



**MORRIS  
ANIMAL  
FOUNDATION**

# Funded Studies

2022



**THANK YOU TO EVERYONE  
WHO MAKES THIS WORK POSSIBLE!**



# Animal Health Studies

**AT MORRIS ANIMAL FOUNDATION, WE WORK EVERY DAY TO IMPROVE AND PROTECT THE HEALTH OF ANIMALS THROUGH SCIENTIFIC INNOVATION, EDUCATION AND INSPIRATION.**

We are committed to fighting animal diseases worldwide in species ranging from cats and dogs to horses and alpacas; amphibians and vultures to anteaters and tigers.

Each year, our Scientific Advisory Boards review, rank and recommend for funding animal health grants submitted by scientists from around the world. At any given time, we are funding upwards of 150 studies in animal health, impacting more species in more places than any other nonprofit scientific organization. Without funding from Morris Animal Foundation, many studies simply could not be done, and critical animal health challenges would not be met.

This reference book provides details on animal health studies approved for funding in Fiscal Year 2022 by Morris Animal Foundation. Information includes the study's title, duration, cost, funded organization and a study summary and description.

**\$149+**  
**Million**  
**Invested**  
Since 1948

**2,940+**  
**Grants Funded**

**300+**  
**Species** Directly Studied

**20,000+**  
**Species Benefit** from Our Research

**400+**  
**Animal Health** Problems Studied

Morris Animal Foundation is supported by generous donors who are passionate about improving the health and well-being of animals around the world. Every gift helps fund cutting-edge research that brings us closer to solving critical health challenges for the animals in our hearts and homes and in the wild.

# Our History



**1948**

Dr. Mark L. Morris Sr. and wife, Louise, establish Buddy Foundation



**1950**

Foundation funds first dog and cat studies, at \$1,000 each



**1956**

First of three Scientific Advisory Boards established



**1959**

First horse study funded



**1962**

Organization renamed Morris Animal Foundation



**1967**

First wildlife study funded; blood survey in zoo animals



**1990**

First llama/alpaca study funded



**2000**

1,000<sup>th</sup> study funded



**2012**

First dogs enrolled in the Golden Retriever Lifetime Study

**2022**

More than \$149 million invested, 2,940+ animal health studies funded

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**Morris Animal Foundation is an international organization that welcomes grant applications from researchers around the world. To learn more about our funded studies, or to apply for a grant, visit [morrisanimalfoundation.org](http://morrisanimalfoundation.org) or contact us:**

**GENERAL INQUIRIES** | 303.708.3429, [mailbox@morrisanimalfoundation.org](mailto:mailbox@morrisanimalfoundation.org)

**RESEARCHER INQUIRIES** | [grantapplications@morrisanimalfoundation.org](mailto:grantapplications@morrisanimalfoundation.org)

**PRESS INQUIRIES** | 303.708.3418, [press@morrisanimalfoundation.org](mailto:press@morrisanimalfoundation.org)

**CALL TOLL-FREE** | 800.243.2345

D22FE-003

## Studying Gut Microbiome Influences on Obesity

HARVARD UNIVERSITY

**Projected Duration:** 3 Years

**Study Cost:** \$75,000

**SUMMARY:** Researchers will investigate whether the gut microbiome influences the success of dietary interventions for weight loss during feline obesity.

**DESCRIPTION:** The gut microbiome is the collection of bacteria and other microorganisms carried naturally in the intestines, which are normal contributors to healthy immune activity and metabolism. The composition of these microbes can vary greatly among individuals, and it has been shown in humans to influence personalized responses to diet (such as glucose tolerance and blood lipid levels). Researchers will determine whether this type of gut microbial personalization also helps to explain why some overweight cats lose weight successfully when put on a lower-calorie or restricted diet, while others do not. Findings will inform further studies on gut microbiome modifications, possibly through targeted probiotics or antibiotics, to help improve weight management in cats.

D22FE-009

## Assessing Fecal Microbiota Transplants for Weight Loss

THE OHIO STATE UNIVERSITY

**Projected Duration:** 2 Years

**Study Cost:** \$73,199

**SUMMARY:** Researchers will assess the efficacy of fecal microbiota transplantation as an adjunctive therapy for weight loss in obese cats.

**DESCRIPTION:** The obesity epidemic is rampant in cats and ultimately results in physical impairment, comorbidities, and reduced quality of life and healthspan. Studies in other species suggest microbes living in the intestinal tract contribute to fat and weight gain, and manipulation of these gut microbiota may confer a health benefit to obese patients. To see if this holds true for cats, researchers will conduct a clinical trial assessing the efficacy of fecal microbiota transplantation (FMT) as an adjunctive therapy in client-owned, healthy but obese cats. FMT is the transfer of feces from a healthy donor to a recipient that helps restore the gut's beneficial microbiota as a pathway to better health. Findings from this clinical trial will help inform the development of precision microbiome-targeted therapies for weight loss management in cats.

## D22FE-019

**Evaluating Opioid-free Anesthesia for Spay Surgery**

UNIVERSITY OF MONTREAL, CANADA

**Projected Duration:** 1 Year**Study Cost:** \$14,803

**SUMMARY:** Researchers will investigate the anesthetic and analgesic effects of an opioid-free or an opioid-sparing protocol in cats undergoing spay surgery.

**DESCRIPTION:** Opioids are morphine-like drugs and have been a cornerstone of acute pain management for many species. Unfortunately, these drugs are not always accessible to veterinarians due to regulatory constraints or drug shortages. To address this issue, researchers want to know if opioid-free or opioid-sparing anesthetic protocols provide adequate pain control in cats. The team will compare the analgesic effects of an anesthetic protocol using different techniques with or without opioids in cats undergoing spay surgery. If successful, findings will help small animal veterinarians who perform routine spaying/neutering procedures and often struggle with opioid shortages. Results also may provide groundbreaking insights into practical means of pain relief in spay-neuter programs around the globe, where opioid and volatile anesthetics are not available, with a positive impact in feline welfare.

## D22FE-027

**Unraveling the Genetics of Feline Hypertrophic Cardiomyopathy**

UNIVERSITY OF CALIFORNIA, DAVIS

**Projected Duration:** 2 Years**Study Cost:** \$72,758

**SUMMARY:** Researchers will look for a shared genetic origin of hypertrophic cardiomyopathy, the most diagnosed feline heart disease, in the general cat population.

**DESCRIPTION:** Hypertrophic cardiomyopathy is a life-threatening heart disease in cats, causing the muscular heart wall to thicken, straining heart function. Certain breeds, including Maine coon cats and ragdoll cats, are more prone to developing hypertrophic cardiomyopathy and a few breed-specific genetic screening tests are now available for these high-risk breeds. However, for most cats, the genetic cause of this disease remains unknown. Researchers will combine two of the largest feline genetic sequencing projects to better pinpoint the genetic mechanisms of hypertrophic cardiomyopathy for the general cat population. The team hopes to use this information to develop novel testing and identify new drug therapy targets to improve care of cats with this devastating heart disease.

## D22FE-031

### Assessing a Promising Therapy for Osteoarthritis

UNIVERSITY OF MINNESOTA

**Projected Duration:** 2 Years

**Study Cost:** \$74,971

**SUMMARY:** Researchers will evaluate the effect of blocking a key protein involved in fat metabolism that may help improve quality of life for cats with osteoarthritis.

**DESCRIPTION:** Osteoarthritis is a common, progressive joint disease that causes pain and mobility issues for cats. Currently, no treatment exists that can safely reduce pain and stop disease progression. Researchers will study if blocking a protein called soluble epoxide hydrolase (sEH) will benefit cats suffering from osteoarthritis. Previous studies in humans have shown a possible association between sEH and the prevalence and progression of osteoarthritis. Other studies by this team in horses and mice indicate that blocking sEH can decrease joint pain and protect the joint surface from further damage. If successful, findings from this study will provide critical data on the efficacy of a novel therapy that may help improve mobility and reduce pain for thousands of cats living with osteoarthritis.

## D22FE-038

### Developing a Novel Three-in-One Vaccine for Cat Viruses

MICHIGAN STATE UNIVERSITY

**Projected Duration:** 2 Years

**Study Cost:** \$74,886

**SUMMARY:** Researchers will develop a new core vaccine that is safe and can provide superior protection against three common cat viruses, feline herpesvirus-1 (FHV-1), feline calicivirus (FCV) and feline panleukopenia virus (FPV).

**DESCRIPTION:** Feline herpesvirus-1 (FHV-1) accounts for approximately 50% of all diagnosed viral upper airway infections and is a major cause of eye infections in cats. Current FHV-1 vaccines are a component of core (recommended) vaccinations. While core vaccines provide satisfactory protection against infection for other common cat viruses, including feline calicivirus (FCV) and feline panleukopenia virus (FPV), protection from FHV-1 is limited and short in duration. To address this problem and reduce the need for multiple core vaccinations, researchers will develop a new three-in-one vaccine that is safe and can provide superior protection from FHV-1, in addition to protection from FCV and FPV. The team hopes their new vaccine will provide long-lasting immunity against all three common cat pathogens.



## D22FE-041

**Investigating the COVID-19 Pandemic's Impact on Cats and Owners**

PURDUE UNIVERSITY

**Projected Duration:** 2 Years**Study Cost:** \$55,620

**SUMMARY:** Researchers will investigate the long-term effects of the COVID-19 pandemic on the behavior and well-being of cats as well as the human-animal bond.

**DESCRIPTION:** The COVID-19 pandemic substantially affected numerous aspects of our daily lives. Researchers want to know if the pandemic also impacted our relationships with our companion animals. Cats are extremely sensitive to their physical and social environment, as well as to the behavior and lifestyle of their owners. The team will assess cat-owner relationships and cat behaviors using validated questionnaires through different phases of the pandemic, from data collected pre-pandemic through data collected recently. The team also will analyze 2013 to 2022 United States' shelter statistics on cat intake and outcomes to investigate temporal trends during the pandemic. Findings will inform recommendations to assist cat owners in maintaining healthy and positive relationships with their pet cats, as well as help inform animal shelter policies, during times of crisis.

## D22FE-301

**Modulating Osteoarthritis Chronic Pain with Sensory Stimuli**

UNIVERSITY OF MONTREAL, CANADA

**Projected Duration:** 2 Years**Study Cost:** \$28,037

**SUMMARY:** Researchers will investigate if chronic pain associated with osteoarthritis has a neuropathic pain component that can be modulated by pleasant and unpleasant sensory stimuli.

**DESCRIPTION:** In humans, chronic pain can be worsened by unpleasant sensations and relieved (at least partially) by pleasant sensations. Researchers will evaluate whether sensory nerve processing is affected in cats with osteoarthritis pain, using minimally invasive electrodiagnostic tests to compare nerve conduction in affected cats and healthy control cats. The team also will study the behavioral response and electroencephalogram (EEG) activity of cats exposed to different types of pleasant and unpleasant sensorial stimuli (such as exposure to citrus smell, light of different colors, different sound intensities or repeated touch). Identifying pleasant or unpleasant sensory experiences that could be used to relieve chronic pain will provide a noninvasive and drug-free strategy to improve the quality of life for cats with osteoarthritis.

## D22FE-305

### Understanding How Gut Microbiota and Metabolic Changes Influence Diabetes

UNIVERSITY OF ILLINOIS

**Projected Duration:** 1 Year

**Study Cost:** \$44,604

**SUMMARY:** Researchers will generate a map of the biological networks of gut microbiota and metabolic pathways associated with diabetes mellitus to help inform the discovery of new treatments.

**DESCRIPTION:** Some studies indicate about 20% of diabetic cats are euthanized in the first year of diagnosis because of reduced quality of life of both the pet and owner. Given the high prevalence of feline diabetes, it's critical to find new ways to screen prediabetic cats and develop new strategies to slow or prevent disease progression. Researchers will evaluate changes in the gut microbiota of diabetic cats that interfere with the cats' metabolism and contribute to the development of diabetes. The team hopes to identify novel biomarkers and biochemical pathways specific to feline diabetes as a first step toward the discovery process for new diagnostics and therapies to help these patients.

## D22FE-403

### Unraveling the Genetics of Feline Hypertrophic Cardiomyopathy – Fellowship Training Grant

UNIVERSITY OF CALIFORNIA, DAVIS

**Projected Duration:** 2 Years

**Study Cost:** \$124,472

**SUMMARY:** Researchers will look for a shared genetic origin of hypertrophic cardiomyopathy, the most diagnosed feline heart disease, across breeds and mixed breeds.

**DESCRIPTION:** Hypertrophic cardiomyopathy is a life-threatening heart disease in cats, causing the muscular heart wall to thicken, straining heart function. Certain breeds, including Maine coons and ragdolls, are more prone to developing hypertrophic cardiomyopathy and a few breed-specific genetic screening tests are now available for these high-risk breeds. However for most cats, the genetic cause of this disease remains unknown. Researchers will combine two of the largest feline genetic sequencing projects to better pinpoint the genetic mechanisms of hypertrophic cardiomyopathy for the general cat population. The team hopes to use this information to develop novel testing and identify new drug therapy targets to improve care of cats with this devastating heart disease.

D22FE-810

## Developing a Diagnostic Test for *Bartonella*-Associated Diseases

UNIVERSITY OF GEORGIA

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**Projected Duration:** 1 Year

**Study Cost:** \$10,800

**SUMMARY:** Researchers will develop a highly sensitive test to diagnose *Bartonella* bacteria, associated with a wide spectrum of debilitating diseases in cats and other species.

**DESCRIPTION:** *Bartonella* bacteria cause a wide spectrum of life-threatening diseases in cats and other species, including dogs and humans. While certain species of these bacteria have been identified as the definitive cause for some diseases, including valvular endocarditis and cat-scratch disease, in many instances this link, although suspected, cannot be pinpointed as a causal factor. This may lead to chronic infections in affected animals. To address this problem, researchers will develop a highly sensitive test to help visualize *Bartonella* bacteria in diseased tissues. Development of this new tool will help improve diagnostics of *Bartonella*-associated diseases to guide treatment and further study of *Bartonella* bacteria's impact on the health of cats and other animals.

## D22CA-015

### Blocking Heartworm Transmission

UNIVERSITY OF PENNSYLVANIA

**Projected Duration:** 3 Years

**Study Cost:** \$75,000

**SUMMARY:** Researchers will investigate the use of a bacteria to help block transmission of heartworm parasites by mosquitoes.

**DESCRIPTION:** More than 150,000 cases of canine heartworm disease are reported annually in the United States alone. Monthly preventive treatments for dogs have been widely available since the mid-1980s. However, drug-resistant strains are on the rise, highlighting the need for novel disease control strategies. Researchers will investigate how infection by certain bacteria decreases the capacity of mosquitoes to transmit infectious larvae of *Dirofilaria immitis*, the agent of heartworm disease. Bacteria-infected mosquitoes (and control groups) will be exposed to both drug-sensitive and drug-resistant parasites. The team hopes findings will provide a new approach to block the spread of heartworm disease by targeting parasites in their mosquito host.

## D22CA-028

### Identifying Genes Associated with Meningoencephalitis

UNIVERSITY OF GEORGIA

**Projected Duration:** 3 Years

**Study Cost:** \$74,143

**SUMMARY:** Researchers will identify immune system genes associated with meningoencephalitis of unknown origin, a common inflammatory central nervous system disease in dogs.

**DESCRIPTION:** Meningoencephalitis of unknown origin (MUO) is a common autoimmune disorder affecting the nervous system of dogs. Treatments are only partially successful with many dogs suffering long-term illness and even death. Identifying changes in the immune system associated with the disease could point the way toward development of improved treatment strategies. Researchers will use state-of-the-art sequencing of blood cells reflecting different states of the disease, including dogs in remission, to help identify immune system genes that contribute to disease. The team hopes their findings will inform future studies to identify new therapy targets – ultimately broadening treatment options for MUO and extending lifespan and quality of life for affected dogs.

## D22CA-040

**Investigating a Novel Drug Therapy for Heart Disease**

UNIVERSITY OF CALIFORNIA, DAVIS

**Projected Duration:** 2 Years**Study Cost:** \$62,647

**DESCRIPTION:** Researchers will evaluate if the drug rapamycin can reverse the negative heart changes associated with subvalvular aortic stenosis, the most common congenital heart defect in dogs.

**SUMMARY:** Subvalvular aortic stenosis (SAS) is one of the most common congenital heart defects in dogs. SAS leads to heart remodeling (physical and functional changes in the heart), cardiac arrhythmias and frequently results in sudden death. No current medical therapy prolongs the lifespan of dogs with severe SAS beyond 4 to 5 years of age. Researchers will conduct a clinical trial to investigate whether the drug rapamycin can reduce the life-threatening heart remodeling associated with SAS. The team hopes this novel therapy may reduce disease severity and improve outcomes and quality of life for dogs with this devastating disease.

## D22CA-051

**Evaluating Rabies Vaccine Safety in Puppies**

ROSS UNIVERSITY, ST. KITTS

**Projected Duration:** 2 Years**Study Cost:** \$48,873

**SUMMARY:** Researchers will evaluate two types of rabies vaccines to determine any effect on the resistance to unrelated infectious and parasitic diseases, and if this effect differs between males and females.

**DESCRIPTION:** Some vaccines may have substantial impacts on health that are not explained by the protection they provide against specific targeted diseases. This effect is thought to be influenced by factors like the type of vaccine, the age and sex of recipients, and the prevalence of other infectious diseases in the population. Although often beneficial, these impacts may in certain circumstances be detrimental. Some evidence exists that certain types of rabies vaccines may increase resistance to unrelated diseases (a beneficial non-specific effect), while other types may decrease resistance, particularly in females. In this study, researchers will test two types of rabies vaccines to determine if there is an effect on the susceptibility to unrelated infectious and parasitic diseases in young puppies living in a low-resource community in Africa. The team also wants to see if any effect differs by sex (male versus female puppies). Through this study, the team hopes to better understand the mechanism of action of any non-specific effects of rabies vaccines, so that potentially beneficial effects might be harnessed, and any detrimental effects mitigated through informed reformulation of existing vaccines or vaccination schedules.



## D22CA-310

### Understanding Genetic Mutations Associated With Drug Variability

WASHINGTON STATE UNIVERSITY

**Projected Duration:** 2 Years

**Study Cost:** \$71,546

**SUMMARY:** Researchers will study the genetics of drug response variability in dogs as a first step toward developing a novel drug sensitivity test to increase drug safety and efficacy for individual patients.

**DESCRIPTION:** Researchers will analyze genetic mutations associated with drug metabolism pathways. Data will be used to develop a novel drug sensitivity test to determine if a dog is a slow, fast or normal processor of drugs, called the phenotype. Knowing the drug processing phenotype of a dog could help veterinarians make informed and individualized drug treatment decisions for their patients, such as whether to increase or decrease dosage or when to use an alternative drug. The successful development of this test could lead to increased safety and efficacy of therapeutic drugs for all dogs, improving personalized medicine.

## D22CA-402

### Differentiating Between Epilepsy and a Non-Epileptic Movement Disorder

UNIVERSITY FOR VETERINARY MEDICINE HANNOVER, GERMANY

**Projected Duration:** 2 Years

**Study Cost:** \$89,478

**SUMMARY:** Researchers will investigate brain function, brain metabolism and gut microbiome in dogs to distinguish between epileptic seizures and an episodic movement disorder called paroxysmal dyskinesia – commonly mistaken for epileptic seizures – to improve diagnosis and appropriate treatment.

**DESCRIPTION:** Idiopathic epilepsy is the most common chronic brain disease in dogs and very challenging for both the dog and its owner. Intermittent recurrent episodes of abnormal movement, referred to as paroxysmal dyskinesia, can mimic epileptic seizures. Without correct diagnosis, patients may get the wrong therapy and seizures or episodes of abnormal movement will continue. Researchers plan to investigate differences in brain activity and metabolism in these two diseases and compare this to healthy dogs using special magnetic resonance imaging techniques. Researchers also will analyze chemical substances in cerebrospinal fluid and examine gut microbes to look deeper into metabolism as a whole in affected patients. Diagnostic tools to differentiate between epilepsy and paroxysmal dyskinesia will help veterinarians provide better care and appropriate treatments for their patients with movement disorders.

## D22CA-406

**Identifying Genetic and Behavioral Factors Influencing Weight Gain**

UNIVERSITY OF CAMBRIDGE, UNITED KINGDOM

**Projected Duration:** 2 Years**Study Cost:** \$124,991

**SUMMARY:** Researchers will evaluate how genetic risk factors and owner behaviors contribute to pet obesity.

**DESCRIPTION:** Almost 60% of dogs are considered overweight. Researchers will look for factors other than diet that drive overeating in dogs, including genetics. The team has mapped genomic factors associated with obesity in Labrador retrievers and validated genes contributing to obesity risk in this breed. Using client-owned Labrador retrievers as a model, the team will compare eating behavior and energy expenditure in high obesity-risk to low obesity-risk dogs to identify additional factors that drive weight gain. Researchers also will analyze data from owners to identify owner behaviors that may influence weight in both low-risk and high-risk dogs. Findings will be used to inform clinical trials to improve obesity prevention and treatment.

## D22CA-503

**Working Toward Better Diagnostics for Mammary Cancer**

UNIVERSITY OF SASKATCHEWAN, CANADA

**Projected Duration:** 3 Years**Study Cost:** \$30,093

**SUMMARY:** Researchers will explore the link between three cell markers and mammary cancer with the hope of improving early diagnostics for dogs.

**DESCRIPTION:** Mammary cancer is the most common type of tumor diagnosis in intact female dogs. Currently, there is no way to screen high-risk dogs for early mammary lesions and up to 60% of these tumors are already malignant at the time of diagnosis. Researchers will investigate the role of three cell markers in the progression of canine mammary cancer, from benign early lesions to aggressive cancer. In previous human studies, an increase in expression of these cell markers in women is linked to mammary cancer. If successful, researchers will explore the use of these markers to improve early diagnostics of mammary tumors in dogs. One of the markers also may be valuable as a prognostic and/or therapeutic marker of cancer. Being able to diagnose canine mammary cancer early, before the development of invasive and widespread disease, would greatly improve prognosis for canine patients.

## D22CA-511

### Finding Solutions for Giant-Breed Dogs with Osteosarcoma

THE OHIO STATE UNIVERSITY

**Projected Duration:** 3 Years

**Study Cost:** \$143,133

**SUMMARY:** Researchers are creating tools to estimate fracture risk in giant-breed dogs with osteosarcoma as well as evaluating a novel method to stabilize the affected bone.

**DESCRIPTION:** Appendicular osteosarcoma is a highly invasive primary bone cancer of the limbs in dogs. This aggressive cancer, if not caught early, can spread rapidly to other sites of the body. Standard-of-care treatment often includes limb amputation to stop cancer spread as well as to minimize acute pain. While limb amputation can be curative for some dogs, this surgical intervention is not suitable for all canine patients, especially those with large body sizes. Targeted radiation may help these patients, but structural damage caused by the cancer often results in pathologic fractures even after treatment. Researchers will evaluate a method to estimate fracture risk in giant-breed dogs after targeted treatment. The team also will assess the efficacy of a special implant designed to stabilize the bone post treatment in these patients. If successful, findings from this study will provide veterinary oncologists with much-needed tools to better care for giant-breed dogs diagnosed with appendicular osteosarcoma.

## D22CA-802

### Understanding the Link Between Autoantibodies and Skin Disease

NORTH CAROLINA STATE UNIVERSITY

**Projected Duration:** 1 Year

**Study Cost:** \$10,325

**SUMMARY:** Researchers will investigate the immune response in dogs with pemphigus foliaceus, a common canine skin disease causing rupturing blisters and sores.

**DESCRIPTION:** Pemphigus foliaceus is one of the most diagnosed autoimmune skin diseases of dogs. In this disease, the dog's own immune system mounts an attack against proteins that anchor skin cells to one another. This results in localized to widespread pustules, erosions and crusting. Management of this disease currently involves the long-term prescription of immunosuppressive drugs that frequently result in treatment-limiting side effects. In this study, researchers will use a novel detection method to screen dogs with pemphigus foliaceus for the presence of a specific type of antibody (IgA autoantibodies) that may play a key role in disease development. Obtaining a more thorough understanding of the immune response in dogs with pemphigus foliaceus, including the role of IgA autoantibodies, will inform the development of much-needed novel therapies to improve the quality of life for patients.

## D22CA-811

**Developing a Test for a Bleeding Disorder**

IOWA STATE UNIVERSITY FOUNDATION

**Projected Duration:** 1 Year**Study Cost:** \$10,800

**SUMMARY:** Researchers will develop a test to measure blood platelet aging in dogs with a bleeding disorder called immune thrombocytopenia to inform treatment discovery.

**DESCRIPTION:** Immune thrombocytopenia (ITP) is a severe bleeding disorder of dogs in which the immune system destroys normal blood platelets, small blood cells and critical components of proper blood clot formation. Dogs with ITP have decreased platelets secondary to immune destruction, which in turn can lead to severe and sometimes life-threatening bleeding. Immunosuppressive drug therapy is a cornerstone of treatment but often results in unwanted side effects. In this study, researchers will develop a test to determine if premature platelet aging (called desialylation) leads to early platelet removal in dogs with ITP. Treatment with Tamiflu, which inhibits desialylation, is an effective, safe alternate therapy in some human ITP patients. The team will determine whether similar medications that inhibit platelet aging also could serve as safe and effective therapies for dogs with ITP.

## D22CA-814

**Investigating a Novel Antimicrobial Strategy for Urinary Tract Infections**

MIDWESTERN UNIVERSITY

**Projected Duration:** 1 Year**Study Cost:** \$10,800

**SUMMARY:** Researchers will isolate novel antimicrobials from natural products, including plants, and test their ability to inhibit bacteria growth responsible for urinary tract infections.

**DESCRIPTION:** An estimated 14% of dogs and 29% of older cats are diagnosed with bacterial urinary tract infections in their lifetime. Antimicrobial therapy is the main treatment for UTIs but sometimes falls short, especially in cases of antibiotic-resistant bacteria. Researchers will explore a new antimicrobial strategy to help in the fight against these outbreaks. The team will identify small molecules isolated from natural products, including plants, that may disrupt iron metabolism. Studies indicate metals, including iron and zinc, may be micronutrients (food) for microorganisms, like bacteria. The team will test the ability of these molecules to inhibit growth of two bacterial species commonly associated with urinary tract infections in dogs and cats. Findings will inform the development of novel treatments for UTIs and may provide veterinarians with alternative antimicrobial options for their patients.

D22CA-818

## Identifying Mosquitoes Associated with Heartworm Disease

VALDOSTA STATE UNIVERSITY

**Projected Duration:** 1 Year

**Study Cost:** \$10,800

**SUMMARY:** Researchers will identify mosquitoes capable of transmitting heartworm disease to dogs and other mammals to inform disease management strategies.

**DESCRIPTION:** Heartworm poses a significant and growing health risk to dogs and other mammals throughout the United States, especially to those living in the southeastern states. Little is known about which species of mosquitoes can harbor and successfully transmit the larval parasite that causes heartworm disease to dogs. Researchers, with the help of trained entomologists, will use advanced molecular techniques to identify disease-vector mosquitoes, collecting, screening and analyzing a variety of species in southern Georgia. Findings will inform targeted control measures against heartworm-transmitting mosquitoes during seasons of high transmission.

D22CA-824

## Searching for Clues to Improve Treatment for Deadly Blood Disorder

NORTH CAROLINA STATE UNIVERSITY

**Projected Duration:** 1 Year

**Study Cost:** \$9,860

**SUMMARY:** Researchers will investigate a potential cause of red blood cell destruction in immune-mediated hemolytic anemia to inform the development of targeted treatments for this deadly autoimmune disease.

**DESCRIPTION:** Immune-mediated hemolytic anemia (IMHA) is a deadly blood disorder that occurs when a dog's immune system is triggered to attack its own red blood cells. Normal cells, including red blood cells, display "flags" to the immune system that they are normal body components and therefore should not be destroyed. Researchers will explore whether red blood cells from dogs with IMHA lack these flags, and whether red blood cell destruction increases when immune cells cannot recognize this flag. If successful, findings will significantly advance our understanding of IMHA, and could lead to new therapeutic approaches that specifically prevent red blood cell destruction in affected dogs.



## GOLDEN RETRIEVER LIFETIME STUDY

### D22CLP-101

#### Studying Toxin Exposures and Canine Lymphoma

UNIVERSITY OF WISCONSIN – MADISON

**Projected Duration:** 2 Years

**SUMMARY:** Researchers are studying whether exposure to chemical pollutants, including herbicides, is linked to the development of lymphoma in golden retrievers.

**DESCRIPTION:** Although lymphoma is a common tumor in dogs, causes and risk factors remain unknown. In humans, lymphoma appears to be associated with chemicals in the environment. Researchers want to know if the same holds true for dogs. The team will analyze blood and urine samples from 60 Golden Retriever Lifetime Study dogs diagnosed with lymphoma. Data will be compared to 60 age- and sex-matched healthy dogs from the Study that will serve as a control group. The team hopes to discover if exposure to environmental chemicals is associated with lymphoma, and with early DNA damage or molecular changes in golden retrievers. If successful, findings will shed light on potential modifiable risk factors for the development of lymphoma in dogs.

### D22CLP-203

#### Assessing Pet Owner Influence on Multi-Year Study Success

UNIVERSITY OF DENVER

**Projected Duration:** 1 Year

**SUMMARY:** Researchers will assess which factors contribute to the high rates of compliance and retention in the Golden Retriever Lifetime Study and identify important considerations to guide future research studies.

**DESCRIPTION:** The participants of Morris Animal Foundation's Golden Retriever Lifetime Study have demonstrated high rates of compliance and retention in the longitudinal study's data collection protocols. Researchers will gather information on social and environmental factors, including demographics, human-animal bond and social determinants of health from a sample population of Study participants to find out how these factors impact compliance and retention rates. Examining the influence of social and environmental factors on participation in the Study will provide unique insights into how to improve compliance and retention in future longitudinal studies involving pets.

**D22CLP-204**

## **Understanding Heartworm Medication Use**

LINCOLN MEMORIAL UNIVERSITY

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**Projected Duration:** 1 Year

**SUMMARY:** Researchers will investigate what factors are predictive of heartworm preventive medication use in golden retrievers.

**DESCRIPTION:** Treatment for heartworm disease in dogs can be costly and is associated with side effects. Prevention remains the best way to keep dogs safe from developing this potentially life-threatening disease. Using data from the Golden Retriever Lifetime Study, researchers will build predictive models for heartworm preventive use. The models will incorporate demographic data as well as information from the Annual Owner and Annual Veterinarian Questionnaires. Predictive models can help veterinarians and researchers understand what factors are predictive of heartworm preventive use as well as inform proactive interventions, including educating owners on the importance and proper use of heartworm preventives to protect dogs.



## D22EQ-022

### Studying Intestinal Inflammation Associated with Colic Surgery

UNIVERSITY OF EDINBURGH, UNITED KINGDOM

**Projected Duration:** 2 Years

**Study Cost:** \$69,300

**SUMMARY:** Researchers will study the immune response in the intestine of horses undergoing colic surgery, focusing on a common complication called postoperative ileus.

**DESCRIPTION:** Up to 62% of horses undergoing colic surgery may develop a life-threatening complication called postoperative ileus (POI). POI is a functional disorder of the intestine, characterized by decreased bowel motility for prolonged periods following surgery. This complication has a reported mortality rate as high as 86% in horses. However, much of what is known about this condition in equine patients is extrapolated from rodent and human-derived data. Researchers will study inflammation in the intestines of horses undergoing colic surgery to better understand why some horses develop POI and why some do not. Findings will help improve our understanding of functional changes specific to horses that develop POI post-surgery and may inform the development of novel therapies and preventive measures for the species.

## D22EQ-025

### Understanding Risk Factors for Transport-Associated Colic in Horses

CHARLES STURT UNIVERSITY, AUSTRALIA

**Projected Duration:** 2 Years

**Study Cost:** \$32,002

**SUMMARY:** Researchers will study whether changes to gastrointestinal (gut) motility in horses are associated with post-travel colic and use this new information to improve management recommendations for the care of transported horses.

**DESCRIPTION:** Horses are one of the most well-traveled species in the world, frequently transported by road and air. Colic after transportation is a common health issue for horses. This condition is believed to be related to changes in pre-travel management and/or travel stress, which culminate in decreased gastrointestinal motility, leading to abdominal pain and blockage. Working with a commercial transportation company, researchers will collect gastrointestinal motility data, travel history, veterinary and observational findings as well as other factors on 30 horses completing a similar 8- to 10-hour journey. The team will collect data pre-travel, immediately after transport and two hours following arrival. As recommendations for the welfare of horses during transportation currently are being reviewed internationally, study findings will inform decisions regarding the care of transported horses in hopes of reducing the incidence of colic post-travel.

## D22EQ-027

**Developing a Colic Training Program for Underserved Communities**

UNIVERSITY OF NOTTINGHAM, UNITED KINGDOM

**Projected Duration:** 1 Year**Study Cost:** \$93,949

**SUMMARY:** Researchers will develop an educational training program for Spanish-speaking horse owners in Colombia to improve early recognition of colic, knowledge of risk factors and appropriate treatment when access to veterinary services is limited.

**DESCRIPTION:** Throughout South America, working equids (horses, donkeys and mules) are essential for transporting people, produce, fuel and water in rural communities. Colombia has an estimated 1.5 million working equids and is ranked 16th in the world for income inequality by Gini index (World Bank, 2017). Many working equid owners live in conditions of poverty, and diseases such as colic not only impact animal welfare, but also the livelihoods of their owners. Lack of education and experience with colic means early signs are not recognized. Limited financial resources and lack of access to veterinary care can lead to ineffective or inappropriate colic treatments. To address these issues, researchers will co-develop new educational resources and workshops for equid owners living in underserved communities in Colombia. Training materials will focus on risk factors, clinical signs and treatment of colic. Educational materials will be easily transferable to other Spanish-speaking countries throughout Latin America. Researchers hope this new resource will help prevent and reduce the risk of colic for working equids in the region and be a win-win for animals and their owners.

## D22EQ-403

**Studying Postoperative Ileus Associated with Colic**

NORTH CAROLINA STATE UNIVERSITY

**Project Duration:** 2 Years**Study Cost:** \$125,000

**SUMMARY:** This study is part of our fellowship program, established to support early career research scientists. The Fellow will study the role of signaling cells in inflammatory processes associated with postoperative ileus, a life-threatening complication of colic surgery.

**DESCRIPTION:** Postoperative ileus (POI), or prolonged absence of bowel movement following intestinal surgery, significantly endangers the lives of horses after colic surgery. Veterinarians do not currently have a method of universally treating POI or predicting when this serious postoperative complication might occur. To address this problem, researchers will study key biological mechanisms that may decrease intestinal wall function and trigger inflammation. The team theorizes these mechanisms may decrease the intestinal wall's capability as a natural barrier, allowing bacterial products to leak into the bloodstream and travel through the body, causing life-threatening complications for the horse. Study findings will improve our understanding of the biological mechanisms associated with POI and may lead to the discovery of new therapy targets or prognostic methods to help predict which colic patients undergoing surgery are at high-risk of developing POI.



## D22EQ-501

### Developing Online Equine Behavior Educational Tools for Owners

OKLAHOMA STATE UNIVERSITY

**Projected Duration:** 3 Years

**Study Cost:** \$49,935

**SUMMARY:** Researchers will develop online training tools to help horse owners better recognize and interpret horse behavior, emotions and body language that may be indicative of health or welfare issues in their animals.

**DESCRIPTION:** An owner's ability to assess changes in their animal's behavior and make appropriate adjustments to their management and care are key components of equine welfare. However, many owners are more comfortable assessing physical health problems in their animals than mental health and welfare issues. To improve care of horses, researchers will create online training tools to help owners better assess their horse's behavior, including facial expressions, body postures and other nonverbal forms of communication. The team will conduct pilot testing of their tool, using volunteer participants to determine the tool's effectiveness in improving owner perceptions of equine mood and mental/emotional states. Upon completion, the course will be distributed through industry partners with open access to horse owners throughout the United States and internationally. The team hopes these easily accessible and engaging tools will prompt horse owners and managers to incorporate mental health assessment of horses into daily management, training and handling practices.

## D22EQ-504

### Reducing Mare Stress at Weaning

ROYAL VETERINARY COLLEGE, UNIVERSITY OF LONDON, GREAT BRITAIN

**Projected Duration:** 1 Year

**Study Cost:** \$9,947

**SUMMARY:** Researchers will study how mare life-history factors, including age and number of previous foals, as well as mare level of attachment to her own foal affect stress-relevant behaviors at removal of the foal at weaning.

**DESCRIPTION:** Under natural conditions, foals are weaned at around 10 to 11 months of age as part of a gradual process mediated by the mare. Often a social bond persists even when the foal is nutritionally independent. In contrast, some domestic horses are subject to artificial weaning practices where foals are separated from the mares at a younger age, with little or no possibility of retaining social contact. While studies show artificial weaning can be stressful for foals, little is known about how artificial weaning affects mares. Researchers will study the variation in mares' behavioral responses to physical separation from their foal. The team hypothesizes that mares scoring higher on attachment to their foals will display behaviors associated with increased stress, including frequent vocalizations and abnormal repetitive behavior. Findings will help inform strategies to reduce chronic effects of cumulative stress to mares at weaning, including foal age at weaning and social support.

## D22EQ-506

### Examining Roughage Availability and Abnormal Horse Behavior

COLORADO STATE UNIVERSITY

**Projected Duration:** 1 Year

**Study Cost:** \$9,119

**SUMMARY:** Researchers will evaluate three feeding systems and availability of roughage to inform feeding management and reduce abnormal behaviors in horses kept in dry lots.

**DESCRIPTION:** Automatic hay boxes are a good feeding strategy for horses because they reduce food waste and provide scheduled feeding times throughout the day. However, limited availability of roughage due to timed feeding may be a factor in the development and prevalence of abnormal behaviors in horses. Offering free choice hay roughage that allows more natural feeding behavior could be the best option regarding horse health and welfare. Devices such as hay-nets/bags and slow-feeders can decrease food waste, increase the time horses spend consuming roughage, and may reduce undesirable behaviors. Researchers will evaluate the effect of three different hay feeders and availability of roughage on behaviors in horses in dry feed lots. Determining better feeding techniques would allow optimal feeding management that may minimize abnormal behaviors and provide better welfare conditions to horses kept in equine establishments.

## D22EQ-514

### Studying the Impact of Lighting on Stabled Horses

HARTPURY UNIVERSITY, UNITED KINGDOM

**Projected Duration:** 1 Year

**Study Cost:** \$9,824

**SUMMARY:** Researchers will study how different lighting systems affect the behavior, circadian rhythm (body clock) and well-being of stabled horses.

**DESCRIPTION:** Sleep is critical to the well-being of animals and can be greatly affected by the animal's environment. Little is known about how variations in lighting may interfere with sleep-wake cycles of stabled horses and if lighting impacts their sleep quality and, in turn, their overall health and behavior. Researchers will evaluate the impact of two lighting systems on the quality of sleep and circadian rhythm (body clock) in stabled horses. Findings will provide evidence-based data on how lighting systems may impact behavior and welfare in these animals. Data also will be used to inform further studies and strategies on how adjustments to stable lighting can promote healthy sleep patterns for horses, improving their day-to-day quality of life.

## D22EQ-516

### Evaluating the Effect of Touch in Human-Horse Interactions

UNIVERSITY OF GUELPH, CANADA

**Projected Duration:** 1 Year

**Study Cost:** \$9,800

**SUMMARY:** Researchers will investigate how therapy horses respond to touch by people to improve our awareness of the horse's experience and inform best practice guidelines for therapy horses.

**DESCRIPTION:** Studies show stroking and petting companion animals helps mitigate signs of stress, depression, pain and anxiety in humans. People with trauma frequently are drawn to animal-assisted interactions as part of their health and recovery process, providing opportunities to experience safe touch and connection with another being. However, little is known about the effects of these hands-on programs on the welfare of the therapy animals. Researchers will recruit volunteers to participate in animal-assisted interactions with horses. These sessions will involve approaching and touching horses or being approached and touched by horses. The team will collect data on behavioral and physiological responses, including heart rate monitoring, in both horses and humans. Findings will be used to inform best practices when working with horses and raise awareness of the horse's perspective in human-horse interactions. Horses deliver subtle messages through their body language and educating those who work with horses will not only improve the welfare of horses but also enhance the working relationship between horse and human, including in animal-assisted interaction programs.

## D22EQ-806

### Identifying Horses At Risk for Surgical Colic Complications

UNIVERSITY OF ILLINOIS

**Projected Duration:** 1 Year

**Study Cost:** \$10,800

**SUMMARY:** Researchers are searching for biomarkers to help identify horses at higher risk for surgical colic complications.

**DESCRIPTION:** Horses that require surgical treatment for colic are at risk for development of postoperative complications and death. Unfortunately, there are no objective tests that can reliably predict which horses are most likely to develop complications after surgery. Peritoneal fluid (PF) bathes the abdominal organs, and changes in the PF environment may play an important role in intestinal disease as well as post-operative complications. To explore this theory, researchers will study the PF's proteome – the complete set of proteins expressed within the fluid – in hopes of identifying specific proteins to distinguish between horses with colic due to strangulating intestinal disease and horses with colic due to non-strangulating intestinal disease, as well as proteins associated with post-operative complications. This pilot study is a first step toward development of an objective stall-side diagnostic test based on PF proteins. If successful, such tests would be valuable tools for equine veterinarians to better diagnose, prognosticate and ultimately treat horses with colic.



D22Z0-023

## Saving Diamondback Terrapins from Crab Trap Drowning

WILLIAM & MARY

**Projected Duration:** 1 Year

**Study Cost:** \$19,418

**SUMMARY:** Researchers will develop new release hatches for crab traps to curb the bycatch drowning of diamondback terrapins in coastal areas where turtle populations overlap with blue crab fisheries.

**DESCRIPTION:** The diamondback terrapin is a turtle that lives exclusively in tidal wetlands and estuaries along the Atlantic and Gulf coasts of North America. Throughout the species' range, the primary source of adult mortality is drowning in traps that are set to catch blue crabs. Both crabs and terrapins enter the traps, but because the traps are underwater, the terrapins cannot surface to breathe and they drown. To reduce the risk of turtle mortality, some states have strict size requirements on openings on crab traps. However, many crabbers feel the small openings also restrict the capture of large crabs, so regulations are largely ignored and terrapins continue to drown. To address this problem, researchers will look at a different strategy that will let the large crabs and terrapins into the traps, but will only let terrapins exit the traps. Similar to the excluder devices used for sea turtles in offshore shrimp fisheries, researchers will design and test a release hatch in the tops of the traps that only terrapins have the ability to open. If successful, this new device may save thousands of terrapins from needless drowning each year and promote turtle conservation in estuaries of North America.

D22Z0-031

## Studying the Sublethal Effects of Mercury on Coastal Wetland Birds

TEXAS A&M UNIVERSITY

**Projected Duration:** 2 Years

**Study Cost:** \$80,206

**SUMMARY:** Researchers will gauge the impact of sublethal, environmental mercury on coastal wetland bird health and reproduction.

**DESCRIPTION:** Coastal wetlands in the northern Gulf of Mexico, habitat to many species of conservation concern, have the highest mercury deposition rates in the United States. Mercury, unlike some other pollutants, is never removed from the environment and can disrupt physiological and neurological functions in animals. To learn more about the impacts of mercury exposure on wildlife health, researchers will study the health and reproductive behavior of three coastal wetland bird species in Texas – Wilson's plover, American oystercatcher and black skimmers. The team will analyze blood and feather samples to gauge mercury load and health. They also will evaluate how mercury affects the ability of parents to effectively incubate eggs, and later effects on chick health. Throughout the project, the team will work closely with the Gulf Coast Bird Observatory and the Gulf of Mexico Avian Monitoring Group. Findings will be shared with wildlife managers and health data modelers to implement mitigation and management approaches to reduce the impact of mercury contamination on wildlife health in threatened coastal wetland habitats.

D22Z0-046

## Assessing Health and Disease Risk in Coastal Wetland Snakes

UNIVERSITY OF GEORGIA

**Projected Duration:** 3 Years**Study Cost:** \$74,952

**SUMMARY:** Researchers will conduct a health assessment of snake species native to the coastal wetlands of the southeastern United States, including the prevalence of snake fungal disease, to inform conservation strategies.

**DESCRIPTION:** Snakes are important to coastal wetland ecosystem health. Ophidiomycosis, also known as snake fungal disease, is an emerging disease worldwide that is associated with skin abnormalities in wild snakes. However, little is known about how other disease-causing agents may worsen disease and increase mortality in affected snakes. Researchers will conduct a surveillance study to evaluate the overall health of snakes in the coastal wetlands in the southeastern United States. The team will test for multiple infectious agents, including the causative fungus of ophidiomycosis, and analyze blood samples to gauge the potential health impacts of infections with both single and multiple agents. Findings will expand our understanding of risk factors for infection and disease in snakes, including species-related, seasonal and environmental factors. The new data will inform development of snake conservation strategies, especially in fragile coastal wetlands and for imperiled species, mitigating the impacts of snake fungal disease and other pathogens on snake biodiversity.

D22Z0-054

## Assessing How Urbanization Affects River Otter Health

SMITHSONIAN ENVIRONMENTAL RESEARCH CENTER

**Projected Duration:** 2 Years**Study Cost:** \$73,592

**SUMMARY:** Researchers will examine the impact of urbanization on North American river otter health across tributaries of the Chesapeake Bay.

**DESCRIPTION:** In coastal areas around the world, human populations are substantially impacting the health of wildlife species and the coastal wetland ecosystems on which they depend. Researchers will study how cities along the shore of the Chesapeake Bay have changed the health and behavior of the North American river otter. As a keystone species consuming a wide variety of prey, the river otter is a key indicator of ecosystem health. The team will look at what the otters are eating, what parasites infect them and how they act in different rivers connecting the Chesapeake Bay, comparing areas that have different human population densities. Findings will help inform coastal conservation of river otters and other animals, as well as inform educational outreach programs in the surrounding communities. The researchers also will assemble a team of citizen scientists to assist with this work.

D22Z0-056

## Studying Long-Term Health and Management of White Ibis

UNIVERSITY OF GEORGIA

**Projected Duration:** 2 Years

**Study Cost:** \$61,822

**SUMMARY:** Researchers will study how urbanization affects the ecology and health of white ibis and potentially other coastal wetland bird species.

**DESCRIPTION:** The white ibis is one of the most abundant birds in south Florida, primarily found in the Everglades and along the coast. Historic wetland and coastal habitat deterioration has prompted the white ibis to increasingly adapt to urban environments. This species is in its early stages of urbanization, with its first urban colonies only recently established. It is not yet known how these urban breeding grounds might affect white ibises' long-term health and well-being. Researchers will monitor the nests and fledglings of both urban and natural colonies to better understand changes in ibis diet, movement and behavior and any resulting health challenges for urbanized birds. Findings will help inform conservation and management of white ibises and potentially other coastal wetland bird species expanding into urban areas.

D22Z0-059

## Understanding Disease Transmission in Bottlenose Dolphins

GEORGETOWN UNIVERSITY

**Projected Duration:** 2 Years

**Study Cost:** \$74,387

**SUMMARY:** Researchers will develop a modeling tool to better understand disease transmission and forecast future disease outbreaks in Atlantic bottlenose dolphins living in the Chesapeake Bay.

**DESCRIPTION:** During 2013-2015, bottlenose dolphins began stranding along the Atlantic Coast at a rate four-fold higher than average due to a morbillivirus outbreak. As bottlenose dolphins are top ocean predators, such mass mortality events can have drastic consequences to overall ecosystem health. Researchers will develop a model of key processes that drive infectious disease transmission in bottlenose dolphins, including social, migratory and demographic structures. This new tool will help researchers and wildlife managers forecast potential disease outbreaks and provide earlier intervention to save more animals. This approach also may help us understand how infectious disease might impact other migratory marine species and inform data collection to mitigate disease spread and promote conservation research in marine species.



D22Z0-308

## Assessing the Ecological Adverse Effects of Coal Ash

UNIVERSITY OF MARY WASHINGTON

Projected Duration: 2 Years

Study Cost: \$92,038

**SUMMARY:** Researchers will assess the impacts of coal ash repositories on freshwater wetlands and health risks to aquatic animals that live there.

**DESCRIPTION:** Coal ash (CA) is a major waste product produced in the United States and contains several water-soluble toxins, including cadmium, selenium, mercury, lead and arsenic. Contaminant-laced waters can enter the environment via runoff, permitted discharge, or accidental spills from storage ponds or landfills. Researchers will assess the presence and concentrations of contaminants in water and sediment samples from aquatic environments surrounding five Virginia CA facilities. The team will study the effects of these contaminants on aquatic invertebrates, including how these contaminants increase in concentration (bioaccumulate) in these animals and contamination impacts on multi-species habitats. Findings will help inform conservation and management of wetland-adjacent CA repositories across the United States and potentially in other coal-producing countries.

D22Z0-409

## Identifying Drivers of Fatal Infections in Southern Sea Otters

UNIVERSITY OF CALIFORNIA, DAVIS

Projected Duration: 2 Years

Study Cost: \$121,845

**SUMMARY:** This study is part of our fellowship program, established to support early career research scientists. The Fellow will study whether infection with different strains of the parasite *Sarcocystis neurona* leads to different disease severity in southern sea otters.

**DESCRIPTION:** The microscopic parasite *Sarcocystis neurona* poses a serious threat to sea otter health and conservation. Little is known as to why some sea otters infected with *S. neurona* die quickly after exposure, while others appear to experience little to no disease. To solve this problem, researchers will examine if infection with different strains of *S. neurona* leads to different disease severity in sea otters. The team will use this data to help develop an antibody test that they hope will be able to discriminate between exposure to strains that cause severe and benign infections in sea otters. Findings will fill in a knowledge gap on an important, but relatively understudied, cause of death in sea otters. The team hopes to identify factors that put sea otters at risk for deadly infection with *S. neurona*, and provide a valuable clinical tool to diagnose infections and better manage infected otters in rehabilitation facilities.

D22Z0-418

## Investigating Disease Outbreaks in Yellow-Eyed Penguins

MASSEY UNIVERSITY, NEW ZEALAND

**Projected Duration:** 2 Years

**Study Cost:** \$125,000

**SUMMARY:** This study is part of our fellowship program, established to support early career research scientists. The Fellow will use advanced genetic technologies to discover causative agents of severe disease and high mortality in yellow-eyed penguin chicks.

**DESCRIPTION:** The population of New Zealand's yellow-eyed penguins, also called hoiho, are predicted to become extinct from its mainland coastal habitat in the next 20-30 years, with disease a major factor leading to their decline. One disease causes painful oral lesions which make it difficult for chicks to feed, leading to substantial morbidity and mortality in pre-fledglings. In 2020 alone, more than half of the mainland population of chicks was affected and 30% perished from the disease. Although a bacteria has been inconsistently isolated from these lesions, it is suspected that an underlying viral pathogen is the causative agent. More recently, a new disease of unknown origin causing lung congestion was identified in very young chicks, resulting in additional losses of 44% of chicks less than one to two weeks of age in the 2020/21 breeding season. Researchers aim to identify causative pathogens responsible for these two diseases in hoiho. The team will use advanced genetic sequencing technology that also will help them evaluate immune system responses of penguins to further identify additional contributors to disease. Findings will help inform disease management strategies, including associated risk factors, in critically endangered hoiho and possibly other at-risk penguin species.

D22Z0-814

## Predicting Avian Cholera Risk for Coastal Wetland Birds

PURDUE UNIVERSITY

**Projected Duration:** 1 Year

**Study Cost:** \$10,800

**SUMMARY:** In this pilot study, researchers will develop a big data model to learn more about drivers of avian cholera outbreaks.

**DESCRIPTION:** Avian cholera causes mass die-offs of waterfowl and other bird species and may be a particular threat to endangered bird species that inhabit coastal wetlands. The precise drivers of avian cholera outbreaks are not known. However, evidence suggests disease outbreaks are seasonal and avian cholera is spread by certain carrier bird species. To better understand drivers of disease spread and outbreaks, researchers will analyze about 20 years of collected data from coastal ecosystems in the United States, including weather, avian cholera outbreak data points and the presence of different bird species in the area. This will allow the team to precisely identify seasonal conditions that drive avian cholera outbreaks as well as endangered bird species most at risk. Findings will be used to help predict and mitigate the risks of future avian cholera outbreaks. This project also will serve as a blueprint for studying bird diseases using big data, and to train promising new researchers in analysis of wildlife data.

D22Z0-818

## Studying Pollutant Exposure in White-Tailed Eagle

NORWEGIAN UNIVERSITY OF SCIENCE &amp; TECHNOLOGY, NORWAY

**Projected Duration:** 1 Year**Study Cost:** \$4,950

**SUMMARY:** In this pilot study, researchers will study how pollutant exposure affects the health and well-being of white-tailed eagles.

**DESCRIPTION:** All organisms are exposed daily to a cocktail of different manmade chemicals that can be toxic even at low doses. Some studies show measuring subtle changes in molecules called microRNAs can be used as early indicators of damage to the body. MicroRNAs are small molecules found in all our cells that act as the body's audit system for cellular communication. When this mechanism fails, cell processes are disrupted and can contribute to declining health and even serious disease. Researchers will study microRNAs in blood samples taken from white-tailed eagles to learn more about how toxic chemicals affect this top-of-the-food-chain raptor species. White-tailed eagles tend to accumulate toxic chemicals that are difficult to excrete. These chemicals get stuck in the eagles' bodies and can affect their immediate and long-term health. The team hopes findings from this study will provide scientists with a new tool to assess the health effects of chemical pollutants in raptors and other wild animals.

D22Z0-821

## Improving Seizure Monitoring and Diagnostics for California Sea Lions

STANFORD UNIVERSITY

**Projected Duration:** 1 Year**Study Cost:** \$10,800

**SUMMARY:** In this pilot study, researchers will attempt to improve seizure monitoring in California sea lions affected by domoic acid, a harmful marine toxin, by building a mechanism to monitor brain electrical activity.

**DESCRIPTION:** Hundreds of California sea lions are affected each year by domoic acid (DA), a naturally occurring toxin caused by off-shore algal blooms. Affected animals can suffer from seizures, memory loss, behavioral changes and structural brain damage. Unfortunately, currently available tools to diagnose, monitor and assess response to treatment for DA toxicosis have some significant draw backs. To address this issue, researchers will test the validity of using an electroencephalogram (EEG), a tool for interpreting electrical activity in the brain, to better assess the health status of sea lions with DA toxicosis during hospitalization. If successful, the team will use their data to develop a workable seizure monitoring tool for DA-affected sea lions in rehabilitation facilities. The team hopes EEG monitoring will allow for more accurate diagnosis of underlying conditions that may impact a sea lion's ability to function in the wild, as well as help monitor the animal's condition while in hospital. Researchers also hope this new tool will provide an objective metric to test whether new treatments for DA toxicity are effective in California sea lions and possibly other marine mammals.

D22Z0-822

## Identifying Threats to Endangered West Indian Manatee

ROSS UNIVERSITY, ST. KITTS

**Projected Duration:** 1 Year

**Study Cost:** \$10,800

**SUMMARY:** Researchers will determine causes of mortality in a subspecies of West Indian manatees to improve health and conservation of these endangered animals.

**DESCRIPTION:** West Indian manatees have an important role in regulating vegetation levels in coastal rivers, inlets, bays, marshes and estuaries. Once widespread throughout the Caribbean, the endangered Antillean subspecies is locally extinct in many previously inhabited areas, existing in small and scattered populations. Unfortunately, causes of manatee deaths in the region are not well documented, making it difficult to develop strategies to protect these marine mammals. Researchers will determine causes of mortality in manatees living in Puerto Rico, a relatively populated region of the Antillean manatees' range. The team will retrospectively review more than two decades of health data to provide a comprehensive view of factors that continue to threaten these mammals. Researchers also will conduct postmortem examinations, including laboratory tests for infectious diseases and parasites from collected samples. Findings will help establish how background health problems are impacting Antillean manatees and other subspecies to help guide management and conservation actions for these understudied and endangered marine mammals.

## Notes

Established in 1948, Morris Animal Foundation is dedicated to improving and protecting the health of animals through scientific innovation, education and inspiration. Our investment in research has yielded life-saving vaccines, new treatments for critical diseases, superior screening tests and advanced diagnostic tools. We respond to emerging animal health threats that endanger entire species and make new discoveries in basic animal biology to support applied research. With every study we fund – more than 2,940 to date – we strive to advance the science of veterinary medicine, honoring the founding principles of Dr. Mark L. Morris Sr. to benefit animals worldwide.

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