

DISCOVERIES

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Join us at the 6th Annual Canines & Cocktails Gala
on December 15, 2016!



Dear Dog Lover,

As 2016 comes to a close, we reflect on another busy year at the AKC Canine Health Foundation (CHF). This year, the Foundation has seen an increase in donations from individual and club donors – all of you! And as a result, we have been able to directly turn these dollars toward increased investment in [canine health research](#). The body of work across research program areas, from tick-borne diseases to cancer and genetics impacts what we learn about canine and human health and disease, and effects change for better health for all dogs and their people.

We welcomed new staff members who are passionate and dedicated to the [work of the Foundation](#). We also welcomed new board members and said a grateful farewell to those whose terms ended. And, our [Scientific Review Committee](#) is stronger than ever. I mention these dedicated groups of people because they form the backbone of the Foundation, and with whose tireless efforts CHF's programs and outreach have become stronger than ever.

This time of year especially, we take the opportunity to be grateful for good health for all dogs and their families, and we say a special [thank you](#) to our donors whose dedicated support to improve the health of all dogs has great meaning. Individuals and breed clubs have truly stepped up this year to support important and urgent research such as the [tick-borne disease initiative](#), genetic disease and epilepsy, and to fight the most common of canine cancers: [lymphoma](#). We appreciate every donation, no matter the amount, because together we are stronger, and together we are making a real difference to better the lives of so many.

Wishing you peace and joy, and the comfort dogs bring to our lives.

With heartfelt thanks,

Diane E. Brown, DVM, PhD
Chief Executive Officer



2016 President's Award & Distinguished Research Partner Award to be Presented at Canines & Cocktails

CHF will honor the American Kennel Club (AKC), the English Springer Spaniel Field Trial Association and the English Springer Spaniel Foundation at the 6th annual Canines & Cocktails Gala on Thursday, December 15, 2016 at the Rosen Centre Hotel in Orlando, FL.

The AKC will receive the 2016 President's Award. This award is given annually to a person or organization that has made an exceptional contribution to advancing canine health. As the founding organization of CHF, the AKC has been a tireless supporter of the Foundation, donating over \$23 million in financial support and in-kind services to further the mission of the Foundation, helping keep operating expenses low and maximizing the dollars the Foundation puts toward cutting-edge research.

"Throughout CHF's nearly 22 year history, the American Kennel Club has been a true partner in the Foundation's mission to help all dogs live longer, healthier lives," said Dr. Diane Brown, CHF CEO. "We are grateful for the AKC's commitment to healthy dogs and for their significant financial and in-kind support."

Also presented at Canines & Cocktails is the Distinguished Research Partner Award, given to a club or organization for their ongoing and outstanding

commitment to fund canine health research. The 2016 recipients are the English Springer Spaniel Field Trial Association and the English Springer Spaniel Foundation. Working in collaboration, these organizations have generously supported canine health research to benefit all dogs. Most recently, they became the first Champion level sponsors of CHF's Tick-Borne Disease Initiative, donating over \$50,000.

Canines & Cocktails will celebrate the many milestones made in canine health research this year, and the donors who make this progress possible. In addition to the awards presentations, guests will enjoy heavy hors d'oeuvres, raffle prizes, and live music by the Gypsy Lane Band.



The event is sponsored by *The Canine Chronicle* and chairpersons are Dr. and Mrs. William Truesdale. Event tickets for Canines & Cocktails are \$85 per person and can be purchased online at akcchf.org/caninesandcocktails. Sponsorship opportunities are also available. We hope to see you there! 🐾



The Estate of Cora N. Miller to Further Canine Health Research with \$1 Million Bequest

Cora Nunnally Miller, a long-time philanthropist and breeder of Whippets, generously named CHF as the recipient of a one million dollar bequest. The estate gift will go to support CHF's endowment fund.

As a youth, Cora learned how to ride horses and became an accomplished horsewoman. After a riding accident on a Quarter horse which broke her back, Cora gave up riding and turned to raising Afghan Hounds and Whippets. She had great success, particularly with Whippets. Cora had a number of champion dogs that were raised and trained at Hound Hill. Her pride and joy was a great champion, Hound Hill Tobias. She was a founding member and director of the Whippet Health Foundation, and served as President as well as on the Board of Directors of the American Whippet Club. An honorary lifetime membership was bestowed upon her at the Boston National in 2006.

"Cora was dedicated to the total Whippet. It was never enough for her dogs to have beauty and type. Her goal as a breeder was to produce beautiful, athletic, and healthy Whippets, and she succeeded," said longtime friend and professional handler Phoebe Booth. To further that goal Cora Miller was an annual donor to the AKC Canine Health Foundation, and she also supported the Whippet Health Foundation.

"We are grateful to the estate of Cora Nunnally Miller for the generous bequest to CHF. This donation carries on Cora's lifelong commitment to the health and well-being of dogs, and by designating her gift to our endowment fund, she will ensure that future generations will benefit from the canine health research funded by the Foundation," said Dr. Charles Garvin, chairman of the CHF board.

"As an artist, Cora Miller saw the light and spirit in every dog. To her, a beautiful dog was a healthy dog. In gifting the AKC Canine Health Foundation, she was placing her generosity where her heart already was: in the furtherance

(continued on page 4)

of the cause of good health for all dogs,” said Cora’s longtime friend, AKC judge and fellow Whippet breeder Sharon Sakson. “She believed in breeding healthy dogs and her gift to the AKC Canine Health Foundation is another way Cora has shared her own deep love of dogs with the world.”

To learn more about naming CHF in your estate plans, please visit akcchf.org/heritagesociety. 🐾



Strides Made in Tick-Borne Disease Research to Benefit Dogs

Thanks to your generous support, CHF is pleased to announce ongoing progress through its Tick-Borne Disease Initiative, launched in February 2016. This comprehensive Initiative addresses important health concerns that include: Lyme disease, bartonellosis, and ehrlichiosis, through much-needed research in diagnostics, disease pathogenesis and prevalence. Tick-borne diseases are an important group of emerging infectious diseases that impact both dogs and their people. As the geographic range of ticks continues to expand, all dogs can be affected by these diseases, year-round.

Through a \$100,000 leadership gift from Kiki Courtelis, a longtime friend to animal health, and a combined \$50,000 gift from the English Springer Spaniel Foundation and English Springer Spaniel Field Trial Association, as well as generous gifts from many individuals, dog clubs, and foundations, the donations raised toward the Initiative, and matched by the American Kennel Club, are driving further progress in this important research for dogs.

“When my veterinarian tells me that he diagnoses Lyme disease at least three times a week, I thought it was worthwhile to find an organization truly attacking these diseases to improve testing, treatment and cures,” said Kiki Courtelis. “It means the world to me that I’m blessed to participate in CHF’s initiative, and be a part of improving the health of the dogs we love so much.”

To date, donations to the Initiative have resulted in the Foundation awarding a first round of **five grants** (see page 11 for more information) to improve diagnostics and enhance practical understanding of tick-borne diseases, including the effects of these infections on blood cells,



Mary Bloom © AKC

the canine blood donor population, disease prevalence in dogs, and treatment recommendations.

According to Mark Haglin, English Springer Spaniel Field Trial Association president, “We have had many encounters over the years with tick-borne disease in our Springer Spaniels and we are very proud to play a role in this Initiative. Being closely associated with friends who are dealing with the devastating effects of Lyme disease, I hope these grants will bring some crossover results on the human side of treatment as well.”

“The Foundation chose this area of research important to canine health because we believe we can have an immediate and long-lasting impact on these diseases in dogs and their human companions,” said Dr. Diane Brown, CHF CEO. “Since launching the Initiative, many of CHF’s supporters have shared stories of a beloved dog being diagnosed with a tick-borne disease like babesiosis, anaplasmosis, or bartonellosis, or a human family member or friend with a diagnosis of Lyme disease, ehrlichiosis or Rocky Mountain spotted fever. The stories remind us of the urgent need to address these diseases that afflict dogs and people.”

To learn more about CHF’s Tick-Borne Disease Initiative, including research outcomes, free educational resources, and additional RFP announcements, visit akcchf.org/ticks. “Tick-borne diseases can surprise you, and the need for accurate diagnosis, proper treatment and prevention is critical,” said Brown. 🐾



2016 Theriogenology Residency Program

The Theriogenology Residency Program is a collaboration between the American Kennel Club, the AKC Canine Health Foundation, and the Theriogenology Foundation to increase the number of trained practitioners in companion animal theriogenology. Theriogenology is the branch of veterinary medicine concerned with reproduction, including the physiology and pathology of male and female reproductive systems, and the clinical practice of veterinary obstetrics, gynecology, and andrology. Each grant is in the amount of \$100,000, to be used for study over 2-3 years.



Dr. Karen Von Dollen, DVM; North Carolina State University (CHF Grant 02281-E)

Residency Coordinator: Dr. Scott Bailey, DVM, MS; North Carolina State University

Born and raised in Santa Barbara, California, Dr. Karen Von Dollen has known she wanted to be a veterinarian from an early age and

spent her childhood participating in 4-H. Dr. Von Dollen attended Bryn Mawr College in Pennsylvania, where she majored in chemistry with minors in mathematics and biology and was a member of the varsity lacrosse team. She returned to California to earn her DVM degree from the University of California - Davis. Following graduation, she completed internships at Alamo Pintado Equine Medical Center in Los Olivos, California and Goulburn Valley Equine Hospital in Victoria, Australia. Her family maintains a small herd of Nubian dairy goats in California, which helped form the foundation for Dr. Von Dollen's veterinary aspirations. In her spare time, she enjoys spending time with family, traveling to visit friends, and relaxing with her beloved corgi "Nora."

Dr. Carla Barstow, DVM; Auburn University (CHF Grant 02282-E)

Residency Coordinator: Dr. Robyn R. Wilborn, DVM, MS; Auburn University

Originally from Tampa, FL, Dr. Carla Barstow has been showing and breeding Samoyeds for over 20 years. Prior to obtaining her DVM degree, she spent 10 years working in the



veterinary field as a technician. Dr. Barstow then pursued her DVM degree at the University of Minnesota, where she received mentorship from Dr. Peggy Root Kustritz: who further cultivated her love of theriogenology. Upon graduation, Dr. Barstow returned to Tampa and joined a private practice which emphasized reproduction and enjoyed a heavy theriogenology caseload prior to starting her residency.



Dr. Victor Stora, DVM; University of Pennsylvania (CHF Grant 02283-E)

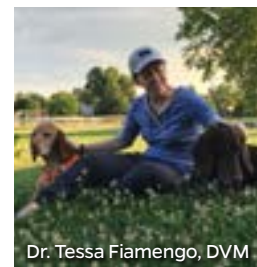
Residency Coordinator: Dr. Margret L. Casal, DVM, PhD; University of Pennsylvania

Dr. Victor Stora received his Bachelor of Science degree from Wagner College, Staten Island, NY, with a double major in Molecular

and Cellular Biology and Biochemistry in 2011. He received his veterinary degree from the School of Veterinary Medicine, Louisiana State University. Throughout veterinary school, Dr. Stora received several awards and scholarships, and has always had a keen interest in small animal reproduction, which he fostered during his internship at Virginia Tech from July 2015 - July 2016. He is a member of the Society for Theriogenology, the American Veterinary Medical Association, and the Society for Andrology. Dr. Stora breeds Shetland Sheepdogs.

Dr. Tessa Fiamengo, DVM; Ohio State University (CHF Grant 02294-E)

Residency Coordinator: Dr. Marco A. Coutinho da Silva, DVM, PhD; Ohio State University



Dr. Tessa Fiamengo graduated with honors from Colorado State University with a major in Biology and minors in Biomedical Sciences and Philosophy in 2007. She earned her veterinary degree from Oregon State University in 2012. Since graduation from veterinary school, Dr. Fiamengo has been working as a small animal general practitioner in Portland, OR. Dr. Fiamengo's interest in theriogenology has been long standing, and prior to veterinary school most of her experience was in equine reproduction. While attending Oregon State, she learned about canine theriogenology. Dr. Fiamengo is a member of the American Veterinary Medical Association and the Society for Theriogenology. 🐾



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several years of age, making elimination of DMS nearly impossible. The investigators have conducted genomic studies and identified genetic sequences that are highly associated with DMS development. This work has led to a genetic test for risk alleles of three different genes. Availability of a genetic test will allow breeders to identify breeding pairs that will produce puppies having genotypic combinations associated with a low risk of disease development, as well as to gradually reduce the frequency of risk alleles in the population. To increase the utility of this test, the researchers must generate genotypes for a random population (i.e., not selected for or against DMS) for calculation of risk assessments. There are 18 possible genotypic combinations between the three genes, and they will study a large population to ensure that each genotype is observed several times and that accurate risk assessments are available.

Funding for the research is provided through the efforts and generosity of the American Shetland Sheepdog Association. The AKC Canine Health Foundation supports the funding of this effort and will oversee administration of funds and scientific progress reports.

Endocrinology Research Program Area

02298-MOU: Using OFA Testing to Assess Progression of Canine Autoimmune Thyroiditis

Principal Investigator: Dr. Brian Petroff, DVM, PhD;
Michigan State University

Total Grant Amount: \$35,630

Grant Period: 8/1/2016 - 7/31/2017

Hypothyroidism may be the most common endocrine disorder in adult dogs. As is currently understood, a majority of cases are caused by autoimmune thyroiditis (AIT), a disorder in which the body's own immune system attacks the thyroid gland. This causes progressive, irreversible destruction of thyroid gland cells resulting in loss of thyroid hormone production. This disorder has similarities to Hashimoto's thyroiditis, an important cause of hypothyroidism in people.

In dogs with AIT, low circulating concentrations of thyroid hormones are often seen in conjunction with increased autoantibodies against thyroglobulin, a large protein made by thyroid cells. Detection of thyroglobulin autoantibodies (TgAA) is used as a marker for how intensely the immune system is attacking the thyroid gland. Elevated TgAA results are the first marker of early stage of AIT, long before there is complete loss of thyroid function. Identification of elevated TgAA results with otherwise normal thyroid hormone concentrations is referred to as 'subclinical thyroiditis.' Dogs with subclinical thyroiditis are considered at risk of progression to hypothyroidism. It is assumed that while dogs with subclinical thyroiditis have increased TgAA, the rate of progression to hypothyroidism varies, and not all animals with increased TgAA will become hypothyroid. The investigators will study dogs with subclinical thyroiditis to better define what proportion develop hypothyroidism, and

Canine Health Research Grants

The AKC Canine Health Foundation believes in the advancement of science to meet the unmet medical needs of the dogs that are such an important part of our daily lives. Here we list some of the new 2016 grants by program area. For more information about any of these studies, including ways to provide financial support/sponsorship, visit akcchf.org. To search all active research see akcchf.org/researchportfolio.

Dermatology and Allergic Disease Research Program Area

02261-MOU: Improvement of Risk Assessments for Dermatomyositis Testing

Principal Investigator: Dr. Leigh Anne Clark, PhD;
Clemson University

Total Grant Amount: \$11,704

Grant Period: 4/1/2016 - 3/31/2017

Dermatomyositis (DMS) is an autoimmune disease of the skin and muscle that is diagnosed almost exclusively in Shetland sheepdogs and collies. The onset of clinical signs of DMS can range from just a few months to

the timeline to disease progression. Funding for the research is provided through the efforts and generosity of the Orthopedic Foundation for Animals. The AKC Canine Health Foundation supports the funding of this effort and will oversee administration of funds and scientific progress reports.

Epilepsy Research Program Area

02248: Identification of a Novel Juvenile Myoclonic Epilepsy Gene and Its Underlying Disease Mechanism

Principal Investigator: Dr. Hannes T Lohi, PhD; University of Helsinki and the Folkhälsan Institute of Genetics

Total Grant Amount: \$82,240

Grant Period: 5/1/2016 - 10/31/2017

Epilepsy is the most common neurological disease in dogs and affects almost all breeds. Genetics is likely to play a major role in seizure risk, and gene discovery remains as an important goal to better understand the disease and its treatment. However, genetic breakthroughs have been rare partially due to incomplete clinical diagnostics to identify true cases and controls, or to distinguish specific syndromes for genetic analyses. The investigators have recently utilized an advanced wireless video-EEG approach in clinical studies to identify juvenile myoclonic epilepsy (JME) in Rhodesian Ridgebacks with characteristic epilepsy phenotype, age of onset and photosensitivity. The pedigree established using the JME cases suggests a strong genetic contribution and is supported by preliminary genetic data that proposes a novel disease locus and a deleterious mutation in a neuronal candidate gene. These promising early findings necessitate further electroclinical and genetic studies for confirmation. In this study, the investigators' objectives are to: i) further characterize EEG, imaging and disease features of JME, ii) confirm the presence and segregation of an epilepsy gene, iii) investigate the breed-specificity, prevalence and penetrance of the mutation, iv) conclude the inheritance model, and v) define the pathogenicity of the mutation. The confirmation of the genetic defect would allow for development of a genetic test for breeding purposes and also to understand how myoclonic seizures develop. This could ultimately lead to improved treatments for canine epilepsy.

02249-A: Studying the Role of the Gastrointestinal Tract in Canine Epilepsy

Principal Investigator: Dr. Karen R. Munana, DVM, MS; North Carolina State University

Total Grant Amount: \$14,995

Grant Period: 6/1/2016 - 11/30/2017

Epilepsy is the most common nervous system disorder of dogs. Approximately one-third of dogs with epilepsy fail to achieve adequate seizure control with anti-seizure medication, and are considered to have drug resistant epilepsy. The mechanisms that lead to drug resistance are poorly understood. Alterations in the population of intestinal bacteria in the Lactobacillus group are believed

to play a role in the development and progression of several human diseases of the nervous system, including anxiety/depression, autism, multiple sclerosis and Alzheimer's disease. An association between epilepsy and both celiac disease and inflammatory bowel disease has been identified in humans, which suggests that changes in intestinal bacterial might play a role in the progression of epilepsy as well. The investigators hypothesize that dogs with epilepsy have an altered population of Lactobacillus species in their gastrointestinal tracts compared to normal dogs, thus influencing the course of disease. Using molecular genetics and bacterial culture techniques, the investigators will determine differences in bacterial populations, and quantify the Lactobacillus component of the feces of untreated epileptic and control dogs, and determine the effect of antiepileptic medication on Lactobacillus growth rates. By providing preliminary information on the role of gastrointestinal tract bacteria in canine epilepsy, information can be gained to further our understanding of epilepsy and drug resistance in dogs, and ultimately lead to more successful management of the disorder.



Join CHF and VetVine for these exciting webinars in 2017!

Exercises to Keep a Dog's Mind and Body Fit at Any Age

February 15

Cynthia M. Otto, DVM, PhD, DACVECC, DACVSMR, CCRT

Update on Canine Hemangiosarcoma

May 10

Douglas H. Thamm, VMD, DACVIM (Oncology)

What's Feeding Those Seizures? An Update on Refractory Canine Epilepsy and the Potential Link to GI Health

October 24

Karen R. Muñana, DVM, MS, DACVIM (Neurology)

Canine Clinical Genetics

December 6

Jerold Bell, DVM

All webinars are live and begin at 8pm ET.

Visit akcchf.org/vetvine for free registration.

02252: Investigating a Ketogenic Medium-Chain Triglyceride (MCT) Supplement for the Treatment of Drug-Resistant Canine Idiopathic Epilepsy and Its Behavioral Comorbidities

Principal Investigator: Dr. Holger Andreas Volk, DVM, PhD; Royal Veterinary College, University of London

Total Grant Amount: \$107,697

Grant Period: 5/1/2016 - 10/31/2017

Canine epilepsy is a chronic neurological condition, often requiring lifelong medication with anti-epileptic drugs (AEDs). Despite appropriate treatment with available AEDs, seizure freedom may not always be achievable. Indeed, over two thirds of dogs with epilepsy continue to have seizures long-term and around 20-30% remain poorly controlled on standard AEDs. The hardest to treat dogs are termed 'refractory' or 'drug-resistant' patients. There is an urgent need to develop alternative treatments to improve the quality of life (QoL) of drug-resistant patients. The ketogenic diet, originally characterized as high in fat and low in carbohydrates, has been a successful treatment in children with epilepsy for several

decades, decreasing seizure activity and even leading to seizure freedom in drug-resistant patients. Recent research has identified that a component of the ketogenic diet, a medium-chain fatty acid (MCT) called C10 has direct anti-seizure effects on the brain. The investigators will assess whether dietary supplementation with ACT oil containing C10 for dogs with drug-resistant epilepsy will reduce seizure frequency and/or severity. As epilepsy has multiple impacts on QoL beyond seizure frequency, the researchers will also investigate whether the MCT supplement alters the side effect profile of AEDs, improves behavioral problems associated with epilepsy (e.g. anxiety) and cognition, and improves the stress levels of the affected dog. If successful, MCT supplements could provide a new tool for canine epilepsy treatment.

02257: Identification of Genetic Risk Factors for Canine Epilepsy

Principal Investigator: Dr. Gary S. Johnson, DVM, PhD; University of Missouri, Columbia

Total Grant Amount: \$84,121

Grant Period: 5/1/2016 - 4/30/2017

Epilepsy is one of the most common neurologic diseases of dogs and a top concern of dog breeders. Despite strong evidence that genetics is important in determining the risk of idiopathic epilepsy, numerous gene mapping studies have failed to identify a locus that accounts for that risk in either dogs or humans. Seizures occur when excessive activity goes beyond the normal threshold for brain function, many factors contribute to that level of activity, and therefore, mutations in numerous genes may collectively contribute to increased activity until that threshold is exceeded, resulting in epilepsy. Any one of these mutations may be present in non-epileptic dogs, but because it only partially alters activity, it would not produce seizures. Therefore, traditional gene mapping studies might overlook that mutation. Using a whole genome sequencing approach the investigators hope to identify DNA variations in epileptic dogs that could affect the function of genes such as ion channels and neurotransmitter receptors that have been shown to alter the seizure threshold in humans or rodents. The frequency of such variations in populations of epileptic and non-epileptic dogs will be directly compared rather than the indirect markers used in traditional mapping studies. The increased power provided by looking for specific gene candidate variations rather than linked markers will aid the identification of epilepsy risk factors, perhaps leading to development of DNA tests to enable breeders to select against such risk factors.

Immunology and Infectious Disease Research Program Area

02245-MOU: Genetic Predisposition to Avian Tuberculosis in Miniature Schnauzers and Basset Hounds

Principal Investigator: Dr. Urs Giger, DVM, PhD; University of Pennsylvania

Total Grant Amount: \$106,858

Grant Period: 5/1/2016 - 4/30/2017

While people and dogs are generally resistant to avian tuberculosis (*Mycobacterium avium*) infections, there are certain individuals that lack proper host defense against these intracellular bacteria. The precise molecular basis is still unknown, but there is much interest because of the major morbidity and mortality in susceptible patients. The investigators have recognized that many young adult Miniature Schnauzers (and few Basset Hounds) succumb to systemic avian tuberculosis (referred to as *Mycobacterium avium* complex or MAC), characterized by enlarged lymph nodes, fever, diarrhea and respiratory signs. Based upon pedigree analysis, this appears to be a simple autosomal recessive trait. Preliminary pedigree and limited molecular genetic data suggest a strong signal for one specific small chromosomal region, which the investigators will substantiate using further samples and whole genome sequencing.

Identification of the molecular basis of this genetic predisposition will allow for a better understanding of the disease and the development of a DNA screening test to identify animals at risk as well as carriers, thereby reducing the production of dogs predisposed to this fatal disease in future generations. As avian tuberculosis is a zoonotic disease, the findings should provide insight into genetic determinants of host microbe interaction and resistance in dogs and people, and thereby could have an impact on comparative medicine.

Funding for the research is provided through the efforts and generosity of the American Miniature Schnauzer Club. The AKC Canine Health Foundation supports the funding of this effort and will oversee administration of funds and scientific progress reports.

02299-A: Investigating Recovery of the Skin Microbiota after Surgery

Principal Investigator: Dr. Julie Horvath, PhD; North Carolina Museum of Natural Sciences

Total Grant Amount: \$9,605

Grant Period: 8/1/2016 – 7/31/2017

A Collaborative Grant with the Triangle Center for Evolutionary Medicine

Microbes that live on the skin of humans and animals are microscopic organisms including bacteria, Archaea, and fungi. These microbes contribute to the overall health and wellness of animals including humans, and have been shown to influence the wound healing process. Antibiotic resistant bacteria are a growing threat to good health. Therefore, while it is not yet understood how microbes play a role in wound healing, a better understanding would allow potential new treatments to emerge using either the microbes themselves, and/or microbial products. This project brings together collaborators from the NCMNS, North Carolina Central University, North Carolina State University (NCSU) and the NCSU College of Veterinary Medicine to investigate the ecological changes in skin microbe composition of dogs following elective

surgery. The dogs in this study receive veterinary care at NCSU's College of Veterinary Medicine, undergoing surgery as part of their care, and are given antibiotics. The study's investigators will assess the presence of antibiotic resistant bacteria on dog skin before and after surgery and evaluate the impacts on wound healing.

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Musculoskeletal Conditions and Disease Research Program Area

02275: Disease Risks Associated with Spay and Neuter: A Breed-Specific, Gender-Specific Perspective

Principal Investigator: Dr. Benjamin L Hart, DVM, PhD; University of California, Davis

Total Grant Amount: \$61,784

Grant Period: 9/1/2016 – 8/31/2017

This study extends the investigator's recently completed AKC Canine Health Foundation-funded project studying 12 dog breeds to identify major differences in the degree to which spay or neuter may be related to an increase in joint disorders (hip dysplasia; cranial cruciate ligament tear) and/or cancers (lymphoma; hemangiosarcoma; and mast cell tumor). The original breeds studied were: Labrador Retriever, Golden Retriever, German Shepherd Dog, Rottweiler, Boxer, Bulldog, Doberman Pinscher, Dachshund, Corgi (both breeds), Chihuahua, Yorkshire Terrier and Shih Tzu. Findings did not associate an increase in disease association in the small breeds with spaying or neutering, while in larger breeds disease risk was dependent upon gender, and whether the spay or neuter procedure was performed before or after one year of age (Hart, B.L., L.A. Hart, A.P. Thigpen and N. H. Willits. 2014. Long-term health effects of neutering dogs: Comparison of Labrador Retrievers and Golden Retrievers. PLoS ONE 9(7): 10.1371/journal.pone.0102241).

In this second phase, the following breeds have been added to the study: Great Dane, Australian Shepherd, Bernese Mountain Dog, Cocker Spaniel, Border Collie, Beagle, St. Bernard, Irish Wolfhound, Jack Russell Terrier, Pug, Maltese, Pomeranian, Miniature Schnauzer, Boston Terrier, Australian Cattle Dog, Shetland Sheepdog, English Springer Spaniel, Cavalier King Charles Spaniel, and West Highland White Terrier. Upon completion of the study, the major publisher, Wiley, has agreed to place the total data set of all 31 breeds on an open access website as a resource for breeders, dogs owners, researchers and veterinarians.

Neurology Research Program Area

02290-MOU: Further Studies to Identify the Mutation Responsible for DUNGd

Principal Investigator: Dr. Dennis P. O'Brien, DVM, PhD;
University of Missouri, Columbia

Total Grant Amount: \$14,904

Grant Period: 7/1/2016 - 6/30/2017

A hereditary disease that the breeders called DUNGd was recognized in Gordon Setters in the early 1990s and reported in the veterinary literature in 2000 (Journal of Veterinary Diagnostic Investigation 12:570–573). Affected pups develop normally until 3–4 weeks of age when they show progressive behavioral changes, gait abnormalities and weakness. By 5–6 weeks of age, they are recumbent and must be euthanized. The investigators will utilize the latest genomic techniques (next-generation whole genome sequencing and gene mapping) to identify genes associated with the disease. If a mutation that appears to cause the disease is found, they will develop a DNA test to identify carriers of the mutation, and thus permit breeders to avoid producing affected pups in the future.

Funding for the research is provided through the efforts and generosity of the Gordon Setter Club of America. The AKC Canine Health Foundation supports the funding of this effort and will oversee administration of funds and scientific progress reports.

Renal Disease Research Program Area

02263-MOU: Characterization of Kidney Disease in Dalmatians

Principal Investigator: Dr. Rachel E Cianciolo, VMD, PhD;
Ohio State University

Total Grant Amount: \$31,434

Grant Period: 5/1/2016 - 4/30/2018

Chronic kidney disease is a significant progressive problem in dogs. Two different hereditary diseases of the urinary system are being studied in Dalmatian dogs: urinary stone formation (urolithiasis) and glomerular disease. These diseases cause distinct clinical signs: urolithiasis leads to urinary tract obstruction while glomerular disease results in protein loss into the urine (proteinuria). The genetic cause of urolithiasis is known while the genetic cause of glomerular disease has not yet been identified. Although one specific type of glomerular disease has been reported in the literature, preliminary investigations indicate that there may be multiple causes of proteinuria in Dalmatians. Evaluation of kidney tissue by the International Veterinary Renal Pathology Service has revealed diverse types of glomerular diseases in Dalmatians, at least 4 of which might be hereditary. Therefore, the most common disease type is unknown and must be identified and characterized. A detailed review of autopsy and biopsy sample archives previously obtained from Dalmatians with proteinuria will be performed. Next, prospective examination of select kidney samples using advanced techniques (electron microscopy and immunofluorescence) will ensure an accurate diagnosis of the glomerular disease. Ultimately, genetic analyses could be performed on related dogs that demonstrate similar glomerular lesions to identify candidate genes.

Funding for the research is provided through the efforts and generosity of the Dalmatian Club of America Foundation. The AKC Canine Health Foundation supports the funding of this effort and will oversee administration of funds and scientific progress reports.

Reproductive Conditions and Disease Research Program Area

02264-A: Role of E. Coli Biofilm in Canine Pyometra

Principal Investigator: Dr. Marco A Coutinho da Silva, DVM, PhD; Ohio State University

Total Grant Amount: \$14,731

Grant Period: 5/1/2016 - 4/30/2017

Pyometra is a potentially life-threatening infection of the canine uterus by bacteria, most commonly *Escherichia coli* (E. coli). In humans with recurrent infections, E. coli produces a biofilm, a layer of polysaccharide that protects the organism from the host immune system as well as antibiotic agents, decreasing treatment efficacy. Current treatments for pyometra are costly, time-consuming, and



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not without risk to the bitch. The investigators postulate that biofilm production by *E. coli* within the endometrium of the bitch may be responsible for perpetuating the disease and making treatment difficult. In this pilot study, the potential of *E. coli* obtained from clinical cases of canine pyometra to produce biofilm will be evaluated in vitro and in vivo. Endometrial samples from clinical cases of pyometra procured from collaborating private practitioners throughout the country will be evaluated for the presence of biofilm in situ, as well as the ability of the isolated bacteria to produce biofilm in vitro. If successful, demonstration of the presence of biofilm in the endometrium of bitches affected by pyometra could lead to development of new therapeutics targeted to disrupt the biofilm, resulting in improved treatment for canine pyometra.

02267-A: An Epidemiological Study of *Brucella canis*

Principal Investigator: Ms. Tory V Whitten, MPH; Minnesota Department of Health

Total Grant Amount: \$14,986

Grant Period: 11/1/2016-10/31/2017

Canine brucellosis is a reproductive disease caused by the bacterium *Brucella canis* (*B. canis*) that can cause infertility, abortion and severe spinal infections in dogs. Though well understood in the context of canine breeding operations, this disease is an under-recognized public health issue in the canine rescue and shelter populations, and may constitute a source of infection to dog and human populations. In 2015 there was an increase in the number of rescue dogs identified with canine brucellosis in Minnesota where, prior to 2015, there had been no cases of canine brucellosis identified in a dog not used in a breeding program. The investigators will measure how common exposure to this disease is in rescue and shelter dogs entering Minnesota, as a first step to understanding prevalence of this important reproductive disease. The results of this study will be used to determine prevalence and raise awareness of this disease in rescue and shelter dog populations, help identify risk factors for canine brucellosis, and develop a diagnostic PCR test for canine brucellosis at the Minnesota Veterinary Diagnostic Laboratory. An important outcome of this study will be to create prevention and control measures applicable to this important population of dogs.

Tick-Borne Disease Research Program Area

02284-A: Lyme Disease in Dogs: Prevalence, Clinical Illness, and Prognosis

Principal Investigator: Dr. Jason Stull, VMD, PhD; Ohio State University

Total Grant Amount: \$14,148

Grant Period: 7/1/2016 - 6/30/2018

Lyme disease (or Borreliosis) is a bacterial disease of dogs and humans that is transmitted by tick bites. In people, Lyme is the most common tick-transmitted disease in the US, with over 25,000 cases in 2014. While most common in the northeastern coastal states and the upper Midwest,



Lyme disease is moving into other regions of the U.S. and Canada. Dogs infected with Lyme disease rarely show signs of illness (typically lameness), but can be severe (e.g., kidney disease). Diagnosis, treatment and prevention of Lyme disease in dogs are complicated by limited research and conflicting professional guidance. Current practices may unnecessarily place dogs at risk for illness and negative outcomes.

The investigators will follow a large group of dogs from different regions of the U.S. and Canada. During this period the investigators will determine how often healthy dogs test positive for Lyme disease (meaning they have been bitten by an infected tick) and identify how often they later develop a Lyme-related illness. The risks and benefits of management strategies for Lyme-positive dogs and obstacles to effective tick prevention will be determined to help clarify unmet pet owner education needs. These findings are likely to extend to better understanding of canine and human Lyme disease, and improve health outcomes. Collectively, this work will allow us to identify, define and improve upon best practices for prevention and control of Lyme disease in areas with different Lyme risks, ultimately improving the health of dogs and people.

02285-A: Thrombocytopenia and Occult Vector-Borne Disease in Greyhound Dogs: Implications for Clinical Cases and Blood Donors

Principal Investigator: Dr. Linda Kidd, DVM, PhD; Western University of Health Sciences

Total Grant Amount: \$12,960

Grant Period: 7/1/2016 - 6/30/2017

Retired racing Greyhounds (RRG) are popular pets, and also commonly serve as blood donors to treat all types of dogs. Not all Greyhounds are RRG; show-bred Greyhounds (SBG) have traceable pedigrees verifying they do not descend from racing lines. Low platelet (thrombocytopenia) and white blood cell counts are considered normal findings in Greyhounds. Protein in the urine is common. Because these findings can also be caused by infection with vector-borne disease agents, Greyhounds can present clinicians with a diagnostic dilemma. Whether these laboratory

results are found with the same frequency in RRG and SBG has not been investigated.

Racing Greyhounds are commonly exposed to the brown dog tick, which transmits many agents that can cause disease. Vector-borne diseases are also transmitted by the lone star tick, also common in the region of the U.S. where racing farms are located. Because these pathogens can cause chronic, clinically silent infection, the investigators hypothesize that infection occurs in, and contributes to blood and urine abnormalities in some healthy-appearing RRG. This study will compare the prevalence of vector-borne diseases in RRG and SBG, determine whether thrombocytopenia, low white blood cell counts and protein in the urine are associated with vector-borne disease in RRG, and whether blood and urine abnormalities occur with the same frequency in RRG and SBG. The results will help veterinarians decide when to pursue infectious disease testing, and whether more aggressive infectious disease screening for both pet and blood donor Greyhounds is warranted based on lineage.

02287: Enhanced Testing for the Diagnosis of Bartonellosis in Dogs

Principal Investigator: Dr. Edward B Breitschwerdt, DVM; North Carolina State University

Total Grant Amount: \$103,013

Grant Period: 8/1/2016 - 7/31/2017

Bartonellosis, a zoonotic bacterial disease of worldwide distribution, is caused by approximately 10 different *Bartonella* species. *Bartonella* are transmitted to canines and humans by ticks, fleas, lice, mites, and sand flies. Dr. Breitschwerdt's laboratory demonstrated the first evidence for *Bartonella* infections in dogs in 1993. *Bartonella* species have been associated with an expanding spectrum of important disease manifestations including anemia, endocarditis, hepatitis, lymphadenitis, myocarditis, thrombocytopenia and vascular tumor-like lesions. Infections can be life-threatening. Due to a lack of sensitive and reliable diagnostic assays, definitive diagnosis of bartonellosis in dogs remains a significant problem. Because these bacteria invade cells and infect tissues throughout the body, this chronic intracellular infection is difficult to cure with currently used antibiotic regimens. This study will develop improved serodiagnostic tests for bartonellosis in dogs. These assays can also be used for world-wide sero-epidemiological prevalence studies, and to establish early and accurate diagnosis. Dr. Breitschwerdt's research group has described concurrent infection in dogs, their owners and veterinary workers; this allows for a One Health approach to this important emerging infectious disease.

02292: Broad-Range Detection of Canine Tick-Borne Disease and Improved Diagnostics Using Next-Generation Sequencing

Principal Investigator: Dr. Pedro Paul Diniz, DVM, PhD; Western University of Health Sciences

Total Grant Amount: \$60,717

Grant Period: 9/1/2016 - 8/31/2017

Diagnostic tests based on the detection of DNA of infectious organisms from clinical samples have revolutionized veterinary medicine in the last decades. Currently, diagnostic panels for several vector-borne organisms are available through universities and private laboratories in the USA and abroad. However, the vast majority of results from clinically ill dogs are negative for tick-borne diseases, which frustrates veterinarians and dog owners trying to reach a definitive diagnosis and improve treatment options. These panels are based on the detection of previously known DNA sequences of each pathogen, with little room for detecting new organisms. Consequently, the current assays may suffer from "myopia": a self-fulfilling effect that prevents the detection of new or emerging organisms. Using an innovative approach, the investigators will employ next-generation sequencing (NGS) to overcome the limitations of current diagnostic technology. With NGS, the investigators can generate millions of individual gene sequencing reads from each clinical sample, allowing for the identification and characterization of multiple organisms from a single sample. Testing samples from dogs naturally exposed to tick-borne diseases, NGS will detect not only new organisms but also characterize genetic differences among known organisms. The resulting dataset of a large number of DNA sequences of known tick-borne organisms and previously undetected organisms in naturally-infected dogs will support the development of diagnostic tools to simultaneously advance canine and human health.

02295-A: The Role of Lymphocytes in Canine Monocytic Ehrlichiosis

Principal Investigator: Dr. Mary Anna Anna Thrall, DVM, MS; Ross University School of Veterinary Medicine

Total Grant Amount: \$15,000

Grant Period: 7/1/2016 - 6/30/2017

Canine monocytic ehrlichiosis (CME) is a serious disease of dogs, caused by the intracellular bacteria *Ehrlichia canis* that is transmitted by a tick bite. There is no vaccine for CME, and the pathophysiology of why the disease is more serious in some dogs is not understood. CME is very common in St. Kitts, home to Ross University School of Veterinary Medicine. The large numbers of affected dogs are a valuable resource for studies of this important disease. Lymphocytes (a type of white blood cell) appear to be related to the pathophysiology of CME. The investigators will study the types of lymphocytes present in dogs with both mild and severe disease and compare them to non-affected dogs. Lymphocytes will be identified by type as B or T cells using antibody markers for lymphocytes and flow cytometry.

The investigators will determine if an increase in lymphocyte counts (lymphocytosis) is associated with

severity of disease, and whether clonality (having a large number of the exact same type of lymphocyte) is associated with severity of disease. Fifty Ehrlichia-positive dogs admitted to Ross University will be evaluated for their number of lymphocytes by blood cell counts, by flow cytometry to determine their lymphocyte subsets, and by PCR and antibody testing for the presence of tick-borne disease. These dogs will be compared to healthy control dogs. The researchers will also evaluate 50 dogs presenting with persistent lymphocytosis and determine the percentage of those dogs that are Ehrlichia positive. The findings of this study will advance understanding of the pathophysiology and diagnosis of ehrlichiosis and lymphocytosis. 🐾

more than \$13.5 million to support canine health research through CHF's scientific programs. According to Dr. Diane Brown, CHF CEO, "What Ann brings to her role on our Board of Directors is wisdom with a quiet confidence, and a unique ability to listen and provide sound guidance. She has opened doors and made introductions, and is a true positive role model for our staff, and for me personally."

Congratulations, Ann, on this well-deserved accomplishment!

Learn more about Ann online: akcchf.org/Viklund 🐾



Meet CHF Board Member and Trailblazer: Ann Viklund

by Sue Copeland

AKC Canine Health Foundation Board Member Ann Viklund has shattered a glass ceiling! Ann, whose "real job" is Director—Conformation, Professional Engagement Team at Nestlé Purina PetCare, was asked to join the prestigious (and previously male-only) Kennel Club of Philadelphia—the first female member in its 140-year history. "I was surprised and delighted when Wayne Ferguson, the president, called and asked me if I would be interested in becoming a member of the club," says Ann.

In her "spare time," Ann gives her time to the AKC Canine Health Foundation. She's served on the Board for three years, currently in the role of Board Secretary and additionally as a member of the Executive Committee. "The Foundation dovetails so well with Purina," she says. "We both want dogs to live long, happy, healthy lives." Purina has been a corporate sponsor to the AKC Canine Health Foundation (CHF) for the past 18 years, providing



Ann Viklund & Trixie



New Faces

CHF is pleased to welcome three new staff members to our team.



Linda Black

Linda Black, CPA, FCPA - Director of Finance

Linda is responsible for maintaining accurate financial statements for CHF. In addition to day-to-day financial oversight and planning, Linda will lead CHF's annual audit, ensuring accountability and transparency.



Bradford Brady

Bradford Brady - Director of Development

Bradford is responsible for developing strategies to increase major gifts, foundation giving, and annual and planned giving. Additionally, Bradford will focus on stewarding donors and identifying prospects to build donor relationships, and creating and fostering relationships with prospective and current donors to solicit major donations.



Laura Ferguson

Laura Ferguson - Administrative Assistant/Bookkeeper

Laura is responsible for the day-to-day administrative tasks of the office, and providing support to both the director of finance and CEO.

"We are thrilled to have added Linda, Bradford, and Laura to the CHF team," said Dr. Diane Brown, CHF CEO. "We look forward to working with our many supporters to further canine health research that will benefit all dogs." 🐾

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