Grants awarded in 2021 to help prevent, treat and cure canine disease.

2021 HIGHLIGHTS
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GLIMPSE INTO 2022
Where is CHF-funded research headed next?

IMPACT
Changing dogs' lives with your help.
The AKC Canine Health Foundation (CHF) is dedicated to advancing the health of all dogs and their owners. The Foundation maintains a diverse portfolio of innovative canine health research grants that aim to find better treatments, more accurate diagnoses, and an improved understanding of the mechanisms that cause disease in dogs. In 2021, CHF awarded 50 new health research and educational grants outlined here. Many new grants embrace a One Health approach by supporting research that improves the health of dogs while simultaneously considering the health of people and the environment. These studies are indicated by the symbol [OH].

Thank you to all the dedicated dog owners, breeders, veterinary professionals, and researchers that continue to support CHF’s mission so that all dogs can live longer, healthier lives.
2021 GRANTS

In 2021, CHF awarded $3.4 million in 50 research grants across 17 different research program areas, including multiple educational grants.

ACORN GRANTS

Acorn grants fund smaller, pilot studies requiring $15,000 or less. These grants allow researchers to take the first steps to improve canine health.

OAK GRANTS

Oak grants provide larger investments (> $15,000) in studies with the potential to advance the health of dogs. In 2021, Oak grants ranged from $21,883 to $348,559.

MOU GRANTS

Memorandum of Understanding (MOU) grants allow AKC Parent Clubs and stakeholders to fund research of direct importance to the health of their breed. In 2021, three new MOU grants were awarded to address health concerns for specific breeds and all dogs.

EDUCATIONAL GRANTS

CHF supports the next generation of canine health researchers and reproductive specialists through Clinician-Scientist Fellowships and the AKC/AKCCHF/TF Small Animal Theriogenology Residency Program. In 2021, theriogenology residency grants were awarded to the University of Florida and Virginia-Maryland College of Veterinary Medicine. Three clinician-scientist fellowships were led by young scientists undertaking a clinical trial for hemangiosarcoma, implementing a novel technique for urethral catheterization, and focusing on bacteria and immune system function in canine atopic dermatitis.

2021 RESEARCH GRANTS

**Immune-Mediated Hemolytic Anemia (IMHA)** | 02988
Investigate a blood protein that may be associated with clotting to improve IMHA treatment.

**Mitral Valve Disease** | 02955
Predict individual risk of myxomatous mitral valve disease and heart failure.

**Dermatomyositis** | 02921-MOU
Perform molecular analysis of a chronic inflammatory and autoimmune disorder affecting skin and muscle and evaluate a novel drug treatment. [OH]

**Diabetes Mellitus** | 02850-A
Evaluate the potential for the drug fenofibrate to reduce the risk of pancreatitis and other complications in diabetic dogs.

**Cushing’s Disease** | 02875
Validate a model for Cushing’s disease caused by a pituitary tumor and use it to identify new treatment targets. [OH]

**Addison’s Disease** | 02945-MOU
Investigate the genetic basis of Addison’s Disease in the Portuguese Water Dog for future development of a genetic test.

**CBD for Epilepsy** | 02930
Determine CBD dose, safety, and tolerability for seizure reduction in dogs with refractory epilepsy. [OH]

**Epilepsy** | 02931
Evaluate the number/type of seizures and the effects of anti-seizure drugs in epileptic dogs using electroencephalography (EEG). [OH]

**Epilepsy Genetics** | 02936
Validate genetic variations associated with idiopathic epilepsy in Belgian Sheepdog and Tervuren breeds.
Epilepsy | 02940
Evaluate blood flow and brain activity in functionally connected regions of the brain in epileptic dogs to better understand and manage this disease. [OH]

Acute GI Injury | 02859-A
Use video capsule endoscopy to assess and define acute gastrointestinal injury in critically ill dogs.

Pancreatitis | 02861-A
Identify and characterize cardiovascular complications of acute pancreatitis in dogs to better understand disease severity and prognosis.

GI Microbiome | 02899
Study how the canine gut microbiome matures during the first year of life using advanced DNA sequencing technology.

Fecal Microbiome Transplants | 02900
Determine optimal fecal storage conditions and donor fecal characteristics for fecal microbiota transplantation using a targeted genomic approach. [OH]

Leishmaniasis | 02838
Develop new technologies for more accurate diagnosis of systemic canine leishmaniasis. [OH]

Chagas Disease | 02980
Assess use of four common systemic insecticides on kissing bug survival and investigate bug feeding patterns for management strategies. [OH]

Spotted Fever Group Rickettsia | 02983
Investigate the genetic, epidemiologic, and ecological features of emerging Spotted Fever Group Rickettsia species in dogs. [OH]

Body Condition Scoring | 02849-A
Develop and validate a new body condition scoring system to more accurately assess fat and muscle loss in canine athletes.

Osteoarthritis | 02851-A
Identify and develop reliable nerve blocks using blind and ultrasound-guided techniques to treat canine osteoarthritis.

Osteoarthritis | 02868-A
Evaluate intra-articular (joint) injection of cartilage/connective tissue cells to treat osteoarthritis.

Degenerative Myelopathy | 02943-MOU
Evaluate genetic and clinical data to identify risk factors for degenerative myelopathy in the German Shepherd Dog.

Mammary Gland Tumors | 02920
Identify tumor-permissive collagen characteristics in canine mammary tumors. [OH]

Soft Tissue Sarcoma | 02855-A
Define the effects of immunosuppressive cells in soft tissue sarcomas and evaluate three drugs that counteract them.

Glioma | 02858-A
Investigate why French Bulldogs with high grade gliomas respond poorly to immunotherapy-based treatment.

Brain Tumors | 02907
Investigate safety and feasibility of using ultrasound-guided histotripsy to treat canine primary brain tumors. [OH]

Mast Cell Tumors | 02910
Clinical trial of combination chemotherapy for improved canine mast cell tumor control.

Oral Melanoma | 02879
Identify the genes necessary for oral melanoma development in dogs.

Surgical Margins | 02880
Assess the accuracy of a new technology to provide real-time surgical margin assessment for soft tissue sarcomas and mammary cancer removal.

Acute Myeloid Leukemia | 02987
Identify relevant gene mutations associated with AML and more accurately classify AML subtypes in dogs for targeted drug development. [OH]
Hemangiosarcoma | 02864-A
Determine if luteinizing hormone (LH) binding increases hemangiosarcoma growth.

Hemangiosarcoma | 02942
Identify genetic and molecular features of hemangiosarcoma useful for early detection and prognosis.

Hemangiosarcoma | 02946
Multicenter inter-disciplinary clinical trial to identify biomarkers and genomic subgroups of canine hemangiosarcoma and define new therapies to prevent cancer spread. [OH]

Lymphoma | 02885
Evaluate environmental exposures to high-risk chemicals in Boxers with and without lymphoma. [OH]

Lymphoma | 02890
Investigate the role of “jumping genes” in T-cell lymphoma as potential new pathway for treatment. [OH]

Lymphoma | 02912
Clinical trial of adoptive natural killer cell therapy in combination with standard chemotherapy for lymphoma. [OH]

Cataracts | 02950-A
Search for causative genetic mutations for late-onset hereditary cataracts in the Boston Terrier.

Progressive Retinal Atrophy | 02952
Identify the causal mutation for X-linked PRA in the Greyhound, determine its prevalence, and work towards development of a genetic test. [OH]

Bartonellosis | 02819
Identify Bartonella-specific antigens with a reliable blood test. [OH]

Babesiosis | 02978-A
Investigate Babesia exposure and infection in dogs in the upper Midwest United States. [OH]

Global Tick-borne Diseases | 02981
Identify diagnostic markers for anaplasmosis and ehrlichiosis for vaccine development. [OH]

Cataracts | 02948-A
Evaluate if tight blood sugar control delays the onset of cataract development in diabetic dogs. [OH]

CHF solicits research proposals that address areas of unmet need and immediate opportunity within canine health research and veterinary medicine. All research proposals undergo rigorous peer review to determine the best approaches to tackle health challenges dogs and their owners face. This creates a portfolio of research grants multifaceted in their approach to canine health, often utilizing genetics, molecular biology, epidemiology, new diagnostics, and novel treatments as their scientific premise. In this upcoming year, CHF will focus on the following areas of canine health: epilepsy, vector-borne disease, behavior, exercise, injury and rehabilitation, and cancer.
2021 IN REVIEW

HOPE TO FIGHT HEMANGIOSARCOMA

CHF invested nearly $500,000 in new hemangiosarcoma studies this year, featuring novel approaches to this devastating cancer in dogs. Investigators at Cornell University are looking for correlations between clinical stage and histological features of canine hemangiosarcoma tumor tissue. CHF is also partnering in a large clinical trial with Ethos Veterinary Health hospitals to provide dogs (and their families) access to a potentially life-changing treatment to fight canine hemangiosarcoma.

ADVANCED DIAGNOSTIC TESTS

A major advancement in human and veterinary medicine, next-generation sequencing (NGS) is a technology that looks at DNA from blood or tissue for genetic variations associated with disease or organisms.

TICK CHECK (Grants 02292 and 02528)

CHF-funded investigators used NGS to improve the accuracy and ease of diagnosing vector-borne infections in dogs by rapidly detecting the relative amounts of infectious organism DNA in dog blood samples. doi.org/10.1186/s12917-021-02969-9

PERSONALIZED MEDICINE (Grant 02502)

Taking a note from human medicine, PennVet investigators developed a Canine Oncopanel to analyze cancer genes using a NGS platform. This platform analyzes 283 cancer genes to detect mutations that drive common and rare canine cancers. This panel can be used on a standard biopsy sample, enabling precision medicine and targeted therapy. doi.org/10.1111/vco.12746

GENETIC TEST ADVANCEMENTS

DWARFISM (Grant 02400-MOU)

Investigators at the University of Minnesota identified the genetic mutation responsible for dwarfism in Great Pyrenees. A DNA test for this mutation is now available.

SLO (Grant 02488)

Genetic mutations highly predictive for symmetrical lupoid onychodystrophy (SLO), a painful inflammatory disease of the nail bed often seen in Bearded Collies, were associated with DLA Class II genes that regulate the immune system.

PANDEMIC PONDERINGS

In 2021, the world and researchers took time to reflect in the face of the COVID-19 pandemic. Many studies awarded in 2021 dove into improved understanding of canine diseases and how we treat them. One, in direct response to the unknowns of the virus, specifically assessed removal of aerosolized particulates on dog coats to inform routine decontamination for dogs prior to re-entering the home (Grant 02847-A). Other new studies approach prevention by investigating the way dogs interact with the world, including prevalence and distribution of ticks, risk of lymphoma development due to environmental factors, and adopting cutting-edge tools and techniques to more effectively treat canine patients.

TRUST YOUR GUT

The gut microbiome hosts a variety of bacteria and microbes that are integral to your dog’s health. CHF-funded researchers are investigating how the microbiome contributes to obesity, epilepsy, and early development. Many studies rely on fecal microbiota transplantation (FMT) to treat disease by restoring microbiome diversity. FMT was first successful in human patients with recurrent C.diff infections and shows promise for other conditions in dogs.
2022 CLINICIAN-SCIENTIST FELLOWS

We thank the three 2021 fellows for their contributions to canine health. In 2022, CHF’s Clinician-Scientist Program continues to support the next generation of canine health researchers at the following institutions:


AKC/AKCCHF/TF SMALL ANIMAL THERIOGENOLOGY RESIDENCY PROGRAM

This program is an educational collaboration between the American Kennel Club (AKC), AKC Canine Health Foundation (AKCCHF), and Theriogenology Foundation (TF) to increase the number of trained practitioners in companion animal theriogenology and clinical genetics. New residents will start at Auburn University, The Ohio State University, and University of Pennsylvania in July 2022. Current residents continuing their 2-3 year programs include:

**VA-MD College of Veterinary Medicine | 02846-E**
Nicole Sugai, DVM
Residency Coordinator: Julie T. Cecere, DVM, MS, DACT

**University of Florida | 02845-E**
Anum Ahmed, DVM
Residency Coordinator: Audrey A. Kelleman, DVM, DACT

**Colorado State University | 02668-E**
Alex Horner, DVM
Residency Coordinator: Fiona Hollinshead, BVSc, PhD, DACT

**Ohio State University | 02666-E**
Joanna Koipillai, BVSc & AH
Residency Coordinator: Marco A. Coutinho da Silva, DVM, PhD, DACT

**Auburn University | 02538-E**
Jamie Douglas, DVM
Residency Coordinator: Robyn Wilborn, DVM, MS, DACT

WHERE ARE THEY NOW?

CHF supports the growth of veterinary science through its educational grants, conference sponsorship, and canine health projects, to achieve its mission to prevent, treat and cure canine disease for years to come.

Many past theriogenology residents are employed in various private practices, providing theriogenology services to dogs and their owners from Australia to Texas.

Alumni of the clinician-scientist fellowship have become current CHF-funded investigators. These include Dr. Steven Friedenberg (UMN; Addison’s disease, IMHA), Dr. Sita Withers (LSU; soft tissue sarcomas), Dr. Joanne Tuohy (VA-MD; osteosarcoma) and Dr. Eva Furrow (UMN; breed-specific hyperlipidemia).

A number of prior fellows continue to support CHF’s mission, serve as co-investigators on CHF-funded research, and communicate important findings to CHF, its donors, and veterinary professionals.

akcchf.org/educationalgrants
The AKC Canine Health Foundation is dedicated to advancing the health of all dogs and their owners by funding scientific research and supporting the dissemination of health information to prevent, treat and cure canine disease.