/22/2013	B	1	
4/22/2013	B	1	
4/22/2013	B	1	
4/15/2013	P	1	
4/15/2013	P	1	
4/15/2013	V	B6	

B6

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnostic, DH: Declined to history, E: Examination, ES: Estimate, F: Departing flight, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PPPVL: Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med. note, V: Vital signs

B6

Page 11 of 17

Date: 4/10/2018 2:06 PM

Client: B6
Patient: B6

rDVM: B6 Referral and hx 2/23/09-4/10/18

Patient History Report

Client: B6 Patient: B6
Phone: B6 Species: CANINE Breed: RETRIEVER/GOLDE
Address: B6 Age: 9 Yrs 8 Mos. Sex: Spayed Female
Color: Gold

Date	Type	Staff	History
------	------	-------	---------

4/15/2013	B	1
4/15/2013	B	1
4/15/2013	B	1
4/15/2013	B	1
4/15/2013	B	1
4/15/2013	B	1
4/15/2013	B	1
4/9/2013	B	B6
1/28/2013	B	B6
11/27/2012	B	B6
9/4/2012	P	10

9/4/2012	B	10
9/4/2012	B	10
2/28/2012	L	1

2/27/2012	P	1
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2/27/2012	B	1
2/27/2012	B	1
2/27/2012	B	1
2/27/2012	B	1
2/27/2012	B	1
2/27/2012	B	1
2/27/2012	B	1
2/27/2012	B	1
2/27/2012	B	1
2/27/2012	B	1
2/27/2012	B	1
2/27/2012	B	1
2/27/2012	B	1
8/1/2011	P	B6

B6

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimates
O: Departing instr, L: Lab tests, M: Image cases, P: Prescription, PA: PVL Accepted, PB: Problems, PP: PVL Performed, PR: PVL Recommended,
R: Correspondence, T: Images, TD: Tentative med note, V: Vital signs

B6

Page 12 of 17

Date: 4/10/2018 2:06 PM

Client: B6
Patient: B6

rDVM B6 Referral and hx 2/23/09-4/10/18

Patient History Report

Client: B6 Patient: B6
Phone: B6 Species: CANINE Breed: RETRIEVER/GOLDE
Address: B6 Age: 9 Yrs. 8 Mos. Sex: Spayed Female
Color: Gold

Date	Type	Staff	History
------	------	-------	---------

8/1/2011	B	B6	
8/1/2011	B	B6	
8/22/2011	B	10	
4/8/2011	B	10	
4/8/2011	B	B6	
4/1/2011	B	1	
3/4/2011	L		

2/24/2011	P	1	
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2/24/2011	B	1	
2/24/2011	B	1	
2/24/2011	B	1	
2/24/2011	B	1	
2/24/2011	B	1	
2/24/2011	B	1	
2/24/2011	B	1	
1/3/2011	B	B6	
4/29/2010	B		
4/28/2010	B		
4/20/2010	P		

4/20/2010	B	B6	
4/20/2010	B		
3/10/2010	P	8	

3/10/2010	V		
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B6

B Billing, C Med note, CB Call back, CK Check in, CM Communications, D Diagnosis, DH Declined to history, E Examination, Es Estrus, F Departing visit, L Lab result, M Image cases, P Prescription, PA PVL Accepted, PB problems, PP PVL Performed, PR PVL Recommended, R Correspondence, T Images, TC Tentative med/note, V VPA signs

B6

Page 13 of 17

Date: 4/10/2018 2:06 PM

Client: B6
Patient: B6

rDVM: B6 Referral and hx 2/23/09-4/10/18

Patient History Report

Client: B6 Patient: B6
Phone: B6 Species: CANINE Breed: RETRIEVER/GOLDE
Address: B6 Age: 9 Yrs. 8 Mos. Sex: Spayed Female
Color: Gold

Date	Type	Staff	History
------	------	-------	---------

3/10/2010	B	8	
3/10/2010	B	8	
3/10/2010	B	8	
2/17/2010	L	77	

2/16/2010 V

2/16/2010	B	1	
2/16/2010	B	1	
2/16/2010	B	1	
2/16/2010	B	1	
2/16/2010	B	1	
2/16/2010	B	1	
2/16/2010	B	1	
2/16/2010	B	1	
2/16/2010	B	1	
8/3/2009	P	B6	

8/3/2009	B	B6	
8/3/2009	B	B6	
8/3/2009	B	B6	
7/10/2009	P	8	

7/10/2009 P 1

7/10/2009	B	1	
7/10/2009	B	8	
7/8/2009	V		

B6

B Billing, C Med note, CB Call back, CK Check-in, CM Communications, D Diagnosis, DH Declined to history, E Examination, ES Estimates, I Departing inst., L Lab result, M Image cases, P Prescription, PA PVI Accepted, RB Problems, PP PVI Performed, PR PVI Recommended, R Correspondence, T Images, TC Tentative med note, V Vital signs

B6

Page 14 of 17

Date: 4/10/2018 2:06 PM

Client: B6
Patient: B6

rDVM: B6 Referral and hx 2/23/09-4/10/18

Patient History Report

Client: B6 Patient: B6
Phone: B6 Species: CANINE Breed: RETRIEVER/GOLDE
Address: B6 Age: 9 Yrs. 8 Mos. Sex: Spayed Female
Color: Gold

Date	Type	Staff	History
------	------	-------	---------

7/8/2009	B	1	
6/19/2009	B	B6	
6/17/2009	B	1	
3/17/2009	B	1	
6/9/2009	B	1	
6/8/2009	B	B6	
6/8/2009	B	1	
5/29/2009	P	1	

5/29/2009	L	11	
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5/29/2009	B	11	
5/29/2009	B	1	
5/29/2009	B	1	
5/29/2009	B	1	
5/29/2009	B	1	
5/29/2009	B	1	
5/29/2009	B	1	
5/29/2009	B	1	
5/29/2009	B	1	
5/26/2009	B	B6	
5/9/2009	P	1	

5/9/2009	B	1	
4/29/2009	B	B6	
4/27/2009	P	1	

4/27/2009	B	1	
4/27/2009	B	1	
4/23/2009	B	B6	
4/22/2009	P	8	

4/22/2009	B	8	
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B6

B-Billing, C-Med note, G8-Gas back, GK-Check-in, CM-Communications, D-Diagnosis, DH-Declined to history, E-Examination, ES-Estimates, I-Departing inst., L-Lab result, M-Image cases, P-Prescription, PA-PVL Accepted, PB-problems, PP-PVL Performed, PR-PVL Recommended, R-Correspondence, T-Images, TC-Tentative med note, V-Vital signs

B6

Page 15 of 17

Date: 4/10/2018 2:06 PM

Client: B6
Patient: B6

rDVM: B6 Referral and hx 2/23/09-4/10/18

Patient History Report

Client: B6 Patient: B6
Phone: B6 Species: CANINE Breed: RETRIEVER/GOLDE N
Address: B6 Age: 9 Yrs. 8 Mos. Sex: Spayed Female
Color: Gold

Date	Type	Staff	History
------	------	-------	---------

4/10/2018	PP	1
4/10/2018	PP	1
4/9/2018	T	1
4/9/2018	PP	1
4/9/2018	B	1
4/9/2018	B	1
4/9/2018	B	1
4/9/2018	B	1
10/2/2017	L	1

10/2/2017	CK	1
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10/2/2017	B	1
10/2/2017	B	1
10/2/2017	B	1
10/2/2017	B	1
10/2/2017	B	1
10/2/2017	B	1
10/2/2017	B	1
6/29/2017	B	B6
3/31/2017	P	160

3/31/2017	B	160
3/23/2017	P	16

3/23/2017	P	16
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B6

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimates, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vitals signs

B6

Page 5 of 17

Date: 4/10/2018 2:06 PM

Client: B6

Patient: B6

rDVM: B6 Referral and hx 2/23/09-4/10/18

Patient History Report

Client: B6	Patient: B6	Breed: RETRIEVER/GOLDE N
Phone: B6	Species: CANINE	Sex: Spayed Female
Address: B6	Age: 9 Yrs. 8 Mos.	Color: Gold

Date	Type	Staff	History
------	------	-------	---------

2/24/2009 P 1

2/24/2009 B **B6**
 2/24/2009 B 1
 2/23/2009 V

2/23/2009 B 1
 2/23/2009 B 1
 2/23/2009 B 1
 2/23/2009 B 1

B6

B Billing, C Med note, CB Call back, CK Check-in, CM Communications, D Diagnosis, DH Described to history, L Examination, PS Formulas
 I Departing Inair, L Lab result, M Image cases, P Prescription, PA PV: Accepted, PB Problems, PP PVL Performed, PR PVL Recommended,
 R Correspondence, F Imagus, TC Tentative med note, V Vital signs

B6

Page 17 of 17

Date 4/10/2018 2:06 PM

Client: B6
Patient: B6

Amino Acid Labs Taurine Panel: B6

18509 PL
18510 WB

Sample Submission Form

Amino Acid Laboratory
University of California, Davis
1020 Vet Med 3B
1089 Veterinary Medicine Drive
Davis, CA 95616
Tel: (530)752-5058, Fax: (530)752-4698

UC CUSTOMERS ONLY:
Non-federal funds ID/Account Number
to bill: _____

<http://www.vetmed.ucdavis.edu/vmb/aal/aal.html>

Vet/Tech Contact: B6
Company Name: Tufts Cummings School of Veterinary Medicine
Address: 200 Westboro Road
North Grafton, MA 01536
Email: B6@tufts.edu
Tel: B6 Fax: 508-839-7936

Billing Contact: B6 TAX ID: _____
Email: B6@tufts.edu Tel: 508-887-4267

Patient Name: B6
Species: *Canine*
Owner's Name: B6

B6
B6 9:43 AM
TAURINE PANEL
Lithium Heparin

Sample Type: Plasma Whole Blood Urine Food Other: _____
Test Items: Taurine Complete Amino Acid Other: _____

Taurine Results (nmol/ml)

Plasma: B6 Whole Blood: B6 Urine: _____ Food: _____

Reference Ranges (nmol/ml)

	Plasma		Whole Blood	
	Normal Range	No Known Risk for Taurine Deficiency	Normal Range	No Known Risk for Taurine Deficiency
Cat	80-120	>40	300-600	>200
Dog	60-120	>40	200-350	>150

B6
B6
B6 9:43 AM
TAURINE PANEL
Lithium Heparin
Canine

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

Diet history: **B6**

CARDIOLOGY DIET HISTORY FORM

Please answer the following questions about your pet

Pet's name: **B6** Owner's name: **B6** Today's date: **B6**

1. How would you assess your pet's appetite? (mark the point on the line 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

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 you 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
Royal Canin Early Cardiac	dry	1 1/2 cup	2x day	April 2018
Bananas		1/2 banana	2x day	
GRUK YOGURT		1 1/2	1x day	
Extra-delr Chew STICK		5" STICK	2x week	April 2017
veggies - broccoli, zucchini, butternut squash, pumpkin		1/2 cup	3x wk	

*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		2000 mg day
Carnitine		
Antioxidants		
Multivitamin		
Fish oil		
Coenzyme Q10		
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): **Bentons**

DIETS BEFORE DIAGNOSIS
 • SIGNATURE KIBBLE - 6-9 MONTHS (SEPT 2017 - APRIL 2018)
 • ACQUA BOKK/SQUASH OR DUCK/PEAR BEFORE THAT

Client: B6
Patient: B6

Vitals Results

5:40:32 PM	
5:40:33 PM	
5:40:34 PM	
5:40:35 PM	
8:02:29 PM	
8:11:31 PM	
8:11:45 PM	
8:12:00 PM	
8:21:56 PM	
8:26:30 PM	
9:42:33 PM	
11:00:07 PM	
11:18:07 PM	
11:18:35 PM	
11:21:05 PM	
11:58:41 PM	
1:04:34 AM	
1:51:32 AM	
2:58:23 AM	
3:04:17 AM	
3:10:25 AM	
3:10:31 AM	
3:59:04 AM	
4:55:24 AM	
5:00:41 AM	
5:55:00 AM	
7:01:46 AM	
7:13:45 AM	
7:14:23 AM	
7:14:51 AM	
7:21:17 AM	
7:28:11 AM	
8:12:43 AM	
9:06:14 AM	
9:06:22 AM	
9:59:21 AM	
10:34:11 AM	
11:25:53 AM	

B6

B6

Client: B6
Patient: B6

Vitals Results

B6	1:27:32 AM	B6
	1:27:49 AM	
	1:50:27 AM	
	:22:02 PM	
	:26:02 PM	
	:55:42 PM	
	:31:07 PM	
	:34:47 PM	
	:34:59 PM	
	:57:10 PM	
	:24:42 AM	
	2:35:27 AM	
	2:35:28 AM	
	2:35:30 AM	
	5:12:11 AM	
	15:01 PM	

Client: B6

Patient: B6

rDVM: B6 rad B6 Thx Right Lat

B6

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

ECG from cardio

B6

B6 10:06:21 AM

Tufts University
Tufts Cummings School of Vet Med
Cardiology

B6

Client: B6
Patient: B6

ECG from cardio

B6

B6 10:08:03 AM Page 1 of 2
Tufts University
Tufts Cummings School of Vet Med
Cardiology

B6

Client: B6
Patient: B6

ECG from cardio

B6

B6 10:08:03 AM Page 2 of 2
Tufts University
Tufts Cummings School of Vet Med
Cardiology

B6

Client: B6
Patient: B6

Patient History

05:40 PM	Vitals
05:40 PM	Vitals
05:40 PM	Vitals
05:40 PM	Vitals
05:42 PM	UserForm
06:17 PM	UserForm
06:18 PM	UserForm
07:40 PM	Purchase
08:02 PM	Treatment
08:02 PM	Vitals
08:06 PM	Labwork
08:11 PM	Treatment
08:11 PM	Vitals
08:11 PM	Treatment
08:11 PM	Vitals
08:12 PM	Treatment
08:12 PM	Vitals
08:12 PM	Treatment
08:13 PM	Purchase
08:13 PM	Purchase
08:20 PM	Purchase
08:20 PM	Purchase
08:21 PM	Treatment
08:21 PM	Vitals
08:26 PM	Treatment
08:26 PM	Vitals
08:26 PM	Vitals
09:42 PM	Vitals
09:43 PM	Treatment
11:00 PM	Vitals
11:17 PM	Treatment
11:17 PM	Treatment
11:18 PM	Treatment
11:18 PM	Vitals
11:18 PM	Treatment
11:18 PM	Vitals
11:21 PM	Treatment
11:21 PM	Vitals
11:58 PM	Treatment
11:58 PM	Treatment
11:58 PM	Vitals
01:04 AM	Treatment
01:04 AM	Vitals
01:04 AM	Vitals

B6

B6

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

Patient History

B6	01:51 AM	Treatment	B6
	01:51 AM	Vitals	
	02:58 AM	Treatment	
	02:58 AM	Vitals	
	02:58 AM	Vitals	
	03:04 AM	Treatment	
	03:04 AM	Vitals	
	03:04 AM	Treatment	
	03:10 AM	Treatment	
	03:10 AM	Vitals	
	03:10 AM	Treatment	
	03:10 AM	Vitals	
	03:59 AM	Treatment	
	03:59 AM	Vitals	
	04:55 AM	Vitals	
	05:00 AM	Vitals	
	05:16 AM	Treatment	
	05:55 AM	Treatment	
	05:55 AM	Vitals	
	06:02 AM	Purchase	
	07:01 AM	Treatment	
	07:01 AM	Vitals	
	07:13 AM	Treatment	
	07:13 AM	Vitals	
	07:14 AM	Vitals	
	07:14 AM	Treatment	
	07:14 AM	Treatment	
	07:14 AM	Vitals	
	07:21 AM	Vitals	
	07:28 AM	Treatment	
	07:28 AM	Vitals	
	08:11 AM	Purchase	
	08:12 AM	Treatment	
	08:12 AM	Vitals	
	08:14 AM	Purchase	
08:31 AM	UserForm		
09:06 AM	Treatment		
09:06 AM	Vitals		
09:06 AM	Treatment		
09:06 AM	Vitals		
09:15 AM	UserForm		
09:43 AM	Purchase		
09:43 AM	Purchase		
09:44 AM	Purchase		
09:44 AM	Purchase		
09:59 AM	Treatment		

Client: B6
Patient: B6

Patient History

B6	09:59 AM	Vitals
	10:06 AM	Purchase
	10:06 AM	Treatment
	10:10 AM	Purchase
	10:34 AM	Treatment
	10:34 AM	Vitals
	11:24 AM	Treatment
	11:25 AM	Treatment
	11:25 AM	Vitals
	11:25 AM	Purchase
	11:27 AM	Treatment
	11:27 AM	Treatment
	11:27 AM	Vitals
	11:27 AM	Treatment
	11:27 AM	Vitals
	11:50 AM	Treatment
	11:50 AM	Vitals
	01:22 PM	Treatment
	01:22 PM	Vitals
	01:26 PM	Treatment
	01:26 PM	Vitals
	01:55 PM	Treatment
	01:55 PM	Vitals
	02:24 PM	Prescription
	02:26 PM	Prescription
	02:27 PM	Prescription
	02:29 PM	Prescription
	02:34 PM	Purchase
	02:55 PM	Appointment
	03:31 PM	Treatment
	03:31 PM	Vitals
	03:34 PM	Treatment
	03:34 PM	Vitals
	03:34 PM	Treatment
03:34 PM	Treatment	
03:34 PM	Vitals	
03:57 PM	Treatment	
03:57 PM	Vitals	
10:54 AM	UserForm	
11:01 AM	Treatment	
11:02 AM	Purchase	
11:24 AM	Vitals	
11:53 AM	Purchase	
12:10 PM	UserForm	

B6

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

Patient History

B6	12:51 PM	Prescription	B6
	12:51 PM	Purchase	
	02:36 PM	Prescription	
	02:36 PM	Purchase	
	09:30 AM	Prescription	
	09:32 AM	Purchase	
	03:55 PM	Prescription	
	03:55 PM	Purchase	
	02:35 AM	Vitals	
	02:35 AM	Vitals	
	02:35 AM	Vitals	
	03:34 AM	UserForm	
	04:09 AM	Treatment	
	05:10 AM	Purchase	
	05:11 AM	Purchase	
	05:11 AM	Purchase	
	05:12 AM	Vitals	
	05:12 AM	Purchase	
	05:13 AM	Purchase	
	05:19 AM	Treatment	
	05:25 AM	UserForm	
	10:56 AM	Appointment	
	02:06 PM	UserForm	
	02:15 PM	Vitals	
	02:33 PM	Treatment	
	02:36 PM	Purchase	
	02:48 PM	UserForm	
	03:07 PM	Purchase	
	03:52 PM	Prescription	
	03:56 PM	Prescription	
04:04 PM	Purchase		

Appears this way in Original

Appears this way in Original

Appears this way in Original

Notice of Patient Admit

Date: B6 5:41:03 PM

Case No: B6

Referring Doctor: B6

Client Name: B6

Patient Name: B6

Dear Colleague,

Your patient presented to our Emergency service. Please make note of the following information to facilitate communication with our team.

The attending doctor is: B6

The reason for admission to the FHSA is: Suspect DCM.

If you have any questions regarding this particular case, please call 508-887-4988 to reach the Cardiology Service. Information is updated daily, by noon.

Thank you for your referral to our Emergency Service.

Cummings
Veterinary Medical Center
AT TUFTS UNIVERSITY

Foster Hospital for Small Animals
55 Willard Street
North Grafton, MA 01536
Telephone (508) 839-5395
Fax (508) 839-7951
<http://vetmed.tufts.edu/Daisy>

B6

B6

Female (Spayed)

Canine Golden Retriever Cream

B6

Daily Update From the Cardiology Service

Today's date: 4/11/2018

Dear: **B6**

Thank you for referring patients to the Foster Hospital for Small Animals at the Cummings School of Tufts University.

Your patient **B6** was admitted and is being cared for by the Cardiology Service.

Today, **B6**

- is in stable condition
- is still in the oxygen cage
- is critically ill
- might be discharged from the hospital today

Today's treatments include

- bloodwork planned/pending
- echocardiography
- cardiac catheter procedure planned
- treatment for DCM (primary vs secondary dietary induced)
- ongoing treatment for thrombosis
- ongoing treatment for arrhythmia

Additional plans:

Please allow 3-5 business days for reports to be finalized upon patient discharge.

Please call (508) 887-4696 before 5pm or email us at cardiovet@tufts.edu if you have any questions. Thank you!

Attending Clinician: **B6**

Faculty Clinician: **B6** DVM, DACVIM

Senior student:

Appears this way in Original

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 Golden Retriever Cream

B6

4/24/2018

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

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

Canine Golden Retriever Cream

B6

7/9/2018

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

Cummings
Veterinary Medical Center
AT TUFTS UNIVERSITY

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

B6

Female (Spayed)

Color: Golden Retriever Cream

B6

B6

Dear **B6**

Tonight **B6** presented to the ER for evaluation of an acutely developed dry non productive cough. She has a history of DCM and is being managed by our Cardiology Service for it. The owners are also concerned that she ingested foreign material on Christmas and her cough may be related to it.

TFAST revealed significant RV enlargement. Thoracic radiographs showed cardiac enlargement without pulmonary edema. Abdominal radiographs (insisted to be performed by owner) were unremarkable.

Hospitalization was recommended so she can be re-evaluated by Cardiology ASAP, but ultimately declined. She was given furosemide 2mg/kg IM and discharged.

If you have any questions, or concerns, please contact us at 508-887-4988.

Thank you,

B6

DVM

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 Golden Retriever Cream
B6

1/2/2019

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 (Cardiology)

	800.218-sub 1	800.218-sub 2	800.218-sub 6	800.218-sub 5	800.218-sub 4	800.261	800.216-sub 2	800.215-sub 5	800.210-sub 1	800.194-sub 1	800.240-sub 1	800.240-sub 2	800.240-sub 3	800.240-sub 4	800.250-sub 1		
	Case Sample	Store-bought	Case sample	Case Sample	Case Sample	Store-bought	Store-bought	Case	Case		Case	Case	Case	Case	Store-bought		
	California Naturals Kangaroo & Lentil	California Naturals Kangaroo & Lentil	California Naturals Kangaroo & Lentil	California Naturals Chicken Meal	Fromm Heartland Gold Grain Free Large Breed Adult	Zignature Essentials Kangaroo	Wysong Vegan Canine/Feline Formula	Wellness Small Breed Healthy Weight Turkey & Brown Rice-DOG	Rachel Ray Nutrish Chicken & Brown Rice-CAT FOOD	Purina Proplan Focus Indoor Care Cat Food	Iams Proactive Health Mini Chunks Adult 1+	Iams Proactive Health Mini Chunks Adult +1	Iams Proactive Health with Grass Fed Lamb	Iams Proactive Health Small & Toy Breed Adult 1+	Wellness Core Grain Free Original-Dog-No reports****	AAFCO-Adult Maint	
B6	Ca	1.30%	1%	0.93%	1.80%	1.20%										0.5 to 2.5%	
	Mg	0.13%	0.14%	0.15%	0.14%	0.14%										0.06%	
	P	0.74%	0.67%	0.68%	1.30%	1%										0.4 to 1.6 %	
	Fe	30 mg/kg	30 mg/kg	31 mg/kg	39 mg/kg	30 mg/kg										40 mg/kg	
	Co	0.12 mg/kg	0.14 mg/kg	.14 mg/kg	0.14 mg/kg	0.37 mg/kg										25 mg/kg-chicks/rats/sheep max	
	Cu	21 mg/kg	19 mg/kg	16 mg/kg	19 mg/kg	25 mg/kg										7.3 mg/kg	
	Zn	240 mg/kg	280 mg/kg	200 mg/kg	330 mg/kg	170 mg/kg										80 mg/kg	
	Se	0.7 mg/kg	0.65 mg/kg	.68 mg/kg	0.66 mg/kg	0.85 mg/kg										0.35 to 2 mg/kg	
	Ca:P	1.76:1	1.49:1	1.37:1	1.38:1	1.2:1										1:1 to 2:1	
Cu:Zn	0.09:1	0.07:1	0.08:1	0.06:1	0.15:1										0.09:1-not AAFCO		
B6	Tau	MB = 0.26% est DMB	MB = 0.11% est DMB	MB = 0.14% est DMB	DMB = 0.12% est DMB	MB = 0.2% est DMB	B = 0.051% est DMB	B = ~0.19% est DMB	MB = 0.22% est DMB	MB = 0.24% est DMB	MB = 0.24% est DMB	MB = 0.11% est DMB	MB = 0.11% est DMB	MB = 0.11% est DMB	MB = 0.12% est DMB	MB = 0.25% est DMB	0.1% in Cats
	Cystine	MB = 0.26% est DMB	MB = 0.26% est DMB	MB = 0.28% est DMB	DMB = 0.36% est DMB	MB = 0.34% est DMB	DMB = 0.33% DMB	MB = 0.46% est DMB	MB = 0.32% est DMB	MB = 0.42% est DMB	MB = 0.5% est DMB	MB = 0.3% est DMB	MB = 0.3% est DMB	= <0.011% est DMB	= <0.011% est DMB	= <0.011% est DMB	n/a
	Met	MB = 0.64% est DMB	MB = 0.61% est DMB	MB = 0.86% est DMB	DMB = 0.69% est DMB	MB = 0.51% est DMB	MB = 0.4% est DMB	MB = 0.60% est DMB	MB = 0.66% est DMB	MB = 0.78% est DMB	MB = 0.94% est DMB	MB = 0.57% est DMB	MB = 0.6% est DMB	B = 0.045% est DMB	B = 0.032% est DMB	B = 0.032% est DMB	0.33% dog
	Met-Cys	0.9% est DMB	0.87% est DMB	1.14% est DMB	1.05% est DMB	0.85% est DMB	0.73% est DMB	1.06% est DMB	0.98% est DMB	1.2% est DMB	1.44% est DMB	0.87% est DMB	0.9% est DMB	0.056% est DMB	0.043% est DMB	0.043% est DMB	0.65% dog
	Cys:Met																
	Met: Met+Cys																
Met: Cys																	
MSU	Iodine	not tested	4.04 ug/g (ppm)	1.87 ug/g (ppm)	3.19 ug/g (ppm)	1.58 ug/g (ppm)	4.2 ug/g (ppm)									1 ppm (min) to 11 ppm (max)	
		per label moisture max 10%	per label moisture max 10%	per label moisture max 10%	per label moisture max 10%	per label moisture as-is 7.07%	per label moisture max 10%	per label moisture max 10%	per label moisture max 11%	per label moisture max 9%	per label moisture max 12%	per label moisture max 10%	per label moisture max 10%	per label moisture max 10%	per label moisture max 10%	per label moisture max 10%	

Last Name

B6

EON	MRx Req	MRx Rcvd	MRx Summ	Interview Req
EON-359281	X	X	X	X
EON-359337	X	X	X	X
EON-359723	X	X	X	X
EON-359524	X	X	X	X
EON-361158	X	X	X	X
EON-361042	X	X	X	NFA
EON-361105	X	X	X	X
EON-361132	x2			
EON-361233	X	X	X	X
EON-361233	X	X	X	NFA
EON-359594	X	X	X	X
EON-359190	X	X	X	X
EON-359301	X	X	X	X
EON-359374-359595	X	X	X	X
EON-361816	X			
EON-361832	X	X	X	NFA
EON-361853	X	X	X	X
EON-361855-57	X	X	X	X
EON-361866	X	X	X	X
EON-361903	X	IP		
EON-362172	X	X	X	X
EON-361876	X	X	X	X
EON-362325	X	X	X	X
EON-362327	X	X	X	X
EON-362347	X	X	X	X
EON-362358	X			
EON-362368	X			
EON-362411	X	X	X	X
EON-362570	X	need CC mrx		
EON-362680	X	X		
EON-362724	X	X	X	X
EON-362795	X	IP - x2		
EON-362796	X			
EON-358522	X	X	X	X
EON-360197	X	X	X	NFA
EON-360030	X	X	JJ	
EON-364330	X	X	X	X
EON-361412	X	X	X	X
EON-361244	X	X	X	X
EON-361347	X	X	X	X
EON-361684	X	X	X	X
EON-363316	X	X	X	X
EON-363409	X	X		
EON-363497	X	X	X	X
EON-363608	X			
EON-363773	X	X	X	X

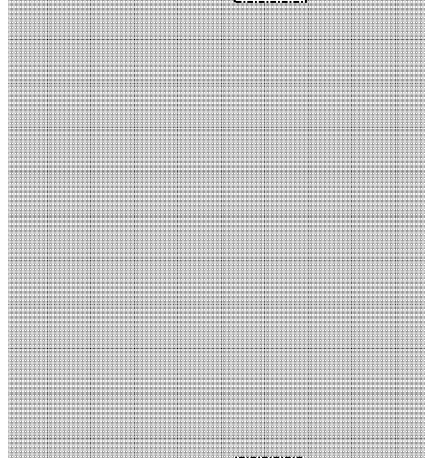
B6

EON-363846	x	x		
EON-363873	x	x	x	x
EON-363894	x2	x	x	x
EON-361320	x	x	x	x
EON-361723	x	x	x	x
EON-363453	necrop?			
EON-363580	x			
EON-364300	echo tau?			
EON-364322	x	NFA	no echo/tau	
EON-364337	x			
EON-364568	x	x	x	x2
EON-365002	x	x	x	x
EON-364590	x	x	x	x
EON-364639	x	x	x	x
EON-364646	x	IP		
EON-364715	x	IP		
EON-364718	x	x	x	x
EON-364891	x	x	x	x
EON-365010	x	x	x	x
EON-365076	x	x	x	x
EON-365839	x	x		yes O perm
EON-366207	x	x		
EON-366509	x	x		
EON-366513	x			
EON-366547	x			
EON-366570	x	x		
EON-366538	x	x	x	NFA
EON-359942	x	x	x	x
EON-368370	x	IP		

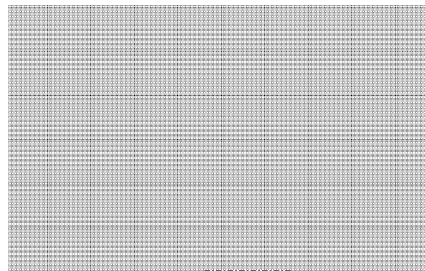
B6

		Yes		No
x	Yes			
x	Yes	No		No x
x	No			No x
x	No			No x
[Redacted]				
		Yes LF		
x	Yes	Yes	x	
		Yes		
x	x	Yes vet	JG	
		No		
x	x	Yes	JG	
x	x	No		O asked
x	No			
x	x	Yes	x	No
[Redacted]				
No answer				Yes
		Yes		No

Echo Vet	Cost	PO Done
8-Nov		x
14-Dec		x
13-Nov	B5	x
1-Nov		x



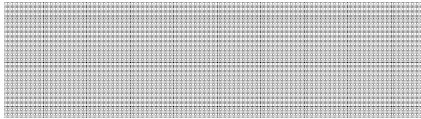
Oct 3, Nov 7	632, B5	x
28-Dec		x
27-Sep		x
1-Nov	B5	x
8-Jan		x



3-Nov	B5	x
19-Oct		x



29-Oct	B5	x
~9-Nov		x
soon		x



Client:
Patient:

B6

B6 echo report 11/27/18

B6

Echocardiogram Report

Date: 11/27/2018
Name: **B6**
Age: 10
Breed: Dober
Sex: Male
Weight: 40.8 kg (90.0 lbs)
Vet: **B6**
Veterinary Hospital

Cardiac Measurements:

2-D	M-Mode	Doppler
Ao D am	IVSd	MV E Vel
LA Diam	LVIDd	MV A Vel
LA Ao	LVPWd	MV E/A Ratio
Ao LA	IVSs	MR Vmax
LVLd A4C	LVIDs	MR maxPG
LVA d A4C	LVPWs	LVOT Vmax
LVEDV A-L A4C	%FS	LVOT maxPG
LVEDV MOD A4C		RVOT Vmax
LVLs A4C		RVOT maxPG
LVA s A4C		
LVESV A-L A4C		
LVESV MOD A4C		
HR		
EF A-L A4C		
LVEF MOD A4C		
SV A-L A4C		
SV MOD A4C		
CO A-L A4C		
CO MOD A4C		

Physical exam:
HR: 114, regularly irregular rhythm, no murmur appreciated today, strong and synchronous pulses, Lungs: Clear and cupnic

Client:
Patient:

B6

N.E.V.S echo report 11/27/18

B6

B6 26443

Page 2 of 2

B6

Echocardiographic Assessment:
Dilated cardiomyopathy - severe

Plan - Cardiac:

- There is severe heart disease present. The risk for CHF and supraventricular arrhythmias (ie atrial fibrillation) is increased. Please consider treating with:

B6

- Consider mild sodium restriction - Royal Canin Early Cardiac.
- Given the severity of the heart disease, the owners should monitor the dog for clinical signs of CHF. Have the owners keep a resting sleeping log of the dog's respiratory rate. If the RR persists above 44 breaths per minute, have the dog return for recheck evaluation and repeat thoracic radiographs.

B6

DVM, Dipl ACVIM (Cardiology)

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

CBC/Chem - 12/5/2018



Tufts Cummings School Of Veterinary Medicine

200 Westboro Road
North Grafton, MA 01536

DUPLICATE

Name/DOB: B6 (2/28/2008)	Sex: M	Provider: B6
Patient ID: 320330	Age: 10	Order Location: B6
Phone number:	Species: Canine	Sample ID: 1812050071
Collection Date: 12/5/2018 10:26 AM	Breed: Doberman Pinscher	
Approval date: 12/5/2018 12:38 PM		

CBC, Comprehensive, Sm Animal (Research)

SMACHUNSKI		Ref. Range/Males
WBC (ADVIA)		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
MCHC (ADVIA)		31.9-34.3 g/dL
RDW (ADVIA)		11.9-15.2
Platelet Count (Advia)		173-486 K/uL
12/05/18 12:38 PM	L B6	Platelets per 100x field (estimated count of 200,000-500,000/uL)
Mean Platelet Volume (Advia)		8.29-13.20 fl
12/05/18 11:06 AM	B6	Platelet clumps (if present) and sample age (greater than 4 hours) can result in a falsely increased MPV.
Platelet Crit		0.129-0.403 %
12/05/18 11:06 AM	B6	Platelet Crit is invalid when clumped platelets are present. Interpretation of PltCt is unclear in species other than canines.
Reticulocyte Count (Advia)		0.20-1.60 %
Absolute Reticulocyte Count (Advia)		14.7-113.7 K/uL
	B6	

Microscopic Exam of Blood Smear (Advia)

SMACHUNSKI		Ref. Range/Males
Seg Neuts (%)		43-86 %
Lymphocytes (%)	L	7-47 %
Monocytes (%)	B6	1-15 %
Eosinophils (%)		0-16 %
Seg Neutrophils (Abs) Advia	H	2.80-11.50 K/uL
Lymphs (Abs) Advia	L	1.00-4.80 K/uL
Mono (Abs) Advia	B6	0.10-1.50 K/uL
Eosinophils (Abs) Advia		0.00-1.40 K/uL
WBC Morphology		No Morphologic Abnormalities
Echinocytes		Occasional

Research Chemistry Profile - Small Animal (Cobas)

SMACHUNSKI		Ref. Range/Males
Glucose		67-135 mg/dL
Urea	H	8-30 mg/dL
Creatinine	B6	0.6-2.0 mg/dL
Phosphorus		2.6-7.2 mg/dL

Sample ID: 1812050071/1
This report continues... (Final)

Reviewed by: _____

Client: **B6**
Patient:

CBC/Chem - 12/5/2018



Tufts Cummings School Of Veterinary Medicine

200 Westboro Road
North Grafton, MA 01536

DUPLICATE

Name/DOB: **B6** (2/28/2008) Provider: **B6**
Patient ID: 320320 Sex: M Order Location: **B6**
Phone number: Age: 10 Sample ID: 1812050071
Collection Date: 12/5/2018 10:26 AM Species: Canine
Approval date: 12/5/2018 12:38 PM Breed: Doberman Pinscher

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

	Ref. Range/Males
SMACHUNSKI	
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
Direct Bilirubin	0.00-0.10 mg/dL
Indirect Bilirubin	0.00-0.20 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
Comments (Chemistry)	

H **B6**

Sample ID: 1812050071.2
END OF REPORT (Final)

Reviewed by: _____
Page 2

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

IDEXX BNP - 12/4/2018

IDEXX Reference Laboratories

Client: SMITH Patient: BROM

Client: **B6**
Patient: **B6**
Species: CANINE
Breed: DOBERMAN_PINSCH
Gender: MALE NEUTERED
Age: 10Y

Date: 12/05/2018
Requisition #: 320320
Accession #: **B6**
Ordered by: **B6**

IDEXX VetConnect 1-888-433-9967
TUFTS UNIVERSITY
200 WESTBORO RD
NORTH GRAFTON, Massachusetts 01536
508-839-5395
Account #88933

CARDIOPET proBNP - CANINE

Test	Result	Reference Range	Low	Normal	High
CARDIOPET proBNP - CANINE	B6	0 - 900 pmol/L	HIGH		B6

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.

Client: **B6**
 Patient:

Holter Monitor Diary 12/5/18

PATIENT INFORMATION AND INSTRUCTIONS

Your physician has prescribed you a Holter Electrocardiogram to determine how your heart functions during normal daily activity.

It's important to keep an accurate diary of your symptoms only. If you begin to feel symptoms related to why your monitor was prescribed such as chest pain, shortness of breath, uneven heartbeats or dizziness, note in your diary the time of day they began, what you were doing and how you were feeling. Use this diary to record:

Time of day: Enter the time as displayed on the recorder. Do NOT use your personal watch.

Symptoms: After manually pushing the ENTER button on your device, write down in your diary the symptoms related to why your monitor was prescribed, such as dizziness, heart pounding, nausea, shortness of breath, or pain in your chest, neck, arm or face. Note in the diary any abnormal symptoms to ensure the study contains the important events and help your physician diagnose your rhythm problem.

Activity: For each diary entry, write down what you were doing when you experienced a symptom: sitting, eating, walking, exercise, bowel movement, etc.

IMPORTANT NOTES TO PATIENT

- To insure an accurate evaluation of this recording, FIRST you MUST include any Symptoms accompanied by the Activity when you were feeling that symptom. This diary must include the time as shown on the display of the recorder, how you were feeling (your symptoms) and your activity at the time of the event. If you are unsure of the significance of a feeling, write it down.
- Keep the recorder away from water. Do not bathe, shower, or swim during this monitoring period.
- Do NOT open or tamper with the device battery compartment or the lead wire connection. If the battery becomes dislodged for any reason after the study has started, the monitor will stop recording. The device cannot be restarted and the study is finished.
- If a wire is disconnected from an electrode, simply re-connect it by snapping the wire onto the electrode. If an electrode falls off, simply re-attach it in the same location.

Following these instructions will help your physician analyze the results of your recording and diagnose your problem.

- SAMPLE DIARY -

TIME	SYMPTOMS	ACTIVITY
9:20	Chest Pain	While I was Mowing Lawn
10:30	Shortness of breath	Used bathroom to urinate
12:00	Heart beats fast	Driving
9:00	Palpitations	Went to sleep

B6 is asymptomatic - Breathing rates between 12-17 breaths/min

TIME	SYMPTOMS	ACTIVITY	TIME	SYMPTOMS	ACTIVITY
12:16		car ride home	10:54-10:59		outside - Brian
1:10-1:12		Playing with dog	11:00-9:00		Sleeping
1:14		Resting	9-10:20		relaxing (Able to breathe)
1:25-3:00		Sleeping	10:20 am - 10:40		up outside
3:37-4:00		short walk with steps	10:55		eating breakfast
4:00-4:25		standing in kitchen	11:00		standing walking around
4:40		excited greeting arriving family member	11:20		In car
4:55		Resting / Lying Down			
5:15		Resting			
6:45		Dinner			
6:52		outside going to bathroom			
7:15-10:15		sleeping			
10:40		Dinner			

Client: **B6**
 Patient:

Holter Monitor Diary 12/5/18

PATIENT INFORMATION AND INSTRUCTIONS

Your physician has prescribed you a Holter Electrocardiogram to determine how your heart functions during normal daily activity.

It's important to keep an accurate diary of your symptoms only. If you begin to feel symptoms related to why your monitor was prescribed such as chest pain, shortness of breath, uneven heartbeats or dizziness, note in your diary the time of day they began, what you were doing and how you were feeling. Use this diary to record:

Time of day: Enter the time as displayed on the recorder. Do NOT use your personal watch.

Symptoms: After manually pushing the ENTER button on your device, write down in your diary the symptoms related to why your monitor was prescribed; such as dizziness, heart pounding, nausea, shortness of breath, or pain in your chest, neck, arm or face. Note in the diary any abnormal symptoms to ensure the study contains the important events and help your physician diagnose your rhythm problem.

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B6 is asymptomatic - Breathing rates between 12-17 breaths/min

TIME	SYMPTOMS	ACTIVITY	TIME	SYMPTOMS	ACTIVITY
12:10		car ride home	10:54-10:59		outside - Brian
1:10-1:12		Playing with dog	11:00-9:00		Sleeping
1:14		Resting	9-10:20		relaxing A/C but 4mg taken
1:25-3:00		Sleeping	10:20am-10:40		up outside
3:37-4:00		short walk with steps	10:55		eating breakfast
4:00-4:25		standing in kitchen	11:00		standing walking around
4:40		excited greeting ARRIVING family member	11:20		In car
4:55		Resting / Lying Down			
5:15		Resting			
6:15		Dinner			
6:52		outside going to bathroom			
7:15-10:15		sleeping			
10:40		Dinner			

Client:
Patient: **B6**

Holter Monitor Diary 12/5/18

TIME	SYMPTOMS	ACTIVITY

-3-

TIME	SYMPTOMS	ACTIVITY

-4-

TIME	SYMPTOMS	ACTIVITY

-5-

HOLTER ECG
Patient Diary

24 HOUR
 48 HOUR

PATIENT: **B6**

PHYSICIAN:

HOSPITAL OR OFFICE LOCATION:

M 103/4 89 lbs
SEX AGE WEIGHT HEIGHT

DATE OF RECORDING: 12/5

RECORDER S/N NO:

TIME OF TEST: START 11:30 AM STOP 11:30 AM
12/5 PM 12/6 PM

MEDICATIONS:

Client: **B6**
Patient:

Texas A & M Cardiac Troponin - 12/5/2018



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: Cardiovet@tufts.edu OR clinpath@tufts.edu

GI Lab Assigned Clinic ID: 11405

Dr. **B6**
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: **B6**
Owner Name:
Species: Canine
Date Received: Dec 06, 2018

Tufts University-Clinical Pathology Lab
Tracking Number: 1812050074

GI Lab Accession **B6**

Test	Result	Reference Interval	Assay Date
Ultra-Sensitive Troponin I Fasting	B6	≤0.06	12/06/18

B6

Comments:

GI Lab Contact Information

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

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

Client:
Patient:

B6

Texas A & M Cardiac Troponin - 12/5/2018



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



**Important
Notices:**

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: **B6** @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. **B6** at **B6** @cvm.tamu.edu or Dr. **B6** at **B6** @cvm.tamu.edu

Dogs with Primary Hyperlipidemia- Prescription diet naïve dogs newly diagnosed with primary hyperlipidemia are eligible to be enrolled in a dietary trial. Contact Dr. **B6** at **B6** @cvm.tamu.edu for more information.

Dogs with Chronic Pancreatitis- Dogs with chronic pancreatitis (cPLi >400µg/L) and hypertriglyceridemia (>300 mg/dl) are eligible to be enrolled in a dietary trial. Contact Dr. **B6** at **B6** @cvm.tamu.edu

Chronic enteropathies in dogs- Please fill out this brief form <http://tinyurl.com/ibd-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. **B6** for further information at: **B6** @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: gilab@cvm.tamu.edu
vetmed.tamu.edu/gilab

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

UCDavis Taurine Level - 12/5/2018

25757

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

Veterinarian Contact: Dr. **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**

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

Patient Name: **B6** Species: Canine

Breed: Doberman Owner's Name: **B6**

Current Diet: home cooked diet - lamb protein, broccoli, Buller's yeast

Sample type: ~~Plasma~~ Whole Blood Urine Food Other 265

Test: Taurine Complete Amino Acids Other: _____

Taurine Results (lab use only)

Plasma: _____ 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:
Patient:

B6

Anesthesia Record and Checklist 12/20/18

B6

Client:
Patient:

B6

Anesthesia Record and Checklist 12/20/18

B6

Client: **B6**
 Patient: _____

Anesthesia Record and Checklist 12/20/18

Patient ID Sticker

Patient Name: _____

Event Documentation

Date: _____ Time: _____
 Doctor: _____
 Code Leader: _____
 Catheter Method: IO / Cutdown / In Place Pre-Event
 Catheter Details: _____
 CPR: Open Chest / Closed Chest Est. Weight: _____

Describe Event: _____

Monitoring	Time	ECG Rhythm			EtCO ₂			Notes / Other					
		PEA / Asystole / VT / VFib											
		PEA / Asystole / VT / VFib											
		PEA / Asystole / VT / VFib											
		PEA / Asystole / VT / VFib											
		PEA / Asystole / VT / VFib											
Drugs / Fluids	Drug/Fluid	Time	Dose	Route	Time	Dose	Route	Time	Dose	Route	Time	Dose	Route
	Epinephrine												
	Atropine												
Defib	Time	ECG Rhythm			Joules			Notes / Other					
		VT / VFib						Internal / External					
		VT / VFib						Internal / External					
		VT / VFib						Internal / External					
		VT / VFib						Internal / External					

ROSC? Yes / No Time: _____ Added to CPR Log? Yes / No

Client: **B6**
 Patient:

Diet history 12/5/18

CARDIOLOGY DIET HISTORY FORM

Please answer the following questions about your pet

Pet's name: **B6** Owner's name: **B6** Today's date: **12/5/18**

1. How would you assess your pet's appetite? (mark the point on the line 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) **NO**
 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) **maybe gained tiny bit due to exercise restriction**
 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 you 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
Lamb meat (Fresh from Grocery)	cooked	7 oz	3x/15/dy	April 2008
egg (organic fresh)	Boiled/cooked	1 egg	5x/15/dy	same as
broccoli (organic)	microwaved	1/2 cup	3x/15/dy	above
Safflower oil (organic)	Grainy/Liquid	1/2 Tsp	2x/15/dy	(same) 2008
Cod Liver oil	Grainy store/Liquid	3/4 Tsp	1x/day	same
Vitamin E Supplement	oil	2 pills	once daily	same
Sea weed Calcium	powder	1 1/4 Tsp	1x/dy	same
Special powder made up of:	powder	2 TSP/dy	3x/15/dy	same
primarily Nutritional Yeast, ... granules				

*Any additional diet information can be listed on the back of this sheet
 see reverse side please
 Kelp, E seaweed, Calcium

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:

Taurine	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Brand/Concentration: Think Whole Foods Brand (just started)	Amount per day: 500 mg - 2/dy
Carnitine	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	L-CARNITINE (just started)	500 mg - 2/dy
Antioxidants	<input type="checkbox"/> Yes <input type="checkbox"/> No		
Multivitamin	<input type="checkbox"/> Yes <input type="checkbox"/> No		
Fish oil	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Cod LIVER oil Nordic Brand (whole Foods)	3/4 TSP/dy
Coenzyme Q10	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	(just started)	100 mg/dy
Other (please list):		Nature's Bounty whole Foods brand?	500 mg tablets - 1 per day
Example: Vitamin C		ARTHRITIS	2 (100 mg) / dy
Vit E		organic/whole Foods (from Vet)	1 TSP - 2x/15/dy
Glucosamine		VET CLASSICS BRAND	2 TABS chondroitin 2x/15/dy
Safflower oil			(one off by first 2-3yo)

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

Client:
Patient:

B6

Diet history 12/5/18

ALSO AS TREATS AFTER MEALS:

currently Beef (dried) (single ingredient) bites - for first 6 months
maybe 1-1/2 oz's 3x's/day

for many years prior (7-8 years) gave - have not given recently

Bison (ground) TREATS (petco) had sweet potato in them
2-3 small biscuits after every meal

Client:
Patient:

B6

Lab Results Amino Acid Laboratory 12/05/18

25757

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

Veterinarian Contact: Dr. **B6**

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

Address: **B6**

Email: Clinpath@tufts.edu / Cardiovet@tufts.edu

Telephone: 508-887-4689

Fax: 508-839-7838

Billing Contact: **B6**

Email: **B6**@tufts.edu

Billing Contact Phone: **B6**

Tax ID: _____

Patient Name: **B6**

Species: Canine

Breed: Doberman

Owner's Name: **B6**

Current Diet: home cooked diet - lamb protein, broccoli, Balance's yeast

Sample type: ~~Plasma~~ Whole Blood Urine Food Other _____

Test: Taurine Complete Amino Acids Other: _____

Taurine Results (lab use only)

Plasma: _____ 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**

Prescription Refill: **B6** ng caps (#60)

Tufts University
Foster Hospital for Small Animals
Hospital for Large Animals
55 Willard Street • North Grafton, MA 01536 • (508) 839-5395

Patient: **B6** *Canine* Date 1/9/19
Owner: _____
Address: **B6**

Rx **B6** SECURITY FEATURES ON BACK
ng caps (#60)
Give 1 capsule by mouth every 12 hours. Give with food.

Refill: 3 **B6**
DEA #: _____
Please Print _____

INTERCHANGE IS MANDATED UNLESS THE PRACTITIONER INDICATES "NO SUBSTITUTION" IN ACCORDANCE WITH THE LAW

Client: **B6**

Patient: **B6**

Prescription Refill **B6** mg capsules (#120)

Tufts University
Foster Hospital for Small Animals
Hospital for Large Animals
55 Willard Street • North Grafton, MA 01536 • (508) 839-5395

Patient: **B6** Date: 1/9/19

Owner: **B6**

Address: **B6**

Rx **B6** capsules (~~500~~) (#120)

GIVE 2 caps PO Q12hrs with food

Refill: 2

DEA # _____

B6

Please Print _____

INTERCHANGE IS MANDATED UNLESS THE PRACTITIONER INDICATES "NO SUBSTITUTION" IN ACCORDANCE WITH THE LAW

SECURITY FEATURES ON BACK

1/16/06/51

Client:
Patient:

B6

Nutrition Client Diet Hx Form

Client Diet History Form

Submitted: 01/14/2019

PET INFORMATION

Pet Name **B6**
Pet Last Name
Pet Species/Breed Dog / Doberman
Pet's Color Black
Pet's Birthdate **B6**
Pet's Sex Male
Spayed or Neutered? Yes

CLIENT INFORMATION

Client Name
Client Address **B6**
Client Phone
Client Email

CONSULT INFORMATION

Type of Consult In person
HCD Being Requested? Yes

Reasons & Goals for Consult

B6 has been on a home cooked (veterinarian provided) diet his whole life. He was recently dx'd wit DCM and although he is a Doberman & almost 11, I want some information on what I can do to vary his diet in case nutritional deficiencies have played a role in the dvp of his DCM. I also have another dog (non-Doberman) that has been on same diet for past 4 years and I don't want to cause harm to her.

Attachments

PRIMARY VETERINARIAN INFORMATION

rDVM Name D **B6**
rDVM Clinic **B6**
rDVM Phone
rDVM Fax
rDVM Email

Client: **B6**
Patient:

Nutrition Client Diet Hx Form

Diet History Form - updated
Agree to Terms
Date Submitted 01/14/2019
Information to Gather
About You, Your Veterinarian(s) and Your Pet
What type of appointment are you requesting? In person
Has your pet been seen at Tufts in the last 6 months? Yes
About the Pet Owner
Pet owner name B6
Pet owner email B6
Address B6 United States
Preferred Phone B6
Preferred Phone Type Mobile
Alternate Phone
Is there another phone number you would like to give us in case we can't reach you at one of the above? No
Spouse/partner/co-owner's name
Spouse/partner/co-owner's email
Spouse/partner/co-owner's phone
How did you hear about our service? - Other

Client:
Patient:

B6

Nutrition Client Diet Hx Form

If other, how did you find out about us?

B6 being seen by the cardiology dept at Tufts for DCM. Dr **B6** recommended a consult.

Your Pet's Primary Veterinarian

Primary veterinarian

Dr **B6**

Primary veterinarian's clinic name

B6

Primary veterinarian's clinic phone

Primary veterinarian's clinic fax

Primary veterinarian's clinic email

Is your pet currently being (or has your pet been) seen by any other veterinarians in relation to her/his current health issues or other health issues that you'd like to discuss with us?

Yes

Information About Your Second Veterinarian

Name of 2nd veterinarian

Dr **B6**

Clinic name of 2nd veterinarian

B6

Phone for 2nd veterinarian's clinic

Fax for 2nd veterinarian's clinic

Email for 2nd veterinarian's clinic

What is this second veterinarian's role in your pet's care?

2nd Vet when spending time in **B6**

Should this 2nd veterinarian receive a copy of any written reports that result from working with our service?

No

Is your pet being seen by a 3rd veterinarian?

Yes

Information About Your Third Veterinarian

Name of 3rd veterinarian

Tufts Cardiology and Tufts Oncology Dept

Client:
Patient:

B6

Nutrition Client Diet Hx Form

Clinic name of 3rd veterinarian
B6
Phone for 3rd veterinarian's clinic
Fax for 3rd veterinarian's clinic
Email for 3rd veterinarian's clinic
What is this third veterinarian's role in your pet's care?
Cardiology & Oncology
Should this 3rd veterinarian receive a copy of any written reports that result from working with our service?
Yes
Is your pet being seen by a 4th veterinarian?
No
About Your Pet
Pet's name
B6
What is your pet's species?
Dog
Breed
Doberman
Color
Black
Sex
Male
Spayed/neutered?
Yes
Do you know your pet's exact birthdate?
Yes
Pet's Birthdate
B6
What is your pet's current weight
87
Pounds or kilograms?
lbs
Has your pet gained or lost weight within the past 6 months?
Stayed the same

Client:
Patient:

B6

Nutrition Client Diet Hx Form

Which category best describes your pet?

ideal weight

Reason and goals for consultation

B6 has been on a home cooked (veterinarian provided) diet his whole life. He was recently dx'd wit DCM and although he is a Doberman & almost 11, I want some information on what I can do to vary his diet in case nutritional deficiencies have played a role in the dvp of his DCM. I also have another dog (non-Doberman) that has been on same diet for past 4 years and I don't want to cause harm to her.

Details About Your Pet's Habits

Questions about your pet

Is your pet housed:

- Indoors

Please describe your pet's activity level:

Low

Do you have any other pets?

Yes

What are your other pets?

Species How many?

Dog Pitbull Mix

Do any pets have access to other pets' food?

No

How many people (including yourself) live in your household?

2

Who feeds your pet?

Mostly me but sometimes my husband

How many times per day do you feed your pet?

Three

Does your pet finish all food that is offered?

Yes

Does your pet have any difficulty with the following?

Does your pet have any of the following?

- Food allergies
- Environmental allergies

Please explain about your pet's conditions

Have not done extensive testing but licks feet often 7-8 mo's out of Year

Not a food allergy but after giving beef as primary protein source for 2-3 yrs. loose stool dvp'd so I have been giving

Client: **B6**
 Patient:

Nutrition Client Diet Hx Form

lamb for past 7-8 years. He does well with lamb. Lately I have added some beef back and he is ok.

Have you observed any changes in any of the following?

- Activity level

Please explain the changes you have observed

Low exercise tolerance- DCM related

Have you made any recent changes in diet (last 4 weeks)?

Yes

Please explain the changes in your pet's diet

Been giving some beef again. Takes pills/ meds better when put in small pieces of beef

Your Pet's Diet

Do you feed your pet DRY (e.g., kibble) pet food?

No

Do you feed your pet WET (e.g., canned or pouched) pet food?

No

Do you feed your pet HOME-COOKED food?

Yes

Please list each kind of HOME-COOKED petfood individually

Food/Ingredient	Amount per serving	How often given?	Fed since (mo/yr)?
Lamb	7 oz's	3 times daily	7-8 years
Broccoli	1/2 cup	3 times daily	10 years
Eggs	1 egg	5 per week	10 3/4 years
Safflower Oil	1 teaspoon	3 times daily	10 3/4 years
Cod Liver Oil	3/4 teaspoon	1 time per day	10 3/4 years
Seaweed/Calcium	1 1/4 teaspoon	1 time per day	10 3/4 years
Vitamin E	2 (200 iu) pills	1 time per day	10 3/4 years
Mixed powder- Nutritional Yeast, seaweed calcium, Lecithin Granules, & Kelp Granules	2 teaspoons	3 times daily	10 3/4 years

Do you feed your pet TREATS?

No

Is there any OTHER kind of food you feed your pet?

No

Do you give any dietary supplements to your pet (for example: vitamins, glucosamine, fatty acids, herbs, or any other supplements)?

Yes

Please list any dietary supplements

Product Name	Amount	Frequency
Vit E	365	2 (200 in tabs) per day
Taurine 500mg	Whole Foods	4 tabs daily
L-Carnitine	Whole Foods	2 (500 mg tabs)daily

Client: **B6**
Patient:

Nutrition Client Diet Hx Form

Product Name	Amount	Frequency
COQ10	Whole Foods	1 100 mg tab daily
Vetclassic Cardiovascular	2 tabs	Once daily
Vetclassics	ArtiEaseGold	1 tab twice daily
Vetclassics	S.O.D. & Boswellia joint support	2 tabs daily

Is your pet receiving any medications?
Yes

Please list your pet's medications

Drug Name	Dosage
B6	tab q 12 hrs
	tab daily
	2.5 mg tab every 12 hrs
	2 tab daily with chemo
	tab daily

Do you use food (e.g., Pill Pockets, cheese, bread, peanut butter, etc.) to administer medications?
No

Regarding commercial diets (pet foods and treats not made in your home) your pet may have received in the past, please select the following statement that is most accurate:
I have fed my pet other commercial diets in the past.

Please list all other commercial diets you are not currently feeding but have fed to your pet in the past.

Food	Approximate Dates	Reason for discontinuing
Used to feed Bison/ Sweet potato treats- can't remember brand	5-7 years	Weight gain, processed food concern

Home-cooked Diets

Is a home-cooked diet being requested? (Please note that this option is only available for phone or in-person consults, not for consults directly with veterinarians.)
Yes

Does your pet have kidney disease?
No

Protein Sources

- Ground beef
- Egg

What is your pet's preferred protein?
Lamb & beef

Carbohydrate Sources

- Oats
- Potato
- Rice
- Sweet potato

Client:
Patient:

B6

Nutrition Client Diet Hx Form

What is your pet's preferred carbohydrate?

Rice or sweet potatoes

Medical Records & Test Results

Requested Items

Would you like to upload and attach anything else to this form?

Client: **B6**
Patient:

RDVM: **B6** s - CBC 1/23/19

JAN/23/2019/WED 02:15 PM

FAX No.

P. 001

B6

B6

Fax

To: *Cardiologist* From: **B6**
Fax: **B6** Pages: *5*
Phone: Date
Re: **B6** cc:

Urgent For Review Please Comment Please Reply Please Recycle

Comments:

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

RDVM **B6** s - CBC 1/23/19

JAN/23/2019/WED 02:15 PM

FAX No.

P. 003
Page 1 of 4

Zoasis - Superchem, Complete Blood Count, T4, Urinalysis-Complete
Date Performed: 01/23/2019 02:37 AM

Patient Info:
ID: 11310 B
Name: **B6**
Owner: **B6**
Provider: B

Species: Canine
Breed: Doberman Pinscher
Birthdate: **B6**
Sex: MN

Clinic: **B6**

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	1-12 IU/L
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
Glucose	70-138 mg/dL
Calcium	8.9-11.4 mg/dL
Corrected Calcium	

B6

B6

file:///C:/Program%20Files%20(x8

B6

1/23/2019

Client: B6
Patient: B6

RDVM B6 s - CBC 1/23/19

JAN/23/2019 WED 02:15 PM

FAX No.

P. 004

1/23/2019

B6

file:///C:/Program%20Files

Platelet EST	
Platelet Count	
MCHC	30-38 g/dL
MCH	19-28 pg
MCV	58-79 fL
Hematocrit	36-60 %
Hemoglobin	12.1-20.3 g/dL
RBC	4.8-9.3 10 ⁶ /μL
WBC	4.0-15.5 10 ³ /μL
Complete Blood Count	
CPK	59-895 IU/L
PrecisionPSL	24-140 U/L
Amylase	290-1125 IU/L
Triglycerides	29-291 mg/dL
Cholesterol	92-324 mg/dL
Chloride	102-120 meq/L
Na/K Ratio	27-38
Potassium	3.6-5.5 meq/L
Sodium	138-154 meq/L
Magnesium	1.5-2.5 meq/L

Pancreatitis is unlikely, but a normal PrecisionPSL result does not rule out pancreatitis as a cause for gastrointestinal signs.

B6

B6

B6

Client:
Patient:

B6

RDVM

B6

- CBC 1/23/19

JAN/23/2019/WED 02:16 PM

FAX No.

P. 005
Page 3 of 4

Neutrophils	60-77 %
Bands	0-3 %
Lymphocytes	12-30 %
Monocytes	3-10 %
Eosinophils	2-10 %
Basophils	0-1 %
Absolute Neutrophils	2060-10600 / μ L
Absolute Lymphocytes	690-4500 / μ L
Absolute Monocytes	0-840 / μ L
Absolute Eosinophils	0-1200 / μ L
Absolute Basophils	0-150 / μ L
T4	
T4	0.8-3.5 μ g/dL

B6

B6

The Total T4 result is less than 1.0 mcg/dl. A Free-T4 by equilibrium dialysis may be helpful in supporting the diagnosis of hypothyroidism in patients demonstrating clinical signs compatible with hypothyroidism. Please contact Customer Service for this additional testing.

Urinalysis-Complete

Collection Method
Natural Voiding

Color

Appearance

Specific Gravity

pH

B6

1.015-1.050

5.5-7.0

B6

file:///C:/Program%20Files%20(x86

B6

20Solutions/Impr... 1/23/2019

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

RDVM **B6** - CBC 1/23/19

JAN/23/2019/WED 02:16 PM

FAX No.

P. 006

1/23/2019

B6

file:///C:/Program%20Files%

0-3 HPF	Squamous Epithelia
None Seen HPF	Bacteria
HPF	Crystals
Hyaline 0-3LPF	Casts
0-3 HPF	RBC
0-3 HPF	WBC
Negative	Blood
Neg To 1+	Bilirubin
Negative	Ketone
Negative	Glucose

B6

Microubminuria testing is recommended (if sediment is inactive) to help determine the clinical significance of proteinuria.

Negative

B6

Protein

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

2/20/19 signed Estimate

Cummings
Veterinary Medical Center
AT TUFTS UNIVERSITY

Treatment Plan

Estimated Charges
02/19/2019

B6

B6

This estimate is based upon our preliminary examination. This is an estimate and is not the final bill. Every effort will be made to keep you informed of the current status of your bill throughout your animal's hospitalization. The final fee may vary considerably from this estimated cost.

Patient	Description	Low Qty	Low Extended	High Qty	High Extended
B6	Ligasure - FHSA	1.00			
	Hospitalization: Day Board (Dog)	1.00			
	Anesthesia < 1/2 Hr	1.00			
	Histopathology: Small Tissue (<6cm) - FHSA	1.00			
	General Procedure: Surgery	1.00			
	Anesthesia Work-Up	1.00			

B6

Doctor of Record: **B6**

B6

I understand that no guarantee of successful treatment is made. I certify that I have read and fully understand the authorization for medical and/or surgical treatment, the reason for why such medical and/or surgical treatment is considered necessary, as well as its advantages and possible complications, if any. I also assume financial responsibility for all charges incurred to this patient(s). I agree to pay 75% of the estimated cost at the time of admission. Additional deposits will be required if additional care or procedures are required. I further agree to pay the balance of the charges when this patient(s) is released.
Procedural billing is inclusive up to and including the estimated duration of hospitalization. There will be additional expenses if hospitalization extends beyond the specified duration.
I have read, understand, and agree to accept the conditions of this treatment plan.

Thank you for entrusting us with your pet's care.

High Total
Low Total
75% Deposit

B6

Client:
Patient:

B6

Anesthesia Record and Checklist 02/20/19

B6

Client:
Patient:

B6

Anesthesia Record and Checklist 02/20/19

B6

Client:
Patient:

B6

Anesthesia Record and Checklist 02/20/19

Patient ID Sticker

Patient Name: _____

Event Documentation

Date: _____ Time: _____
 Doctor: _____
 Code Leader: _____
 Catheter Method: IO / Cutdown / In Place Pre-Event
 Catheter Details: _____
 CPR: Open Chest / Closed Chest Est. Weight: _____

Describe Event: _____

Monitoring	Time	ECG Rhythm			EtCO ₂			Notes / Other					
		PEA / Asystole / VT / VFib											
		PEA / Asystole / VT / VFib											
		PEA / Asystole / VT / VFib											
		PEA / Asystole / VT / VFib											
		PEA / Asystole / VT / VFib											
Drugs / Fluids	Drug/Fluid	Time	Dose	Route	Time	Dose	Route	Time	Dose	Route	Time	Dose	Route
	Epinephrine												
	Atropine												
Defib	Time	ECG Rhythm			Joules			Notes / Other					
		VT / VFib						Internal / External					
		VT / VFib						Internal / External					
		VT / VFib						Internal / External					
		VT / VFib						Internal / External					

ROSC? Yes / No Time: _____

Added to CPR Log? Yes / No

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

IDEXX BNP 3/7/19

B6

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

Client: **B6**
Patient: **B6**
Species: CANINE
Breed: DOBERMAN_PINSCH
Gender: MALE NEUTERED
Age: 10Y

Date: 03/07/2019
Requisition #: 1A
Accession #: **B6**
Ordered by: **B6**

IDEXX VetConnect 1-888-433-9967
TUFTS UNIVERSITY
200 WESTBORO RD
NORTH GRAFTON, Massachusetts 01536
508-839-5395
Account #88933

CARDIOPET proBNP - CANINE

Test	Result	Reference Range	Low	Normal	High
CARDIOPET proBNP - CANINE	B6	0 - 900 pmol/L	HIGH		B6

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.

Client: **B6**
Patient:

Commercial Diet Plan

Clinical Nutrition Service

Foster Hospital for Small Animals
200 Westboro Road
North Grafton, MA 01536
Phone: (508) 887-4696 Attn: Nutrition Liaison
Fax: 508-887-4363
www.petfoodology.org
vetnutrition@tufts.edu

Cummings
Veterinary Medical Center
AT TUFTS UNIVERSITY

Commercial Diet Plan

3/12/2019 (phone appointment 2/19/19)

Pet Name: **B6**

Signalment: 11 year old neutered male Doberman pinscher

Weight: 83.8 pounds (38.1 kg)

Body condition score: 5-6/9, Muscle condition score: Normal

Relevant health conditions: high grade oral fibrosarcoma; DCM, atrial fibrillation, partial Von Willebrand Factor deficiency, history skin allergies and gastrointestinal upset

Referring veterinarians: Drs. **B6**, FHSA; Dr. **B6**

Diet History (at time of appointment):

- Current diet: Lamb, broccoli, eggs, mixed powder – nutritional yeast, seaweed calcium, lecithin granules, kelp granules
- Medications: **B6**
- Supplements: safflower oil, cod liver oil, seaweed calcium, vitamin E, taurine, L-carnitine, CoQ10, Vetclassic Cardiovascular, Vetclassics ArtiEaseGold, Vetclassics S.O.D & Boswellia joint support
- Medication administration: N/A
- Estimated intake: unable to estimate

Nutritional Goals

- Meet calorie needs to maintain body weight
- Meet essential nutrient needs
- Low sodium (< 80 mg/100 kcal)
- Moderate to high protein
- Omega-3 fatty acid supplementation

Recommendations:

- **B6** home-cooked diet at the time of his appointment was not meeting his nutritional needs as it was deficient in a number of essential nutrients. You ended up with this diet through experimentation, trying to avoid signs of skin allergies as well as poor stool quality and other gastrointestinal signs. Since your appointment, **B6** appetite has been much more variable – he has been unwilling to eat the same things every day.
- For dogs with heart disease who have not yet experienced heart failure, we recommend avoiding high sodium diets and treats and considering fish oil supplementation. Some dogs develop muscle loss with or without fat loss as their heart disease progresses. Feeding a higher protein diet and supplementing with fish oil may have benefit in preventing or treating this condition. There may also be some benefit of CoQ10, taurine, and carnitine supplementation, but ideal doses are unknown. **B6** taurine level came back high normal, so his DCM is less likely to be related to taurine deficiency, but it is fine to continue supplementation if you prefer.
- Both cancer and heart disease can cause changes in appetite and muscle and weight loss in dogs, so it is hard to know which is contributing the most to **B6** current appetite issues. In addition to appetite stimulants like Entyce, there are other "tricks" that may help increase **B6**'s calorie intake:
 - Rotating diets when **B6** gets picky may help ensure that a nutritionally balanced diet is eaten in appropriate amounts. Other techniques that you can utilize to optimize **B6**'s appetite include:
 - Changing the temperature of the food - every dog is a little bit different and some dogs

Commercial Diet Plan

prefer their food warmed, while others like it chilled. You can put canned food in the microwave for 10-15 seconds or put it in the freezer for 15 minutes to see if temperature makes a difference.

- A change of scenery - sometimes changing the feeding location can improve appetite. Try to offer food in a different room or outside. Sometimes feeding next to another pet can also encourage eating, although you need to ensure that fights do not occur over food.
- A different dish - try to offer B6 meal on one of your dinner plates or in a different type of bowl. Some dishes, particularly plastic, can retain unpleasant odors or flavors.
- Palatability enhancers can be used to encourage him to eat the appropriate diets if necessary, but ideally should not be used at every meal. Many dogs like sweet things and maple syrup, brown sugar, applesauce or fruit yogurt may be appealing as well as fats such as butter, lard, etc. Ideally, the total calories (noted below) from these foods and treats should not exceed B6's 10% treat allowance (see treat section) on regular basis.
- We discussed making a balanced home-cooked diet for B6 at your appointment, but his changes in appetite since then make this an impractical option as he is not currently willing to eat any food items consistently enough to be worth formulating a nutritionally complete recipe for him (all ingredients bring with them different nutrient profiles and are not interchangeable in a recipe). Therefore, we recommend mixing and matching commercial foods as needed to meet his energy needs, monitoring him for an increase in allergy signs or poor stool quality. If his appetite becomes more consistent, we can revisit the idea of a home-cooked diet if desired.
- Our estimate of B6 daily calorie requirements is around 1500 kilocalories (kcal) per day, with no more than 150 of these calories in the form of treats. One kilocalorie is equivalent to one human Calorie.
- We have a list of low sodium commercial diets on our "Heartsmart" website: <http://vetmed.tufts.edu/wp-content/uploads/Low-sodium-diet-list-2019-dog.pdf>
- Below are some additional commercial foods that meet our nutritional goals. You can mix and match the canned and dry based on B6 preference.

Diet	Kcal/cup or can	Sodium mg/100kcal	Daily Feeding Amount (cups or cans)
Wellness Simple Duck & Oatmeal (dry)	450	23	3
Wellness CORE Senior (dry)	359	55	3 3/4
Nutro Wholesome Essentials Adult Chicken, Brown Rice & Sweet potato (dry)	343	80	3 7/8
Purina ONE SmartBlend True Instinct Tender Cuts in Gravy with real chicken (can)	427	52	3 1/8
Wellness Core 95% Beef with Carrots (12.5 oz can)	427	69	3 1/8

Supplements:

- Unfortunately, there is little regulation of supplements for people or animals (neither safety nor efficacy has to be proven prior to marketing) and some of these products may be harmful rather than helpful. Therefore, we are quite selective when it comes to recommending specific supplements. We usually only recommend a product where there is adequate data to show that it is safe and has a reasonable expectation of efficacy.
- While taurine, carnitine, and coQ10 may have some benefits for dogs with heart disease, Vetclassic supplement contains all of these ingredients that you are supplementing separately, plus others. Feeding multiple supplements with the same ingredients is not ideal as it could lead to excess nutrient levels and makes it hard to keep track of how much he is getting. Likewise, both the ArtiEase Gold and the SOD & Boswellia joint products have overlapping ingredients both with each other, and with the cardiac supplement. We recommend stopping all of the Vetclassic supplements. It is fine to continue the taurine, carnitine, and CoQ10 separately.
- Glucosamine, chondroitin, and MSM supplements are intended to slow the degradation of joint cartilage and the development of arthritis and provide some relief to dogs that already have it. The data to support benefits of these products is currently equivocal, but they are unlikely to be harmful. Brands that we can recommend that are validated and have research behind them include the veterinary brands Cosequin or Dasuquin and we would recommend these products over the joint supplements that you have been using.
- The nutritional yeast, safflower oil, kelp, and other supplements for his home-cooked diet can be

Commercial Diet Plan

discontinued.

- Quality control of fish oil supplements can vary widely; we recommend using one of the following brands as these supplements have been independently validated to contain the appropriate amount of omega fatty acids and are concentrated to reduce the number of capsules that must be given:
 - GNC Triple Strength Fish Oil 1500 (1000 mg EPA + DHA per softgel): 2-3 softgels per day
 - Swanson EFA's Super EPA (500 mg EPA + DHA per softgel): 5 softgels per day

Although omega-3 fatty acids may have some benefits, if Brom doesn't like the taste, you'll either need to administer as capsules like a medication so they aren't chewed, or discontinue giving them so this doesn't adversely affect appetite.

Treats/Palatability enhancers:

- **B6** should ideally receive a maximum of 10% of the daily calorie intake (150 kcal/day) from treats. These extra calories can be given as treats or mixed in with the diet for variety. If the total amount of the diet being fed is altered, the treat allowance should be adjusted accordingly so that treats never exceed 10% of total calories to avoid unbalancing the home-cooked diet (or a commercial diet) by nutrient dilution.
- The calorie and nutrient information for human foods can be found on the packaging or on the USDA database: <http://www.nal.usda.gov/fnic/foodcomp/search/>. Please note that calories are listed as "energy" with units of kcals. Some treat suggestions include:

Food (raw unless noted)	Amount	Calories
Honey	1 tbsp	64
Maple Syrup	1 tbsp	52
Brown Sugar	1 packed tsp	17
Chicken fat	1/2 tbsp	57
Lard	1/2 tbsp	57
Molasses	1 tbsp	58
Butternut or acorn winter squash (cooked)	1/4 cup cubes	15
Baby carrots	1 baby carrot	4-5
Green beans	1 green bean	2
Sweet red peppers	1/2 cup chopped	23
Broccoli	1/2 cup chopped or diced	15
Green peas	1/8 cup green peas	15
Cucumbers	1 cup slices	16
Apples	1/4 cup chopped	15
Strawberry	1 medium 1.5 inch strawberry	6
Blueberries	1/4 cup blueberries or 25 berries	20
Bananas	1/8 cup bananas	17

- You can also use lamb, salmon, beef, or other meats that you know that **B6** likes to top dress commercial food if needed, trying to stay within his treat allowance.
- Additional treat suggestions are available online: <http://vetmed.tufts.edu/wp-content/uploads/low-salt-treats-and-med-administration-2018.pdf>

Foods to AVOID:

- Avoid macadamia nuts, avocado, garlic, onions, grapes, raisins, xylitol, and other foods known or suspected to be toxic to dogs.
- High sodium foods - most bread products, cheese, deli or processed meats, fast food, crunchy human snack foods, pizza.
- Commercial canned broths should also be avoided as even the low sodium options are too high in salt for **B6**. If you would like to put a small amount of broth on **B6** food, it is best to boil meat in plain water with no seasoning and use this broth without the meat. Alternatively, you can try the broths made for dogs by the Fruitables company.

Medication Administration:

- The best foods for giving medications would be one of the above noted canned diets. You can roll the canned food into a meatball and put the pill in the middle of the meatball. However, this does run the risk of

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

Commercial Diet Plan

causing a food aversion, so please proceed cautiously. Alternately, you can use small pieces of white bread, mini marshmallows, marshmallow Fluff, or fruit (such as a banana or melon). Pill Pockets can also be used (9 kcal per tablet size, 23-29 kcal per capsule size). The calories from all foods used to administer medications should be subtracted from **B6** treat allowance. Please let us know if you need additional options for administering medications.

Follow Up:

- Please monitor **B6** weight and calorie intake (to the best of your ability). He can stay on an appetite stimulant long-term if needed.
- Please follow the recommendations of the oncology and cardiology services with regards to management of Brom's tumor and heart disease.
- These diet recommendations may require re-evaluation in the future if the diets are not tolerated or palatable, or if **B6** develops any additional health problems; a recheck fee may apply.
- A recheck appointment or additional fees may be required for ongoing case management. We will advise you when we feel that this is appropriate.

Please contact us if you have any questions about **B6** nutritional plan.

Sincerely,

B6 VMD, MS, DACVN
Clinical Nutrition Service

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

Diet Hx 3/7/19

CARDIOLOGY DIET HISTORY FORM

Please answer the following questions about your pet

Pet's name: **B6** Owner's name: **B6** Today's date: **3/7/19**

1. How would you assess your pet's appetite? (mark the point on the line 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 **Liver / Turkey & Beef**

3. Over the last few weeks, has your pet (check one)

Lost weight Gained weight Stayed about the same weight Don't know

4 lbs

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 you 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
Beef Beef	fresh/cooked fresh/cooked	only 10oz max 10oz	1x/day 1x/day	PAST 2 wks PAST 3 wks
Lamb Lamb	fresh/cooked fresh/cooked	5-6oz 5-6oz	1x/day 1x/day	PAST 2 wks PAST 3 wks
NOT eating broccoli anymore				
egg	hard boiled	whole egg	1-2/wk	PAST 2 wks

***Any additional diet information can be listed on the back of this sheet** **stopped eating BMDO TREATS feeding AND I no longer add oil or powder to his food, very sensitive to smell**

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:

Supplement	Yes	No	Brand/Concentration	Amount per day
Taurine ✓	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Carnitine ✓	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Antioxidants	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Multivitamin	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Fish oil ✓	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Coenzyme Q10 ✓	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Other (please list): Example: Vitamin C	<input type="checkbox"/>	<input checked="" type="checkbox"/>	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): **go beef cubes or lamb cubes but BMDO do not work anymore**

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

Registration

B6

Client and Pet Registration Form

Client Name: **B6**

Spouse/Partner: **B6**

Address: **B6**

City, State, Zip: **B6**

Home Phone: **B6**
Work Phone: **B6**
Cell Phone: **B6**
Email: **B6**
Pager: **B6**

Pet Name: **B6**

Patient ID: 320320

Date of Birth: **B6**

Age: **B6** Years Old

Species: Canine

Breed: Doberman Pinscher

Color: Black/Tan

Sex: Male (Neutered)

Weight: Weight (kg) 38.10 kg

Rabies Date:

Referring Veterinarian: **B6**

B6

B6

B6

Agreement and Consent:

- I agree to pay for all services rendered to my pet at the end of today's examination.
- I understand that payment is required at the time of service.
- I understand that the cost of the initial exam **does not** cover any further diagnostics, treatments, or medications that may be necessary for my pet.
- I understand that if further diagnostics or treatments are recommended by the doctor I may request an estimate of those charges first.
- I understand that I have the right to refuse any treatments, diagnostics, or medications that have been recommended to me by the doctor.

Signature: **B6**

Date: 3/18/2019

You and your doctor will be provided with a report from the doctor for every examination performed on your pet at **B6**. Thank you for trusting us to care for your pet!

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

Vitals Results

7/8/2015 4:00:07 PM	Heart Rate (/min)
7/8/2015 4:00:08 PM	Respiratory Rate
7/8/2015 4:00:09 PM	Temperature (F)
7/8/2015 4:00:10 PM	Weight (kg)
7/8/2015 4:33:00 PM	Nursing note
7/16/2015 9:11:25 PM	Nursing note
7/16/2015 9:18:15 PM	Weight (kg)
7/16/2015 9:22:01 PM	Nursing note
7/16/2015 9:38:48 PM	Weight (kg)
7/16/2015 9:39:07 PM	Interest in water
7/16/2015 9:43:31 PM	Eliminations
7/16/2015 11:59:09 PM	Respiratory Rate
7/16/2015 11:59:35 PM	Heart Rate (/min)
7/16/2015 11:59:48 PM	Eliminations
7/16/2015 11:59:54 PM	Eliminations
7/17/2015 3:50:51 AM	Eliminations
7/17/2015 3:51:12 AM	Respiratory Rate
7/17/2015 3:51:21 AM	Eliminations
7/17/2015 3:51:30 AM	Heart Rate (/min)
7/17/2015 7:15:01 AM	Weight (kg)
7/17/2015 7:21:38 AM	Heart Rate (/min)
7/17/2015 7:21:53 AM	Respiratory Rate
7/17/2015 7:37:07 AM	Eliminations
7/17/2015 11:27:43 AM	Eliminations
7/17/2015 11:51:09 AM	Notes
7/17/2015 2:33:23 PM	Notes
7/17/2015 2:46:01 PM	Anesthesia Notes
7/17/2015 3:15:39 PM	Eliminations
7/17/2015 3:16:39 PM	Respiratory Rate
7/17/2015 3:16:52 PM	Heart Rate (/min)
7/17/2015 7:47:02 PM	Temperature (F)
7/17/2015 7:47:09 PM	Eliminations
7/17/2015 7:47:24 PM	Amount eaten
7/17/2015 7:47:46 PM	Respiratory Rate
7/17/2015 7:47:53 PM	Heart Rate (/min)

B6

Client: **B6**
Patient:

Vitals Results

7/17/2015 11:26:08 PM	Heart Rate (/min)
7/17/2015 11:26:13 PM	Respiratory Rate
7/17/2015 11:26:33 PM	Eliminations
7/18/2015 3:25:33 AM	Respiratory Rate
7/18/2015 3:25:44 AM	Heart Rate (/min)
7/18/2015 3:25:52 AM	Eliminations
7/18/2015 3:30:48 AM	Amount eaten
7/18/2015 7:25:36 AM	Weight (kg)
7/18/2015 7:26:23 AM	Eliminations
7/18/2015 7:40:47 AM	Nursing note
7/18/2015 8:08:14 AM	Temperature (F)
7/18/2015 8:08:28 AM	Respiratory Rate
7/18/2015 8:08:43 AM	Heart Rate (/min)
7/18/2015 11:41:13 AM	Respiratory Rate
7/18/2015 11:49:35 AM	Heart Rate (/min)
7/18/2015 12:17:48 PM	Eliminations
7/18/2015 12:20:33 PM	Amount eaten
7/18/2015 3:05:57 PM	Eliminations
7/18/2015 3:30:20 PM	Respiratory Rate
7/18/2015 3:30:28 PM	Heart Rate (/min)
7/18/2015 7:21:10 PM	Eliminations
7/18/2015 7:38:23 PM	Amount eaten
7/18/2015 7:48:48 PM	Temperature (F)
7/18/2015 7:49:31 PM	Heart Rate (/min)
7/18/2015 7:49:43 PM	Respiratory Rate
7/18/2015 10:35:56 PM	Eliminations
7/19/2015 12:01:58 AM	Eliminations
7/19/2015 12:09:36 AM	Heart Rate (/min)
7/19/2015 12:09:41 AM	Respiratory Rate
7/19/2015 4:15:02 AM	Respiratory Rate
7/19/2015 4:27:58 AM	Nursing note
7/19/2015 4:34:44 AM	Amount eaten
7/19/2015 4:40:11 AM	Eliminations
7/19/2015 4:40:24 AM	Heart Rate (/min)
7/19/2015 7:28:16 AM	Eliminations
7/19/2015 7:30:45 AM	Notes

B6

Client:
Patient:

B6

Vitals Results

7/19/2015 7:35:16 AM	Temperature (F)
7/19/2015 7:35:24 AM	Respiratory Rate
7/19/2015 7:35:32 AM	Heart Rate (/min)
12/5/2018 9:35:36 AM	Weight (kg)
12/20/2018 8:06:54 AM	Nursing note
12/20/2018 9:07:11 AM	Nursing note
12/20/2018 9:28:36 AM	Body Condition Score (BCS)
12/20/2018 9:28:37 AM	Temperature (F)
12/20/2018 9:28:39 AM	Heart Rate (/min)
12/20/2018 9:28:40 AM	Respiratory Rate
12/20/2018 9:28:41 AM	Muscle Condition Score (MCS)
12/20/2018 9:28:42 AM	Pain assessment
12/20/2018 11:31:47 AM	Heart Rate (/min)
12/20/2018 11:31:56 AM	Respiratory Rate
12/20/2018 11:32:05 AM	Eliminations
12/20/2018 12:56:10 PM	Anesthesia Notes
12/20/2018 1:22:46 PM	Incision check
12/20/2018 1:23:10 PM	Pain assessment
12/20/2018 3:29:03 PM	Cardiac rhythm
12/20/2018 3:29:04 PM	Heart Rate (/min)
12/20/2018 3:36:49 PM	Eliminations
12/20/2018 3:37:07 PM	Respiratory Rate
12/20/2018 3:38:27 PM	Interest in water
1/2/2019 12:33:50 PM	Weight (kg)
2/20/2019 8:31:42 AM	Eliminations
2/20/2019 8:32:12 AM	Weight (kg)
2/20/2019 8:33:08 AM	Interest in water
2/20/2019 8:37:04 AM	Temperature (F)
2/20/2019 8:37:06 AM	Heart Rate (/min)
2/20/2019 8:37:07 AM	Respiratory Rate
2/20/2019 8:48:04 AM	Body Condition Score (BCS)
2/20/2019 9:37:17 AM	Notes
2/20/2019 11:29:12 AM	Respiratory Rate
2/20/2019 11:31:48 AM	Heart Rate (/min)
2/20/2019 11:31:54 AM	Eliminations
2/20/2019 2:12:01 PM	Anesthesia Notes
3/7/2019 10:32:38 AM	Weight (kg)
3/19/2019 10:17:26 AM	Weight (kg)
3/21/2019 7:58:08 AM	Weight (kg)

B6

Client:
Patient:

B6

Vitals Results

3/21/2019 7:59:28 AM	Nursing note
3/21/2019 8:56:05 AM	Body Condition Score (BCS)
3/21/2019 8:56:06 AM	Temperature (F)
3/21/2019 8:56:07 AM	Weight (kg)
3/21/2019 8:56:08 AM	Heart Rate (/min)
3/21/2019 8:56:09 AM	Respiratory Rate
3/21/2019 8:56:10 AM	Muscle Condition Score (MCS)
3/21/2019 8:56:11 AM	Pain assessment
3/21/2019 9:23:07 AM	Interest in water

B6

Client:
Patient: **B6**

ECG from Cardio

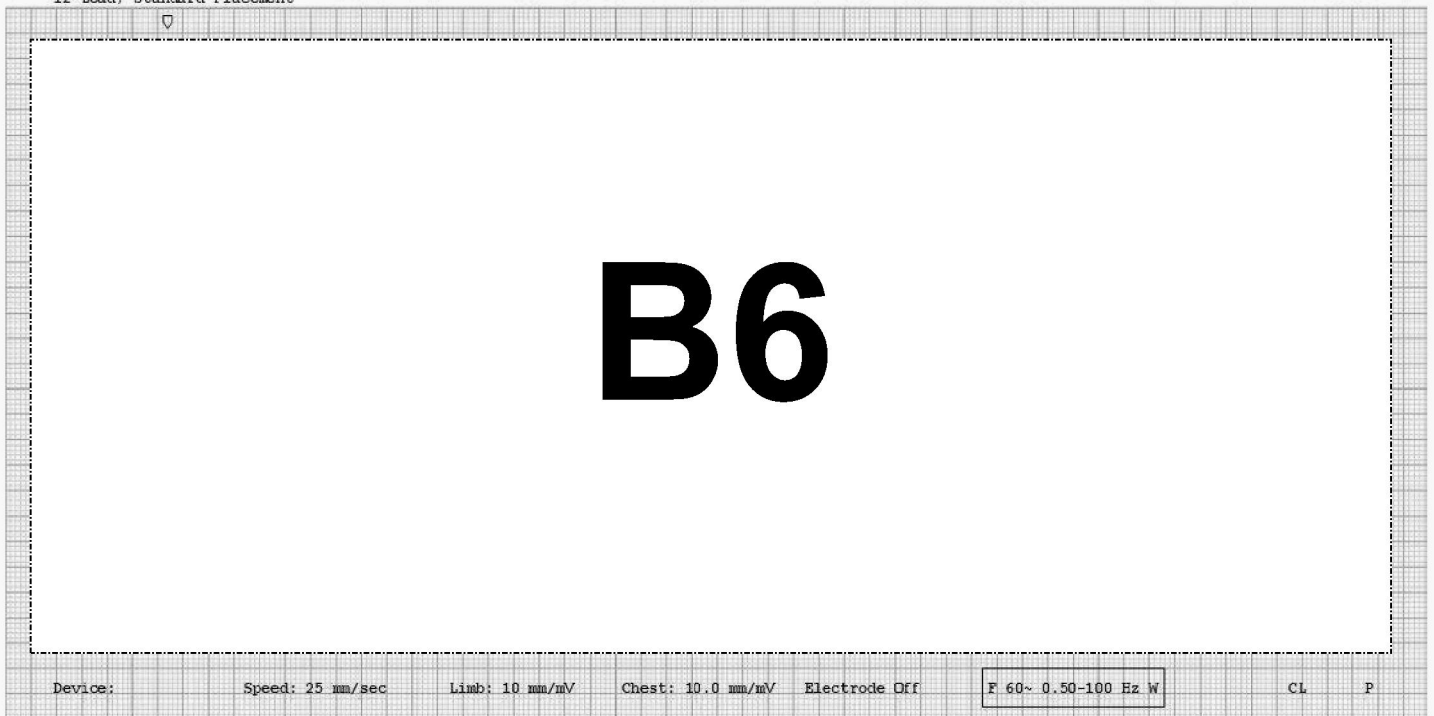
B6

12/5/2018 11:21:48 AM

Tufts University
Tufts Cummings School of Vet Med
Cardiology

12 Lead; Standard Placement

B6



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

ECG from Cardio

B6

12/5/2018 11:22:50 AM

Page 1 of 2

Tufts University
Tufts Cummings School of Vet Med
Cardiology

12 Lead; Standard Placement

B6

Device: Speed: 50 mm/sec Limb: 10 mm/mV Chest: 10.0 mm/mV Electrode Off F 60~ 0.50-100 Hz W CL P

Client:
Patient:

B6

ECG from Cardio

B6

12/5/2018 11:22:50 AM

Page 2 of 2

Tufts University
Tufts Cummings School of Vet Med
Cardiology

B6

Client:
Patient: **B6**

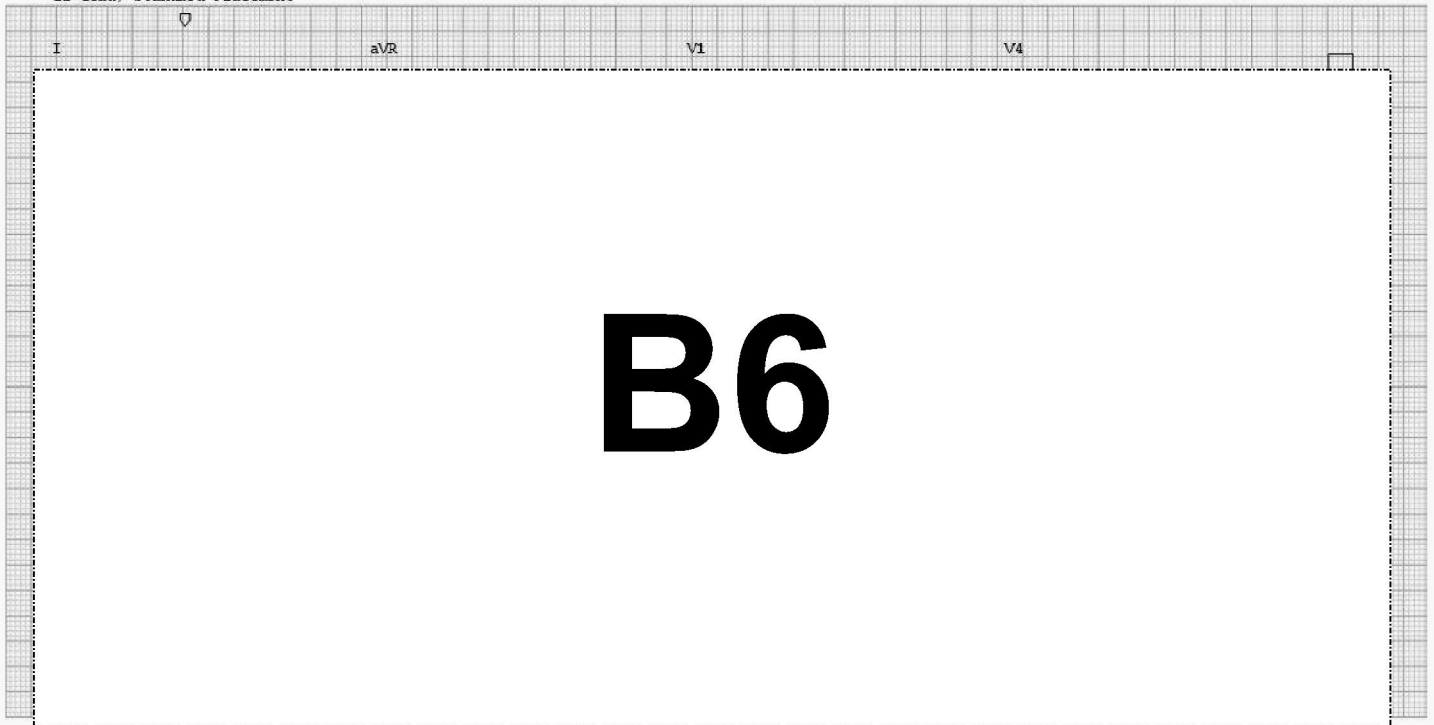
ECG from Cardio

B6

12/5/2018 11:23:04 AM

Tufts University
Tufts Cummings School of Vet Med
Cardiology

12 Lead; Standard Placement



Client:
Patient:

B6

ECG from Cardio

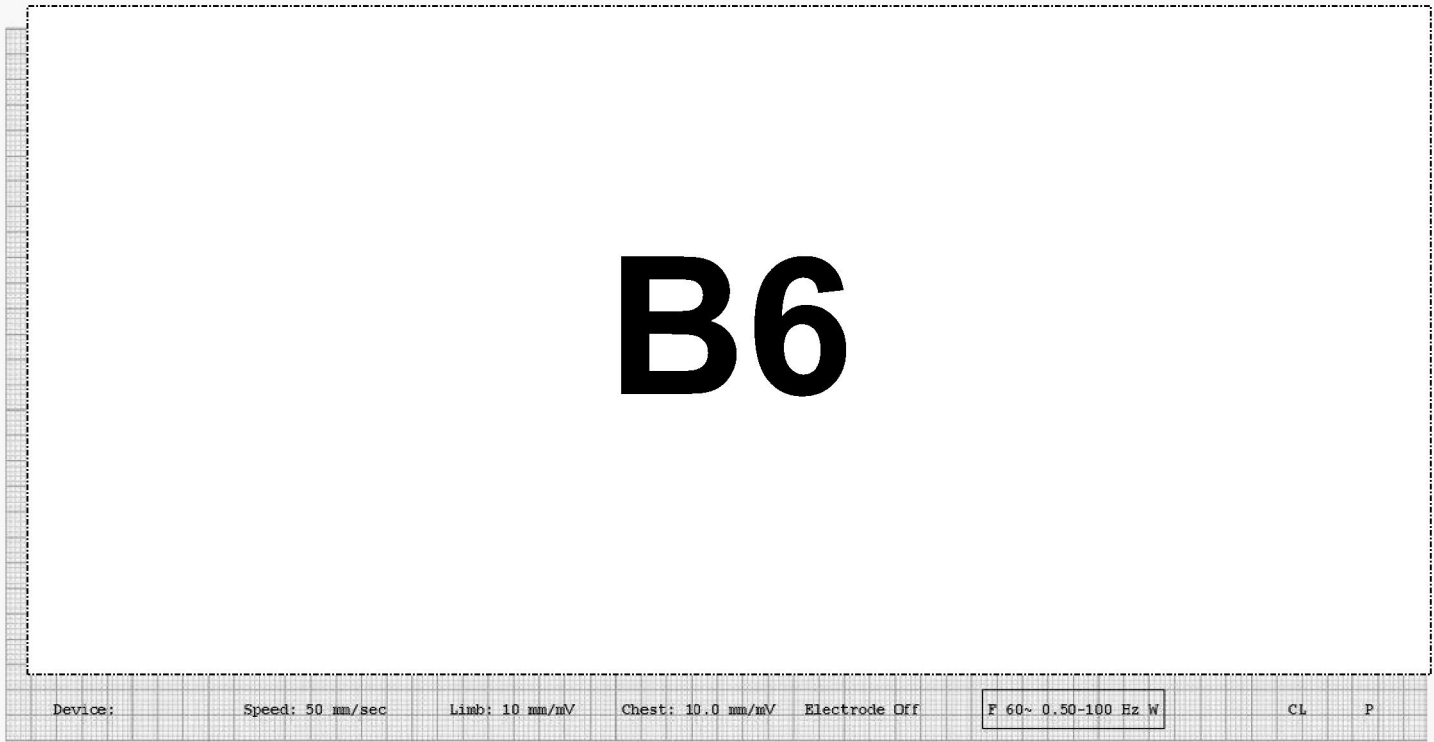
B6

12/5/2018 11:23:32 AM

Page 1 of 2

Tufts University
Tufts Cummings School of Vet Med
Cardiology

B6



Client: **B6**
Patient:

ECG from Cardio

B6

12/5/2018 11:23:32 AM

Page 2 of 2

Tufts University
Tufts Cummings School of Vet Med
Cardiology

B6

Client: **B6**
Patient:

Alba Holter

CANINE HOLTER MONITORING REPORT

HOLTER MONITOR REPORT

Patient Name:	B6	Interp. Physician:	
Date of Birth:		Scan Number:	Tufts - Clinic
ID :	320320	Date Recorded:	12/5/2018 @ 11:33
Age:	-	Date Processed:	12/6/2018
Sex:	M	Recorder Num:	014783
Analyst:		HookupTech:	
Physician:		Medications:	
Indications:			

The patient was monitored for a total of 23:59 hours. The total time analyzed was 22:40 hours. Start time was 11:33am1. There was a total of 110400 beats. 3% were Ventricular beats, 7% were Supraventricular beats, and patient is not paced.

Mean Heart Rate: 81	Total Beats: 110400
Maximum Heart Rate: 189 @ 1:08pm1	Tachycardia beats: 82 (>=160 BPM) 0%
Minimum Heart Rate: 54 @ 1:12am2	Bradycardia beats: 135 (<= 60 BPM) 0%
Pauses: 0 (> 5 sec.)	Longest RR at 2.356 seconds at 8:39am2

Ventricular Ectopy

Total:
Singles:
Pairs:
Total Runs:
Beats in Runs:
Longest Run:
Fastest Run:
RonT:

B6

Supraventricular Ectopy

Total:
Single:
Pairs:
Total Runs:
Beats in Runs:
Longest Run:
Fastest Run:
Aberrant:

B6

RR Variability

SDNN:
pNN50:
RMSSD:
SDSD:

COMMENTS:

The underlying rhythm is normal sinus rhythm.
Frequent VE's were noted with 51 pairs and 2 runs.
Frequent SVE's were noted with 348 pairs and 155 runs.
No events were recorded while wearing monitor.

Physician's Signature: _____

Date: _____

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

Alba Holter

Patient

B6

ID : 320320

Date Recorded: 12/5/2018

@

11:33

Page: 2

GENERAL PROFILE

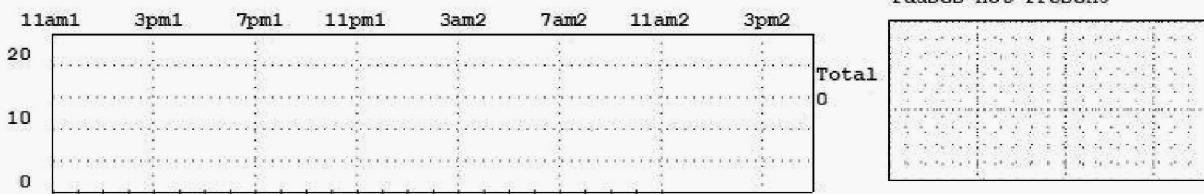
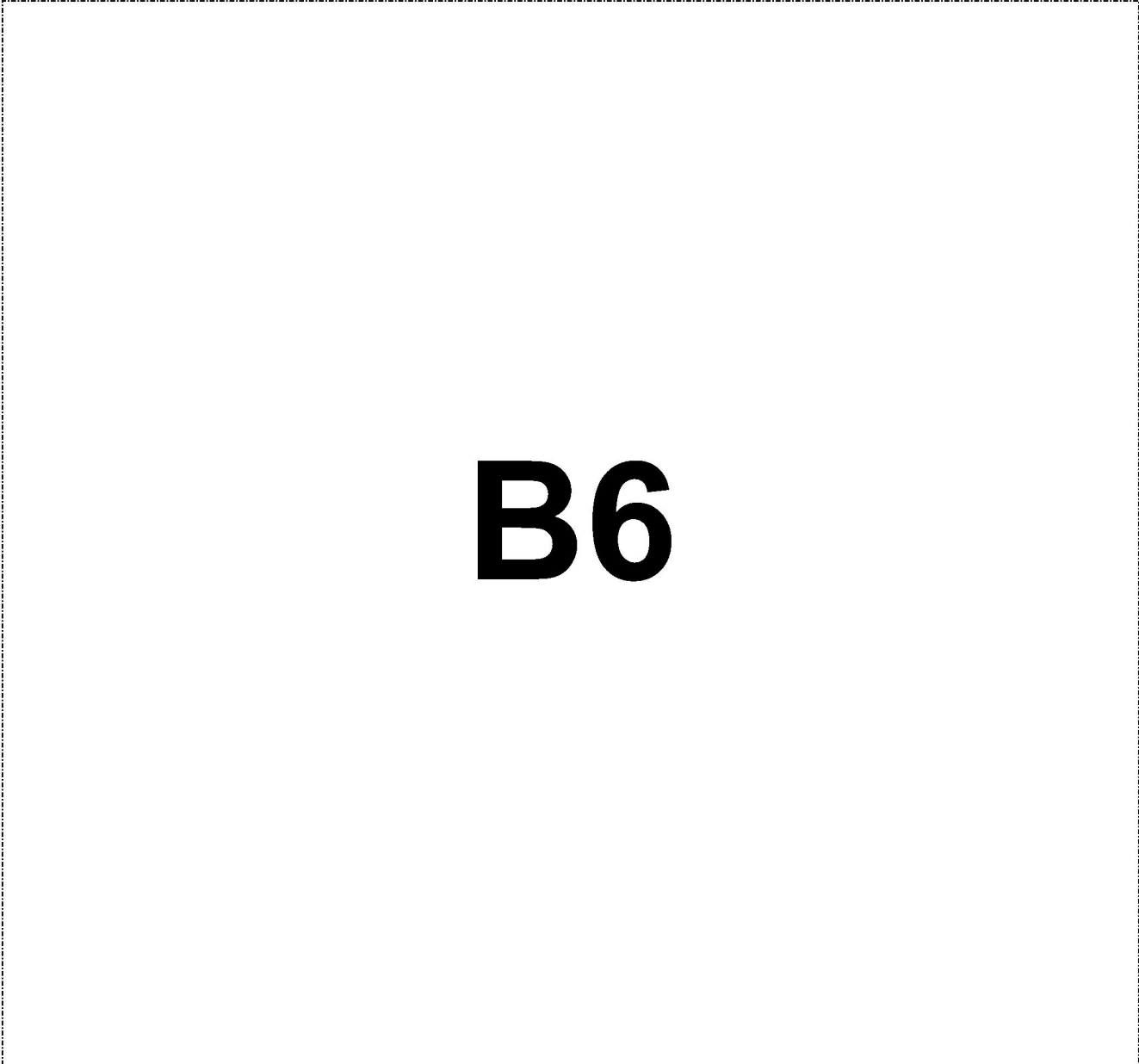
B6

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

Alba Holter

Patient: **B6** ID : 320320 Date Recorded: 12/5/2018 @ 11:33 Page: 3

CRITICAL EVENTS



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TASTE

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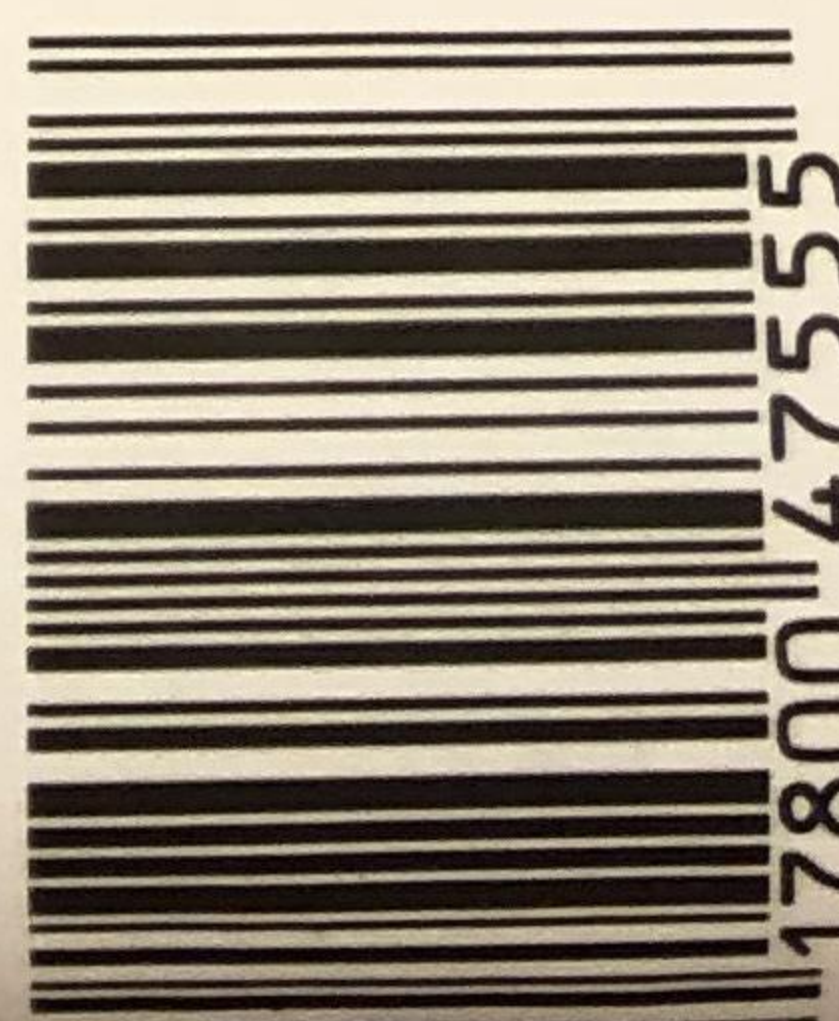
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WET FORMULAS

STORE IN A COOL, DRY PLACE.

B6

EXAM NO: 39177 HOSPITAL: B6
 DATE: B6 DOCTOR: B6
 CLIENT/AGENT: B6 MRN: B6
 PATIENT: B6 SEX/DOB: FS / B6
 SPECIES/BREED: Canine / American Pit Bull Terrier WEIGHT: 63.0 lbs / 28.6 kg

CARDIOVASCULAR EXAMINATION REPORT

History: Progressive lethargy with developing cough. New murmur. Reported radiographic cardiomegaly without CHF. CBC and chemistries are unremarkable (HCT= 40%, BUN/Cr= 18/0.7 mg/dL).

B6

2D/M-Mode/Doppler Echocardiogram: (1+ = trace or borderline, 2+ = mild, 3+ = moderate, 4+ = severe, 5+ = extreme)

RV Wall	B6	Left Atrium (LA)	B6
RA Atrium		Left Ventricle (LV)	
Right Ventricle		LV Septum	
Tricuspid Valve		LV Posterior Wall	
RV Outflow Tract		Mitral Valve	
Pulmonic Valve		LV Outflow Tract	
Pulmonary Artery		Aortic Valve/Ao	
Other Findings			

- Diagnosis:**
1. DILATED CARDIOMYOPATHY: MODERATE
 2. MITRAL REGURGITATION: MILD

Comments: Chamber enlargement with decreased contractility indices are markers for dilated cardiomyopathy (DCM). There is also concurrent secondary mitral regurgitation. In majority patients, it is loss of contractility from unknown degenerative changes. Recently grain-free diets have been associated with taurine deficiency induced DCM particularly diets with lean meat, with little organ contribution from unique source (kangaroo, salmon), grain free, high in legumes (lintels, peas) and fiber. Homemade vegan or vegetarian diets without taurine supplementation are at risk. Extreme hypothyroid states may also trigger LV dysfunction, but little evidence for it. Overall prognosis is fair to guarded. Some return to subclinical state with subtle symptoms once treatment is started. Better prognosis if a transient myocarditis or associated with low taurine or a hypothyroid state. Others progress to classic DCM with refractory CHF within 3-9 months, or a malignant arrhythmia develops that triggers sudden death. Long term survival is dependent on response to treatment if arrhythmias progress, if treatment impact renal function balanced against the quality of life.

Recommendations:

B6

B6 DVM
Diplomate, ACVIM (Cardiology)

B6

Patient History Report: **B6** - 9/26/2018

Clinic:

B6

Client:

B6

Home Phone: **B6**

Work Phone2: **B6** xhome

ID: **B6** File #: **B6**

Patient: **B6**

ID: **B6**

Tag: **B6** Chip: **B6**

Species: Canine, Golden Retriever

Sex: male/neutered

Age: **B6** mo, DOB: **B6**

Weight: 94.0 Lbs

Color:

Last visit: 8/21/2018

Referred By:

Tel: / Fax:

Medical Record Entries:

8/24/2018

B6	Lab Result -	Accession No.	Doctor	Owner	Pet Name
Received					
B6	8		B6	B6	08/22/2018

Species	Breed	Sex	Pet Age	Reported
Canine		CM	3Y	

Test Requested	Results	Reference Range	Units
----------------	---------	-----------------	-------

Taurine	B6
---------	-----------

Normal Values (nmols/ml)

Normal Range

Critical Level

Cat Plasma 60-120

Less than 40

Whole Blood 300-600

Less than 200

Dog Plasma 60-120

Less than 40

Whole Blood 200-350

Less than 150

TEST PERFORMED AT
LABORATORY

B6

B6

B6

PRELIMINARY

Patient: [B6] Golden Retriever, MN; DOB [B6]
Client: [B6]
Veterinarian: [B6]
Practice: [B6]

01/23/2019 **Presenting Complaint:** Cardiac Recheck

History:

[B6] is presented for his six-month cardiac recheck. He has been doing well at home. His resting respiratory rates have been 14-20bpm. His appetite has been excellent; he was switched to a grain-rich in September, but he had diarrhea, so he finally settled on Royal Canin KP (Hydrolyzed) on November 11, 2018, and he was cut back to 4 cups BID on January 10, 2019 due to his increasing weight. His activity level has been increased since his diet change, though he does still tire quickly. He has been snoring, and he will still twitch in his sleep. His most recent labwork was performed November 20, 2018 (BUN 29mg/dL, Crea 1.1mg/dL, SDMA 12 μ g/dL). [B6] would like to know if it's okay to increase [B6] glucosamine amount. [B6] received 75mg of trazadone at 8:00AM.

Performed Today:

Physical Exam: BAR, sweet; Weight increased 8.82# to 39.1kg/ 86.02 pounds (BCS 6/9); Temperature 100.2F; Heart rate 96bpm; Grade III/VI low frequency systolic murmur over mitral and tricuspid valves; frequent arrhythmia; Respiratory rate 30bpm; breath sounds clear (referred upper airway noise); Abdomen unremarkable: mild periodontal disease; Several cutaneous masses

Echocardiogram: Left ventricular internal diameter in systole and diastole decreased from last exam! Left ventricle no longer officially enlarged and appears less spheroid. Myocardial motion still subjectively decreased. End systolic volume index 44cm³/Ms (74.3 cm³/M2 (9/19), (58.7cm³/M2 (3/18), 39.33cm³/Ms (8/17) - 21.95 (2/16), 29 (8/16), (54.9cm³/Ms off pimo). End diastolic volume index 115cm³/M2 (201.89 cm³/M2(9/18), (129cm³/M2 (3/18), 95.25 (8/17) - 106cm³/M2 (3/16), 148.9 off pimo. Volume indices are improved but not normal. Mild to moderate centrally directed mitral insufficiency. Normal left atrial size. EPSS decreased from 1.0cm to 0.3cm. Multiple multiform VPC, including one ventricular couplet noted on ECG gated during echocardiogram today. Pulmonary veins and Caudal vena cava unremarkable.

Holter Monitor: Pending, Results in 10-14 days

Assessment:

- Reduced Systolic Function - improved on taurine, pimobendan**
- Progressive Dysfunction (3/18, 9/18)**
- Ventricular Premature Complexes**
- Left Bundle Branch Block Morphology**
- Exercise Intolerance - improved on pimobendan**
- Seems related to outside temperature**
- Increased Respiratory Rate at Rest - Wax/waning**
- Elevated SDMA/Minimally Concentrated Urine (5-17)**

[B6] heart has improved! It is not completely back to his best, but there is a clear difference. Maybe he will look even better next time around!

Information for [B6]

BY [B6] FAXED EMAILED
 DATE 1/23/19

18

B6

B6

It is OK if **B6** wears the monitor longer than 24 hours. **Please note if there are any problems with the monitor while recording.** It is OK if a single lead dislodges - we may still obtain a valid reading. You may try to replace if you can easily find the electrode. Please do not use scissors to cut off the bandages surrounding the Holter - there are several long lead wires. Be sure to use some Goo Gone or mineral oil to remove the tape and/or ECG pads from his chest if they seem sticky. If, after removing the electrodes, the skin is red or irritated, you may apply 1% hydrocortisone cream to keep the itch and irritation down. Holter results are generally available 10-14 days after the monitor is returned to us.

Medications:

L-Carnitine: Give 1500mg orally every 24 hours.

Contact **B6 research technician **B6** at **B6** to obtain L-carnitine.**

Pimobendan 5mg: Give 1&1/2 tablets orally every 12 hours.

Enalapril 20mg: Give 1 tab(s) orally every 12 hours

Taurine 250mg: Give 2 tablets orally every 12 hours

Furosemide/Lasix 40mg: None for now

Start 1&1/2 orally every 12 hours if sleeping respiratory rate above 40bpm

Trazodone 50mg: Give 1-2 tablets orally every 12 hours as needed for anxiety.

****Please give trazodone 2 hours prior to his next visit****

Glucosamine DHPlus Level 2: Give 1 tablet orally every 12 hours.

Gabapentin 800mg: Give 1/2 tablet orally every 8-12 hours as needed for pain.

Can give 3/4 tablet orally every 12 hours as needed for anxiety.

or **Gabapentin 300mg:** Give 2 capsules orally, or as frequently as every 12 hours as needed for anxiety for thunderstorm anxiety. This drug is very effective but has an onset of action of about 2 hours.

Or **Alprazolam 1mg:** Give 1 tablet orally every 8-12 hours, as needed for thunderstorm anxiety. This drug is a little less effective, but does have a rapid onset of action

Fish Oil Supplement: **B6** needs 1000-1400mg of the EPA component orally every 24 hours (Owners currently giving on weekdays)

Heartworm and Flea preventative recommended year-round

All medications prescribed by **B6 are for long term use unless otherwise stated**

Monitoring:

Diet: Normal -Avoid salty snacks (deli meats, cheese, Pupperoni or Snausages)
Consider switch from grain-free

Exercise: Avoid Overexertion/Overheating

Call us if: Status changes, Increased respiratory rate, Increase or change in cough, distended abdomen, passing out, failure to respond to medications

Recheck:

Recheck here for physical exam, abbreviated echocardiogram, in 6 months - sooner if problems;

Other recheck based upon results of Holter monitor

*****Premedicate with trazodone*****

B6

B6

We appreciate your confidence in **B6**. We pledge to provide the clients you refer to us the same personal care that you and your pets appreciate. Please do not hesitate to call with any questions or concerns. Again, thank you for your trust.

RDVM Radiographs:

Returned to Owner

Mailed to: **B6**

Discharge Technician's Initials:

B6

B6

B6

B6

Diplomate, ACVIM (Cardiology)

Information for

B6

B6

Name: B6

B6

Date: 01/10/2019

Weight: 33.0 kg (72.8 lbs)

Age: 7

Ref: B6

Sex: Male

Patient ID: B6

Breed: Canine

B6

History & Cardiovascular Examination:

Indication: taurine level is low

Echo 9/2018

LVIDd = 60mm

LVIDs = 40 mm

PE: no murmur; regular; eupneic/clear lungs; 100 bpm

Echocardiographic Findings:**Comprehensive echocardiographic descriptions::**

Left ventricle: normal size and function.

Left atrium: normal size.

Right ventricle: normal size and function

Right atrium: normal size.

Mitral valve: normal appearance without regurgitation.

Tricuspid valve: normal appearance without regurgitation.

Aortic valve: normal appearance without regurgitation nor stenosis

Pulmonic valve: normal appearance without regurgitation nor stenosis.

Aorta: normal size and appearance.

Pulmonary arteries: normal size and appearance.

Pericardium: normal appearance without pericardial effusion.

Pleural space: no effusion noted

Cardiac Diagnoses & Assessment:

- 1) Resolved left ventricular dilation - r/o nutritional/malabsorptive
- 2) Low blood taurine - resolved

improved/normalized LV dimensions indicated likely nutritional cardiomyopathy. Good long-term prognosis without any contraindications.

Recommendations:

- 1) Continue pimobendan 10mg PO BID until next echo
- 2) taurine 1 gram PO BID. No taurine level indicated.
- 3) Stop enalapril & carnitine
- 4) Continue a commercial, non-novel protein based diet

Print Date: 1/10/2019

FDA-CVM-FOIA-2019-1704-003677

Address

B6

Sold by

ed by

Quantity

ce

Amount

10

100

100

20

1

1

1

1

B6

mg

B6

Present this...

Convention 2019 Submission for FDA CVM Update on DCM (Team leader: Dr. Siobhan DeLancey)

1) Speaker Information notes:

a. Speakers:

- i. Lauren Carey, D.V.M. (FDA Center for Veterinary Medicine, Division of Veterinary Product Safety)
- ii. Jennifer Jones, D.V.M. (FDA Center for Veterinary Medicine, Veterinary Laboratory Investigation and Response Network)
- iii. Lee Anne M. Palmer, V.M.D., M.P.H. (FDA Center for Veterinary Medicine, Division of Veterinary Product Safety, Veterinary Epidemiologist)

2) Title:

- a. Update from FDA on Canine Dilated Cardiomyopathy Investigation and Potential Diet Association.

3) Abbreviated Title:

- a. FDA Update: Dilated Cardiomyopathy Investigation

4) Description:

- a. In recent years, veterinary cardiologists nationwide have reported an uptick in cases of Dilated Cardiomyopathy (DCM) in dogs, including occurrences in breeds not normally expected to develop it. Canine DCM was traditionally thought of as a genetic condition of specific large and giant breed dogs, including the Doberman Pinscher, Newfoundland and Great Dane. Subsequently, additional breeds such as Cocker Spaniels and Golden Retrievers were identified to have a predisposition to taurine deficiency associated with DCM. However, more recently, FDA has been investigating a potential link between certain diets and cases of DCM in dogs, some small-breed, without a genetic predisposition to the disease. FDA veterinarians and researchers have been collecting and studying case reports, including extensive dietary histories, medical records, product samples, and diagnostic samples. This session will share what FDA has learned thus far in its investigation and highlight ways that practitioners can help advance the agency's investigation.

5) Objectives:

- a. Attendees should recognize that recent cases of DCM include a variety of dog breeds that are not traditionally associated with a genetic predisposition to DCM.
- b. Attendees should understand what dietary factors FDA is currently investigating.
- c. Attendees should understand what data is most helpful to submit to aid FDA in its investigation.



1-1999

Familial Dilated Cardiomyopathy of Young Portuguese Water Dogs

Donna M. Dambach


Anne Lannon

Meg M. Sleeper

James W. Buchanan

University of Pennsylvania, jwb@vet.upenn.edu

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Recommended Citation

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Familial Dilated Cardiomyopathy of Young Portuguese Water Dogs

Abstract

A novel dilated cardiomyopathy (DCM) in 12 related Portuguese Water Dogs was identified by retrospective analysis of postmortem and biopsy case records. Male and female puppies born to clinically healthy parents typically died at 13 (± 7.3) weeks of age (range, 2–32 weeks) because of congestive heart failure. Puppies died suddenly without previous signs or with mild depression followed by clinical signs of congestive heart failure 1–5 days before death. There was no sex predilection. The hearts were enlarged and rounded, with marked left ventricular and atrial dilation. No other significant structural cardiac defects were noted. The histologic changes in the myocardium were diffuse and characterized by myofibers of irregular sizes separated by an edematous interstitium. The myofibers had multifocal swollen, cleared segments often involving perinuclear areas that contained granular, phosphotungstic-acid-hematoxylin-positive material consistent with mitochondria. There was loss of the cross-striation pattern, and intercalated discs were difficult to identify. There was no evidence of concurrent myocardial fibrosis; rare chronic inflammatory infiltrates were noted in one dog. Noncardiac skeletal muscles were not affected. The underlying cause is unknown. From the pedigree analysis, an autosomal recessive pattern of inheritance is suspected. Based on the histologic findings, this DCM is most likely due to an underlying molecular (biochemical or structural) defect. The early onset and rapid progression of the disease makes this a clinically distinctive form of canine DCM.

Keywords

Dog, Idiopathic dilated cardiomyopathy

Disciplines

Animal Diseases | Cardiology | Cardiovascular Diseases | Congenital, Hereditary, and Neonatal Diseases and Abnormalities | Veterinary Infectious Diseases

Familial Dilated Cardiomyopathy of Young Portuguese Water Dogs

Donna M. Dambach, Anne Lannon, Meg M. Sleeper, and James Buchanan

A novel dilated cardiomyopathy (DCM) in 12 related Portuguese Water Dogs was identified by retrospective analysis of postmortem and biopsy case records. Male and female puppies born to clinically healthy parents typically died at 13 (\pm 7.3) weeks of age (range, 2–32 weeks) because of congestive heart failure. Puppies died suddenly without previous signs or with mild depression followed by clinical signs of congestive heart failure 1–5 days before death. There was no sex predilection. The hearts were enlarged and rounded, with marked left ventricular and atrial dilation. No other significant structural cardiac defects were noted. The histologic changes in the myocardium were diffuse and characterized by myofibers of irregular sizes separated by an edematous interstitium. The myofibers had multifocal swollen, cleared segments often involving perinuclear areas that contained granular, phosphotungstic-acid-hematoxylin–positive material consistent with mitochondria. There was loss of the cross-striation pattern, and intercalated discs were difficult to identify. There was no evidence of concurrent myocardial fibrosis; rare chronic inflammatory infiltrates were noted in one dog. Noncardiac skeletal muscles were not affected. The underlying cause is unknown. From the pedigree analysis, an autosomal recessive pattern of inheritance is suspected. Based on the histologic findings, this DCM is most likely due to an underlying molecular (biochemical or structural) defect. The early onset and rapid progression of the disease makes this a clinically distinctive form of canine DCM.

Key words: Dog; Idiopathic dilated cardiomyopathy.

Dilated cardiomyopathy (DCM) is the most commonly reported form of canine cardiomyopathy.^{1,2} DCM is most often associated with large and giant breed dogs and the Doberman Pinscher, Boxer, and English and American Cocker Spaniel breeds.^{3–7} In all breeds, the age range of affected dogs is wide (6 months to 15 years), although the typical age range of clinical presentation is 4–8 years.¹ For the Boxer, Doberman Pinscher, and Great Dane breeds, less than 1% of cases are made up of dogs younger than 1 year of age.⁸ There is a 2:1 male predilection reported in the affected breeds.⁸ Survival is poor after onset of signs ranging from 6 weeks to 2 years, and death is due to congestive heart failure or fatal arrhythmias. The predisposition of specific breeds for DCM suggests a heritable basis for the disease, but the exact underlying molecular or biochemical mechanism(s) for canine DCM in all cases is unknown. Many of the structural and biochemical changes noted may be secondary manifestations of the failing heart. This is the first report of DCM in the Portuguese Water Dog breed. This disease appears to be familial, but it has features that distinguish it from other canine dilated cardiomyopathies.

Materials and Methods

The 12 cases of DCM in Portuguese Water Dogs (POWD) were identified by review of the records of the Necropsy and Surgical Pathology Services of the School of Veterinary Medicine, University of

Pennsylvania, for the period 1987–1996. Postmortem examinations were performed on 5 pups, and heart weight and heart:body weight ratio were recorded in 3 pups. Heart weight was determined after removal of the pericardium and great vessels and after all heart chambers were opened and blood clots were removed. Body weight and condition were recorded at postmortem to allow calculation of heart:body weight ratios. Tissues and information from the remaining 7 cases of DCM were obtained through submissions to the Surgical Pathology Service. Hearts from clinically normal age- and breed-matched pups were also examined histologically. All tissues were fixed in 10% neutral buffered formalin, routinely processed, embedded in paraffin, and sectioned at 3–5 μ m for light microscopy. Tissue sections were stained with hematoxylin and eosin, Masson's trichrome for collagen, alcian blue (pH 2.7) for mucopolysaccharides, phosphotungstic acid-hematoxylin for mitochondria, and periodic acid-Schiff for glycogen. Formalin-fixed, frozen tissue from 1 pup (10) was stained with oil red O for lipid. When whole hearts were submitted for evaluation, the following were examined histologically: sections through the entire left and right free walls (atria, atrioventricular valves, and ventricles) and sections through the entire interventricular septum, including right atrioventricular valve and aortic valve.

Clinical and historical data were obtained either by examination of the clinical records from affected pups at the Veterinary Hospital, University of Pennsylvania, or from the referring veterinarians. Two pups (4, 10) were clinically evaluated with radiographs, EKG, and echocardiography prior to death. Results of serum clinicopathologic analysis and CBCs were available for 1 pup (10). Urinary metabolic screening was performed on pup 10 using spot tests and 1-dimensional paper chromatography to analyze the types of amino acids, organic acids, and carbohydrates in urine.⁹ Pedigree analysis was performed using 4–6-generation pedigree information from affected pups provided by owners and breeders.

Results

Clinical Findings

The clinical courses of the 12 pups were similar. The affected pups were 13 \pm 7.3 (SD) weeks of age (range, 2–32 weeks) at the time of death. The longest clinical course was 5 days and was characterized by depression and decreased appetite, collapse, and death. The remainder of the pups presented with either an acute onset of respiratory distress leading to death within hours or sudden unexpected collapse and death (Table 1). There was no evidence of protracted disease, even in the 32-week-old male. Because

From the Departments of Pathobiology (Dambach) and Clinical Studies (Medical Genetics [Lannon] and Cardiology [Sleeper, Buchanan]), School of Veterinary Medicine, University of Pennsylvania, Philadelphia, PA. Dr. Dambach is currently affiliated with the Department of Experimental Pathology, Bristol-Myers-Squibb, Princeton, NJ; e-mail: dambach_Donna_m@msmail.bms.com. Dr. Lannon is currently affiliated with Guide Dogs for the Blind, San Rasal, CA. Previously presented in poster form at the 1996 Meeting of the American College of Veterinary Pathologists, Seattle, WA.

Reprint requests: Donna M. Dambach, VMD, Laboratory of Pathology, School of Veterinary Medicine, University of Pennsylvania, 3800 Spruce Street, Philadelphia, PA 19104.

Accepted February 27, 1998.

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0891-6640/99/1301-0010/\$3.00/0

Table 1. Characteristics of Portuguese Water Dog pups with dilated cardiomyopathy.

Pup No.	Age (weeks)	Gender	Heart Weight (g) (% body weight)	Clinical History
1 ^a	12	Female		Several days depression, anorexia; sudden collapse, death
2 ^a	12	Female		24-hour respiratory distress, death; cardiomegaly, pulmonary edema
3	32	Male	174 (1.06%)	Acute onset respiratory distress; enlarged heart, pulmonary edema
4	14	Female	73 (1.3%)	Few hours of weakness, then respiratory distress, cyanosis, death; pup from previous litter from same parents died with similar signs
5	2	Male		Respiratory distress; failure to thrive
6	7	Male		Sudden, unexpected death
7 ^b	9	Male		Not available
8 ^b	11	Female	44	Respiratory distress; severe interstitial pattern
9	8	Female	32	Lethargic, decreased appetite on day of death; died suddenly while playing; breeder reported another littermate died
10 ^c	14	Female	67 (1.09%)	Quiet pup; echocardiography showed dilated heart; all other clinical data normal; euthanized
11 ^c	13	Male	73	Sudden onset respiratory distress; exercise intolerance; died 4 hours later
12 ^c	17	Female	83	Sudden onset respiratory distress; died 30 minutes later

Pups with same superscript are littermates.

of the unexpected onset of the clinical signs and the rapid decline, 10 of 12 pups lacked clinicopathologic data. Two pups (4, 10) were evaluated and followed clinically from the onset of clinical signs to death. Pup 4 was presented because of respiratory distress. Physical examination revealed a grade III/VI soft systolic murmur at the left cardiac

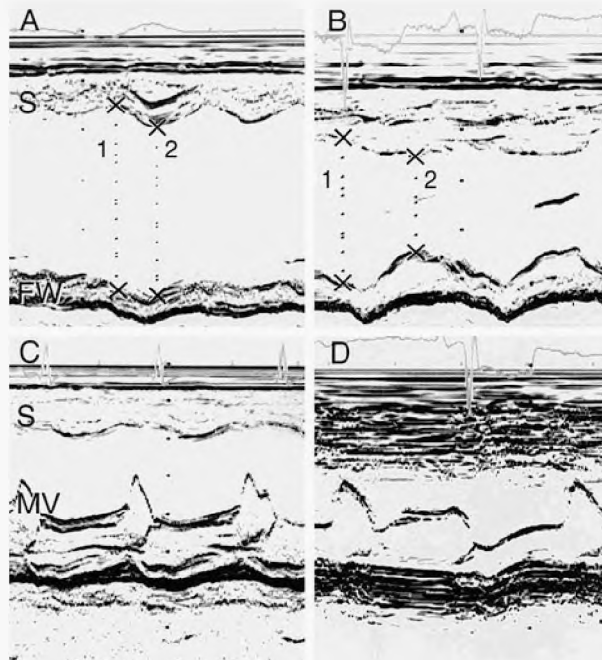


Fig 1. M-mode echocardiographs from affected pup 10 (A, C) and a normal age-, breed-, and weight-matched pup (B, D). The affected pup had increased left ventricular end-diastolic diameter (1) (3.7 cm) and increased end-systolic diameter (2) (3.4 cm), yielding a shortening fraction of 10%. Respective values in the normal pup (B) were 2.3 cm, 1.5 cm, and a shortening fraction of 35%. An echocardiogram of the affected pup (C) showed mitral valve (MV) motion and increased E-point septal separation (EPSS) of 1.1 cm. EPSS in the normal pup (D) was 0.5 cm. S = interventricular septum, FW = left ventricular free wall.

apex. The cardiac rhythm was regular; however, weak pulses and pale mucous membranes were detected. Crackles were auscultatable over all lung fields, and the pup was markedly dyspneic. Radiographs revealed left-sided cardiomegaly and a hilar alveolar pattern consistent with pulmonary edema. The vertebra:heart ratio measurement was 11.9 (normal = 8.6–10.6).¹⁰ Echocardiography revealed a severely dilated left ventricle with a shortening fraction of 10% (normal = 27–48%)¹¹ (Fig 1). The pup was treated with furosemide (2 mg/kg IV q8h), nitroglycerine (0.6mL sc q6h), digoxin (0.04 mg PO q12h), and increased inspired oxygen tension via an oxygen cage. The pup underwent cardiac arrest later that day, and resuscitation attempts were not successful.

Pup 10 was presented because a littermate (pup 11) died suddenly, and cardiomyopathy was diagnosed at postmortem. Physical examination of pup 10 at the time of presentation revealed a slightly muffled 1st heart sound; however, no murmur was detected. Normal bronchovesicular lung sounds were auscultated over all lung fields. Radiographs revealed a heart size at the upper limit of normal, with a vertebra:heart ratio of 10.7. The right cranial pulmonary arteries and veins were enlarged. All variables on an EKG examination were within normal limits (PR = 80 ms; QRS = 40 ms; QT = 200 ms; RII = 1.7 mV; mean electrical axis = normal), although a sinus tachycardia was present (heart rate [HR] = 180beats/minute). An echocardiogram revealed cardiomegaly, with a left ventricular end diastolic diameter of 3.7 cm and a left ventricular systolic diameter of 3.4 cm (respective normal values from an age-, breed-, and size-matched control animal: 2.3 and 1.5 cm). The shortening fraction was 10%. E-point septal separation was 1.1 cm (normal, 0.3 cm), and the aortic ejection time was 0.135 seconds (normal, 0.185 seconds) (Sleeper, unpublished data). Mild mitral regurgitation was detected with Doppler investigation.

The following day, the pup remained tachycardic, and a faint, intermittent diastolic gallop was occasionally auscultatable. By that evening, the pup was slightly weak and had a decreased appetite. Bronchovesicular sounds were in-

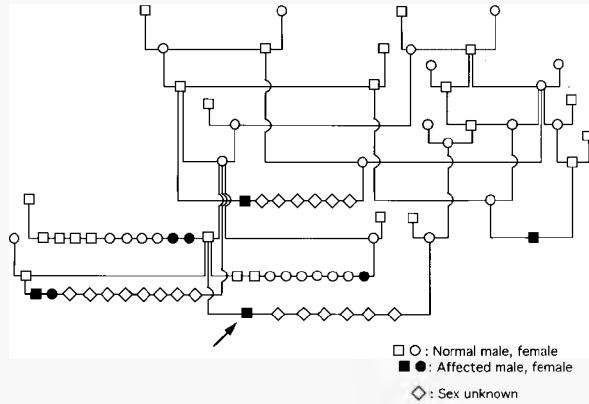


Fig 2. Pedigree analysis of 8 pups affected with dilated cardiomyopathy (DCM). The arrow indicates the propositus (pup 10). Pedigree analysis reveals common ancestry of the 8 POWD affected with DCM. Both genders are affected and were produced by phenotypically normal parents. In another family of POWD sharing no common ancestor with the propositus within 6 generations, there are 4 affected dogs (1 male, 3 females). These results are highly suggestive of an autosomal recessive mode of inheritance.

creased; however, no distinct crackles were auscultatable. Mild end expiratory effort was noted. The 2nd day after presentation as a clinically normal pup, the dog was weaker and anorectic. Auscultation revealed a grade V/VI pansystolic murmur with the point of maximal intensity at the left apex. A prominent gallop rhythm was also noted, and pulses were of a short duration and weak. Crackles became auscultatable bilaterally in the thorax several hours later, and a bolus of 1 mg/kg furosemide was administered IV. Over the following 2 hours, crackles became more prominent, as did tachypnea and dyspnea. During this period, the pup vomited and remained severely depressed. An EKG exam demonstrated sinus tachycardia (HR=190 beats/minute) but was otherwise unremarkable. Another bolus of IV furosemide was administered; however, the pup remained in respiratory distress and was euthanized and submitted for postmortem. A CBC and serum and urinary biochemical analyses on pup 10 did not reveal any abnormalities. Radiographic abnormalities for pups 4, 10, and 11 included pulmonary interstitial patterns characteristic of edema in all 3 pups and cardiomegaly in 2.

The treatment for 7 pups consisted of emergency supportive care to stabilize the cardiovascular system, including 1 or more of the following: cardiopulmonary resuscitation (n = 3); digoxin (n = 1), furosemide (n = 3), nitroglycerine (n = 1), oxygen (n = 3), corticosteroids (n = 1), fluids (n = 1), epinephrine (n = 2), and aminophylline (n = 1).

Pedigree Analysis

Pedigree analysis revealed common ancestry of 8 of the POWD affected with DCM (Fig 2). One female was the dam of 4 affected pups, the granddam of 2 affected pups, the great-granddam of 1 pup, and a half-sister to the remaining affected pup. Another family of POWD sharing no common ancestor to pup 10 within 6 generations did include the 4 additional affected pups. All 12 affected pups

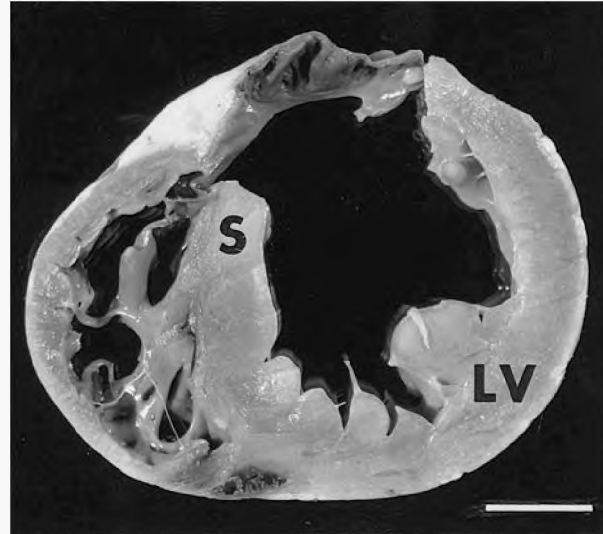


Fig 3. Transverse section of heart from pup 10 with dilated cardiomyopathy. The heart is globoid due to diffuse chamber dilation, which is most pronounced for the left ventricle and atrium. S = septum; LV = left ventricular free wall. Bar = 1 cm.

were produced by phenotypically normal parents. Both males (n = 5) and females (n = 7) were affected. Based upon these findings, the pedigree is most consistent with an autosomal recessive mode of inheritance, but a polygenic mode of inheritance cannot be ruled out without further test breedings. Although there are several anecdotal reports of pups dying with clinical signs similar to those reported here, the true incidence of this disease in the POWD breed cannot be determined at this time.

Postmortem Results

Entire hearts of 9 pups were available for examination, but only sections of heart were submitted for the remaining 3 pups. Of the 9 hearts examined, all had similar changes (Fig 3). The hearts were enlarged and globoid with rounding of the apex. The left auricle was markedly dilated, often larger than the right auricle. The left ventricle was dilated and easily compressible from the epicardial surface. On cut section, the left ventricular lumen was expanded with flattening of papillary muscles. The left ventricular free wall thickness was noticeably reduced (measurements of thickness were not routinely made). The endocardium of the left ventricle was diffusely opaque, corresponding histologically to endocardial fibrosis. The right ventricle and atrium were also dilated, but these changes were not as pronounced at that seen in the left hemiportion of the heart. A patent foramen ovale (1 × 0.4 cm) was noted in case pup 2. No other structural abnormalities were found in the remaining 8 hearts.

Lung changes were noted grossly at postmortem in 5 pups; lungs were wet and rubbery, congested, and slightly firm. Lungs from 11 pups were examined histologically. Interstitial edema and alveolar histiocytosis were noted in all pups, and in 7 pups there was minimal to mild acute interstitial pneumonia with infiltrates of neutrophils and the presence of alveolar fibrin and necrosis of individual cells

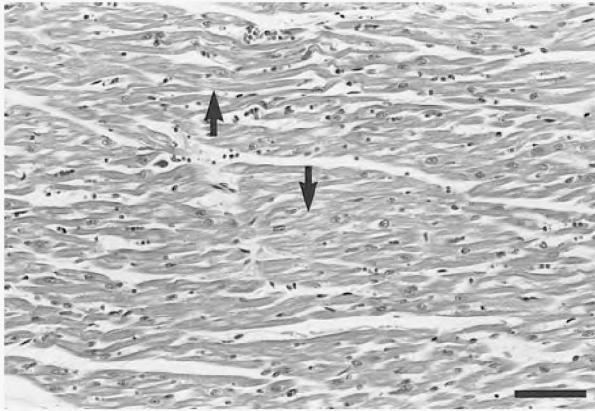


Fig 4. Histologic section of myocardium from pup affected with dilated cardiomyopathy. The interstitial space between the myofibers is prominent. The myofibers are generally thinner than normal and disorganized; their size varies markedly. The swollen, cleared areas of the sarcoplasm are obvious at this magnification (arrows). Hematoxylin and eosin. Bar = 61 μ m.

in the septa. Erythrophagocytosis was noted in only 1 pup (9); however, red blood cells were noted in alveoli in all 11 pups examined. The changes are consistent with those found in congestive heart failure and secondary hypoxia. The mild acute interstitial inflammation may have also been the result of mild aspiration during the bouts of dyspnea.

Other changes noted at postmortem or from tissues submitted were consistent with those resulting from heart failure. Hepatic congestion was found histologically in the 6 pups where liver was available for evaluation. Hepatomegaly was reported in 6 pups; hepatic capsular fibrin was also reported in 1 pup. These gross findings are consistent with passive hepatic congestion of cardiac origin. Peritoneal cavity ascites was reported in 2 pups, and pleural effusion (transudate) was reported in 1 pup.

Histologic Examination

Heart tissue from 5 normal breed-matched dogs (4 pups 6–18 weeks of age and one 4-year-old adult dog) were compared with that of affected pups. The changes in the myocardium from affected pups were most obvious upon examination of longitudinal sections of myofibers. The myofibers were accentuated by an interstitium expanded by clear space that did not stain with special stains for mucopolysaccharides, lipid, or glycogen and was therefore consistent with edema. The myofibers often appeared irregular in thickness and wavy to bent; many myofibers appeared to taper or branch. These changes created a disorganized appearance of the myofibers in some areas when examined at low magnification (Fig 4). There was a generalized loss of the normal pattern of cross-striations in affected myofibers, and intercalated discs were not seen. The irregularity in myofiber thickness was due predominately to swelling and clearing of the sarcoplasm, which resulted in an overall decrease in staining intensity when compared with normal myocardium (Fig 5). The zones of clearing in the myofibers were multifocal and segmental and typically included prominent perinuclear staining with pinpoint eosinophilic granular material (Fig 5). This granular material



Fig 5. Histologic appearance of myocardium from POWD affected with DCM (a) and from a clinically normal pup (b). The myofibers of the affected dog (a) are expanded segmentally by cleared areas of the sarcoplasm, which are typically prominent in perinuclear regions (arrowhead) but extend to affect large areas of the fibers, leading to loss of regular cross-striations (arrows). There is greater nuclear size/shape variability in the affected heart when compared with tissue from a breed/age-matched control dog (b). Hematoxylin and eosin. Bars = 57 μ m.

stained dark blue with phosphotungstic acid–hematoxylin, which is consistent with mitochondria. However, the cleared areas of the myofiber sarcoplasm did not stain with special stains for mucopolysaccharides, lipid, or glycogen, which suggests that the swelling was due to accumulation of intracellular fluid (hydropic change).

There was no histologic evidence of myocardial fibrosis in any pup when tissues were examined with a trichrome stain. Myofiber nuclei had marked size variability, with karyomegaly and occasional indented nuclei. The nuclei also were slightly more hyperchromatic when compared with the nuclei from normal myocardium. These nuclear changes are consistent with those described in cases of myocardial hypertrophy.¹² On cross-section, the changes in the myofibers were more difficult to appreciate when compared with normal myocardium; the most prominent changes included nuclear hyperchromasia and myofibers of irregular shape and size that often appeared more angular.

Myocardial inflammation was absent in all except pup 2, in which rare mixed inflammatory cells (neutrophils, lymphocytes, and macrophages) were noted associated with the endocardium and perivascularly. Rare Anitchkow cells

were noted in the interstitium of case pup 12. Myofiber degeneration and necrosis were also absent in all pups examined. Coronary arterial and venous vasculatures were histologically normal. Skeletal muscle obtained from the extremities was also histologically normal.

Discussion

DCM is characterized by generalized dilation of both atria and ventricles of the heart.² Clinical manifestations of DCM result from decreased pump function leading to reduced cardiac output. A narrow pulse pressure may be detected on physical examination, and ventricular gallops typically develop once cardiac decompensation occurs. Body cavity and pulmonary fluid accumulation and hepatomegaly result from a compensatory increase in preload and the decreased forward movement of the blood through the heart to the arterial system. The most striking clinical signs are related to hypoxia and hypoperfusion, with weakness, exercise intolerance, syncope, coughing, respiratory distress, and tachypnea frequently observed. The development of these clinical signs typically occurs late in the course of disease and is ominous.¹³ Murmurs due to consequent valvular insufficiency occur if dilation is severe enough to enlarge the valve annulus. Arrhythmias are a common finding, as are radiographic and echocardiographic evidence of heart enlargement. Echocardiographic findings consistent with cardiac enlargement include increased end-diastolic and end-systolic ventricular volumes and increased atrial diameter; changes are more frequently detected on the left side. The shortening fraction is typically lowered, with a decreased left ventricular free wall thickness. An additional common feature is a reduced left ventricular ejection time. Death is due to congestive heart failure or fatal arrhythmias.

The histologic changes noted in cases of DCM are not pathognomonic for DCM nor are they indicative of a specific cause. In the dog, as in humans, the histologic changes differ among individuals, but several changes are commonly found in all DCM cases, including 1 or more of the following: myofiber degeneration (vacuoles or fracturing) and necrosis, interstitial fibrosis in areas of myofiber loss, mononuclear (lymphoplasmacytic and histiocytic) inflammation, infiltration of adipocytes, and myofiber atrophy. Myofiber hypertrophy is also a common compensatory occurrence because the affected hearts have increased weights. Variable myofiber size with thin and wavy fibers has also been reported.¹⁴

Ultrastructural changes are also inconsistent among cases of canine DCM and include myofibrillolysis (disorientation and loss of myofibrils), increased intermyofibrillar space, sarcoplasmic reticulum dilation, interstitial edema, thickening of Z-bands, mitochondria of irregular shape and size, and increases in the numbers of mitochondria, glycogen granules, lysosomes, lipofuscin granules, and lipid vacuoles.¹⁴⁻¹⁷ Additional mitochondrial changes include swollen and disrupted cristae, myelin figure formation, and spherical intramitochondrial inclusions. In general, the ultrastructural changes are also nonspecific and have been noted in a variety of chronic cardiac diseases. Some changes indicate an increase in cell breakdown products, ie, lipofuscin and myelin figures. Other changes are most likely compen-

satory and related to deranged energy metabolism (mitochondrial changes, lipid and glycogen accumulation) and hypertrophy (Z-band thickening).¹⁵

The causes of DCM can be divided into 2 major categories: primary (idiopathic) and secondary. Secondary DCM is the result of cardiac dysfunction due to extracardiac factors that affect cardiac function. These factors are usually systemic in origin and include infectious agents, toxins, and inflammatory or neoplastic conditions that result in destruction of the myocardium and acquired or inherited metabolic diseases that affect myofiber function.¹ Primary or idiopathic DCM principally or exclusively affects the myocardium, and the etiology is unknown. The clinical determination of idiopathic DCM is based upon the absence of underlying systemic, coronary, valvular, structural (congenital), hypertensive, or pericardial disease. Suspected causes of idiopathic DCM include inherited (genetic) defects, infectious agents (enteroviral), immunologic disease, and endstage disease of unknown origin (toxic, infectious, inflammatory).^{12,18,19} The latter proposed etiologies are based upon the finding of inflammatory infiltrates in the myocardium. The only definitive virus-induced DCM described in the dog is parvoviral myocarditis. Pups affected with parvoviral myocarditis are between 2 and 16 weeks of age with no apparent familial, breed, or sex predilection.²⁰ Histologically, the changes in the myocardium correspond to a lymphocytic, end-stage myocarditis with myofiber loss and replacement by extensive fibrosis. In early stages of disease, viral inclusions are noted in myofibers, often without concurrent inflammation. Subacute changes include myofiber necrosis and mild inflammatory infiltrates.

Immune-mediated myocarditis leading to endstage DCM has also been suggested as a possible etiological subset of human DCM,^{18,19} but an immune-mediated cause of canine DCM has not been proved. A subset of human DCM appears to have a genetic basis. Inherited DCM can be further subdivided into disorders of substrate and energy metabolism, storage diseases, and disorders of mechanisms yet to be determined that are classified as heritable because of evidence of familial relatedness.^{19,21,22} In other forms of human cardiomyopathy, such as hypertrophic cardiomyopathy, genetic defects have been related to contractility proteins (cardiac beta-myosin heavy chain), cytoskeletal proteins, and proteins involved in either signal transduction or metabolism.¹⁹ Similar defects have not been found to date for DCM in dogs.

Other etiologies that have been considered for DCM in humans and animals revolve around defects in energy metabolism or decreased levels of compounds that protect against oxidative damage. These problems include deficiencies in magnesium, thiamine, selenium, vitamin E, and taurine.²³⁻²⁵ Deficiencies of these compounds have not been thoroughly explored in the dog.²⁶ Catecholamine excess has also been suggested in human DCM because DCM has been identified in patients with actively secreting pheochromocytomas and in animals given catecholamines.²⁷ The exact mechanism of catecholamine-induced cardiomyopathy is unknown.

In dogs, idiopathic DCM is generally suspected to be heritable based upon the various breed predilections, but heterogeneous underlying biochemical/metabolic defects

are suspected. Substantive evidence supporting the possible underlying causes or mechanisms is quite limited. Decreased myocardial L-carnitine concentrations have been noted in related Boxer dogs with DCM and in some Doberman Pinschers with DCM.^{28,29} However, L-carnitine concentrations are also lowered with advanced cardiac disease of any cause, and therefore a lower concentration is not a definitive indicator of underlying cause.²³ Supplementation may serve to enhance remaining cardiac function.

Decreased cardiac myosin levels have been noted in clinically normal Doberman Pinschers and Doberman Pinschers affected with DCM when compared with cardiac myosin levels in other dog breeds.³⁰ Lower myosin levels may predispose the heart to failure due to diminished protective effects against cellular hypoxia. The myoglobin concentration noted in clinically normal Doberman Pinschers was similar to cardiac myoglobin concentrations in dogs with heart failure experimentally induced by rapid ventricular pacing.³⁰ These findings indicate that changes in myoglobin concentration may be important in the progression of heart failure and that it may be an important component of the DCM of Doberman Pinschers. However, the fact that experimentally induced heart failure resulted in a lowering of myoglobin may also suggest that the lowered myoglobin found in the clinically normal Doberman Pinschers may simply be yet another indicator of underlying cardiac dysfunction due to some other etiology. In the same study, mitochondrial ATPase activity was 45% lower in both clinically affected and normal Doberman Pinschers when compared with normal dogs. A similar decrease was also noted in experimental models of heart failure, suggesting again that this finding is most likely a result rather than a cause of heart failure.³⁰

McCutcheon et al³¹ examined myocardial metabolite and enzyme levels for the major metabolic pathways for energy production and calcium transfer in Doberman Pinschers with DCM. They found significant decreases of metabolites and enzymes associated with mitochondrial ATP production. The greatest decreases were found for the mitochondrial respiratory chain enzymes and myoglobin. The authors conceded that their findings do not indicate whether the decreased mitochondrial energy production is a primary or secondary defect. Comparison with experimentally induced models of heart failure will help resolve this question. Lower concentrations of enzymes and myoglobin in DCM of Doberman Pinschers may not be unique to that form of DCM but may be secondary compensatory changes of the failing heart.

The clinical and postmortem findings in the 12 affected POWD described in this report are consistent with the findings reported for other canine DCM. The heart:body weight ratios available for 3 of the pups were all above 1%, which is greater than that reported for normal dogs (0.084%).³² The lack of apparent underlying systemic or structural causes for DCM in these dogs places this form of DCM in the category of primary or idiopathic DCM, and the apparent autosomal recessive pattern of inheritance is consistent with a familial disease.

The histologic features noted in the myocardium are subtle and lack changes associated with chronicity, ie, fibrosis or inflammation found in other forms of canine DCM. The

changes in the myofibers and interstitium were diffusely distributed in the myocardium of affected POWD but were most pronounced in the left ventricular and septal myocardium. The cause of the expanded interstitium was edema, and the myofiber swelling and loss of cross-striations was attributable to cytoplasmic fluid accumulation (hydropic change) and an apparent increase in the numbers of mitochondria as confirmed by use of special stains to detect the deposition of lipid, glycogen, or mucopolysaccharides, which may have expanded the interstitium and sarcoplasm. Hydropic change is a nonspecific indicator of membrane dysfunction caused by a defect in energy production or structural membrane failure. Although myofibers were thinner than normal, the increased heart weights and the nuclear hyperchromasia and size variability are consistent with myofiber hypertrophy. Myofiber splitting/branching and disarray, noted in other forms of cardiomyopathy, were also noted in the myocardium of the affected POWD. There was no evidence of active myofiber necrosis in the 12 pups examined. Thus, myocardial decompensation probably is acute and rapidly fatal, precluding cellular degeneration that would be noted histologically.

There was no evidence for myocardial storage disease as a cause for POWD DCM. Eleven of the POWD pups lacked any evidence of cardiac inflammation; however, a single pup did have rare perivascular and endocardial inflammation. The significance of the inflammation noted in the single pup is unknown. The general lack of inflammation suggests that the underlying cause is most likely not infectious or immune mediated. However, because this is a preliminary description of a new DCM, the possibility of underlying infectious or immune-mediated causes should still be considered. There was no indication that this DCM was the result of primary vascular disease; all coronary vasculature examined histologically and at postmortem was normal. Skeletal muscle obtained from the extremities of affected pups was histologically normal, indicating that a primary DCM is present in the POWD breed. There was also no clinical evidence of noncardiac skeletal muscle involvement. The finding of Anitchkow cells in the interstitium of 1 pup is nonspecific. Anitchkow cells are mesenchymal cells located in the myocardial interstitium and are suspected to be activated myofibroblasts, considered indicative of myocardial damage.³³

The clinical course of the POWD DCM was distinctive. The age of onset noted in the POWD (13 ± 7.3 weeks) is the youngest for any form of canine DCM, and the progression of disease (sudden death to 5 days) is significantly more rapid than has been reported in other dogs with DCM (0.5–24 months). All pups either died suddenly without previous clinical signs or had vague clinical signs related to left ventricular failure for 1–5 days prior to death, and treatment did not affect outcome in these pups. Pups evaluated prior to death had signs referable to left ventricular failure and radiographic, electrocardiographic, and echocardiographic indices consistent with a diagnosis of DCM. Serum biochemical and urine analyses and CBCs were within normal ranges for the pups examined, and urinary metabolic screening for inborn errors of metabolism did not indicate inherited metabolic diseases such as mucopolysaccharidosis and several amino acidurias (data not shown). Unfortunately,

ly, no additional biochemical evaluations for serum constituents more specific for cardiac disease, eg, creatine phosphokinase or plasma carnitine, were performed on these pups.

The true prevalence of DCM in the POWD breed cannot be determined at this time. The POWD are a relatively new breed in the United States, and they comprise a small population. All of the current US dogs came from foundation stock originating in Portugal, hence the gene pool is small. Several breeders in the USA and Portugal have anecdotally reported sudden death in young pups, but the causes of these deaths have not been investigated.

This study was limited by the lack of available fresh tissues and active cases for more complete analysis. Future investigations should be designed to expand information concerning biochemical, molecular, and histologic/ultrastructural changes and to confirm the mode of inheritance. POWD DCM also may serve as a useful canine model for DCM.

This newly described familial DCM of the Portuguese Water Dog breed appears to have an autosomal recessive mode of inheritance. It is distinguished clinically from other forms of canine DCM by the young age at onset (13 ± 7.3 weeks) and the rapid clinical course (days). The preliminary histologic findings suggest that this DCM is not the result of an infectious or immune-mediated etiology, but it is most likely caused by an underlying molecular (biochemical/structural) defect.

Acknowledgments

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Plasma and whole blood taurine in normal dogs of varying size fed commercially prepared food

By S. J. DELANEY¹, P. H. KASS², Q. R. ROGERS³ and A. J. FASCETTI³

Summary

The objective of the present study was to examine the effect of signalment, body size and diet on plasma taurine and whole blood taurine concentrations. A total of 131 normal dogs consuming commercially prepared dog food had blood drawn 3–5 h post-prandially to be analysed for plasma amino acids and whole blood taurine. Body weight and morphometric measurements of each dog were taken. Plasma and whole blood taurine concentrations were 77 ± 2.1 nmol/ml (mean \pm SEM) and 266 ± 5.1 nmol/ml (mean \pm SEM), respectively. No effect of age, sex, body weight, body size, or diet was seen on plasma and whole blood taurine concentrations. Mean whole blood taurine concentrations were lower in dogs fed diets containing whole grain rice, rice bran or barley. The lowest whole blood concentrations were seen in dogs fed lamb or lamb meal and rice diets. Plasma methionine and cysteine concentrations were lower in dogs fed diets with animal meals or turkey, and whole grain rice, rice bran or barley. Fifteen of 131 dogs had plasma taurine concentrations lower than, or equal, to the previously reported lowest mean food-deprived plasma taurine concentration in normal dogs of 49 ± 5 nmol/ml (mean \pm SEM) (ELLIOTT et al., 2000). These findings support the theory that taurine deficiency in dogs may be related to the consumption of certain dietary ingredients. Scientific and clinical evidence supports the hypothesis that dilated cardiomyopathy is associated with low blood taurine concentration in dogs; therefore, further work is indicated to determine the mechanism by which diet can affect taurine status in dogs.

Introduction

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Taurine and Carnitine in Canine Cardiomyopathy

Sherry Lynn Sanderson, DVM, PhD

Department of Physiology and Pharmacology, University of Georgia, College of Veterinary
Medicine, 501 DW Brooks Drive, Athens, GA 30602, USA

Dilated cardiomyopathy (DCM) is one of the most common acquired cardiovascular diseases in dogs [1–4]. Although few studies of the prevalence of DCM in the overall population of dogs have been reported, estimates range from 0.5% to 1.1% [5,6]. Only degenerative valvular disease and, in some regions of the world, heartworm infection are more common causes of cardiac morbidity and mortality in dogs. DCM is seen most commonly in large and giant breeds of dogs, although its frequency seems to be increasing in medium-sized breeds, such as the English and American cocker spaniels [4–8]. It has been reported rarely in small and miniature breeds of dogs [9].

B4

E-mail address: sanderso@vet.uga.edu

0195-5616/06/\$ – see front matter
doi:10.1016/j.cvsm.2006.08.010

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CVM Update

FDA Provides Update on Investigation into Potential Connection Between Certain Diets and Cases of Canine Heart Disease

February 19, 2018

The U.S. Food and Drug Administration today is providing an update on its investigation into reports of dilated cardiomyopathy (DCM) in dogs eating certain pet foods. The update covers reports of DCM received by FDA through November 30, 2018.

This update does not include reports received in December and January due to the lapse in appropriations from December 22, 2018, to January 25, 2019. Because the Anti-Deficiency Act does not except activities that are solely related to protecting “animal health,” FDA was not able to continue its investigation during that time.

The FDA first [alerted](#) the public about this investigation in July 2018. Since then, the FDA’s Center for Veterinary Medicine (CVM) has taken a multi-pronged approach to the investigation, collaborating with a variety of components of the animal health sector to collect and evaluate information about the DCM cases and the diets pets ate prior to becoming ill.

Based on the information gathered as part of our investigation to date, our advice to pet owners remains consistent. The agency has not identified specific recommendations about diet changes for dogs who are not displaying DCM symptoms, but encourages pet owners to consult directly with their veterinarians for their animal’s dietary advice. FDA-CVM investigative activities include:

- Analyzing cases statistically to search for correlations between diagnosed DCM cases and what those dogs did or did not eat.
- Working with the Veterinary Laboratory Investigation and Response Network (Vet-LIRN), a collaboration of government and veterinary diagnostic laboratories to test blood, serum and tissues from affected animals.
- Collaborating with Chesapeake Veterinary Cardiology Associates (CVCA) to collect case summaries and blood/serum/tissue of dogs diagnosed with DCM to see if there are unique factors that separate diet-associated DCM from genetic. The FDA is also reviewing echocardiograms of dogs who are not showing symptoms of DCM to evaluate the significance of early changes in heart function.
- Consulting with board certified veterinarians in animal nutrition to identify nutritional factors such as nutrient bioavailability and ingredient digestibility that may contribute to the development of heart disease.
- Examining ingredient sourcing/processing and product formulation with pet food manufacturers.

Between January 1, 2014, and November 30, 2018, the FDA received 300 reports of DCM (294 canine reports, 6 feline reports); 276 of these (273 canine, 3 feline) were reported after the July public notification about FDA’s investigation. Some of these reports involved more than one affected animal from the same household. While there are dog breeds (typically large and giant breeds, plus Cocker Spaniels) that are known to have a genetic predisposition to dilated cardiomyopathy, the reports to the FDA continue to span a wide range of breeds, many that do not have a known genetic predisposition.

The FDA has received reports of cats with DCM, but due to the low number of reports (10 since January 2014), dogs are the primary focus of the agency's investigation. For details about the number of reports, visit the DCM Investigation webpage.

In cases in which dogs ate a single primary diet (i.e., didn't eat multiple food products, excluding treats), 90 percent reported feeding a grain-free food. Approximately 10 percent reported feeding a food containing grains and some of these diets were vegan or vegetarian. A large proportion of the reported diets in DCM cases – both grain-free and grain-containing – contained peas and/or lentils in various forms (whole, flour, protein, etc.) as a main ingredient (listed within the first 10 ingredients, before vitamins and minerals). The products included commercially available kibble, canned and raw foods, as well as home-cooked diets.

The agency appreciates the support from pet owners and veterinarians who have submitted data through case reports that included extensive diet histories, medical records, diagnostic samples of blood, serum, and/or tissue, and echocardiograms. Due to the high volume of reports, the agency cannot respond to each report individually, but each report is valuable and becomes part of the FDA's investigation.

The FDA continues to encourage pet owners and veterinary professionals to report both symptomatic and asymptomatic cases of dogs suspected to have DCM connected to diet by using the electronic [Safety Reporting Portal](#) or calling their state's [FDA Consumer Complaint Coordinators](#). Please see the link below about "[How to Report a Pet Food Complaint](#)" for additional instructions. The FDA will continue to provide updates on the progress of this investigation and will alert the public about significant developments.

Additional Information

- [FDA Investigation into Potential Link between Certain Diets and Canine Dilated Cardiomyopathy](#)
- [Questions & Answers: FDA Center for Veterinary Medicine's Investigation into a Possible Connection Between Diet and Canine Heart Disease](#)
- [Vet-LIRN Investigative Update \(December 2018\)](#)
- [How to Report a Pet Food Complaint](#)
- [Veterinary Laboratory Investigation and Response Network \(Vet-LIRN\)](#)

Document properties

Author: Norris, Anne
Template: Normal.dotm
Page count: 2
Paragraph count: 22
Line count: 69
Word count: 795
Character count (spaces excluded): 4517
Character count (spaces included): 5308

Document Comments
Total Comments: 2

Author: Norris, Anne
Date: 12/11/2018 1:43:00 PM
Initial: NA
Range: hyperlink
Scope: DCM Investigation webpage

Author: Norris, Anne
Date: 12/18/2018 1:09:00 PM
Initial: NA
Range: link to investigation web page
Scope: FDA Investigation into Potential Link between Certain Diets and
Canine Dilated Cardiomyopathy

From: Jones, Jennifer L </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=0F6CA12EAA9348959A4CBB1E829AF244-JENNIFER.JO>
To: Norris, Anne
CC: Peloquin, Sarah
Sent: 6/13/2019 3:37:04 PM
Subject: RE: Vet-LIRN Update on DCM

Done :)

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



From: Norris, Anne
Sent: Thursday, June 13, 2019 11:17 AM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Peloquin, Sarah <Sarah.Peloquin@fda.hhs.gov>
Subject: RE: Vet-LIRN Update on DCM

Shoot, sorry I spoke too soon.

B5

B5

Sorry about that, I wish I could pull the numbers myself without having to bother you again!

From: Norris, Anne
Sent: Thursday, June 13, 2019 10:41 AM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Peloquin, Sarah <Sarah.Peloquin@fda.hhs.gov>
Subject: RE: Vet-LIRN Update on DCM

Thanks! Sounds good. Tracey just asked me to reschedule tomorrow's meeting for early next week. I'll still send around the comms docs links for people to start reviewing in the interim.

From: Jones, Jennifer L
Sent: Thursday, June 13, 2019 10:03 AM
To: Norris, Anne <Anne.Norris@fda.hhs.gov>
Cc: Peloquin, Sarah <Sarah.Peloquin@fda.hhs.gov>
Subject: RE: Vet-LIRN Update on DCM

Thanks, Anne
time.

B5

We don't need to meet unless

B5

In that case, I'm free today until 3.

Otherwise, we can just chat tomorrow with the group.

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



From: Norris, Anne
Sent: Thursday, June 13, 2019 9:49 AM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Peloquin, Sarah <Sarah.Peloquin@fda.hhs.gov>
Subject: RE: Vet-LIRN Update on DCM

Thanks, you're the best! Just one stat I need for the comms that I don't see in there

B5

B5

I'll give this a read through, but I think it's in great shape for tomorrow. If you'd like to talk it through before then, happy to do that.

From: Jones, Jennifer L
Sent: Thursday, June 13, 2019 9:31 AM
To: Norris, Anne <Anne.Norris@fda.hhs.gov>
Cc: Peloquin, Sarah <Sarah.Peloquin@fda.hhs.gov>
Subject: RE: Vet-LIRN Update on DCM

Good morning Anne,
I finished with the Vet-LIRN updates, and they're ready for your team.
Please let me know if you want to meet ahead of tomorrow's meeting to discuss the content.
Thanks again,
Jen

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



From: Jones, Jennifer L
Sent: Wednesday, June 05, 2019 9:38 AM
To: Norris, Anne <Anne.Norris@fda.hhs.gov>
Subject: RE: Vet-LIRN Update on DCM

Thank you :)

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



From: Norris, Anne
Sent: Wednesday, June 05, 2019 9:37 AM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Subject: RE: Vet-LIRN Update on DCM

Sure, no problem at all.

B6

From: Jones, Jennifer L
Sent: Wednesday, June 5, 2019 9:33 AM
To: Norris, Anne <Anne.Norris@fda.hhs.gov>
Subject: RE: Vet-LIRN Update on DCM

Thanks, Anne. I'll take a look and work on the updates.
Can I get it to you by COB Thursday?

B6

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



From: Norris, Anne
Sent: Wednesday, June 05, 2019 9:23 AM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Subject: Vet-LIRN Update on DCM

Hi Jen,

Wanted to circle back after Dr. Solomon's DCM briefing. You did a great job! I think he has a much better appreciation for where things stand now.

I mocked up a new document for the June DCM Vet-LIRN Update using the last Vet LIRN-Update as the basis and thought you could edit/add/subtract as you wish.

[Draft – Vet-LIRN DCM Update for June 2019](#)

Happy to discuss/help however I can, please let me know! If at all possible, I think we'd like to have drafts ready to share with the group by the middle of next week. Is that workable for you?

Thanks!
Anne

Anne Norris
Strategic Initiatives

Office of the Director
Center for Veterinary Medicine
U.S. Food & Drug Administration
O: 240-402-0132

B6

Anne.Norris@fda.hhs.gov



From: Jones, Jennifer L </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=0F6CA12EAA9348959A4CBB1E829AF244-JENNIFER.JO>
To: Freeman, Lisa
CC: Norris, Anne
Sent: 7/5/2019 10:49:33 AM
Subject: RE: FDA DCM Update Links-Live 6/27/2019

Hi Lisa,
No, I did not hear about any preliminary data from [B6] I'd love to read anything you're willing to share.
Thanks again,
Jen

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



From: Freeman, Lisa <Lisa.Freeman@tufts.edu>
Sent: Thursday, June 27, 2019 11:20 AM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Norris, Anne <Anne.Norris@fda.hhs.gov>
Subject: Re: FDA DCM Update Links-Live 6/27/2019

Hi Jen. I heard rumors of something coming so thanks for letting me know. Did you hear from [B6] about our preliminary data presented at ACVIM? Let me know if you'd like to discuss
Thanks. Lisa

Sent from my iPhone

On Jun 27, 2019, at 11:14 AM, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov> wrote:

Good morning,
I wanted to let you know that FDA Consumer update about DCM when live this morning. Here are the links:
[CVM Update](#)

[Web Update – DCM Investigation](#)

[Web QA \(Updated\)](#)

[Vet-LIRN Update](#)

[DCM Complaint Spreadsheet – 1/1/14 - 4/30/19](#)

If you have any questions about the content, please direct them to: AskCVM@fda.hhs.gov

Thank you and take care,
Jen

Jennifer L. A. Jones, DVM
Veterinary Medical Officer
U.S. Food & Drug Administration
Center for Veterinary Medicine
Office of Research
Veterinary Laboratory Investigation and Response Network (Vet-LIRN)

8401 Muirkirk Road, G704
Laurel, Maryland 20708
new tel: 240-402-5421
fax: 301-210-4685
e-mail: jennifer.jones@fda.hhs.gov
Web: <http://www.fda.gov/AnimalVeterinary/ScienceResearch/ucm247334.htm>
<image005.png> <image006.png>

From: Joshua A Stern <jstern@ucdavis.edu>
To: Jones, Jennifer L
CC: Norris, Anne
Sent: 6/27/2019 3:56:33 PM
Subject: Re: FDA DCM Update Links-Live 6/27/2019
Attachments: image005.png; image006.png

Thanks so much!

Joshua A. Stern, DVM, PhD, DACVIM
614.390.1516; jstern@ucdavis.edu
Sent from my iPhone

On Jun 27, 2019, at 8:11 AM, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov> wrote:

Good morning,
I wanted to let you know that FDA Consumer update about DCM when live this morning. Here are the links:
[CVM Update](#)

[Web Update – DCM Investigation](#)

[Web QA \(Updated\)](#)

[Vet-LIRN Update](#)

[DCM Complaint Spreadsheet – 1/1/14 - 4/30/19](#)

If you have any questions about the content, please direct them to: AskCVM@fda.hhs.gov

Thank you and take care,
Jen

Jennifer L. A. Jones, DVM

Veterinary Medical Officer
U.S. Food & Drug Administration
Center for Veterinary Medicine
Office of Research
Veterinary Laboratory Investigation and Response Network (Vet-LIRN)
8401 Muirkirk Road, G704
Laurel, Maryland 20708
new tel: 240-402-5421
fax: 301-210-4685
e-mail: jennifer.jones@fda.hhs.gov
Web: <http://www.fda.gov/AnimalVeterinary/ScienceResearch/ucm247334.htm>
<image005.png> <image006.png>

From: ADIN,DARCY BRITTAIN <adind@ufl.edu>
To: Jones, Jennifer L
Sent: 6/27/2019 4:47:40 PM
Subject: RE: FDA DCM Update Links-Live 6/27/2019

Thank you for the update! Sounds like you are making good progress!
Take care
Darcy

From: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Sent: Thursday, June 27, 2019 11:11 AM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Norris, Anne <Anne.Norris@fda.hhs.gov>
Subject: FDA DCM Update Links-Live 6/27/2019

Good morning,
I wanted to let you know that FDA Consumer update about DCM when live this morning. Here are the links:
[CVM Update](#)

[Web Update – DCM Investigation](#)

[Web QA \(Updated\)](#)

[Vet-LIRN Update](#)

[DCM Complaint Spreadsheet – 1/1/14 - 4/30/19](#)

If you have any questions about the content, please direct them to: AskCVM@fda.hhs.gov

Thank you and take care,
Jen

Jennifer L. A. Jones, DVM

Veterinary Medical Officer
U.S. Food & Drug Administration
Center for Veterinary Medicine
Office of Research
Veterinary Laboratory Investigation and Response Network (Vet-LIRN)
8401 Muirkirk Road, G704
Laurel, Maryland 20708
new tel: 240-402-5421
fax: 301-210-4685
e-mail: jennifer.jones@fda.hhs.gov
Web: <http://www.fda.gov/AnimalVeterinary/ScienceResearch/ucm247334.htm>



From: Putnam, Juli </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=45A45E85E6E94413A4BD2C9FDBB3DE1B-JULIANN.PUT>
To: Palmer, Lee Anne; Carey, Lauren; Hartogensis, Martine; DeLancey, Siobhan; Jones, Jennifer L; Reimschuessel, Renate; Norris, Anne
CC: Forfa, Tracey; Rotstein, David; Eisenman, Theresa; Nemser, Sarah
Sent: 7/27/2018 8:40:54 PM
Subject: RE: Media inquiry request - Washington Post - DCM - Deadline: 7/31

Thanks!

From: Palmer, Lee Anne
Sent: Friday, July 27, 2018 4:12 PM
To: Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>
Cc: Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Eisenman, Theresa <Theresa.Eisenman@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>
Subject: RE: Media inquiry request - Washington Post - DCM - Deadline: 7/31

Hi Juli – just a couple edits below to consider. I separated it into paragraphs only to make it easier for me to read.

B5

Thanks – have a great weekend! Lee Anne

From: Putnam, Juli
Sent: Friday, July 27, 2018 4:04 PM
To: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>
Cc: Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Eisenman, Theresa <Theresa.Eisenman@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>
Subject: RE: Media inquiry request - Washington Post - DCM - Deadline: 7/31

Thank you all – so I can say:

B5

From: Palmer, Lee Anne

Sent: Friday, July 27, 2018 3:33 PM

To: Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>

Cc: Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Eisenman, Theresa <Theresa.Eisenman@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>

Subject: RE: Media inquiry request - Washington Post - DCM - Deadline: 7/31

B5

From: Carey, Lauren

Sent: Friday, July 27, 2018 3:19 PM

To: Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>

Cc: Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Eisenman, Theresa <Theresa.Eisenman@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>

Subject: RE: Media inquiry request - Washington Post - DCM - Deadline: 7/31

Hi Juli,

B5

Thanks,
Lauren

From: Putnam, Juli

Sent: Friday, July 27, 2018 10:44 AM

To: Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>

Cc: Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Eisenman, Theresa <Theresa.Eisenman@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>

Subject: RE: Media inquiry request - Washington Post - DCM - Deadline: 7/31

B5

Best,
Juli

From: Carey, Lauren
Sent: Friday, July 27, 2018 9:40 AM
To: Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>
Cc: Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Eisenman, Theresa <Theresa.Eisenman@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>
Subject: RE: Media inquiry request - Washington Post - DCM - Deadline: 7/31

Hi Juli,

B5

Thanks,
Lauren

From: Putnam, Juli
Sent: Friday, July 27, 2018 9:26 AM
To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>
Cc: Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Eisenman, Theresa <Theresa.Eisenman@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>
Subject: RE: Media inquiry request - Washington Post - DCM - Deadline: 7/31

Hi all,
The Washington Post story got delayed and now the reporter (Kate Furby) is asking us for an updated case count for dogs without the genetic predisposition falling ill. She also wants an updated number on the dogs who may have passed away as a result. She saw that The New York Times mentioned that the FDA had reported three deaths. She is wondering if these deaths were just since the report came out, or if this is total number. (I know those were the # from our initial warning but not sure if more deaths have been reported to us since).

Are we able to provide an updated case count between now and next Tuesday? I will, of course, remind her that the numbers are constantly changing so they only represent a single point in time.

Best,
Juli

From: Hartogensis, Martine
Sent: Tuesday, July 24, 2018 9:09 AM
To: Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>
Cc: Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Eisenman,

Theresa <Theresa.Eisenman@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>

Subject: RE: Media inquiry request - Washington Post - DCM - Deadline: 7/20

Hi Juli,

B5

Martine

From: Putnam, Juli

Sent: Tuesday, July 24, 2018 8:41 AM

To: DeLancey, Siobhan <Siobhan.DeLancey@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>

Cc: Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Eisenman, Theresa <Theresa.Eisenman@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>

Subject: RE: Media inquiry request - Washington Post - DCM - Deadline: 7/20

B5

From: DeLancey, Siobhan

Sent: Monday, July 23, 2018 12:56 PM

To: Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>

Cc: Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Eisenman, Theresa <Theresa.Eisenman@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>

Subject: RE: Media inquiry request - Washington Post - DCM - Deadline: 7/20

B5

Siobhan DeLancey, RVT, MPH

O: 240-402-9973

B6

Siobhan.DeLancey@fda.hhs.gov

From: Putnam, Juli

Sent: Monday, July 23, 2018 12:45 PM

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

<Martine.Hartogenesis@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>
Cc: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Eisenman, Theresa <Theresa.Eisenman@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>
Subject: RE: Media inquiry request - Washington Post - DCM - Deadline: 7/20

B5

Thanks for your guidance.
Best,
Juli

From: Jones, Jennifer L
Sent: Monday, July 23, 2018 6:48 AM
To: Hartogenesis, Martine <Martine.Hartogenesis@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>
Cc: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Eisenman, Theresa <Theresa.Eisenman@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>
Subject: RE: Media inquiry request - Washington Post - DCM - Deadline: 7/20

B5

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



From: Hartogenesis, Martine
Sent: Friday, July 20, 2018 11:27 AM
To: Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>
Cc: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Eisenman, Theresa <Theresa.Eisenman@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>
Subject: RE: Media inquiry request - Washington Post - DCM - Deadline: 7/20

Thanks Renate!

Martine

From: Reimschuessel, Renate
Sent: Friday, July 20, 2018 11:26 AM
To: Hartogenesis, Martine <Martine.Hartogenesis@fda.hhs.gov>; Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>
Cc: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Eisenman, Theresa <Theresa.Eisenman@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>
Subject: RE: Media inquiry request - Washington Post - DCM - Deadline: 7/20

B5

Renate Reimschuessel V.M.D. Ph.D. Director Vet-LIRN

Phone 1-240-402-5404

Fax 301-210-4685

<http://www.fda.gov/AnimalVeterinary/ScienceResearch/ucm247334.htm>

From: Hartogensis, Martine

Sent: Friday, July 20, 2018 11:14 AM

To: Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>

Cc: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Eisenman, Theresa <Theresa.Eisenman@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>

Subject: RE: Media inquiry request - Washington Post - DCM - Deadline: 7/20

Ok, thanks Juli! I am looping in Sarah Nemser and Renate in case they know, but no worries if not.

Thanks again!

Martine

From: Putnam, Juli

Sent: Friday, July 20, 2018 11:02 AM

To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>

Cc: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Eisenman, Theresa <Theresa.Eisenman@fda.hhs.gov>

Subject: RE: Media inquiry request - Washington Post - DCM - Deadline: 7/20

Thanks, Martine. I got an out of office that Jen is out until Monday. However, if we are able to confirm this number before then, please send to my colleague Theresa Eisenman (copied on this email) and she will provide it to the NYT reporter. I am on leave the rest of today so Theresa will be able to help on any other follow-up we may have with NYT or Washington Post on DCM today.

Thanks, and hope everyone has a good weekend!

Best,
Juli

From: Hartogensis, Martine

Sent: Friday, July 20, 2018 10:21 AM

To: Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>

Cc: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>

Subject: RE: Media inquiry request - Washington Post - DCM - Deadline: 7/20

Hi Juli,

It sounds like there may be about **B5** Jen, can you confirm?

Martine

From: Putnam, Juli

Sent: Friday, July 20, 2018 10:19 AM

To: Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>

Cc: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>

Subject: RE: Media inquiry request - Washington Post - DCM - Deadline: 7/20

B5

From: Carey, Lauren

Sent: Friday, July 20, 2018 9:50 AM

To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>

Cc: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>

Subject: RE: Media inquiry request - Washington Post - DCM - Deadline: 7/20

B5

From: Hartogensis, Martine

Sent: Friday, July 20, 2018 8:02 AM

To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>

Cc: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>

Subject: RE: Media inquiry request - Washington Post - DCM - Deadline: 7/20

Thanks Jen.

B5

Martine

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

Date: July 20, 2018 at 6:47:01 AM EDT

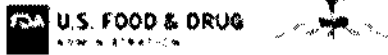
To: Carey, Lauren <Lauren.Carey@fda.hhs.gov>, Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>, Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>, Norris, Anne <Anne.Norris@fda.hhs.gov>

Cc: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>, Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>, Rotstein, David <David.Rotstein@fda.hhs.gov>

Subject: RE: Media inquiry request - Washington Post - DCM - Deadline: 7/20

B5

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



From: Carey, Lauren

Sent: Thursday, July 19, 2018 4:12 PM

To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>

Cc: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>

Subject: RE: Media inquiry request - Washington Post - DCM - Deadline: 7/20

Jen should have an answer for you on that.

From: Hartogensis, Martine

Sent: Thursday, July 19, 2018 4:02 PM

To: Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>

Cc: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>

Subject: RE: Media inquiry request - Washington Post - DCM - Deadline: 7/20

Hi Juli,

Just looping in the dream team again. Do any of you know if our

B5

TIA!

Martine

From: Putnam, Juli

Sent: Thursday, July 19, 2018 3:58 PM

To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>

Cc: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>

Subject: RE: Media inquiry request - Washington Post - DCM - Deadline: 7/20

B5

From: Hartogenesis, Martine
Sent: Thursday, July 19, 2018 3:43 PM
To: Norris, Anne <Anne.Norris@fda.hhs.gov>; Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>
Cc: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>
Subject: RE: Media inquiry request - Washington Post - DCM - Deadline: 7/20

Great points, thank you Anne!

From: Norris, Anne
Sent: Thursday, July 19, 2018 3:42 PM
To: Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>; Hartogenesis, Martine <Martine.Hartogenesis@fda.hhs.gov>
Cc: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>
Subject: RE: Media inquiry request - Washington Post - DCM - Deadline: 7/20

I know you haven't accepted yet, Martine, but wanted to throw these points out for you and Juli to consider for future interviews. We keep getting variations on the same questions over and over again from consumers, so it might be helpful to mention a variation of the information provided below to allay some of the consumer anxiety out there.

B5

Thanks,
Anne

From: Putnam, Juli
Sent: Thursday, July 19, 2018 3:33 PM
To: Hartogenesis, Martine <Martine.Hartogenesis@fda.hhs.gov>
Cc: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>
Subject: Media inquiry request - Washington Post - DCM - Deadline: 7/20

Hi Martine,
Are you willing to do another interview on DCM tomorrow morning? Washington Post is now writing too. Please advise.
Thanks!
Juli

Reporter: Kate Furby
Outlet: Washington Post
Deadline: 7/20
Background: Kate would like to write a story on FDA's alert regarding DCM and its potential link to dog food. This would be for the Health, Environment, Science section of the Post. She is contacting a few vets at universities now as well.

Questions:

She said her questions would just be standard ones about the FDA alert on dog food and canine heart health.

- Questions about DCM – what is it, what are symptoms, how is it detected, how common is it, etc.
- Questions about legumes and potatoes in dog diets.

Juli Putnam
Press Officer

Office of Media Affairs
Office of External Affairs

U.S. Food and Drug Administration

Tel: 240-402-0537

B6

Juli.Putnam@fda.hhs.gov



From: Palmer, Lee Anne </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=CF7C8BD53B6C45A39318A596ACEA7C53-LPALMER>
To: DeLancey, Siobhan; Hartogensis, Martine; Carey, Lauren; Jones, Jennifer L; Rotstein, David
CC: Norris, Anne; Putnam, Juli
Sent: 10/9/2018 7:42:46 PM
Subject: RE: Media Request - DCM - WUSA9 inquiry

That sounds good – thanks! Just let us know if and when...I made one possible edit in green.

From: DeLancey, Siobhan
Sent: Tuesday, October 9, 2018 3:01 PM
To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>
Cc: Norris, Anne <Anne.Norris@fda.hhs.gov>; Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>
Subject: RE: Media Request - DCM - WUSA9 inquiry

B5

From: Hartogensis, Martine
Sent: Tuesday, October 09, 2018 2:59 PM
To: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>
Cc: Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>
Subject: RE: Media Request - DCM - WUSA9 inquiry

Hi DCM Team!

See the media request below. This is mostly for Lee Anne's group to update numbers (if you have them), but Jen and Dave, please feel free to revise as well. I had one edit in red.

Thanks very much in advance!

Martine

From: Haake, Lindsay
Sent: Tuesday, October 09, 2018 2:48 PM
To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>
Cc: Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>
Subject: FW: Media Request - DCM - WUSA9 inquiry

Good Afternoon Martine –

B5

When you get a chance, please review and let me know if you have any edits by COB Friday, October 12th.

Thanks!
Lindsay

Media Inquiry

Reporter: Whitney Wild

Media Outlet: WUSA9

Reporter Deadline: Requested an interview for the week of October 15th

Background: I'm reaching out from WUSA9 here in D.C. We are exploring a story about the growing concern about a possible link between grain-free dog food and dilated cardiomyopathy cited in this announcement:

<https://www.fda.gov/animalveterinary/newsevents/cvmupdates/ucm613305.htm>

Is there anyone from the FDA we could speak with on-camera about the research the agency is doing, any conclusions and the complaints the agency has fielded surrounding this issue?

Questions/Proposed Responses:

B5

B5

Lindsay Haake

Press Officer

Office of Media Affairs

Office of External Affairs

U.S. Food and Drug Administration

Tel: 301-796-3007 / **B6**

Lindsay.Haake@fda.hhs.gov



patientid	patient	client	Diagnosis	wb taurine	plasma taurine	supplemented	improved	dob
Atypical breeds								
B6			DCM/CHF	not tested	not tested	yes	no	
			DCM/CHF	wnl	wnl	no		
			DCM/CHF	not tested	not tested	no (died in hosp)		
			DCM/CHF, RA mass	not tested	not tested	no		
			DCM/CHF	not tested	not tested	yes	will be rechecked soon	
			DCM/CHF	not tested	not tested	no		
			DCM/CHF	wnl	wnl	no		
			DCM	wnl	wnl	no		
			DCM/CHF	wnl	wnl	no		
			Murmur but no echo (in for GI issues)	not tested	not tested	no		
			DCM/CHF	wnl	wnl	yes	no	
			DCM +/- CHF, V tach	not tested	not tested	no		
			DCM	not tested	not tested	no		
			DCM/CHF	not tested	not tested	yes	yes	
			DCM/CHF	not tested	not tested	no (died in hosp)		
			DCM	wnl	wnl	no		
			DCM/CHF	B6		yes	no	
			DCM/CHF	not tested	not tested	no		
		DCM	B6		yes (just started)	?		
Confirmed taurine deficient in typical breeds								
B6			DCM	B6	not tested	yes (just started)	will recheck in 2 months	
			DCM		not tested	yes	yes	

B6

breed	visit date	sex	age	diet
PORTUGUESE WATER DOG	5/5/2017	SF	B6	Fromm Hasen Duckenpfeffer
LABRADOR CROSS	2/2/2018	CM		Supreme Source salmon meal & sweet potato receipt (salmon, pea, lentil, fava bean, sweet potato...)
SAMOYED	12/23/2015	CM		Vegan dog foods (various brands; currently Pet Guard Organic Vegan)
GOLDEN RETRIEVER	2/8/2018	CM		Holistic Select duck/rice
LABRADOR RETRIEVER	2/9/2018	CM		Canidae Pure LID Grain Free (duck/bison/wild boar) dry food or Merrick LID Grain Free (chicken, buffalo, or duck) dry f
GERMAN SHEPHERD	12/5/2015	CM		Canidae
BEAGLE CROSS	7/23/2016	CM		CA natural kangaroo/lentil
GERMAN SHORTHAIR POINTER	3/7/2017	M		Fromm various varieties (gamebird, lamb/lentil, Fromm Hasen Duckenpfeffer?)
AUSTRALIAN CATTLE DOG	4/11/2017	SF		Earthborn Holistic Meadow Feast (lamb, peas, tapioca, flaxseed)
MIX	3/21/2017	CM		Zignature kangaroo
LAB	4/2/2018	SF		Zignature kangaroo
PIT BULL	2/23/2018	CM		Purina One lamb and rice (maybe unrelated to diet but sending because of lamb)
PHAROAH HOUND	5/24/2017	F		4 Health grain free dry
PIT BULL	12/28/2015	CM		Zignature lamb
FRENCH BULLDOG	10/26/2016	CM		Zignature salmon
FRENCH BULLDOG	10/28/2016	SF		Zignature salmon
GOLDEN RETRIEVER	4/17/2015	CM		CA natural kangaroo/lentil
GOLDEN RETRIEVER	7/31/2015	SF		CA natural kangaroo/lentil
GOLDEN RETRIEVER	4/11/2018	SF		Zignature kangaroo
DOBERMAN PINSCHER	4/19/2018	CM	Blue Buffalo Basic salmon	
BOXER	7/7/2017	CM	Petcurean Go! Limited Ingredient dry, Petcurean Now Fresh, Stella & Chewy's raw patties,	

bod

From: Norris, Anne </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=891982B43D804C9396555BAF36C73DE1-ANNE.NORRIS>
To: Palmer, Lee Anne; Rotstein, David; Jones, Jennifer L; Reimschuessel, Renate; Edwards, David; Hartogensis, Martine; Burkholder, William; DeLancey, Siobhan
CC: Carey, Lauren; Lovell, Randall A; Ceric, Olgica; Nemser, Sarah; Conway, Charlotte; Atkinson, Krisztina Z; Hodges, April
Sent: 5/22/2018 1:23:46 PM
Subject: RE: 800.267-DCM and meeting with Cardiac Care for Pets

Thank you for explaining. Completely understand the sensitivity, was just curious. We can use a light touch in any preliminary communications.

From: Palmer, Lee Anne
Sent: Tuesday, May 22, 2018 9:13 AM
To: Norris, Anne <Anne.Norris@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Edwards, David <David.Edwards@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Burkholder, William <William.Burkholder@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>
Cc: Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Lovell, Randall A <Randall.Lovell@fda.hhs.gov>; Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>; Conway, Charlotte <Charlotte.Conway@fda.hhs.gov>; Atkinson, Krisztina Z <Krisztina.Atkinson@fda.hhs.gov>; Hodges, April <April.Hodges@fda.hhs.gov>
Subject: RE: 800.267-DCM and meeting with Cardiac Care for Pets

B5

From: Norris, Anne
Sent: Tuesday, May 22, 2018 8:49 AM
To: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Edwards, David <David.Edwards@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Burkholder, William <William.Burkholder@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>
Cc: Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Lovell, Randall A <Randall.Lovell@fda.hhs.gov>; Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>; Conway, Charlotte

<Charlotte.Conway@fda.hhs.gov>; Atkinson, Krisztina Z <Krisztina.Atkinson@fda.hhs.gov>; Hodges, April <April.Hodges@fda.hhs.gov>

Subject: RE: 800.267-DCM and meeting with Cardiac Care for Pets

B5

From: Palmer, Lee Anne

Sent: Tuesday, May 22, 2018 8:39 AM

To: Rotstein, David <David.Rotstein@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Edwards, David <David.Edwards@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Burkholder, William <William.Burkholder@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>

Cc: Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Lovell, Randall A <Randall.Lovell@fda.hhs.gov>; Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>; Conway, Charlotte <Charlotte.Conway@fda.hhs.gov>; Atkinson, Krisztina Z <Krisztina.Atkinson@fda.hhs.gov>; Hodges, April <April.Hodges@fda.hhs.gov>

Subject: RE: 800.267-DCM and meeting with Cardiac Care for Pets

B5

From: Rotstein, David

Sent: Tuesday, May 22, 2018 8:37 AM

To: Norris, Anne <Anne.Norris@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Edwards, David <David.Edwards@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Burkholder, William <William.Burkholder@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>

Cc: Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Lovell, Randall A <Randall.Lovell@fda.hhs.gov>; Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>; Conway, Charlotte <Charlotte.Conway@fda.hhs.gov>; Atkinson, Krisztina Z <Krisztina.Atkinson@fda.hhs.gov>; Hodges, April <April.Hodges@fda.hhs.gov>

Subject: RE: 800.267-DCM and meeting with Cardiac Care for Pets

Anne,

Agreed.

B5

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM Vet-LIRN Liaison
CVM OSC/DC/CERT
7519 Standish Place

B6

 **U.S. FOOD & DRUG
ADMINISTRATION**



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From: Norris, Anne

Sent: Tuesday, May 22, 2018 8:34 AM

To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Edwards, David <David.Edwards@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Burkholder, William <William.Burkholder@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>

Cc: Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Lovell, Randall A <Randall.Lovell@fda.hhs.gov>; Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>; Conway, Charlotte <Charlotte.Conway@fda.hhs.gov>; Atkinson, Krisztina Z <Krisztina.Atkinson@fda.hhs.gov>; Hodges, April <April.Hodges@fda.hhs.gov>

Subject: RE: 800.267-DCM and meeting with Cardiac Care for Pets

B5

From: Jones, Jennifer L

Sent: Tuesday, May 22, 2018 8:31 AM

To: Rotstein, David <David.Rotstein@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Edwards, David <David.Edwards@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Burkholder, William <William.Burkholder@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>

Cc: Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Lovell, Randall A <Randall.Lovell@fda.hhs.gov>; Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>; Conway, Charlotte <Charlotte.Conway@fda.hhs.gov>; Atkinson, Krisztina Z <Krisztina.Atkinson@fda.hhs.gov>; Hodges, April <April.Hodges@fda.hhs.gov>

Subject: RE: 800.267-DCM and meeting with Cardiac Care for Pets

B5

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



From: Rotstein, David

Sent: Tuesday, May 22, 2018 8:25 AM

To: Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Edwards, David <David.Edwards@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Burkholder, William <William.Burkholder@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>

Cc: Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Lovell, Randall A <Randall.Lovell@fda.hhs.gov>; Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>; Conway, Charlotte <Charlotte.Conway@fda.hhs.gov>; Atkinson, Krisztina Z

<Krisztina.Atkinson@fda.hhs.gov>; Hodges, April <April.Hodges@fda.hhs.gov>

Subject: RE: 800.267-DCM and meeting with Cardiac Care for Pets

B5

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM Vet-LIRN Liaison
CVM OSC/DC/CERT
7519 Standish Place

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From: Reimschuessel, Renate

Sent: Tuesday, May 22, 2018 8:18 AM

To: Edwards, David <David.Edwards@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Burkholder, William

<William.Burkholder@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>

Cc: Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Lovell, Randall A <Randall.Lovell@fda.hhs.gov>; Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah

<Sarah.Nemser@fda.hhs.gov>; Conway, Charlotte <Charlotte.Conway@fda.hhs.gov>; Atkinson, Krisztina Z <Krisztina.Atkinson@fda.hhs.gov>; Hodges, April <April.Hodges@fda.hhs.gov>

Subject: RE: 800.267-DCM and meeting with Cardiac Care for Pets

B5

B5

Just some food for thought... rr

Renate Reimschuessel V.M.D. Ph.D. Vet-LIRN

Phone 1-240-402-5404

Fax 301-210-4685

<http://www.fda.gov/AnimalVeterinary/ScienceResearch/ucm247334.htm>

From: Edwards, David

Sent: Tuesday, May 22, 2018 7:54 AM

To: Rotstein, David <David.Rotstein@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Burkholder, William <William.Burkholder@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>

Cc: Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Lovell, Randall A <Randall.Lovell@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>; Conway, Charlotte <Charlotte.Conway@fda.hhs.gov>; Atkinson, Krisztina Z <Krisztina.Atkinson@fda.hhs.gov>; Hodges, April <April.Hodges@fda.hhs.gov>

Subject: RE: 800.267-DCM and meetign with Cardiac Care for Pets

Hi everyone,

B5

Thanks,
Dave

From: Rotstein, David

Sent: Monday, May 21, 2018 7:49 AM

To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Burkholder, William <William.Burkholder@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>

Cc: Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Lovell, Randall A

<Randall.Lovell@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>; Conway, Charlotte <Charlotte.Conway@fda.hhs.gov>; Edwards, David <David.Edwards@fda.hhs.gov>; Atkinson, Krisztina Z <Krisztina.Atkinson@fda.hhs.gov>; Hodges, April <April.Hodges@fda.hhs.gov>
Subject: RE: 800.267-DCM and meetign with Cardiac Care for Pets

B5

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM Vet-LIRN Liaison
CVM OSC/DC/CERT
7519 Standish Place

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From: Hartogenesis, Martine
Sent: Monday, May 21, 2018 7:47 AM
To: Burkholder, William <William.Burkholder@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>
Cc: Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Lovell, Randall A <Randall.Lovell@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>; Conway, Charlotte <Charlotte.Conway@fda.hhs.gov>; Edwards, David <David.Edwards@fda.hhs.gov>; Atkinson, Krisztina Z <Krisztina.Atkinson@fda.hhs.gov>
Subject: RE: 800.267-DCM and meetign with Cardiac Care for Pets

Thanks Bill and your concerns are noted!

B5

Thank you all for your help and dedication to this fascinating issue!

Martine

From: Burkholder, William

Sent: Friday, May 18, 2018 5:04 PM

To: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>

Cc: Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Lovell, Randall A <Randall.Lovell@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>; Conway, Charlotte <Charlotte.Conway@fda.hhs.gov>; Edwards, David <David.Edwards@fda.hhs.gov>; Atkinson, Krisztina Z <Krisztina.Atkinson@fda.hhs.gov>

Subject: RE: 800.267-DCM and meetign with Cardiac Care for Pets

B5

Bill

What Socrates is really supposed to have said: "The only true wisdom is in knowing that you know nothing."

From: Palmer, Lee Anne

Sent: Friday, May 18, 2018 2:09 PM

To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>

Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Lovell, Randall A <Randall.Lovell@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>

Subject: RE: 800.267-DCM and meetign with Cardiac Care for Pets

B5

Lee Anne

From: Jones, Jennifer L

Sent: Friday, May 18, 2018 1:54 PM

To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>

Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Lovell, Randall A <Randall.Lovell@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>

Subject: RE: 800.267-DCM and meetign with Cardiac Care for Pets

B5

Any other ideas or suggestions?

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



From: Hartogensis, Martine

Sent: Friday, May 18, 2018 11:58 AM

To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>

Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Lovell, Randall A <Randall.Lovell@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>

Subject: RE: 800.267-DCM and meetign with Cardiac Care for Pets

Thank you Jen! Sounds good and looking forward to the meeting.

Martine

From: Jones, Jennifer L

Sent: Friday, May 18, 2018 6:42 AM

To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>

Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>;

Norris, Anne <Anne.Norris@fda.hhs.gov>; Lovell, Randall A <Randall.Lovell@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>

Subject: RE: 800.267-DCM and meetign with Cardiac Care for Pets

CVCA is not a part of Vet-LIRN

B5

B5

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



From: Hartogenesis, Martine

Sent: Thursday, May 17, 2018 7:52 PM

To: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>

Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Lovell, Randall A <Randall.Lovell@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>

Subject: RE: 800.267-DCM and meetign with Cardiac Care for Pets

Yes, excellent work!

B5

they part of VET-LIRN?

Thanks in advance!

Martine

From: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>

Date: May 17, 2018 at 2:27:35 PM EDT

To: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>, Hartogenesis, Martine <Martine.Hartogenesis@fda.hhs.gov>, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>, Rotstein, David <David.Rotstein@fda.hhs.gov>

Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>, Carey, Lauren <Lauren.Carey@fda.hhs.gov>, Norris, Anne <Anne.Norris@fda.hhs.gov>, Lovell, Randall A <Randall.Lovell@fda.hhs.gov>, Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>, Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>, Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>

Subject: RE: 800.267-DCM and meetign with Cardiac Care for Pets

B4, B5

From: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>

Date: May 17, 2018 at 2:14:48 PM EDT

To: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>, Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>, Rotstein, David <David.Rotstein@fda.hhs.gov>

Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>, Carey, Lauren <Lauren.Carey@fda.hhs.gov>, Norris, Anne <Anne.Norris@fda.hhs.gov>, Lovell, Randall A <Randall.Lovell@fda.hhs.gov>, Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>, Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>, Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>

Subject: RE: 800.267-DCM and meetign with Cardiac Care for Pets

Hah! Perfect timing! We're all heading down the same path...

From: DeLancey, Siobhan

Sent: Thursday, May 17, 2018 2:13 PM

To: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>

Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Lovell, Randall A <Randall.Lovell@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>

Subject: RE: 800.267-DCM and meetign with Cardiac Care for Pets

As luck would have it, I'm at CE today listening to B6 talk about nutrition and cardiomyopathies. See attached slide.

From: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>

Date: May 17, 2018 at 2:06:04 PM EDT

To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>, Rotstein, David <David.Rotstein@fda.hhs.gov>

Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>, Carey, Lauren <Lauren.Carey@fda.hhs.gov>, Norris, Anne <Anne.Norris@fda.hhs.gov>, DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>, Lovell, Randall A <Randall.Lovell@fda.hhs.gov>, Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>, Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>, Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>

Subject: RE: 800.267-DCM and meetign with Cardiac Care for Pets

B5

B5

From: Hartogenesis, Martine

Sent: Thursday, May 17, 2018 11:59 AM

To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>

Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Lovell, Randall A <Randall.Lovell@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>

Subject: RE: 800.267-DCM and meetign with Cardiac Care for Pets

Excellent work Jen!!

B5

Martine

From: Jones, Jennifer L

Sent: Thursday, May 17, 2018 11:29 AM

To: Rotstein, David <David.Rotstein@fda.hhs.gov>; Hartogenesis, Martine <Martine.Hartogenesis@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>

Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Lovell, Randall A <Randall.Lovell@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>
Subject: RE: 800.267-DCM and meetign with Cardiac Care for Pets

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Please see the PPT for the rationale/summary

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



From: Rotstein, David
Sent: Monday, May 14, 2018 10:22 AM
To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Lovell, Randall A <Randall.Lovell@fda.hhs.gov>
Subject: RE: DCM and meetign with Cardiac Care for Pets

B5

From: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>
Date: May 14, 2018 at 9:09:17 AM EDT
To: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>, Rotstein, David <David.Rotstein@fda.hhs.gov>, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>, Carey, Lauren <Lauren.Carey@fda.hhs.gov>, Norris, Anne <Anne.Norris@fda.hhs.gov>, DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>, Lovell, Randall A <Randall.Lovell@fda.hhs.gov>
Subject: RE: DCM and meetign with Cardiac Care for Pets

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Martine

From: Palmer, Lee Anne
Sent: Friday, May 11, 2018 4:30 PM
To: Rotstein, David <David.Rotstein@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>;

Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Lovell, Randall A <Randall.Lovell@fda.hhs.gov>

Subject: RE: DCM and meetign with Cardiac Care for Pets

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From: Rotstein, David

Sent: Friday, May 11, 2018 4:14 PM

To: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>

Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Lovell, Randall A <Randall.Lovell@fda.hhs.gov>

Subject: RE: DCM and meetign with Cardiac Care for Pets

Lee Anne,

B5

From: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>

Date: May 11, 2018 at 4:06:05 PM EDT

To: Rotstein, David <David.Rotstein@fda.hhs.gov>, Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>

Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>, Carey, Lauren <Lauren.Carey@fda.hhs.gov>, Norris, Anne <Anne.Norris@fda.hhs.gov>, DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>, Lovell, Randall A <Randall.Lovell@fda.hhs.gov>

Subject: RE: DCM and meetign with Cardiac Care for Pets

B5

B5

From: Rotstein, David
Sent: Wednesday, May 9, 2018 4:13 PM
To: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Hartogenesis, Martine <Martine.Hartogenesis@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>
Subject: RE: DCM and meetign with Cardiac Care for Pets

Sounds very intriguing!!!

From: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>
Date: May 9, 2018 at 4:09:18 PM EDT
To: Hartogenesis, Martine <Martine.Hartogenesis@fda.hhs.gov>, Rotstein, David <David.Rotstein@fda.hhs.gov>, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>, Carey, Lauren <Lauren.Carey@fda.hhs.gov>, Norris, Anne <Anne.Norris@fda.hhs.gov>, DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>
Subject: RE: DCM and meetign with Cardiac Care for Pets

B5

From: Hartogenesis, Martine
Sent: Wednesday, May 9, 2018 2:17 PM

To: Rotstein, David <David.Rotstein@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>
Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>
Subject: RE: DCM and meetign with Cardiac Care for Pets

Awesome, thank you Dave!

Martine

From: Rotstein, David
Sent: Wednesday, May 09, 2018 2:06 PM
To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>
Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>
Subject: RE: DCM and meetign with Cardiac Care for Pets

Good Afternoon,

I spoke with [B6] @ Cardiac Care for Pets. He is going to look into times/dates with the cardiologists there and we can set the meeting up from that point.

Just some basic information:

B5

As a side note, there is a facebook page dedicated to this issue:

<https://www.facebook.com/groups/1952593284998859/about/>

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM Vet-LIRN Liaison
CVM OSC/DC/CERT
7519 Standish Place
[B6]



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From: Hartogensis, Martine
Sent: Tuesday, May 08, 2018 10:58 AM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>

Subject: RE: DCM

Thank you Jen and Dave! Very interesting and sounds like you all are on it!

B6

B6

B6

Keep us posted!

Thanks again!

Martine

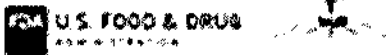
Hi Martine,

B5

I'm happy to share more info as needed.

Jen

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



From: Rotstein, David
Sent: Tuesday, May 08, 2018 9:45 AM
To: Hartogenesis, Martine <Martine.Hartogenesis@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Subject: RE: DCM

Martine,

B5

B5

B5

Looping in Jen.

Thanks for the update!

dave

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM Vet-LIRN Liaison
CVM OSC/DC/CERT
7519 Standish Place

B6



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From: Hartogensis, Martine
Sent: Tuesday, May 08, 2018 9:00 AM
To: Rotstein, David <David.Rotstein@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>
Subject: RE: DCM

B5

I was at DC Academy last week and spoke with a cardiology resident. They have been seeing DCM cases for the past 3 months and are considering writing up a paper. They are thinking the

B5

B5

B5

Martine

From: Rotstein, David
Sent: Monday, May 07, 2018 1:13 PM
To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>
Subject: Re: DCM

Martine

Lee Anne will likely discuss at OSC **B5** But it does look like there is a relationship between the increased DCM reports and grain free diets.

B5

There's a way to go on this moving forward.

Dave

From: Hartogenesis, Martine <Martine.Hartogenesis@fda.hhs.gov>
Date: May 7, 2018 at 1:03:13 PM EDT
To: Rotstein, David <David.Rotstein@fda.hhs.gov>
Subject: DCM

Hi Dave!


Do you have any more details on the DCM and grain free diet issue?

Martine

800.267
Grain free
versus
Non Grain Free Foods

Jones
Vet-LIRN


Grain Free products w/ reported DCM



Product Name	Grain free?	Species	Tau (%)
B4	Yes	Canine	0.26
	Yes	Canine	0.11
	Yes	Canine	0.14
	Yes	Canine	0.12
	Yes	Canine	0.2
	Yes	Canine	0.051
	Yes	Canine	0.25

- 6/7 products with sufficient Taurine levels
- Only 1 product— **B4** was low in Taurine
 - Feline AAFCO minimum Tau is 0.1% for extruded foods
 - No AAFCO minimum for dogs
 - Dog in this case had low Whole blood Tau
- Taurine is conditionally essential in dogs, because they can synthesize it from Cystine and Methionine.

Grain Free products w/ reported DCM



Product Name	Grain free?	Species	Tau (%)	Cys (%)	Met (%)	Met-Cys (%)
B4	Yes	Canine	0.26	0.26	0.64	0.9
	Yes	Canine	0.11	0.26	0.61	0.87
	Yes	Canine	0.14	0.28	0.86	1.14
	Yes	Canine	0.12	0.36	0.69	1.05
	Yes	Canine	0.2	0.34	0.51	0.85
	Yes	Canine	0.051	0.33	0.4	0.73
	Yes	Canine	0.25	0.38	0.7	1.08
				AAFCO min:	0.33 to 0.35 %	0.65 to 0.7%

- All Grain Free Products contain Methionine and Methionine-Cystine % within the AAFCO requirements.
 - There is no AAFCO requirement for Cystine %
- The **B4** had the lowest Met and Met-Cys content, but it was still above AAFCO requirements (highlighted)
- The **B4** had the lowest Cys content (highlighted).

Non Grain Free Products w/o reported DCM

Product Name	Grain free?	Species	Tau (%)	Cys (%)	Met (%)	Met-Cys (%)
B4	No	Canine	0.22	0.32	0.66	0.98
	No	Canine	0.11	0.3	0.57	0.87
	No	Canine	0.11	0.3	0.6	0.9
	No	Canine	0.11	0.31	0.58	0.89
	No	Canine	0.12	0.32	0.65	0.97
	No	Both	0.19	0.46	0.6	1.06
	No	Feline	0.24	0.42	0.78	1.2
	No	Feline	0.24	0.5	0.94	1.44

- In non-GF foods, the Taurine, Met, and Met-Cys levels were above AAFCO minimums.
 - Similar to Grain free foods.

Grain Free vs. Non Grain Free

Product Name	Tau (%)	Cys (%)	Met (%)	Met-Cys (%)
Avg All GF foods	0.16	0.32	0.63	0.95
Avg All Non-GF Dog foods	0.14	0.34	0.61	0.95
Avg All Non-GF Cat Foods	0.22	0.46	0.77	1.23

- Average Tau, Cys, Met, and Met-Cys content in Grain Free dog foods is similar to the non-GF dog foods.
- The *non-GF cat foods* tend to have higher average levels, because they have greater minimum AAFCO requirements.

Overall Comparison

Grain free?	Species	Tau (%)	Cys (%)	Met (%)	Met-Cys (%)
Yes	Canine	0.26	0.26	0.64	0.9
Yes	Canine	0.11	0.26	0.61	0.87
Yes	Canine	0.14	0.28	0.86	1.14
Yes	Canine	0.12	0.36	0.69	1.05
Yes	Canine	0.2	0.24	0.51	0.85
Yes	Canine	0.051	0.33	0.4	0.73
Yes	Canine	0.25	0.38	0.7	1.08
No	Canine	0.22	0.32	0.66	0.98
No	Canine	0.11	0.3	0.57	0.87
No	Canine	0.11	0.3	0.6	0.9
No	Canine	0.11	0.31	0.58	0.89
No	Canine	0.12	0.32	0.85	0.97
No	Both	0.19	0.46	0.6	1.06
No	Feline	0.24	0.42	0.78	1.2
No	Feline	0.24	0.5	0.94	1.44

B4

Because the Grain free and Non-GF foods have a similar Tau, Cys, Met, and Met-Cys content, we can look closely at **B4**

It has adequate Met and Met-Cys levels, which should enable a dog to make adequate Tau, without needing Tau in the food.

However, the dog eating this diet had low Whole blood Tau.

Ingredient comparison

B4

Tau (%)	Cys (%)	Met (%)	Met-Cys (%)	Dog Tau level	Tau added to product?	Cys or Met added to product?	# Legume Sources	Names (place in Ingredient list)
0.26	0.26	0.64	0.9	wilt (2)	No	Met	4	red lentils (2), green lentils (5), peas (4), pea fiber (7)
0.11	0.26	0.61	0.67	storebought	No	Met	4	red lentils (2), green lentils (5), peas (4), pea fiber (7)
0.14	0.28	0.86	1.14	292 (whl)	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
0.12	0.36	0.69	1.05	unknown	No	No	0	
0.2	0.34	0.53	0.85	unknown	Yes	Met	4	peas (3), lentils (4), chickpeas (5), pea flour (14)
0.25	0.38	0.7	1.08	unknown	Yes	Met	1	peas (4)
0.25	0.38	0.7	1.08	unknown	Yes	Met	1	peas (5), chickpeas (4), pea flour (5), red lentils (5), green lentils (5), pea fiber (11)
0.22	0.32	0.68	0.98	unknown	Yes	No	1	pea fiber (6)
0.11	0.3	0.57	0.87		No	Met	0	
0.11	0.3	0.6	0.9		No	Met	0	
0.11	0.31	0.58	0.89		No	Met	1	green peas (22)
0.12	0.32	0.65	0.97		No	Met	1	green peas (20)
0.19	0.46	0.6	1.06		Yes	No	2	pea protein (5), peas (9)

- Other products (stars) with normal Met and Met-Cys % and are not supplemented with Met in the ingredients like the **B4** (red box). The non GF diet **B4** had a comparable # legume sources, but its only legume source was low on the ingredient list and contained less legume sources than the **B4** respectively.
- The **B4** product contains Brown Rice and Rice, so isn't grain free. But the dog in this case had DCM. Not much is known about the case.
- If the Met-Cys and Met % are normal, then something is causing the **B4** dog's low blood Tau. Are there problems with nutrient uptake b/c of the amount and/or number of legumes in the product?

Ingredient comparison

Product Name	Tau (%)	Cys (%)	Met (%)	Met-Cys (%)	Dog Tau level	Tau added to product?	Cys or Met added to product?	# Legume Sources	Names (place in ingredient list)
B4	0.26	0.26	0.64	0.9	wnl (2)	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
	0.11	0.26	0.61	0.87	storebought	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
	0.14	0.28	0.86	1.14	292 (wnl)	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
	0.12	0.36	0.69	1.05	unknown	No	★ No	0	
	0.2	0.34	0.51	0.85	unknown	Yes	★ Met	4	peas (3), lentils (4), chickpeas (5), pea flour (14)
	0.25	0.38	0.7	1.08	unknown	Yes	★ No	1	peas (4)
	0.051	0.33	0.4	0.73	low	No	★ No	6	peas (3), chickpeas (4), pea flour (5), red lentils (8), green lentils (9), pea protein (11), pea fiber (20)
	0.22	0.32	0.66	0.98		Yes	★ No	1	pea fiber (20)
	0.11	0.3	0.57	0.87		No	Met	0	
	0.11	0.3	0.6	0.9		No	Met	0	
	0.11	0.31	0.58	0.89		No	Met	1	green peas (22)
	0.12	0.32	0.65	0.97		No	Met	1	green peas (20)
	0.19	0.46	0.6	1.06		Yes	No	2	pea protein (5), peas (9)

B4 product may be a red herring/separate issue or a clue about how the legume may affect the product

NCSU ACVIM Abstract-Dr. Adin

Methods: *retrospective evaluation* of dogs diagnosed with DCM who had diet recorded in the last 2 years. Dogs were lumped into Grain-free (further subdivided into California naturals and other) and Non-Grain free diets

Results: *22 dogs ate grain free* (10; **B4** of these were Kangaroo and Lentil).

Taurine testing in 11 of these dogs did not show deficiency - carnitine testing in 4 did not show deficiency. Two sets of unrelated housemates were in this group.

-27 dogs ate non-grain free. Taurine testing in 11 of these and 5 were deficient (3 ate vegetarian diets)

- Dogs eating **B4** weighed less than the other groups (I interpret this to mean they are not the typical large breed DCM dog- 23 vs 35 kg P=0.03).

- Dogs eating **B4** had bigger hearts in diastole and systole and a more spherical heart than 1) dogs eating other grain free diets and 2) dogs eating nongrain free diets (all statistically significant).

- Dogs eating Grain free diets as a group had bigger hearts in diastole and systole and more spherical hearts on echo than dogs eating nongrain free diets (all statistically significant)

- presence of CHF was not different between groups

NCSU ACVIM Abstract-Dr. Adin

Methods: *retrospective evaluation* of dogs diagnosed with DCM who had diet recorded in the last 2 years. Dogs were lumped into Grain-free (further subdivided into Lentil, Chickpea, and other legumes) and Nongrain-free (other groups) groups. Dogs were further divided into 23 vs 35 kg groups. Dogs eating a more grain-free diet were (all statistically significant).

Results: BLUF: Taurine WNL for 11 of 27 dogs on GF diets with DCM

Taurine: did not differ between groups. 15 were deficient.

WB taurine is only a snapshot of the content. Paired plasma and WB are better indicators of overall body Tau content.

(I interquartile range) P=0.03

spherical hearts on echo than dogs eating nongrain free diets (all statistically significant)

- Dogs eating Grain free diets as a group had bigger hearts in diastole and systole and more spherical hearts on echo than dogs eating nongrain free diets (all statistically significant)
- presence of CHF was not different between groups

Call with Cardiologists

Since the abstract:

- Dr. Adin has seen 36 DCM dogs on Grain Free diets.
- Taurine in 18 dogs was WNL.
 - The majority were supplemented.
- 7 were rechecked and *all* showed some improvement with *diet change.*
 - 1/7 not supplemented, only diet change:
 - not much echo change at 3 months but at 9 months had improved echo parameters.
 - 1/7 was changed to a **B4** Grain Free diet and had similar improvement to the dogs with diet change and Taurine supplementation at 3 months.

Call with Cardiologists

Since the abstract:

- Dr. Adin has seen 26 DCM dogs on Grain Free diets
- Tau BLUF: Taurine is normal in the dogs checked, but they may improve faster with Tau supplementation and diet change. with
- 7 w die
 - not much echo change at 3 months but at 9 months had improved echo parameters.
- 1/7 was changed to a **B4** Grain Free diet and had similar improvement to the dogs with diet change and Taurine supplementation at 3 months.

GF Diet Ingredient comparison

Product Name	Dog Tau level	Tau added to product?	Cys or Met added to product?	# Legume Sources	Names (place in ingredient list)
B4	wml (2)	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
	storebought	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
	292 (wml)	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
	unknown	No	No	0	
	unknown	Yes	Met	4	peas (3), lentils (4), chickpeas (5), pea flour (14)
	unknown	Yes	No	1	peas (4)
		No	No	6	peas (3), chickpeas (4), pea flour (5), red lentils (6), green lentils (9), pea protein (11)
		Yes	No	1	pea fiber (10)
		No	Met	0	
		No	Met	0	
		No	Met	1	green peas (22)
		No	Met	1	green peas (20)
		Yes	No	2	pea protein (5), peas (9)
		Yes	No	1	dried ground peas (12)
		Yes	No	0	

- Should we be looking at other dietary causes of DCM, whose GI uptake may be affected by these legume sources?
 - *Untested*: Thiamine, choline, erucic acid, vitamin E*, Polyunsaturated fatty acids*
 - Tested: Ca, Mg, P, Fe, Co, Cu, Zn, Se, Tau, Cys, Met, Iodine

*Courtesy Randall Lovell

GF Diet Ingredient comparison

B4

Dog Tau level	Tau added to product?	Cys or Met added to product?	# Legume Sources	Names (place in ingredient list)
wnl (2)	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
storebought	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
292 (wnl)	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
unknown	No	No	0	
unknown	Yes	Met	4	peas (3), lentils (4), chickpeas (5), pea flour (14)
unknown	Yes	No	1	peas (4)
BLUF	No	No	0	peas (3), chickpeas (4), pea flour (5), red lentils (8), green lentils (9), pea protein (11)
	Yes	No	1	pea fiber (10)
	No	Met	0	
	No	Met	0	
	No	Met	1	green peas (22)
	No	Met	1	green peas (20)
	Yes	No	2	pea protein (5), peas (9)
	Yes	No	1	dried ground peas (12)
	Yes	No	0	

BLUF: Grain Free diets have many more legume species and legume sources closer to the beginning of the ingredient list than Non-GF diets.

Questions

- Are there properties to these legumes affecting Cys or Met uptake or Tau synthesis in dogs causing DCM?

Grain free
versus
Non Grain Free Foods

Jones
Vet-LIRN

Grain Free products w/ reported DCM

Product	Grain Free?	Tau (%)
Product A	Yes	0.26
Product A	Yes	0.11
Product A	Yes	0.14
Product B	Yes	0.12
Product C	Yes	0.2
Product D	Yes	0.051
Product E	Yes	0.25

- 6/7 GF products with sufficient Taurine levels
- Only 1 product was low in Taurine
 - Feline AAFCO minimum Tau is 0.1% for extruded foods
 - No AAFCO minimum for dogs
 - Dog in this case had low Whole blood Tau
- Taurine is conditionally essential in dogs, because they can synthesize it from Cystine and Methionine.

Grain Free products w/ reported DCM

Product	Grain free?	Tau (%)	Cys (%)	Met (%)	Met-Cys (%)
Product A	Yes	0.26	0.26	0.64	0.9
Product A	Yes	0.11	0.26	0.61	0.87
Product A	Yes	0.14	0.28	0.86	1.14
Product B	Yes	0.12	0.36	0.69	1.05
Product C	Yes	0.2	0.34	0.51	0.85
Product D	Yes	0.051	0.33	0.4	0.73
Product E	Yes	0.25	0.38	0.7	1.08

AAFCO min: 0.33 to 0.35 % 0.65 to 0.7%

- All Grain Free Products contain Methionine and Methionine-Cystine % within the AAFCO requirements.
 - There is no AAFCO requirement for Cystine %
- The low Tau product had the lowest Met and Met-Cys content, but it was still above AAFCO requirements (highlighted)
- One product had the lowest Cys content (highlighted).

Non Grain Free Products w/o reported DCM

Product	Grain free?	Species	Tau (%)	Cys (%)	Met (%)	Met-Cys (%)
Product F	No	Canine	0.22	0.32	0.66	0.98
Product G	No	Canine	0.11	0.3	0.57	0.87
Product G	No	Canine	0.11	0.3	0.6	0.9
Product H	No	Canine	0.11	0.31	0.58	0.89
Product I	No	Canine	0.12	0.32	0.65	0.97
Product J	No	Both	0.19	0.46	0.6	1.06
Product K	No	Feline	0.24	0.42	0.78	1.2
Product L	No	Feline	0.24	0.5	0.94	1.44

- In non-GF foods, the Taurine, Met, and Met-Cys levels were above AAFCO minimums.
 - Similar to Grain free foods.

Grain Free vs. Non Grain Free

Product Name	Tau (%)	Cys (%)	Met (%)	Met-Cys (%)
Avg All GF foods	0.16	0.32	0.63	0.95
Avg All Non-GF Dog foods	0.14	0.34	0.61	0.95
Avg All Non-GF Cat Foods	0.22	0.46	0.77	1.23

- Average Tau, Cys, Met, and Met-Cys content in Grain Free dog foods is similar to the non-GF dog foods.
- The *non-GF cat foods* tend to have higher average levels, because they have greater minimum AAFCO requirements.

Overall Comparison

Product	Grain Free?	Species	Tau (%)	Cys (%)	Met (%)	Met-Cys (%)
Product A	Yes	Canine	0.26	0.26	0.64	0.9
Product A	Yes	Canine	0.11	0.26	0.61	0.87
Product A	Yes	Canine	0.14	0.28	0.86	1.14
Product B	Yes	Canine	0.12	0.36	0.69	1.05
Product C	Yes	Canine	0.2	0.34	0.51	0.85
Product D	Yes	Canine	0.051	0.33	0.4	0.73
Product E	Yes	Canine	0.19	0.38	0.7	1.08
Product F	No	Canine	0.22	0.32	0.66	0.98
Product G	No	Canine	0.11	0.3	0.57	0.87
Product G	No	Canine	0.11	0.3	0.6	0.9
Product H	No	Canine	0.11	0.31	0.58	0.89
Product I	No	Canine	0.12	0.32	0.65	0.97
Product J	No	Both	0.19	0.46	0.6	1.06
Product K	No	Feline	0.24	0.42	0.78	1.2
Product L	No	Feline	0.24	0.5	0.94	1.44

- Because the Grain free and Non-GF foods have a similar Tau, Cys, Met, and Met-Cys content, we can look closely at one product.
- It has adequate Met and Met-Cys levels, which should enable a dog to make adequate Tau, without needing Tau in the food.
- However, the dog eating this diet had low Whole blood Tau.

Ingredient comparison

Product	Grain free?	Species	Tau (%)	Cys (%)	Met (%)	Met-Cys (%)	Dog Tau level	Tau added to product?	Cys or Met added to product?	# Legume Sources	Names (piece in ingredient list)
Product A	Yes	Canine	0.26	0.26	0.64	0.9	wnl (2)	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
Product A	Yes	Canine	0.11	0.26	0.61	0.87	storebought	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
Product A	Yes	Canine	0.14	0.28	0.96	1.14	292 (wnl)	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
Product B	Yes	Canine	0.12	0.36	0.69	1.05	unknown	No	★	0	
Product C	Yes	Canine	0.2	0.34	0.51	0.85	unknown	Yes	Met	4	peas (3), lentils (4), chickpeas (5), pea flour (14)
Product D	Yes	Canine	0.25	0.38	0.7	1.08	unknown	Yes	★	1	peas (4)
Product E	Yes	Canine	0.07	0.38	0.6	0.77	low	No	★	0	peas (3), chickpeas (4), pea flour (5), red lentils (8), green lentils (9), pea protein (11)
Product F	No	Canine	0.22	0.32	0.66	0.88	low	No	★	0	pea fiber (20)
Product G	No	Canine	0.11	0.3	0.57	0.87		No	Met	0	
Product H	No	Canine	0.11	0.31	0.58	0.89		No	Met	1	green peas (22)
Product I	No	Canine	0.12	0.32	0.65	0.87		No	Met	1	green peas (20)
Product J	No	Both	0.19	0.46	0.6	1.06		Yes	No	2	pea protein (5), peas (9)
Product K	No	Feline	0.14	0.42	0.78	1.2		Yes	No	1	dried ground peas (7)
Product L	No	Feline	0.14	0.5	0.94	1.44		Yes	No	0	

- Other products (stars) with normal Met and Met-Cys % and are not supplemented with Met in the ingredients, like the low Tau product (red box). The non GF diet had a comparable # legume sources, but its only legume source was low on the ingredient list and contained less legume sources than the other starred GF products, respectively.
- The first starred product contains Brown Rice and Rice, so isn't grain free. But the dog in this case had DCM. Not much is known about the case.
- If the Met-Cys and Met % are normal, then something is causing the red box dog's low blood Tau. Are there problems with nutrient uptake b/c of the amount and/or number of legumes in the product?

Ingredient comparison

Product	Grain free?	Species	Tau (%)	Cys (%)	Met (%)	Met-Cys (%)	Dog Tau level	Tau added to product?	Cys or Met added to product?	# Legume Sources	Names (place in ingredient list)
Product A	Yes	Canine	0.26	0.26	0.64	0.9	wnl (2)	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
Product A	Yes	Canine	0.11	0.26	0.61	0.87	storebought	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
Product A	Yes	Canine	0.14	0.28	0.86	1.14	292 (wnl)	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
Product B	Yes	Canine	0.12	0.36	0.69	1.05	unknown	No	★ No	0	
Product C	Yes	Canine	0.2	0.34	0.51	0.85	unknown	Yes	★ Met	4	peas (3), lentils (4), chickpeas (5), pea flour (14)
Product D	Yes	Canine	0.25	0.38	0.7	1.08	unknown	Yes	★ No	1	peas (4)
Product E	Yes	Canine	0.051	0.33	0.4	0.73	Low	No	★ No	6	peas (3), chickpeas (4), pea flour (5), red lentils (8), green lentils (9), pea protein (11)
Product F	No	Canine	0.22	0.32	0.66	0.98		Yes	★ No	1	pea fiber (10)
Product G	No	Canine	0.11	0.3	0.57	0.87		No	Met	0	
Product H	No	Canine	0.11	0.3	0.6	0.9		No	Met	0	
Product I	No	Canine	0.11	0.31	0.58	0.89		No	Met	1	green peas (22)
Product J	No	Canine	0.12	0.32	0.65	0.97		No	Met	1	green peas (2C)
Product J	No	Both	0.19	0.46	0.6	1.06		Yes	No	2	pea protein (5), peas (9)
Product K	No	Feline	0.24	0.42	0.78	1.2		Yes	No	1	dried ground peas (12)
Product L	No	Feline	0.24	0.5	0.94	1.44		Yes	No	0	

The low Tau product may be a red herring/separate issue or a clue about how the legume may affect the product

NCSU ACVIM Abstract-Dr. Adin

Methods: *retrospective evaluation* of dogs diagnosed with DCM who had diet recorded in the last 2 years. Dogs were lumped into Grain-free (further subdivided into Brand XXXX and other) and Non-Grain free diets

Results: *-22 dogs ate grain free* (10 Brand XXXX, 7 of these were Kangaroo and Lentil). *Taurine testing in 11 of these dogs did not show deficiency* - carnitine testing in 4 did not show deficiency. Two sets of unrelated housemates were in this group.

-27 dogs ate non-grain free. Taurine testing in 11 of these and *5 were deficient (3 ate vegetarian diets)*

- Dogs eating Brand XXXX weighed less than the other groups (I interpret this to mean they are not the typical large breed DCM dog- 23 vs 35 kg P=0.03).

- Dogs eating Brand XXXX had bigger hearts in diastole and systole and a more spherical heart than 1) dogs eating other grain free diets and 2) dogs eating nongrain free diets (all statistically significant).

- Dogs eating Grain free diets as a group had bigger hearts in diastole and systole and more spherical hearts on echo than dogs eating nongrain free diets (all statistically significant)

- presence of CHF was not different between groups

NCSU ACVIM Abstract-Dr. Adin

Methods: *retrospective evaluation* of dogs diagnosed with DCM who had diet recorded in the last 2 years. Dogs were lumped into Grain-free (further

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Results:

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BLUF: Taurine WNL for 11 of 11 dogs tested on GF diets with DCM

WB taurine is only a snapshot of the content. Paired plasma and WB are better indicators of overall body Tau content.

- Dogs eating Grain free diets as a group had bigger hearts in diastole and systole and more spherical hearts on echo than dogs eating nongrain free diets (all statistically significant)

- presence of CHF was not different between groups

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dogs eating

Call with Cardiologists

Since the abstract:

- Dr. Adin has seen 36 DCM dogs on Grain Free diets.
- Taurine in 18 dogs was WNL.
 - The majority were supplemented.
- 7 were rechecked and *all* showed some improvement with *diet change*.
 - 1/7 not supplemented, only diet change:
 - not much echo change at 3 months but at 9 months had improved echo parameters.
 - 1/7 was changed to a Large Manufacturer Grain Free diet and had similar improvement to the dogs with diet change and Taurine supplementation at 3 months.

Call with Cardiologists

Since the abstract:

- Dr. Adin has seen 36 DCM dogs on Grain Free diets.
- Taurine levels were checked, but they may improve faster with Tau supplementation and diet change.
- 7 weeks with diet change had improved echo parameters.
- 1/7 was changed to a Large Manufacturer Grain Free diet and had similar improvement to the dogs with diet change and Taurine supplementation at 3 months.

GF Diet Ingredient comparison

Product	Grain free?	Species	Tau (%)	Cys (%)	Met (%)	Met-Cys (%)	Dog Tau level	Tau added to product?	Cys or Met added to product?	# Legume Sources	Names (place in ingredient list)
Product A	Yes	Canine	0.26	0.26	0.64	0.9	wnl (2)	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
Product A	Yes	Canine	0.11	0.26	0.61	0.87	storebought	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
Product A	Yes	Canine	0.14	0.28	0.86	1.14	292 (wnl)	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
Product B	Yes	Canine	0.12	0.36	0.69	1.05	unknown	No	No	0	
Product C	Yes	Canine	0.2	0.34	0.51	0.85	unknown	Yes	Met	4	peas (3), lentils (4), chickpeas (5), pea flour (14)
Product D	Yes	Canine	0.25	0.38	0.7	1.08	unknown	Yes	No	1	peas (4)
Product E	Yes	Canine	0.051	0.33	0.4	0.73	Low	No	No	6	peas (3), chickpeas (4), pea flour (5), red lentils (8), green lentils (9), pea protein (11)
Product F	No	Canine	0.22	0.32	0.66	0.98		Yes	No	1	pea fiber (10)
Product G	No	Canine	0.11	0.3	0.57	0.87		No	Met	0	
Product G	No	Canine	0.11	0.3	0.6	0.9		No	Met	0	
Product H	No	Canine	0.11	0.31	0.58	0.89		No	Met	1	green peas (22)
Product I	No	Canine	0.12	0.32	0.65	0.97		No	Met	1	green peas (20)
Product J	No	Both	0.19	0.46	0.6	1.06		Yes	No	2	pea protein (5), peas (9)
Product K	No	Feline	0.24	0.42	0.78	1.2		Yes	No	1	dried ground peas (12)
Product L	No	Feline	0.24	0.5	0.94	1.44		Yes	No	0	

- Should we be looking at other dietary causes of DCM, whose GI uptake may be affected by these legume sources?

- *Untested*: Thiamine, choline, erucic acid, vitamin E*, Polyunsaturated fatty acids*
- Tested: Ca, Mg, P, Fe, Co, Cu, Zn, Se, Tau, Cys, Met, Iodine

*Courtesy Randall Lovell

GF Diet Ingredient comparison

Product	Grain free?	Species	Tau (%)	Cys (%)	Met (%)	Met-Cys (%)	Dog Tau level	Tau added to product?	Cys or Met added to product?	# Legume Sources	Names (place in ingredient list)
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Product C	Yes	Canine	0.2	0.34	0.51	0.85	unknown	Yes	Met	4	peas (3), lentils (4), chickpeas (5), pea flour (14)
Product D	Yes	Canine	0.25	0.38	0.7	1.08	unknown	Yes	No	1	peas (4)
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Product F	No	Canine	0.22	0.32	0.66	0.98		Yes	No	1	pea fiber (10)
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Product G	No	Canine	0.11	0.3	0.6	0.9		No	Met	0	
Product H	No	Canine	0.11	0.31	0.58	0.89		No	Met	1	green peas (22)
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Product J	No	Both	0.19	0.46	0.6	1.06		Yes	No	2	pea protein (5), peas (9)
Product K	No	Feline	0.24	0.42	0.78	1.2		Yes	No	1	dried ground peas (12)
Product L	No	Feline	0.24	0.5	0.94	1.44		Yes	No	0	

BLUF: Grain Free diets have many more legume species and legume sources closer to the beginning of the ingredient list than Non-GF diets.

Questions

- Are there properties to these legumes affecting Cys or Met uptake or Tau synthesis in dogs causing DCM?

From: Hartogensis, Martine </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=02DF91D554D34B948FC58433D0E42073-MHARTOGE>
To: Jones, Jennifer L; Rotstein, David; Carey, Lauren; Norris, Anne; Palmer, Lee Anne
CC: DeLancey, Siobhan
Sent: 7/3/2018 8:13:15 PM
Subject: RE: Redacted complaint file for the DCM webposting

Hi Jen,

B5

B5

Thanks again for all the excellent work!

Martine

From: Jones, Jennifer L
Sent: Tuesday, July 03, 2018 2:03 PM
To: Rotstein, David <David.Rotstein@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>
Cc: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>
Subject: RE: Redacted complaint file for the DCM webposting

I updated the slide deck with a summary from some great articles. Bottom line:

B5

B5

<https://academic.oup.com/in/article/131/2/276/4687012>

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



From: Rotstein, David
Sent: Tuesday, July 03, 2018 8:26 AM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>
Cc: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>
Subject: RE: Redacted complaint file for the DCM webposting

Please check your calendar, if you don't see it, I'll resend the invite.

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

Date: July 3, 2018 at 8:19:29 AM EDT

To: Carey, Lauren <Lauren.Carey@fda.hhs.gov>, Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>, Norris, Anne <Anne.Norris@fda.hhs.gov>, Rotstein, David <David.Rotstein@fda.hhs.gov>, Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>

Cc: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>

Subject: RE: Redacted complaint file for the DCM webposting

B5

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



From: Carey, Lauren

Sent: Monday, July 02, 2018 5:59 PM

To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>

Cc: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>

Subject: RE: Redacted complaint file for the DCM webposting

Hi Martine,

B5

Thanks,
Lauren

From: Hartogensis, Martine

Sent: Monday, July 02, 2018 5:28 PM

To: Norris, Anne <Anne.Norris@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>

Cc: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>

Subject: RE: Redacted complaint file for the DCM webposting

B5

Martine

From: Norris, Anne

Sent: Monday, July 02, 2018 3:57 PM

To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>

Cc: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Hartogensis, Martine

<Martine.Hartogensis@fda.hhs.gov>

Subject: FW: Redacted complaint file for the DCM webposting

Importance: High

Hi Jen and Dave,

B5

Thanks,
Anne

From: Palmer, Lee Anne

Sent: Friday, June 15, 2018 8:51 AM

To: Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>;

Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>

Subject: Redacted complaint file for the DCM webposting

Hi – all set with the complaint file. I hope to have a last look today at the DCM piece. Hopefully this AM, but may creep into the afternoon at this point...

Thanks!

Lee Anne

Lee Anne M. Palmer, VMD, MPH

Team Leader HFV-242, Supervisory VMO

Center for Veterinary Medicine

OSC, Division of Veterinary Product Safety

U.S. Food and Drug Administration

Tel: 240-402-5767

Leeanne.palmer@fda.hhs.gov



Copper Deficiency Does Not Lead to Taurine Deficiency in Rats¹

Kwang Suk Ko,² Cristina L. Törres,² Andrea J. Fascetti,² Martha H. Stipanuk,³ Lawrence Hirschberger,³ and Quinton R. Rogers^{2*}

²Department of Molecular Biosciences, School of Veterinary Medicine, University of California Davis, CA 95616 and ³Division of Nutritional Sciences, Cornell University, Ithaca, NY 14853

Abstract

Copper deficiency has been reported to cause a decrease in urinary taurine excretion in rats. We determined whether Cu deficiency would decrease taurine status and the hepatic activities of cysteine dioxygenase (CDO) and/or cysteine sulfinic acid decarboxylase (CSAD) in rats. Ten weanling male rats were assigned to either a Cu-adequate (+Cu) or Cu-deficient (-Cu) group. All rats consumed a Cu-deficient purified diet and water ad-libitum for 16 wk. The water for the +Cu group contained 20 mg Cu/L as CuSO₄. At wk 16, the groups differed ($P < 0.05$) in the following variables (means \pm SEM, -Cu vs. +Cu): body weight (BW), 375 \pm 19 vs. 418 \pm 2.9 g; food intake, 16.2 \pm 0.7 vs. 18.5 \pm 0.4 g/d; hematocrit, 0.294 \pm 0.027 vs. 0.436 \pm 0.027; hemoglobin, 95.2 \pm 9 vs. 134 \pm 10 g/L; liver Cu, 8.7 \pm 2.0 vs. 65.9 \pm 2.5 nmol/g; plasma Cu, 0.38 \pm 0.09 vs. 13.4 \pm 0.61 μ mol/L; plasma ceruloplasmin activity, 1.75 \pm 1.0 vs. 67.9 \pm 8.4 IU; relative heart weight, 0.56 \pm 0.04 vs. 0.35 \pm 0.02% BW; relative liver weight, 4.06 \pm 0.23 vs. 3.37 \pm 0.06% BW; and liver CSAD activity, 18.8 \pm 1.37 vs. 13.5 \pm 1.11 nmol \cdot min⁻¹ \cdot mg protein⁻¹. The groups did not differ at wk 16 in: plasma taurine, 249 \pm 14 vs. 298 \pm 63 μ mol/L; whole blood taurine, 386 \pm 32 vs. 390 \pm 25 μ mol/L; urinary taurine excretion, 82.5 \pm 15 vs. 52.0 \pm 8.3 μ mol/d; liver taurine, 2.6 \pm 0.7 vs. 2.8 \pm 0.4 μ mol/g; liver total glutathione, 6.9 \pm 0.48 vs. 6.3 \pm 0.40 μ mol/g; liver cyst(e)ine, 96 \pm 7.1 vs. 99 \pm 5.3 nmol/g and liver CDO activity, 2.19 \pm 0.33 vs. 2.74 \pm 0.21 nmol \cdot min⁻¹ \cdot mg protein⁻¹. These findings support the conclusion that Cu deficiency does not affect body taurine status. J. Nutr. 136: 2502–2505, 2006.

Introduction

Taurine (2-aminoethanesulfonic acid) is a beta-amino sulfur amino acid, but it is neither an essential amino acid in most animals nor a building block of proteins. Taurine is known to be synthesized from the sulfur amino acids, methionine/cyst(e)ine (1) at a sufficient rate to meet biological needs in most animals. However, since taurine deficiency was found to be a cause of dilated cardiomyopathy (DCM)⁴ in cats (2), taurine deficiency has been considered by many nutritionists and veterinarians as a possible causative factor for DCM in dogs.

Moise et al. (3) reported that taurine deficiency was linked to DCM in foxes, a canid, which suggests that taurine deficiency may occur in dogs under certain metabolic conditions, even though it has been shown that with many diets no dietary taurine is required for normal taurine status. Clinical signs of DCM associated with taurine deficiency in dogs have been reported by various cardiologists. Although the metabolic basis for the taurine deficiency has not been elucidated, it is thought to involve abnormal energetics via calcium channel dysregulation in mitochondria (4). The majority of clinical

signs of DCM in dogs were in large-breed dogs that had been fed commercial dog foods for long periods of time that were composed primarily of lamb meal and rice (5). This suggests a dietary link between certain dog foods and the development of DCM in dogs.

Because Gray and Daniel (6) reported that urinary taurine excretion was reduced in Cu-deficient rats and suggested that it may be the result of a decreased synthesis of taurine, we examined the Cu content of the dog foods reported to be associated with taurine deficiency. The lamb and rice diet, which most of the affected dogs were consuming, was not supplemented with Cu [3.1mg/1000 kcal (4184 kJ) ME], but was supplemented with Zn at several-fold (84mg/1000 kcal ME) the minimum requirement for the dog. This resulted in a relatively high Zn to Cu ratio of a magnitude known to induce metallothionein formation in some species (7) which, in turn, binds Cu and decreases Cu bioavailability (8). We hypothesized that the high Zn to Cu ratio present in the diet may have decreased the availability of Cu and thereby had an effect on taurine status via the activity of cysteine dioxygenase [CDO, Enzyme Commission(EC) 1.13.11.20] and/or cysteine sulfinic acid decarboxylase (CSAD, EC 4.1.1.29), key enzymes for the synthesis of taurine from cysteine.

To test this hypothesis, Cu deficiency was induced in male weanling rats and taurine status and the activities of the 2 enzymes involved in taurine synthesis were examined as a model to determine whether Cu deficiency in dogs may be involved in causing DCM in dogs.

¹ Supported by the Center for Companion Animal Health (CCAH), the School of Veterinary Medicine, University of California, Davis.

⁴ Abbreviations used: BW, body weight; CDO, cysteine dioxygenase; CSAD, cysteine sulfinic acid decarboxylase; +Cu, copper-adequate; -Cu, copper-deficient; DCM, dilated cardiomyopathy.

* To whom correspondence should be addressed. E-mail: qrogers@ucdavis.edu.

Materials and Method

Rats and diets. The husbandry and treatment of the rats were approved by the Animal Use and Care Administrative Advisory Committee at University of California, Davis and were in compliance with the NRC guidelines for laboratory animals (9). Ten male weanling rats were purchased (Harlan-Sprague-Dawley) and were divided into 2 groups. Both groups, Cu deficient group (-Cu) and Cu adequate group (+Cu), were fed the same Cu-deficient diet (Table 1), throughout the entire experimental period. The mineral composition of the Cu deficient diet was based on the AIN-76A diet (10) except that the diet contained no added Cu. The diet provided protein at 180 g/kg with no supplementation of methionine to avoid excess substrates for taurine biosynthesis. In addition to the diet, the +Cu group was given Nanopure water (Barnstead Nanopure II System, Barnstead International) containing 20 mg Cu/L as CuSO₄. To ensure the consumption of satisfactory amounts of Cu for +Cu group, the amount of Cu-supplemented water consumed for 3 d was recorded once every 4 wk, and the amount of Cu consumed was calculated to be adequate. The mean Cu consumption by the +Cu group was 0.155 mg/d, which exceeds the Cu requirements of growing rats. The -Cu group was given Nanopure water without any supplementation. All rats had free access to food and water throughout the experiment. The rats were housed in hanging stainless-steel cages with a 12-h light-dark cycle. The room temperature ranged between 14 and 29°C.

Sampling. To determine the Cu status of the rats, ~500 µL of blood was collected every 2 wk from the saphenous vein (11), using heparinized Microvette CB300 (Sarstedt) blood collection tubes. When the -Cu group showed hematological and biochemical signs of Cu deficiency (hematocrit <40, hemoglobin concentration <120 g/L, and/or ceruloplasmin activity <10 IU), the rats were placed in metabolic cages to collect urine for taurine analysis (3 d for adaptation and 4 d for collection). At the end of the urine collection period, the rats were anesthetized with ethyl ether, and the blood, liver, and heart collected. Blood was taken from abdominal aorta using heparinized syringes (~20 µL of sodium heparin solution, 1000 USP kU/L, Baxter HealthCare). A portion of blood was centrifuged, at 15,800 × g for 15 min, immediately after collection to obtain plasma for determination of taurine concentration and ceruloplasmin activity. Liver samples for assays of CDO and CSAD activities and metabolite concentrations were frozen at -80°C until analyses. Other samples were stored at -20°C.

TABLE 1 Composition of copper-deficient diet

Ingredients	g/kg ¹
Casein, high protein ²	180.00
Sucrose ³	518.53
Corn starch ⁴	159.27
Corn oil ⁵	50.00
Fiber (Cellufil) ⁶	50.00
Mineral mix (modified AIN-76) ⁷	35.00
Vitamin mixture ⁸	5.00
50% Choline chloride in water ⁹	2.20
Total	1000.00

¹ As-fed basis.

² New Zealand Milk Products.

³ Westco Products.

⁴ National Starch and Chemical Co.

⁵ ACH Food Companies.

⁶ Amersham Life Science.

⁷ No supplementation of copper; modified AIN-76 mineral mix (10) (g/kg mineral mix): Calcium phosphate-dibasic, 500.00; sodium chloride, 74.00; potassium citrate-monohydrate, 220.00; potassium sulfate, 52.00; magnesium oxide, 24.00; manganese sulfate, 5.14; ferric citrate, 6.00; zinc sulfate-septahydrate, 3.67; cupric carbonate, 0.00; potassium iodate, 0.01; sodium selenate, 0.007; chromium potassium sulfate, 0.55; sucrose-finely powdered, 114.623.

⁸ Vitamin mixture for adult cats (29) which exceeds all of minimum vitamin requirements of growing rats.

⁹ International Mineral and Chemical Corp.

Measurements. During the experiment, daily food intakes were recorded and body weights (BW) were measured every 3 d. Hematocrits and hemoglobin concentrations were measured every 2 wk. The weights of hearts and livers were measured immediately after collection. A portion of the collected blood was prepared by centrifugation in a model MB micro-capillary centrifuge (IEC) at 10,285 × g for 4 min before hematocrit measurements were taken. Hemoglobin concentration was measured as described by van Kampen and Zijlstra (12). Cu concentrations in the diets, plasma, and liver were measured by atomic absorption spectrometry (AAAnalyst 800, Perkin Elmer Instrument) and samples were prepared as described by Clegg et al. (13). Taurine concentrations in whole blood, plasma, and urine were determined using an amino acid analyzer (Beckman 7300 Analyzer C7 Model, Beckman Instruments) (14). Plasma ceruloplasmin activity was measured as its oxidase activity using the modified *o*-dianisidine dihydrochloride method (15). Liver samples were transported on dry ice from the University of California to Cornell University. Then, CDO and CSAD activities in the livers and concentrations of taurine, total glutathione, and cyst(e)ine in the livers were measured. CDO activity was measured as described by Bagley et al. (16). CSAD activity was measured as described by Bella et al. (17). Total glutathione and cyst(e)ine were quantified by the HPLC method of Fariss and Reed (18) as modified by Stipanuk et al. (19). Protein concentration was determined by the method of Smith et al. (20).

All results are expressed as means ± SEM. Differences between groups at wk 16 were compared using 1-way ANOVA (SYSTAT 10.2, SYSTAT Software). For all analyses, differences were considered significant at $P < 0.05$. Probability values in the range of $0.05 \leq P < 0.1$ indicated a noteworthy trend.

Results

The diets were prepared 3 times during the experiment. The Cu concentrations in the 3 batches of the experimental diets were 1.16, 0.11, and 0.13 mg/kg diet (as-fed basis), respectively. All were lower than the minimum Cu requirement for growing rats (5.0 mg/kg diet) as listed by the NRC (21).

The -Cu group consumed 12% less food and had a 10% lower BW than the +Cu group ($P < 0.05$; Table 2). However, relative heart ($P < 0.01$) and liver ($P < 0.05$) weights were greater in the -Cu group than in the +Cu group (Table 2).

Several metabolic indicators of Cu deficiency differed between the groups at wk 16 ($P < 0.01$, Table 2). The hematocrit and hemoglobin concentrations of the -Cu group were 67 and 71%, respectively, of those of the +Cu group. Liver and plasma

TABLE 2 Anthropometric variables and indicators of copper and taurine status in rats fed -Cu or +Cu diets for 16 wk¹

	-Cu	+Cu	<i>P</i> -value
Body weight, <i>g</i>	375 ± 19	418 ± 2.9	<0.05
Food intakes, ² <i>g/d</i>	16.2 ± 0.7	18.5 ± 0.4	<0.05
Relative heart wt, % <i>BW</i>	0.56 ± 0.04	0.35 ± 0.02	<0.01
Liver weights, % <i>BW</i>	4.06 ± 0.23	3.37 ± 0.06	<0.05
Hematocrit	0.294 ± 0.027	0.436 ± 0.027	<0.01
Hemoglobin, <i>g/L</i>	95.2 ± 9	134 ± 10	<0.01
Plasma copper, <i>µmol/L</i>	0.38 ± 0.09	13.4 ± 0.61	<0.01
Liver copper, <i>nmol/g wet tissue</i>	8.7 ± 2.0	65.9 ± 2.5	<0.01
Plasma ceruloplasmin, <i>IU</i> ³	1.75 ± 1.0	67.9 ± 8.4	<0.01
Plasma taurine, <i>µmol/L</i>	249 ± 14	298 ± 63	0.45
Whole blood taurine, <i>µmol/L</i>	386 ± 32	390 ± 25	0.92
Urinary taurine, ² <i>µmol/L</i>	82.5 ± 15	52.0 ± 8.3	0.087

¹ Values are means ± SEM, $n = 5$.

² During wk 16.

³ IU, International unit, $\mu\text{mol} \cdot \text{min}^{-1} \cdot \text{L}^{-1}$.

TABLE 3 Hepatic cysteine dioxygenase and cysteine sulfinic acid decarboxylase activities in rats fed -Cu and +Cu diets for 16 wk¹

	CDO			CSAD		
	-Cu	+Cu	P-value	-Cu	+Cu	P-value
$\mu\text{mol} \cdot \text{min}^{-1} \cdot \text{liver}^{-1}$	5.07 ± 0.95	5.53 ± 0.42	0.60	41.1 ± 1.31	27.3 ± 2.62	0.0008
$\mu\text{mol} \cdot \text{min}^{-1} \cdot \text{g liver}^{-1}$	0.33 ± 0.04	0.39 ± 0.02	0.19	2.78 ± 0.21	1.90 ± 0.15	0.005
$\text{nmol} \cdot 100 \text{ g BW}^{-1}$	1.29 ± 0.25	1.34 ± 0.11	0.83	11.0 ± 0.66	6.56 ± 0.59	0.0006
$\text{nmol} \cdot \text{min}^{-1} \cdot \text{mg protein}^{-1}$	2.19 ± 0.33	2.74 ± 0.21	0.14	18.8 ± 1.37	13.5 ± 1.11	0.001

¹ Values are mean ± SEM, *n* = 5 except CDO, -Cu, *n* = 4 (due to an outlier).

Cu concentrations in -Cu group were only 13 and 3%, respectively, of those of the +Cu group. The plasma ceruloplasmin activity in the +Cu group was about 40 times that of the -Cu group.

Taurine concentrations in plasma and whole blood did not differ between the groups but urinary taurine excretion tended to be greater in the -Cu group than in the +Cu group (*P* = 0.09, Table 2). The groups did not differ (-Cu vs. +Cu) in liver taurine (2.6 ± 0.7 vs. 2.8 ± 0.4 μmol/g), cyst(e)ine (96 ± 7.1 vs. 99 ± 5.3 nmol/g), and total glutathione (GSH + GSSG) (6.9 ± 0.48 vs 6.3 ± 0.40 μmol/g) concentrations.

Hepatic CDO activity did not differ between the groups whether expressed relative to the total liver, g liver, liver protein, or body weight (Table 3). The CSAD activity was greater in the +Cu group, regardless of the base used for calculation than in the -Cu group (*P* < 0.005, Table 3).

Discussion

In this study we focused on the relatively high ratio of Zn to Cu in some lamb and rice diets as a possible factor causing taurine deficiency in dogs. After failing to induce Cu deficiency in 12 medium-to-large mixed breed adult dogs fed a commercial type diet with a Cu chelating agent, Syprine (trientine hydrochloride), for 1 y, we decided to examine a cheaper, more expedient model, the albino rat, to examine the effect of Cu deficiency on taurine status.

The lower BW and food intake in the -Cu group than in the +Cu group and the greater relative heart and liver weights in -Cu group than in the +Cu group (Table 2) are typical and consistent with other reports for Cu-deficient rats (6,22,23). All metabolic indicators of Cu deficiency were significantly lower in the -Cu group than in the +Cu group, confirming that the -Cu group was Cu-deficient after a period of 16 wk (6,23).

Taurine homeostasis is maintained predominantly by the regulation of renal taurine reabsorption so that excess dietary taurine is excreted in the urine (24). Therefore, it is generally assumed that the amount of taurine excreted in urine reflects the extent of excess taurine in the taurine pools of animals. The taurine status of the rats was determined by evaluating plasma and whole blood taurine concentrations and urinary taurine excretion (Table 2). The fact that none of these values were significantly different between the -Cu and +Cu group, and the finding that there was a trend for a higher urinary taurine excretion in the -Cu group, which is the opposite of that found by Gray and Daniel (6), negates our hypothesis that Cu deficiency causes taurine deficiency.

A lower food intake by the -Cu group provided less total substrate and might have been expected to result in less taurine synthesis. Food intakes relative to metabolic body weights of the rats during the last 3 d of the experiment, were 34.3 ± 1.02 g/kg BW^{0.75} for the -Cu group and 41.4 ± 0.95 g/kg BW^{0.75} for the

+Cu group (*P* < 0.01). Perhaps the results would have been different if a less severe Cu deficiency had been induced or if the rats were fed on the diets for a longer period of time.

Cu deficiency had no effect on the taurine, cyst(e)ine, or total glutathione concentrations at the major site of taurine synthesis, the liver. These results indicate that Cu deficiency in rats does not affect the major products of cysteine metabolism in the liver. However, some reports indicate that Cu deficiency in rats increases hepatic GSH concentration (25,26). The cause for this inconsistency is unclear. Perhaps a more prolonged Cu deficiency in the earlier studies is responsible.

The only significant effect of Cu deficiency on sulfur amino acid metabolism was a higher CSAD activity in liver (*P* < 0.01). The activities of CDO and CSAD are critical to taurine synthesis because they are the key enzymes in the synthesis of taurine from its direct precursor, cysteine. The regulation of these key enzymes in the synthesis of taurine has been reported (27,28). Bagley and Stipanuk (28) demonstrated that, as the dietary protein concentration increases, CDO activity increases and CSAD activity decreases. That is, CDO and CSAD are regulated in a reciprocal manner in response to dietary protein or sulfur amino acid concentration in the diet. In the current study, the reciprocal regulations of activities in the 2 enzymes were not found because CDO did not change. However, the difference in CSAD activity in this study was consistent with previous finding that CSAD activity decreases with higher protein intake (27,28). The food intake/kg BW^{0.75} of the rats during the last 3 d of the the experiment was higher in the +Cu group (*P* < 0.01) and the CSAD activity was lower in this group. Although the CDO activity did not differ between groups, it was 10% higher in the +Cu group (*P* = 0.60), possibly showing a trend for metabolic adaptation of the taurine synthesis system to maintain taurine homeostasis.

In conclusion, Cu deficiency did not affect taurine or other sulfur amino acid metabolites in plasma or in the liver of rats in this study. CSAD activity appeared to be controlled in a normal manner by the amount of dietary protein ingested. We conclude that Cu deficiency does not affect cysteine metabolism or taurine homeostasis in rats and that it is highly unlikely that DCM-induced taurine deficiency in large-breed dogs is the result of a dietary-induced Cu deficiency.

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Effects of dietary fat and L-carnitine on plasma and whole blood taurine concentrations and cardiac function in healthy dogs fed protein-restricted diets

Sherry L. Sanderson, DVM, PhD; Kathy L. Gross, PhD; Phillip N. Ogburn, DVM, PhD; Clay Calvert, DVM; Gil Jacobs, DVM; Stephen R. Lowry, PhD; Kathy A. Bird; Lori A. Koehler; Laurie L. Swanson

Objective—To evaluate plasma taurine concentrations (PTC), whole blood taurine concentrations (WBTC), and echocardiographic findings in dogs fed 1 of 3 protein-restricted diets that varied in fat and L-carnitine content.

Animals—17 healthy Beagles.

Design—Baseline PTC and WBTC were determined, and echocardiography was performed in all dogs consuming a maintenance diet. Dogs were then fed 1 of 3 protein-restricted diets for 48 months: a low-fat (LF) diet, a high-fat and L-carnitine supplemented (HF + C) diet, or a high-fat (HF) diet. All diets contained methionine and cystine concentrations at or above recommended Association of American Feed Control Officials (AAFCO) minimum requirements. Echocardiographic findings, PTC, and WBTC were evaluated every 6 months.

Results—The PTC and WBTC were not significantly different among the 3 groups after 12 months. All groups had significant decreases in WBTC from baseline concentrations, and the HF group also had a significant decrease in PTC. One dog with PT and WBT deficiency developed dilated cardiomyopathy (DCM). Taurine supplementation resulted in significant improvement in cardiac function. Another dog with decreased WBTC developed changes compatible with early DCM.

Conclusions and Clinical Relevance—Results revealed that dogs fed protein-restricted diets can develop decreased taurine concentrations; therefore, protein-restricted diets should be supplemented with taurine. Dietary methionine and cystine concentrations at or above AAFCO recommended minimum requirements did not prevent decreased taurine concentrations. The possibility exists that AAFCO recommended minimum requirements are not adequate for dogs consuming protein-restricted diets. Our results also revealed that, similar to cats, dogs can develop DCM secondary to taurine deficiency, and taurine supplementation can result in substantial improvement in cardiac function. (*Am J Vet Res* 2001;62:1616–1623)

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Supported by a grant from Hill's Pet Nutrition, Topeka, Kan.

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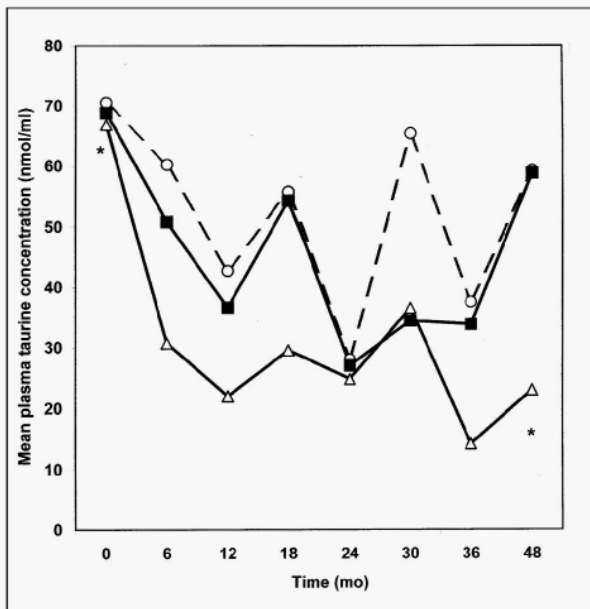


Figure 1—Within-group effect of 3 protein-restricted diets on plasma taurine concentrations in healthy Beagles. *Significant ($P < 0.05$) decrease over time within the high-fat diet group. Circles—Low-fat diet. Squares—High fat plus carnitine supplemented diet. Triangles—High-fat diet.

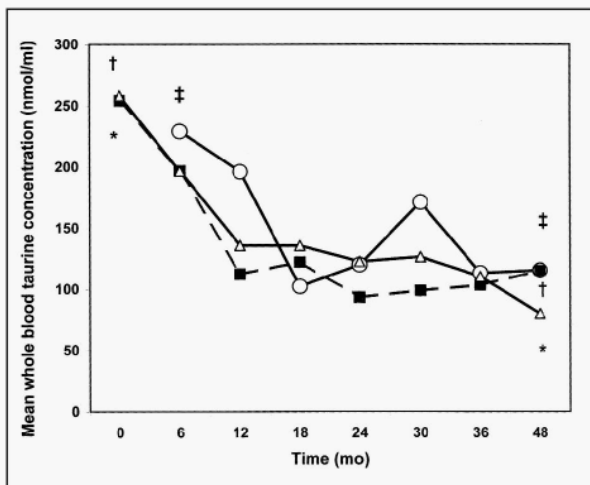


Figure 2—Within-group effect of 3 protein-restricted diets on whole blood taurine concentrations in healthy Beagles. *, †, ‡Significant ($P < 0.05$) difference over time within the low-fat diet, high-fat plus carnitine supplemented diet, and high-fat diet groups, respectively. See Figure 1 for key.

dogs in the HF groups had WBTC below reference range at 48 months.

Echocardiographic findings—At baseline, significant differences were not detected among the 3 diet groups regarding percentage of fractional shortening (FS%), EPSS, left ventricular diameter at end systole (LVDs), and left ventricular diameter at end diastole (LVDd). At 6 and 42 months, significant differences were detected in FS% among the 3 diet groups. Results of the least significant difference test and diet group means (Table 2) revealed that at 6 months, FS% was significantly higher in the LF group than in

the HF + C and HF groups, and at 42 months, FS% was significantly higher in the LF group than in the HF + C group. Significant differences in LVDs were detected at 42 months among the 3 diet groups. Results of the least significant difference test and diet group means revealed that mean LVDs was significantly higher in the HF + C group than in the LF and HF groups. At 24 months, results of 2-way ANOVA revealed a significant difference in LVDd among the 3 groups. Results of the least significant difference test and diet group means revealed that LVDd was significantly higher in the HF + C group than in the LF and HF groups.

Results of linear regression analysis revealed no significant differences in FS%, EPSS, LVDs, and LVDd over time in the LF and HF groups. However, significant differences were detected in FS% and LVDs over time in the HF + C group; mean FS% decreased and mean LVDs increased over time in this group.

None of the dogs in the LF or HF diet groups had evidence of DCM by the end of the 48-month study. However, by the end of the study, 1 of 5 dogs in the HF + C diet group met all 4 criteria for the diagnosis of DCM (Table 3). At 12 months, echocardiography revealed mild left ventricular dilatation, suggestive of early DCM. By 42 months, all criteria established for the diagnosis of DCM were met. This dog developed PTC and WBTC below the reference range at 12 months, which persisted through 48 months. Because the dog was fed a carnitine-supplemented diet, plasma and cardiac muscle carnitine concentrations were above reference range limits. At 48 months, taurine supplementation (500 mg, PO, q 12 h) was initiated, and 3 months later, echocardiography revealed FS% and EPSS had normalized, with persistence of mild left ventricular dilatation during systole and diastole. The dog subsequently developed a thickened mitral valve (endocarditis).

A second dog in the HF + C diet group did not meet all the criteria for DCM but had a mildly decreased FS% (26.0%; reference range, 28 to 44%) and slightly increased LDVs (26.7 mm; reference range, 17.5 to 23.7 mm) that began at 42 months and persisted through 48 months. At 48 months, PTC was still within reference range limits (81.8 nmol/ml; reference range, 41 to 97 nmol/ml); however, WBTC was below reference range (126.8 nmol/ml; reference range, 155 to 347 nmol/ml). This dog was also fed a carnitine-supplemented diet, and, therefore, plasma and cardiac carnitine concentrations were above reference range limits. Plasma-free, short-chain acyl, long-chain acyl, and total carnitine were 99.9 nmol/ml (reference range, 9.0 to 36.0), 10.5 nmol/ml (reference range, < 7.0), 3.4 nmol/ml (reference range, < 2.0), and 113.8 nmol/ml (reference range, 12.0 to 40), respectively. Cardiac muscle free, short-chain acyl, long-chain acyl, and total carnitine were 16.9 nmol/mg NCP (reference range, 3.5 to 11.5), 4.0 nmol/mg NCP (reference range, < 5.0), 0 (reference range, < 0.66), and 20.9 nmol/mg NCP (reference range, 4.5 to 14.0), respectively. Taurine supplementation was not initiated in this dog.

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From: Jones, Jennifer L </o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=0f6ca12eaa9348959a4cbb1e829af244-Jennifer.Jo>
To: 'Andrea Fascetti'
Sent: 5/21/2018 10:42:57 AM
Subject: RE: Question about aminoacid analysis-Matrices

Thank you, Andrea!

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



From: Andrea Fascetti [mailto:ajfascetti@ucdavis.edu]
Sent: Sunday, May 20, 2018 5:14 PM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Subject: Re: Question about aminoacid analysis-Matrices

Hi Jen - Here are a number of articles on dog taurine. I am sure you have many of them, but I am sending what I have just in case. The paper with the bile acid analysis was Ko 2016. Hope these help.

Andrea

On May 18, 2018, at 11:29 AM, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov> wrote:

Hi Andrea,

I had a few questions unrelated to our contract.

Are you able to analyze amino acids in feces?

Is whole blood or plasma best for measuring amino acids in dogs?

-particularly taurine, cystine, and methionine.

Thank you in advance, and I hope you have a great weekend,

Jen

Jennifer L. A. Jones, DVM

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Web: <http://www.fda.gov/AnimalVeterinary/ScienceResearch/ucm247334.htm>

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From: Palmer, Lee Anne </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=CF7C8BD53B6C45A39318A596ACEA7C53-LPALMER>
To: Jones, Jennifer L
Sent: 5/21/2018 3:19:28 PM
Subject: RE: FYI-Articles from Fascetti-Taurine handling

Wow! Thanks. Some light reading!

From: Jones, Jennifer L
Sent: Monday, May 21, 2018 11:15 AM
To: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>
Subject: FYI-Articles from Fascetti-Taurine handling

The articles from Andrea.

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



From: Andrea Fascetti [<mailto:aifascetti@ucdavis.edu>]
Sent: Sunday, May 20, 2018 5:14 PM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Subject: Re: Question about aminoacid analysis-Matrices

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Web: <http://www.fda.gov/AnimalVeterinary/ScienceResearch/ucm247334.htm>
<[image001.png](#)> <[image004.png](#)>

From: Rotstein, David </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=0A3B17EBFCF14A6CB8E94F322906BADD-DROTSTEI>
To: Hartogenesis, Martine; Palmer, Lee Anne; Jones, Jennifer L; Queen, Jackie L
Sent: 5/23/2018 9:00:47 AM
Subject: Re: DCM Firms

Martine,

Thank you.

B5

Dave

From: Hartogenesis, Martine <Martine.Hartogenesis@fda.hhs.gov>
Date: May 22, 2018 at 9:56:42 PM EDT
To: Rotstein, David <David.Rotstein@fda.hhs.gov>, Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>, Queen, Jackie L <Jackie.Queen@fda.hhs.gov>
Cc: Rotstein, David <David.Rotstein@fda.hhs.gov>
Subject: Re: DCM Firms

Thank you Dave! What is the

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I am heading **B6** but let's regroup then and come up with a plan! Thanks again!

Martine

From: Rotstein, David <David.Rotstein@fda.hhs.gov>
Date: May 22, 2018 at 4:11:39 PM EDT
To: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>, Hartogenesis, Martine <Martine.Hartogenesis@fda.hhs.gov>, Queen, Jackie L <Jackie.Queen@fda.hhs.gov>
Cc: Rotstein, David <David.Rotstein@fda.hhs.gov>
Subject: DCM Firms

B4, B5

firms.

B5

Brand	flavor	Firm	Location	FEI	Division
B4					

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM Vet-LIRN Liaison
CVM OSC/DC/CERT
7519 Standish Place

B6 (BB)



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From: Palmer, Lee Anne </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=CF7C8BD53B6C45A39318A596ACEA7C53-LPALMER>
To: Rotstein, David; Jones, Jennifer L; Hartogensis, Martine; Queen, Jackie L
Sent: 5/22/2018 8:13:01 PM
Subject: RE: DCM Firms

Thanks Dave! So a **B4, B5** Very interesting!

From: Rotstein, David
Sent: Tuesday, May 22, 2018 4:12 PM
To: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Queen, Jackie L <Jackie.Queen@fda.hhs.gov>
Cc: Rotstein, David <David.Rotstein@fda.hhs.gov>
Subject: DCM Firms

B5

B4, B5

Brand	flavor	Firm	Location	FEI	I
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B4

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM Vet-LIRN Liaison

CVM OSC/DC/CERT
7519 Standish Place
B6 (BB)



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From: Freeman, Lisa <Lisa.Freeman@tufts.edu>
To: Darcy Adin
CC: Jones, Jennifer L; Joshua A Stern; Fries, Ryan C [REDACTED] Rotstein, David; Norris, Anne; DeLancey, Siobhan; Ceric, Olgica
Sent: 5/27/2018 7:25:28 PM
Subject: RE: diet related DCM - revised protocol
Attachments: protocol NP 5-27-18.docx

Hi everyone

[REDACTED]

B4, B5

Best,
Lisa

Lisa M. Freeman, DVM, PhD, DACVN
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: Darcy Adin [mailto:dbadin@ncsu.edu]
Sent: Friday, May 25, 2018 5:26 PM
To: Freeman, Lisa <Lisa.Freeman@tufts.edu>
Cc: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Joshua A Stern <istern@ucdavis.edu>; Fries, Ryan C <rfries@illinois.edu> [REDACTED] Rotstein, David <David.Rotstein@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>
Subject: Re: diet related DCM - a couple forms

Thank you Lisa! Those look very helpful.
We have several Great Danes with DCM eating [REDACTED] must be popular with owners of that breed!
Hope you have a good weekend,
Darcy

On Thu, May 24, 2018 at 3:21 PM, Freeman, Lisa <Lisa.Freeman@tufts.edu> wrote:
Hi everyone

[REDACTED]

B5

[REDACTED]

B5

Thanks
Lisa

Lisa M. Freeman, DVM, PhD, DACVN
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 [mailto:Jennifer.Jones@fda.hhs.gov]

Sent: Friday, April 20, 2018 3:50 PM

To: Darcy Adin <dbadin@ncsu.edu>; Freeman, Lisa <Lisa.Freeman@tufts.edu>; Joshua A Stern <istern@ucdavis.edu>; Fries, Ryan C <rfries@illinois.edu>; [REDACTED] **B6**

B6

Cc: Rotstein, David <David.Rotstein@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>

Subject: RE: hold-call with Dr. Adin re: DCM cases

Importance: High

My apologies for the repeat email. After further internal discussion, in lieu of submitting Consumer Complaints, you can just email me a spreadsheet with the data.

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



From: Jones, Jennifer L

Sent: Friday, April 20, 2018 1:19 PM

To: 'Darcy Adin' <dbadin@ncsu.edu>; Freeman, Lisa <lisa.freeman@tufts.edu>; Joshua A Stern <istern@ucdavis.edu>; Fries, Ryan C <rfries@illinois.edu>; [REDACTED] **B6**

B6

Cc: Rotstein, David <David.Rotstein@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>

Subject: RE: hold-call with Dr. Adin re: DCM cases

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<https://www.safetyreporting.hhs.gov>. You can attach documents already created that compile your case data. We will review the data and may contact you for possible follow-up.

In the meantime, if you have a dog with DCM on a grain free diet that dies or is euthanized, please do not dispose of the animal's body or any remaining food. Please submit an individual consumer complaint for that dog, and mention that you have been instructed to submit the report by Vet-LIRN. We will review the complaint for potential follow-up and may be able to offer a necropsy. I attached a copy of our Vet-LIRN network procedures that describe how we operate. I also included a version for animal owners.

Please email or call me with any questions. Thank you again for your time and expertise,
Jen

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



From: Darcy Adin [mailto:dbadin@ncsu.edu]
Sent: Thursday, April 19, 2018 11:00 AM
To: Freeman, Lisa <lisa.freeman@tufts.edu>; Joshua A Stern <jstern@ucdavis.edu>; Fries, Ryan C <rfries@illinois.edu>; [B6];
Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Rotstein, David <David.Rotstein@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>
Subject: Fwd: hold-call with Dr. Adin re: DCM cases

Dear Dr. Jones,

We are all able to meet tomorrow, Friday April 20th at 11 am EST to discuss our clinical observations and concerns surrounding a potential relationship between grain-free canine diets and Dilated Cardiomyopathy.

Drs. [B6], Freeman, [B6] Fries and Stern - the call details are in the forwarded email below.

Just a brief introduction for the FDA group:

[B6]

Dr. Lisa Freeman is a Professor of Clinical Nutrition at Tufts University, College of Vet Med

[B6]

Dr. Ryan Fries is a Clinical Assistant Professor of Cardiology at Illinois, College of Vet Med

Dr. Josh Stern is an Associate Professor of Cardiology at UC Davis, College of Vet Med

Thank you everyone for making time in your schedule! I am looking forward to this.

Sincerely,
Darcy Adin

----- Forwarded message -----

From: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Date: Thu, Apr 19, 2018 at 7:16 AM
Subject: hold-call with Dr. Adin re: DCM cases
To: "Rotstein, David" <David.Rotstein@fda.hhs.gov>, "Norris, Anne" <Anne.Norris@fda.hhs.gov>, "DeLancey, Siobhan" <Siobhan.Delancey@fda.hhs.gov>, Darcy Adin <dbadin@ncsu.edu>

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--

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

--

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

From: [redacted] **B6**
To: Freeman, Lisa
CC: Jones, Jennifer L; Darcy Adin; Joshua A Stern; Fries, Ryan C; [redacted] **B6** Rotstein, David;
Norris, Anne; DeLancey, Siobhan; Ceric, Olgica
Sent: 5/30/2018 2:09:26 AM
Subject: Re: diet related DCM - a couple forms

Thank you so much for all your work Lisa! I just diagnosed a golden today with DCM that eats [redacted] **B4** too. I am having the owners fill out the diet history form and will follow your protocol as above. [redacted] **B5**

[redacted] **B5**

Thanks,

[redacted] **B6**

On Thu, May 24, 2018 at 3:21 PM, Freeman, Lisa <Lisa.Freeman@tufts.edu> wrote:

Hi everyone

[redacted] **B5**

[redacted] **B5**

Thanks

Lisa

Lisa M. Freeman, DVM, PhD, DACVN

Professor

Cummings School of Veterinary Medicine

Friedman School of Nutrition Science and Policy

Tufts Clinical and Translational Science Institute

Tufts University

www.petfoodology.org

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Sent: Friday, April 20, 2018 3:50 PM

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[REDACTED] B6

Cc: Rotstein, David <David.Rotstein@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>

Subject: RE: hold-call with Dr. Adin re: DCM cases

Importance: High

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Jennifer Jones, DVM

Veterinary Medical Officer

Tel: 240-402-5421



From: Jones, Jennifer L

Sent: Friday, April 20, 2018 1:19 PM

To: 'Darcy Adin' <dbadin@ncsu.edu>; Freeman, Lisa <lisa.freeman@tufts.edu>; Joshua A Stern <jstern@ucdavis.edu>; Fries, Ryan C <rfries@illinois.edu>; [REDACTED] B6

[REDACTED] B6

Cc: Rotstein, David <David.Rotstein@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>

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included a version for animal owners.

Please email or call me with any questions. Thank you again for your time and expertise.

Jen

Jennifer Jones, DVM

Veterinary Medical Officer

Tel: 240-402-5421



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

Sent: Thursday, April 19, 2018 11:00 AM

To: Freeman, Lisa <lisa.freeman@tufts.edu>; Joshua A Stern <jstern@ucdavis.edu>; Fries, Ryan C <rfries@illinois.edu>;
[REDACTED] B6 [REDACTED]; Jones, Jennifer L
<Jennifer.Jones@fda.hhs.gov>

Cc: Rotstein, David <David.Rotstein@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan
<Siobhan.Delancey@fda.hhs.gov>

Subject: Fwd: hold-call with Dr. Adin re: DCM cases

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Drs. [REDACTED] B6 Freeman, [REDACTED] B6 Fries and Stern - the call details are in the forwarded email below.

Just a brief introduction for the FDA group:

[REDACTED] B6 [REDACTED]

Dr. Lisa Freeman is a Professor of Clinical Nutrition at Tufts University, College of Vet Med

[REDACTED] B6 [REDACTED]

Dr. Ryan Fries is a Clinical Assistant Professor of Cardiology at Illinois, College of Vet Med

Dr. Josh Stern is an Associate Professor of Cardiology at UC Davis, College of Vet Med

Thank you everyone for making time in your schedule! I am looking forward to this.

Sincerely,

Darcy Adin

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Date: Thu, Apr 19, 2018 at 7:16 AM

Subject: hold-call with Dr. Adin re: DCM cases

To: "Rotstein, David" <David.Rotstein@fda.hhs.gov>, "Norris, Anne" <Anne.Norris@fda.hhs.gov>, "DeLancey, Siobhan" <Siobhan.Delancey@fda.hhs.gov>, Darcy Adin <dbadin@ncsu.edu>

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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

B6

From: Hartogenesis, Martine </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=02DF91D554D34B948FC58433D0E42073-MHARTOGE>
To: Jones, Jennifer L; Rotstein, David; Palmer, Lee Anne; Carey, Lauren
Sent: 6/5/2018 6:31:27 PM
Subject: RE: checking in-FW: DRAFT- email to the Divisions about Dilated Cardiomyopathy

Yes, sorry Jen and good idea!

From: Jones, Jennifer L
Sent: Tuesday, June 05, 2018 2:30 PM
To: Rotstein, David <David.Rotstein@fda.hhs.gov>; Hartogenesis, Martine <Martine.Hartogenesis@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>
Subject: RE: checking in-FW: DRAFT- email to the Divisions about Dilated Cardiomyopathy

Dave, [REDACTED] B5

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



From: Rotstein, David
Sent: Tuesday, June 05, 2018 2:25 PM
To: Hartogenesis, Martine <Martine.Hartogenesis@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>
Subject: RE: checking in-FW: DRAFT- email to the Divisions about Dilated Cardiomyopathy

Thank you.

I am going to send these out and also include the information Tuff's sent out to give them a more complete picture of it all.

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM Vet-LIRN Liaison
CVM OSC/DC/CERT
7519 Standish Place

[REDACTED] B6

(BB)



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From: Hartogenesis, Martine

Sent: Tuesday, June 05, 2018 2:23 PM

To: Rotstein, David <David.Rotstein@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>

Subject: RE: checking in-FW: DRAFT- email to the Divisions about Dilated Cardiomyopathy

Hi Dave,

Are you talking about the ORA Divisions? If so, great idea and ok with me to send.

Martine

From: Rotstein, David

Sent: Monday, June 04, 2018 12:58 PM

To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>

Subject: checking in-FW: DRAFT- email to the Divisions about Dilated Cardiomyopathy

Everyone,

B5

Thanks,
dave

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM Vet-LIRN Liaison
CVM OSC/DC/CERT
7519 Standish Place
B6 (BB)



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From: Rotstein, David

Sent: Thursday, May 24, 2018 10:04 AM

To: Queen, Jackie L <Jackie.Queen@fda.hhs.gov>

Cc: Rotstein, David <David.Rotstein@fda.hhs.gov>

Subject: DRAFT- email to the Divisions about Dilated Cardiomyopathy

Jackie,

Please take a look when you get a chance:

Good Morning,

CVM has been investigating reports of dilated cardiomyopathy (DCM), a condition involving thinning of the heart muscle, in dogs. Some breeds involved (Golden Retrievers) are predisposed to DCM. Cases were brought to the attention of CVM by veterinary colleges and private veterinary cardiologists. Grain free dog foods appear to be a common factor. CVM is exploring diagnostic investigations through FDA CVM Vet-LIRN and also epidemiological evaluation by the CVM Division of Veterinary Product Safety. In cats, the condition is associated with low taurine and there have been sporadic recalls relating to low taurine cat food. **B5**

B5

Some additional information is attached.

Because of the increased reports/cases at veterinary colleges, there has been a larger web presence among professionals and the public including a Facebook page concerning the issue.

B5

Thank you,

Dave

B4, B5

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM Vet-LIRN Liaison

CVM OSC/DC/CERT

7519 Standish Place

B5

(BB)



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To: Jones, Jennifer L; Rotstein, David; Palmer, Lee Anne; Carey, Lauren
Sent: 6/5/2018 6:50:50 PM
Subject: RE: checking in-FW: DRAFT- email to the Divisions about Dilated Cardiomyopathy

Hi!

B5

We are tentatively going to do a call Monday 9:30-10:30. Does that work for everyone?

They will set up a Go To meeting and I will forward.

Thanks again!

Martine

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Sent: Tuesday, June 05, 2018 2:30 PM
To: Rotstein, David <David.Rotstein@fda.hhs.gov>; Hartogenesis, Martine <Martine.Hartogenesis@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>
Subject: RE: checking in-FW: DRAFT- email to the Divisions about Dilated Cardiomyopathy

Dave, **B5**

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



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Subject: RE: checking in-FW: DRAFT- email to the Divisions about Dilated Cardiomyopathy

Thank you.

B5

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM Vet-LIRN Liaison
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7519 Standish Place
B6 (BB)



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Subject: checking in-FW: DRAFT- email to the Divisions about Dilated Cardiomyopathy

Everyone,

B5

Thanks,
dave

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM Vet-LIRN Liaison
CVM OSC/DC/CERT
7519 Standish Place

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B5

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B5

Thank you,

Dave

B4, B5

B4, B5

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800.267
Grain free
versus
Non Grain Free Foods

Jones
Vet-LIRN

Grain Free products w/ reported DCM



Product Name	Grain free?	Species	Tau (%)
B4, B5	Yes	Canine	0.26
	Yes	Canine	0.11
	Yes	Canine	0.14
	Yes	Canine	0.12
	Yes	Canine	0.2
	Yes	Canine	0.051
	Yes	Canine	0.25

- 6/7 products with sufficient Taurine levels
- Only 1 product: **B4, B5** Essentials was low in Taurine
 - Feline AAFCO minimum Tau is 0.1% for extruded foods
 - No AAFCO minimum for dogs
 - Dog in this case had low Whole blood Tau
- Taurine is conditionally essential in dogs, because they can synthesize it from Cystine and Methionine.


Grain Free products w/ reported DCM



Product Name	Grain free?	Species	Tau (%)	Cys (%)	Met (%)	Met-Cys (%)
B4, B5	Yes	Canine	0.26	0.26	0.64	0.9
	Yes	Canine	0.11	0.26	0.61	0.87
	Yes	Canine	0.14	0.28	0.86	1.14
	Yes	Canine	0.12	0.36	0.69	1.05
	Yes	Canine	0.2	0.34	0.51	0.85
	Yes	Canine	0.051	0.33	0.4	0.73
	Yes	Canine	0.25	0.38	0.7	1.08
	AAFCO min: 0.33 to 0.35 % 0.65 to 0.7%					

- All Grain Free Products contain Methionine and Methionine-Cystine % within the AAFCO requirements.
 - There is no AAFCO requirement for Cystine %
- The **B4, B5** had the lowest Met and Met-Cys content, but it was still above AAFCO requirements (highlighted)
- The **B4, B5** had the lowest Cys content (highlighted).

Non Grain Free Products w/o reported DCM



Product Name	Grain free?	Species	Tau (%)	Cys (%)	Met (%)	Met-Cys (%)
B4, B5	No	Canine	0.22	0.32	0.66	0.98
	No	Canine	0.11	0.3	0.57	0.87
	No	Canine	0.11	0.3	0.6	0.9
	No	Canine	0.11	0.31	0.58	0.89
	No	Canine	0.12	0.32	0.65	0.97
	No	Both	0.19	0.46	0.6	1.06
	No	Feline	0.24	0.42	0.78	1.2
	No	Feline	0.24	0.5	0.94	1.44

- In non-GF foods, the Taurine, Met, and Met-Cys levels were above AAFCO minimums.
 - Similar to Grain free foods.

Grain Free vs. Non Grain Free

Product Name	Tau (%)	Cys (%)	Met (%)	Met-Cys (%)
Avg All GF foods	0.16	0.32	0.63	0.95
Avg All Non-GF Dog foods	0.14	0.34	0.61	0.95
Avg All Non-GF Cat Foods	0.22	0.46	0.77	1.23

- Average Tau, Cys, Met, and Met-Cys content in Grain Free dog foods is similar to the non-GF dog foods.
- The *non-GF cat foods* tend to have higher average levels, because they have greater minimum AAFCO requirements.

Overall Comparison

Product Name	Grain free?	Species	Tau (%)	Cys (%)	Met (%)	Met-Cys (%)
	Yes	Canine	0.26	0.26	0.64	0.9
	Yes	Canine	0.11	0.26	0.61	0.87
	Yes	Canine	0.14	0.28	0.86	1.14
	Yes	Canine	0.12	0.36	0.69	1.05
	Yes	Canine	0.2	0.24	0.51	0.85
	Yes	Canine	0.051	0.33	0.4	0.73
	Yes	Canine	0.25	0.38	0.7	1.08
	No	Canine	0.22	0.32	0.66	0.98
	No	Canine	0.11	0.3	0.57	0.87
	No	Canine	0.11	0.3	0.6	0.9
	No	Canine	0.11	0.31	0.58	0.89
	No	Canine	0.12	0.32	0.65	0.97
	No	Both	0.19	0.46	0.6	1.06
	No	Feline	0.24	0.42	0.78	1.2
	No	Feline	0.24	0.5	0.94	1.44

B4, B5

Because the Grain free and Non-GF foods have a similar Tau, Cys, Met, and Met-Cys content, we can look closely at **B4, B5**

It has adequate Met and Met-Cys levels, which should enable a dog to make adequate Tau, without needing Tau in the food.

However, the dog eating this diet had low Whole blood Tau.

Ingredient comparison

Product Name	Tau (%)	Cys (%)	Met (%)	Met-Cys (%)	Dog Tau level	Tau added to product?	Cys or Met added to product?	# Legume Sources	Names (place in ingredient list)
	0.26	0.26	0.64	0.9	wnl (2)	No	Met	4	red lentils (2), green lentils (5), peas (4), pea fiber (7)
	0.11	0.26	0.61	0.87	storebought	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
	0.14	0.28	0.86	1.14	292 (wnl)	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
	0.12	0.36	0.69	1.05	unknown	No	No	0	
	0.2	0.34	0.51	0.85	unknown	Yes	Met	4	peas (3), lentils (4), chickpeas (5), pea flour (14)
	0.25	0.38	0.7	1.08	unknown	Yes	No	1	peas (4)
	0.051	0.33	0.4	0.73	low	No	No	6	peas (3), chickpeas (4), pea flour (5), red lentils (8), green lentils (9), pea protein (11)
	0.22	0.32	0.66	0.98		Yes	No	1	pea fiber (10)
	0.11	0.3	0.57	0.87		No	Met	0	
	0.11	0.3	0.6	0.9		No	Met	0	
	0.11	0.31	0.58	0.89		No	Met	1	green peas (22)
	0.12	0.32	0.65	0.97		No	Met	1	green peas (20)
	0.19	0.46	0.6	1.06		Yes	No	2	pea protein (5), peas (9)

B4, B5

- Other products (stars) with normal Met and Met-Cys % and are not supplemented with Met in the ingredients, like the **B4, B5** (red box). The non GF diet **B4, B5** had a comparable # legume sources, but its only legume source was low on the ingredient list and contained less legume sources than the **B4, B5** respectively.
- The **B4, B5** meal product contains **B4, B5** so isn't grain free. But the dog in this case had DCM. Not much is known about the case.
- If the Met-Cys and Met % are normal, then something is causing the **B4, B5** **B4, B5** dog's low blood Tau. Are there problems with nutrient uptake b/c of the amount and/or number of legumes in the product?

Ingredient comparison

Product Name	Tau (%)	Cys (%)	Met (%)	Met-Cys (%)	Dog Tau level	Tau added to product?	Cys or Met added to product?	# Legume Sources	Names (place in ingredient list)
	0.26	0.26	0.64	0.9	wnl (2)	No	Met	4	red lentils (2), green lentils (5), peas (4), pea fiber (7)
	0.11	0.26	0.61	0.87	storebought	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
	0.14	0.28	0.86	1.14	292 (wnl)	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
	0.12	0.36	0.69	1.05	unknown	No	No	0	
	0.2	0.34	0.51	0.85	unknown	Yes	Met	4	peas (3), lentils (4), chickpeas (5), pea flour (14)
	0.25	0.38	0.7	1.08	unknown	Yes	No	1	peas (4)
	0.051	0.33	0.4	0.73	low	No	No	6	peas (3), chickpeas (4), pea flour (5), red lentils (8), green lentils (9), pea protein (11)
	0.22	0.32	0.66	0.98		Yes	No	1	pea fiber (10)
	0.11	0.3	0.57	0.87		No	Met	0	
	0.11	0.3	0.6	0.9		No	Met	0	
	0.11	0.31	0.58	0.89		No	Met	1	green peas (22)
	0.12	0.32	0.65	0.97		No	Met	1	green peas (20)
	0.19	0.46	0.6	1.06		Yes	No	2	pea protein (5), peas (9)

B4, B5

B4, B5 product may be a red herring/separate issue or a clue about how the legume may affect the product

NCSU ACVIM Abstract-Dr. Adin

Methods: *retrospective evaluation* of dogs diagnosed with DCM who had diet recorded in the last 2 years. Dogs were lumped into Grain-free (further subdivided into **B4, B5** and other) and Non-Grain free diets

Results: *-22 dogs ate grain free* (10 **B4, B5** 7 of these were Kangaroo and Lentil).

Taurine testing in 11 of these dogs did not show deficiency - carnitine testing in 4 did not show deficiency. Two sets of unrelated housemates were in this group.

-27 dogs ate non-grain free. Taurine testing in 11 of these and 5 were deficient (3 ate vegetarian diets)

- Dogs eating **B4, B5** weighed less than the other groups (I interpret this to mean they are not the typical large breed DCM dog- 23 vs 35 kg P=0.03).

- Dogs eating **B4, B5** had bigger hearts in diastole and systole and a more spherical heart than 1) dogs eating other grain free diets and 2) dogs eating nongrain free diets (all statistically significant).

- Dogs eating Grain free diets as a group had bigger hearts in diastole and systole and more spherical hearts on echo than dogs eating nongrain free diets (all statistically significant)

- presence of CHF was not different between groups

NCSU ACVIM Abstract-Dr. Adin

Methods: *retrospective evaluation* of dogs diagnosed with DCM who had diet recorded in the last 2 years. Dogs were lumped into Grain-free (further subdivi

Results **B4** Taurine WNL for 11 of 27 dogs on GF diets with DCM

Taurine did not

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WB taurine is only a snapshot of the content. Paired plasma and WB are better indicators of overall body Tau content.

- Dogs eating Grain free diets as a group had bigger hearts in diastole and systole and more spherical hearts on echo than dogs eating nongrain free diets (all statistically significant)

- presence of CHF was not different between groups

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- 23 vs 35 kg

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Call with Cardiologists

Since the abstract:

- Dr. Adin has seen 36 DCM dogs on Grain Free diets.
- Taurine in 18 dogs was WNL.
 - The majority were supplemented.
- 7 were rechecked and *all* showed some improvement with *diet change*.
 - 1/7 not supplemented, only diet change:
 - not much echo change at 3 months but at 9 months had improved echo parameters.
 - 1/7 was changed to a **B4** Grain Free diet and had similar improvement to the dogs with diet change and Taurine supplementation at 3 months.

Call with Cardiologists

Since the abstract:

- Dr. Adin has seen 26 DCM dogs on Grain Free diets
- Tau **B4** Taurine is normal in the dogs checked, but they may improve faster with Tau supplementation and diet change. with
- 7 w *die*
 - not much echo change at 3 months but at 9 months had improved echo parameters.
 - 1/7 was changed to a **B4, B5** Grain Free diet and had similar improvement to the dogs with diet change and Taurine supplementation at 3 months.

GF Diet Ingredient comparison

Product Name	Dog Tau level	Tau added to product?	Cys or Met added to product?	# Legume Sources	Names (place in ingredient list)
B4, B5	wnl (2)	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
	storebought	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
	292 (wnl)	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
	unknown	No	No	0	
	unknown	Yes	Met	4	peas (3), lentils (4), chickpeas (5), pea flour (14)
	unknown	Yes	No	1	peas (4)
	Low	No	No	6	peas (3), chickpeas (4), pea flour (5), red lentils (8), green lentils (9), pea protein (11)
		Yes	No	1	pea fiber (10)
		No	Met	0	
		No	Met	0	
		No	Met	1	green peas (22)
		No	Met	1	green peas (20)
		Yes	No	2	pea protein (5), peas (9)
		Yes	No	1	dried ground peas (12)
		Yes	No	0	

- Should we be looking at other dietary causes of DCM, whose GI uptake may be affected by these legume sources?
 - *Untested*: Thiamine, choline, erucic acid, vitamin E*, Polyunsaturated fatty acids*
 - Tested: Ca, Mg, P, Fe, Co, Cu, Zn, Se, Tau, Cys, Met, Iodine

*Courtesy B6

GF Diet Ingredient comparison

Product Name	Dog Tau level	Tau added to product?	Cys or Met added to product?	# Legume Sources	Names (place in ingredient list)
	wnl (2)	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
	storebought	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
	292 (wnl)	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
	unknown	No	No	0	
	unknown	Yes	Met	4	peas (3), lentils (4), chickpeas (5), pea flour (14)
	unknown	Yes	No	1	peas (4)
	Low	No	No	6	peas (3), chickpeas (4), pea flour (5), red lentils (8), green lentils (9), pea protein (11), pea fiber (10)
		Yes	No	1	pea fiber (10)
		No	Met	0	
		No	Met	0	
		No	Met	1	green peas (22)
		No	Met	1	green peas (20)
		Yes	No	2	pea protein (5), peas (9)
		Yes	No	1	dried ground peas (12)
		Yes	No	0	

B4, B5

B4 Grain Free diets have many more legume species and legume sources closer to the beginning of the ingredient list than Non-GF diets.

Questions

- Are there properties to these legumes affecting Cys or Met uptake or Tau synthesis in dogs causing DCM?

PubMed

Format: Abstract

J AOAC Int. 2004 May-Jun;87(3):787-91.

Resistant starch as related to companion animal nutrition.

Spears JK¹, Fahey GC Jr.

Author information

Abstract

Companion animal diets may contain up to 50% starch, derived from cereal grains. The amount of resistant starch (RS) in an ingredient depends on the origin and form of the ingredient and on the processing conditions to which the ingredient has been exposed. Extrusion has proven to be a means of optimizing utilization of starch by companion animals. Although the RS fraction of starch typically decreases by extrusion, retrogradation can result in increased concentrations of this fraction. Limited research exists regarding the effects of RS in companion animal nutrition and gastrointestinal health. Existing in vitro and in vivo research indicates that certain RS sources are readily fermented in the large bowel, producing short-chain fatty acids, whereas others are less fermentable, resulting in excellent laxation properties. Feeding dogs a diet high in RS may result in an increase in fecal bulk due to an increased excretion of microbial matter in those cases where RS is highly fermentable, or to indigestibility of the RS source in other cases. RS has a role to play as a potential proxy for dietary fiber, especially for those companion animals fed diets high in protein and fat and devoid of traditional dietary fiber.

PMID: 15287680

[Indexed for MEDLINE]

Publication type, MeSH terms, Substances

LinkOut - more resources

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Grain free
versus
Non Grain Free Foods

Jones
Vet-LIRN

Grain Free products w/ reported DCM

Product	Grain Free?	Tau (%)
Product A	Yes	0.26
Product A	Yes	0.11
Product A	Yes	0.14
Product B	Yes	0.12
Product C	Yes	0.2
Product D	Yes	0.051
Product E	Yes	0.25

- 6/7 GF products with sufficient Taurine levels
- Only 1 product was low in Taurine
 - Feline AAFCO minimum Tau is 0.1% for extruded foods
 - No AAFCO minimum for dogs
 - Dog in this case had low Whole blood Tau
- Taurine is conditionally essential in dogs, because they can synthesize it from Cystine and Methionine.

Grain Free products w/ reported DCM

Product	Grain Free?	Tau (%)	Cys (%)	Met (%)	Met-Cys (%)
Product A	Yes	0.26	0.26	0.64	0.9
Product A	Yes	0.11	0.26	0.61	0.87
Product A	Yes	0.14	0.28	0.86	1.14
Product B	Yes	0.12	0.36	0.69	1.05
Product C	Yes	0.2	0.34	0.51	0.85
Product D	Yes	0.051	0.33	0.4	0.73
Product E	Yes	0.25	0.38	0.7	1.08

AAFCO min: 0.33 to 0.35 % 0.65 to 0.7%

- All Grain Free Products contain Methionine and Methionine-Cystine % within the AAFCO requirements.
 - There is no AAFCO requirement for Cystine %
- The low Tau product had the lowest Met and Met-Cys content, but it was still above AAFCO requirements (highlighted)
- One product had the lowest Cys content (highlighted).

Non Grain Free Products w/o reported DCM

Product	Grain Free?	Species	Tau (%)	Cys (%)	Met (%)	Met-Cys (%)
Product F	No	Canine	0.22	0.32	0.66	0.98
Product G	No	Canine	0.11	0.3	0.57	0.87
Product G	No	Canine	0.11	0.3	0.6	0.9
Product H	No	Canine	0.11	0.31	0.58	0.89
Product I	No	Canine	0.12	0.32	0.65	0.97
Product J	No	Both	0.19	0.46	0.6	1.06
Product K	No	Feline	0.24	0.42	0.78	1.2
Product L	No	Feline	0.24	0.5	0.94	1.44

- In non-GF foods, the Taurine, Met, and Met-Cys levels were above AAFCO minimums.
 - Similar to Grain free foods.

Grain Free vs. Non Grain Free

Product Name	Tau (%)	Cys (%)	Met (%)	Met-Cys (%)
Avg All GF foods	0.16	0.32	0.63	0.95
Avg All Non-GF Dog foods	0.14	0.34	0.61	0.95
Avg All Non-GF Cat Foods	0.22	0.46	0.77	1.23

- Average Tau, Cys, Met, and Met-Cys content in Grain Free dog foods is similar to the non-GF dog foods.
- The *non-GF cat foods* tend to have higher average levels, because they have greater minimum AAFCO requirements.

Overall Comparison

Product	Grain Free?	Species	Tau (%)	Cys (%)	Met (%)	Met-Cys (%)
Product A	Yes	Canine	0.26	0.26	0.64	0.9
Product A	Yes	Canine	0.11	0.26	0.61	0.87
Product A	Yes	Canine	0.14	0.28	0.86	1.14
Product B	Yes	Canine	0.12	0.36	0.69	1.05
Product C	Yes	Canine	0.2	0.34	0.51	0.85
Product D	Yes	Canine	0.051	0.33	0.4	0.73
Product E	Yes	Canine	0.25	0.38	0.7	1.08
Product F	No	Canine	0.22	0.32	0.66	0.98
Product G	No	Canine	0.11	0.3	0.57	0.87
Product G	No	Canine	0.11	0.3	0.6	0.9
Product H	No	Canine	0.11	0.31	0.58	0.89
Product I	No	Canine	0.12	0.32	0.65	0.97
Product J	No	Both	0.19	0.46	0.6	1.06
Product K	No	Feline	0.24	0.42	0.78	1.2
Product L	No	Feline	0.24	0.5	0.94	1.44

- Because the Grain free and Non-GF foods have a similar Tau, Cys, Met, and Met-Cys content, we can look closely at one product.
- It has adequate Met and Met-Cys levels, which should enable a dog to make adequate Tau, without needing Tau in the food.
- However, the dog eating this diet had low Whole blood Tau.

Ingredient comparison

Product	Grain free?	Species	Tau (%)	Cys (%)	Met (%)	Met-Cys (%)	Dog Tau level	Tau added to product?	Cys or Met added to product?	# Legume Sources	Names (place in ingredient list)
Product A	Yes	Canine	0.26	0.26	0.64	0.9	wnl (2)	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
Product A	Yes	Canine	0.11	0.26	0.61	0.87	storebought	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
Product A	Yes	Canine	0.14	0.28	0.86	1.14	292 (wnl)	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
Product B	Yes	Canine	0.12	0.36	0.69	1.05	unknown	No	No	0	
Product C	Yes	Canine	0.2	0.34	0.51	0.85	unknown	Yes	Met	4	peas (3), lentils (4), chickpeas (5), pea flour (14)
Product D	Yes	Canine	0.25	0.38	0.7	1.08	unknown	Yes	No	1	peas (4)
Product E	Yes	Canine	0.051	0.33	0.4	0.73	Low	No	No	6	peas (3), chickpeas (4), pea flour (5), red lentils (8), green lentils (9), pea protein (11)
Product F	No	Canine	0.22	0.32	0.66	0.98		Yes	No	1	pea fiber (10)
Product G	No	Canine	0.11	0.3	0.57	0.87		No	Met	0	
Product G	No	Canine	0.11	0.3	0.6	0.9		No	Met	0	
Product H	No	Canine	0.11	0.31	0.58	0.89		No	Met	1	green peas (22)
Product I	No	Canine	0.12	0.32	0.55	0.97		No	Met	1	green peas (20)
Product J	No	Both	0.19	0.46	0.6	1.06		Yes	No	2	pea protein (5), peas (9)
Product K	No	Feline	0.14	0.42	0.78	1.2		Yes	No	1	dried ground peas (12)
Product L	No	Feline	0.24	0.5	0.94	1.44		Yes	No	0	

- Other products (stars) with normal Met and Met-Cys % and are not supplemented with Met in the ingredients, like the low Tau product (red box). The non GF diet had a comparable # legume sources, but its only legume source was low on the ingredient list and contained less legume sources than the other starred GF products, respectively.
- The first starred product contains Brown Rice and Rice, so isn't grain free. But the dog in this case had DCM. Not much is known about the case.
- If the Met-Cys and Met % are normal, then something is causing the red box dog's low blood Tau. Are there problems with nutrient uptake b/c of the amount and/or number of legumes in the product?

Ingredient comparison

Product	Grain free?	Species	Tau (%)	Cys (%)	Met (%)	Met-Cys (%)	Dog Tau level	Tau added to product?	Cys or Met added to product?	# Legume Sources	Names (place in ingredient list)
Product A	Yes	Canine	0.26	0.26	0.64	0.9	wnl (2)	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
Product A	Yes	Canine	0.11	0.26	0.61	0.87	storebought	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
Product A	Yes	Canine	0.14	0.28	0.86	1.14	292 (wnl)	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
Product B	Yes	Canine	0.12	0.36	0.69	1.05	unknown	No	★ No	0	
Product C	Yes	Canine	0.2	0.34	0.51	0.85	unknown	Yes	Met	4	peas (3), lentils (4), chickpeas (5), pea flour (14)
Product D	Yes	Canine	0.25	0.38	0.7	1.08	unknown	Yes	★ No	1	peas (4)
Product E	Yes	Canine	0.051	0.33	0.4	0.73	Low	No	★ No	6	peas (3), chickpeas (4), pea flour (5), red lentils (8), green lentils (9), pea protein (11)
Product F	No	Canine	0.22	0.32	0.66	0.98		Yes	★ No	1	pea fiber (10)
Product G	No	Canine	0.11	0.3	0.57	0.87		No	Met	0	
Product G	No	Canine	0.11	0.3	0.6	0.9		No	Met	0	
Product H	No	Canine	0.11	0.31	0.58	0.89		No	Met	1	green peas (22)
Product I	No	Canine	0.12	0.32	0.65	0.97		No	Met	1	green peas (20)
Product J	No	Both	0.19	0.46	0.6	1.06		Yes	No	2	pea protein (5), peas (9)
Product K	No	Feline	0.24	0.42	0.78	1.2		Yes	No	1	dried ground peas (12)
Product L	No	Feline	0.24	0.5	0.94	1.44		Yes	No	0	

The low Tau product may be a red herring/separate issue or a clue about how the legume may affect the product

NCSU ACVIM Abstract-Dr. Adin

Methods: *retrospective evaluation* of dogs diagnosed with DCM who had diet recorded in the last 2 years. Dogs were lumped into Grain-free (further subdivided into Brand XXXX and other) and Non-Grain free diets

Results: *-22 dogs ate grain free* (10 Brand XXXX, 7 of these were Kangaroo and Lentil). *Taurine testing in 11 of these dogs did not show deficiency* - carnitine testing in 4 did not show deficiency. Two sets of unrelated housemates were in this group.

-27 dogs ate non-grain free. Taurine testing in 11 of these and *5 were deficient (3 ate vegetarian diets)*

- Dogs eating Brand XXXX weighed less than the other groups (I interpret this to mean they are not the typical large breed DCM dog- 23 vs 35 kg P=0.03).

- Dogs eating Brand XXXX had bigger hearts in diastole and systole and a more spherical heart than 1) dogs eating other grain free diets and 2) dogs eating nongrain free diets (all statistically significant).

- Dogs eating Grain free diets as a group had bigger hearts in diastole and systole and more spherical hearts on echo than dogs eating nongrain free diets (all statistically significant)

- presence of CHF was not different between groups

NCSU ACVIM Abstract-Dr. Adin

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Results:

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- presence of CHF was not different between groups

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dogs eating

Call with Cardiologists

Since the abstract:

- Dr. Adin has seen 36 DCM dogs on Grain Free diets.
- Taurine in 18 dogs was WNL.
 - The majority were supplemented.
- 7 were rechecked and *all* showed some improvement with *diet change*.
 - 1/7 not supplemented, only diet change:
 - not much echo change at 3 months but at 9 months had improved echo parameters.
 - 1/7 was changed to a Large Manufacturer Grain Free diet and had similar improvement to the dogs with diet change and Taurine supplementation at 3 months.

Call with Cardiologists

Since the abstract:

- Dr. Adin has seen 36 DCM dogs on Grain Free diets.
- Taurine levels were checked, but they may improve faster with Tau supplementation and diet change.
- 7 weeks had improved echo parameters.
- 1/7 was changed to a Large Manufacturer Grain Free diet and had similar improvement to the dogs with diet change and Taurine supplementation at 3 months.

GF Diet Ingredient comparison

Product	Grain free?	Species	Tau (%)	Cys (%)	Met (%)	Met-Cys (%)	Dog Tau level	Tau added to product?	Cys or Met added to product?	# Legume Sources	Names (place in ingredient list)
Product A	Yes	Canine	0.26	0.26	0.64	0.9	wnl (2)	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
Product A	Yes	Canine	0.11	0.26	0.61	0.87	storebought	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
Product A	Yes	Canine	0.14	0.28	0.86	1.14	292 (wnl)	No	Met	4	red lentils (2), green lentils (3), peas (4), pea fiber (7)
Product B	Yes	Canine	0.12	0.36	0.69	1.05	unknown	No	No	0	
Product C	Yes	Canine	0.2	0.34	0.51	0.85	unknown	Yes	Met	4	peas (3), lentils (4), chickpeas (5), pea flour (14)
Product D	Yes	Canine	0.25	0.38	0.7	1.08	unknown	Yes	No	1	peas (4)
Product E	Yes	Canine	0.051	0.33	0.4	0.73	Low	No	No	6	peas (3), chickpeas (4), pea flour (5), red lentils (3), green lentils (9), pea protein (11)
Product F	No	Canine	0.22	0.32	0.66	0.98		Yes	No	1	pea fiber (10)
Product G	No	Canine	0.11	0.3	0.57	0.87		No	Met	0	
Product G	No	Canine	0.11	0.3	0.5	0.9		No	Met	0	
Product H	No	Canine	0.11	0.31	0.58	0.89		No	Met	1	green peas (22)
Product I	No	Canine	0.12	0.32	0.65	0.97		No	Met	1	green peas (20)
Product J	No	Both	0.19	0.46	0.5	1.06		Yes	No	2	pea protein (5), peas (9)
Product K	No	Feline	0.24	0.42	0.78	1.2		Yes	No	1	dried ground peas (12)
Product L	No	Feline	0.24	0.5	0.94	1.44		Yes	No	0	

- Should we be looking at other dietary causes of DCM, whose GI uptake may be affected by these legume sources?
 - *Untested*: Thiamine, choline, erucic acid, vitamin E*, Polyunsaturated fatty acids*
 - Tested: Ca, Mg, P, Fe, Co, Cu, Zn, Se, Tau, Cys, Met, Iodine

*Courtesy Randall Lovell

GF Diet Ingredient comparison

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B4 Grain Free diets have many more legume species and legume sources closer to the beginning of the ingredient list than Non-GF diets.

Questions

- Are there properties to these legumes affecting Cys or Met uptake or Tau synthesis in dogs causing DCM?

From: Carey, Lauren </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=F0226BD682844FA2B71EA3750D4FCB82-LAUREN.CARE>
To: Rotstein, David; Palmer, Lee Anne; Hartogensis, Martine; Jones, Jennifer L
CC: Burkholder, William; Norris, Anne; DeLancey, Siobhan
Sent: 5/11/2018 10:12:19 AM
Subject: RE: DCM and meetign with Cardiac Care for Pets
Attachments: Infographic novel pet food proteins _ PetfoodIndustry.com - 5-11-2018.pdf

Thought this was interesting in the wake of our discussions.

B5

B5

From: Rotstein, David
Sent: Wednesday, May 09, 2018 4:13 PM
To: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>
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I want to confirm it, then will send it along – could be Friday before I get this in shape to send... not to leave you hanging, but wanted to be more sure. Definitely, not done today as I'd thought. Thanks!

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Awesome, thank you Dave!

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Subject: RE: DCM and meetign with Cardiac Care for Pets

Good Afternoon,

I spoke with **B5, B6** Cardiac Care for Pets. He is going to look into times/dates with the cardiologists there and we can set the meeting up from that point.

Just some basic information:

B5

As a side note, there is a facebook page dedicated to this issue:

<https://www.facebook.com/groups/1952593284998859/about/>

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM Vet-LIRN Liaison
CVM OSC/DC/CERT
7519 Standish Place

B5 (BB)



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Sent: Tuesday, May 08, 2018 10:58 AM

To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>

Subject: RE: DCM

Thank you Jen and Dave! Very interesting and sounds like you all are on it!

B6

B6

https://www.cvcavets.com/doctor_directory/

B6

Keep us posted!

Thanks again!

Martine

Hi Martine,

B5

I'm happy to share more info as needed.

Jen

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



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Sent: Tuesday, May 08, 2018 9:45 AM
To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Subject: RE: DCM

Martine,

B5

Looping in Jen.

Thanks for the update!

dave

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM Vet-LIRN Liaison
CVM OSC/DC/CERT
7519 Standish Place

B5



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Subject: RE: DCM

B5

Martine

From: Rotstein, David
Sent: Monday, May 07, 2018 1:13 PM
To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>
Subject: Re: DCM

Martine

B5

There's a way to go on this moving forward.

Dave

From: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>
Date: May 7, 2018 at 1:03:13 PM EDT
To: Rotstein, David <David.Rotstein@fda.hhs.gov>
Subject: DCM

Hi Dave!

Do you have any more details on the DCM and grain free diet issue?

Martine

From: Rotstein, David </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=0A3B17EBFCF14A6CB8E94F322906BADD-DROTSTEI>
To: Palmer, Lee Anne; Hartogensis, Martine; Jones, Jennifer L
CC: Burkholder, William; Carey, Lauren; Norris, Anne; DeLancey, Siobhan; Lovell, Randall A
Sent: 5/11/2018 8:14:20 PM
Subject: RE: DCM and meetign with Cardiac Care for Pets

Lee Anne,

This is fantastic

B5

B5

B5

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From: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>

Date: May 11, 2018 at 4:06:05 PM EDT

To: Rotstein, David <David.Rotstein@fda.hhs.gov>, Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>

Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>, Carey, Lauren <Lauren.Carey@fda.hhs.gov>, Norris, Anne <Anne.Norris@fda.hhs.gov>, DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>, Lovell, Randall A <Randall.Lovell@fda.hhs.gov>

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Hi there –

B5

B5

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I'll final this up next week, have to get to other things yet today. Have a great weekend! J Lee Anne

B5

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Just some basic information:

[B5]

As a side note, there is a facebook page dedicated to this issue:

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[B6]



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Thank you Jen and Dave! Very interesting and sounds like you all are on it! The resident I spoke to was [B6]

https://www.cvcavets.com/doctor_directory/b

[B6]

Keep us posted!

Thanks again!

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Hi Martine,

B5

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Veterinary Medical Officer
Tel: 240-402-5421



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Thanks for the update!

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B6



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CC: Burkholder, William; Carey, Lauren; Norris, Anne; DeLancey, Siobhan; Lovell, Randall A
Sent: 5/11/2018 9:41:19 PM
Subject: RE: DCM and meetign with Cardiac Care for Pets

I'll be sending out the invite shortly. Feel free to forward it on.

From: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>
Date: May 11, 2018 at 4:30:16 PM EDT
To: Rotstein, David <David.Rotstein@fda.hhs.gov>, Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
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To: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
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7519 Standish Place

B6



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From: Hartogensis, Martine
Sent: Tuesday, May 08, 2018 10:58 AM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>
Subject: RE: DCM

Thank you Jen and Dave! Very interesting and sounds like you all are on it! The resident I spoke to was

B6

https://www.cvcavets.com/doctor_directory

B6

Keep us posted!

Thanks again!

Martine

Hi Martine,

B5

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



From: Rotstein, David

Sent: Tuesday, May 08, 2018 9:45 AM

To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>

Subject: RE: DCM

Martine,

B5

Looping in Jen.

Thanks for the update!

dave

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM Vet-LIRN Liaison
CVM OSC/DC/CERT
7519 Standish Place

B6



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From: Hartogensis, Martine

Sent: Tuesday, May 08, 2018 9:00 AM

To: Rotstein, David <David.Rotstein@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>

Subject: RE: DCM

B5

Martine

From: Rotstein, David

Sent: Monday, May 07, 2018 1:13 PM
To: Hartogenesis, Martine <Martine.Hartogenesis@fda.hhs.gov>
Subject: Re: DCM

Martine

Lee Anne will likely [redacted B5] But it does [redacted B5]
[redacted B5]

Vet-LIRN is looking into [redacted B5]
[redacted B5]

There's a way to go on this moving forward.

Dave

From: Hartogenesis, Martine <Martine.Hartogenesis@fda.hhs.gov>
Date: May 7, 2018 at 1:03:13 PM EDT
To: Rotstein, David <David.Rotstein@fda.hhs.gov>
Subject: DCM

Hi Dave!

Do you have any more details on the DCM and grain free diet issue?

Martine

From: Hartogenesis, Martine </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=02DF91D554D34B948FC58433D0E42073-MHARTOGE>
To: Palmer, Lee Anne; Rotstein, David; Jones, Jennifer L
CC: Burkholder, William; Carey, Lauren; Norris, Anne; DeLancey, Siobhan; Lovell, Randall A
Sent: 5/14/2018 1:09:15 PM
Subject: RE: DCM and meetign with Cardiac Care for Pets

This is very interesting.

B5

B5

Martine

From: Palmer, Lee Anne
Sent: Friday, May 11, 2018 4:30 PM
To: Rotstein, David <David.Rotstein@fda.hhs.gov>; Hartogenesis, Martine <Martine.Hartogenesis@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Lovell, Randall A <Randall.Lovell@fda.hhs.gov>
Subject: RE: DCM and meetign with Cardiac Care for Pets

B5

From: Rotstein, David
Sent: Friday, May 11, 2018 4:14 PM
To: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Hartogenesis, Martine <Martine.Hartogenesis@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Lovell, Randall A <Randall.Lovell@fda.hhs.gov>
Subject: RE: DCM and meetign with Cardiac Care for Pets

Lee Anne,

This is fantastic.

B5

I think this

B5

B5

B5

From: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>

Date: May 11, 2018 at 4:06:05 PM EDT

To: Rotstein, David <David.Rotstein@fda.hhs.gov>, Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>

Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>, Carey, Lauren <Lauren.Carey@fda.hhs.gov>, Norris, Anne <Anne.Norris@fda.hhs.gov>, DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>, Lovell, Randall A <Randall.Lovell@fda.hhs.gov>

Subject: RE: DCM and meetign with Cardiac Care for Pets

Hi there

B5

B5

B5

I'll final this up next week, have to get to other things yet today. Have a great weekend! J Lee Anne

B5

From: Rotstein, David

Sent: Wednesday, May 9, 2018 4:13 PM

To: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>

Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>

Subject: RE: DCM and meetign with Cardiac Care for Pets

Sounds very intriguing!!!

From: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>

Date: May 9, 2018 at 4:09:18 PM EDT

To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>, Rotstein, David <David.Rotstein@fda.hhs.gov>, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>

Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>, Carey, Lauren <Lauren.Carey@fda.hhs.gov>, Norris, Anne <Anne.Norris@fda.hhs.gov>, DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>

Subject: RE: DCM and meetign with Cardiac Care for Pets

B5

B5 I want to confirm it, then will send it along – could be Friday before I get this in shape to send...not to leave you hanging, but wanted to be more sure. Definitely, not done today as I'd thought. Thanks!

From: Hartogensis, Martine

Sent: Wednesday, May 9, 2018 2:17 PM

To: Rotstein, David <David.Rotstein@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>

Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>

Subject: RE: DCM and meetign with Cardiac Care for Pets

Awesome, thank you Dave!

Martine

From: Rotstein, David

Sent: Wednesday, May 09, 2018 2:06 PM

To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>

Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>

Subject: RE: DCM and meetign with Cardiac Care for Pets

Good Afternoon,

I spoke with **B6** @ Cardiac Care for Pets. He is going to look into times/dates with the cardiologists there and we can set the meeting up from that point.

Just some basic information:

B5

As a side note, there is a facebook page dedicated to this issue:

<https://www.facebook.com/groups/1952593284998859/about/>

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM Vet-LIRN Liaison
CVM OSC/DC/CERT

7519 Standish Place

B6



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From: Hartogenesis, Martine

Sent: Tuesday, May 08, 2018 10:58 AM

To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>

Subject: RE: DCM

Thank you Jen and Dave! Very interesting and sounds like you all are on it! The resident I spoke to was

B6

https://www.cvcavets.com/doctor_directory

B6

Keep us posted!

Thanks again!

Martine

Hi Martine.

B5

I'm happy to share more info as needed.

Jen

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



From: Rotstein, David
Sent: Tuesday, May 08, 2018 9:45 AM
To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Subject: RE: DCM

Martine,

B5

Looping in Jen.

Thanks for the update!

dave

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM Vet-LIRN Liaison
CVM OSC/DC/CERT
7519 Standish Place

B6



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From: Hartogensis, Martine
Sent: Tuesday, May 08, 2018 9:00 AM
To: Rotstein, David <David.Rotstein@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>
Subject: RE: DCM

B5

B5

Martine

From: Rotstein, David
Sent: Monday, May 07, 2018 1:13 PM
To: Hartogenesis, Martine <Martine.Hartogenesis@fda.hhs.gov>
Subject: Re: DCM

Martine

B5

There's a way to go on this moving forward.

Dave

From: Hartogenesis, Martine <Martine.Hartogenesis@fda.hhs.gov>
Date: May 7, 2018 at 1:03:13 PM EDT
To: Rotstein, David <David.Rotstein@fda.hhs.gov>
Subject: DCM

Hi Dave!

Do you have any more details on the DCM and grain free diet issue?

Martine

From: Carey, Lauren </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=F0226BD682844FA2B71EA3750D4FCB82-LAUREN.CARE>
To: Putnam, Juli; Hartogensis, Martine; Palmer, Lee Anne; DeLancey, Siobhan; Norris, Anne; Forfa, Tracey; Rotstein, David; Jones, Jennifer L
Sent: 7/18/2018 7:41:18 PM
Subject: RE: Bloomberg News inquiry re: Dog Food causing canine heart disease - Deadline: ASAP

Hi Juli,

Sorry, so many emails that things are getting buried.

B5

B5

Thanks,
Lauren

From: Putnam, Juli
Sent: Wednesday, July 18, 2018 2:54 PM
To: Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Subject: RE: Bloomberg News inquiry re: Dog Food causing canine heart disease - Deadline: ASAP

Hi all, can you please confirm

B5

B5

Thanks!

Best,
Juli

From: Carey, Lauren
Sent: Friday, July 13, 2018 9:37 AM
To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Subject: RE: Bloomberg News inquiry re: Dog Food causing canine heart disease - Deadline: ASAP

B5

From: Hartogensis, Martine
Sent: Friday, July 13, 2018 9:33 AM
To: Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Subject: RE: Bloomberg News inquiry re: Dog Food causing canine heart disease - Deadline: ASAP

Hi Juli,

You could also say something like:

B5

B5

Looping in Jen as well...

Martine

From: Putnam, Juli
Sent: Friday, July 13, 2018 9:29 AM
To: Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>
Subject: RE: Bloomberg News inquiry re: Dog Food causing canine heart disease - Deadline: ASAP

Thank you, Lauren! How's this? I'm adding Dave to take a look as well.

- How many of those unusual reports have you received so far? Can you give us a number of the dogs affected, to FDA knowledge?

Proposed response:

B5

B5

From: Carey, Lauren
Sent: Friday, July 13, 2018 9:18 AM
To: Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>
Subject: RE: Bloomberg News inquiry re: Dog Food causing canine heart disease - Deadline: ASAP

Hi,

B5

Thanks,
Lauren

From: Putnam, Juli
Sent: Friday, July 13, 2018 9:04 AM

To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>
Cc: Carey, Lauren <Lauren.Carey@fda.hhs.gov>
Subject: RE: Bloomberg News inquiry re: Dog Food causing canine heart disease - Deadline: ASAP

Thanks, everyone [redacted] B5
[redacted] B5 See the draft proposed response below for your review.

- How many of those unusual reports have you received so far? Can you give us a number of the dogs affected, to FDA knowledge?

Proposed response:

B5

From: Hartogensis, Martine
Sent: Thursday, July 12, 2018 6:21 PM
To: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>
Cc: Carey, Lauren <Lauren.Carey@fda.hhs.gov>
Subject: RE: Bloomberg News inquiry re: Dog Food causing canine heart disease - Deadline: ASAP

Thanks Lee Anne! [redacted] B6

From: Palmer, Lee Anne
Sent: Thursday, July 12, 2018 6:20 PM
To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>
Cc: Carey, Lauren <Lauren.Carey@fda.hhs.gov>
Subject: RE: Bloomberg News inquiry re: Dog Food causing canine heart disease - Deadline: ASAP

B5

From: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>
Date: July 12, 2018 at 6:16:01 PM EDT
To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>
Cc: Carey, Lauren <Lauren.Carey@fda.hhs.gov>
Subject: RE: Bloomberg News inquiry re: Dog Food causing canine heart disease - Deadline: ASAP

Hi about [redacted] B5 to date . Can't see whole steam - will send them read all

From: Hartogenesis, Martine <Martine.Hartogenesis@fda.hhs.gov>

Date: July 12, 2018 at 5:28:58 PM EDT

To: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>, Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>, Norris, Anne <Anne.Norris@fda.hhs.gov>, Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>

Cc: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>, Carey, Lauren <Lauren.Carey@fda.hhs.gov>

Subject: RE: Bloomberg News inquiry re: Dog Food causing canine heart disease - Deadline: ASAP

Yes, me too.

As of right now, I believe we have ab

B5

Lee Anne or Lauren, can you confirm?

From: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>

Date: July 12, 2018 at 4:54:18 PM EDT

To: Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>, Norris, Anne <Anne.Norris@fda.hhs.gov>, Hartogenesis, Martine <Martine.Hartogenesis@fda.hhs.gov>, Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>

Subject: RE: Bloomberg News inquiry re: Dog Food causing canine heart disease - Deadline: ASAP

That works for me!

Siobhan DeLancey, RVT, MPH

O: 240-402-9973

M: **B6**

From: Putnam, Juli

Sent: Thursday, July 12, 2018 4:52 PM

To: DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Hartogenesis, Martine <Martine.Hartogenesis@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>

Subject: RE: Bloomberg News inquiry re: Dog Food causing canine heart disease - Deadline: ASAP

B5

From: DeLancey, Siobhan

Sent: Thursday, July 12, 2018 4:47 PM

To: Putnam, Juli <JuliAnn.Putnam@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>

Subject: RE: Bloomberg News inquiry re: Dog Food causing canine heart disease - Deadline: ASAP

B5

Siobhan DeLancey, RVT, MPH

O: 240-402-9973

M: **B6**

From: Putnam, Juli

Sent: Thursday, July 12, 2018 4:44 PM

To: Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>

Subject: RE: Bloomberg News inquiry re: Dog Food causing canine heart disease - Deadline: ASAP

Importance: High

B5

From: Putnam, Juli

Sent: Thursday, July 12, 2018 3:49 PM

To: Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan (<Siobhan.Delancey@fda.hhs.gov> <Siobhan.Delancey@fda.hhs.gov>); Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Forfa, Tracey <Tracey.Forfa@fda.hhs.gov>

Subject: Bloomberg News inquiry re: Dog Food causing canine heart disease - Deadline: ASAP

Importance: High

Hi all - I know Dr. Solomon is out this week so including you all in the interest of time. Please let me know if you have edits to the responses and if we can answer the last one. Thanks!

Best,

Juli

Reporter: Aziza Kasumov

Outlet: Bloomberg

Deadline: asap

Background: I'm Aziza, a reporter for Bloomberg News working on a story about your statement from today about the potential link between certain dog foods and canine heart disease. I have a few more questions about the report, can you answer these for me? We're on tight deadline, so the sooner, the better.

Questions and proposed responses:

- Were the foods from several brands or from one brand of dog food? Can you name the companies that produced the foods linked to the reports, and which foods exactly the dogs ate? Was there one particular food brand that was heavily linked to the unusual reports?

B5

- How many of those unusual reports have you received so far? Can you give us a number of the dogs affected, to FDA knowledge?
CVM, please advise.

From: Freeman, Lisa <Lisa.Freeman@tufts.edu>
To: Peloquin, Sarah
Sent: [REDACTED] 4:36:23 PM
Subject: Re: [REDACTED]

Thanks!! Lisa

Sent from my iPhone

On [REDACTED] at 8:49 AM, Peloquin, Sarah <Sarah.Peloquin@fda.hhs.gov> wrote:

Hi Lisa,

The tissues can be collected in the same way as [REDACTED] (formalin and frozen). Then the vet should hold the tissues until next week, and we could send the boxes to him then.

I'll email him to clarify as well.

Thanks!
Sarah

Sarah Peloquin, DVM
Veterinary Medical Officer
tel: 240-402-1218

From: Freeman, Lisa <Lisa.Freeman@tufts.edu>
Sent: [REDACTED] 10:01 AM
To: Peloquin, Sarah <Sarah.Peloquin@fda.hhs.gov>
Cc: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Guag, Jake <Jake.Guag@fda.hhs.gov>
Subject: RE: [REDACTED]

Hi Sarah
Just to clarify – all of the tissue in the freezer or some in the freezer and some in formalin?
Thanks
Lisa

From: Peloquin, Sarah <Sarah.Peloquin@fda.hhs.gov>
Sent: [REDACTED] 9:56 AM
To: Freeman, Lisa <Lisa.Freeman@tufts.edu>
Cc: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Guag, Jake <Jake.Guag@fda.hhs.gov>
Subject: RE: [REDACTED]

Yes, -20 degrees should be fine.

Thanks, Lisa!
Sarah

Sarah Peloquin, DVM
Veterinary Medical Officer
tel: 240-402-1218

From: Freeman, Lisa <Lisa.Freeman@tufts.edu>
Sent: [REDACTED] 9:54 AM
To: Peloquin, Sarah <Sarah.Peloquin@fda.hhs.gov>

Cc: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Guag, Jake <Jake.Guag@fda.hhs.gov>

Subject: RE: [REDACTED] B6

Hi Sarah

Can they be frozen at -20? I'm sure the primary care vet doesn't have a -80 freezer

Thanks

Lisa

From: Peloquin, Sarah <Sarah.Peloquin@fda.hhs.gov>

Sent: [REDACTED] B6 [REDACTED] 9:51 AM

To: Freeman, Lisa <Lisa.Freeman@tufts.edu>

Cc: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Guag, Jake <Jake.Guag@fda.hhs.gov>

Subject: RE: [REDACTED] B6

Hi Lisa!

I hope you've been well. Jake also forwarded your email to me—thank you for following up with us.

If possible, the body and/or samples could be held frozen until next week. I'll discuss with Jen when she gets back, since I'm unsure where we are with our post-mortem samples. I'll make sure we follow up with you.

Thanks again, and have a great weekend!

Sarah

Sarah Peloquin, DVM

Veterinary Medical Officer

tel: 240-402-1218

From: Freeman, Lisa <Lisa.Freeman@tufts.edu>

Sent: [REDACTED] B6 [REDACTED] 9:26 AM

To: Peloquin, Sarah <Sarah.Peloquin@fda.hhs.gov>

Subject: FW: [REDACTED] B6

Dear Sarah

Got an out of office message from Jennifer so updating you so you can hopefully help to facilitate

Thanks

Lisa

From: Tufts Veterinary Clinical Nutrition Service

Sent: [REDACTED] B6 [REDACTED] 9:09 AM

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

Cc: [REDACTED] B6 [REDACTED]@tufts.edu>

Subject: [REDACTED] B6

Dear Jennifer and Jake

I just heard from [REDACTED] B6 the primary care vet for [REDACTED] B6. She is the dog from the household in which at least 3 dogs were affected with diet-associated DCM. This was the first case from the household which was identified when she came in for congestive heart failure.

The owners contacted him and said they will be bringing her in today to be euthanized for worsening heart failure. He's volunteered to get heart and liver samples as he did from [REDACTED] B6 Jake – could you send him shipping materials? His email is

[REDACTED] B6

Thanks very much

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

From: Freeman, Lisa <Lisa.Freeman@tufts.edu>
To: Jones, Jennifer L
Sent: 11/13/2018 10:12:07 PM
Subject: RE: 800.267-EON-358523; [B6]
Attachments: taurine [B6].pdf; taurine [B6].pdf; taurine [B6].pdf

Hi Jen

Attached are 3 taurine levels on dogs I've already reported – [B6], [B6] and [B6]

I'll try to get the rest reported this week. I got a little backed up with so many. Do I have the record for most reports? 😊

Also, Darcy Adin and I are collaborating on some studies so would love to catch up at some point if you think a conference call would be worthwhile.

Thanks!

Lisa

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Tufts Clinical and Translational Science Institute
Tufts University
www.petfoodology.org

From: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Sent: Tuesday, November 13, 2018 3:13 PM
To: Freeman, Lisa <lisa.freeman@tufts.edu>
Subject: RE: 800.267-EON-358523; [B6]

Thanks, Lisa. You can send the updates to me. I'm the primary POC for the DCM cases, and Dr. Peloquin will be handling the other cases.

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



U.S. FOOD & DRUG
ADMINISTRATION



From: Freeman, Lisa <Lisa.Freeman@tufts.edu>
Sent: Tuesday, November 13, 2018 3:02 PM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Subject: RE: 800.267-EON-358523; [B6]

Hi Jen,

I've noted in a few submissions that I haven't yet talked to the owners but on any others, you should be able to contact them

Should I continue to send updates on cases I've submitted to you or is it better to send to someone else on your team?

The cases are continuing to come in so I've got some additional cases to submit.

Thanks

Lisa

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Tufts Clinical and Translational Science Institute
Tufts University
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From: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Sent: Tuesday, November 13, 2018 2:45 PM
To: Freeman, Lisa <lisa.freeman@tufts.edu>
Subject: 800.267-EON-358523- **B6**

Hi Lisa,
Should I assume that it's ok to contact the owners for an interview when you submit the complaints?
Hope you're well. Just want to check,
Jen

Jennifer L. A. Jones, DVM

Veterinary Medical Officer
U.S. Food & Drug Administration
Center for Veterinary Medicine
Office of Research
Veterinary Laboratory Investigation and Response Network (Vet-LIRN)
8401 Muirkirk Road, G704
Laurel, Maryland 20708
new tel: 240-402-5421
fax: 301-210-4685
e-mail: jennifer.jones@fda.hhs.gov
Web: <http://www.fda.gov/AnimalVeterinary/ScienceResearch/ucm247334.htm>



From: Freeman, Lisa <Lisa.Freeman@tufts.edu>
To: Jones, Jennifer L
Sent: 12/27/2018 1:55:26 PM
Subject: updates

Hi Jen
I'm finally digging out from other deadlines so am back to reporting cases to you. I'll submit a bunch online but wanted to let you know that [B6] died [B6]
Hope you get some time off to enjoy the holidays!
Lisa

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From: Freeman, Lisa <Lisa.Freeman@tufts.edu>
To: Jones, Jennifer L
Sent: 10/18/2018 2:19:15 PM
Subject: Updates: Taurine Result for [B6] and [B6]
Attachments: T_23038.jpg; T_23040.jpg

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From: Tufts Veterinary Cardiology Service
Sent: Wednesday, October 17, 2018 9:28 AM
To: Freeman, Lisa <lisa.freeman@tufts.edu>
Subject: FW: Taurine Result

Veterinary Cardiology Service
Tufts University Cummings School of Veterinary Medicine

Please note: This account is not monitored on weekends, holidays, or evenings (after 5pm). Please allow 24 - 48 business hours for a reply. For immediate service during business hours, please call the liaison office at 508-887-4696. If you need to speak with the Emergency Service, please call 508-839-5395.

Foster Hospital for Small Animals
200 Westboro Road
North Grafton, MA 01536
<http://www.tufts.edu/vet/>
508.887.4696 phone
508.887.4363 fax

From: Amino Acid Lab <ucd.aminoacid.lab@ucdavis.edu>
Sent: Tuesday, October 16, 2018 6:37 PM
To: Clinical Pathology Lab <clinpath@tufts.edu>; Tufts Veterinary Cardiology Service <cardiovet@tufts.edu>
Subject: Taurine Result

Hello -

Thank you for using the Amino Acid Laboratory at UC Davis, School of Veterinary Medicine.

Please find attached the results for your patient. You will note that we are now using a new submission form. The new form requests some additional information that may be useful in interpreting your results. Please note, with the recent increase in the number of dogs screened for taurine deficiency, we are seeing some dogs with values within the lower reference ranges (or above the “no known risk for deficiency range”) yet are still exhibiting changes in cardiac function.

In addition to our new submission form, we have also attached 2 handouts developed by our cardiology service at UC Davis for your information. The first is a general handout on dilated cardiomyopathy in dogs. The second is a handout specifically focused on Golden Retrievers, a breed that has been over-represented in the association between grain-free diet consumption and dilated cardiomyopathy.

We hope your clinic finds this information helpful. Veterinarians are always welcome to contact our laboratory for assistance in evaluating your patient’s results.

Thank you -

The Amino Acid Laboratory
Department of Molecular Biosciences
School of Veterinary Medicine
University of California, Davis

Phone: 530-752-5058

Email: ucd.aminoacid.lab@ucdavis.edu

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

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

Lab Results Report

Chemistry 21 (Cobas)		9/13/2018 11:43:20 AM	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	

Ingredient listing by Atypical vs Typical Breed for Canine DCM

Ingredient	Typical vs Atypical					
	Atypical		Typical		All	
	N	% of Total	N	% of Total	N	% of Total
Folic Acid	35	2.45%	4	0.28%	39	2.73%
Biotin	31	2.17%	4	0.28%	35	2.45%
Peas	31	2.17%	4	0.28%	35	2.45%
Pyridoxine hydrochloride	31	2.17%	4	0.28%	35	2.45%
Thiamine mononitrate	31	2.17%	4	0.28%	35	2.45%
Vitamin E Supplement	31	2.17%	4	0.28%	35	2.45%
Niacin supplement	31	2.17%	3	0.21%	34	2.38%
Vitamin B12 Supplement	29	2.03%	4	0.28%	33	2.31%
Vitamin D3 Supplement	29	2.03%	4	0.28%	33	2.31%
Natural Flavor	27	1.89%	4	0.28%	31	2.17%
Copper proteinate	26	1.82%	3	0.21%	29	2.03%
Manganese proteinate	26	1.82%	3	0.21%	29	2.03%
Flaxseed	26	1.82%	2	0.14%	28	1.96%
Calcium iodate	23	1.61%	4	0.28%	27	1.89%
Iron Proteinate	24	1.68%	3	0.21%	27	1.89%
Riboflavin Supplement	22	1.54%	4	0.28%	26	1.82%
Salt	22	1.54%	4	0.28%	26	1.82%
Calcium carbonate	20	1.40%	4	0.28%	24	1.68%
Choline chloride	20	1.40%	4	0.28%	24	1.68%
Zinc Proteinate	21	1.47%	3	0.21%	24	1.68%
Vitamin A Supplement	20	1.40%	3	0.21%	23	1.61%
Potassium Chloride	17	1.19%	4	0.28%	21	1.47%
Sodium Selenite	18	1.26%	3	0.21%	21	1.47%
Sunflower oil	20	1.40%	1	0.07%	21	1.47%
Calcium pantothenate	17	1.19%	1	0.07%	18	1.26%
Rosemary extract	16	1.12%	2	0.14%	18	1.26%
Chickpeas	16	1.12%	1	0.07%	17	1.19%
Green lentils	16	1.12%	1	0.07%	17	1.19%
Pea Protein	13	0.91%	4	0.28%	17	1.19%
Red lentils	16	1.12%	1	0.07%	17	1.19%
d-Calcium pantothenate	14	0.98%	3	0.21%	17	1.19%
Kangaroo	14	0.98%	1	0.07%	15	1.05%
Pea Fiber	13	0.91%	1	0.07%	14	0.98%
Probiotics	13	0.91%	1	0.07%	14	0.98%
Dicalcium Phosphate	12	0.84%	1	0.07%	13	0.91%
Yucca schidigera extract	10	0.70%	3	0.21%	13	0.91%
Alfalfa Meal	10	0.70%	2	0.14%	12	0.84%
Mixed Tocopherols	10	0.70%	2	0.14%	12	0.84%
Pea Flour	11	0.77%	1	0.07%	12	0.84%
Beta Carotene	11	0.77%	0	0.00%	11	0.77%
Betaine Hydrochloride	11	0.77%	0	0.00%	11	0.77%
Copper sulfate	8	0.56%	3	0.21%	11	0.77%
DL-methionine	11	0.77%	0	0.00%	11	0.77%
Ferrous sulfate	8	0.56%	3	0.21%	11	0.77%
Lactic acid	8	0.56%	3	0.21%	11	0.77%
Zinc Sulfate	10	0.70%	1	0.07%	11	0.77%
Sweet potatoes	8	0.56%	2	0.14%	10	0.70%
Taurine	7	0.49%	3	0.21%	10	0.70%

Ingredient	Typical vs Atypical					
	Atypical		Typical		All	
	N	% of Total	N	% of Total	N	% of Total
Cobalt proteinate	8	0.56%	1	0.07%	9	0.63%
Riboflavin supplement	9	0.63%	0	0.00%	9	0.63%
salt	9	0.63%	0	0.00%	9	0.63%
Apples	6	0.42%	2	0.14%	8	0.56%
Blueberries	7	0.49%	1	0.07%	8	0.56%
Carrots	8	0.56%	0	0.00%	8	0.56%
Manganese sulfate	7	0.49%	1	0.07%	8	0.56%
Potato	7	0.49%	1	0.07%	8	0.56%
Potassium Iodide	7	0.49%	0	0.00%	7	0.49%
Selenium yeast	6	0.42%	1	0.07%	7	0.49%
Vitamin A Acetate	7	0.49%	0	0.00%	7	0.49%
Cranberries	5	0.35%	1	0.07%	6	0.42%
Dried Tomato Pomace	4	0.28%	2	0.14%	6	0.42%
Kangaroo meal	5	0.35%	1	0.07%	6	0.42%
Manganese Oxide	4	0.28%	2	0.14%	6	0.42%
Salmon Oil	6	0.42%	0	0.00%	6	0.42%
Salmon meal	3	0.21%	3	0.21%	6	0.42%
Spinach	6	0.42%	0	0.00%	6	0.42%
Acetate	4	0.28%	1	0.07%	5	0.35%
Alfalfa	5	0.35%	0	0.00%	5	0.35%
Ascorbic acid	5	0.35%	0	0.00%	5	0.35%
Canola oil	4	0.28%	1	0.07%	5	0.35%
Lamb meal	5	0.35%	0	0.00%	5	0.35%
Lentils	5	0.35%	0	0.00%	5	0.35%
Parsley	4	0.28%	1	0.07%	5	0.35%
Vitamin A	4	0.28%	1	0.07%	5	0.35%
Zinc proteinate	5	0.35%	0	0.00%	5	0.35%
Beta-Carotene	2	0.14%	2	0.14%	4	0.28%
Cheese	4	0.28%	0	0.00%	4	0.28%
Dried Whole Egg	4	0.28%	0	0.00%	4	0.28%
Duck	4	0.28%	0	0.00%	4	0.28%
Duck meal	4	0.28%	0	0.00%	4	0.28%
Minerals	4	0.28%	0	0.00%	4	0.28%
Pumpkin	1	0.07%	3	0.21%	4	0.28%
Salmon	2	0.14%	2	0.14%	4	0.28%
Sorbic Acid	4	0.28%	0	0.00%	4	0.28%
Vitamins	4	0.28%	0	0.00%	4	0.28%
Celery	3	0.21%	0	0.00%	3	0.21%
Chicken fat	3	0.21%	0	0.00%	3	0.21%
Chicken meal	3	0.21%	0	0.00%	3	0.21%
Cobalt Amino Acid Complex	3	0.21%	0	0.00%	3	0.21%
Copper Amino Acid Complex	3	0.21%	0	0.00%	3	0.21%
DL Methionine	2	0.14%	1	0.07%	3	0.21%
Inositol	1	0.07%	2	0.14%	3	0.21%
Iron Amino Acid Complex	3	0.21%	0	0.00%	3	0.21%
L-Ascorbyl-2-Polyphosphate	1	0.07%	2	0.14%	3	0.21%
Lamb	3	0.21%	0	0.00%	3	0.21%
Lettuce	3	0.21%	0	0.00%	3	0.21%
Manganese Amino Acid Complex	3	0.21%	0	0.00%	3	0.21%
Menadione sodium bisulfite complex	1	0.07%	2	0.14%	3	0.21%
Poultry fat	1	0.07%	2	0.14%	3	0.21%

Ingredient	Typical vs Atypical					
	Atypical		Typical		All	
	N	% of Total	N	% of Total	N	% of Total
Turkey meal	3	0.21%	0	0.00%	3	0.21%
Zinc Amino Acid Complex	3	0.21%	0	0.00%	3	0.21%
peas	3	0.21%	0	0.00%	3	0.21%
Beet Pulp	2	0.14%	0	0.00%	2	0.14%
Broccoli	2	0.14%	0	0.00%	2	0.14%
Brown Rice	1	0.07%	1	0.07%	2	0.14%
Caramel color	1	0.07%	1	0.07%	2	0.14%
Chicken Fat	2	0.14%	0	0.00%	2	0.14%
Chickory Root Extract	2	0.14%	0	0.00%	2	0.14%
Chicory root	1	0.07%	1	0.07%	2	0.14%
Citric acid	0	0.00%	2	0.14%	2	0.14%
Cobalt carbonate	2	0.14%	0	0.00%	2	0.14%
Copper Amino Acid Chelate	1	0.07%	1	0.07%	2	0.14%
Deboned Salmon	1	0.07%	1	0.07%	2	0.14%
Deboned chicken	2	0.14%	0	0.00%	2	0.14%
Dried Kelp	1	0.07%	1	0.07%	2	0.14%
Flaxseed oil	2	0.14%	0	0.00%	2	0.14%
Garbonzo bean	0	0.00%	2	0.14%	2	0.14%
Iron Amino Acid Chelate	1	0.07%	1	0.07%	2	0.14%
L-carnitine	1	0.07%	1	0.07%	2	0.14%
L-lysine	1	0.07%	1	0.07%	2	0.14%
Manganese Amino Acid Chelate	1	0.07%	1	0.07%	2	0.14%
Pomegranate	2	0.14%	0	0.00%	2	0.14%
Pork Fat	2	0.14%	0	0.00%	2	0.14%
Pork Liver	2	0.14%	0	0.00%	2	0.14%
Pork Meat Meal	2	0.14%	0	0.00%	2	0.14%
Rabbit	2	0.14%	0	0.00%	2	0.14%
Rabbit Meal	2	0.14%	0	0.00%	2	0.14%
Tomato pomace	2	0.14%	0	0.00%	2	0.14%
Tomatoes	2	0.14%	0	0.00%	2	0.14%
Venison	2	0.14%	0	0.00%	2	0.14%
Vitamin B12 Lactic Supplement	2	0.14%	0	0.00%	2	0.14%
Watercress	2	0.14%	0	0.00%	2	0.14%
Zinc Amino Acid Chelate	1	0.07%	1	0.07%	2	0.14%
Zinc Oxide	0	0.00%	2	0.14%	2	0.14%
Alfalfa sprouts	1	0.07%	0	0.00%	1	0.07%
Animal digest	1	0.07%	0	0.00%	1	0.07%
Animal fat	1	0.07%	0	0.00%	1	0.07%
Barley	1	0.07%	0	0.00%	1	0.07%
Barley grass	0	0.00%	1	0.07%	1	0.07%
Betaine	1	0.07%	0	0.00%	1	0.07%
Bison	1	0.07%	0	0.00%	1	0.07%
Brewers Rice	1	0.07%	0	0.00%	1	0.07%
Brewers Yeast	1	0.07%	0	0.00%	1	0.07%
Calcium Iodate	1	0.07%	0	0.00%	1	0.07%
Calcium phosphate	1	0.07%	0	0.00%	1	0.07%
Cauliflower	1	0.07%	0	0.00%	1	0.07%
Chicken	1	0.07%	0	0.00%	1	0.07%
Chicken cartilage	1	0.07%	0	0.00%	1	0.07%
Chicory Root	1	0.07%	0	0.00%	1	0.07%
Chicory root extract	1	0.07%	0	0.00%	1	0.07%

Ingredient	Typical vs Atypical					
	Atypical		Typical		All	
	N	% of Total	N	% of Total	N	% of Total
Cinnamon	1	0.07%	0	0.00%	1	0.07%
Cobalt Amino Acid Chelate	1	0.07%	0	0.00%	1	0.07%
Corn gluten meal	1	0.07%	0	0.00%	1	0.07%
Deboned Beef	1	0.07%	0	0.00%	1	0.07%
Deboned Turkey	1	0.07%	0	0.00%	1	0.07%
Deboned buffalo	1	0.07%	0	0.00%	1	0.07%
Deboned duck	1	0.07%	0	0.00%	1	0.07%
Deflourinated Tricalcium Phosphate	1	0.07%	0	0.00%	1	0.07%
Dried Seaweed Meal	1	0.07%	0	0.00%	1	0.07%
Dried Yeast	0	0.00%	1	0.07%	1	0.07%
Dried kelp	1	0.07%	0	0.00%	1	0.07%
Duck fat	1	0.07%	0	0.00%	1	0.07%
Ergocalciferol	1	0.07%	0	0.00%	1	0.07%
Faba Beans	1	0.07%	0	0.00%	1	0.07%
Fennel	1	0.07%	0	0.00%	1	0.07%
Fish oil	0	0.00%	1	0.07%	1	0.07%
Garlic oil	1	0.07%	0	0.00%	1	0.07%
Glucosamine hydrochloride	1	0.07%	0	0.00%	1	0.07%
Glycerin	1	0.07%	0	0.00%	1	0.07%
Green tea extract	1	0.07%	0	0.00%	1	0.07%
Guar gum	1	0.07%	0	0.00%	1	0.07%
Inulin	1	0.07%	0	0.00%	1	0.07%
L-lysine monohydrochloride	1	0.07%	0	0.00%	1	0.07%
Manganous oxide	1	0.07%	0	0.00%	1	0.07%
Natural Chicken flavor	1	0.07%	0	0.00%	1	0.07%
Natural Pork flavor	1	0.07%	0	0.00%	1	0.07%
Nicotinic acid	0	0.00%	1	0.07%	1	0.07%
Oatmeal	0	0.00%	1	0.07%	1	0.07%
Oats	1	0.07%	0	0.00%	1	0.07%
Olive oil	1	0.07%	0	0.00%	1	0.07%
Papayas	1	0.07%	0	0.00%	1	0.07%
Pea flour	1	0.07%	0	0.00%	1	0.07%
Peppermint	1	0.07%	0	0.00%	1	0.07%
Pheasant	1	0.07%	0	0.00%	1	0.07%
Pork fat	1	0.07%	0	0.00%	1	0.07%
Pork liver	1	0.07%	0	0.00%	1	0.07%
Pork meal	1	0.07%	0	0.00%	1	0.07%
Potato protein	1	0.07%	0	0.00%	1	0.07%
Potato starch	0	0.00%	1	0.07%	1	0.07%
Poultry by-product meal	1	0.07%	0	0.00%	1	0.07%
Quail	1	0.07%	0	0.00%	1	0.07%
Quinoa	1	0.07%	0	0.00%	1	0.07%
Raspberries	1	0.07%	0	0.00%	1	0.07%
Rosemary oil	0	0.00%	1	0.07%	1	0.07%
Salmon Meal	1	0.07%	0	0.00%	1	0.07%
Salmon oil	1	0.07%	0	0.00%	1	0.07%
Soybean meal	1	0.07%	0	0.00%	1	0.07%
Spearmint extract	1	0.07%	0	0.00%	1	0.07%
Sulfur	1	0.07%	0	0.00%	1	0.07%
Tapioca	1	0.07%	0	0.00%	1	0.07%
Tomato powder	1	0.07%	0	0.00%	1	0.07%

Ingredient	Typical vs Atypical					
	Atypical		Typical		All	
	N	% of Total	N	% of Total	N	% of Total
Turkey	1	0.07%	0	0.00%	1	0.07%
Turmeric	0	0.00%	1	0.07%	1	0.07%
Vitamin D Supplement	1	0.07%	0	0.00%	1	0.07%
Water for Processing	1	0.07%	0	0.00%	1	0.07%
Whole Grain Corn	1	0.07%	0	0.00%	1	0.07%
Whole Grain Wheat	1	0.07%	0	0.00%	1	0.07%
Wild boar	1	0.07%	0	0.00%	1	0.07%
Yellow squash	1	0.07%	0	0.00%	1	0.07%
Zinc oxide	1	0.07%	0	0.00%	1	0.07%
Zucchini	1	0.07%	0	0.00%	1	0.07%
alfalfa	1	0.07%	0	0.00%	1	0.07%
potatoes	1	0.07%	0	0.00%	1	0.07%
unknown	1	0.07%	0	0.00%	1	0.07%
L-Ascorbyl-2-Polyphosphate	0	0.00%	1	0.07%	1	0.07%
All	1243	86.98%	186	13.02%	1429	100.00%

1 row has been excluded.

Document properties

Author: Palmer, Lee Anne
Template: Normal.dotm
Page count: 2
Paragraph count: 1525
Line count: 1529
Word count: 1739
Character count (spaces excluded): 6739
Character count (spaces included): 6956

From: Jones, Jennifer L </o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=0f6ca12eaa9348959a4cbb1e829af244-Jennifer.Jo>
To: Rotstein, David; Palmer, Lee Anne; Carey, Lauren
Sent: 5/8/2018 11:09:29 AM
Subject: RE: Ingredient listing by Atypical vs Typical Breed for Canine DCM.docx

Thank you, Lee Anne! This is great. Here's the list of product I sent for comparison Cystine, Taurine, and Methionine Testing. Let me know if you want the full ingredients to do Odds Ratios, etc. As I mentioned yesterday at OSC council, I listed in the far right column the ingredients in common between the non-GF and GF diets if the ingredient was more frequent than 14 in the frequency chart you sent. A lot of the nonGF foods also contained peas (which was surprising), but they were much lower on the ingredient list...

<u>Case ID</u>	<u>Product Name</u>	<u>Type</u>	<u>Grains</u>
800.216-sub 2	B4	Grains	brown rice, corn, barley
800.215-sub 5		Grains	rice, rye flour, brown rice barley
800.210-sub 1		Grains	corn gluten meal, rice, b
800.194-sub 1		Grains	brewers rice, corn gluter wheat flour
800.240-sub 1		Grains	corn, sorghum
800.240-sub 2		Grains	corn, sorghum
800.240-sub 3		Grains	corn, sorghum, brewers
800.240-sub 4		Grains	corn, sorghum,
800.250-sub 1		Grain Free-No PFRs	Grain FREE

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



From: Rotstein, David
Sent: Monday, May 07, 2018 2:42 PM
To: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>
Subject: RE: Ingredient listing by Atypical vs Typical Breed for Canine DCM.docx

Lee Anne,

It was all very helpful!

David Rotstein, DVM, MPVM, Dipl. ACVP
 CVM Vet-LIRN Liaison
 CVM OSC/DC/CERT

7519 Standish Place

B6

(BB)



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From: Palmer, Lee Anne
Sent: Monday, May 07, 2018 2:34 PM
To: Rotstein, David <David.Rotstein@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>
Subject: RE: Ingredient listing by Atypical vs Typical Breed for Canine DCM.docx

And I didn't really answer the question –

B5

B5

Sorry about that, was answering the question you didn't ask!

From: Palmer, Lee Anne
Sent: Monday, May 7, 2018 2:32 PM
To: Rotstein, David <David.Rotstein@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>
Subject: RE: Ingredient listing by Atypical vs Typical Breed for Canine DCM.docx

So, it is a good question.

B5

B5

From: Rotstein, David
Sent: Monday, May 7, 2018 2:19 PM
To: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>
Subject: RE: Ingredient listing by Atypical vs Typical Breed for Canine DCM.docx

Lee Anne,

B5

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM Vet-LIRN Liaison
CVM OSC/DC/CERT

7519 Standish Place

B6 (BB)



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From: Palmer, Lee Anne
Sent: Monday, May 07, 2018 2:16 PM
To: Rotstein, David <David.Rotstein@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>
Subject: RE: Ingredient listing by Atypical vs Typical Breed for Canine DCM.docx

B5

From: Rotstein, David
Sent: Monday, May 7, 2018 2:10 PM
To: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>
Subject: RE: Ingredient listing by Atypical vs Typical Breed for Canine DCM.docx

Lee Anne,

Thank you.

I think **B5** Martine emailed me for an update.

Dave

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM Vet-LIRN Liaison
CVM OSC/DC/CERT
7519 Standish Place
B6 (BB)



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From: Palmer, Lee Anne

Sent: Monday, May 07, 2018 2:08 PM

To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>

Subject: Ingredient listing by Atypical vs Typical Breed for Canine DCM.docx

From: Jones, Jennifer L </o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=0f6ca12eaa9348959a4cbb1e829af244-Jennifer.Jo>
To: Rotstein, David; Palmer, Lee Anne; Hartogensis, Martine
CC: Burkholder, William; Carey, Lauren; Norris, Anne; DeLancey, Siobhan; Lovell, Randall A
Sent: 5/14/2018 11:09:04 AM
Subject: RE: DCM and meetign with Cardiac Care for Pets

I'll be interested to see B5

Based on those results, Lee Anne's analysis, and thoughts from managment, Vet-LIRN could:

B5

<u>Case ID</u>	<u>Product Name</u>	<u>Type</u>	<u>Grains</u>
800.216-sub 2	B4	Grains	brown rice, corn, barley
800.215-sub 5		Grains	rice, rye flour, brown rice barley
800.210-sub 1		Grains	corn gluten meal, rice, bi
800.194-sub 1		Grains	brewers rice, corn gluter wheat flour
800.240-sub 1		Grains	corn, sorghum
800.240-sub 2		Grains	corn, sorghum
800.240-sub 3		Grains	corn, sorghum, brewers
800.240-sub 4		Grains	corn, sorghum,
800.250-sub 1		Grain Free-No PFRs	Grain FREE

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



From: Rotstein, David
Sent: Friday, May 11, 2018 6:06 PM
To: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Hartogensis, Martine
 <Martine.Hartogensis@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>

Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Lovell, Randall A <Randall.Lovell@fda.hhs.gov>

Subject: RE: DCM and meetign with Cardiac Care for Pets

Lee Anne and Jen,

B6

which is the day CVCA is available. I made you both alternate hosts.

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM Vet-LIRN Liaison
CVM OSC/DC/CERT
7519 Standish Place

B6



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From: Palmer, Lee Anne

Sent: Friday, May 11, 2018 4:30 PM

To: Rotstein, David <David.Rotstein@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>

Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Lovell, Randall A <Randall.Lovell@fda.hhs.gov>

Subject: RE: DCM and meetign with Cardiac Care for Pets

B5

From: Rotstein, David

Sent: Friday, May 11, 2018 4:14 PM

To: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>

Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>; Lovell, Randall A <Randall.Lovell@fda.hhs.gov>

Subject: RE: DCM and meetign with Cardiac Care for Pets

Lee Anne,

This is fantastic.

B5

B5

From: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>

Date: May 11, 2018 at 4:06:05 PM EDT

To: Rotstein, David <David.Rotstein@fda.hhs.gov>, Hartogenesis, Martine <Martine.Hartogenesis@fda.hhs.gov>, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>

Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>, Carey, Lauren <Lauren.Carey@fda.hhs.gov>, Norris, Anne <Anne.Norris@fda.hhs.gov>, DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>, Lovell, Randall A <Randall.Lovell@fda.hhs.gov>

Subject: RE: DCM and meetign with Cardiac Care for Pets

Hi there –

B5

B5

B5

I'll final this up next week, have to get to other things yet today. Have a great weekend! J Lee Anne

B5

From: Rotstein, David
Sent: Wednesday, May 9, 2018 4:13 PM
To: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>
Subject: RE: DCM and meetign with Cardiac Care for Pets

Sounds very intriguing!!!

From: Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>
Date: May 9, 2018 at 4:09:18 PM EDT
To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>, Rotstein, David <David.Rotstein@fda.hhs.gov>, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>, Carey, Lauren <Lauren.Carey@fda.hhs.gov>, Norris, Anne <Anne.Norris@fda.hhs.gov>, DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>
Subject: RE: DCM and meetign with Cardiac Care for Pets

B5

B5 I want to confirm it, then will send it along – could be Friday before I get this in shape to send...not to leave you hanging, but wanted to be more sure. Definitely, not done today as I'd thought. Thanks!

From: Hartogensis, Martine
Sent: Wednesday, May 9, 2018 2:17 PM
To: Rotstein, David <David.Rotstein@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>
Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>
Subject: RE: DCM and meetign with Cardiac Care for Pets

Awesome, thank you Dave!

Martine

From: Rotstein, David
Sent: Wednesday, May 09, 2018 2:06 PM
To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>
Cc: Burkholder, William <William.Burkholder@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Norris, Anne <Anne.Norris@fda.hhs.gov>; DeLancey, Siobhan <Siobhan.Delancey@fda.hhs.gov>
Subject: RE: DCM and meetign with Cardiac Care for Pets

Good Afternoon,

I spoke with **B6** Cardiac Care for Pets. He is going to look into times/dates with the cardiologists there and we can set the meeting up from that point.

Just some basic information:

B5

As a side note, there is a facebook page dedicated to this issue:

<https://www.facebook.com/groups/1952593284998859/about/>

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM Vet-LIRN Liaison
CVM OSC/DC/CERT
7519 Standish Place

B6



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From: Hartogensis, Martine
Sent: Tuesday, May 08, 2018 10:58 AM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>
Subject: RE: DCM

Thank you Jen and Dave! Very interesting and sounds like you all are on it!

B6

B6

B6

Keep us posted!

Thanks again!

Martine

Hi Martine,

B5

I'm happy to share more info as needed.

Jen

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



From: Rotstein, David
Sent: Tuesday, May 08, 2018 9:45 AM
To: Hartogensis, Martine <Martine.Hartogensis@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Subject: RE: DCM

Martine,

B5

Looping in Jen.

Thanks for the update!

dave

David Rotstein, DVM, MPVM, Dipl. ACVP

CVM Vet-LIRN Liaison
CVM OSC/DC/CERT
7519 Standish Place

B6



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From: Hartogenesis, Martine
Sent: Tuesday, May 08, 2018 9:00 AM
To: Rotstein, David <David.Rotstein@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>
Subject: RE: DCM

B5

Martine

From: Rotstein, David
Sent: Monday, May 07, 2018 1:13 PM
To: Hartogenesis, Martine <Martine.Hartogenesis@fda.hhs.gov>
Subject: Re: DCM

Martine

Lee Anne will likely [redacted] **B5**

Vet-LIRN is looking into [redacted] **B5**

There's a way to go on this moving forward.

Dave

From: Hartogenesis, Martine <Martine.Hartogenesis@fda.hhs.gov>

Date: May 7, 2018 at 1:03:13 PM EDT

To: Rotstein, David <David.Rotstein@fda.hhs.gov>

Subject: DCM

Hi Dave!

Do you have any more details on the DCM and grain free diet issue?

Martine

From: Jones, Jennifer L </o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=0f6ca12eaa9348959a4cbb1e829af244-Jennifer.Jo>
To: 'Andrea Fascetti'
Sent: 8/20/2018 10:47:59 AM
Subject: RE: [REDACTED] **B5**

Excellent, thank you, Andrea. Please give my thanks to [REDACTED] **B6** as well. We can make the [REDACTED] **B5** solution from the [REDACTED] **B5**

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



From: Andrea Fascetti [mailto:ajfascetti@ucdavis.edu]
Sent: Saturday, August 18, 2018 6:43 PM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Subject: Re: [REDACTED] **B5**

Hello Jen -

I posed this question to [REDACTED] **B5** and here is his reply:

[REDACTED] **B5**

I will try to find out why he prefers using the chemical form - it may be as simple as cost. I sent an email but have not heard back - I have been on clinics all week and he has been pulling long hours.

I will try to track him down on Monday. We got in over 100 samples last week alone. Happy to catch up with you if we can be of any help with regard to the taurine matter.

[REDACTED] **B5**

Kind regards and I hope you are getting some time to enjoy the summer.

Andrea

On Aug 17, 2018, at 7:48 AM, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov> wrote:

Hi Andrea,

I had a quick question. I'm trying to order the [REDACTED] **B6** but does it matter [REDACTED] **B5**? I referenced the [REDACTED] **B5** paper you sent but couldn't find any specifics of the chemical formula.

I hope you and your family are doing well, including your dog after the quarantine period J
Thanks again and take care,
Jen

Jennifer L. A. Jones, DVM

Veterinary Medical Officer
U.S. Food & Drug Administration
Center for Veterinary Medicine
Office of Research
Veterinary Laboratory Investigation and Response Network (Vet-LIRN)
8401 Muirkirk Road, G704
Laurel, Maryland 20708
new tel: 240-402-5421
fax: 301-210-4685
e-mail: jennifer.jones@fda.hhs.gov
Web: <http://www.fda.gov/AnimalVeterinary/ScienceResearch/ucm247334.htm>
<image001.png> <image004.png>

From: Jones, Jennifer L </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=0F6CA12EAA9348959A4CBB1E829AF244-JENNIFER.JO>
To: [REDACTED] B6
Sent: 7/5/2019 4:34:49 PM
Subject: [REDACTED] B6 FDA-CVCA Study for Dilated Cardiomyopathy
Importance: High
Attachments: 03-Vet-LIRN-Network ProceduresOwners-12.22.2015.pdf

Good afternoon [REDACTED] B6

I am sorry that you lost [REDACTED] B6 Please accept my condolences. We have been working with CVCA to better understand Dilated Cardiomyopathy in dogs that ate pet foods labelled "grain free" and contain higher amounts of legumes and/or potato products. As part of that investigation, we would like to ask you some questions about [REDACTED] B6 past diet and environmental exposures.

The phone interview lasts approximately 30 minutes. Please send me 3 times when you would be available to speak between 6:30 am and 3 pm the following days:

- 7/11
- 7/12
- 7/15
- 7/16
- 7/17
- 7/18

I attached a copy of our network procedures. They describe how owners help with our case investigations. Thank you kindly,
Dr. Jones

Jennifer L. A. Jones, DVM

Veterinary Medical Officer
U.S. Food & Drug Administration
Center for Veterinary Medicine
Office of Research
Veterinary Laboratory Investigation and Response Network (Vet-LIRN)
8401 Muirkirk Road, G704
Laurel, Maryland 20708
new tel: 240-402-5421
fax: 301-210-4685
e-mail: jennifer.jones@fda.hhs.gov
Web: <http://www.fda.gov/AnimalVeterinary/ScienceResearch/ucm247334.htm>



From: Jones, Jennifer L </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=0F6CA12EAA9348959A4CBB1E829AF244-JENNIFER.JO>
To: [REDACTED] B6
Sent: 7/5/2019 4:51:54 PM
Subject: [REDACTED] B6 FDA-CVCA Study for Dilated Cardiomyopathy
Importance: High
Attachments: 03-Vet-LIRN-Network ProceduresOwners-12.22.2015.pdf

Good afternoon Mr. [REDACTED] B6

We have been working with CVCA to better understand Dilated Cardiomyopathy in dogs that ate pet foods labelled "grain free" and contain higher amounts of legumes and/or potato products. As part of that investigation, we would like to ask you some questions about [REDACTED] B6's past and current diet and environmental exposures.

The phone interview lasts approximately 30 minutes. Please send me 3 times when you would be available to speak between 6:30 am and 3 pm eastern time the following days:

- 7/11
- 7/12
- 7/15
- 7/16
- 7/17
- 7/18

I attached a copy of our network procedures. They describe how owners help with our case investigations.

Thank you kindly,

Dr. Jones

Jennifer L. A. Jones, DVM

Veterinary Medical Officer
U.S. Food & Drug Administration
Center for Veterinary Medicine
Office of Research
Veterinary Laboratory Investigation and Response Network (Vet-LIRN)
8401 Muirkirk Road, G704
Laurel, Maryland 20708
new tel: 240-402-5421
fax: 301-210-4685
e-mail: jennifer.jones@fda.hhs.gov
Web: <http://www.fda.gov/AnimalVeterinary/ScienceResearch/ucm247334.htm>



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

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: German Shepherd
 Sex: Female (Spayed)
 Age: **B6**

Lab Results Report

CBC (Research) (Advia) 3/22/2019 3:35:09 PM Accession ID: B6

Test	Results	Reference Range	Units
WBC (ADVIA)	B6	4.4 - 15.1	K/uL
RBC(ADVIA)		5.8 - 8.5	M/uL
HGB(ADVIA)		13.3 - 20.5	g/dL
HCT(ADVIA)		39 - 55	%
MCV(ADVIA)		64.5 - 77.5	fL
MCH(ADVIA)		21.3 - 25.9	pg
MCHC(ADVIA)		31.9 - 34.3	g/dL
CHCM		0 - 0	g/dl
RDW (ADVIA)		11.9 - 15.2	
COMMENTS (HEMATOLOGY)		0 - 0	

Hemolysis present 0-1 platelets per High power field

CBC (Research) (Advia) 3/22/2019 3:35:10 PM Accession ID: B6

Test	Results	Reference Range	Units
SEGS%	B6	43 - 86	%
LYMPHS%		7 - 47	%
MONOS%		1 - 15	%
EOS%		0 - 16	%
NRBC		0 - 1	/100 WBC
SEGS (AB)ADVIA		2.8 - 11.5	K/ul
LYMPHS (ABS)ADVIA		1 - 4.8	K/uL
MONOS (ABS)ADVIA		0.1 - 1.5	K/uL



Client: **B6**
 Patient:

EOS (ABS)ADVIA	B6	0 - 1.4	K/uL
WBC MORPHOLOGY		0 - 0	
No Morphologic Abnormalities			
POIKILOCYTOSIS		0 - 0	

CBC (Research) (Advia) 3/22/2019 3:35:26 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	
MAGNESIUM 2+		1.8 - 3	mEq/L	
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	
iCO2 (BICARB)		14 - 28	mEq/L	
AGAP		8 - 19		
NA/K		29 - 40		
T BILIRUBIN		0.1 - 0.3	mg/dL	
ALK PHOS		12 - 127	U/L	
GGT		0 - 10	U/L	
ALT		14 - 86	U/L	
AST		9 - 54	U/L	
CK		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	
COMMENTS (CHEMISTRY)			0 - 0	



Client: **B6**
Patient:

Medical records

Patient History Report

Client:	B6	Patient:	B6	Breed:	GERMAN SHEPHERD
Phone:	B6	Species:	CANINE	Sex:	Spayed Female
Address:	B6	Age:	B6		
		Color:	black and red		

Date	Type	Staff	History
------	------	-------	---------

3/19/2019 CM

B6

EMAIL
Recipients: TO: **B6** (Other)
Attachments: **B6** 2739-2_ph.pdf (Patient History)
Subject: Patient History from **B6** for
Message: No message entered.

3/19/2019 CM

EMAIL
Recipients: TO: ATTN Guardian (Other)
Attachments: **B6** 2739-2_ph.pdf (Patient History)
Subject: Patient History from **B6** for
Message: No message entered.

3/18/2019 D

4

Dilated or Congested Cardiomyopathy Tentative

3/18/2019 I

4

B6 IT WILL CAUSE INCREASED THIRST AND DESIRE TO URINATE. BE SURE YOUR PET HAS FRESH, CLEAN DRINKING WATER AT ALL TIMES. ALLOW YOUR PET TO HAVE ACCESS OUTDOORS MORE OFTEN WHILE ON A DIURETIC MEDICATION.

3/18/2019 P

4

B6

3/18/2019 P

4

3/18/2019 TC

4

B6

Heart: Irregular rhythm, extra beats occasionally. ECG has VPC's. Radiographs reveal enlarged heart, tall, dorsal displacement of trachea, loss of caudal waist, congestion of veins

B6

Assessment: Ultrasound revealed thin wall to ventricles, dilated ventricles
Rule Outs DCM, dietary related likely
Plan: **B6** Recommend see cardiologist, transition to regular diet --

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimates, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vitals/signs

Client: **B6**
Patient:

Medical records

Patient History Report

Client:	B6	Patient:	B6	Breed:	GERMAN SHEPHERD
Phone:		Species:	CANINE	Sex:	Spayed Female
Address:		Age:	B6	Color:	black and red

Date	Type	Staff	History
------	------	-------	---------

not grain free. Call the food company and let them know.

3/18/2019 T 3/18/2019 P	B6	Image: Thorax B6
3/18/2019 C		Technician Note Here for coughing on and off. Started 3 days ago. Its worse in the morning. No change in diet. No medications other then a joint supplement.
3/18/2019 T 3/18/2019 V		4 image: Mar 18, 2019 04:24 PM Staff: 4 Weight : 67.20 pounds
1/23/2019 L		4 Microbiology results from IDEXX Reference Laboratory Requisition ID: 117388426 Test Result Reference Range Posted Final OVA&PARA WHIPWORM HOOKWORM ROUNDWORM Ascn: B6
B6		

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimates, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative medl note, V: Vital signs

B6

Client: **B6**
Patient:

Medical records

Patient History Report

Client:	B6	Patient:	B6	Breed:	GERMAN SHEPHERD
Phone:		Species:	CANINE	Sex:	Spayed Female
Address:		Age:	B6	Color:	black and red

Date	Type	Staff	History
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infectious agents using RealPCR (canine diarrhea panel: test code 2625; feline diarrhea panel: test code 2627)

1/22/2019	L	4	SNAP Assays results from IDEXX VetLab In-clinic Laboratory Requisition ID: 19361 Posted Final
			Test Result Reference Range
			HW =
			Lyme =
			AP_spp =
			EC-EE =

B6

1/22/2019 I

B6

B6

1/22/2019 I

1/22/2019 I

1/22/2019 I

4

1/22/2019 V

B6

Weight : 69.20 pounds

1/22/2019 E

4

Adult Canine: 0 Abnormals

1/22/2019 C

B6

Tech History-Canine - Closed Jan 23/2019

B6

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimate, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vital signs

B6

Client: **B6**
Patient:

Medical records

Patient History Report

Client:	B6	Patient:	B6	Breed:	GERMAN SHEPHERD
Phone:		Species:	CANINE	Sex:	Spayed Female
Address:		Age:	B6	Color:	black and red

Date	Type	Staff	History
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B6

10/16/2018	C	22	Exam/Medical Notes
B6			

10/16/2018	P	22	B6
10/16/2018	P	22	

10/16/2018	C	B6	Technician Note
B6			

10/16/2018	V	22	Oct 16, 2018 03:27 PM Staff: 22
		Weight:	: 69.00 pounds

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimates, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vital signs

B6

Client: **B6**
Patient:

Medical records

Patient History Report

Client:	B6	Patient:	B6	Breed:	GERMAN SHEPHERD
Phone:		Species:	CANINE	Sex:	Spayed Female
Address:		Age:	11 Yrs. 6 Mos.	Color:	B6

Date	Type	Staff	History
9/13/2018	D	4	B6 Final
9/13/2018	C	4	Exam/Medical Notes B6
9/13/2018	I	4	B6
9/13/2018	P	4	
9/13/2018	C	B6	Technician Note B6
9/13/2018	V	4	Sep 13, 2018 02:46 PM Staff: 4 Weight : 69.40 pounds

6/20/2018 R 22 Rabies Certificate w/Dr Signature 2.-CLOSED_06/21/2018

B6 **B6**
B6

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimates, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vital signs

B6

Client: **B6**
Patient:

Medical records

Patient History Report

Client: **B6** Patient: **B6**
Phone: **B6** Species: CANINE Breed: GERMAN SHEPHERD
Address: **B6** Age: **B6** Sex: Spayed Female
Color: black and red

Date	Type	Staff	History
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Rabies Certificate

Client ID: **B6** Patient ID: **B6**
Client Name: **B6** Patient Name: **B6**
Address: **B6** Species: CANINE
Breed: GERMAN SHEPHERD
Sex: Spayed Female
Color: black and red
Phone: **B6** Markings: **B6**
Birthdate: **B6**
Weight: 65.8
Microchip#: **B6**

Tag Number: **B6**
Lot Number: **B6**
Vaccination Date: **B6**
Expiration Date: **B6**
Producer: **B6**
K/MLV: **B6**

B6

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimate, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vitalsigns

B6

Client: **B6**
Patient:

Medical records

Patient History Report

Client:	B6	Patient:	B6	Breed:	GERMAN SHEPHERD
Phone:		Species:	CANTINE	Sex:	Spayed Female
Address:		Age:	B6	Color:	black and red

Date	Type	Staff	History
6/20/2018	I	22	B6
6/20/2018	I	22	
6/20/2018	I	22	
6/20/2018	E	22	

6/20/2018	C	B6	Technician Note
B6			

6/20/2018 V **B6** Jun 20, 2018 05:03 PM Staff: **B6**
Weight : 65.80 pounds

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimates, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vital signs

B6

Client: **B6**
Patient:

Medical records

Patient History Report

Client:	B6	Patient:	B6	Breed:	GERMAN SHEPHERD
Phone:		Species:	CANINE	Sex:	Spayed Female
Address:		Age:	B6	Color:	

Date	Type	Staff	History
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5/24/2018 P 4

B6

1/11/2018 L 22

Microbiology results from IDEXX Reference
Laboratory Requisition ID: 108610170 Posted Final
Test Result Reference Range
OVA&PARA
WHIPWORM **B6**
HOOKWORM
ROUNDWORM
Asc: **B6**

OVA & PARASITES

B6

1/10/2018 L 22

SNAP Assays results from IDEXX VetLab In-clinic
Laboratory Requisition ID: 17113 Posted Final
Test Result Reference Range
HW = **B6**
Lyme =

1/10/2018 I 22

Your pet was vaccinated with the Boehringer Ingelheim Duramune Lyme vaccine on the left side of the chest with a Serial # 6960100A with expiration date Aug

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimates, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vital signs

B6

Client: **B6**
Patient:

Medical records

Patient History Report

Client:	B6	Patient:	B6	Breed:	GERMAN SHEPHERD
Phone:		Species:	CANINE	Sex:	Spayed Female
Address:		Age:	B6	Color:	black and red

Date	Type	Staff	History
1/10/2018	I	22	5,2018 Have you checked out your Petly page? This free service allows you to access pet information including bloodwork and vaccine reminders, order prescription refills, request appointments, and more! Please be sure to provide us with your email address so you can take advantage of this opportunity.
1/10/2018	P	22	B6
1/10/2018	E	22	B6

1/10/2018	C	B6	Tech History-Canine - Closed Jan 11/2018 B6
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1/10/2018	V	B6	Jan 10, 2018 02:57 PM Staff: B6 Weight: : 60.20 pounds
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7/11/2017	C	B6	Tech History-Canine - Closed Jul 12/2017
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B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimate, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vital signs

Client: **B6**
Patient:

Medical records

Patient History Report

Client:	B6	Patient:	B6	Breed:	GERMAN SHEPHERD
Phone:		Species:	CANINE	Sex:	Spayed Female
Address:		Age:	B6	Color:	black and red

Date	Type	Staff	History
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B6

7/11/2017 E 2
7/11/2017 I 2
7/11/2017 I 2

Small Animal: 0 Abnormals

7/11/2017 I

B6

B6

7/11/2017 P

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimate, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vital signs

B6

Page 10 of 30

Date: 3/20/2019 11:15 AM

Client: **B6**
Patient:

Medical records

Patient History Report

Client: **B6** Patient: **B6**
Phone: **B6** Species: CANINE Breed: GERMAN SHEPHERD
Address: **B6** Age: **B6** Sex: Spayed Female
Color: black and red

Date Type Staff History

7/11/2017 P **B6** **B6**

7/11/2017 V Jul 11, 2017 12:05 PM Staff **B6**

Weight : 59.40 pounds

2/4/2017 L 2 UA/Microscopy results from IDEXX Reference Laboratory Requisition ID: 103441206 Posted Final
Test Result Reference Range

BACTERIA
BILIRUBIN
BLOOD
CASTS
CLARITY
COLOR
CRYSTALS
EPI CELL
GLUCOSE
KETONES
MUCUS
OTHER
PH
PROTEIN
RBC
SP GRAVITY
UROB
WBC 0 - 5

B6

Asc: **B6**
UCUP
RE: 900 COLLECTION METHOD FREE-CATCH

B6

1/20/2017 L 2 Microbiology results from IDEXX Reference Laboratory Requisition ID: 103265539 Posted Final
Test Result Reference Range

OVA&PARA
WHIPWORM
HOOKWORM

B6

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimates, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PAPVL: Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vital signs

Client: **B6**
Patient:

Medical records

Patient History Report

Client:	B6	Patient:	B6	Breed:	GERMAN SHEPHERD
Phone:	B6	Species:	CANINE	Sex:	Spayed Female
Address:	B6	Age:	B6	Color:	black and red

Date	Type	Staff	History
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1/20/2017 L 2

Hematology results from IDEXX Reference			
Test	Result	Reference Range	Posted Final
Laboratory Requisition ID:	103265148		
HCT	B6	38.3 - 56.5	
HGB	B6	13.4 - 20.7	
MCHC	B6	32.6 - 39.2	
WBC	B6	4.9 - 17.6	
LYMPHS	B6		
MONOS	B6		
EOS	B6		
BASO	B6		
RBC	B6	5.39 - 8.70	
MCV	B6	59 - 76	
MCH	B6	21.9 - 26.1	
NEUT SEG	B6		
PLATELETS	B6	143 - 448	
RETIC CNT	B6		
ABS BASO	B6	0 - 100	
ABS EOS	B6	70 - 1490	
ABS LYMPHS	B6	1060 - 4950	
ABS MONOS	B6	130 - 1150	
ABS NEUTS	B6	2940 - 12670	

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimates, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vital signs

B6

Client: **B6**
Patient:

Medical records

Patient History Report

Client Phone Address	B6	Patient: B6 Species: CANINE Age: B6 Color: black and red	Breed: GERMAN SHEPHERD Sex: Spayed Female
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Date	Type	Staff	History
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ABS RET **B6** 10 - 110
Asc: **B6**
RE: 3034 REMARKS
REMARKS

B6

1/20/2017 L 2

Chemistry results from IDEXX Reference Laboratory Requisition
ID: 103265148 Posted Final

Test	Result	Reference Range
ALB		2.7 - 3.9
ALKP		5 - 160
ALT		18 - 121
AMYL		337 - 1469
AST		16 - 55
BUN/UREA		9 - 31
Ca		8.4 - 11.8
Chloride		108 - 119
CHOL		131 - 345
CK		10 - 200
CREA		0.5 - 1.5
DBIL		0.0 - 0.1
GGT		0 - 13
GLU		63 - 114
LIPA		138 - 755
PHOS		2.5 - 6.1
Potassium		4.0 - 5.4
Sodium		142 - 152
TBIL		0.0 - 0.3
TP		5.5 - 7.5
GLOB		2.4 - 4.0
ANION GAP		11 - 26
BICARB		13 - 27
IBIL		0.0 - 0.2
A/G Ratio		0.7 - 1.5
B/C Ratio		
Na/K Ratio		28 - 37
SDMA		0 - 14

B6

Asc: **B6**
RE: 281 HEMOLYSIS INDEX N
Index of N, 1+, 2+ exhibits no significant effect on chemistry values.
RE: 282 LIPEMIA INDEX N
Index of N, 1+, 2+ exhibits no significant effect on chemistry values.

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimates, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PAPVL: Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vital signs

B6

Client: **B6**
Patient:

Medical records

Patient History Report

Client:	B6	Patient:	B6	Breed:	GERMAN SHEPHERD
Phone:		Species:	CANINE	Sex:	Spayed Female
Address:		Age:	B6	Color:	black and red

Date	Type	Staff	History
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B6

1/20/2017 L 2 Endocrinology results from IDEXX Reference
Laboratory Requisition ID: 103265148 Posted Final
Test Result Reference Range
T4 **B6** 1.0 - 4.0
Asc#: **B6**

Interpretive ranges:
<1.0 Low
1.0-4.0 Normal
>4.0 High
2.1-5.4 Therapeutic
Dogs with no clinical signs of hypothyroidism and results within the normal reference range are likely euthyroid. Dogs with low T4 concentrations may be hypothyroid or euthyroid sick. Occasionally, hypothyroid dogs can have T4 concentrations that are low normal. Dogs with clinical signs of hypothyroidism and low or low normal T4 concentrations may be evaluated further by submission of free T4 and canine TSH. A high T4 concentration in a clinically normal dog is likely variation of normal; however elevations may occur secondary to thyroid autoantibodies or rarely thyroid neoplasia. For dogs on thyroid supplement, acceptable 4-6 hour post pill total T4 concentrations generally fall within the higher end or slightly above the reference range.

1/20/2017 L 2 Miscellaneous results from IDEXX Reference

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimates, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vital signs

B6

Client: **B6**
Patient:

Medical records

Patient History Report

Client:	B6	Patient:	B6	Breed:	GERMAN SHEPHERD
Phone:		Species:	CANINE	Sex:	Spayed Female
Address:		Age:	B6	Color:	black and red

Date	Type	Staff	History
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Laboratory Requisition ID: 103265148 Posted Final
Asc'n: **B6**
RE: 950 UPC IF INDICATED
UPC IF INDICATED

B6

1/19/2017	L	2	SNAP Assays results from IDEXX VetLab In-clinic Laboratory Requisition ID: 15201 Posted Final Test Result Reference Range HW = Lyme = AP_spp = EC-EE =
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B6

1/19/2017	L	2	B6
1/19/2017	L	2	
1/19/2017	L	2	
1/19/2017	P	2	
1/19/2017	E	2	

1/19/2017 C **B6** Tech History-Canine - Closed Jan 20/2017

B6

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimates, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vital signs

B6

Client: **B6**
Patient:

Medical records

Patient History Report

Client:	B6	Patient:	B6	Breed:	GERMAN SHEPHERD
Phone:		Species:	CANINE	Sex:	Spayed Female
Address:		Age:	B6	Color:	black and red

Date	Type	Staff	History
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B6

1/19/2017	V	B6	Jan 19, 2017 02:01 PM Staff: B6 Weight : 64.00 pounds
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5/25/2016	C	4	Exam/Medical Notes B6
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5/25/2016	D	4	Sprain Final B6
5/25/2016	I	4	

5/25/2016	C	B6	Technician Note B6
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B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimate, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vital signs

B6

Client: **B6**
Patient:

Medical records

Patient History Report

Client:	B6	Patient:	B6	Breed:	GERMAN SHEPHERD
Phone:		Species:	CANINE	Sex:	Spayed Female
Address:		Age:	B6	Color:	black and red

Date	Type	Staff	History
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5/25/2016 V **B6** May 25, 2016 03:47 PM Staff: **B6**

Weight : 65.20 pounds
Temperature : 101.5

11/23/2015 L 2 SNAP Assays results from IDEXX VetLab In-clinic
Laboratory Requisition ID: 13362 Posted Final
Test Result Reference Range
HW = **B6**
Lyme =
AP_spp =
EC-EE =

11/23/2015 I 2

B6

11/23/2015 I 2

11/23/2015 I 2

11/23/2015 I 2

Have you checked out your Pet Portal? This free service allows you to access pet information including bloodwork and vaccine reminders, order prescription refills, request appointments, and more! Please be sure to provide us with your email address so you can take advantage of this opportunity.

11/23/2015 I 2

B6

11/23/2015 P 2

11/23/2015 P 2

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimates, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vital signs

B6

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

Medical records

Patient History Report

Client: Phone: Address:	B6	Patient: B6 Species: CANINE Age: B6 Color: black and red	Breed: GERMAN SHEPHERD Sex: Spayed Female
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Date	Type	Staff	History
11/23/2015	V		B6 Nov 23, 2015 11:34 AM Weight : 60.00 pounds
11/23/2015	P	2	B6
11/23/2015	P	2	
11/23/2015	E	2	

11/23/2015	C	B6	Tech History-Canine - Closed Nov 24, 2015 B6
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11/23/2015	L	2	Microbiology results from IDEXX Reference Laboratory Requisition ID: 100159968 Test Result Reference Range OVA&PARA WHIPWORM HOOKWORM ROUNDWORM Ascn: B6 FV FS CANINE
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B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimates, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PAPVL: Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vital signs

Client: **B6**
Patient:

Medical records

Patient History Report

Client: **B6** Patient: **B6**
Phone: **B6** Species: CANINE Breed: GERMAN SHEPHERD
Address: **B6** Age: **B6** Sex: Spayed Female
Color: black and red

Date Type Staff History

B6

5/7/2015 C 4 Exam/Medical Notes
RV right hip SQ.

5/7/2015 R 4 Rabies Certificate w/Dr Signature 2 - CLOSED 05/08/2015

B6 **B6**
B6

Rabies Certificate

Client ID: **B6** Patient ID: **B6**
Client Name: **B6** Patient Name: **B6**
Address: **B6** Species: CANINE
Breed: GERMAN SHEPHERD
Sex: Spayed Female
Phone: **B6** Color: black and red
Markings: **B6**

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimates, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vital signs

B6

Client: **B6**
Patient:

Medical records

Patient History Report

Client:	B6	Patient:	B6	Breed:	GERMAN SHEPHERD
Phone:		Species:	CANINE	Sex:	Spayed Female
Address:		Age:	B6	Color:	black and red

Date	Type	Staff	History
------	------	-------	---------

Birthdate: **B6**

Weight: 59.8

Microchip#: **B6**

Tag Number:
Lot Number:
Vaccination Date:
Expiration Date:
Producer:
K / MLV:

B6

B6

5/7/2015	I	4	It is required by Connecticut state law that all domestic animals be vaccinated for Rabies according to State statutes. Currently, dogs and cats must receive a rabies vaccination by 6 months of age. Revaccination is required within 12 months of the first vaccination. Booster vaccinations must then be done within 36 months of the second vaccination for the animal to be considered 'Current' on its rabies vaccinations.
5/7/2015	I	4	B6
5/7/2015	V	4	May 7, 2015 10:44 AM Staff: 4

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimate, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vital signs

B6

Client: **B6**
Patient:

Medical records

Patient History Report

Client:	B6	Patient:	B6	Breed:	GERMAN SHEPHERD
Phone:		Species:	CANINE	Sex:	Spayed Female
Address:		Age:	B6	Color:	black and red

Date	Type	Staff	History
2/14/2015	V	B6	Weight : 59.80 pounds Feb 14, 2015 12:46 PM Staff: B6 Weight : 59.40 pounds
2/6/2015	I	2	B6
2/6/2015	V	B6	
9/9/2014	C	2	Exam/Medical Notes B6
9/9/2014	P	4	B6
9/9/2014	C	4	Exam/Medical Notes B6
9/9/2014	C	B6	Technician Note B6
9/9/2014	V	2	Sep 9, 2014 11:32 AM Staff: 2 Weight : 66.60 pounds

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimates, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vital signs

B6

Client: **B6**
Patient:

Medical records

Patient History Report

Client:	B6	Patient:	B6	Breed:	GERMAN SHEPHERD
Phone:		Species:	CANINE	Sex:	Spayed Female
Address:		Age:	B6	Color:	black and red

Date	Type	Staff	History
8/5/2014	C	B6	Phone Call Notes LMOM re: fecal negative
8/4/2014	L	2	SNAP Assays results from IDEXX VetLab In-clinic Laboratory Requisition ID: 11236 Posted Final Test Result Reference Range HW = Lyme = AP_spp = EC-EE =
8/4/2014	P	2	B6
8/4/2014	I	2	
8/4/2014	I	2	
8/4/2014	E	2	
8/4/2014	P	2	
8/4/2014	V	B6	

8/4/2014 C **B6** Tech History-Canine - Closed Aug 05/2014

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimates, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vital signs

Client: **B6**
Patient:

Medical records

Patient History Report

Client:	B6	Patient:	B6	Breed:	GERMAN SHEPHERD
Phone:		Species:	CANINE	Sex:	Spayed Female
Address:		Age:	B6	Color:	black and red

Date	Type	Staff	History
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B6

8/4/2014	L	2	Microbiology results from IDEXX Reference Laboratory Requisition ID: 2739-2 Posted Final Test Result Reference Range OVA&PARA SEE NOTES Ascn B6 FV FS CANINE
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B6

3/6/2014	I	B6	Simply snap the two disks together to puncture the safety seal. Part fur at the base of the tail and begin applying in a continuous motion up to the shoulder blades. Allow drying before interacting with your pet. http://www.vectrapet.com/how-to-apply/
3/6/2014	I		ALL FLEA PRODUCTS ARE INSECTICIDES. PLEASE FOLLOW THE DIRECTIONS ON THE LABEL. USING TOO MUCH CAN HARM YOUR PET. IF

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimate, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vital signs

B6

Client: **B6**
Patient:

Medical records

Patient History Report

Client:	B6	Patient:	B6	Breed:	GERMAN SHEPHERD
Phone:		Species:	CANINE	Sex:	Spayed Female
Address:		Age:	B6	Color:	black and red

Date	Type	Staff	History
------	------	-------	---------

3/6/2014	P		<p>YOU HAVE ANY QUESTIONS, PLEASE CALL THE HOSPITAL. Fleas continue to hatch from the environment for months after the adult population is eradicated. Continue to treat all pets in the household, as well as the environment, to be sure the flea infestation does not recur. Please call us if you are having trouble administering the product, or continue to see fleas.</p> <p>B6</p>
3/6/2014	I		
3/6/2014	I	B6	
3/6/2014	P		

12/24/2013	C	2	Exam/Medical Notes
<p>B6</p>			

12/24/2013	P	2	<p>B6</p>
12/24/2013	V	2	<p>Dec 24, 2013 11:39 AM Staff: 2</p> <p>Weight: : 71.40 pounds</p>
9/9/2013	PB	4	<p>B6</p>
9/9/2013	PB	4	

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimate, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vital signs

Client: **B6**
Patient:

Medical records

Patient History Report

Client:	B6	Patient:	B6	Breed:	GERMAN SHEPHERD
Phone:		Species:	CANINE	Sex:	Spayed Female
Address:		Age:	B6	Color:	black and red

Date	Type	Staff	History
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9/9/2013	C	4	Exam/Medical Notes B6
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9/9/2013	P	4	B6
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9/9/2013	C	B6	Technician Note B6
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9/9/2013	V	B6	Sep 9, 2013 03:05 PM Staff: B6 Weight : 64.00 pounds Temperature : B6 Pulse : B6 Respiration : B6 Alert/Attitude : B6 Pain Scale : B6 Appetite : B6 Urine Output : B6 Fecal Output : B6
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8/7/2013	L	2	SNAP Assays results from IDEXX VetLab In-clinic Laboratory Requisition ID: 9501 Posted Final Test Result Reference Range HW = B6 Lyme = AP_spp = EC-EE =
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B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimates, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vital signs

B6

Client: **B6**
Patient:

Medical records

Patient History Report

Client:	B6	Patient:	B6	Breed:	GERMAN SHEPHERD
Phone:		Species:	CANINE	Sex:	Spayed Female
Address:		Age:	B6	Color:	black and red

Date	Type	Staff	History
8/7/2013	I	2	Your pet was vaccinated with the Boehringer Ingelheim Duramune Lyme vaccine on the left side of the chest with a Serial # 522112A with expiration date July 12, 2014.
8/7/2013	P	2	B6
8/7/2013	E	2	B6

8/7/2013	C	B6	Tech History-Canine - Closed Aug 08/2013
B6			

8/7/2013	V	B6	Aug 7, 2013 03:41 PM Staff: B6
Weight : 65.40 pounds			
Body Score (1-9) :			
Temperature :			
Pulse :			
Respiration :			
Alert/Attitude :			
Pain Scale :			
Mucous Membranes :			
Capillary Refill :			
Dental Score :			
Appetite :			
Urine Output :			
Fecal Output :			

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimates, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vitalsigns

B6

Client: **B6**
Patient:

Medical records

Patient History Report

Client:	B6	Patient:	B6	Breed:	GERMAN SHEPHERD
Phone:		Species:	CANINE	Sex:	Spayed Female
Address:		Age:	B6	Color:	black and red

Date	Type	Staff	History
4/19/2013	C	B6	Client Communication - Closed Apr 20/2013 B6
4/18/2013	I	4	B6
4/18/2013	I	4	
4/18/2013	P	4	
4/18/2013	C	4	Exam/Medical Notes B6
4/18/2013	C	B6	Technician Note B6
4/18/2013	V	4	Apr 18, 2013 03:47 PM Staff: 4 Weight : 62.40 pounds
4/18/2013	L	4	Microbiology results from IDEXX Reference Laboratory Requisition ID: 2739-2 Posted Final Test Result Reference Range OVA&PARA SEE NOTES Asc'n B6

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimates, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vital signs

Client: **B6**
Patient:

Medical records

Patient History Report

Client:	B6	Patient:	B6	Breed:	GERMAN SHEPHERD
Phone:		Species:	CANINE	Sex:	Spayed Female
Address:		Age:	B6	Color:	black and red

Date	Type	Staff	History
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B6	FS CANINE
B6	

2/25/2013	V	B6	Feb 25, 2013 04:37 PM Staff: B6
			Weight : 59.20 pounds

2/25/2013	C	B6	Phone Call Notes
B6			

2/25/2013	P	4	1.00 BOX B6 (2670)
9/28/2012	P	B6	B6
9/28/2012	L		

B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimate, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vital signs

B6

Page 28 of 30

Date: 3/20/2019 11:15 AM

Client: **B6**
Patient:

Medical records

Patient History Report

Client:	B6	Patient:	B6	Breed:	GERMAN SHEPHERD
Phone:		Species:	CANINE	Sex:	Spayed Female
Address:		Age:	B6	Color:	black and red

Date	Type	Staff	History
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8/23/2012	L	2	recommended by the American Heartworm Society (AHS) and the Companion Animal Parasite Council (CAPC) that these agents are used year-around in all areas of the U.S. SNAP Assays results from IDEXX VetLab In-clinic Laboratory Requisition ID: 7599 Posted Final Test Result Reference Range HW = Lyme = E. canis = B6 A. ph. =
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8/23/2012	E	2	B6
8/23/2012	I	2	
8/23/2012	I	2	
8/23/2012	I	2	

8/23/2012	C	B6	B6
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8/21/2012	C	RT	Records received by Fax - CLOSED 08/23/2012 - Records received by Fax
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B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimates, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative med note, V: Vitals/signs

B6

Client: **B6**
Patient:

Medical records

Patient History Report

Client:	B6	Patient:	B6	Breed:	GERMAN SHEPHERD
Phone:		Species:	CANINE	Sex:	Spayed Female
Address:		Age:	B6	Color:	black and red

Date	Type	Staff	History
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B: Billing, C: Med note, CB: Call back, CK: Check-in, CM: Communications, D: Diagnosis, DH: Declined to history, E: Examination, ES: Estimate, I: Departing instr, L: Lab result, M: Image cases, P: Prescription, PA: PVL Accepted, PB: problems, PP: PVL Performed, PR: PVL Recommended, R: Correspondence, T: Images, TC: Tentative medl note, V: Vital signs

B6

Page 30 of 30

Date: 3/20/2019 11:15 AM

Client:
Patient:

B6

Diet Hx 3/22/19

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

Pet's name:

B6

Owner's name:

B6

Today's date:

3/22/19

1. How would you assess your pet's appetite? (mark the point on the line 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

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 you 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
ACANA TRIMMED (MOSTLY RED) MEAT FORMULA + FREE-RUN POULTRY FORMULA	DRY	1 1/4 cup	2x DAY	2015
HOMECOMED LIVER TREATS MADE OF 1 lb. CHICKEN LIVERS, 1-1/2 CUPS (DREN FLOUR), 3 EGGS + GARLIC POWDER	TREAT		ONLY	
RAW MINORON BONES				

*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 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	Nature's Bounty	500 mg tablets - 1 per day
GLUCOSAMINE		2 tabs / 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): _____

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

CBC/Chem 3/22/19



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: **B6** Order Location: V320559: Investigation into
Phone number: Species: Canine Sample ID: 1903220112
Collection Date: 3/22/2019 3:35 PM Breed: German Shepherd
Approval date: 3/22/2019 5:02 PM

CBC (Research) (Advia)

		Ref. Range/Females
DNOYES		
WBC (ADVIA)		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
MCHC (ADVIA)	H	31.9-34.3 g/dL
CHCM		
RDW (ADVIA)		11.9-15.2
Comments (Hematology)	Hemolysis present 0-1 platelets per High power field	

Microscopic Exam of Blood Smear (Advia)

		Ref. Range/Females
DNOYES		
Seg Neuts (%)		43-86 %
Lymphocytes (%)	L	7-47 %
Monocytes (%)		1-15 %
Eosinophils (%)		0-16 %
Nucleated RBC		0-1 /100 WBC

03/22/19 4:07 PM White blood cell count has been corrected for the presence of nucleated red blood cells

Seg Neutrophils (Abs) Advia		2.800-11.500 K/uL
Lymphs (Abs) Advia	L	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		
Poikilocytosis		

Research Chemistry Profile - Small Animal (Cobas)

		Ref. Range/Females
CSTCYR		
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

Sample ID: 1903220112/1
This report continues... (Final)

Reviewed by: _____

Client: **B6**
Patient:

CBC/Chem 3/22/19



Tufts Cummings School Of Veterinary Medicine

200 Westboro Road
North Grafton, MA 01536

DUPLICATE

Name/DOB:	B6	Sex: SF	Provider: B6
Patient ID:		Age: B6	Order Location: V320559: Investigation into
Phone number:		Species: Canine	Sample ID: 1903220112
Collection Date: 3/22/2019 3:35 PM		Breed: German Shepherd	
Approval date: 3/22/2019 5:02 PM			

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

		Ref. Range/Females
CSTCYR	B6	3.7-5.4 mEq/L
Potassium		14-28 mEq/L
tCO2(Bicarb)		8.0-19.0
AGAP		29-40
NA/K		0.10-0.30 mg/dL
Total Bilirubin		12-127 U/L
Alkaline Phosphatase		0-10 U/L
GGT		14-86 U/L
ALT		9-54 U/L
AST		22-422 U/L
Creatine Kinase		82-355 mg/dL
Cholesterol		30-338 mg/dl
Triglycerides		409-1250 U/L
Amylase	291-315 mmol/L	
Osmolality (calculated)		
Comments (Chemistry)		

Sample ID: 19032201122
REPRINT: Orig printing on 3/22/2019 (Final)

Reviewed by: _____
Page 2

Client: **B6**
Patient:

NT-proBNP 3/22/19

IDEXX Reference Laboratories

Client: **B6** Patient: EMI

Client: **B6**
Patient:
Species: CANINE
Breed: GERMAN_SHEPHERD
Gender: FEMALE S PAVED
Age: **B6**

Date: 03/22/2019
Requisition #: 1A
Accession #: 2303942774
Ordered by: RUSH

IDEXX VetConnect 1-888-433-9967
TUFTS UNIVERSITY
200 WESTBORO RD
NORTH GRAFTON, Massachusetts 01536
508-839-5395
Account #88933

CARDIOPET proBNP - CANINE

Test	Result	Reference Range	Low	Normal	High
CARDIOPET proBNP - CANINE	B6	0 - 900 pmol/L			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.

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

Patient's at-home monitoring sheet 3/26/19

B6
 B6
 Tufts Patient ID: B6
 German Shepherd
 Birthdate: B6

HEART FAILURE MONITORING WORKSHEET

Date	Respiration		B6	B6	B6	B6	Appetite				Comments
	Rate/Minute	Time					Excellent	Good	Fair	Poor	
03/23/19	30	22:00					✓				No coughing, rested comfortably during day, slightly restless at night- moved from one spot to another for about an hour before falling asleep.
03/24/19	34	23:10					✓				Spent some time lying outside, seemed pretty comfortable throughout the day. Stool softer than normal.
03/25/19	34	07:00					✓				Food: 1/2 cup Acana & 3/4 cup Royal Canin Early Cardiac 2x day. Emi pooped once today at 7pm. Stool was normal, formed.
	28	22:56									
03/26/19	30	10:45					✓				Food: 1/2 cup Acana & 3/4 cup Royal Canin Early Cardiac 2x day. Emi had accident last night, urinated in dog bed.

Respiration Rate: Count the number of breaths for 30 seconds and multiply times 2 to get the respiratory rate per minute. In dogs, obtain the respiratory rate when they are at rest and not panting. In cats get the respiratory rate at rest when they are not purring. **In animals with well controlled heart failure the breathing rate is often less than 35-40 breaths per minute.** When the breathing rate is climbing, or when there is more effort to the chest wall or belly muscles during breathing, then fluid is likely accumulating in the lungs and more furosemide may be indicated. Please bring this sheet with you to your next veterinary exam.

Client:
Patient:

B6

Vitals Results

3/22/2019 1:43:08 PM

Weight (kg)

25.9000

Client:
Patient:

B6

ECG from Cardio

B6

3/22/2019 2:18:38 PM

Page 1 of 2

Tufts University
Tufts Cummings School of Vet Med
Cardiology

12 Lead; Standard Placement

B6

Client:
Patient:

B6

ECG from Cardio

B6

3/22/2019 2:18:38 PM

Page 2 of 2

Tufts University
Tufts Cummings School of Vet Med
Cardiology

B6

Client:
Patient:

B6

Patient History

03/20/2019 11:52 AM	Appointment
03/20/2019 01:33 PM	Appointment
03/22/2019 01:11 PM	UserForm
03/22/2019 01:13 PM	UserForm
03/22/2019 01:43 PM	Vitals
03/22/2019 01:43 PM	Purchase
03/22/2019 01:56 PM	Treatment
03/22/2019 02:43 PM	UserForm
03/22/2019 03:57 PM	Prescription
03/22/2019 04:00 PM	Prescription
03/22/2019 04:18 PM	Purchase
03/23/2019 09:47 AM	Email
03/27/2019 12:41 PM	Appointment

B6

Patient Account History	Description	Qty	price	Extended	Disc	Pmt
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Client:
Patient:

B6

Patient Account History	Description	Qty	price	Extended	Disc	Pmt
Friday, 22 March 2019 13:43	Appointment: Cardiology Study	1.000	0.000	0.0000	0.0000	0.0000

Client:
Patient:

B6

Patient Account History	Description	Qty	price	Extended	Disc	Pmt
Friday, 22 March 2019 15:57	B6	60.000	0.390	28.4000	0.0000	0.0000

Client:
Patient:

B6

Patient Account History	Description	Qty	price	Extended	Disc	Pmt
Friday, 22 March 2019 16:00	B6	30.000	0.110	8.3000	0.0000	0.0000

Client:
Patient:

B6

Patient Account History	Description	Qty	price	Extended	Disc	Pmt
Friday, 22 March 2019 16:18	Pharmacy Finished	1.000	0.000	0.0000	0.0000	0.0000

B6

B6 Female (Spayed)

Canine German Shepherd Black/Red

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: 3/22/2019

Owner's address:

Owner's Name Signature

Date

**If the individual admitting the animal is someone other than the legal owner,
please complete the portion below:**

The owner of the animal as 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

Discharge Instructions

Patient

Name: B6

Species: Canine

Black/Red Female (Spayed) German Shepherd

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

Admit Date: 3/22/2019 1:09:07 PM

Discharge Date: 3/22/2019

Diagnoses: Dilated cardiomyopathy (DCM) with congestive heart failure, ventricular premature depolarizations

Diagnostic test results and findings:

o **Echocardiogram findings:** B6

o **ECG findings:** B6

o **Labwork findings:** B6

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. The heart enlargement has now progressed to the point of congestive heart failure, meaning that fluid is backing up into the lungs (pulmonary edema). 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 her 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 furosemide (Lasix). If difficulty breathing is not improved by within 30-60 minutes after giving extra furosemide then we recommend giving 1 more dose and if that does not help then a recheck exam be scheduled and/or that your dog be evaluated by an emergency clinic.
- 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/>).
- 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.
- If you have any concerns, please call or have your dog evaluated by a veterinarian. Our emergency clinic is open 24 hours/day.

Recommended Medications:

B6

We might add in a medication for arrhythmia in the future, especially if **B6** has a collapse or if the ECG shows worsening arrhythmia - a drug like **B6** would likely be added.

Diet suggestions:

Dogs with heart failure accumulate more fluid in their body if they eat large amounts of sodium (salt). Sodium can be found in all foods, but some foods are lower in sodium than others. Many pet treats, people foods, and supplements used to give pills often have more sodium than is desirable - a sheet that has suggestions for low sodium treats can be found on the HeartSmart web site (<http://vet.tufts.edu/heartsmart/diet/>)

Your dog's usual diet may also have more sodium than recommended - we want him/her to continue to eat his/her normal diet for the first 7 to 14 days so we can make sure he is tolerating medications well, but after that time we would recommend slowly introducing one of the lower sodium diets on the HeartSmart list (25% of the new diet and 75% old diet for 2-3 days, then 50/50, etc.). Hopefully you can find a diet on the list that your dog likes to eat. Alternatively, if you are attached to the current diet you can research the amount of sodium in the diet to ensure that the sodium content is similar to those on the list.

- 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 1-6 Healthy Cuisine Roasted Chicken, Carrot, and Spinach Stew

Royal Canin Mature 8+

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 after any medication adjustments are made. At this visit we will check your dog's breathing effort and heart function, do a blood test to recheck kidney values, and recheck an ECG. A recheck cardiac exam for the study and an echocardiogram is recommended in 3 months.

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

<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

AliveCor/Kardia Handout

If you have an iPhone or Android, you may want to explore the option of purchasing an AliveCor/Kardia ECG monitor which will allow you to record and email your pet's heart rate and rhythm at home.

The device (Kardia) can be purchased at www.alivecor.com or www.amazon.com. The app for your phone is free.

If you have an iPhone:

- Search for 'Veterinary AliveECG' app in the Apple Store
- You will need to sign-up for an account
- Make sure to have your pet's name in the information so we know whom it is from
- If the app asks for permission to access headphone port/speaker port, say **'OK/allow'**

If you have an Android:

- Search for 'Kardia' app in the Google Playstore
- You will need to sign-up for an account.
- Make sure to have your pet's name in the information so we know whom it is from
- If the app asks for permission to access headphone port/speaker port, say **'OK/allow'**
- Once downloaded, it will require you to send a "test ECG" for activation of the app. Just place your fingers on the silver sensors and let it record
- If the test ECG is unable to record, try again, with less movement. If it still fails, then your phone is not compatible with the device

Recording an ECG:

- Apply rubbing alcohol (soaked cotton ball will work) to the chest region behind your pet's elbow (where you can feel the heartbeat)
- Enough to wet the regions where both silver boxes will touch the animal
- If your pet is fluffy, you may have to clip a small patch of fur to allow for better contact
- Hold the device against your pet's chest with the silver areas being up and down (vertical) in contact with the animal
- With the app open, hold your phone near (within a few inches) the device.
- There is a signal bar in the upper left corner of the app to show whether it detects the device. If there are no bars then move your phone around/get closer to the device until they appear.
- Once you see a recording, hold everything in place for at least 30 seconds if possible.
- *The human Kardia app will attempt to interpret the ECG; just ignore this as it is not always accurate.*
- *The heart rate that the apps report is also not always accurate.*

Saving an ECG:

- The app will automatically save the ECG as long as the recording is long enough (>20seconds)
- You can click on the ID (box with pencil icon) in the Veterinary AliveECG app to add your pet's name

Emailing an ECG:

- If you are in the recording screen on the Veterinary AliveECG app, click on "ECGs" to see the list of saved ECGs
- If you are in the home screen on the Kardia app, click "History".
- Select the ECG you wish to send. Go to "Share". Select "Email PDF". **SKIP** the Password protect feature and select the email app you wish to send it by (Gmail, outlook, yahoo, etc). **You must have a working email on your phone for this to work.**
- Select an ECG that you wish to send
- Click the mail icon (either a box with arrow or a letter symbol), and select "Email"
- Email to: cardiovet@tufts.edu (only monitored Monday-Friday 9AM-5PM)

Cummings Veterinary Medical Center

AT TUFTS UNIVERSITY

Cardiology Liaison: 508-887-4696

B6

Patient ID: B6

B6 canine

B6 Female (Spayed) German

Shepherd

Black/Red

Cardiology Appointment Report ENROLLED IN DCM DIET STUDY

Date: 3/22/2019

Attending Cardiologist:

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

B6

Cardiology Resident:

B6

Cardiology Technician:

B6

Student: B6

Presenting Complaint: referred for evaluation of DCM and for grain-free diet study

Concurrent Diseases: none reported

General Medical History:

Last weekend, had difficulty breathing on a walk, described as wheezing (very brief) and then seemed to be okay. Next morning, the same thing happened. Took in to rDVM on Monday where she was diagnosed with DCM. Usually a "lowkey dog". Owner noted increased breathing effort during rest (quick, short). Nothing else out of the ordinary. Prior history of infected anal gland, resolved with antibiotics by rDVM. Currently on heartworm preventative.

No "wheezing" spells since starting the B6 but still tachypneic.

Eating and drinking are normal.

Diet and Supplements:

Acana heritage red meat formula (grain-free) has been on for a few years (occasionally a different)
Eats homemade liver treats in treat balls (chicken mixed with cornflour, eggs, garlic)
Occasional raw marrow bone

Cardiovascular History:

Prior CHF diagnosis? Y
Prior heart murmur? N
Prior ATE? N
Prior arrhythmia? Y, VPCs noted on ECG
Monitoring respiratory rate and effort at home? Y, has had increased effort during rest (not counting)
Cough? Y
Shortness of breath or difficulty breathing? Y
Syncope or collapse? N
Sudden onset lameness? N
Exercise intolerance? Hard to say, she's usually low energy - has been sometimes avoiding going upstairs when she usually would

Current Medications Pertinent to CV System:

Medication: B6
Formulation/Tab Size: B6
Administration Frequency: B6
Need refills?

Medication: B6
Formulation/Tab Size: B6
Administration Frequency: B6
Need refills?

Cardiac Physical Examination:

B6

Muscle condition: muscle loss mostly in the pelvic area

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

Cardiovascular Physical Exam:

Murmur Grade:
 None to
 I/VI
 II/VI
 III/VI
 IV/VI
 V/VI
 VI/VI

Murmur location/description: left apical

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
- Premature beats

- Bradycardia
- Tachycardia

Gallop: S3

- Yes
- No
- Intermittent

- Pronounced
- Other: Impressive gallop

Pulmonary assessments:

- Eupneic
- Mild dyspnea
- Marked dyspnea
- Normal BV sounds

- Pulmonary crackles
- Wheezes
- Upper airway stridor

Abdominal exam:

- Normal - minimal exam
- Hepatomegaly
- Abdominal distension

- Mild ascites
- Marked ascites

Problems:

DCM with CHF

Mildly increased effort of breathing (likely secondary to CHF vs less likely pulmonary disease vs PTE vs pulmonary hypertension)

Diagnostic plan:

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

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

B6

Radiographic findings: None available at time of exam

Assessment and recommendations:

Dilated cardiomyopathy with mild pulmonary edema today and some ventricular arrhythmia. **B6**

B6

prescribed), enter into DCM diet study, start taurine pending taurine levels, and we talked for some time about the pros and cons of starting an antiarrhythmic. The dog did not have collapse and sustained arrhythmia was not documented. Discussed Holter or aserial alivacor readings. **B6**

B6

Get long lead II ECG and recheck renal values and electrolytes in about 10 days and then consider increasing (**B6** 10 mg AM and 5 mg PM), **B6** based on current bloods (liver enzymes) and recheck ECG. Discussed diet change.

Heart Failure Classification Score:

ISACHC Classification:

- Ia
- Ib
- II to
- IIIa
- IIIb

ACVIM Classification:

- A
- B1
- B2
- C
- D

M-Mode

IVSd	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
EPSS	cm
B6	
<u>M-Mode Normalized</u>	
IVSdN	{0.290 - 0.520}
LVIDdN	{1.350 - 1.730} !
LVPWdN	{0.330 - 0.530}
IVSsN	{0.430 - 0.710}

LVIDsN
LVPWsN
Ao Diam N
LA Diam N

(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
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
LA Area
R-R
HR
CO A-L LAX
CO MOD LAX

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ms
BPM
l/min
l/min

B6

Doppler
MR Vmax
MR maxPG
MV E Vel
MV DecT
MV Dec Slope

m/s
mmHg
m/s
ms
m/s

MVA Vel
MV E/A Ratio
E'
E/E'
A'
S'
AV Vmax
AV maxPG
PV Vmax
PV maxPG

B6

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

B6**B6**

Tufts Patient ID: 441842

German Shepherd

Birthdate:

B6**HEART FAILURE MONITORING WORKSHEET**

Date	Respiration		B6								Appetite				Comments
	Rate/Minute	Time	AM	PM	AM	PM	AM	PM	AM	PM	Excellent	Good	Fair	Poor	
03/23/19	30	22:00	50mg	50mg	10mg	-	7.5mg	7.5mg	500mg	500mg	✓				No coughing, rested comfortably during day, slightly restless at night- moved from one spot to another for about an hour before falling asleep.
03/24/19	34	23:10	50mg	50mg	10mg	-	7.5mg	7.5mg	500mg	500mg	✓				Spent some time lying outside, seemed pretty comfortable throughout the day. Stool softer than normal.
03/25/19	34	07:00	50mg	50mg	10mg	-	7.5mg	7.5mg	500mg	500mg	✓				Food: 3/4 cup Acana & 1/2 cup Royal Canin Early Cardiac 2x day. Emi pooped once today at 7pm... stool was normal, formed. Squints a bit when outside.
"	28	22:56													
03/26/19	30	10:45	50mg	50mg	10mg	-	7.5mg	7.5mg	500mg	500mg	✓				Food: 3/4 cup Acana & 1/2 cup Royal Canin Early Cardiac 2x day. Emi had accident last night, urinated in dog bed.
03/27/19	32	08:26	50mg	50mg	10mg	-	7.5mg	7.5mg	500mg	500mg	✓				Food: 1/2 cup Acana & 3/4 cup Royal Canin Early Cardiac 2x day. A little more active and engaging.
03/28/19	34	23:15	50mg	50mg	10mg	-	7.5mg	7.5mg	500mg	500mg	✓				Food: 1/2 cup Acana & 3/4 cup Royal Canin Early Cardiac 2x day. Slept through night, about 6 hours, no accidents.
03/29/19	30	22:55	50mg	50mg	10mg	-	7.5mg	7.5mg	500mg	500mg	✓				Food: 1/4 cup Acana & 1 cup Royal Canin Early Cardiac 2x day. Urinated while asleep last night. Acting a little more like herself, follows Pandora outside.
03/30/19	30	23:16	50mg	50mg	10mg	-	7.5mg	7.5mg	500mg	500mg		✓			Food: 1/4 cup Acana & 1 cup Royal Canin Early Cardiac 2x day. Ate most of her food this evening.
03/31/19	28	19:32	50mg	50mg	10mg	-	7.5mg	7.5mg	500mg	500mg		✓			Food: 1/4 cup Acana & 1 cup Royal Canin Early Cardiac 2x day. Left a little food in her bowl in the morning and evening. Followed Pandora around yard.
04/01/19	24	23:02	50mg	50mg	10mg	-	7.5mg	7.5mg	500mg	500mg	✓				Food: 1-1/4 cup Royal Canin Early Cardiac 2x day.
04/02/19	16	22:53	50mg	50mg	10mg	-	7.5mg	7.5mg	500mg	500mg		✓			Food: 1-1/4 cup Royal Canin Early Cardiac 2x day. Loose stool around 7pm. Didn't eat all her food am or pm.
"	16	22:56													
04/03/19	20	15:04	50mg	50mg	10mg	-	7.5mg	7.5mg	500mg	500mg		✓			Food: 1-1/4 cup Royal Canin Early Cardiac 2x day. Loose stool 12:30pm. Alert, more active when outside. Didn't eat all her food am or pm.
"	32	21:41													
04/04/19			50mg		10mg		7.5mg		500mg		✓				Food: 1-1/4 cup Royal Canin Early Cardiac 2x day.

Respiration Rate: Count the number of breaths for 30 seconds and multiply times 2 to get the respiratory rate per minute. In dogs, obtain the respiratory rate when they are at rest and not panting. In cats get the respiratory rate at rest when they are not purring. *In animals with well controlled heart failure the breathing rate is often less than 35-40 breaths per minute.* When the breathing rate is climbing, or when there is more effort to the chest wall or belly muscles during breathing, then fluid is likely accumulating in the lungs and more furosemide may be indicated. Please bring this sheet with you to your next veterinary exam.

CARDIOLOGY DIET HISTORY FORM

29.7kg

Please answer the following questions about your pet

Pet's name **B6** Owner's name **B6** Today's date: 4/4/19

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 you 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
ROYAL CANIN EARLY CARDIAC		1 1/4 cup	2x/day	
LIVER TREATS - HOMEMADE - JUST CHICKEN LIVER, ROOTS + CORNFLOUR		1/4 cup	2x/day	

**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 checked="" 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	Nature's Bounty	500 mg tablets – 1 per day
Glucosamine	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

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): _____

Client: **B6**
Patient:

Recheck chem: **B6**



Tufts Cummings School Of Veterinary Medicine

200 Westboro Road
North Grafton, MA 01536

Name/DOB: B6	Sex: CM	Provider: Dr. John Rush
Patient ID: B6	Age: 12	Order Location: V320559: Investigation into
Phone number:	Species: Canine	Sample ID: 1904300091
Collection Date: 4/30/2019 12:52 PM	Breed: Golden Retriever	
Approval date: 4/30/2019 1:33 PM		

Research Chemistry Profile - Small Animal (Cobas)

		Ref. Range/Males
CSTCYR	B6	
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: 1904300091/1
END OF REPORT (Final)

Reviewed by: _____

Client: **B6**
Patient:

Diet Hx **B6**

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

Pet's name **B6** Owner's name: **B6** Today's date: **B6**

1. How would you assess your pet's appetite? (mark the point on the line 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 appetite has improved since he began meds

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. - Completed history last visit so I just included his current food here.

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
Nutro 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
Pro Axiom Pro Plan weight management- few bite size PC Chicken	dry bowl	1/2 c few pc.	2 x day	Started 4/22-present
Milkbone brand sm. dog biscuits		13 pc.	3x daily	? - present
				? - present

*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 checked="" type="checkbox"/> Yes <input type="checkbox"/> No	see file	
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	Nature's Bounty	500 mg tablets - 1 per day

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): small piece of chicken

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

Amino Acid Lab taurine panel 4/17/19

29882 OPL
QWB

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
Canine
3:54 PM
SHIP IN ICE PACKS, TAURINE
PANEL
Lithium Heparin
Lush

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: Golden Ret Owner's Name: **B6**

Current Diet: Blue Buffalo Chicken LID

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: _____
B6

	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**

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

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

Phone: 508 887 4696
Fax:
Animal Name: **B6**
Owner Name:
Species: Canine
Date Received: May 30, 2019

Tufts Cummings School of Vet Med -
Cardiology/Nutrition Tracking Number:
444016

GI Lab Accession: **B6**

Test	Result	Reference Interval	Assay Date
Ultra-Sensitive Troponin I Fasting	B6 ng/mL	≤0.06	05/31/19

B6

Comments:

GI Lab Contact Information

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

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

Report Details - B6	
ICSR:	2023228
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:	2017-07-11 17:06:59 EDT
Reported Problem:	<p>Problem Description: Please note: Dr. Jennifer Jones was consulted prior to submission of this report. She would like to be involved in the case review 3 week history of cough treated unsuccessfully with doxycycline and prednisone. 3 day history of inappetence and vomiting prior to presentation to B6 emergency service for dyspnea. Radiographs showed severe pulmonary edema and echocardiogram showed severe Dilated Cardiomyopathy. There was an initial response to diuretic therapy however, he declined and was placed on the ventilator for respiratory support and continued CHF treatment. Attempts to wean off the ventilator were unsuccessful and aquaphoresis was performed. He continued to decline despite aggressive therapy and was euthanized. Infectious disease testing was negative and taurine and carnitine analysis showed adequate levels. Necropsy initially did not reveal a cause for DCM and supported alveolar injury (possibly ventilator related). A re-review of the myocardial histopathology by one of our pathologist showed myofiber vacuoles reminiscent of the changes seen in doxorubicin toxicity. Since the dog had not received doxorubicin B6</p> <p style="text-align: center;">B6</p> <p>B6 had been fed California Naturals Adult - both kangaroo with lentils and venison with lentils along with Milo's kitchen treats. We have samples of these foods from 6/17 but not the original bags from when he was presented 2/17. These samples were provided at the time his housemate B6 (unrelated, older miniature schnauzer) also presented with severe DCM and CHF. I will enter this dog as a separate affected patient. Both dogs had extensive infectious disease testing which was negative and nutritional amino acid deficiencies were ruled out. Because of this, their unrelated lineages (although the same breed, they were from different lines), different ages but similar time of presentation B6 had clinical signs at the time B6 was treated, but didn't present with CHF for several months), we are considering common environmental factors which could precipitate DCM, including food contamination or toxin exposure.</p> <p>Date Problem Started: B6</p> <p>Concurrent Medical Problem: No</p> <p>Outcome to Date: Died Euthanized</p> <p>Date of Death: B6</p>
Product Information:	<p>Product Name: Alternated between: -California Natural Adult Limited Ingredient Grain Free Venison & Green Lentils and Kangaroo & Red Lentils Recipe</p> <p>Product Type: Pet Food</p> <p>Lot Number:</p> <p>UPC: not available</p> <p>Package Type: BAG</p> <p>Package Size: 26 Pound</p> <p>Purchase Date: 06/01/2017</p> <p>Possess Unopened Product: No</p> <p>Possess Opened Product: Yes</p> <p>Storage Conditions: In a cabinet, in the original bag</p> <p>Product Use Information:</p> <p>Description: twice daily feeding The sample we have is from 6/17, however, we do not have food samples from 2/17 when both dogs started with clinical signs.</p> <p>Time Interval between Product: 2 Years</p>

Use and Adverse Event:	
Product Use Stopped After the Onset of the Adverse Event:	No
Perceived Relatedness to Adverse Event:	Possibly related
Other Foods or Products Given to the Animal During This Time Period:	Yes

Manufacturer /Distributor Information:	
Purchase Location Information:	Address: United States

Animal Information:

Name:	B6	
Type Of Species:	Dog	
Type Of Breed:	Schnauzer - Miniature	
Gender:	Male	
Reproductive Status:	Neutered	
Weight:	8.2 Kilogram	
Age:	2.5 Years	
Assessment of Prior Health:	Excellent	
Number of Animals Given the Product:	2	
Number of Animals Reacted:	2	
Owner Information:	Owner Information provided:	Yes
	Contact:	Name: B6
		Phone:
		Email:
	Address:	B6

Healthcare Professional Information:	Practice Name:	North Carolina State University, College of Veterinary Medicine	
	Contact:	Name:	Darcy Adin
		Phone:	(919) 513-6694
		Other Phone:	6145829798
		Email:	dbadin@ncsu.edu
	Address:	1060 William Moore Dr Raleigh New York 27607 United States	
	Practice Name:	North Carolina State University College of Veterinary Medici	
	Contact:	Name:	B6
		Phone:	

		Other Phone: B6
	Practice Name:	North Carolina state University, College of Veterinary Medic
	Contact:	Name: B6
		Phone:
		Other Phone:
Sender Information:	Name:	Darcy Adin
	Address:	1060 William Moore Dr Raleigh New York 27607 United States
	Contact:	Phone: 9195136694
		Other Phone: 6145829798
		Email: dbadin@ncsu.edu
	Permission To Contact Sender:	Yes
	Preferred Method Of Contact:	Email
	Reported to Other Parties:	Manufacturer
Additional Documents:		

EMILED
51710KK

NC State University
Veterinary Hospital
1052 William Moore Drive
Raleigh, NC 27607
Discharge Comments

Fax: Admin
Fax: Referral

Small Animal (919) 513-6500
Large Animal (919) 513-6630

Client B6	Patient B6 MASTIFF MC FAWN CANINE	Case # B6 95.3 kg	Attending DVM Student Discharging DVM Referring DVM	B6 B6
---------------------	---	--------------------------------	--	------------------------

Admission Date/Time: MAY 03, 2018 03:42 PM Discharge Date/Time: MAY 04, 2018 03:30 PM Discharge Status:

CASE SUMMARY

DIAGNOSIS

1. Dilated cardiomyopathy - r/o primary vs diet induced
2. Atrial fibrillation
3. Congestive heart failure - pulmonary edema, abdominal effusion, pleural effusion

HISTORY

B6 is a B6 male castrated English Mastiff, who was presented to the NCSU B6 for lethargy and coughing with a terminal retch for four days. He was hospitalized and transferred to the NCSU Cardiology Service for further care.

B6 has been more lethargic at home for the past couple of weeks. Approximately 1 week ago he also began coughing with a terminal retch. He was taken to his primary veterinarian three days ago where bloodwork and a urinalysis were submitted to B6 B6

B6 Over the past few days the coughing has progressed, and he is currently coughing 5-6 times per hour. He also refused to eat the morning of presentation, which is abnormal. Due to his progressive decline, he was presented to NCSU for further evaluation.

B6 is otherwise eating, drinking, urinating, and defecating normally. He has a history of allergies, and was started on benedryl and famotidine by his primary veterinarian at his visit a couple of days ago. He also has a history of frequent ear infections, light bulb foreign body, and naproxen toxicity. B6 has been seen by the NCSU B6

B6 Both events resolved without hospitalization or intervention. He eats Zignature kangaroo diet (grain-free; for another dog's allergic skin disease). To supplement B6 diet, raw liver was added about 5-6 weeks ago to supply additional taurine. He is on no current medications, apart from preventative B6

PHYSICAL EXAM FINDINGS:

B6

CV/RESP: rapid irregularly irregular tachyarrhythmia, variable and weak femoral pulses, increased lung sounds bilaterally
GI/GU: no pain on abdominal palpation, no overt gastrointestinal distress

B6

DIAGNOSTICS

1. Big 4 B6
2. Doppler blood pressure on admission B6 mmHg
3. ECG: Atrial fibrillation with a rate of B6 bpm and infrequent left sided VPC's

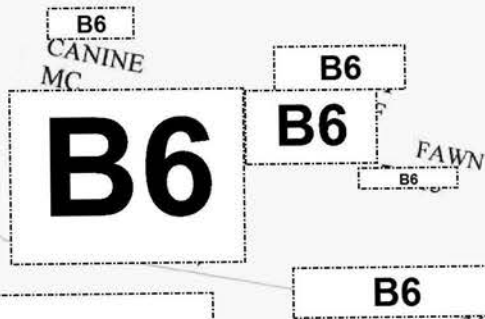
4. AFAST/TFAST - mild peritoneal effusion, no pleural or pericardial effusion

5. Echocardiogram

- a. Dilated cardiomyopathy - r/o primary vs diet induced
- b. Severely increased LV size
- c. Decreased ventricular wall thickness
- d. Moderately enlarged right ventricle
- e. Moderately reduced RV systolic function
- f. Severely dilated left atrium
- g. Moderate mitral valve regurgitation
- h. Mild to moderate tricuspid regurgitation

6. Thoracic radiographs * final report pending *

- a. Generalized cardiomegaly
- b. Mild pulmonary edema



B6

9. Whole blood taurine: pending

ASSESSMENT:

Thank you for bringing **B6** in to see us today. He is a sweet boy and was a pleasure to work with.

As you know, **B6** has been diagnosed with a heart condition known as dilated cardiomyopathy (DCM). DCM is a disease of unknown cause affecting the muscle of the heart and is most commonly seen in large breed dogs (such as Dobermans, Great Danes, and Labrador Retrievers). Although the exact mechanism of DCM is currently unknown, dietary taurine/carnitine deficiencies, genetics and toxins have all been linked to DCM. The overall effect of DCM is a decrease in the contractility (pumping ability) of the heart. Because the heart is unable to pump with enough vigor to move blood adequately forward into circulation, a volume overload occurs and the heart dilates to accommodate it. As a result, the chambers of the heart become very large, and the walls of the heart become very thin. Ultimately, the heart is unable to accommodate and dilate further; the result is back-up of blood from the heart and into the lungs, known as congestive heart failure ("fluid on the lungs").

It is important to know that this disease is progressive, and ultimately those patients affected with it will experience congestive heart failure. Based on the results of **B6** diagnostics, it appears that he has experienced an episode of congestive heart failure secondary to DCM. This explains the clinical signs you observed at home - lethargy, panting, coughing. **B6** has responded well to heart failure medications in the hospital, and he is breathing comfortably. We will be sending him home on medications to help prevent further fluid accumulation, and improve the function of his heart. We will also recommend starting him on a supplement called taurine - that has been shown to improve heart function in DCM cases caused by nutritional deficiencies.

B6 has also been diagnosed with an arrhythmia called atrial fibrillation (AF). Cardiac enlargement in dilated cardiomyopathy can result in this rhythm. AF arises due to an abnormality in the electrical system of the heart. In AF, the pacemaker cells' normal electrical impulses are overwhelmed by disorganized electrical impulses that originate in other areas of the atria. The result is an erratic, usually rapid, heart rhythm. Although in and of itself not life-threatening, AF may lead to the development of decreased exercise tolerance, fainting, lethargy and decreased appetite. If sustained for prolonged periods of time at very rapid rates, AF can also lead to the development of congestive heart failure, which was likely a contributing factor in **B6** episode of heart failure.

Changes in the muscle of the heart in dogs with DCM can lead to fibrosis and remodeling of the myocardium (heart muscle). This can lead to the development of ventricular arrhythmias. Intermittent ventricular arrhythmias are not dangerous, but if they occur in sequence and rapidly, they can result in sudden death. In the future we would like to place a holter monitor (24 hour ECG) to evaluate **B6** average heart rate at home, but also to evaluate for underlying ventricular arrhythmias. This can be performed at his next recheck appointment.

Although we cannot cure DCM, we hope to manage **B6** clinical signs with medical therapy as outlined below. The average survival for DCM patients after an episode of heart failure is 6-12 months. However, as we discussed, if **B6** DCM is secondary to a nutritional deficiency - his heart structure and function may show improvement with taurine supplementation and diet change. Please see below for diet recommendations.

Please monitor him for signs of worsening of heart failure such as increased exercise intolerance, labored breathing, increased coughing or fainting. Call NCSU Cardiology or your referring veterinarian if any of these signs occur. Also, please learn to take a respiratory (breathing) rate when your pet is resting. This can be done by counting the number of breaths your pet takes in 15 seconds and multiplying by 4 (to get the total breaths per minute). This number should remain less than 36-40 at rest.

INSTRUCTIONS FOR CARE

MEDICATIONS:

B6

MONITORING:

1. Please continue to monitor **B6** for signs of recurrent congestive heart failure. These would include exercise intolerance, increased respiratory rate, difficulty breathing, episodes of fainting/collapse, or decreased appetite. If you notice any of these signs, please contact us and have **B6** evaluated by a veterinarian.

2. Please also begin to monitor **B6** respiratory rate at home when you observe him sleeping. You can do this by counting the number of breaths he takes in 15 seconds, then multiplying this number by 4 to obtain the number of breaths per minute. A normal respiratory rate should be less than 36 breaths per minute. If you feel that **B6** respiratory rate is increasing - or if he is having more effort while breathing, please contact us.

ACTIVITY:

Please avoid strenuous exercise or situations which place undue stress on your **B6**. In general, pets with congestive heart failure will self-regulate their exercise. Please monitor for any change in exercise capability.

DIET:

As we discussed, we would like to change **B6** diet due to a concern for dietary induced DCM. We have seen an association between grain free diets and poor cardiac function recently. Although there is currently no scientific evidence, we have seen an increasing number of dogs with this problem. We would recommend transitioning him to a diet that contains grains. Some brands to consider include the major commercial brands (Purina, Hills, Royal Canin, Iams). There is a Royal Canin select protein adult KO diet that contains kangaroo as the protein source.

RECOMMENDATIONS FOR FURTHER EVALUATION:

B6

If you have any concerns with how your pet is doing, or to schedule an appointment, please contact the NC State Veterinary Hospital at 919-513-6694. There is a veterinarian on call 24 hours a day.

NOTE: If your pet is in need of emergency aid and you are not able to get to the NC State Veterinary Hospital quickly, please seek care at the nearest veterinary emergency facility. Take these discharge instructions and current medications with you so that the treating veterinarian will know as much as possible regarding your pet's medical condition.

B6

B6

Clinician -

B6

Student - c/o 2018

Clinicians:
Dr. Darcy Adin

B6

Residents:

B6

Clinical Technicians:

B6

Research Technician

B6

Client Services:

B6

In order to help expedite medication refills, please visit us online at www.ncstatevets.org and select Pet Owners, Pharmacy Refills.

B6

CANINE
MC

B6

B6

MASTIFF

B6

FAWN

B6

B6

**NC STATE VETERINARY HOSPITAL
HISTORY & PHYSICAL**

B6
CANINE
MC

B6
MASTIFF

B6 FAWN

B6

B6

Admission / Exam Date: 5/31/2018

Weight: _____ lbs kgs _____

Temp: _____ Pulse: _____ Respiration: _____

Membrane Color: _____ Capillary Refill: _____

Body Condition: _____ Pain Score: _____

VACCINATION STATUS:			YES	NO	DATE		N	ABN	No Exam		N	ABN	No Exam
Rabies	<input type="checkbox"/>	<input type="checkbox"/>				General Appearance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Reproductive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Distemper or FVRCP	<input type="checkbox"/>	<input type="checkbox"/>				Integumentary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mammary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lepto or FeLV	<input type="checkbox"/>	<input type="checkbox"/>				Ophthalmic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Urinary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tetanus	<input type="checkbox"/>	<input type="checkbox"/>				Otic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Nervous	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EEE / WEE / VEE	<input type="checkbox"/>	<input type="checkbox"/>				Musculoskeletal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Alimentary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
West Nile Virus	<input type="checkbox"/>	<input type="checkbox"/>				Cardiovascular	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Lymphatic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Influenza	<input type="checkbox"/>	<input type="checkbox"/>				Respiratory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
Rhinopneumonitis	<input type="checkbox"/>	<input type="checkbox"/>											
Other: _____	<input type="checkbox"/>	<input type="checkbox"/>				Lactating?	<input type="checkbox"/> Yes	<input type="checkbox"/> No		Pregnant?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

CHIEF COMPLAINT: _____

B6

- I. Present History
- A. Onset / Duration
- B. Progression
- C. Prior Treatment
- II. Past History
- A. Medical Illness
- B. Surgical
- C. Reproductive
- D. Adverse Drug Reaction
- E. Trauma
- III. Environment
- IV. Preventative
- V. Systems Review

Student Signature: _____

Clinician Signature: **B6** _____

NCSU, COLLEGE OF VETERINARY MEDICINE
NCSU DIAGNOSTIC LABORATORIES

Client

Patient

Med Rec Case: **B6**

B6

B6
MC 209.475 lbs
TERRY CENTER TC-ICU ICU-XL

MASTIFF FAWN
CANINE **B6**

Completed 17 of 17 Results

Request	Item	Priority	Status	Dates
H-773345	RENAL	ROUTINE	COMPLETE	Requested: 05/04/18 08:55 AM Collection: 05/04/18 08:55 AM Received: 05/04/18 09:05 AM Needed: 05/04/18 08:55 AM Status: 05/04/18 09:52 AM
Requesting DVM: B6				
Student:				
Comments:				

CHEMISTRY - RENAL PANEL

TEST	RESULT	UNITS	REF RANGE	RESULT DATETIME
UREA NITROGEN	B6	MG/DL	6 - 26	05/04/2018 09:52 AM
CREATININE		MG/DL	.7 - 1.5	05/04/2018 09:52 AM
PHOSPHORUS		MG/DL	2.5 - 5.6	05/04/2018 09:52 AM
CALCIUM		MG/DL	9.4 - 11.4	05/04/2018 09:52 AM
PROTEIN- TOTAL		G/DL	5.2 - 7.3	05/04/2018 09:52 AM
ALBUMIN		G/DL	3 - 3.9	05/04/2018 09:52 AM
GLOBULIN		G/DL	1.7 - 3.8	05/04/2018 09:52 AM
ALB/GLOB RATIO			.9 - 1.8	05/04/2018 09:52 AM
SODIUM		MMOL/L	140 - 156	05/04/2018 09:52 AM
POTASSIUM		MMOL/L	4 - 5.3	05/04/2018 09:52 AM
CHLORIDE		MMOL/L	108 - 122	05/04/2018 09:52 AM
BICARBONATE		MMOL/L	18 - 26	05/04/2018 09:52 AM
ANION GAP			11.2 - 19.9	05/04/2018 09:52 AM
NA / K RATIO			27.7 - 35.9	05/04/2018 09:52 AM
ICTERIC INDEX				05/04/2018 09:52 AM
HEMOLYSIS INDEX				05/04/2018 09:52 AM
LIPEMIA INDEX				05/04/2018 09:52 AM

Comments:
CHLORIDE

B6

Containers
1018-6103

18742

B6

Sample Submission Form

Amino Acid Laboratory
University of California, Davis
1020 Vet Med 3B
1089 Veterinary Medicine Drive
Davis, CA 95616
Tel: (530)752-5058, Fax: (530)752-4698

<http://www.vetmed.ucdavis.edu/vmb/aal/aal.html>

Vet/Tech Contact: **B6**
Company Name: North Carolina State University College of Veterinary Medicine
Address: Clinical Pathology Lab, Room C-269
1052 William Moore Drive
Raleigh, NC 27607
Email:
Tel: **B6** Fax: 919 513-6556

Billing Contact: _____ TAX ID: _____
Email: _____ Tel: _____

Patient Name: **B6**
Species: Cat
Owner's Name: **B6**

Sample Type: Plasma Whole Blood Urine Food Other: _____
Test Items: Taurine Complete Amino Acid Other: _____

Taurine Results (nmol/ml)

Plasma: _____ Whole Blood: **B6** Urine: _____ Food: _____

Reference Ranges (nmol/ml)

	Plasma		Whole Blood	
	Normal Range	No Known Risk for Taurine Deficiency	Normal Range	No Known Risk for Taurine Deficiency
Cat	80-120	>40	300-600	>200
Dog	60-120	>40	200-350	>150

NCSU, COLLEGE OF VETERINARY MEDICINE
NCSU DIAGNOSTIC LABORATORIES

Client

Patient

Med Rec Case

B6

B6

B6

MC 209.475 lbs
TERRY CENTER TC-ER ER-01

MASTIFF, FAWN

CANINE **B6**

Completed 29 of 29 Results

Request	Item	Priority	Status	Dates
H-773260	SAF	ROUTINE	COMPLETE	Requested: 05/03/18 04:40 PM Collection: 05/03/18 04:39 PM Received: 05/03/18 04:46 PM Needed: 05/03/18 04:39 PM Status: 05/03/18 05:18 PM
Requesting DVM: B6				
Student:				
Comments:				

CHEMISTRY - SMALL ANIMAL CHEMISTRY PANEL

TEST	RESULT	UNITS	REF RANGE	RESULT DATETIME
GLUCOSE		MG/DL	70 - 131	05/03/2018 05:18 PM
UREA NITROGEN		MG/DL	6 - 26	05/03/2018 05:18 PM
CREATININE		MG/DL	.7 - 1.5	05/03/2018 05:18 PM
PHOSPHORUS		MG/DL	2.5 - 5.6	05/03/2018 05:18 PM
CALCIUM		MG/DL	9.4 - 11.4	05/03/2018 05:18 PM
MAGNESIUM		MG/DL	1.8 - 2.5	05/03/2018 05:18 PM
PROTEIN- TOTAL		G/DL	5.2 - 7.3	05/03/2018 05:18 PM
ALBUMIN		G/DL	3 - 3.9	05/03/2018 05:18 PM
GLOBULIN		G/DL	1.7 - 3.8	05/03/2018 05:18 PM
ALB/GLOB RATIO			.9 - 1.8	05/03/2018 05:18 PM
CHOLESTEROL		MG/DL	124 - 344	05/03/2018 05:18 PM
BILIRUBIN- TOTAL				05/03/2018 05:18 PM
ALKALINE PHOSPHATASE		IU/L	16 - 140	05/03/2018 05:18 PM
ALT		IU/L	12 - 54	05/03/2018 05:18 PM
AST	B6	IU/L	16 - 140	05/03/2018 05:18 PM
GGT				05/03/2018 05:18 PM
CK		IU/L	43 - 234	05/03/2018 05:18 PM
SODIUM		MMOL/L	140 - 156	05/03/2018 05:18 PM
POTASSIUM		MMOL/L	4 - 5.3	05/03/2018 05:18 PM
CHLORIDE		MMOL/L	108 - 122	05/03/2018 05:18 PM
BICARBONATE		MMOL/L	18 - 26	05/03/2018 05:18 PM
ANION GAP			11.2 - 19.9	05/03/2018 05:18 PM
NA / K RATIO			27.7 - 35.9	05/03/2018 05:18 PM
OSMOLALITY- CALC.		MOSM/KG	278.7 - 311.6	05/03/2018 05:18 PM
AMYLASE		IU/L	236 - 1337	05/03/2018 05:18 PM
LIPASE		IU/L	12 - 147	05/03/2018 05:18 PM
ICTERIC INDEX				05/03/2018 05:18 PM
HEMOLYSIS INDEX				05/03/2018 05:18 PM
LIPEMIA INDEX				05/03/2018 05:18 PM

Comments:
CHLORIDE

B6

Containers
1018-6087

Canine Echocardiography Report

Patient Name: **B6** Date of Exam: **B6**
Medical Rec #: **B6** Breed: Mastiff
DOB: **B6** Weight: 95 kg
Age: Sex: Mc BSA: 2.10 m²
Sonographer: **B6** HR:
BP-sys:
Report Status: READ
Ref. Clinician: **B6**
Diagnosis: Dilated Cardiomyopathy w/ heart failure
Study Details: 2D Echo/Doppler/Color Doppler. The images were of adequate diagnostic quality. The patient was awake.

2D
IVS
LV
LVPW

2D
LA Long Axis
LA d
Ao s
LA/Ao

M-mode
RV
IVS
LV
LVPW
LV normalized
LA

B6

Mitral Regurgitation:

MR Vmax
MR Peak Gradient
Est SBP by MR

B6

B6
CANINE
MC

B6

B6
MASTIFF

B6

FAWN

B6

Tricuspid valve:
P 1/2 T

B6

CLINICIAN INTERPRETATION:

Left Ventricle: The left ventricular cavity size is severely increased. Ventricular wall thickness is decreased. LV basal fractional shortening is severely decreased.

Left Atrium: The left atrium is severely dilated.

Right Atrium: The right atrium is moderately dilated.

Right Ventricle: The right ventricular size is moderately enlarged. Global RV systolic function is

moderately reduced.

Mitral Valve: The E-point septal separation is increased. Moderate mitral valve regurgitation. The MR jet is centrally-directed.

ECHO SUMMARY:

1. The left ventricular cavity size is severely increased.
2. Ventricular wall thickness is decreased.
3. Moderately enlarged right ventricle.
4. Moderately reduced RV systolic function.
5. Severely dilated left atrium.
6. Moderately dilated right atrium.
7. Moderate mitral valve regurgitation.
8. Mild to moderate tricuspid regurgitation.

CV Exam:

Body condition was overweight. The animal was panting. The mucous membranes appeared pink, with a normal capillary refill time. Femoral pulse quality was difficult to assess.

ECG:

The heart rate measured at 220 beats/minute. The ECG rhythm is atrial fibrillation.

Recommendations: The echocardiogram was limited due to patient size and stability.

This study shows evidence of dilated cardiomyopathy and atrial fibrillation. The LV is severely dilated with thin walls. The systolic function is severely reduced - with the septum moving more adequately than the LV free wall. The mitral regurgitation was difficult to quantify - but appears to be at least moderate. The left atrium is severely dilated.

The ECG shows evidence of atrial fibrillation with a ventricular response rate of B6 bpm.

The patient eats a grain free diet (Zignature Kangaroo). Given the recent association with grain free diets and dilated cardiomyopathy - diet induced DCM is possible. However, given the breed and age idiopathic DCM is also considered.

There is a small volume of free fluid within the abdomen - consistent with R-CHF. Thoracic radiographs show mild pulmonary edema.

B6

B6

B6

Electronically signed on 5/3/2018 on 5:38:12 PM

B6

CANINE
MC

MASTIEF

B6

FAWN

B6

B6

B6

NC State University
Veterinary Hospital
1052 William Moore Drive
Raleigh, NC 27607
Discharge Comments

Fax: Admin
Fax: Referral

Small Animal (919) 513-6500
Large Animal (919) 513-6630

Client B6	Patient B6 MASTIFF MC FAWN CANINE	Case # B6 96.2197 kg	Attending DVM Student Discharging DV Referring DVM	B6
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Admission Date/Time:AUG 17, 2018 08:54 AM Discharge Date/Time:AUG 17, 2018 11:42 AM Discharge Status:

CASE SUMMARY

DIAGNOSIS:

1. Dilated cardiomyopathy - suspect at least partially diet induced
2. Atrial fibrillation
3. Congestive heart failure - pulmonary edema, pleural effusion, abdominal effusion - well controlled

HISTORY

B6 is a 6 year old male castrated Mastiff who was presented to the NCSU Cardiology Service on 8/17/18 for a recheck of dilated cardiomyopathy, atrial fibrillation, and congestive heart failure.

B6 was first presented to the NCSU ER **B6** for lethargy and coughing with a terminal retch for four days. Bloodwork performed at his regular veterinarian on **B6** showed hypoalbuminemia **B6**, with normal kidney values (BUN **B6** Creat **B6**). A CBC and T4 were within normal limits. The urinalysis revealed proteinuria, and pyuria, and the collection method was not reported. The coughing progressed until his presentation at the ER, where he was coughing 5-6 times per hour. He also refused to eat the morning of presentation, which was abnormal. While at NCSU an echocardiogram showed evidence of dilated cardiomyopathy, small volume pleural effusion, and moderate volume abdominal effusion. Thoracic radiographs showed mild pulmonary edema. An ECG showed atrial fibrillation with a ventricular response rate of ~250bpm. A whole blood taurine returned within normal limits **B6** nmol/mL. **B6** was hospitalized overnight and responded well to treatment. He was discharged on **B6**.

B6

B6 came in on 5/11/18 for a recheck with the NCSU Cardiology Service. At this time, chest radiographs showed similar left sided cardiomegaly, mildly improved pulmonary venous distention, and similar to mildly improved unstructured interstitial pattern. His renal panel showed no significant findings and his digoxin level was **B6** ng/nL. His fluid check showed no evidence of abdominal or pericardial effusion, with possible scant pleural effusion. His heart rate was between **B6** bpm during his exam, therefore his **B6** dose was increased to 360mg BID. In addition, therapy with **B6** (mg SID). A holter monitor performed 1 week later showed adequate atrial fibrillation rate control (average heart rate 95bpm), with a low number of ventricular arrhythmias.

B6 owner began supplementation with fish oil, and no other changes were made.

Since his last visit **B6** has been doing well at home. He has increased energy and activity levels and has been initiating play with his housemate. He has been able to play for up to an hour, limiting his own activity well and still only panting after playing. They have not noticed any periods of increased respiratory effort and have heard only a rare cough. At rest, they have found his respiratory rate to consistently be below 40 brpm consistently and his heart rate to be between **B6** bmp.

B6 has a history of allergies, and was started on benedryl and famotidine by his primary veterinarian at his visit on **B6**. He also has a history of frequent ear infections, light bulb foreign body, and naproxen toxicity **B6**.

B6

Without representation or intervention prior to his diagnosis of cardiac disease, he was eating Earthborne Naturals Lamb Grain-free from 2013-2015, and then Zignature Kangaroo Grain-free (for another dog's allergic skin disease) with raw liver added to supply additional taurine. Since May, he has been transitioned to Fromm Salmon a la Veg dry dog food (not a grain free diet) and it has gone smoothly. He also receives monthly preventatives (Sentinel and Bravecto).

B6

B6

B6

ASSESSMENT:

Thank you for entrusting us with B6 care, he was a very sweet boy!

Today we performed a recheck echocardiogram to evaluate B6 cardiac structure and function. We are happy to report that his echo shows significant improvement. His heart remains moderately to severely enlarged, and continues to show evidence of reduced function - but overall has shown significant improvement in the past 3 months. This is great news and indicates at least some portion of his cardiac changes are responding to a diet change. As we discussed, it is still very possible B6 has underlying dilated cardiomyopathy secondary to his genetics, but we are very pleased to see this improvement with a diet change. B6 kidney panel showed normal values - indicating he is tolerating his medications well. In addition, B6 heart rate was slow and well controlled during his exam. His heart rate became elevated when stressed, but this is not unexpected. Given these findings, we would like B6 to continue receiving his medications at their current dosages.

We would like to see B6 back in 3-4 months for another recheck echocardiogram. If his heart continues to show improvement, we may be able to discontinue some of his cardiac medications. At this visit, we can also perform a recheck holter monitor, to monitor for any worsening arrhythmias. Please continue to monitor him for any signs of worsening cardiac disease - such as lethargy, increased respiratory rate/effort, coughing, weakness, or collapse. If you are concerned about how he is doing, please contact us and have him evaluated by a veterinarian.

INSTRUCTIONS FOR CARE

B6

B6

MONITORING:

1. Please continue to monitor **B6** for signs of recurrent congestive heart failure. These would include exercise intolerance, increased respiratory rate, difficulty breathing, episodes of fainting/collapse, or decreased appetite. If you notice any of these signs, please contact us and have **B6** evaluated by a veterinarian.

2. Please continue monitoring **B6** respiratory rate at home when you observe him sleeping. If you feel that **B6** respiratory rate is increasing, or if he is having more effort while breathing, please contact us.

ACTIVITY: Please avoid strenuous exercise or situations which place undue stress on you. **B6** In general, pets with congestive heart failure will self-regulate their exercise. Please monitor for any change in exercise capability.

DIE **B6** can continue on his Fromm Salmon a la Veg diet.

PLAN FOR RE-EVALUATION

1. We would like to see **B6** back for a recheck exam, blood pressure, renal panel, echocardiogram, and holter monitor in 3-4 months. Please let us know if you feel he needs to be seen sooner.

If you have any concerns with how your pet is doing, or to schedule an appointment, please contact the NC State Veterinary Hospital at 919-513-6694. There is a veterinarian on call 24 hours a day.

NOTE: If your pet is in need of emergency aid and you are not able to get to the NC State Veterinary Hospital quickly, please seek care at the nearest veterinary emergency facility. Take these discharge instructions and current medications with you so that the treating veterinarian will know as much as possible regarding your pets' medical condition.

B6

Senior Student: **B6**

Clinicians: Residents: Student Assistants:

B6

In order to help expedite medication refills, please visit us online at www.ncstatevets.org and select Pet Owners, Pharmacy Refills.

179359
CANINE
MC

B6

B6

MASTIFF

B6

FAWN

B6

B6

CARDIOLOGY PATIENT QUESTIONNAIRE

B6
CANINE MC
B6
MASTIFF
FAWN
B6
B6
B6

Contact number **B6**
(Please try to be available between 9:30 and 10:30 am for questions or updates)

I would like to pick up my pet at: _____ today if possible.
(between 1pm and 4pm)

May we sedate or tranquilize your pet today if necessary? YES NO

Some tests require shaving to obtain the best results – may we shave your pet's fur today if necessary? YES NO

Please indicate any symptoms your pet has experienced since your last visit – please describe in the space provided:

<input checked="" type="checkbox"/>	Change in activity level	Increased
<input type="checkbox"/>	Change in water consumption	
<input type="checkbox"/>	Change in urination frequency	
<input type="checkbox"/>	Change in appetite	
<input type="checkbox"/>	Coughing	
<input type="checkbox"/>	Difficulty breathing	
<input type="checkbox"/>	Sneezing	
<input type="checkbox"/>	Weakness / fainting	
<input type="checkbox"/>	Vomiting	
<input type="checkbox"/>	Diarrhea	

Current diet: Fromm 4 star Salmon ala Veg Has your pet been fed today? YES NO
 Have you seen your family vet since your last visit? No If yes, what time 7:30 am/pm
 How much? 3 cups

CURRENT MEDICATIONS:

Drug Name	How often given?	Was medication given today?	What time?	REFILL NEEDED TODAY?
B6	BID	yes	0730	YES <input type="radio"/> NO <input checked="" type="radio"/>
	BID	yes		YES <input type="radio"/> NO <input checked="" type="radio"/>
	BID			YES <input checked="" type="radio"/> NO <input type="radio"/>
	BID			YES <input checked="" type="radio"/> NO <input type="radio"/>
	daily			YES <input type="radio"/> NO <input checked="" type="radio"/>
	daily			YES <input type="radio"/> NO <input checked="" type="radio"/>
	BID			YES <input type="radio"/> NO <input checked="" type="radio"/>

Owner Signature: _____

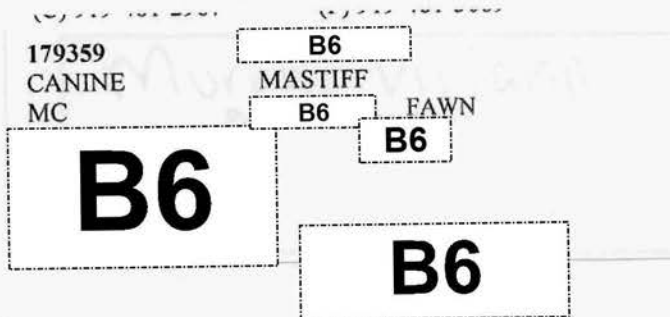
B6

Date: _____

Written prescription
no back to
outside
pharmacy
please

NC State Veterinary Hospital
Cardiology Pet Diet History

Date: 8/17/18



Current diet:

Brand Fromm 4 Star

Variety Salmon ala Veg

Is this diet Grain-free? No

How long has your pet eaten this food? 3 months

Are there other pets in your house eating this food? 1 other pet

Other diets eaten in the last 3 years and dates:

Signature Kangaroo Grain-free 2015 - May 2018
Earthborne Naturals Lamb Grain-free 2013-2015

Other food (treats, rawhides, table food):

Treats + table foods

Supplements (e.g. fish oil, CoQ10, vitamins etc)

Joint + Max Triple Strength, Fish oil, Taurine

NC STATE VETERINARY HOSPITAL
HISTORY & PHYSICAL

179359
CANINE
MC

B6

MASTIFF

B6 FAWN

B6

B6

B6

Admission / Exam Date: 8/17/18

Weight: 212 lbs lbs kgs 96.4 kg

Temp: - Pulse: 140 Respiration: pank

Membrane Color: pink Capillary Refill: 2

Body Condition: 0/9 Pain Score: 0/4

VACCINATION STATUS:			YES	NO	DATE		N	ABN	No Exam		N	ABN	No Exam
Rabies	<input type="checkbox"/>	<input type="checkbox"/>				General Appearance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Reproductive	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Distemper or FVRCP	<input type="checkbox"/>	<input type="checkbox"/>				Integumentary	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Mammary	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Lepto or FeLV	<input type="checkbox"/>	<input type="checkbox"/>				Ophthalmic	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Urinary	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tetanus	<input type="checkbox"/>	<input type="checkbox"/>				Otic	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Nervous	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EEE / WEE / VEE	<input type="checkbox"/>	<input type="checkbox"/>				Musculoskeletal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Alimentary	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
West Nile Virus	<input type="checkbox"/>	<input type="checkbox"/>				Cardiovascular	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Lymphatic	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Influenza	<input type="checkbox"/>	<input type="checkbox"/>				Respiratory	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
Rhinopneumonitis	<input type="checkbox"/>	<input type="checkbox"/>				Lactating?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No		Pregnant?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Other:	<input type="checkbox"/>	<input type="checkbox"/>											

CHIEF COMPLAINT: recheck for DCM (diet induced?) + CHF

B6

- | | | | |
|---------------------|--------------------------|-------------------|---------------------|
| I. Present History | II. Past History | III. Environment | Student Signature |
| A. Onset / Duration | A. Medical Illness | IV. Preventative | |
| B. Progression | B. Surgical | V. Systems Review | |
| C. Prior Treatment | C. Reproductive | | |
| | D. Adverse Drug Reaction | | |
| | E. Trauma | | Clinician Signature |

B6

10:32 (initials)

179359
CANINE
MC

B6
MASTIFF
B6 FAWN
B6

NC STATE VETERINARY HOSPITAL
DAILY TREATMENT RECORD

B6

B6

ALERTS:

IV CATHETER SITE(S):

DATE PLACED: 8/17/18

INITIAL B6

CLINICAL SUMMARY:

recheck through cardio

DATE:

CAGE: B-3

DIET:

WATER:

WEIGHT: 95kg

TREATMENT PLAN
(RECORD OBSERVATIONS
ON BACK)

MONITORING

	TIME	①	②	③						
① walk q 6	8:00 AM									
	9:00 AM									
② water q 6	10:00 AM	0	DLC							
	11:00 AM									
③ check all legs	12:00 PM									
	1:00 PM									
	2:00 PM									
	3:00 PM									
	4:00 PM									
	5:00 PM									
	6:00 PM									
	7:00 PM									
	8:00 PM									
	9:00 PM									
	10:00 PM									
	11:00 PM									
	12:00 AM									
	1:00 AM									
	2:00 AM									
	3:00 AM									
	4:00 AM									
	5:00 AM									
	6:00 AM									
	7:00 AM									

STUDENT B6

CLINICIAN B6

MEDICAL RECORD

PAGE

OF

Canine Echocardiography Report

Patient Name:
Medical Rec #:
DOB:
Age:
Sex:
Sonographer:

B6
B6

Date of Exam: 8/17/2018
Breed: Mastiff
Weight: 96 kg
BSA: 2.12 m²
HR:
BP-sys:

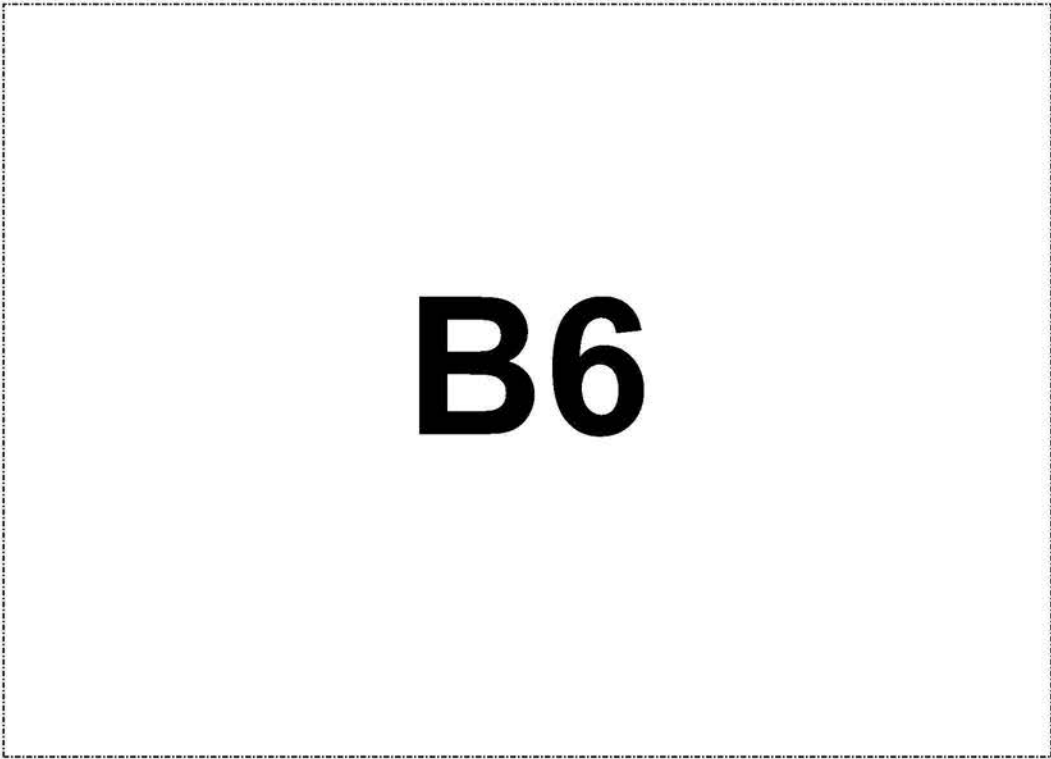
Report Status:
Ref. Clinician:
Diagnosis:
Study Details:

READ
B6
Dilated cardiomyopathy - suspect diet induced, atrial fibrillation
2D Echo/Doppler/Color Doppler. The images were of adequate diagnostic quality. The patient was awake.

2D
IVS
LV
LVPW

LV Area
LV Vol
Vol Index
Maj Axis
2D
LA Long Axis
LA d
Ao s
LA/Ao

M-mode
RV
IVS
LV
LVPW
LV normalized
LA



Normal Canine M-mode values (in cm) for 50 kg dogs.

LVIDd	LVPWd	IVSd	LA	AO	%FS
			B6		

Aortic Valve:
VMax
Pk Grad

Tricuspid valve:
P 1/2 T

B6

CLINICIAN INTERPRETATION:

Left Ventricle: The left ventricular cavity size is moderate to severely increased. Ventricular wall thickness is normal. LV basal fractional shortening is mild to moderately decreased.

Left Atrium: The left atrium is moderately dilated.

Right Atrium: The right atrium is mildly dilated.

Right Ventricle: The right ventricular size is mildly enlarged. RV wall thickness is normal. Global RV systolic function is mildly reduced.

Aortic Valve: No degree of aortic stenosis is present. No evidence of aortic valve regurgitation.

Mitral Valve: The E-point septal separation is increased. Mild to moderate mitral valve regurgitation. The MR jet is centrally-directed.

Pulmonic Valve: The pulmonic valve is normal.

Pericardium/Effusions: No pericardial effusion is seen.

Aorta: The aortic sinuses, arch, ascending and descending aorta appear all normal.

Pulmonary Artery: The pulmonary artery is of normal size and origin.

ECHO SUMMARY:

1. Dilated cardiomyopathy - suspect diet induced
2. The left ventricular cavity size is moderate to severely increased.
3. Moderately dilated left atrium.
4. Mildly dilated right atrium.
5. Mild to moderate mitral valve regurgitation.
6. Mild tricuspid regurgitation.

CV Exam:

Body condition was normal. The animal was panting. The mucous membranes appeared pink, with a normal capillary refill time. Femoral pulse quality was normal. Cardiac auscultation revealed a systolic murmur of grade I-II/VI intensity loudest at the left apex. Pulmonary auscultation revealed normal lung sounds.

ECG:

The heart rate measured at B6 beats/minute. The ECG rhythm is atrial fibrillation. The heart rate in the exam room was B6 bpm.

Recommendations: This is a recheck echocardiogram and is compared to the prior study B6 was eating a grain free diet at the time of the prior study - and was transitioned to a non-grain free diet approximately 3 months ago.

This study shows improvement in the cardiac size and function. The LV remains moderately to severely dilated - but has shown a significant decrease in size over the past 3 months. The LV wall thickness has increased as well. The systolic function has shown improvement - but remains mildly to moderately reduced. The mitral regurgitation has decreased in severity, and the left atrium has decreased in size (but remains moderately enlarged).

A diagnostic ECG was not performed. The ECG during the echocardiogram showed atrial fibrillation with a ventricular response rate of B6 bpm. The heart rate in the exam room was B6 bpm, and the owners count a resting heart rate of B6 bpm at home.

Overall these findings show a significant improvement after the patient was transitioned off a grain free diet. Recommend continuing the cardiac medications at the current dosages. Recommend beginning taurine and fish oil supplementation. Recommend a recheck echocardiogram and holter monitor in 3-4 months.

B6

Electronically signed on 8/17/2018 on 5:08:14 PM

NC State University
Veterinary Hospital
1052 William Moore Drive
Raleigh, NC 27607
Discharge Comments

Fax: Admin
Fax: Referral

Small Animal (919) 513-6500
Large Animal (919) 513-6630

Client B6	Patient B6 MASTIFF MC FAWN CANINE	Case # B6 96.2197 kg	Attending DVM Student Discharging DVM Referring DVM	B6
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Admission Date/Time: AUG 17, 2018 08:54 AM Discharge Date/Time: AUG 17, 2018 11:42 AM Discharge Status:

CASE SUMMARY

DIAGNOSIS:

1. Dilated cardiomyopathy - suspect at least partially diet induced
2. Atrial fibrillation
3. Congestive heart failure - pulmonary edema, pleural effusion, abdominal effusion - well controlled

HISTORY

B6 is a 6 year old male castrated Mastiff who was presented to the NCSU Cardiology Service on 8/17/18 for a recheck of dilated cardiomyopathy, atrial fibrillation, and congestive heart failure.

B6 was first presented to the NCSU ER c **B6** for lethargy and coughing with a terminalretch for four days. Bloodwork performed at his regular veterinarian c **B6** the urinalysis revealed proteinuria, and pyuria, and the collection method was not reported. The coughing progressed until his presentation at the ER, where he was coughing 5-6 times per hour. He also refused to eat the morning of presentation, which was abnormal. While at NCSU an echocardiogram showed evidence of dilated cardiomyopathy, small volume pleural effusion, and moderate volume abdominal effusion. Thoracic radiographs showed mild pulmonary edema. An ECG showed atrial fibrillation with a ventricular response rate of **B6** bpm. A whole blood taurine returned within normal limits **B6** nmol/mL. **B6** was hospitalized overnight and responded well to treatment. He was discharged on **B6**.

B6

B6 came in on 5/11/18 for a recheck with the NCSU Cardiology Service. At this time, chest radiographs showed similar left sided egally, mildly improved pulmonary venous distention, and similar to mildly improved unstructured interstitial pattern. His renal panel showed no significant findings and his digoxin level was **B6** ng/nL. His fluid check showed no evidence of abdominal or pericardial effusion, with possible scant pleural effusion. His heart rate was between **B6** bpm during his exam, therefore his **B6** dose was increased to 360mg BID. In addition, therapy with **B6** (200mg SID). A holter monitor performed 1 week later showed adequate atrial fibrillation rate control (average heart rate **B6** bpm), with a low number of ventricular arrhythmias. **B6** owner began supplementation with fish oil, and no other changes were made.

Since his last visit **B6** has been doing well at home. He has increased energy and activity levels and has been initiating play with his housemate. He has been able to play for up to an hour, limiting his own activity well and still only panting after playing. They have not noticed any periods of increased respiratory effort and have heard only a rare cough. At rest, they have found his respiratory rate to consistently be below **B6** rpm consistently and his heart rate to be between **B6** bmp.

B6 has a history of allergies, and was started on **B6** by his primary veterinarian at his visit on **B6**. He

B6

Since his diagnosis of cardiac disease, he was eating Earthborne Naturals Lamb Grain-free from 2013-2015, and then Zignature Kangaroo Grain-free (for another dog's allergic skin disease) with raw liver added to supply additional taurine. Since May, he has been transitioned to Fromm Salmon a la Veg dry dog food (not a grain free diet) and it has gone smoothly. He also receives monthly preventatives (Sentinel and Bravecto).

CURRENT MEDICATIONS:

B6

B6

CVR: Grade II/VI left apical systolic murmur, irregular rhythm appreciated; eupneic, lung fields clear with normal bronchovesicular sounds noted on bilateral auscultation

B6

RESULTS OF DIAGNOSTIC TESTS:

1. Blood Pressure: **B6**

2. Renal Panel: **B6**

3. Echocardiogram

- a. Moderate to severe LV dilation - significantly improved compared to prior
- b. Moderately reduced LV systolic function - static
- c. Moderate left atrial enlargement - significantly improved compared to prior
- d. Mild to moderate mitral regurgitation - significantly improved compared to prior
- e. No free fluid noted

ASSESSMENT:

Thank you for entrusting us with **B6** care, he was a very sweet boy!

Today we performed a recheck echocardiogram to evaluate **B6** cardiac structure and function. We are happy to report that his echo shows significant improvement. His heart remains moderately to severely enlarged, and continues to show evidence of reduced function - but overall has shown significant improvement in the past 3 months. This is great news, and indicates at least some portion of his cardiac changes are responding to a diet change. As we discussed, it is still very possible **B6** has underlying dilated cardiomyopathy secondary to his genetics, but we are very pleased to see this improvement with a diet change. **B6** kidney panel showed normal values - indicating he is tolerating his medications well. In addition, **B6** heart rate was slow and well controlled during his exam. His heart rate became elevated when stressed, but this is not unexpected. Given these findings, we would like **B6** to continue receiving his medications at their current dosages.

We would like to see **B6** back in 3-4 months for another recheck echocardiogram. If his heart continues to show improvement, we may be able to discontinue some of his cardiac medications. At this visit, we can also perform a recheck holter monitor, to monitor for any worsening arrhythmias. Please continue to monitor him for any signs of worsening cardiac disease - such as lethargy, increased respiratory rate/effort, coughing, weakness, or collapse. If you are concerned about how he is doing, please contact us and have him evaluated by a veterinarian.

INSTRUCTIONS FOR CARE

MEDICATIONS:

B6

B6

MONITORING:

1. Please continue to monitor **B6** for signs of recurrent congestive heart failure. These would include exercise intolerance, increased respiratory rate, difficulty breathing, episodes of fainting/collapse, or decreased appetite. If you notice any of these signs, please contact us and have **B6** evaluated by a veterinarian.

2. Please continue monitoring **B6** respiratory rate at home when you observe him sleeping. If you feel that **B6** respiratory rate is increasing, or if he is having more effort while breathing, please contact us.

ACTIVITY: Please avoid strenuous exercise or situations which place undue stress on your **B6**. In general, pets with congestive heart failure will self-regulate their exercise. Please monitor for any change in exercise capacity.

DIET: **B6** can continue on his Fromm Salmon a la Veg diet.

PLAN FOR RE-EVALUATION:

B6
months. Please let us know if you feel he needs to be seen sooner.

If you have any concerns with how your pet is doing, or to schedule an appointment, please contact the NC State Veterinary Hospital at 919-513-6694. There is a veterinarian on call 24 hours a day.

NOTE: If your pet is in need of emergency aid and you are not able to get to the NC State Veterinary Hospital quickly, please seek care at the nearest veterinary emergency facility. Take these discharge instructions and current medications with you so that the treating veterinarian will know as much as possible regarding your pets' medical condition.

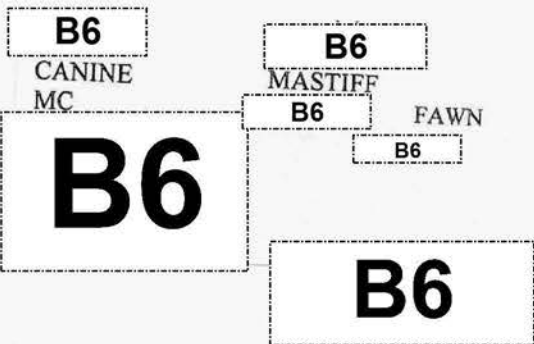
B6

Senior Student **B6**

Clinicians: Residents: Clinical Technicians: Client Services:

B6

In order to help expedite medication refills, please visit us online at www.ncstatevets.org and select Pet Owners, Pharmacy Refills.



CARDIOLOGY PATIENT QUESTIONNAIRE

Contact number

B6

(Please try to be available between
9:30 and 10:30 am for questions or
updates)

B6
CANINE
MC
B6
B6
MASTIFF
FAWN
B6
B6

I would like to pick up my pet at: _____ today if possible.
(between 1pm and 4pm)

May we sedate or tranquilize your pet today if necessary? YES NO

Some tests require shaving to obtain the best results – may we shave your pet's fur today if necessary? YES NO

Please indicate any symptoms your pet has experienced since your last visit – please describe in the space provided:

<input checked="" type="checkbox"/>	Change in activity level	Increased
<input type="checkbox"/>	Change in water consumption	
<input type="checkbox"/>	Change in urination frequency	
<input type="checkbox"/>	Change in appetite	
<input type="checkbox"/>	Coughing	
<input type="checkbox"/>	Difficulty breathing	
<input type="checkbox"/>	Sneezing	
<input type="checkbox"/>	Weakness / fainting	
<input type="checkbox"/>	Vomiting	
<input type="checkbox"/>	Diarrhea	

Current diet: Fromm 4 star Salmon ala Veg Has your pet been fed today? YES NO
 Have you seen your family vet since your last visit? No If yes, what time 7:30 am/pm
 How much? 3 cups

CURRENT MEDICATIONS:

Drug Name	How often given?	Was medication given today?	What time?	REFILL NEEDED TODAY?
B6	BID	yes	0730	YES <input type="radio"/> NO <input checked="" type="radio"/>
	BID	yes		YES <input type="radio"/> NO <input checked="" type="radio"/>
	BID			YES <input checked="" type="radio"/> NO <input type="radio"/>
	BID			YES <input checked="" type="radio"/> NO <input type="radio"/>
	daily			YES <input type="radio"/> NO <input checked="" type="radio"/>
	daily			YES <input type="radio"/> NO <input checked="" type="radio"/>
	BID			YES <input type="radio"/> NO <input checked="" type="radio"/>

80mg
2 BID

Owner Signature:

B6

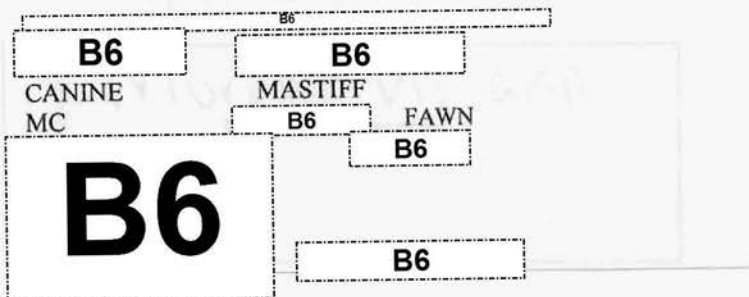
Date: _____

→ written
prescription
no back to
outside
pharmacy
please

NC State Veterinary Hospital

Cardiology Pet Diet History

Date: 8/17/18



Current diet:

Brand Fromm 4 Star

Variety Salmon ala Veg

Is this diet Grain-free? No

How long has your pet eaten this food? 3 months

Are there other pets in your house eating this food? 1 other pet

Other diets eaten in the last 3 years and dates:

Signature Kangaroo Grain-free 2015 - May 2018
Earthborne Naturals Lamb Grain-free 2013-2015

Other food (treats, rawhides, table food):

Treats + table foods

Supplements (e.g. fish oil, CoQ10, vitamins etc)

Joint + Max Triple Strength, Fish oil, Taurine

NC STATE VETERINARY HOSPITAL
HISTORY & PHYSICAL

B6
CANINE
MC
MASTIFF
B6
FAWN
B6
B6

Admission / Exam Date: 8/17/18
 Weight: 212 lbs kgs 96.4 kg
 Temp: — Pulse: 140 Respiration: pink
 Membrane Color: pink Capillary Refill: L2
 Body Condition: 6/9 Pain Score: 0/4

VACCINATION STATUS:			YES	NO	DATE	N	ABN	No Exam	Reproductive	N	ABN	No Exam
Rabies	<input type="checkbox"/>	<input type="checkbox"/>				<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Distemper or FVRCP	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Mammary	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Lepto or FeLV	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Urinary	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tetanus	<input type="checkbox"/>	<input type="checkbox"/>				<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Nervous	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EEE / WEE / VEE	<input type="checkbox"/>	<input type="checkbox"/>				<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Alimentary	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
West Nile Virus	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Lymphatic	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Influenza	<input type="checkbox"/>	<input type="checkbox"/>				<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
Rhinopneumonitis	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
Other:	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				

General Appearance N ABN No Exam
 Integumentary N ABN No Exam
 Ophthalmic N ABN No Exam
 Otic N ABN No Exam
 Musculoskeletal N ABN No Exam
 Cardiovascular N ABN No Exam
 Respiratory N ABN No Exam
 Lactating? Yes No
 Pregnant? Yes No

CHIEF COMPLAINT: recheck for DCM (diet induced?) + CHF

B6

[Faint, illegible handwriting]

- I. Present History
 - A. Onset / Duration
 - B. Progression
 - C. Prior Treatment
 - II. Past History
 - A. Medical Illness
 - B. Surgical
 - C. Reproductive
 - D. Adverse Drug Reaction
 - E. Trauma
 - III. Environment
 - IV. Preventative
 - V. Systems Review
- Student Signature _____
 Clinician Signature _____

B6

10:32 (UTC)

B6
CANINE
MC
B6
MASTIFF
B6
FAWN
B6
B6

NC STATE VETERINARY HOSPITAL
DAILY TREATMENT RECORD

ALERTS:

IV CATHETER SITE(S): _____ DATE PLACED: 8/17/18 INITIALS: **B6**

CLINICAL SUMMARY: recheck through cardio

DATE: _____ CAGE: B-3 DIET: _____ WATER: _____ WEIGHT: 95kg

TREATMENT PLAN (RECORD OBSERVATIONS ON BACK)	TIME	MONITORING																		
		①	②	③																
① walk q 6	8:00 AM																			
	9:00 AM																			
② water q 6	10:00 AM	0	DLC																	
	11:00 AM																			
③ check all legs	12:00 PM																			
	1:00 PM																			
	2:00 PM																			
	3:00 PM																			
	4:00 PM																			
	5:00 PM																			
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	2:00 AM																			
	3:00 AM																			
	4:00 AM																			
	5:00 AM																			
	6:00 AM																			
	7:00 AM																			

STUDENT: **B6** CLINIC: **B6**

MEDICAL RECORD

PAGE

OF

Canine Echocardiography Report

Patient Name:
Medical Rec #:
DOB:
Age:
Sex:
Sonographer:

B6

6 years
Mc
B6

Date of Exam: 8/17/2018
Breed: Mastiff
Weight: 96 kg
BSA: 2.12 m²
HR:
BP-sys:

Report Status:
Ref. Clinician:
Diagnosis:
Study Details:

READ
B6
Dilated cardiomyopathy - suspect diet induced, atrial fibrillation
2D Echo/Doppler/Color Doppler. The images were of adequate diagnostic quality. The patient was awake.

2D
IVS
LV
LVPW

LV Area
LV Vol
Vol Index
Maj Axis
2D
LA Long Axis
LA d
Ao s
LA/Ao

M-mode
RV
IVS
LV
LVPW
LV normalized
LA



Normal Canine M-mode values (in cm) for 50 kg dogs.

LVIDd LVPWd IVSd LA Ao s
B6

Aortic Valve:
VMax
Pk Grad

B6

Tricuspid valve:
P 1/2 T

CLINICIAN INTERPRETATION:

Left Ventricle: The left ventricular cavity size is moderate to severely increased. Ventricular wall thickness is normal. LV basal fractional shortening is mild to moderately decreased.

Left Atrium: The left atrium is moderately dilated.

Right Atrium: The right atrium is mildly dilated.

Right Ventricle: The right ventricular size is mildly enlarged. RV wall thickness is normal. Global RV systolic function is mildly reduced.

Aortic Valve: No degree of aortic stenosis is present. No evidence of aortic valve regurgitation.

Mitral Valve: The E-point septal separation is increased. Mild to moderate mitral valve regurgitation. The MR jet is centrally-directed.

Pulmonic Valve: The pulmonic valve is normal.

Pericardium/Effusions: No pericardial effusion is seen.

Aorta: The aortic sinuses, arch, ascending and descending aorta appear all normal.

Pulmonary Artery: The pulmonary artery is of normal size and origin.

ECHO SUMMARY:

1. Dilated cardiomyopathy - suspect diet induced
2. The left ventricular cavity size is moderate to severely increased.
3. Moderately dilated left atrium.
4. Mildly dilated right atrium.
5. Mild to moderate mitral valve regurgitation.
6. Mild tricuspid regurgitation.

CV Exam:

Body condition was normal. The animal was panting. The mucous membranes appeared pink, with a normal capillary refill time. Femoral pulse quality was normal. Cardiac auscultation revealed a systolic murmur of grade I-II/VI intensity loudest at the left apex. Pulmonary auscultation revealed normal lung sounds.

ECG:

The heart rate measured at **B6** beats/minute. The ECG rhythm is atrial fibrillation. The heart rate in the exam room was **B6** pm.

Recommendations: This is a recheck echocardiogram and is compared to the prior study. **B6** was eating a grain free diet at the time of the prior study - and was transitioned to a non-grain free diet approximately 3 months ago.

This study shows improvement in the cardiac size and function. The LV remains moderately to severely dilated - but has shown a significant decrease in size over the past 3 months. The LV wall thickness has increased as well. The systolic function has shown improvement - but remains mildly to moderately reduced. The mitral regurgitation has decreased in severity, and the left atrium has decreased in size (but remains moderately enlarged).

A diagnostic ECG was not performed. The ECG during the echocardiogram showed atrial fibrillation with a ventricular response rate of **B6** pm. The heart rate in the exam room was **B6** pm, and the owners count a resting heart rate of **B6** pm at home.

Overall these findings show a significant improvement after the patient was transitioned off a grain free diet. Recommend continuing the cardiac medications at the current dosages. Recommend beginning taurine and fish oil supplementation. Recommend a recheck echocardiogram and holter monitor in 3-4 months.

B6

Electronically signed on 8/17/2018 on 5:08:14 PM

From: Carey, Lauren </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=F0226BD682844FA2B71EA3750D4FCB82-LAUREN.CARE>
To: Rotstein, David; Ceric, Olgica; Glover, Mark; Jones, Jennifer L; Nemser, Sarah; Palmer, Lee Anne; Peloquin, Sarah; Queen, Jackie L
Sent: 10/25/2018 7:10:28 PM
Subject: RE: [B6] case-FW: Taste of the Wild High Prairie: Lisa Freeman - EON-369325

Dr. Freeman stated this might be a duplicate submission. I dug through the database and I don't find anything so I think this is an original report for this case.

From: Rotstein, David
Sent: Thursday, October 25, 2018 7:54 AM
To: Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Glover, Mark <Mark.Glover@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Peloquin, Sarah <Sarah.Peloquin@fda.hhs.gov>; Queen, Jackie L <Jackie.Queen@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>
Subject: [B6] case-FW: Taste of the Wild High Prairie: Lisa Freeman - EON-369325

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM Vet-LIRN Liaison
CVM OSC/DC/CERT
7519 Standish Place
[B6] (BB)



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From: PFR Event <pfpreventcreation@fda.hhs.gov>
Sent: Thursday, October 25, 2018 7:53 AM
To: Cleary, Michael * <Michael.Cleary@fda.hhs.gov>; HQ Pet Food Report Notification <HQPetFoodReportNotification@fda.hhs.gov>; usha.gulati@doveltech.com
Subject: Taste of the Wild High Prairie: Lisa Freeman - EON-369325

A PFR Report has been received and PFR Event [EON-369325] has been created in the EON System.

A "PDF" report by name "2057945-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 "2057945-attachments.zip" and is attached to this email notification.

Below is the summary of the report:

EON Key: EON-369325

ICSR #: 2057945

EON Title: PFR Event created for Taste of the Wild High Prairie; 2057945

AE Date	02/20/2018	Number Fed/Exposed	1
Best By Date		Number Reacted	1
Animal Species	Dog	Outcome to Date	Died Naturally
Breed	Great Dane		
Age	9 Years		
District Involved	PFR-New England DO		

Product information

Individual Case Safety Report Number: 2057945

Product Group: Pet Food

Product Name: Taste of the Wild High Prairie

Description: DCM, CHF, atrial fibrillation WB taurine = **B6** Dog's diet previously submitted to FDA Note: this may be a duplicate submission

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: Died Naturally

Number of Animals Treated With Product: 1

Number of Animals Reacted With Product: 1

Product Name	Lot Number or ID	Best By Date
Taste of the Wild High Prairie		

Sender information

Lisa Freeman

200 Westboro Rd

North Grafton, MA 01536

USA

Owner information

B6

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

<https://eon.fda.gov/eon//browse/EON-369325>

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

<https://eon.fda.gov/eon//EventCustomDetailsAction!viewReport.jsps?decorator=none&e=0&issueType=12&issuelid=386247>

=====

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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.

From: Freeman, Lisa <Lisa.Freeman@tufts.edu>
To: Jones, Jennifer L
Sent: 8/22/2018 6:17:24 PM
Subject: RE: [REDACTED] B6

PS – [REDACTED] B6 died [REDACTED] B6

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: Freeman, Lisa
Sent: Wednesday, August 22, 2018 1:43 PM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Subject: [REDACTED] B6

Hmm – that's strange.
I'll send those along
Here's [REDACTED] B6
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 <Jennifer.Jones@fda.hhs.gov>
Sent: Wednesday, August 22, 2018 12:54 PM
To: Freeman, Lisa <lisa.freeman@tufts.edu>
Subject: RE: updates

Hi Lisa,
I don't have the report in our records from [REDACTED] B6. If she submitted one and has an ICSR number, we can track it down.

Also, I had our team check for reports for [REDACTED] B6 and [REDACTED] B6 but there weren't any. Are you also able to send those along with records?

Thank you again for all of your efforts gathering the records, getting permission for interviews with owners, and submitting these complaints. You've been a great help to the investigation!!
Jen

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



From: Freeman, Lisa [<mailto:Lisa.Freeman@tufts.edu>]
Sent: Tuesday, August 21, 2018 10:56 AM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Subject: RE: updates

Hi Jen
Actually, [B6] from [B6] submitted [B6]. If you don't have that one, let me know and I can submit
Owner would be very happy to talk to you
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 <Jennifer.Jones@fda.hhs.gov>
Sent: Tuesday, August 21, 2018 10:46 AM
To: Freeman, Lisa <lisa.freeman@tufts.edu>
Subject: RE: updates

Thank you, Lisa.
We're going to send you the box this week with 7 whirl-pak bags. Each bag will be labelled for the dog and our internal identifier number (EON-XXXXXX). Please fill the bags with the respective food. I've calculated the return weight based on filling 7 bags full.

Also, I have the medical records for [B6], but did you submit a pet food report for him? I'm wondering if I didn't see it on our end.

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



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: Carey, Lauren </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=F0226BD682844FA2B71EA3750D4FCB82-LAUREN.CARE>
To: Rotstein, David; Ceric, Olgica; Glover, Mark; Jones, Jennifer L; Nemser, Sarah; Palmer, Lee Anne; Peloquin, Sarah; Queen, Jackie L
Sent: 11/13/2018 8:56:20 PM
Subject: RE: DCM cases- Lisa Freeman and/or Tufts-related- 11/10/18

To stay on the same page: EON-370713 and EON-370715 are 2 pets from the same household reported by Dr. Freeman. EON-370762 is the owner report for this household.

From: Rotstein, David
Sent: Saturday, November 10, 2018 8:56 PM
To: Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Glover, Mark <Mark.Glover@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Peloquin, Sarah <Sarah.Peloquin@fda.hhs.gov>; Queen, Jackie L <Jackie.Queen@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>
Subject: DCM cases- Lisa Freeman and/or Tufts-related- 11/10/18

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM Vet-LIRN Liaison
CVM OSC/DC/CERT
7519 Standish Place
B6 (BB)



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From: Carey, Lauren </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=F0226BD682844FA2B71EA3750D4FCB82-LAUREN.CARE>
To: Rotstein, David; Ceric, Olgica; Glover, Mark; Jones, Jennifer L; Nemser, Sarah; Palmer, Lee Anne; Peloquin, Sarah; Queen, Jackie L
Sent: 11/19/2018 11:49:14 AM
Subject: RE: DCM cases 11/16/2018 1500

EON-371239 is the 2nd report for this dog, the 4th report for this household. Dr. Freeman submitted a report for each dog (EON-370713 and EON-370715) and the owner has now submitted a report for each dog (EON-370762 and EON-371239).

From: Rotstein, David
Sent: Friday, November 16, 2018 2:59 PM
To: Carey, Lauren <Lauren.Carey@fda.hhs.gov>; Ceric, Olgica <Olgica.Ceric@fda.hhs.gov>; Glover, Mark <Mark.Glover@fda.hhs.gov>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Peloquin, Sarah <Sarah.Peloquin@fda.hhs.gov>; Queen, Jackie L <Jackie.Queen@fda.hhs.gov>; Rotstein, David <David.Rotstein@fda.hhs.gov>
Subject: DCM cases 11/16/2018 1500

Please note for(EON370762) EON-371239-Zignature, that there was a report for another dog in the household.

David Rotstein, DVM, MPVM, Dipl. ACVP
CVM Vet-LIRN Liaison
CVM OSC/DC/CERT
7519 Standish Place
B6 BB)



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