



PURINA
PRO PLAN

DOBERMAN PINSCHER Update

A NESTLÉ PURINA PUBLICATION DEDICATED TO DOBERMAN PINSCHER ENTHUSIASTS

VOLUME 16 | FALL 2018

UNDERSTANDING DILATED CARDIOMYOPATHY

The Role of Genetics & Epigenetics

LIFETIME STUDY OF DCM IN DOBERMAN PINSCHERS

AIMS TO BETTER UNDERSTAND FATAL HEART DISEASE



A loyal Doberman Pinscher enthusiast, Sue Krom of North Charleston, South Carolina, believes a game-changing approach is needed to better understand dilated cardiomyopathy (DCM), a heart disease that affects up to half of her favorite breed. Her belief is shaped by firsthand experience; three of the six Dobermans she has owned died from DCM.

Even before DCM was recognized as a potentially fatal heart disease with a [lifetime risk of around 50 percent for Dobermans](#), Krom was assisting with cardiac health screenings at the Doberman Pinscher Club of America (DPCA) National Specialty. Her personal pain, the memory of losing “Ramba” (Nagler’s Slightly Sinful CDX), “Armani” (UCH Nagler’s Lightening Strikes CGC CDX RN) and “Dulcinea,” to DCM, motivated her to take on a health activist role, helping for nine years with the health clinics.

“DCM is a challenging disease for Doberman breeders and owners to understand, partly because it is so fickle,” Krom says. “Although there are two genetic mutations linked to DCM, some Dobermans without either mutation have developed DCM. Even more confusing, dogs with one or both mutations may never develop the disease.”

DCM, an inherited, irreversible heart muscle disorder that affects Dobermans more than any other breed, eventually leads to congestive heart failure, though some

dogs die suddenly before developing heart failure. About 25 to 30 percent of affected Dobermans experience ventricular tachycardia, or erratic heartbeats, that causes sudden death. Normal heartbeats are interrupted by rapid beats that are too close together, subsequently shorting out the heart. About one-third of dogs with ventricular tachycardia have no prior signs of the disease until they die suddenly.

Congestive heart failure occurs from fluid buildup due to the heart dilating as it compensates for the weakened heart muscle, eventually becoming unable to pump blood correctly. Fluid can accumulate in the lungs, which is pulmonary edema, or in the abdomen, known as ascites. The disease is likely advanced and the prognosis grim in dogs exhibiting clinical signs of weakness, lethargy and coughing. Often not diagnosed until midlife, around age 7 1/2, dogs may have already been bred when the disease is discovered.

A new lifetime study of DCM in 300 Doberman Pinschers has just begun. Funded by the Doberman Pinscher Club of America, the research is led by three veterinary cardiologists who are driven by their passion to learn game-changing answers to better understand DCM. Currently, 150 Dobermans are enrolled in the study, with December 2018 as the target date for reaching full enrollment.

Ryan Fries, DVM, DACVIM (Cardiology), assistant professor at the University of Illinois, says, "Many genetically affected dogs without evidence of disease expression are under 5 years of age. Is it a lack of penetrance that keeps them from developing DCM or some other factor? Following their progression of this disease over several years is vital to understanding this disease. The more we know, the better we can educate breeders."

Dr. Fries along with Nancy Morris, DVM, DACVIM (Cardiology), of Mass Veterinary Cardiology Services in Agawam, Massachusetts, and Amara Estrada, DVM, DACVIM (Cardiology), professor of cardiology at the University of Florida, are collaborating on the research. The participating Dobermans are patients treated at their veterinary practices, plus dogs enrolled via cardiac health clinics at the DPCA National Specialty.

The complexity of the disease, combined with the inconsistent expression of the two DCM genetic mutations (PDK4 and DCM2), has led to this study and its novel approach looking at the disease. Epigenetic factors, including a dog's environment, diet, geographical area, exercise, and nutritional supplements, are getting a close-up review to learn if they have an impact on clinical expression of DCM in genetically affected dogs.

"We believe that Doberman Pinschers with both the PDK4 and DCM2 genetic mutations will eventually develop DCM with a greater frequency than dogs with a single mutation or no mutation," says Dr. Morris, who has provided discounted cardiac screening tests at the DPCA National Specialty for many years.

A shift in openness about the disease among breeders and owners is noteworthy. "Breeders are beginning to take DCM seriously, and this is helping to advance progress," says May Jacobson, PhD, of Sudbury, Massachusetts, chair of the DPCA Health Research Evaluation Committee.

A COMPREHENSIVE REVIEW

The longitudinal, prospective study underway, titled "Epigenetic and Genetic Factors Associated with Dilated Cardiomyopathy in the Doberman Pinscher," aims to provide comprehensive information about DCM through exploration of

"Many genetically affected dogs without evidence of disease expression are under 5 years of age. Is it a lack of penetrance that keeps them from developing DCM or some other factor? Following their progression of this disease over several years is vital to understanding this disease."

Ryan Fries, DVM, DACVIM (Cardiology),
University of Illinois

Early screening for DCM, consisting of an echocardiogram and a baseline Holter monitor test, starting when dogs are 2 years of age, has long been recommended by the Doberman Pinscher Club of America.

the association between epigenetic factors and the expression of DCM in Dobermans known to have the PDK4 and/or DCM2 mutations. Funding of \$12,250 from DPCA is supporting genetic testing for participating Dobermans from cheek swabs submitted to the North Carolina State University Veterinary Cardiac Genetics Lab.

Kate Meurs, DVM, PhD, DACVIM (Cardiology), professor and associate dean for research and graduate studies at NC State, discovered the PKD4 and DCM2 mutations. The first mutation she discovered affects PDK4, a regulatory enzyme in the heart's mitochondria cells that is necessary for normal energy metabolism. The mutation is found in about 37 percent of Dobermans that develop DCM.

The newly discovered DCM2 mutation affects the heart by diminishing normal cardiac contractions. The prevalence rate is not known, though it is believed about 60 percent of Dobermans with this mutation will develop DCM. Dr. Meurs' scientific paper on the DCM2 research has not yet been published.

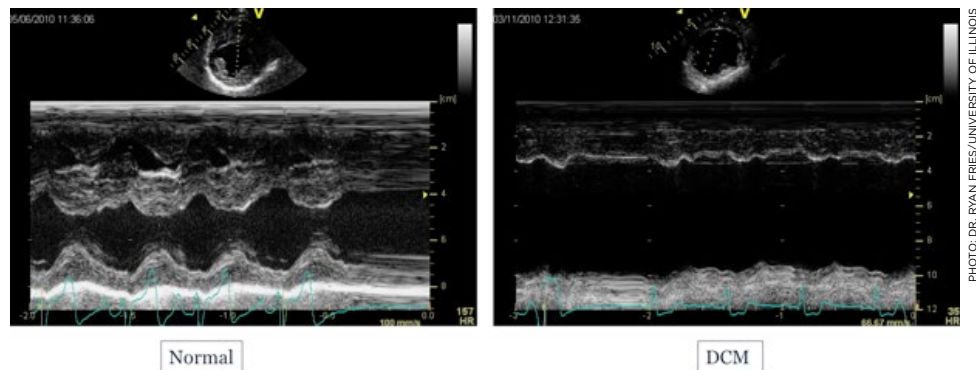
Dogs are eligible for the study after a two-dimensional transthoracic echocardiogram combined with an electrocardiogram, which detects the electrical activity of the heart, and Holter monitor testing are performed. Owners are responsible for the costs of these tests.

After owners complete an online survey about a dog's diet history, nutritional supplementation, exercise practices, and environment, genetic testing will be provided at no cost to the owners.

Early screening for DCM, consisting of an echocardiogram and a baseline Holter monitor test, starting when dogs are 2 years of age, has long been recommended by DPCA. The parent club advises testing annually until dogs are around age 5 and then switching to biannual testing. Dogs in breeding programs should be tested every six months. The tests help to identify the disease sooner when treatment can help slow its progression, ease clinical signs and improve quality of life.

The diagnostic tests are used together because one test may produce normal results and the other may pick up on an abnormality, or vice versa. For example, an echocardiogram examines the structure of the heart and detects functional abnormalities at a single segment of time, while the Holter monitor provides information about the heart's electrical activity over an entire day. Together, these tests help to identify dogs that might later experience sudden death or develop structural disease not already present.

Holter monitor testing involves a dog wearing a vest outfitted with electrodes that record heart rhythm



Echocardiogram images show normal heart function, left, and reduced systolic function in a Doberman Pinscher diagnosed with dilated cardiomyopathy.

PHOTO: DR. RYAN FRIES/UNIVERSITY OF ILLINOIS

TIMELINE FOR GENETIC & EPIGENETIC DCM STUDY* IN DOBERMAN PINSCHERS

October 2017	Began enrolling Doberman Pinschers at the 2017 DPCA National
July 2018	Enrollment reaches 150 Dobermans
October 6-13, 2018	DPCA National Specialty at Lake Charles, Illinois Cardiac health clinic & continued enrollment of dogs
December 2018	Goal for completing enrollment of 300 dogs
Early 2020	First update of results, with subsequent updates planned every 18 to 24 months



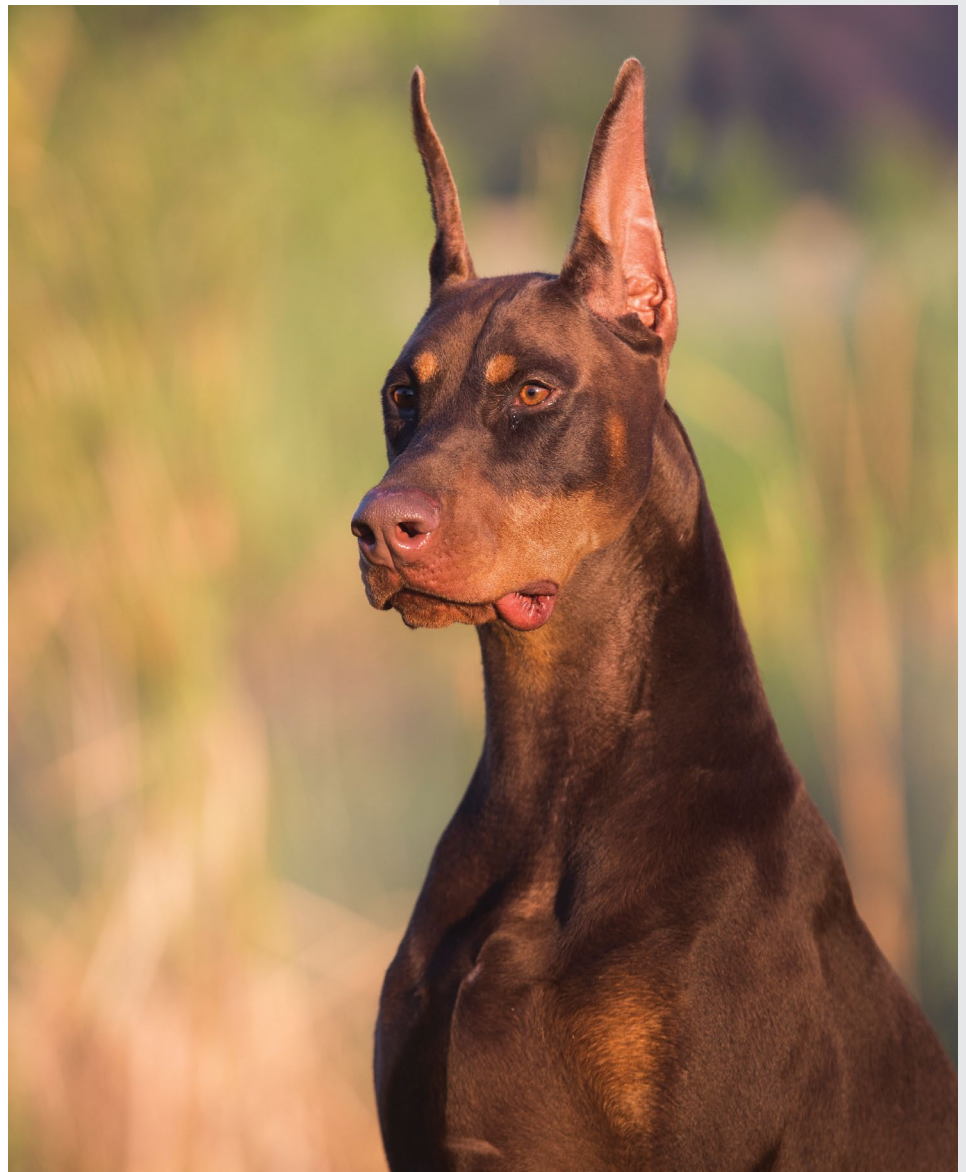
*Funded by the Doberman Pinscher Club of America, this longitudinal, prospective observational study will follow genetically affected and normal dogs throughout their lives. For information about participating, please contact Dr. Ryan Fries at rfries@illinois.edu.

over 24 hours. The testing picks up all normal heartbeats during that time, as well as abnormal heartbeats. Heart rate varies based on a dog's activities. A sleeping dog's heart may beat from 28 to 40 times per minute, compared to a rate of 65 to 80 beats per minutes when the dog is awake. The heart may accelerate to 200 beats per minute when a dog is running.

The most common abnormal heartbeats in Dobermans are known as premature ventricular contractions (PVCs), which disrupt the normal rhythm of the heart. A single PVC may not be a cause for concern, though PVCs also can occur as two, a couplet, as three, a triplet, or in succession of four or more, which is known as ventricular tachycardia.

"I don't worry when I see 50 PVCs over 24 hours," Dr. Morris says, noting that there is some controversy regarding what is a normal threshold. "On the other hand, 10 PVCs in a row constitute ventricular tachycardia. This is when we worry about the possibility of sudden cardiac death."

Medications offer palliative care and slow the progression of DCM, though they are not able to stop or reverse the heart disease.





“Drugs such as sotalol and mexiletine are used to control arrhythmias,” says Dr. Fries. “Pimobendan is prescribed to strengthen the heart’s contractions, and diuretics can help prevent fluid from collecting around the lungs. An ACE (angiotensin-converting-enzyme) inhibitor may help improve heart function.”

These heart medications can be costly. Some owners report paying up to \$10 a day for their dog’s prescriptions.

“I took a second job to pay for my dogs’ medications,” Krom says.

EFFECT OF EPIGENETICS

Getting a handle on the effect of epigenetic factors on DCM could provide important insights. Information about nutritional supplements, diet and exercise patterns are collected in the surveys that owners complete online. Questions pertaining to a dog’s lifestyle, home environment and geographical area are included as well.

When it comes to exercise, Doberman Pinschers are likely to participate in a mix of activities. Some may compete in Schutzhund, dock diving and agility; others may have a relaxed lifestyle as a family companion. “The PDK4 mutation affects the heart’s energy metabolism, so if the heart is already energy-depleted, is exercise protective or deleterious?” he asks.

A tragedy of this heart disease is the fact that affected dogs usually appear normal until the heart muscle is no longer able to adequately pump blood to the body. Affected young dogs typically won’t live to be old. “These dogs usually succumb to arrhythmias, while older dogs with DCM are more apt to die of congestive heart failure,” says Dr. Morris.

A beautiful, regal breed, Doberman Pinschers are sadly most vulnerable to DCM. Although it will be some years before the full results



of this study will be known, as dogs will be followed throughout their lives, advances may come along the way.

“Our purpose is to provide the most complete information possible and to help Doberman breeders and owners better understand how to manage their breeding program, find the disease early and promote the best health possible for affected dogs and the breed as a whole,” Dr. Fries says.

Krom is eager to support the research and to learn more about DCM. “When the day comes that

we know more, I will feel somewhat vindicated over the loss of my three Dobermans,” she says. “Importantly, we will be able to help future generations be a stronger, heart-healthy breed.” ■

Purina appreciates the support of the Doberman Pinscher Club of America, particularly Dr. May Jacobson, chair of the DPCA Health Research Evaluation Committee, who helped identify this topic for the *Purina Pro Plan Doberman Pinscher Update*.

PURINA PUPPY CHOW ENHANCES NUTRITION FOR PUPPIES

During the first year of life, puppies need more protein than adult dogs and essential nutrients to support their growth and development. *Purina Puppy Chow* is launching three newly formulated formulas in October that provide 30 percent more protein than *Purina Dog Chow Complete Adult* dog food. The new formulas have added vitamin C, an antioxidant, and contain DHA, an essential omega-3 fatty acid, for brain and vision development. They also contain antioxidants to support a healthy immune system. Look for new packaging featuring children and puppies on these *Puppy Chow* formulas: Complete, Tender & Crunchy, and Natural. *Purina Puppy Chow* is sold at grocery stores, major pet food retailers and online.



LEARN MORE

PURINA DOG CHOW SALUTES VETERANS WITH SERVICE DOG SALUTE CAMPAIGN

Purina Dog Chow is donating up to \$500,000 to support Tony La Russa's Animal Rescue Foundation's (ARF) veteran's program. The campaign, called *Dog Chow Service Dog Salute*, will benefit ARF's expanding veterans program that matches veterans with rescue dogs whom they train to become their own service dogs. Here's how it works: Through Veteran's Day, Nov. 11, *Dog Chow* will donate **\$1 for each unique share on Facebook** of the BuzzFeed video featuring the powerful stories of veterans and rescue



dogs brought together by ARF (up to \$250,000). In addition, the brand will donate **5 cents from the sale of each specially marked bag** of *Purina Dog Chow Complete Adult With Chicken* dog food (up to \$250,000) through Nov. 11. Located in Walnut Creek, California, ARF has rescued more than 38,000 dogs and cats since it began in 1991.

LEARN HOW TO DONATE

PURINA PRO CLUB MEMBERS CAN USE PURINA POINTS FOR MERCHANDISE

PURINA PRO CLUB *Purina Pro Club* members can redeem their Purina Points for orders of Purina logo apparel and merchandise as well as gift certificates for retail, restaurants and travel through the Purina Points Rewards program. Members also can use Purina Points for checks toward future purchases of *Purina* brand dog food. Click on the link below to log in to your account, and then go to the Rewards program to place an order.

GET STARTED NOW

LOOKING TO REPRINT?

Doberman Pinscher Update articles may be reprinted provided the article is used in its entirety and in a positive manner. To request permission to reprint an article, please contact the editor at: barbara.fawver@purina.nestle.com. Reprints should include the following attribution: Used with permission from the *Purina Pro Plan Doberman Pinscher Update*, Nestlé Purina PetCare.