

## Matters of The Heart – Myxomatous Mitral Valve Disease in Dogs

By Sharon Albright, DVM, CCRT  
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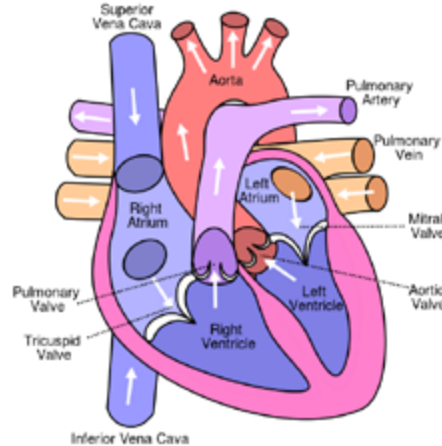
Myxomatous mitral valve disease (MMVD) is the most common cardiac disease in dogs and accounts for 75% of all heart disease seen in canines.

It primarily affects smaller-breed dogs later in life, but can affect any breed, including mixed breeds. The AKC Canine Health Foundation (CHF) and its donors are committed to understanding the genetic and biochemical mechanisms of this currently incurable disease to improve quality of life for affected dogs and their families.



The mitral valve sits between the left atrium and left ventricle of the heart. Oxygenated blood from the lungs is pumped into the left atrium, through the mitral valve, into the left ventricle, and then out into the body. Like all heart valves, the mitral valve functions as a one-way door directing blood flow in a single direction.

Myxomatous degeneration refers to the change of normal heart valve tissue into thicker leaflets (or doors) with nodules on the edges. These changes prevent complete closure of the valve, allowing backflow of blood. This inefficient swirling of blood creates the murmur heard with a stethoscope and increases pressure in the left atrium. This increased pressure eventually causes fluid to spill from the bloodstream back into the lungs, a condition known as congestive heart failure.



From Wikimedia Commons

Since MMVD can occur with greater frequency in certain breeds, CHF has awarded several research grants to characterize the clinical presentation and understand the prevalence and genetic basis of the disease in certain breeds. Identification of associated genetic mutations may facilitate informed breeding decisions and lead to screening and prevention plans for high-risk dogs, plus new therapeutic targets for all dogs. Additional funding has been provided to explore genomic, proteomic, and structural changes in affected dogs to improve our ability to diagnose MMVD and manage high-risk dogs. Finally, CHF has awarded numerous grants to investigate the role of biomarkers such as microRNA, N-terminal pro-brain natriuretic peptide (NT-proBNP), cardiac troponin I, and serotonin in the pathophysiology, diagnosis, and monitoring of MMVD in dogs.

Since there is no known way to reverse valvular degeneration, CHF's research funding also explores treatment aimed at controlling the congestive heart

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### CALENDAR OF EVENTS

#### WHERE TO FIND US

**January 19-23**

VMX Conference, Orlando, FL

**February 9-12**

Westminster Kennel Club Dog Show,  
 New York, NY

**March 2-3**

Beverly Hills Dog Show, Pomona, CA

**March 9-11**

SAVMA Symposium, Athens, GA

**March 20-24**

Tarheel Cluster, Raleigh, NC

Read this new, informative review  
 paper published in the **Journal  
 of the American Veterinary  
 Medical Association** to learn the  
 latest on diet-associated dilated  
 cardiomyopathy in dogs:

<https://avmajournals.avma.org/doi/pdfplus/10.2460/javma.253.11.1390?fbclid=IwAR2-yn4xvLLoXECxK9jKV0YwgtFSPQpCTnd7ZAJvZ4wyDwL79MCKp8ogNs8>

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failure that results from MMVD. Results have provided more detail on the effects of the commonly used drug pimobendan. A recent CHF-awarded grant on MMVD ([02436: Predicting Disease Stage and Diuretic Responsiveness in Dogs with Acquired Heart Disease](#)) will evaluate several potential blood and/or urine variables that correlate with urine production and may indicate a patient's responsiveness to diuretics, ultimately providing a personalized treatment strategy for affected dogs.

Myxomatous mitral valve disease is a common and incurable disease of older dogs. CHF and its donors have invested more than \$340,000 to understand this disease and create better diagnostic tests and treatment options for affected dogs, and there is still much to learn. Donate today at [akcCHF.org/donate](http://akcCHF.org/donate) so that all dogs may live longer, healthier lives. 🐾

## Canine Health Research to Improve Working Dog Success

By Sharon Albright, DVM, CCRT

Manager of Communications & Veterinary Outreach, AKC Canine Health Foundation

Working dogs perform various tasks to assist humans. Guide dogs, hearing dogs, service dogs, and dogs that detect seizures, cancer, drugs, or explosives all lend their canine talents to improving human lives and keeping us safe. Extensive resources are invested to breed, raise, and train these dogs, but success rates from training programs are reportedly only 35-50%. AKC Canine Health Foundation (CHF) funded researchers are exploring the temperamental traits and cognitive skills that make a successful working dog.



Temperament is defined as an animal's nature or behaviors that are relatively independent from learning, values, and attitudes. In contrast, cognition is the ability to assimilate information obtained from thought, experience, and the senses into knowledge and understanding. Both are important to the success of a working dog.

Temperament is defined as an animal's nature or behaviors that are relatively independent from learning, values, and attitudes. In contrast, cognition is the ability to assimilate information obtained from thought, experience, and the senses into knowledge and understanding. Both are important to the success of a working dog.

With funding from [CHF Grant 01995: Understanding the Flexibility and Limitations of How Dogs Acquire Knowledge and Understanding: Application to Service Dog Emotional Health and Selection](#), researchers explored how selecting for a more placid temperament in service dogs might affect cognitive performance. By testing dogs' problem-solving abilities at different arousal levels, they found that assistance dog performance improved with increased arousal. In contrast, pet dogs had a higher baseline level of arousal, so the increased arousal took them beyond the point of improved problem-solving ability and their performance worsened.

Researchers also set out to determine what cognitive skills best predict a dog's ability to help humans. They ran a comprehensive dog cognitive test battery (DCTB) on service dog candidates, explosive detection dogs, and volunteer pet dogs. They identified a subset of tasks that were associated with success as an assistance or detection dog and administered this sub-test to new groups of assistance and detection dogs. Results showed that the assistance dog sub-test accurately predicted career success for the 25% highest scoring dogs. Because detection dog success was not defined by any single measure, such as graduation from an assistance dog training school, a predictive test was not created. However, results did show that successful detection dogs (as determined by scored training records or handler surveys) scored higher on tests indicating sensitivity to human gestures and two measures of short-term memory.

To further explore these canine cognitive abilities, researchers conducted another study to compare the canine test results referenced above to those of similar tests on human infants and chimpanzees. The results demonstrated that canines perform more like human infants than do chimpanzees for cooperative communication tasks. They postulate that these results support the Domesticated Cognition Hypothesis, which states that humans and dogs underwent similar selection pressures for 'survival of the friendliest' and therefore developed similar cooperative communication skills.

The most recent CHF-awarded grant to study canine cognition will look even farther back in a dog's life to determine what



# Canine Health Research to Improve Working Dog Success

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developmental factors affect working dogs. With funding from [Grant O2518: The Effects of Early Life Experience on Working Dog Temperament and Cognition](#), researchers will examine the effects of the dam's temperament and the environment during the first eight weeks of life on working dog success. Results may inform how we can optimize early life processes, training, and exposures to promote the healthy development of working dogs.

An integrative approach that considers canine cognitive traits, temperamental traits, and their interactions is needed to understand working dog success. CHF is committed to improving the health of all dogs, including working dogs and the individuals they serve. Improving our ability to breed, raise, and train working dogs for various purposes will only strengthen the unique bond between our two species. 🐾

## 2019 Clinician-Scientist Fellows

Established in 2013, CHF's [Clinician-Scientist Fellowship Program](#) encourages and supports the next generation of canine health researchers to sustain future advancements in canine health.



**Ana Costa, DVM, MS, Diplomate ACVIM; Washington State University**

Mentors: Michael H. Court, BVSc, PhD, Diplomate ACVA; Katrina L. Mealey, DVM, PhD; and Nicolas Villarino, DVM, PhD, Diplomate ACVP

Dr. Costa received her DVM from Escola Universitária Vasco Da Gama in Portugal. Her work focuses on the *in vitro* impact of uremic toxins on drug binding to albumin. Since these conditions mimic canine chronic renal failure, results may lead to improved management and care of compromised patients.



**Shelby Gasson, DVM; Texas A&M University**

Mentor: W. Brian Saunders, DVM, PhD, Diplomate ACVS

Dr. Gasson received her DVM from Texas A&M University. She is continuing her work as the AKC Canine Health Foundation GCHP Hill Country's Let's Get Ready To Rumble "Rumble" Clinician-Scientist Fellow ([akcCHF.org/rumble](http://akcCHF.org/rumble)). Dr. Gasson's work focuses on the development of tissue engineering constructs for treatment of osteochondral (joint) defects. *This fellowship is generously sponsored by Rumble's owners, Carolyn and Gary Koch, breeders Kristy and Kevin Ratliff, and handler Esteban Farias.*



**Mariah Gentry, DVM; University of Pennsylvania**

Mentor: Margret L. Casal, DVM, PhD, Diplomate ECAR

Dr. Gentry received her DVM from Cornell University. Her work focuses on the heritability of renal dysplasia in Cairn Terriers and she aims to develop a DNA-based marker test, so the disorder can be diagnosed at an early age.

*This fellowship is generously sponsored by the Foundation of the Cairn Terrier Club of America.*



**Sarah Murphy; Clemson University**

Mentor: Leigh Anne Clark, PhD

Ms. Murphy is a PhD candidate at Clemson University. Her work focuses on the genetics of congenital idiopathic megaesophagus (CIM) in German Shepherd Dogs and Great Danes. The goal of her study is to develop a genomic prediction tool to help breeders plan matings that will not produce CIM.

*This fellowship is generously sponsored by the Orthopedic Foundation for Animals.*



**Caroline Wood, DVM, PhD; University of Minnesota**

Mentor: Jaime Modiano, VMD, PhD

Dr. Wood received her DVM and PhD from the University of Minnesota. Her research aims to define the unique DNA methylation patterns for specific dog lymphocyte subsets found in osteosarcoma (bone) tumors in dogs to aid discovery of new treatments. *This fellowship is generously sponsored by the American German Shepherd Dog Charitable Foundation.*

**MISSION:** *The mission of the American Kennel Club Canine Health Foundation, Inc. is to advance the health of all dogs and their owners by funding scientific research and supporting the dissemination of health information to prevent, treat and cure canine disease.*

## 2018 CHF Awards



Eddie Dziuk, OFA COO and Dr. Fran Smith, OFA President and Chairman of the Board

CHF presents the **President's Award** annually to a person or organization that has made an exceptional contribution to advancing canine health. The 2018 President's Award winner is the Orthopedic Foundation for Animals (OFA). The OFA has generously supported CHF research on numerous canine health topics including musculoskeletal disease, thyroid disease, genetics, oncology, and neurology. CHF and OFA co-sponsored creation of the Canine Health Information Center (CHIC), which includes a database used to research and maintain information on the health issues prevalent in specific breeds, and a DNA repository to facilitate research aimed at reducing the incidence of inherited disease in dogs. OFA has co-sponsored funding for students from US schools of veterinary medicine to attend CHF's biennial National Parent Club Canine Health Conference. In 2018, OFA generously supported CHF's Clinician-Scientist Fellowship Program with a \$50,000 contribution, which brought their cumulative total of CHF support to over \$500,000. Thank you to the OFA for their continued dedication to improving canine health! 🐾

Each year, CHF presents the **Distinguished Research Partner Award** to clubs or organizations for their ongoing and outstanding commitment to support canine health research.

The 2018 Distinguished Research Partners are the American Boxer Charitable Foundation and the Golden Retriever Foundation

We thank the Boards and members of these dedicated foundations for supporting canine health research!

The inaugural **AKC Canine Health Foundation Legacy Award** recipient is Mrs. Katharine (Kate) Simonds. The Legacy Award is given in special recognition of a lifelong champion for dogs and supporter of the AKC Canine Health Foundation and its mission.

## Recent CHF-Awarded Grant Highlights

### **02575-MOU: Genetic Basis of Exercise-Induced Collapse in Border Collie Related Breeds**

Principal Investigator: James Mickelson, PhD; University of Minnesota

Investigators are defining the genetic architecture, heritability, and potential genomic loci associated with exercise-induced collapse in Border collies, mixes, and related breeds. *This research is co-funded through the collaborative efforts of the Border Collie Society of America and AKC Canine Health Foundation.*

### **02532-A: Canine Influenza: Occurrence, Spatial and Temporal Trends and Identifying Modifiable Factors to Reduce Transmission at Canine Shows in the United States**

Principal Investigator: Thomas Wittum, PhD; Ohio State University; Jason Stull, VMD, MPVM, PhD; Ohio State University and University of Prince Edward Island

Investigators are developing a system to identify disease outbreaks to create targeted prevention strategies and reduce the spread of canine influenza in the United States.

### **02487: OX40 Checkpoint Molecule Targeted Antibodies for Cancer Immunotherapy in Dogs**

Principal Investigator: Steven W. Dow, DVM, PhD; Colorado State University

Investigators are exploring the role of antibodies against checkpoint molecules in cancer immunity in dogs.

See our full research grants portfolio at [akcchf.org/research](http://akcchf.org/research).

## How You Can Help

### Double Your Donation!

In 2019, The American Kennel Club (AKC) will match donations from new and lapsed\* donors to the AKC Canine Health Foundation. The AKC will also match donations to CHF's Canine Cancer Research Initiative.

Double your impact and support canine health research today at [akcchf.org/donate](http://akcchf.org/donate).

\* last gift to CHF was prior to 1/1/18



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