



AMERICAN KENNEL CLUB
**CANINE HEALTH
 FOUNDATION**
 PREVENT TREAT & CURE®

DISCOVERIES



issue 46 • fall 2013



MISSION:
The Foundation is dedicated to advancing the health of all dogs and their owners by funding sound scientific research and supporting the dissemination of health information to prevent, treat and cure canine disease.

UPDATE FROM THE CEO

Update from the AKC Canine Health Foundation CEO, Dr. Terry T. Warren

November is the month that turns our hearts and minds to thinking of others and **giving thanks** for all the bounty that we experience throughout the year. You can say "thank you" for your dog's love and affection by making an end-of-the-year donation to the AKC Canine Health Foundation (CHF). Your gift will make a difference and help us succeed in our efforts to prevent, treat and cure canine disease. New Oak Grants have just been announced, and are detailed on **page 4**. The Foundation has funded a robust research portfolio this year, which includes the Golden Retriever Foundation/CHF collaborative cancer grants in the amount of \$1.4 million, new Oak Grants amounting to nearly \$1.5 million, \$480,000 for bloat research and Acorn Grants in the amount of \$260,000. Help dogs live longer, healthier lives by making a donation to one or more of the research program areas in our portfolio.

There are many ways to support CHF that may not be familiar to you:

Recognize and honor your dog or a friend's dog by purchasing a brick on the *Walk of Champions* or *Path of Honor* at the Purina Event Center in Gray Summit, MO. Nestlé Purina Petcare has provided us with this wonderful fundraising opportunity, which has raised \$50,820 through the sale of 726 bricks. To honor a special dog, person or organization, go to <http://support.caninehealthfoundation.org/bricks>.

*For the love of your dog...for the future of your breed...*join the Foundation's Heritage Society by making a commitment to CHF through a planned gift. We are overwhelmed by the many dog lovers who have said thank you to their best friend by leaving a legacy that honors their lifelong companionship. To learn more about why people support canine health, read several donor profiles on **page 2**.

Provide an opportunity for others to give through CHF's new **point of purchase** donation

Story continued on page 11

THIS ISSUE AT A GLANCE

CHF to receive proceeds from Westminster Poster sales 2

Dr. Kathryn Meurs awarded the Asa Mays Excellence in Canine Health Research Award 3

NEW Canine Health Research Funding..... 4

CHF Honored as a Research Partner by the Univ of Minnesota College of Veterinary Medicine 10

**CANINES & COCKTAILS,
 UPCOMING EVENTS
 & MUCH MORE**
(See back for details.)

CHF Benefits from Westminster Poster

The AKC Canine Health Foundation (CHF) has once again been named the recipient of the proceeds from sales of the official poster for the 138th Westminster Kennel Club (WKC) Annual Dog Show, February 10 – 11, 2014.

Each year, WKC selects a canine-related charity or organization to receive proceeds from its prestigious show's poster sales. WKC conducts a contest, sponsored and judged by the New York Academy of Art, to design an original piece of artwork, which is replicated and sold as a poster during the Westminster Kennel Club Dog Show.

Posters can be ordered through the Westminster Kennel Club website at westminsterkennelclub.org, and they will also be available for purchase during the WKC dog show. The original piece of artwork will be raffled off at CHF's annual Westminster Cocktail Party on Saturday, February 8, 2014. For information on how to purchase raffle tickets, or for tickets to this event, visit www.akcchf.org. 🐾



Why Give?

Companionship. Loyalty. Commitment. Love. Most of us can agree, the relationship with our dogs is like no other and supporting canine health research is a way to help ensure that all dogs live longer, healthier lives. What's more, canine health research also directly impacts human medicine, enabling not only our dogs to benefit from the research conducted on diseases like cancer, heart disease and adrenal disease, but each of us, too. Recently, several CHF donors shared their motivations for giving to the Foundation:

Long-time dog-fanciers Edward and Patricia Gilbert of Paradise, CA, donate to CHF to support the world's leading canine research centers. "We see benefits not only in how the research provides solutions and tools for breeders to prevent, treat and cure disease and repair injury, but the research results in healthier people, too." The Gilberts also understand how the research in one breed can impact the health concerns of other breeds. "In the case of one of our Salukis, research for Doberman Pinschers provided the protocol that extended his useful life by several years." They also believe that CHF-funded research has equipped breeders with important resources.

Teaming up for Healthy Pups



Introducing *DonateWiseNow*®

This quarter we launched a new Point of Purchase fundraising initiative that enables us to team up with small retailers—at no cost to them.

Customers will be prompted to *make donations* at checkout, **increasing fundraising opportunities** for, and growing awareness about, CHF.

For more information, visit:

www.akcchf.org/donatewisenow.

"We have witnessed the results of research that has provided breeders with tools to eliminate major genetic, breed-specific problems. This would not have been possible without CHF research. CHF has helped focus research on real-world, breed-specific problems."

The Gilberts also point to the importance of fiscal responsibility when making a donation to CHF. "We are influenced by the fact that donated funds are managed in a fiscally responsible manner as attested to by a 4-Star Charity Navigator rating."

Mimi and Jim Tysseling of Scottsdale, AZ, not only make personal donations to CHF, but they have also helped to raise awareness and funds through regional specialties, dog shows and other special events. "When I learned of the mission of the Canine Health Foundation, I felt it was my responsibility as a breeder, owner, judge and healthcare professional to get involved," said Mimi Tysseling. "Having dedicated over 30 years in the human healthcare arena, I have seen many medical miracles happen through funding for research." The Tysselings understand how canine health research can impact human medicine, and they also understand the importance of sharing the Foundation's mission with others, knowing that the more people who support canine health, the greater the benefit for all dogs.

Owning a dog brings joy and friendship, two benefits Sandy Bingham-Porter and Steve Porter of Charleston, IL, know firsthand. "Research has shown the significant impact dogs give us emotionally, physically and socially. Be it in the form of touch, exercise or attachment, our dogs support us," said Sandy Bingham-Porter.

Story continued on page 11

CHF Presents Dr. Kathryn Meurs with the Asa Mays Excellence in Canine Health Research Award

The AKC Canine Health Foundation (CHF) presented Dr. Kathryn Meurs, of North Carolina State University with the Asa Mays Excellence in Canine Health Research Award on August 10 at the National Parent Club Canine Health Conference in St. Louis, MO. Dr. Meurs was selected to receive this biennial award based on her critical contributions to understanding inherited heart disease in dogs.

CHF established the Asa Mays Excellence in Canine Health Research Award to honor researchers who demonstrate meritorious advancements in identifying, characterizing and treating canine disease and ailments. The late Dr. Mays, DVM, was a dog breeder, judge and founding board member of the AKC Canine Health Foundation, and the award is a fitting tribute to his long-term dedication to canine health.

After receiving her doctorate in veterinary medicine from the University of Wisconsin-Madison, Dr. Meurs earned a PhD in genetics from Texas A&M University and the Texas Heart Institute.

She is a diplomate of the American College of Veterinary Internal Medicine with a subspecialty in cardiology. Dr. Meurs is currently associate dean of research and graduate studies at North Carolina State University.

Dr. Meurs is a leader in comparative genetics research with a special interest in inherited heart disease, cardiomyopathy and pharmacogenomics. She is credited with the discovery of four causative mutations for inherited cardiomyopathies in dogs and cats, one of which was subsequently described in human beings with hypertrophic cardiomyopathy. The genetic tests developed by Dr. Meurs are helping to reduce the incidence of heart disease so that dogs can live longer, healthier lives.

"The pioneering effort of researchers like Dr. Meurs is a testament to Asa Mays' vision for conquering diseases in all dogs," said Dr. Shila Nordone, CHF's chief scientific officer. "We are privileged to work with Dr. Meurs and we are pleased to recognize her contributions to canine health with this award."

More information about the Asa Mays award, including detailed recipient profiles, visit: www.akcchf.org/about-us/awards-and-scholarships/asa-mays-excellence-in-canine.html. 🐾

Bloat Grants Approved

Gastric dilatation-volvulus (GDV), or bloat, is a devastating disease common in large and giant-breed dogs. Funded through CHF's Bloat Initiative, these two grants are part of a major research effort to identify the underlying mechanisms of this devastating condition. Learn more about CHF's Bloat Initiative by visiting www.akcchf.org/bloat.

01935: Abnormalities in the stomach's ability to contract predisposes large-breed dogs to bloat
Principal Investigator: Dr. Laura L. Nelson, DVM
Institution: Michigan State University
Total Grant Amount: \$233,774.00

Bloat (GDV) occurs most frequently in older dogs with a close relative who has also suffered the condition. Bloat causes the stomach to become both displaced and distended with air. Without emergency medical stabilization and surgical intervention, affected dogs quickly experience shock, damage to the stomach wall and death. The underlying cause of GDV remains unknown. Abnormalities in the ability of the stomach to contract have been documented in dogs after naturally occurring GDV. An analogous stomach condition in cattle, left-sided displacement of the abomasum (LDA) has been shown to, in some instances, be associated with abnormalities in the motilin gene. Motilin is an important driver of stomach contraction. This suggests that LDA and potentially GDV may be primarily caused by a stomach that does not properly contract, a condition that may be inherited. Dr. Nelson seeks to determine the relationship of abnormal stomach contraction with GDV, and to define the biochemical and genetic alterations that may be associated with these stomach abnormalities. The long-term goal is to develop a genetic test to identify dogs at high risk for GDV, and to determine which dogs will benefit most from prophylactic gastropexy or other preventive therapies.

01937: Evaluating the complex genetic basis of bloat
Principal Investigator: Claire Rebecca Sharp, BVMS
Institution: Tufts University
Total Grant Amount: \$251,097.00

Bloat (GDV) has an unacceptably high morbidity and mortality rate. It is known that there is no single cause for GDV, rather its occurrence is multifactorial, with both genetic and environmental factors contributing. Dr. Sharp will investigate how these risk factors cause GDV through the application of genomic and molecular methods, analyzing samples from dogs with GDV and comparing them to dogs of similar age and breed that have not developed GDV. A genome wide association study (GWAS) to identify differences in the genetic makeup of dogs with GDV, and to see which genes are turned on and off in GDV (epigenomics) will also be performed. Dogs with GDV will also be monitored for different types or amounts of proteins, hormones and other molecules in their blood and tissues (transcriptomics, proteomics and metabolomics). Together, this information will bring an understanding of what causes GDV and allow for early intervention to prevent bloat.

CHF Approves Nearly \$1.5 million in Canine Health Research Funding

The AKC Canine Health Foundation (CHF) is proud to announce the approval of 17 research grants to 14 universities. These grants, totaling nearly \$1.5 million in funding for researchers studying canine health, will provide better treatments, more accurate diagnosis and a deeper understanding of the mechanisms that cause disease in areas such as endocrinology, oncology, cardiology and musculoskeletal health.

The new grants cover a wide range of health concerns that affect all dogs. In response to health polls received at the end of 2012 as well as known areas of need in veterinary medicine, studies were chosen for funding to fill critical gaps in knowledge in canine health. Areas of emphasis in CHF's 2014 research portfolio include inflammatory bowel disease, immune-mediated hemolytic anemia, Cushing's syndrome, chronic kidney disease and hip dysplasia. CHF provided funding to develop a novel treatment for canine cartilage disease that will provide support for the evidence-based practice of regenerative medicine. Finally, novel drug targets to treat canine pain will be identified and, for the first time, veterinary cardiologists will be able to use genomic data to provide personalized treatment for pulmonary hypertension. To make a donation to support these grants, visit www.akcchf.org/2014grants.

To highlight the goals and significance of the new research projects, CHF has developed a series of short videos (5-10 minutes each) with Dr. Shila Nordone, CHF's chief scientific officer. Dr. Nordone explains how these grants, separated by research program area, will move canine health forward, eventually helping dogs that come into the veterinary clinic. The webinars can be viewed at www.akcchf.org/videos.

The complete portfolio of **2014 Oak Grants** is as follows:

Behavior

01995: Understanding the flexibility and limitations of how dogs acquire knowledge and understanding: Application to service dog emotional health and selection

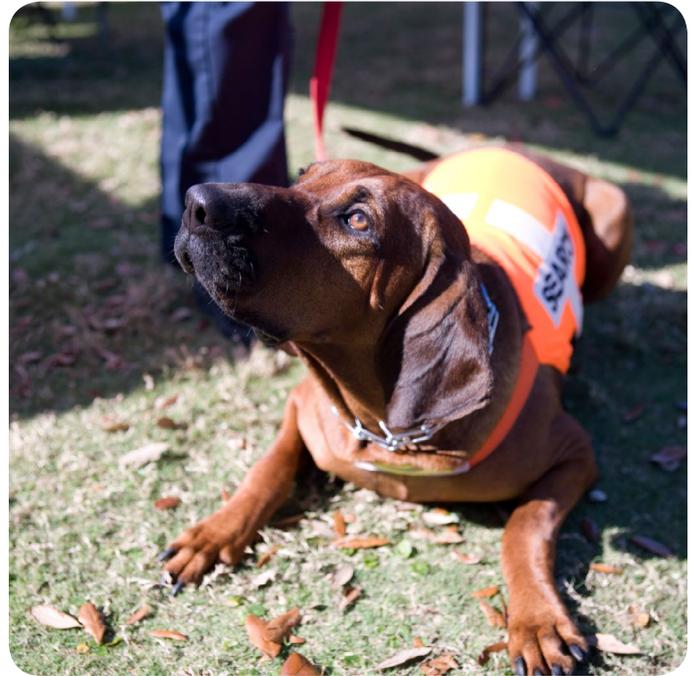
Principal Investigators: Dr. Evan L. MacLean, PhD, and Dr. Brian Hare, PhD

Institution: Duke University

Total Grant Amount: \$97,809.00

Dogs are being used to help people with disabilities in more ways than ever before. There is increasing evidence that trained dogs can dramatically improve the lives of people with a wide variety of disabilities, and the demand for these dogs climbs higher each year. The biggest challenge faced is increasing the supply of well-trained dogs to serve individuals who will benefit from their help, while at the same time ensuring the reciprocal emotional health of the dogs chosen for service. The research aims of Dr. MacLean and his colleagues are to increase the supply of these dogs by improving our ability to

identify and train dogs with the greatest potential for success. The Duke Canine Cognition Center and Canine Companions for Independence will work together to identify cognitive traits that predict success during assistance-dog training. They will pose the question: Do a dog's communicative abilities, memory, empathy for humans or ability to independently solve problems predict success? For the first time, a series of cognitive games will be used to determine which dogs have the cognitive abilities that best predict their abilities to help humans. With this new tool they will be able to more rapidly identify and train the best dogs in order to increase the number of people assisted by our best friends. This research will ensure that we begin to take the steps to understand canine emotional health and well-being in the service-dog selection process and beyond.



Blood Disease

01988: Identification of a safe storage time for canine blood used in the treatment of anemia

Principal Investigators: Dr. Mary Beth Callan, VMD, and Dr. Eldad A. Hod

Institution: University of Pennsylvania

Total Grant Amount: \$113,499.00

Red blood cells (RBCs) can be refrigerator-stored for up to 35-42 days in humans and dogs. Given that blood is a precious and limited resource, both human and veterinary blood banks typically dispense the oldest RBC units first to reduce waste. However, accumulating evidence suggests that transfusion of RBCs stored >14 days is associated with increased rates of complications and death in human patients. Preliminary data from a study of more than 2,000 dogs receiving RBC transfusions suggest that administration of older RBCs to dogs with certain

types of anemia negatively impacts survival. Dr. Callan's goal is to conduct a randomized clinical trial in which dogs with anemia in need of RBC transfusions will receive either "fresh" RBCs (stored <7 days) or "old" RBCs (stored 21–28 days). If they document that administration of older RBCs is associated with increased inflammation and poorer outcome in dogs with anemia, the results of this study will have a significant impact on canine health and veterinary blood banks by changing current transfusion practices; that is, by providing fresh rather than older RBCs to anemic canine patients.

02052: Defining the mechanism of severe, life-threatening bleeding disorders in dogs

Principal Investigators: Dr. Dana N. LeVine, DVM, PhD, and Dr. Majory Brooks, DVM

Institution: Iowa State University

Total Grant Amount: \$51,296.50

Immune thrombocytopenia (ITP) is a common bleeding disorder in dogs. It occurs when the immune system destroys the body's own platelets—blood cells that prevent hemorrhage. The resulting lack of platelets causes mild bruising in some dogs and in others causes severe, life-threatening hemorrhage. Veterinarians do not understand what triggers ITP and cannot predict its severity. Consequently, all ITP patients are treated with potent medications that suppress the entire immune system. Many dogs experience treatment side-effects, including excessive thirst and urination, ulcers, weight gain and recurrent infections. For some dogs, the side-effects, rather than ITP, prove fatal. Dr. LeVine will investigate the specific causes of ITP by measuring immune cells and proteins that are likely involved in platelet destruction. Further, her laboratory will identify protein-based biological markers that predict bleeding severity. Finally, they will define genes associated with the disease in breeds especially prone to ITP. Together, these efforts will benefit ITP patients through individualized therapy that matches treatment intensity with disease severity. Discovery of the immune and genetic causes of ITP will not only improve disease treatment, but ultimately help to prevent it.

Cardiology

01982: Personalized medicine: The intersection of genotype and drug responsiveness in the treatment of canine pulmonary hypertension

Principal Investigators: Dr. Joshua A. Stern, DVM, and Dr. Lynelle R. Johnson, DVM, PhD

Institution: University of California, Davis

Total Grant Amount: \$27,971.00

Genetic background is thought to alter the way animals and humans respond to disease and drug therapy. The unique DNA signature of an individual is now recognized as a pivotal influence on disease outcome during treatment and has become the central concept propelling the study of pharmacogenomics and individualized medicine. Dr. Stern will apply this cutting-edge knowledge to pulmonary

hypertension in dogs, a common disease with serious consequences, including exercise intolerance, respiratory distress and sudden death. Dr. Stern has identified a mutation in the gene phosphodiesterase 5A (PDE5A), the target of a drug called sildenafil, and believes this mutation may influence responsiveness of dogs to the drug. Dr. Stern will evaluate the responsiveness of dogs to sildenafil through pre- and post-echocardiogram, identification of biological markers of disease and quality-of-life questionnaires. Differences between treatment responses will be compared to genotype. He aims to establish a diagnostic test that allows clinicians to make treatment recommendations on a personalized basis, and tailor the therapeutic approach to treatment of pulmonary hypertension.



01994: Early and accurate prediction of mitral valve disease development

Principal Investigator: Dr. Sydney N. Moise, DVM, MS

Institution: Cornell University

Total Grant Amount: \$36,881.00

In the dog, 75% of heart disease is caused by myxomatous mitral valve degeneration (MMVD). The cause of MMVD remains incompletely defined, but likely involves the interplay of genetics, aging and mechanical damages. A dog's mitral valve opens and closes approximately 120,000 times per day under a constant barrage of mechanical forces. With such stress, the struggle of the valvular tissue to stay "normal" is constant. Dr. Moise hypothesizes that dogs suffering from MMVD have an altered structure of the mitral valve apparatus, which in turn is linked to breed size and/or cartilage development. Using a computer algorithm to assess the motion of the mitral valve leaflets, Dr. Moise and colleagues will define the mechanical signatures of valvular strain. They believe that these signatures are identifiable at a young age in the breeds most commonly affected by MMVD. A quantitative understanding of mitral leaflet strain will both improve our ability to predict MMVD susceptibility and increase the power and resolution of gene mapping efforts, and if successful, will inform new targets and timelines for therapeutic intervention.

02046: Using a novel combination of drugs to treat arrhythmia and heart failure in dogs

Principal Investigator: Dr. Janice McIntosh Bright, DVM, MS

Institution: Colorado State University

Total Grant Amount: \$33,060.00

Atrial fibrillation is a common heart rhythm abnormality (arrhythmia) in dogs. This arrhythmia affects all dog breeds and frequently coexists with heart failure causing worsening of disease and high mortality. Atrial fibrillation may be managed by administering drugs to slow heart rate or by restoring normal rhythm (cardioversion). Dr. Bright will evaluate dogs with naturally occurring atrial fibrillation and heart failure for their responsiveness to two drugs: amiodarone, an antiarrhythmic agent, and ranolazine, a drug used in humans with coronary heart disease. She will determine whether ranolazine given with amiodarone prolongs normal rhythm compared to amiodarone alone and whether ranolazine also improves heart function. Results will validate combined ranolazine/amiodarone administration as an improved new treatment for atrial fibrillation in dogs with heart failure, extending their quality of life.

Endocrinology

02011: Identification of novel drugs to halt the metastasis of tumors that cause Cushing's syndrome

Principal Investigator: Dr. Sara Galac, DVM, PhD

Institution: University of Utrecht

Total Grant Amount: \$41,700.00

Tumors of the adrenal gland that lead to Cushing's syndrome are characterized by excessive cortisol secretion, which in turn causes these tumors to be aggressive and rapidly metastasize. Recently, a critical role of steroidogenic factor (SF-1) in adrenal tumor formation has been demonstrated. Elevated SF-1 levels trigger tumor formation in mice and are associated with poor prognosis in humans and dogs. Blocking SF-1 with medical compounds (SF-1 inverse agonists) may suppress both tumor growth and cortisol production, thus enhancing the ability of veterinary surgeons to successfully remove adrenocortical tumors and prevent metastasis. In this study, Dr. Galac will obtain adrenal cancer cells from dogs after adrenal surgery and culture these tumors with SF-1 inverse agonists. The effect of these SF-1 agonists on cortisol production and cell growth will be evaluated, and if drugs are found to suppress cortisol production, Dr. Galac predicts they can enter the drug pipeline for the treatment of canine adrenal cancer. Due to the similarities with adrenal cancer in humans, the results of this study could be applied to human medicine.

Gastrointestinal Disease

02002: Defining the genetic basis of inflammatory bowel disease

Principal Investigators: Dr. Karin Allenspach, DVM, PhD, and Dr. Albert Jergens, DVM, MS, PhD

Institution: Royal Veterinary College, University of London

Total Grant Amount: \$119,268.00

Inflammatory bowel disease (IBD) is a group of disorders in which the intestinal tract has become invaded with the dog's own white blood cells, leading to inflammation. Over time, this inflammation causes the intestine to become less efficient at absorbing nutrients from digested food and weight loss, and vomiting or diarrhea often result. IBD can be controlled, but not cured. The cause of IBD is poorly understood, but it appears that genetics, diet, intestinal bacteria and abnormalities of the dog's immune system all play a role. Dr. Allenspach has recently identified genetic markers known as SNPs (single nucleotide polymorphisms), which she believes contribute to disease susceptibility. Beyond genetics, this research group has mechanistic data showing one of the putative mutations contributes to the inflammation seen in the intestine of dogs with IBD. In order to find all underlying genetic factors that could contribute to disease, they propose to perform a genome-wide association study. This study will lead to the development of new diagnostic and therapeutic avenues for canine IBD as has already been the case in people with IBD.



02050: Defining the genetic susceptibility to granulomatous colitis, a severe form of inflammatory bowel disease

Principal Investigator: Dr. Kenneth W. Simpson, BVMS, PhD

Institution: Cornell University

Total Grant Amount: \$187,730.00

Granulomatous colitis is a severe inflammatory bowel disease (IBD), usually diagnosed in young dogs. Affected dogs present with hemorrhagic diarrhea, often progressing to weight loss and debilitation. Recent studies have identified invasive *Escherichia coli* (*E. coli*) bacteria within macrophages in the inflamed large intestine, and eradication of *E. coli* induces dramatic clinical and histologic improvement. Unfortunately, the emergence of antimicrobial resistance has greatly reduced our ability to treat this disease, and persistently affected dogs are frequently euthanized. The type of *E. coli* isolated from dogs with granulomatous colitis is very similar to adherent and invasive *E. coli* (AIEC) associated with IBD in people. These types of *E. coli* are considered opportunistic pathogens that can exploit genetic defects in bacterial killing in an IBD-susceptible individual. Dr. Simpson suspects this is due to a heritable abnormality that confers susceptibility to invasion and persistence of *E. coli*. In preliminary studies, his research group has identified a region of the canine genome that is associated with granulomatous colitis affected dogs. This region contains candidate genes associated with IBD in people and mouse models, and has been specifically linked to sensing and killing of *E. coli*. The purpose of this study is to identify the gene(s), causal variant(s) and cellular pathways involved in the development of granulomatous colitis. This would enable the development of screening tests to eradicate this disease, and advance understanding of the development of IBD in dogs and people.

Hepatic Disease

01986: Profiling the metabolic and lipid imbalances that are causative of gallbladder disease in dogs

Principal Investigator: Dr. Jody L. Gookin, DVM, PhD

Institution: North Carolina State University

Total Grant Amount: \$134,398.00

The gallbladder mucocele (GBM) is one of the most common, poorly understood and deadliest biliary diseases of dogs. A GBM develops when the gallbladder secretes abnormal mucus that eventually obstructs or ruptures the gallbladder. GBM formation afflicts all dogs, but especially Shetland Sheepdogs, Miniature Schnauzers and Cocker Spaniels, and in general, dogs with disorders of steroid hormone or lipid metabolism. By the time a diagnosis of GBM is made, emergency surgery to remove the gallbladder is often required. After surgery, only 22–50% of dogs survive to be discharged from the hospital. There is a critical need to determine why dogs form a GBM so we can prevent the high cost and lost lives of these dogs. Based on the breeds and diseases that predispose to GBM, Dr.

Gookin hypothesizes these dogs have a unique disturbance in cholesterol or lipid metabolism. If the cause of this disturbance can be identified, we will be able to understand why GBMs form, develop tests for early diagnosis and design diets or drugs to prevent GBM formation.

Musculoskeletal Conditions and Disease

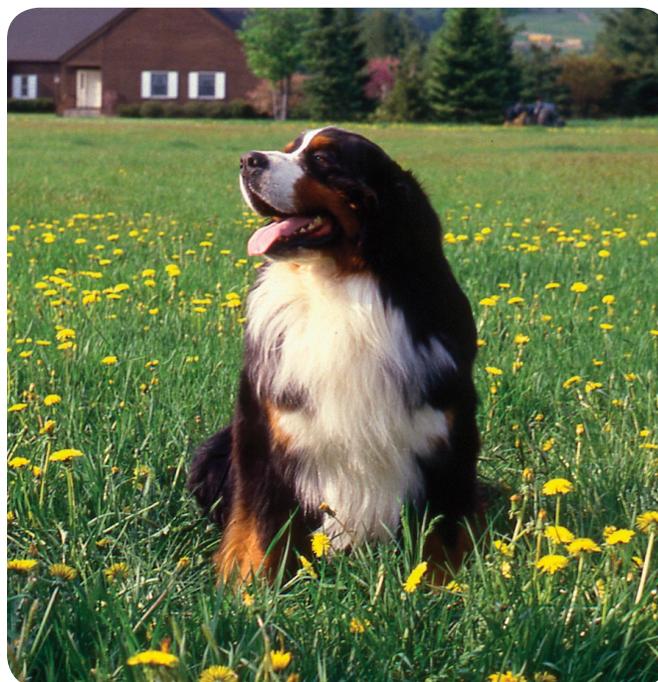
01828: Mapping of genetic risk factors for canine hip dysplasia

Principal Investigators: Dr. Antti Iivanainen, DVM, PhD, and Dr. Hannes Lohi, PhD

Institution: University of Helsinki and the Folkhälsan Institute of Genetics

Total Grant Amount: \$94,781.00

Canine hip dysplasia is a common developmental disorder of the hip joint that severely affects a dog's quality of life. As the disease has several genetic risk elements and is influenced by environmental factors like diet and exercise, it is of paramount importance that genetic association studies are conducted using adequately sized cohorts of genotyped diseased and healthy animals. Dr. Iivanainen will sample a large population of dogs (>300–400 dogs) so that contributing genetic loci can reliably be discovered. This research group expects that with such a strongly powered study, all major genetic risk factors can be uncovered with a high statistical significance. Investigators expect that identified loci will be discovered across breeds. The identification of genetic risk elements will allow the development of genetic tests that can be used in breeding programs to control the disease incidence, as well as further studies regarding the possible role of diet and exercise in hip dysplasia development.



02078: Development of a regenerative medicine technique to treat cartilage disorders in dogs

Principal Investigator: Dr. William Brian Saunders, DVM, PhD, and Dr. Melissa Grunlan, PhD
 Institution: Texas AgriLife Research
 Total Grant Amount: \$120,872.00

Osteochondrosis (OC) is a common and debilitating disease affecting large, athletic dogs. Osteochondrosis is caused by abnormal endochondral ossification, the process by which growth plate cartilage adjacent to joint surfaces transitions from cartilage to bone. The result is excessively thickened cartilage that partially or completely separates from surrounding bone. Cartilage separation exposes the joint to underlying bone and creates a large loose body, termed a joint mouse, within the joint. Surgical or medical treatment results vary widely based on the affected joint, size of the osteochondrosis defect, and intended purpose for each dog. Treatment options for osteochondrosis have remained essentially unchanged for decades. Tissue engineering represents a promising treatment alternative for dogs suffering from OC. Dr. Saunders believes the key to successful tissue engineering involves generation of regenerative osteochondral plugs, or ROPs. ROPs are tri-layered cylindrical plugs composed of hydrogels seeded with adult mesenchymal stem cells (MSCs). Each ROP layer is composed of materials that closely mimic specific zones of the joint and adjacent bone. ROP layers are bioactive, directing encapsulated MSCs to differentiate into specific tissues to more efficiently restore normal joint anatomy. Dr. Saunders will optimize the materials used to generate ROP layers and will determine if MSCs from tissue lining the joint (synovium) or inner cavity of bones (bone marrow) more effectively reconstruct native cartilage, transitional tissue or bone. This work represents an important advance in canine regenerative medicine and is highly applicable to dogs with osteochondrosis or other common joint ailments such as osteoarthritis.

Neurology

01985: Defining novel drug targets to treat chronic and neuropathic pain in the dog

Principal Investigators: Dr. Ronald Sluyter, PhD, and Dr. Leanne Stokes, PhD
 Institution: University of Wollongong
 Total Grant Amount: \$69,128.00

Through previous funding by the AKC Canine Health Foundation, Dr. Ronald Sluyter discovered a novel canine protein named the P2X receptor. This receptor is responsible for movement of positively charged ions into cells, and has been implicated in a wide range of cellular function in humans. Due to its ubiquitous expression and broad-based function, the P2X receptor is thought to play a decisive role in multiple diseases, including chronic neuropathic and inflammatory pain, dry eye, irritable bowel syndrome, interstitial cystitis, dysfunctional urinary bladder and cancer. In this grant, Dr. Sluyter will focus on the role of the P2X receptor in pain in the dog. Chronic or

long-lasting pain is a major health problem and welfare issue in dogs. Improved understanding of the mechanisms that define chronic pain will greatly aid in the development of new approaches and drugs to alleviate or treat chronic pain in dogs.

Oncology

02071: Development of a therapeutic brain tumor vaccine

Principal Investigator: Dr. Grace Elizabeth Pluhar, DVM, PhD
 Institution: University of Minnesota
 Total Grant Amount: \$130,572.00

Meningiomas are the most common primary brain tumor in dogs that affect more than 10,000 dogs in the US annually. These tumors occur most frequently in older dogs and in certain breeds—Golden Retrievers, Labrador Retrievers, Boxers, German Shepherd Dogs and Collies—causing uncontrolled generalized grand mal seizures in most cases. Most meningiomas recur less than one year after either surgery or radiation therapy. Furthermore, radiation therapy is expensive, involves many repeated episodes of general anesthesia, and causes severe adverse effects. Clearly, there is an urgent need for novel therapies to prevent tumor recurrence and increase survival time after surgery. Dr. Pluhar has developed immunotherapy protocols for dogs with gliomas, and recently assessed her strategy in a pilot study treating meningiomas with tumor lysate vaccines. Her data from six dogs showed this approach was safe, feasible and effective. Dr. Pluhar now proposes a larger clinical trial treating 30 dogs with meningioma by surgery alone or surgery followed by vaccines. They expect to see a specific immune response to the vaccines that prevents tumor recurrence. The data from the proposed study will provide further proof of safety and efficacy of vaccine-based therapy to support: 1) more widespread use in dogs and 2) initiation of a Phase I trial for high-grade and recurrent meningioma in humans.





Ophthalmology

02057: Identification of the genetic cause of corneal ulcers

Principal Investigator: Dr. Keith W Montgomery, DVM

Institution: North Carolina State University

Total Grant Amount: \$27,201.00

Spontaneous chronic corneal epithelial defects (SCCEDs) describe an eye disorder characterized by chronic corneal ulcers that fail to undergo normal healing. The predilection of certain breeds suggests that SCCEDs is inherited. Affected dogs develop spontaneous corneal ulcers that are often exceptionally painful and persist for weeks to months. Most dogs require surgical therapy to heal the corneal ulcer and experience corneal scarring as a result. Although SCCEDs can be effectively treated, some dogs develop additional episodes of corneal ulcers during their lifetimes. The impact on the quality of life for dogs during episodes of ulceration has led to increased interest in disease prevention. However, since SCCEDs is an adult onset disease, many dogs are selected for breeding before they are diagnosed. A blood test that could identify affected animals before they are used for breeding would greatly decrease the prevalence of SCCEDs. Dr. Montgomery will use a genome-wide association approach to identify an association of a genetic region to SCCEDs. They will then more closely evaluate the chromosomal region of interest to determine the gene and ultimately the causative genetic mutation. They believe that the identification of a genetic cause for SCCEDs can be used to reduce the prevalence of this disease in multiple affected breeds.

02061: Emergence of pigmentary uveitis as a potential cause of cataracts and glaucoma

Principal Investigators: Dr. Wendy M. Townsend, DVM, MS, and Dr. Kari J. Ekenstedt, DVM, PhD

Institution: Purdue University

Total Grant Amount: \$74,070.00

Pigmentary uveitis affects 10% of senior Golden Retrievers, and frequently results in blindness due to cataracts and/or glaucoma. The pain of glaucoma often leads to removal of the eye. Currently there is no way to prevent or effectively treat pigmentary uveitis. Evidence strongly suggests pigmentary uveitis is an inherited disease: It is observed exclusively in the Golden Retriever breed, and family members (parents/offspring, full- and half-siblings) can be

affected. Complicating the phenotype is the fact that most dogs are 8 years or older before developing clinical signs of pigmentary uveitis. Therefore, affected dogs may be used extensively in a breeding program before being diagnosed. This has frustrated conscientious breeders in their efforts to decrease the prevalence of pigmentary uveitis. Dr. Townsend and her team hypothesize that a genome-wide association study (GWAS) will identify a chromosomal region associated with Golden Retriever pigmentary uveitis, and that high-throughput DNA sequencing will allow identification of the causative mutation. Previous CHF funding helped establish a bank of Golden Retriever DNA for use in the present proposal. Identification of the gene responsible for pigmentary uveitis would permit development of a genetic test whereby affected individuals can be identified at a young age, allowing breeders to make informed breeding decisions. In addition, knowing the molecular basis underlying pigmentary uveitis may allow researchers to develop more effective treatments for dogs already affected by or genetically destined to develop pigmentary uveitis; this could possibly prevent the blindness, cataracts and glaucoma caused by pigmentary uveitis.

Renal Disease

02066: Identification of novel biomarkers and therapeutic targets for chronic kidney disease in dogs

Principal Investigator: Dr. Mary B. Naby, DVM, PhD

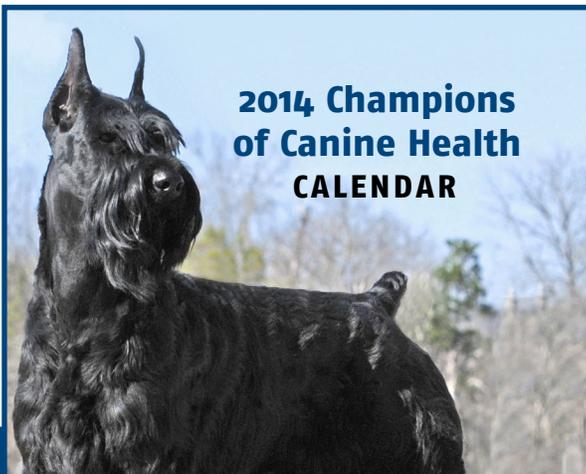
Institution: Texas AgriLife Research

Total Grant Amount: \$108,243.00

Chronic kidney disease is a significant cause of illness and death in dogs. Early treatment can prolong the lives of dogs with chronic kidney disease, but timely detection can be difficult. The outcome for each patient using current, early, non-invasive testing is unpredictable. Therefore, improvements in tests to detect kidney damage at an earlier stage would allow veterinarians to provide dogs with appropriate treatments in a more timely fashion to slow disease progression and improve quality and length of life. Further, better treatments are needed to prevent disease progression. MicroRNAs (miRNAs) are small molecules that can regulate gene expression by up or down regulation of messenger RNA transcripts and proteins in target tissues. Many studies have found that increases or decreases in miRNAs can serve as biomarkers of diseases, including human chronic kidney disease. They also contribute to the development of diseases. Dr. Naby will evaluate miRNAs in the serum and urine of dogs with chronic kidney disease to determine their use as biomarkers of kidney injury and their potential as targets for future therapeutics. They will evaluate kidney tissue, urine and serum samples from dogs with a hereditary disease that causes early-onset chronic kidney disease, as well as serum and urine from dogs with a variety of other naturally occurring kidney diseases to identify miRNAs that may be useful as biomarkers of kidney damage. Gene and protein targets of altered miRNAs will also be evaluated to learn more about the mechanisms that contribute to the development of chronic kidney disease in dogs. 🐾

CHF Honored as a Research Partner by the University of Minnesota College of Veterinary Medicine

CHF was recently honored as a distinguished research partner by the University of Minnesota College (UMN) of Veterinary Medicine (CVM) at Points of Pride Research Day. This annual event celebrates the CVM's research program and honors faculty, fellows, students and research partners who contribute to the advancement of biomedical sciences and veterinary medicine. Points of Pride Research Day included a poster competition, seminars and award presentations. Dr. Shila Nordone, CHF's chief scientific officer, who attended the event, said, "Given the current constraints of research funding in the new economy, CHF realizes that partnerships across all aspects of animal health and veterinary medicine are no longer merely helpful, but are now critical for progress. We are very proud to be recognized as a partner in this collective effort by UMN and look forward to continuing our ongoing collaboration to prevent, treat and cure canine disease." 🐾



2014 Champions of Canine Health CALENDAR

2014 Calendar Fundraiser

We are truly grateful to all our 2014 Calendar Sponsors for their contribution and commitment to this fundraising project. Since inception, this project has raised over \$555,000 for canine health research! **The 2014 Champions for Canine Health Calendar** is now available for pre-order! Reserve your calendar before December 1 and you will be entered into our raffle for a chance to win a FREE engraved brick on the Walk of Champions or the Path of Honor walkways at the *Purina Events Center* in Gray Summit, MO. For more details and to view participants of our 2014 calendar, visit www.akcchf.org/calendar.

TRUCK VAULT Cares

...about conservation, canines & kids



Put TruckVault's money where your mouse is!

Your vote can turn into CASH* for CHF:

Visit truckvaultcares.com and facebook.com/truck-vaultcares and Vote for CHF. Track the votes by watching the CHF puppy's bowl fill up!

You'll also be entered in random drawings throughout the voting for prizes ranging from the following:

- South Dakota hunting trip
- TruckVault
- Webley & Scott shotgun
- Filson® apparel
- Happy Jack® dog care products
- Kent Cartridge ammo
- Sport utility building

VOTE TODAY!

Tell your friends and you can help raise even more money for CHF: Forward a link, post on Facebook, send a tweet...spread the word!

Vote for CHF by visiting [f/truckvaultcares](https://facebook.com/truckvaultcares)
truckvaultcares.com

*A pool of \$10,000 has been provided by TruckVault, Scott Linden's Wingshooting USA television show and our sponsors. Every dollar will be allocated on a proportional basis by number of votes to seven beneficiary groups, including CHF. Everyone wins!

program. CHF has partnered with Benchmark Payment Networks to offer DonateWiseNow® as its point-of-sale fundraising application. Businesses that accept credit/debit cards for payment can now show their customers that they support canine health by offering the opportunity to make a donation to the Foundation at checkout. We are actively recruiting businesses to implement DonateWiseNow® for canine health. For more information, go to www.akcCHF.org/donatewisenow, and please let us know if you have a retail or online business that would like to support canine health research with this new fundraising opportunity.

Together, we have supported \$40 million in research and educational programs that have made a difference, bringing 22 genetic tests to market, providing advancement in cancer therapies by extending the life of affected dogs, funding cutting-edge discoveries helping dogs and their owners overcome devastating brain tumors, improving diagnostics so treatments can begin earlier and work better, and so much more. Thank you for helping us succeed.

We hope to see you all in Orlando on **Thursday, December 12, 2013**, at our **Canines & Cocktails** event where we will celebrate our wonderful dogs and our advancements in human and canine health. Details of the event can be found on the back cover.

Have a wonderful holiday season and thank you all for saying thank you by giving! 🐾

The Bingham-Porters also see donating to CHF as an opportunity to give back. "By supporting CHF, we can support people and their dogs. Healthy dogs that live longer can help with the quality and longevity of people's lives." Like you, these donors are committed to making a difference by supporting canine health research. And whatever your motivation to give, we can all agree with Dianne Avery and Beni Levy of Avilla, IN. "Dogs make our lives better. Supporting canine health research is our gift to future generations of dogs and the people who love them."

As we approach year-end, please consider making the most generous gift you can to the AKC Canine Health Foundation. Donations are accepted online or by mail. Please contact us at 888-682-9696 with special donation circumstances such as planned gifts, appreciated stock or vehicles. 🐾



Upcoming Events

Visit Our Booth

AKC / Eukanuba National Championship
December 10 – 15, Orlando, FL

Westminster Kennel Club Dog Show
February 10 – 11, Piers 92 / 94, New York, NY

New Club Members

as of 9.5.13

All Natural Canine® Cares Dog Club
Leonberger Club of America

Kudos

Our sincere gratitude to **Mr. and Mrs. Mike & Nancy Shaw** for their generous contribution helping prevent, treat and cure canine disease.

Kudos to **Santa Maria Kennel Club Inc.**, for their annual gift of \$1,000.

A grand thank you to **Ms. Connie G. Miller and Mr. Jeffrey Pepper** for sponsoring the veterinary scholarships to the 2013 National Parent Club Canine Health Conference in St. Louis, MO.

Hats off to the **Yorkshire Terrier Club of America Foundation Inc.**, for their gift of \$10,000 toward our Collaborative Cancer Research Initiative.

We appreciate the support of **Mr. Howard Postovit** for his donation to improve the health of all dogs.

More tails are wagging thanks to the support from **American Chesapeake Club Charitable Trust** for contributing \$5,000 toward our bloat initiative; \$4,000 toward research in our lymphoma program area; and \$1,000 toward research in immunology and infectious disease research.

Thanks to **Old Dominion Kennel Club of Northern Virginia** for their \$1,000 contribution to helping all dogs live longer, healthier lives.

We are thrilled to have **Mr. and Mrs. Randy and Pam Foster** as our 2014 Calendar Cover sponsor! Their generosity will help us further research efforts for canine health.



AMERICAN KENNEL CLUB
**CANINE HEALTH
FOUNDATION**
PREVENT TREAT & CURE®

PO Box 900061
Raleigh, NC 27675-9061

NON-PROFIT ORG
US POSTAGE
PAID
RALEIGH, NC
PERMIT #1854

You can make a difference...Donate Today!

A gift to CHF helps dogs live longer, healthier lives by supporting cutting-edge research to prevent, treat and cure canine disease.

Like us on  /AKCcaninehealthfoundation

Follow us on  @caninehealthfnd

Link with us on  akc-canine-health-foundation

Check us out on  /K9HealthFoundation



www.akcchf.org
888.682.9696

Alliances



Canines & Cocktails

*Please join us for an evening of celebration hosted by
Friends of the AKC Canine Health Foundation.*

Thursday, December 12, 2013 | 6:30-9pm

Rosen Centre Hotel | Grand Ballroom C | 9840 International Drive | Orlando, FL 32819

\$125/person to benefit the AKC Canine Health Foundation

Your contribution is tax-deductible and
helps dogs live longer, healthier lives.

For tickets: www.akcchf.org/caninesandcocktails or 888-682-9696