



2011-2012



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Cats

Health Successes for Cats

Cats hold a unique place in our hearts. Because so few organizations are supporting feline health research, Morris Animal Foundation's funding is absolutely critical to advancing feline health and welfare. Following are some recent highlights.

Identifying a Promising New Drug Therapy for Feline Oral Cancer: Oral squamous cell carcinoma is the third most common tumor in cats. Current treatments are ineffective or only effective when the disease is diagnosed early. Researchers have determined that a new class of drugs has anticancer effects on feline oral cancer cells and that these drugs have greater efficacy than traditional chemotherapy drugs. More clinical trial testing is needed, but these anticancer drugs may provide new therapies for cats suffering from this deadly cancer.

Addressing Infectious Diseases: Cytauxzoonosis is a tick-borne disease that until recently caused rapid death in all infected cats. Researchers evaluated how the disease spreads and determined that clinically healthy cats may still be able to spread the disease and that some unique parasitic strains are more pathogenic than others. This indicates that the parasite may be genetically adapting to cause less severe disease in pet cats. They also discovered that disease severity varies depending on the geographical location of the cat. The good news for cats and their owners is that owners can now be more confident that treatment will ensure their pet's survival.

Reducing Pain from Urinary Stones: Urinary stones cause painful, bloody urination and are a common problem in cats. About 5 percent of these stones are made of urate, a salt of uric acid. A University of Minnesota study showed that the stones can be managed through dietary and medicinal therapies. The findings may also be used to define abnormalities that lead to stone formation so that more effective therapies can be developed.

Learn more about feline health at www.Research4Cats.org.



CANCER

Examining a New Radiation Therapy for Feline Oral Cancer

Dr. Susan M. LaRue, Colorado State University, D09FE-003

Dr. Hiroto Yoshikawa, Colorado State University, Fellowship Training Grant, D10FE-405

Total Study Cost: \$145,001

Total Fellowship Training Grant Cost: \$109,562

Feline oral squamous cell carcinoma accounts for approximately 10 percent of all feline tumors. As this cancer progresses, it interferes with eating and drinking and decreases the cat's quality of life. Because surgery, chemotherapy and radiation therapy have a historically high failure rate, cats are often euthanized rather than treated. This study will evaluate a number of the biological characteristics of these tumors to help scientists understand why they fail to respond to traditional treatment. Researchers will then correlate these factors with treatment outcomes, including local tumor control and survival. Cats in the study will undergo stereotactic radiation therapy, a new approach that takes only one day and has minimal side effects. The treatment has not been evaluated for cats with oral cancer, although it looks promising for other feline tumors. This study will help develop more tumor-specific treatment options for cats suffering from this devastating disease.

CANCER

Assessing Potential Therapy for Feline Vaccine-Associated Cancers

Dr. Jessica Lawrence, University of Georgia, First Award Grant, D10FE-302

Total Study Cost: \$115,344

A feline vaccine-associated sarcoma (VAS) is a soft-tissue tumor that can develop after a cat has been vaccinated against such viruses as rabies or feline leukemia. The time from vaccination to tumor development can be as short as 4 weeks or as long as 10 years. A combination of surgery, radiation therapy and, occasionally, chemotherapy offers cats the best chance for long-term survival. Most cats remain cancer free for 10 to 32 months after treatment, but this type of cancer is almost always fatal. New treatments are needed. This study researches the efficacy of masitinib, a new drug that was recently approved in Europe for use in dogs, for targeting one of the mechanisms that leads to VAS formation in cats. The researchers will evaluate the drug's ability to sensitize in vitro feline VAS cells to radiation. If the study finds that the drug successfully increases the sensitivity of VAS cells to radiation, the findings will provide the foundation for subsequent clinical studies designed to identify optimal means of incorporating masitinib into the treatment of cats with VAS.



CANCER

Evaluating a New Therapy for Feline Oral Cancer

Dr. Elizabeth A. McNiel, Tufts University, D10FE-021

Total Study Cost: \$128,153

Feline oral squamous cell carcinoma is a common cancer affecting older cats. Prognosis is poor, even with aggressive treatment involving surgery, radiation therapy and chemotherapy. Most cats die due to progressive growth of the cancer in the mouth, which causes discomfort and interferes with eating, drinking and even breathing. The failure of conventional treatments to significantly improve health or prolong life in cats affected by this cancer underscores the importance of developing new strategies to treat the disease. One such approach involves targeting the tumor blood supply. The growth of a tumor is critically dependent upon its ability to develop blood vessels, a process called angiogenesis. This study will evaluate the effectiveness of a synthetic protein in preventing growth of tumor blood vessels. If effective, this protein could lead to better treatment for this often fatal cancer.

CANCER

Using Genetic Technology to Diagnose Cancer Types in Cats

Dr. Rachael Thomas, North Carolina State University, D10FE-007

Total Study Cost: \$143,439

Each year, as many as 22,000 cats in the U.S. develop sarcomas at the site of a vaccine or other injection. Because these injection site-associated sarcomas (ISASs) are typically more aggressive and prone to recurrence than spontaneous sarcomas that are not injection related, they often require more urgent and radical therapeutic intervention. Distinguishing between ISASs and non-ISASs is essential for optimizing clinical management and outcome for each patient, but at present there are no efficient and definitive means for diagnosis. This study uses state-of-the-art microarray-based technology to identify DNA-based markers that may provide more powerful diagnostic and prognostic tools for evaluating these tumors. These data will highlight cancer-associated gene defects as potential new therapeutic targets and will provide a wealth of comparative data that will advance feline molecular oncology studies.

“With your support, we hope to gain vital information combining a newly available target drug with radiation therapy on sarcoma cells grown in our laboratory.”

— Dr. Jessica Lawrence, University of Georgia

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GENETICS

Comparing Cat Breeds to Identify Genetic Reasons for Bone Disease

Dr. Bianca Haase, University of Sydney, Australia, D12FE-021

Total Study Cost: \$52,628

Scottish Fold and American Curl cat breeds are easily identified by their unusual ears, which are an inherited trait. Although Scottish Folds have forward-folding ears, American Curls have ears that curl toward the center of the back of the skull. In American Curls, only the ear cartilage is malformed, whereas Scottish Folds can suffer from bone malformations and crippling arthritis that greatly affects their long-term quality of life. Based on existing pedigree analyses, two independent gene mutations appear responsible for the folded ear. It is possible that both mutations have occurred in the same gene or in genes belonging to the same signaling pathway. Researchers will genotype cats from both breeds and identify the genes and chromosomal regions responsible for the folded-ear traits. The outcome of this study is of particular importance in understanding cartilage physiology, and it could provide new information regarding the much broader problem of osteoarthritis in these cats.

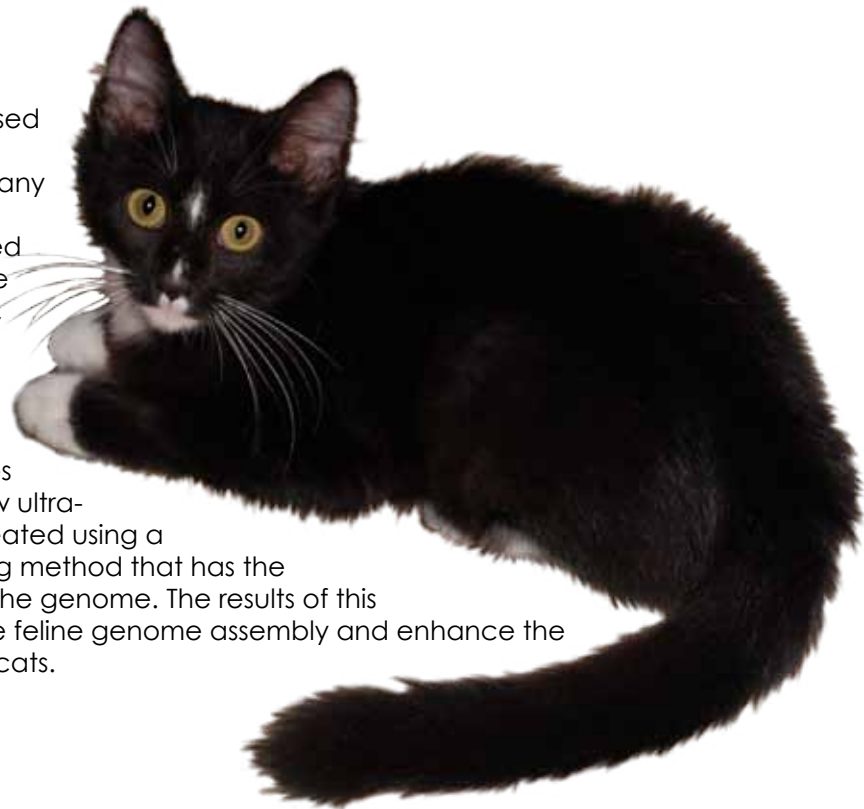
GENETICS

Improving the Feline Genome Assembly

Dr. William J. Murphy, Texas A&M University, D12FE-019

Total Study Cost: \$177,508

Recently, domestic cat genome maps and sequencing resources have been effectively used to map and identify more than a dozen genes that influence feline disease and coat color. Many of these studies have led to genetic tests, but large fractions of the genome are misassembled and disagree with previous maps. Resolving the location and structure of duplications is critical, as a growing body of literature suggests that these structurally unstable regions hold information about a large number of diseases. Researchers will work to improve the feline genome sequence assembly using approaches made possible with recent technologies. A new ultra-high-resolution radiation hybrid map will be created using a new-generation sequencing-based genotyping method that has the potential to map millions of sequences across the genome. The results of this study will significantly improve the quality of the feline genome assembly and enhance the tools scientists use to study genetic diseases in cats.





GENETICS

Understanding the Genetic Role miRNAs Play in Cancer

Dr. Thomas J. Rosol, Ohio State University, D12FE-015

Total Study Cost: \$170,974

Cancer is a leading cause of death in cats. Understanding the genetic basis of cancer is crucial for improving diagnosis, treatment and prevention. Small non-protein-coding RNAs, called microRNAs (miRNAs), have recently been implicated as having a major role in gene regulation and cancer development (as well as development of many other diseases) in humans. These miRNAs have widespread effects on gene regulation and expression and have been shown to have great potential for treatment and diagnosis. Researchers will identify feline miRNAs using genome-wide computational analyses and will sequence the expressed miRNAs using next-generation (deep) DNA-sequencing technology. This study will help improve understanding of the role miRNAs play in cat health.

HEART/CARDIOVASCULAR DISEASES

Evaluating Beta Blockers to Treat Heart Disease

Dr. Teresa C. DeFrancesco, North Carolina State University, D09FE-007

Total Study Cost: \$35,622

Heart disease usually strikes cats in the prime of their lives—around 4 to 6 years of age. Hypertrophic cardiomyopathy (HCM) is the most common type of feline heart disease. While some affected animals remain asymptomatic for life, others experience devastating complications, such as heart failure and life-threatening blood clots. Veterinary advances and owners' increased willingness to pursue diagnostic tests have helped identify more cats with asymptomatic HCM. These cats are usually treated with beta blockers, which are an effective treatment in humans. However, research into the long-term effects or benefits of this treatment in cats does not exist. Researchers will monitor cats undergoing treatment with the beta blocker atenolol to better determine whether early medical therapy improves the outcome for cats with asymptomatic HCM.

“ The chance to try a simple, natural, easily administered treatment that has the potential to help a lot of cats deal with a common and significant problem is a tremendous opportunity — an opportunity we have thanks to your support. ”
— Dr. Craig Webb, Colorado State University

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HEART/CARDIOVASCULAR DISEASES

Identifying Risk Factors for Heart Disease

Dr. Philip R. Fox, Animal Medical Center, D09FE-026

Total Study Cost: \$101,174

Hypertrophic cardiomyopathy (HCM) is the most common type of feline heart disease and the greatest cause of cardiovascular disease and death. Identification of clinical risk factors in humans has improved patient health and survival. Although HCM in cats is remarkably similar to HCM in people, clinical markers that could identify at-risk cats aren't available. Lack of this vital information inhibits efforts to develop effective preventive therapies. This study involves 27 board-certified cardiologists from 24 specialty hospitals throughout the country and is the first comprehensive, long-term clinical evaluation of HCM in cats. The team hopes to discover risk factors for HCM that could be used to improve patient care and increase survival.

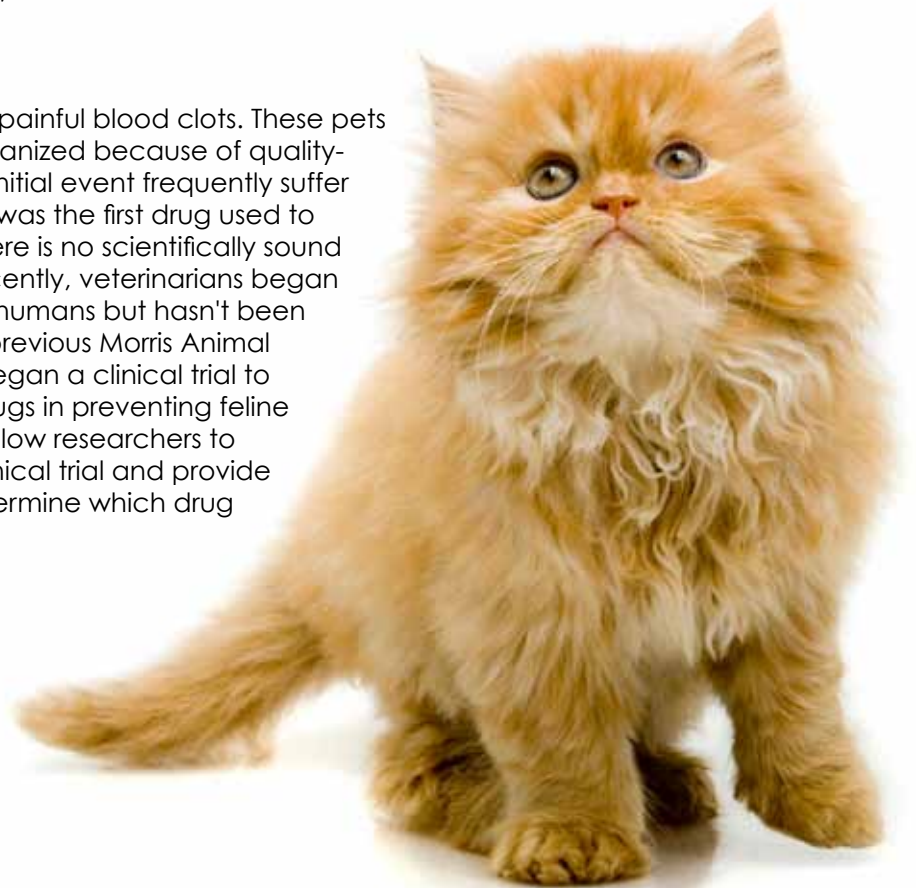
HEART/CARDIOVASCULAR DISEASES

Comparing Drugs that Prevent Blood Clots

Dr. Daniel F. Hogan, Purdue University, D09FE-001

Total Study Cost: \$49,679

Cats with heart disease often develop painful blood clots. These pets frequently die from the clot or are euthanized because of quality-of-life concerns. Those that survive an initial event frequently suffer a subsequent clotting episode. Aspirin was the first drug used to prevent clot recurrence in cats, but there is no scientifically sound research to prove its effectiveness. Recently, veterinarians began using clopidogrel, which is effective in humans but hasn't been tested in veterinary clinical trials. With previous Morris Animal Foundation funding, the researchers began a clinical trial to compare the effectiveness of these drugs in preventing feline blood clots. Funding for this study will allow researchers to enroll an additional 70 cats into the clinical trial and provide the clinical information needed to determine which drug works best.





INFECTIOUS DISEASES

Understanding Genetic Variations Predisposing Cats to FIP

Dr. Gary R. Whittaker, Cornell University, D10FE-511

Total Study Cost: \$129,328

Matching Funds Challenge

Feline infectious peritonitis (FIP) is a fatal, progressive and immune-augmented disease of cats that is particularly deadly in animal shelters. It is caused by a feline coronavirus (FCoV). FCoV infection is widespread in domestic, feral and nondomestic cat populations worldwide, and about 10 percent of FCoV-positive cats develop FIP. The disease tends to occur most frequently in cats younger than 2 years or, less commonly, in geriatric cats. Epidemiologic data suggest that a cat's genetic background contributes to the manifestation of FIP, but specific genetic determinants of these clinical outcomes have yet to be discovered. This study will evaluate the genetic factors predisposing cats to FIP—both from a viral and a host perspective. The ultimate outcome of this study will be to develop a diagnostic tool for preventing FIP outbreaks in shelter cats.

INFECTIOUS DISEASES

Identifying Genes to Create a Vaccine Against a Deadly Feline Parasite

Dr. Adam Birkenheuer, North Carolina State University, D12FE-026

Total Study Cost: \$119,380

Cytauxzoonosis is a life-threatening disease of domestic cats that is similar to malaria in humans. Without treatment, 97 percent of cats with cytauxzoonosis die, and even with the best available treatments, morbidity is extreme and mortality rates approach 40 percent. Regardless of the outcome, treatment can cost thousands of dollars. The geographic distribution of the parasite has spread rapidly since its discovery in the 1970s, and cytauxzoonosis has been diagnosed in 35 of the states in the continental United States. Researchers recently deciphered the *Cytauxzoon felis* genome sequence and identified about 4,300 protein-coding genes, each of which represents a possible protective antigen. They will now identify and prioritize which of these genes are the best vaccine candidates. This study is a critical first step in the development of a vaccine against this disease. Ultimately, researchers believe a successful *C. felis* vaccine will save the lives of thousands of cats and thereby save their owners from emotional and financial hardship. The project will also help train at least two DVM/PhD graduate students who are preparing for careers in animal health.

“ Because of your generosity, I was able to determine the cause of the respiratory disease outbreak that had been plaguing the Oklahoma City Animal Shelter for two years. There is no telling how many animals have been saved because of your support. ”

— Heather Wallace, Oklahoma State University

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INFECTIOUS DISEASES

Establishing Continuous Cultures of a Tick-Transmitted Parasite

Dr. Patricia J. Holman, Texas A&M University, D12FE-017

Total Study Cost: \$95,754

Cytauxzoon felis is a tick-transmitted parasite that causes rapid and frequently fatal disease in domestic cats. Bobcats are natural hosts, so they do not get sick from the parasite, but they can carry the infection, which is then transmitted by ticks to domestic cats. Diagnostic and treatment options are limited, and there is no vaccine to protect pets against this deadly parasite. In order to obtain parasites for research, at the present time experimentally infected or naturally infected cats must be used. Researchers will determine the optimal conditions needed to establish and maintain continuous in vitro cultures of *C. felis* blood-stage parasites. If successful, the availability of continuous cultures would help facilitate more studies on *C. felis* and help researchers find ways to prevent and cure this deadly disease.

INFECTIOUS DISEASES

Identifying Molecular Markers of Virulent Feline Calicivirus Infection

Dr. John S. Parker, Cornell University, D12FE-002

Total Study Cost: \$253,685

Feline calicivirus (FCV), a common viral disease that affects cats, causes upper respiratory symptoms, pneumonia and mouth sores. Despite increased vaccination rates, FCV remains a highly prevalent feline pathogen that causes significant morbidity and occasional death. The available vaccines protect against disease but not infection, and the most devastating type of the disease can still appear in cat populations. Researchers will examine the interaction between FCV and a cell surface receptor called feline junctional adhesion molecule A (fJAM-A). They suspect that newer, more virulent isolates of FCV undergo dramatic changes when they interact with fJAM-A and that these changes make the strains more efficient at infecting cats. The information from this study could help identify the virulent virus early so cats can be treated quickly.





INFECTIOUS DISEASES

Identifying Genetic Causes of Coronavirus and FIP

Dr. Yvonne Drechsler, Western University of Health Sciences, First Award Grant, D10FE-303

Total Study Cost: \$118,800

There are two types of feline coronavirus (FCoV), and an infected cat's prognosis depends on which type of virus infects the cat. Feline enteric coronavirus is more common and causes only mild gastrointestinal disease. Feline infectious peritonitis (FIP), however, which constitutes 10 percent of FCoV infections, spreads rapidly and can result in death, most frequently in young cats. Currently, no tests are available to determine if a cat is infected with FIP. Though little is known about what accounts for the difference in disease manifestation, the two types of FCoV are genetically very similar. Researchers will identify the genetic regions responsible for causing disease. This information will help in developing early diagnostic tools and will lay the foundation for developing better vaccines and treatment options for this disease.

INFECTIOUS DISEASES

Conducting Genetic Analysis of *Mycoplasma haemofelis*

Dr. Joanne B. Messick, Purdue University, D10FE-004

Total Study Cost: \$176,075

About 25 percent of all cats that are anemic or acutely ill are also infected with *Mycoplasma haemofelis*. This parasite has been widely studied in cats because of its role as a primary pathogen, its role as a cofactor in the development of retroviral and other diseases and its propensity to establish chronic infections despite antibiotic treatment. The objectives of this research are to analyze the genomic sequence of *M. haemofelis*, understand how this hemoplasma causes disease and provide new insights into the evolution of infectious mycoplasmas. The information gathered could provide valuable clues about the culture conditions needed to support hemoplasma growth in vitro, which to date has not been achieved, and would help scientists study how this parasite causes disease in cats.

“ One of the serendipitous benefits of the study and the generosity of the Morris Animal Foundation is that I firmly believe a number of cat owners who otherwise simply could not have afforded the important but expensive diagnostics involved in working up a cat with chronic diarrhea were able to do so because of their participation in this study. ”

— Dr. Craig Webb, Colorado State University

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METABOLIC DISORDERS

Testing a New Gene Therapy to Help Cats with Chronic Renal Failure

Dr. Brian Murphy, University of California–Davis, Pilot Study, D12FE-803

Total Study Cost: \$11,880

Chronic renal failure (CRF) is a common clinical problem in cats, and risk increases with age. Non-regenerative anemia is a serious and common complication of CRF that contributes significantly to the overall morbidity of cats with CRF. The most important cause of non-regenerative anemia appears to be deficiency of erythropoietin (EPO), a hormone produced by the kidney that prompts the bone marrow to form red blood cells. This EPO-dependent anemia contributes substantially to the clinical signs of weakness, lethargy and poor appetite encountered in cats with CRF. Researchers will use a feline immunodeficiency virus–based gene therapy system to express biologically active EPO in feline and human cells in vitro. If proven to be effective in laboratory tests, this viral vector system could be used as an effective method of treating CRF-affected cats with non-regenerative anemia.

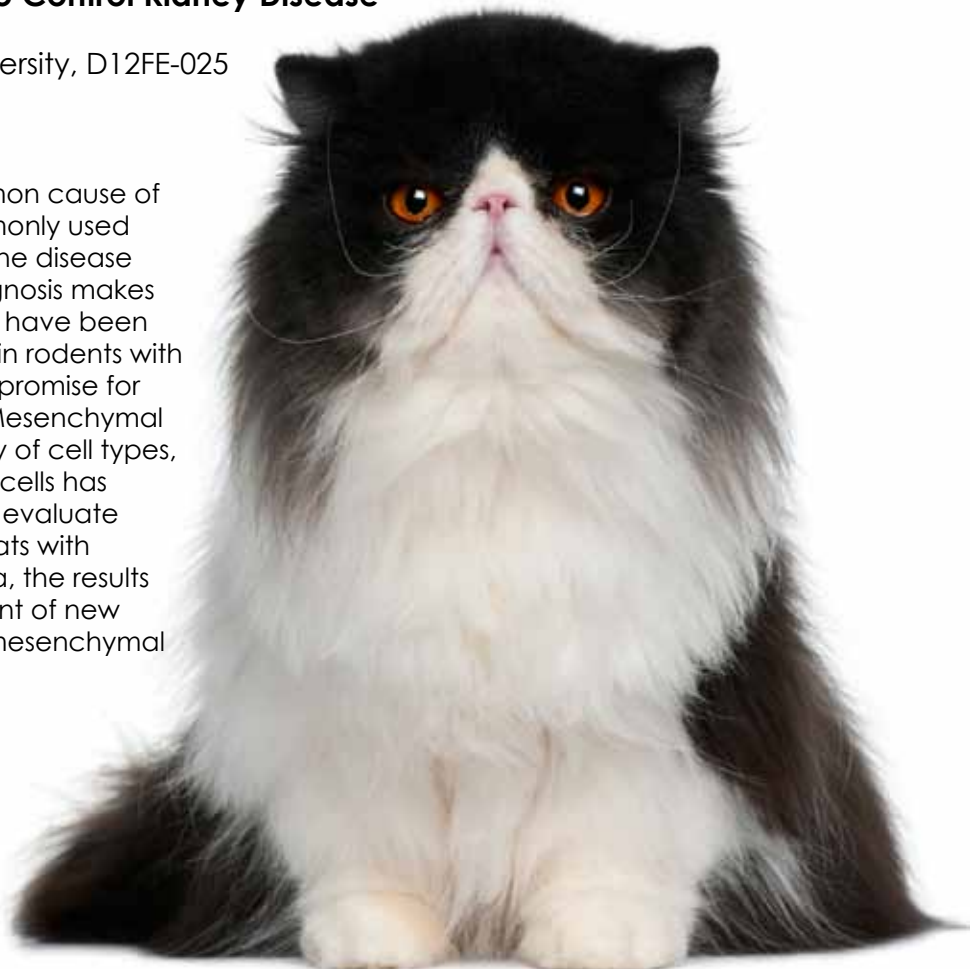
METABOLIC DISORDERS

Evaluating the Use of Stem Cells to Control Kidney Disease

Dr. Steven Dow, Colorado State University, D12FE-025

Total Study Cost: \$108,518

Chronic kidney disease (CKD) is a common cause of illness and death in cats, yet most commonly used diagnostic tests cannot reliably detect the disease until the advanced stages. This late diagnosis makes treatment challenging at best. Scientists have been testing mesenchymal stem-cell therapy in rodents with renal disease, and the treatments show promise for reversing or stabilizing kidney function. Mesenchymal stem cells can differentiate into a variety of cell types, and intravenous administration of these cells has been proven safe for cats. This study will evaluate the therapy's effectiveness in treating cats with CKD. If this study generates positive data, the results will significantly improve the development of new strategies to manage feline CKD using mesenchymal stem-cell therapy.





METABOLIC DISORDERS

Managing Diabetes and Liver Disease in Cats

Dr. Levent Dirikolu, University of Illinois, D10FE-028

Total Study Cost: \$79,713

Diabetes mellitus and hepatic lipidosis (fatty liver) are common medical problems in cats, and both diseases are associated with obesity. Overweight cats with diabetes or fatty liver disease need specific treatments for these potentially life-threatening disorders. Nonalcoholic fatty liver disease in people is similar in several ways to hepatic lipidosis in cats. Relatively new anti-diabetic drugs called thiazolidinediones (TZDs) have been shown to improve insulin sensitivity and reverse fatty changes in the liver, not only in people with diabetes but also in people with nonalcoholic fatty liver disease. Human TZDs, such as pioglitazone, may also be beneficial in treating feline diabetes and fatty liver disease. This study investigates the use of pioglitazone in cats, so that it can later be used for clinical trials in cats with diabetes mellitus and hepatic lipidosis.

METABOLIC DISORDERS

Treating Health Conditions in Obese Cats

Dr. Melissa Clark, University of Illinois, Pfizer Animal Health–Morris Animal Foundation Fellowship, D09FE-906

Total Fellowship Cost: \$176,000

Diabetes mellitus and hepatic lipidosis (fatty liver) are commonly encountered medical problems in cats. In humans, relatively new antidiabetic drugs called thiazolidinediones (TZDs) have been shown to improve insulin sensitivity and reverse fatty changes in the liver, not only in diabetics but also in people with fatty liver disease. As a fellow, this researcher participates in a clinical pharmacology residency/PhD program at the University of Illinois College of Veterinary Medicine that focuses on improving companion animal health and welfare. Specifically, her postdoctoral studies will focus on the treatment of obesity, diabetes and hepatic lipidosis in cats. She plans to seek certification from the American College of Veterinary Clinical Pathologists and ultimately wants to design and coordinate clinical trials that deliver new tools to veterinarians. Her previous research experience includes assessment of vaccine efficacy, fluid resuscitation and bone-graft healing.

“ I cannot thank you enough for giving us the opportunity to develop treatments that we hope will be available to all shelter cats once this study is published. ”

— Dr. Clive Phillips, University of Queensland

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METABOLIC DISORDERS

Determining Causes of Kidney Failure

Dr. Susan M. Bailey, Colorado State University, D09FE-002

Total Study Cost: \$93,166

Chronic renal failure (CRF), the most common feline kidney disease, primarily affects older cats. Although many factors may predispose a cat to CRF, the underlying cause is often unknown. Telomeres, which are the protective structures at the ends of chromosomes that are composed of DNA and proteins, may play a role. These structures shorten with age, eventually becoming too short to protect the chromosome. This process is called senescence, and preliminary evidence suggests that it contributes to human renal diseases. The condition may cause declines in kidney function in cats as well. This study investigates senescence as a cause of feline CRF. The findings may lead to new treatment strategies involving anti-senescence therapies.

OVERPOPULATION

Exploring Birth Control Options to Manage Cat Overpopulation

Dr. Cristina Gobello, National University of La Plata, Argentina, Pilot Study, D12FE-800

Total Study Cost: \$10,658

Cat overpopulation is a severe social and sanitary problem in many countries. Safe, efficient and practical pharmaceutical compounds are still needed to help control reproduction in felids. Researchers will evaluate the use of gonadotropin-releasing hormone (GnRH) analogs as a way to prevent female cats from getting pregnant. GnRH analogs are a group of medications that reduce the ovaries' production of estrogen and progesterone. In women, GnRH is used to induce temporary menopause. The researchers will conduct a randomized clinical trial to determine whether the drug is safe for cats and if it will postpone puberty. The results will contribute to the appropriate design of a large-scale study to further explore the hormone's effectiveness for controlling cat overpopulation. All the cats will be spayed at the end of the study and offered for adoption to students of the college.





OVERPOPULATION

Gauging Stakeholder Opinions on Feral Cats

Dr. Susan K. Jacobson, University of Florida, D12FE-016

Total Study Cost: \$53,407

There are an estimated 25 million to 50 million free-roaming and feral cats in the United States, and these cats are at risk for starvation, disease and injury. Debate over the practicality, humaneness and effectiveness of population-control methods has led to intense conflict, protests and distrust between population managers and stakeholders, including cat owners, cat feeders, animal activists, veterinarians, wildlife/bird associations and others affected by the growing feral cat populations. This study will evaluate public attitudes toward cats, tolerance for cats, preferences for management techniques and the role that individual values play in influencing these variables. This research could help identify areas for collaboration among vocal stakeholder groups and help develop humane and effective education and management campaigns to reduce feral and free-roaming community cats.

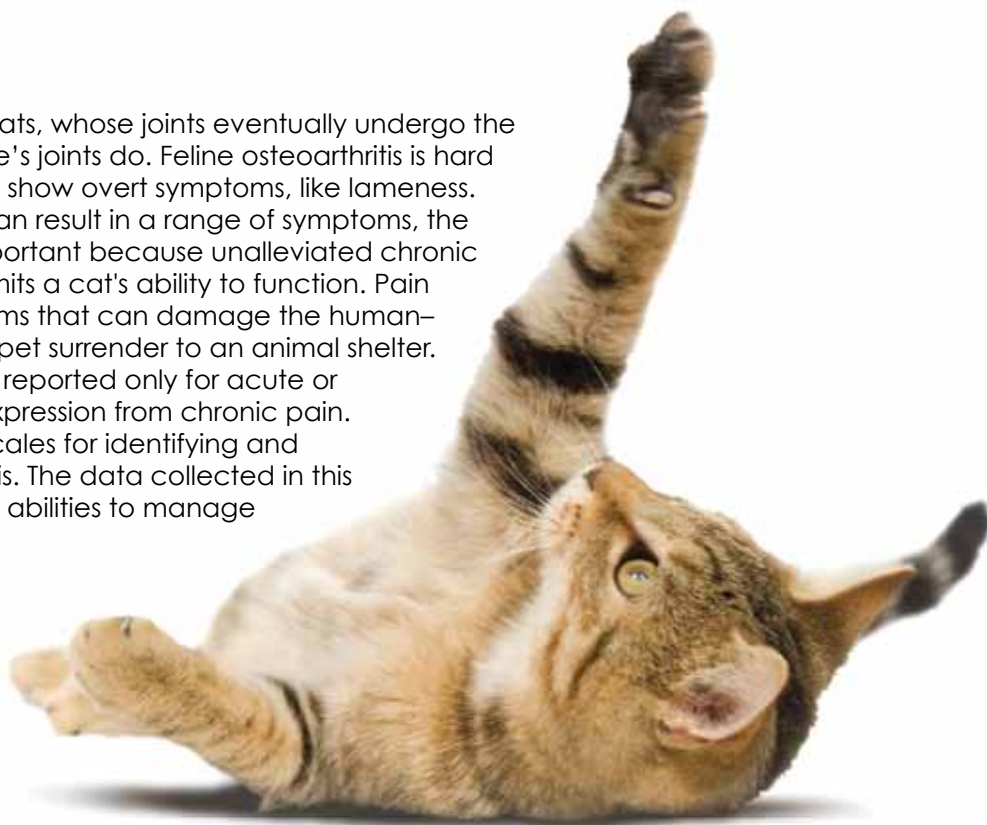
PAIN MANAGEMENT

Managing Chronic Pain in Cats with Osteoarthritis

Dr. Mary Klinck, University of Montreal, Canada, Pfizer Animal Health–Morris Animal Foundation Fellowship, D10FE-901

Total Fellowship Cost: \$176,000

Osteoarthritis is fairly common in older cats, whose joints eventually undergo the same degenerative process that people's joints do. Feline osteoarthritis is hard to diagnose, however, if the cat doesn't show overt symptoms, like lameness. This painful and progressive condition can result in a range of symptoms, the worst of which is chronic pain. This is important because unalleviated chronic pain presents a welfare concern and limits a cat's ability to function. Pain may also contribute to behavior problems that can damage the human–animal bond, resulting in euthanasia or pet surrender to an animal shelter. Validated evaluation scales have been reported only for acute or surgical feline pain, which differs in its expression from chronic pain. This study will produce validated pain scales for identifying and quantifying pain caused by osteoarthritis. The data collected in this study would contribute to veterinarians' abilities to manage pain effectively using these scales.



RESPIRATORY DISEASES

Evaluating Novel Treatments for Shelter Cats with Upper Respiratory Disease

Dr. Michael R. Lappin, Colorado State University, D10FE-518

Total Study Cost: \$70,150

Matching Funds Challenge

Upper respiratory tract disease (URTD) is expensive to treat and is a leading cause of euthanasia of cats in shelters. Feline herpesvirus 1 and feline calicivirus are the most common causes of URTD. Vaccines for these viruses lessen illness when the cats are exposed but do not block infection, which means exposed cats are infected for life and are susceptible to disease flare-ups. This study will test three novel treatment strategies on shelter cats that are suspected to have long-term viral URTD but fail to respond to conventional therapies. Previous studies indicate that each new treatment has the potential to lead to new standardized therapies.

RESPIRATORY DISEASES

Evaluating a Potential Cure for Feline Asthma

Dr. Carol R. Norris Reiner, University of Missouri, D09FE-022

Dr. Chee-Hoon Chang, University of Missouri, Fellowship Training Grant, D10FE-403

Total Study Cost: \$157,048

Total Fellowship Training Grant Cost: \$110,000

Feline asthma, which is caused by abnormal immune reactions to inhaled allergens, affects an estimated 1 to 5 percent of pet cats. Cats with asthma may cough, wheeze or have episodes of respiratory distress that can be debilitating or fatal. Current lifelong treatments are temporary solutions in controlling clinical signs and inflammation of the airways. The only potential cure is allergen-specific immunotherapy, also known as allergy shots. Great strides have been made to improve the safety and efficacy of allergy shots, but they take weeks to months to cure the problem. During that time, cats usually need concurrent care with steroids to control clinical symptoms and prevent disease progression. This study will determine whether concurrent use of steroids impairs the effectiveness of allergy shots in cats with asthma.

“ We appreciate your financial support as we are continuing to make advances in this novel diagnostic testing relevant for client-owned cats with naturally developing asthma. ”

— Dr. Carol Reiner, University of Missouri

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STOMACH/GASTROINTESTINAL DISORDERS

Testing Drugs for Treating Chronic Diarrhea

Dr. Jody L. Gookin, North Carolina State University, D08FE-040

Total Study Cost: \$148,739

Diarrhea can be a significant problem for cats, particularly those living in shelters. Diarrhea is commonly caused by *Tritrichomonas foetus*, an infectious pathogen that lives in the cat's colon and causes inflammation. Left untreated, infected cats can develop chronic diarrhea and remain infected for life. This study will use intestinal cell cultures to examine the mechanisms that cause infection and will test a number of common oral drugs that may be able to inhibit these mechanisms. Results of the study will likely identify novel targets for treating this chronic infection.

STRESS/WELFARE

Determining How Environment Affects Stress in Cats

Dr. Tony Buffington, Ohio State University, D09FE-502

Total Study Cost: \$420,608

Matching Funds Challenge

Entering a shelter is a frightening experience for most cats and results in a strong stress response. Chronic stress can lead to illness, making it less likely that the cat will be adopted into a new home and more likely that it will be euthanized. Improving the cage experience and increasing the safety and comfort of a cat's surroundings—from its arrival at the shelter to its adoption—may improve health outcomes. Researchers will determine whether changes in the cage environment reduce stress and will then use this information to create a training program to help shelter workers lessen stress in cats. This project will help decrease the number of days to adoption, the number of sick cats and the number of days cats are sick.

“ This is a very exciting and tremendously rewarding project to be a part of. I hope you can truly appreciate the impact your generosity has on the veterinary profession, our clients, and most importantly, those most mysterious and most loved of pets, our cats! ”

— Dr. Craig Webb, Colorado State University

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Dogs

Health Successes for Dogs

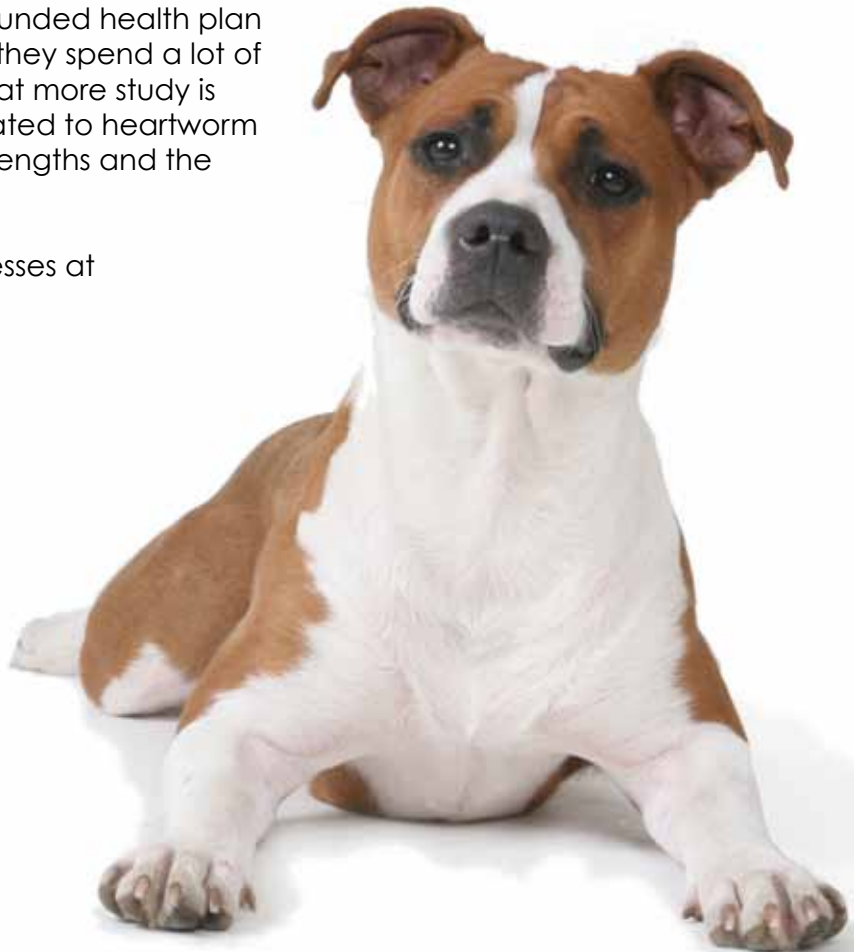
Dogs are members of the family. Because of this, Morris Animal Foundation has funded hundreds of studies since 1950 to help dogs live longer, healthier lives. Some recent highlights include the following.

Identifying the Most Effective Knee Surgery for Large Dogs: Cranial cruciate ligament disease results in partial or complete joint instability, pain and lameness. Two types of surgical treatments are commonly used to treat this condition in dogs: lateral fabellar suture and tibial plateau leveling osteotomy (TPLO). Researchers compared the two surgeries and determined that TPLO surgery is the more effective option for large and giant breed dogs.

Combating the Flu in Shelters: Scientists have struggled to find effective ways to diagnose canine influenza virus, a highly contagious respiratory infection in dogs that can lead to life-threatening pneumonia and even death. Researchers validated a diagnostic test that can differentiate antibodies made by infected dogs from those made in response to vaccination, therefore ensuring that infected dogs will be properly treated and managed. Although the test still hinges on the availability of a new vaccine that has yet to be released, it could also be useful for future epidemiologic studies of canine influenza infection.

Addressing Heartworm: A recent study showed that heartworm prevention is an important part of a well-rounded health plan for dogs in the Western states, especially if they spend a lot of time outside. The researchers also found that more study is needed to assess other notable factors related to heartworm vulnerability in dogs, such as varying coat lengths and the impact of elevation on infection rates.

Learn more about our canine health successes at www.MorrisAnimalFoundation.org.





BEHAVIOR

Identifying Factors Leading to Early Retirement of Guide and Service Dogs

Dr. James Serpell and Dr. Cynthia M. Otto, University of Pennsylvania, D08CA-504

Total Study Cost: \$288,886

Matching Funds Challenge

An estimated 20 percent of guide dogs retire early for a variety of medical and behavioral reasons. Sensitivity to stress may lead to chronic behavioral and health problems, which ultimately result in early retirement. A 2008 Morris Animal Foundation survey of more than 1,000 guide-dog handlers highlighted the need for more research into the factors that contribute to early retirement among guide dogs. In collaboration with three of the largest guide and assistance dog organizations in the United States, researchers will track the health, behavior and experiences of a group of working dogs from puppyhood through the early part of their working careers. Based on their findings, the team will identify factors that predict the development of health and behavioral problems that lead to early retirement of guide dogs.

BLOOD DISORDERS

Comparing Aspirin and Heparin in Treating Dogs with IMHA

Dr. David J. Polzin, University of Minnesota, D10CA-026

Total Study Cost: \$176,631

Immune-mediated hemolytic anemia (IMHA), a common form of severe anemia in dogs, is associated with high mortality rates. Many dogs die due to related blood clots. Investigators will expand their previous research on heparin therapy, which showed that individually adjusted heparin dosing was significantly better than standard-dose heparin therapy in reducing mortality. A recent retrospective study reported improved survival in dogs with IMHA that received low-dose aspirin therapy, which resulted in aspirin becoming standard therapy for dogs with IMHA. However, multiple studies comparing aspirin to heparin in humans have shown marginal to no benefit with aspirin as opposed to significant reduction in blood clots with heparin. Researchers will establish whether aspirin or individually adjusted heparin therapy is more effective in enhancing survival in dogs with IMHA.

“ I extend again my grateful appreciation for your support of, and interest in, this Purdue veterinary medicine study and to Morris Animal Foundation for their prioritization of funding for research of this disease. ”

— Dr. George Moore, Purdue University

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BONE/MUSCULOSKELETAL DISORDERS

Evaluating a New Cell Therapy for Osteoarthritis in Dogs

Dr. Thomas G. Koch, University of Guelph, Canada, First Award Grant, D12CA-313

Total Study Cost: \$117,717

An estimated 20 percent of adult dogs suffer from osteoarthritis. Many drug therapies are available, but some dogs do not respond to these medications or cannot tolerate them. One option would be to try to repair the connective tissue of the arthritic area, but cell therapies for connective tissue development need further exploration and validation before they are ready for mainstream clinical practice. This study will evaluate canine mesenchymal stromal-cell formulations for their effect on the immune system and ability to generate cartilage. Data gathered will contribute to a greater understanding of cellular reprogramming events and could be used to develop advanced treatments for repairing damaged tissue in dogs.

BONE/MUSCULOSKELETAL DISORDERS

Studying Genetic Association for Bone Disease in Weimaraners and Other Breeds

Dr. Noa Safra, University of California–Davis, Fellowship Training Grant, D10CA-404

Total Fellowship Training Grant Cost: \$110,000

Many breeds of rapidly growing large dogs, such as Weimaraners, Great Danes and Boxers, are affected at a young age by hypertrophic osteodystrophy (HOD), a painful bone disease that can cause lameness. Affected puppies may have several episodes of HOD, and the poor quality of life and high costs of hospitalization lead some owners to elect euthanasia. Identifying genetic markers associated with HOD could enable breeders to select against the disease. A prior genome-wide association study looked at HOD in Weimaraners, and this study will expand on that research by similarly genotyping 50 more Weimaraners and 30 Irish Setters with similar HOD presentations. Because HOD is an autoinflammatory disorder, characterizing its molecular basis has the potential to also contribute to the understanding of other autoinflammatory and autoimmune diseases in dogs.





BONE/MUSCULOSKELETAL DISORDERS

Determining the Best Treatment for Orthopedic Disorders

Dr. Ursula Krotscheck, Cornell University, First Award Grant, D09CA-303

Total Study Cost: \$100,080

One of the most common orthopedic problems in dogs is a fragmented coronoid process, which frequently causes forelimb lameness. This problem occurs when two of the three bones that compose the elbow joint grow unequally, causing a fracture when the elbow bears too much weight. The fragment is usually removed through surgery, but treated dogs often develop arthritis in the same area. This study compares the long-term outcomes of the commonly used surgical treatment with those of a newer surgery that may decrease progression of arthritis. The findings will help determine the ideal diagnostic and surgical procedure for treating a fragmented coronoid process and will thereby improve long-term quality of life for affected dogs.

BRAIN/NEUROLOGICAL DISORDERS

Developing Stem Cells to Treat Spinal Cord Injuries

Dr. Jose Cibelli, Michigan State University, D12CA-066

Total Study Cost: \$106,321

Up to 2 percent of the dogs admitted to the hospital arrive with spinal cord injury, and 77 percent of these injuries are due to intervertebral disc disease. Long-backed breeds, especially Dachshunds, have the highest incidence. Currently, there is no restorative treatment for canine spinal cord injuries. The use of induced pluripotent stem cells (iPSCs) offers a potential solution; however, efforts to establish a platform for canine iPSC generation, neural differentiation and cell transplantation have been limited. Previously, the researchers generated canine iPSCs from adult fibroblasts of a German Shorthair Pointer and derived canine neural stem cells from those cells. In this study, they will attempt to do the same with Dachshunds. If successful, the study could demonstrate that derivation of canine iPSCs and canine neural stem cells is feasible, thereby opening the window for studies into inherited central nervous system diseases in dogs.



BRAIN/NEUROLOGICAL DISORDERS

Mapping Genes Associated with Inflammatory Brain Disorder in Dogs

Dr. Renee M. Barber, University of Georgia, Fellowship Training Grant, D10CA-406

Total Fellowship Training Grant Cost: \$106,337

Necrotizing meningoencephalitis (NME) is an inflammatory disorder of the brain and its surrounding membranes that affects small, purebred dogs, including Pugs, Maltese and Chihuahuas. The cause of NME is unknown, and there is no way to definitively test for NME before death. NME has proven to be inherited within families of Pugs, which indicates that genetic factors play a role in its development. Researchers previously identified three regions of genetic difference that are associated with the development of NME in Pugs. This study will work to identify specific genetic mutations responsible for this disorder. The identification of genes associated with NME will improve understanding of the disease, allow for the development of DNA tests and potentially help in the development of more directed treatment strategies. Ultimately, DNA tests should allow for a dramatic reduction in the incidence of NME by changing breeding programs.

BRAIN/NEUROLOGICAL DISORDERS

Evaluating the Safety and Efficacy of a Drug to Control Epilepsy in Dogs

Dr. Dawn Merton Boothe, Auburn University, D10CA-060

Total Study Cost: \$40,948

Epilepsy is a serious, late-onset seizure disorder that affects a large number of breeds and usually requires lifelong treatment. Dogs often develop a tolerance to therapy, so increasingly higher doses of anticonvulsants are needed. Previous studies showed that levetiracetam (commercially known as Keppra), a human antiepileptic drug, is well tolerated by dogs, even at concentrations that exceed the maximum therapeutic range for humans. The drug also shows promise in controlling seizures. However, the half-life of levetiracetam is short in dogs. An extended-release Keppra product was recently approved for humans and may allow for twice- or once-daily dosing in dogs. This study will determine the efficacy of levetiracetam as a safe, convenient anticonvulsant drug that can be given to dogs in a single oral dose. These data should be directly applicable to canine epilepsy patients, allowing the use of levetiracetam as a sole anticonvulsant drug.

“Your donation and support of this project will have a positive effect on the quality of life for many dogs. I very much appreciate your support of this important project.”

— Dr. Brian Gilger, North Carolina State University

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BRAIN/NEUROLOGICAL DISORDERS

Treating Canine Paralysis with Stem Cells

Dr. Natasha J. Olby, North Carolina State University, D10CA-040

Total Study Cost: \$297,578

Most dogs who suffer from a severe spinal fracture that causes paralysis of the hind legs and loss of sensation will remain permanently paralyzed and unable to urinate. Numerous studies have shown that transplantation of a variety of cell types into an injured spinal cord is safe and can produce improvement. However, for the therapy to be clinically practical, transplantation of cells derived from the patient (autologous cells) is ideal, and combining different therapies is needed to improve the host regenerative response and survival as well as integration of transplanted cells. With the recent explosion of stem-cell therapy research, poorly controlled studies have resulted in contradictory results, making it unclear whether transplantation is effective. Investigators will compare the effect of three different therapies in chronically paraplegic dogs. This blinded clinical trial will rigorously compare a novel cellular transplantation therapy with different control groups. A positive result will provide a clinically applicable stem-cell therapy for chronic canine paralysis.

CANCER

Determining How Nutrition Plays a Key Role in Cancer

Dr. Anne C. Schmidt-Küntzel, Cheetah Conservation Fund, Namibia, Africa, Pilot Study, D12CA-800

Total Study Cost: \$11,360

Anatolian Shepherds are commonly used as guardian dogs for herding sheep and protecting animals. Anatolian Shepherds bred and placed with farmers in southern Africa have a high incidence of tongue cancer (squamous cell carcinoma). Preliminary data also suggest an increased incidence in mixed breeds in the same area, which indicates that the primary cause of tongue cancer is likely not breed specific and that predisposing factors such as exposure to ultraviolet radiation (high UV index) combined with poor nutrition could play a role. Nutrient deficiencies specific to working dogs in southern Africa may lower the dogs' ability to counteract damage caused by excessive UV exposure and increase their risk of developing tongue cancer. Researchers will test blood levels of livestock-guarding dogs in Namibia to identify predisposing factors for this cancer. This study will provide valuable data for the possible prevention of tongue cancer in all dogs by adjusting the diet to compensate for UV damage.



CANCER

Understanding the Role of Specific Cells in Lymphoma Spread

Dr. Daisuke Ito, University of Minnesota, First Award Grant, D12CA-302

Total Study Cost: \$118,800

Canine lymphoma accounts for up to 24 percent of all canine tumors and more than 80 percent of hematopoietic cell cancers. Diffuse large B-cell lymphoma is the most common type of lymphoma in dogs. Despite efforts to establish effective chemotherapy protocols, long-term remissions are rare, and the median survival time for dogs with high-grade tumors ranges from 6 to 11 months. New strategies are required to improve survival and attain cures. One of the limitations in identifying therapeutic targets for canine lymphoma has been the lack of reliable systems to maintain and expand lymphoma cells in the laboratory. Previously, the researcher created a culture system to maintain lymphoma cells in the laboratory. In this study, he will use this system to stimulate CD40, a protein found in B lymphocyte cells that help lymphoma cells spread, and learn more about its signaling pathway. The findings may highlight novel targets for developing therapies to treat diffuse large B-cell lymphoma in dogs.

CANCER

Identifying the Genetic Landscape of Soft-Tissue Sarcomas

Dr. Marlene Hauck, North Carolina State University, D12CA-071

Total Study Cost: \$113,822

Advances in next-generation gene-sequencing technology, known as deep sequencing, permit scientists to identify mutations that drive abnormal growth within a given tumor and to determine the critical pathways involved. Researchers will perform deep sequencing in 50 canine soft-tissue sarcomas and 10 unique, healthy, early-passage cells that are found in connective tissue. The researchers anticipate that they will discover about 80 genetic mutations per tumor, of which fewer than 15 will be driver mutations that are common between tumors. The number of critical pathways determined in each tumor is also likely to be fewer than 15. This information could increase understanding of soft-tissue sarcoma development and lead to novel treatments for this cancer in dogs as drugs are identified or developed to target these common mutations or pathways.

“Your contribution is much appreciated and very important in advancing the mission of the Morris Animal Foundation in general and our work in particular.”

— Dr. Mark Rutherford, University of Minnesota

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CANCER

Establishing the Effective Dose of a New Antitumor Drug

Dr. William C. Kisseberth, Ohio State University, D12CA-061

Total Study Cost: \$182,893

Cancer is a leading cause of disease-related death in dogs and kills nearly 50 percent of dogs over the age of 10. Certain breeds are predisposed to certain cancers. Mast cell tumors, for example, are particularly common in Labrador and Golden Retrievers, Boxers, Staffordshire Terriers and Shar-Peis. Breeds predisposed to developing lymphoma include Golden Retrievers, Boxers, Rottweilers, Cocker Spaniels and others. Histone deacetylase inhibitors are a new class of antitumor drugs being developed for cancer treatment. The researchers have been conducting preclinical studies of a new histone deacetylase inhibitor known as AR-42 for the past five years. AR-42 has shown significant antitumor activity against a variety of canine tumor cell lines and malignant canine mast cells. The researchers will work to identify the maximum oral dose of AR-42 for dogs with mast cell tumors and lymphoma. If successful, this drug could be developed further for veterinary use.

CANCER

Evaluating a Novel Drug for Lymphoma

Dr. Barbara Biller, Colorado State University, D12CA-033

Total Study Cost: \$104,695

Lymphoma is one of the most common cancers of dogs, accounting for an estimated 25 percent of all canine cancers. More than 8 percent of dogs die of the disease within 2 years because chemoresistance develops. Although all types of dogs can be affected, certain breeds, such as Boxers, Rottweilers, Golden Retrievers and Cocker Spaniels, appear to be at greater risk. The researchers will investigate a modified antibody (IMMU-114) that effectively kills canine lymphoma cells but does not appear to result in serious side effects when administered to healthy dogs. They will work to find the best dosage and evaluate its safety and effectiveness in dogs with B-cell lymphoma. If successful, this research might provide a new treatment option for owners of dogs that develop this type of lymphoma. This antibody might also be effective in the treatment of malignant histiocytosis, a cancer commonly found in Bernese Mountain Dogs. Therefore, a secondary aim of this project will be to conduct preliminary studies to determine if IMMU-114 could be effective in treating this aggressive disease.

“ Over the past year of work, made possible by your generous support through the Morris Animal Foundation, we have been able to unravel some of the derangements that contribute to hemangiosarcoma cell proliferation. ”

— Dr. Stuart Helfand, Oregon State University

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CANCER

Developing a New Delivery System for Lymphoma Treatment

Dr. Nicola Mason, University of Pennsylvania, D12CA-026

Total Study Cost: \$119,380

Blood cell lymphomas affect about 30 of every 100,000 dogs. Current treatment consists of a combination of cytotoxic drugs that induce remission in about 75 percent of patients. However, most dogs relapse within six to nine months of diagnosis. In human medicine, rituximab, an antibody-targeting drug, has substantially improved survival times for people with various types of B-cell lymphoma. Rituximab cannot be used in dogs, however, because it is a foreign protein and will therefore be rapidly destroyed by the dog's immune system. Furthermore, rituximab does not recognize or bind to canine B cells. The researchers in this study will use a novel system to develop a canine-derived antibody fragment similar to rituximab that will recognize canine cancer cells and can be used repeatedly in dogs to specifically target B cells. Development of such a canine-derived antibody fragment may then allow targeted delivery of cytotoxic agents to the malignant B cells, thereby allowing for increased chemotherapy doses, reduced side effects and improved outcome for dogs with B cell lymphoma.

CANCER

MADGiC: Making Advanced Discoveries in Golden Cancers

Dr. Jaime F. Modiano, University of Minnesota; Dr. Matthew Breen, North Carolina State University; and Dr. Kerstin Lindblad-Toh, Uppsala University, Sweden, D10CA-501

Total Study Cost: \$1,109,688

Golden Retrievers have been one of the most popular breeds in America for decades, but unfortunately these dogs also have one of the highest incidences of cancer. Hemangiosarcoma and lymphoma account for more than 30 percent of the deaths in this breed. Although breed susceptibility to cancer was first reported 30 years ago, the relationship between inherited traits and susceptibility for these cancers is still not known. The Golden Retriever Foundation and Morris Animal Foundation are funding this study to discover and characterize heritable and somatic cancer mutations in Golden Retrievers. The three-year project will examine genetic traits that contribute to risk and progression of hemangiosarcoma and lymphoma in Golden Retrievers. The long-term goal is to understand what causes these diseases. Because both cancers occur with such high frequency, reducing their incidence (while retaining the positive phenotypes of the breed) will be a complex task, but the development of reliable genetic tests would allow breeders to build programs whereby high-risk combinations of factors could be avoided. In addition, effective strategies could be developed to control and treat hemangiosarcoma and lymphoma in Golden Retrievers and other dogs.





CANCER

Using Human Diagnostic Tools to Identify Liver Cancers

Dr. Elizabeth A. Ballegeer, Michigan State University, First Award Grant, D10CA-316

Total Study Cost: \$115,687

Thoroughly evaluating masses in the canine liver presents a diagnostic challenge. It requires invasive diagnostic techniques, such as biopsy and fine-needle aspiration, that are sometimes effective but usually don't completely show microscopic changes in liver masses. Imaging is particularly relevant in the diagnostic evaluation of the canine liver. This study will examine a radioactive drug used to diagnose human cancer combined with both positron emission tomography and computed tomography to determine whether this noninvasive technique can help diagnose liver disease and expedite therapeutic intervention in dogs. Results from this study will contribute to the little information known about the use of this particular form of imaging in diagnosing and prescribing treatment for canine liver cancers.

CANCER

Evaluating Cyclopamine as a Therapy for Canine Bone Cancer

Dr. Heather M. Wilson, Texas A&M University, First Award Grant, D10CA-308

Total Study Cost: \$67,521

Cancer arises from a single mutated cell possessing the power to replicate, expand and eventually form a tumor. There are many theories as to what causes and prompts progression of this process. One theory states that a cell with stem cell capabilities divides to produce new tumor-initiating cells and daughter cells. Identifying pathways that can increase sensitivity of these cells to therapeutic intervention is paramount to finding a cure for bone cancer. Cyclopamine, a chemical found in the corn lily plant, inhibits the Sonic Hedgehog pathway, which is responsible for normal embryo development and for maintaining adult stem cells and directing the regeneration of tissues. This study will research cyclopamine's effectiveness at inhibiting tumor-initiating cells in canine osteosarcoma cell lines. The goal is to provide a new targeted therapy for pets with osteosarcoma.

“ Thank you for your kind and generous donation to the Morris Animal Foundation in support of our ongoing research looking at therapies for canine lymphoma. ”

— Dr. Laura Garrett, University of Illinois

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CANCER

Evaluating a Potential Drug for Treating Malignant Tumors

Dr. Jacqueline M. Wypij, University of Illinois, D10CA-064

Total Study Cost: \$11,880

Malignant histiocytic cancers (histiocytic sarcoma and malignant histiocytosis) appear to be increasing in dogs. Bernese Mountain Dogs, Flat-coated Retrievers and Rottweilers seem to have an increased risk, although any breed can be affected. Despite current treatment options, these tumors are locally aggressive, are highly metastatic and spread widely throughout the body. Nearly all cases end in death. The drug rapamycin targets a protein that regulates cell growth. Rapamycin exhibits antibiotic, immunosuppressive and antifungal properties and, in canine cancer cases, offers antineoplastic effects against melanoma and osteosarcoma in vitro. The drug is currently being evaluated in another Morris Animal Foundation-funded clinical trial for treating osteosarcoma in dogs. Rapamycin may also be a novel therapy for sensitive malignant histiocytic tumors. Data obtained in this study will support future clinical trials in dogs with histiocytic sarcoma and malignant histiocytosis and will potentially identify differences in high-risk breeds. In addition, this research study will provide training for an undergraduate student.

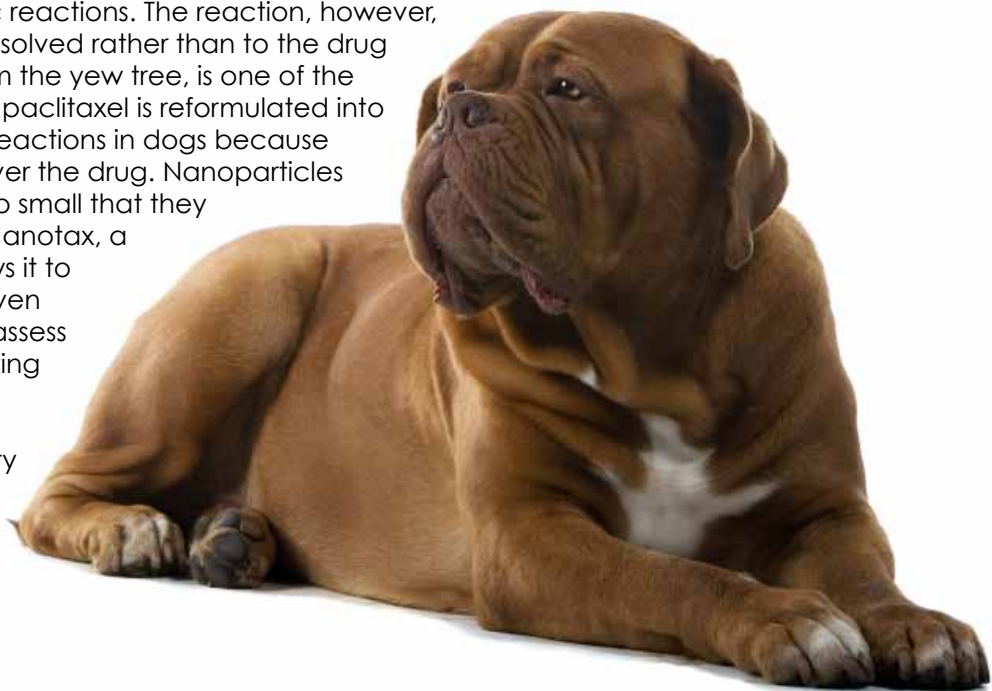
CANCER

Conducting a Clinical Trial of Nanoparticle Paclitaxel in Dogs with Tumors

Dr. Kimberly A. Selting, University of Missouri, D10CA-047

Total Study Cost: \$87,573

Many treatments for cancer work well in both humans and animals, yet taxane chemotherapy is too toxic for dogs and causes massive allergic reactions. The reaction, however, is to the liquid in which the drug is dissolved rather than to the drug itself. Paclitaxel, which is derived from the yew tree, is one of the most active drugs in this class. When paclitaxel is reformulated into nanoparticles, it is unlikely to cause reactions in dogs because the toxic liquid is not needed to deliver the drug. Nanoparticles also have the advantage of being so small that they are easily taken up in cancer cells. Nanotax, a reformulation of paclitaxel that allows it to be mixed with water, is safe when given intravenously to dogs. This study will assess whether Nanotax works well for treating canine tumors. If proven effective, Nanotax could be a new treatment option that would improve the quality and length of life for companion animals.





CANCER

Enhancing Drug Treatment of Bladder Cancer

Dr. Carolyn J. Henry, University of Missouri, D10CA-044

Total Study Cost: \$134,169

Transitional cell carcinoma (TCC) is the most common form of bladder cancer in dogs. Breeds at increased risk for TCC include Scottish Terriers, West Highland White Terriers, Shetland Sheepdogs, Beagles, Collies and Airedale Terriers. By the time it is diagnosed in canine patients, TCC is usually invasive and has advanced to the point that local therapies are ineffective. A combination of cisplatin, a chemotherapy drug, and piroxicam, a nonsteroidal anti-inflammatory drug, has provided the best response rates to date; however, this treatment often leads to kidney failure and other dose-limiting complications. This study will test the ability of the drug Tavocept to reduce chemotherapy-induced side effects such as kidney failure. The goal of the study is to enhance veterinarians' ability to safely and effectively treat canine bladder cancer.

CANCER

Evaluating a Therapeutic Target for Canine Soft-Tissue Sarcomas

Dr. Marlene Hauck, North Carolina State University, D10CA-023

Total Study Cost: \$96,347

One common reason treatment of canine soft-tissue sarcomas fails is tumor hypoxia, or low oxygen levels in the tumor. Heat shock proteins are a class of molecules that are known to be overexpressed in cancer cells. Preliminary data suggest that overexpression of a specific protein, HSP70, may be responsible for mediating the hypoxia-induced resistance to chemotherapy, but this protein is only beginning to be understood. HSP70 is an attractive therapeutic target, as it is not expressed in normal tissues. Researchers will evaluate the effects of HSP70 inhibition on programmed cell death, metastasis and the sensitivity of tumor cells to radiation and chemotherapy. Ultimately, this type of treatment may allow individualized treatment of a patient's tumor based on specific genetic changes and should lead to better treatment response for canine cancer patients.

“Your support is sincerely appreciated by the researchers and scientists dedicated to finding ways to prevent, treat, and cure cancer in companion animals and, most importantly, by those animals who benefit from these studies.”

— Dr. Cheryl London, Ohio State University

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CANCER

Determining the Correct Dosing for a Novel Drug to Treat Canine Lymphoma

Dr. Alfred M. Legendre, University of Tennessee, D10CA-002

Total Study Cost: \$59,400

Lymphoma is a common tumor of the lymph nodes of dogs that is rarely cured because the tumor becomes resistant to chemotherapy. AD 198 is a new anthracycline drug that is similar to doxorubicin, which is used in chemotherapy. Though very effective, doxorubicin causes heart toxicity, which limits the total amount that can be safely given. AD 198 shows promise in treating lymphomas that are resistant to doxorubicin, and it does not produce heart toxicity. An injectable formulation of AD 198 has been developed and evaluated in healthy dogs. This study will determine the best dose for dogs with lymphoma, and researchers will study how well AD 198 affects cancer cells so that an alternative treatment option can be available to owners and veterinarians.

CANCER

Identifying Genetic Factors of Bone Cancer

Dr. Joelle M. Fenger, Ohio State University, Fellowship Training Grant, D09CA-402

Total Fellowship Training Grant Cost: \$101,715

Bone cancer, or osteosarcoma, is a relatively common disease in large and giant breed dogs and a leading cause of death in some breeds, such as Greyhounds and Rottweilers. MicroRNAs (miRNAs) are small non-protein-coding RNAs involved in the initiation and progression of cancer in humans. Researchers will use a new genetic tool developed to determine which miRNAs are expressed in canine osteosarcoma cell lines and tumors. They will also try to identify the miRNAs associated with specific breeds, those associated with an individual dog's prognosis and survival and those identified as targets for developing new treatments for this painful disease.





CANCER

Developing a Better Diagnostic Tool for Brain Tumors

Dr. Annie V. Chen, Washington State University, First Award Grant, D09CA-308

Total Study Cost: \$71,793

A substantial number of dogs are diagnosed with brain tumors each year. Magnetic resonance imaging (MRI) is used to identify lesions in the brain, but it can't diagnose tumor type. Knowing the tumor type would help veterinarians provide owners with a more accurate prognosis so they can determine the best treatment. This study evaluates the effectiveness of an MRI-compatible, stereotactic brain-biopsy system in diagnosing dogs with brain lesions. If successful, this tool will provide a less invasive, more accurate diagnosis of canine brain tumors, allowing veterinarians to better treat affected dogs.

CANCER

Studying How Mast Cell Tumors Become Malignant

Dr. Cheryl A. London, Ohio State University, D09CA-060

Total Study Cost: \$68,211

Mast cell tumors are the most common skin tumor in dogs, and they are often fatal. Unfortunately, identifying the tumors likely to become malignant is challenging because little is known about how mast cells transform from benign to malignant. MicroRNAs (miRNAs) are small non-protein-coding RNAs involved in the initiation and progression of cancer in humans. Researchers will analyze expression of miRNAs associated with aggressive mast cell disease and begin to define how they may promote aggressive progression of tumors in dogs. This will help veterinarians better determine the prognosis for dogs with these tumors and more effectively treat them.

“ The clients that have enrolled in my study have all been very thankful to Morris Animal Foundation for providing the financial support for the clinical trial. Although having a brain tumor is inevitably terminal in most cases, owners are happy to get a definitive diagnosis and know how to follow up with the best therapy. ”

— Dr. Annie V. Chen-Allen, Washington State University

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CANCER

Improving Ability to Predict Cancer Spread

Dr. Marlene Hauck, North Carolina State University, D09CA-031

Total Study Cost: \$155,926

Soft-tissue sarcomas are common in dogs. While many are easily treated with local therapy, the disease spreads (metastasizes) and kills about one-third of affected dogs. Veterinarians can't reliably predict which dogs will develop metastasis, making it difficult for them to determine which dogs should receive chemotherapy and whether treatment is working. Researchers will compare gene and protein expression patterns of tumors that spread to those that don't spread and will use the information to develop a more reliable test for predicting metastasis. If successful, this test will help veterinarians improve canine cancer treatment and will also improve the overall understanding of this disease so that scientists can further study potential intervention therapies.

CANCER

Understanding How Bone Cancer Spreads

Dr. Dawn L. Duval, Colorado State University, D08CA-053

Total Study Cost: \$203,565

Large and giant dog breeds have high risk for osteosarcoma, a highly aggressive bone cancer that spreads (metastasizes) to the organs. Despite aggressive treatment with surgery followed by chemotherapy, many dogs survive less than one year after diagnosis because the cancer recurs in other bones or organs, particularly the lungs. Understanding the biological mechanisms that contribute to the disease's spread and resistance to standard therapy would help veterinary researchers develop tailored therapeutic approaches, identify new drug targets and identify common genetic features that contribute to the disease's ability to spread—all of which would help increase survival rates of dogs affected by this common cancer.

DENTAL

Using Iodine to Clean Canine Mouths

Dr. Gary S. Goldstein, University of Minnesota, D12CA-041

Total Study Cost: \$62,210

Plaque and tartar are typically observed in all dogs and cats treated at veterinary practices. A high percentage of these animals will have some degree of gingivitis and periodontitis. The precursor for tartar and gingivitis is plaque, which, if not prevented or treated, will lead to periodontal disease and result in the destruction of tissue, tooth loss and systemic infection. The researchers of this study will test whether use of molecular iodine once or twice per day will prevent plaque in dogs. They will also develop a delivery system that will release molecular iodine into drinking water as the dog drinks. If proven effective, this study could help reduce canine dental disease.



EYE DISORDERS

Identifying Genetic Mutations for Cataracts in Australian Shepherds

Dr. Sally Ricketts, Animal Health Trust, United Kingdom, First Award Grant, D10CA-303

Total Study Cost: \$62,193

Australian Shepherds depend heavily on their eyesight when herding stock animals such as cattle and sheep. Unfortunately, this breed has an increased risk of developing hereditary cataracts (HC), the most common eye disease leading to blindness in purebred dogs. This study investigates the genetic basis of HC in Australian Shepherds. Although recent studies have identified a mutation in the HSF4 gene that partially accounts for HC in this breed, about 10 percent of affected dogs do not carry this mutation. Furthermore, 15 percent of dogs reported to be clear of cataracts are carriers of this mutation. Consequently, the inability to accurately determine a dog's genetic risk for cataracts has led to difficulties for the breeding community. Researchers aim to identify additional genetic mutations that contribute to HC in Australian Shepherds by comparing the DNA of affected and unaffected dogs over 8 years old. If successful, the research could benefit Australian Shepherds and other breeds and could also help prevent this debilitating eye disorder.

EYE DISORDERS

Improving Outcomes of Cataract Surgery

Dr. Brian C. Gilger, North Carolina State University, D09CA-037

Total Study Cost: \$58,268

Cataract surgery is one of the most common ocular surgeries performed in dogs. While this surgery improves the quality of life for many dogs, others continue to have complications, such as persistent inflammation and development of cloudiness, or "after-cataract." Dogs often require long-term and frequent use of eye drop medications to help prevent complications. Researchers will determine the effectiveness of a novel method of releasing celecoxib, an anti-inflammatory medication shown to decrease ocular inflammation and prevent after-cataract. If successful, this unique method would provide sustained, effective therapy that doesn't require frequent eye drops. This postsurgical treatment option would greatly improve the success of cataract surgery in dogs.

“ We have made substantial progress on the project during the past year through your support. ”

— Dr. Samuel Black, University of Massachusetts

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GENETICS

Analyzing Causes of Behavioral Changes in Belgian Malinois

Dr. Anita M. Oberbauer, University of California–Davis, D12CA-054

Total Study Cost: \$201,454

Some Belgian Malinois may experience seizures and unpredictable behavioral changes, including eyes glazing over, a lack of response to environmental stimuli and a loss of behavioral inhibition characterized by such behaviors as owner-directed biting. Dogs with severe behavioral changes may be euthanized because of their threat to humans and other dogs. The researchers hope to identify a mutation in a neurotransmitter-related gene that may play an important role in seizures and extreme behaviors. Identifying dogs with this mutation would allow breeders to select against these traits and carefully target homes for puppies according to buyer background and experience. This breed is increasingly used in working environments that involve substantial interaction with the public, so a genetic test would provide an objective genetic measure that is strongly predictive of health and behavioral issues at early ages.

GENETICS

Understanding the Genetic Basis for Urinary Stones

Dr. Ned Patterson, University of Minnesota, D12CA-031

Total Study Cost: \$180,215

Urinary stones are common in dogs, especially in Miniature Schnauzers, which are 10 to 20 times more at risk than other breeds. Surgical removal of the stones is usually the only cure for this painful disease. Preventive measures are lacking and recurrence rates are high. Pedigree analysis of Miniature Schnauzers enrolled in a previous pilot study revealed substantial familial associations for urinary stones and high rates of the disease independent of diet or environment. These previous findings suggest that there may be an underlying genetic basis for urinary stones. The current study will evaluate the DNA from Miniature Schnauzers and seven other breeds at high risk for developing urinary stones: Yorkshire Terriers, Lhasa Apsos, Bichon Frises, Shih Tzus, Pomeranians, Malteses and Miniature Poodles. Researchers from the University Minnesota hope to identify a chromosome area associated with the disease trait with the goal of developing a genetic screening test for the disease. Results from this study will also help veterinarians select specific drugs or diets to prevent urinary stones in the breeds most prone.





HEART/CARDIOVASCULAR DISEASES

Developing a New Technique to Study Canine Heart Disease

Dr. Carla Lacerda, Colorado State University, First Award Grant, D12CA-309

Total Study Cost: \$118,800

Myxomatous mitral valve disease (MMVD) is the most prevalent heart disease in dogs, and it affects 5 to 7 million dogs in the United States alone. MMVD is the most common cause of heart failure in dogs, particularly older and small breed dogs. Currently, dogs receive pain management for heart failure, but there is no treatment for the disease itself. The mechanisms that initiate and cause MMVD are unknown, and a better understanding of the cellular and molecular mechanisms that cause degeneration in mitral valves could point to new therapies to slow or prevent MMVD. The researcher will test her hypothesis that inappropriate strain on the mitral valves causes proteins and other factors to kick start MMVD. Data collected from this study could yield critical new insights into the development of MMVD and validate a new model to study the disease process and identify new therapeutic strategies to slow progression of MMVD. Given the significance of canine MMVD, this new approach could substantially decrease suffering and death in aging and small breed dogs.

HEART/CARDIOVASCULAR DISEASES

Improving Monitoring of Dogs with Congestive Heart Failure

Dr. Craig G. Ruaux, Oregon State University, D10CA-034

Total Study Cost: \$56,543

Cavalier King Charles Spaniels and other toy breeds are commonly diagnosed with congestive heart failure. Veterinarians are increasingly measuring levels of two compounds found in dogs, NT-proBNP and cardiac troponin I, to diagnose and monitor congestive heart failure. Depending on the individual dog, these compounds can change from day to day. Researchers will define several values and establish clinically meaningful changes in levels of these two compounds. Then they will determine if these levels are lower in dogs with heart disease than in healthy dogs. If so, it would mean that veterinarians could use values derived from dogs with heart disease to monitor patients with heart disease, rather than relying on baseline values from healthy dogs. This study has the potential to modify the way in which these compounds are used to diagnose and monitor dogs with cardiac disease and could increase their usefulness for noninvasive monitoring.

“ It is greatly encouraging to us when someone else sees the interest and potential impact of our work. So thank you for the boost to our morale, as well as the financial support! ”

— Dr. Marlene Hauck, North Carolina State University

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HEART/CARDIOVASCULAR DISEASES

Understanding a Genetic Mutation that Causes Heart Defects in Golden Retrievers

Dr. Joshua A. Stern, Washington State University, Pfizer Animal Health–Morris Animal Foundation Fellowship, D09CA-909

Total Fellowship Cost: \$176,000

Subvalvular aortic stenosis, one of the more common heart malformations in dogs, is a congenital and inherited disease, but there is no way to test for the disease. This researcher will study the genetic mutation that causes the defect in Golden Retrievers. This fellowship creates a new position in the university's Veterinary Cardiac Genetics Laboratory, where the fellow will be mentored by a leading veterinary cardiologist. This opportunity will allow the fellow to pursue a career in veterinary cardiovascular research.

INFECTIOUS DISEASES

Using the Demographics of Dog Populations to Prevent Rabies

Dr. Darryn Knobel, University of Pretoria, South Africa, First Award Grant, D12CA-312

Total Study Cost: \$115,935

Rabies prevention and treatment in humans is costly, and the necessary resources are often scarce or inadequate, which leads to an inappropriate focus on dog culling in many countries. Rabies can be controlled, and in certain instances eradicated, by the mass vaccination of dogs against the virus. Demonstrating the effectiveness of this approach to authorities in developing countries where rabies is a problem is important to improve the uptake of dog vaccination and to discourage culling. Understanding the demographics of dog populations (in particular, rates of birth, death, and in- and out-migration) is essential in planning and implementing effective canine rabies vaccination campaigns. However, little is known about the dynamics of dog populations in developing countries, including those in sub-Saharan Africa, where canine rabies is endemic. The researcher will establish a Health and Demographic Surveillance System for Dogs in a rabies-infected area in South Africa and will use that system to better understand the demographics of the dog population. The aim is not only to improve rabies control through dog vaccination but also to create a platform that will be used to accurately measure rates of other diseases in the dog population, to identify determinants of dog health and welfare, and to rigorously assess interventions aimed at improving health and welfare.





INFECTIOUS DISEASES

Determining the Prevalence of Canine Influenza Virus in Shelter Dogs

Heidi L. Pecoraro, Colorado State University, Fellowship Training Grant, D10CA-401

Total Fellowship Training Grant Cost: \$52,864

Since it was first identified in 2004 as a cause of respiratory disease, canine influenza virus (CIV) has spread widely among dogs in the United States. The virus is transmitted in droplets created by coughing and sneezing. As a consequence, the highest incidence of CIV is found in dogs that are housed in groups, such as in shelters. Once CIV is introduced into a facility, it is difficult to break the cycle of infection. To better understand the cycle of transmission and to create effective CIV prevention and control strategies in shelters, this study will evaluate the prevalence of CIV infection to determine if CIV is contributing to continued infection in shelter dog populations. This research could potentially help shelters set new management operations to better protect dogs from contracting the disease.

INFECTIOUS DISEASES

Combating Canine Flu in Shelter Dogs

Dr. Gabriele A. Landolt, Colorado State University, D09CA-009

Total Study Cost: \$142,993

Canine influenza virus (CIV), commonly known as canine flu, causes a great deal of pain and suffering in dogs. The virus spreads through coughing, sneezing and close contact in closed environments. This makes CIV particularly damaging to dogs in shelters. Many shelters find it nearly impossible to rid their facilities of the disease once it is introduced. Researchers will learn more about how canine flu spreads among shelter dogs and will also determine whether there is a reliable patient-side test that could detect the virus during a dog's intake exam at a shelter. This would allow shelter managers to quarantine affected dogs and keep the virus from spreading to healthy animals. The information learned could also help promote the use of a vaccine for this emerging and common virus.

“Your kind gift allows us to study the epidemiology of canine influenza in humane shelters and improve the diagnosis for canine influenza virus infection in shelter dogs.”

— Dr. Gabriel Landolt, Colorado State University

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INFECTIOUS DISEASES

Improving Prevention of Leishmaniasis

Dr. Kevin Esch, Iowa State University, Pfizer Animal Health–Morris Animal Foundation Fellowship, D09CA-911

Total Fellowship Cost: \$176,000

Visceral leishmaniasis is a severe, generalized and often fatal infection. This researcher will study epidemiologic patterns of zoonotic diseases and ways in which public health policy may influence them. The fellowship will focus on the *Leishmania* parasite, which affects humans and dogs and is transmitted by a specific type of sand fly. Affected dogs may experience fatigue, weight loss, fever, skin lesions and lameness or stiffness. The fellow hopes to improve knowledge about geographic and demographic distribution of leishmaniasis and to improve its prevention and treatment in animals and people.

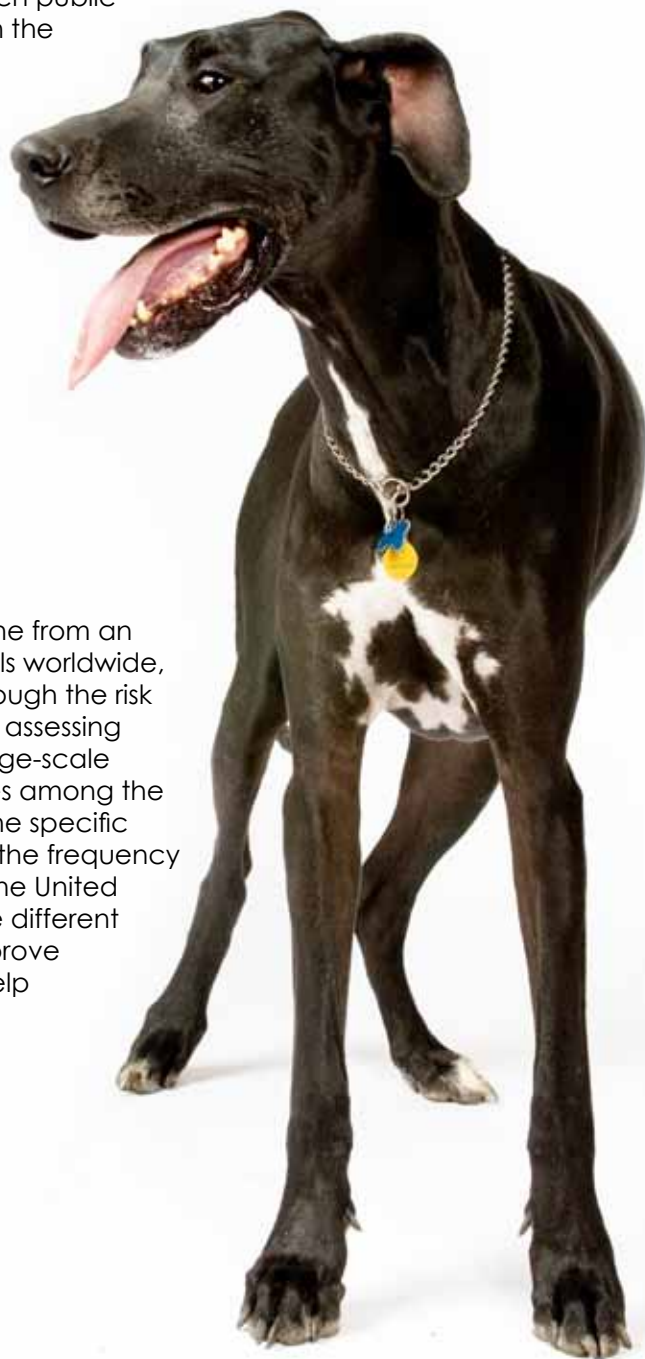
INFECTIOUS DISEASES

Assessing the Prevalence of Leptospirosis

Dr. George E. Moore, Purdue University, D08CA-500

Total Study Cost: \$188,258

Leptospirosis is a bacterial disease caused by exposure to urine from an infected animal, usually wildlife. It affects humans and animals worldwide, causing life-threatening kidney, liver and blood disease. Although the risk of infection in dogs may have increased in the past decade, assessing the prevalence of this disease is complicated by a lack of large-scale epidemiologic data, limitations of diagnostic tests, differences among the various strains of the bacteria and limited understanding of the specific immune response of infected dogs. This study will investigate the frequency and distribution of leptospirosis infection in dogs throughout the United States and will determine the molecular characteristics of the different bacteria strains. While the molecular information will help improve diagnostic tests and vaccines, the epidemiologic data will help manage the risk and spread of this deadly disease.





METABOLIC DISORDERS

Testing Noninvasive Techniques to Diagnose Kidney Disease in Dogs

Dr. Jessica Hokamp, Texas A&M University, Pfizer Animal Health–Morris Animal Foundation Fellowship, D12CA-903

Total Fellowship Cost: \$176,000

Chronic kidney disease (CKD), a common cause of morbidity and mortality in dogs, affects up to 15 percent of older dogs. Early treatment helps slow renal disease progression, but CKD often remains unrecognized until late in the disease process. Even when CKD is identified early, current noninvasive tests for renal dysfunction cannot identify the cause of disease or provide an accurate prognosis. The most accurate assessment of renal damage requires biopsy with histopathologic testing, but this is a relatively invasive procedure that requires general anesthesia, which excludes some patients because of health risks. This researcher will identify and validate less invasive diagnostic methods to detect renal disease earlier and to more effectively monitor its progression. It is hoped that, ultimately, this study will further the understanding of renal disease progression in dogs and lead to ways to counter its progression using noninvasive therapeutic interventions.

METABOLIC DISORDERS

Testing Higher Doses of a Drug to Combat Kidney Disease

Dr. Barrak M. Pressler, Ohio State University, D12CA-053

Total Study Cost: \$167,297

One in five dogs will develop kidney disease. By some estimates, in as many as 50 percent of canine patients with chronic renal failure, the underlying cause may be proteinuric glomerular diseases or urine protein excretion diseases. The mainstays of glomerular disease treatment in dogs and people are angiotensin-converting enzyme inhibitors such as enalapril. The beneficial effects of this class of drugs include reduction in urinary loss of proteins. Although there is an established dose of enalapril for dogs, recent studies in people suggest that higher doses may dramatically improve patient survival. This study will evaluate whether higher doses of enalapril in dogs would be more effective at reducing urine protein excretion. The results of this study may dramatically increase survival time of dogs with kidney disease secondary to or associated with excess urinary excretion of protein.

“ Without the steadfast support of individuals such as you and the Foundation, many projects would not be able to reach important milestones that can be transformational in our understanding of disease or in our ability to design better treatments. ”

— Aric Frantz, University of Minnesota

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METABOLIC DISORDERS

Studying the Effect of Cranberry Extract on Canine Urinary Tract Infections

Dr. Natasha J. Olby, North Carolina State University, D10CA-022

Total Study Cost: \$126,130

Thirty-eight percent of dogs develop a urinary tract infection between the first and sixth week after a spinal cord injury due to a disc herniation. Cranberries, in the form of extract or juice, are used widely in humans to reduce the incidence of urinary infections. Phytochemicals in cranberries reduce the ability of bacteria, particularly *Escherichia coli*, to adhere to the wall of the bladder, thus decreasing the chance of developing an infection. Researchers will determine whether this safe and inexpensive treatment can reduce the number of infections that dogs develop as they recover from a spinal cord injury. The results of this study could improve the quality of care in dogs with spinal cord injuries.

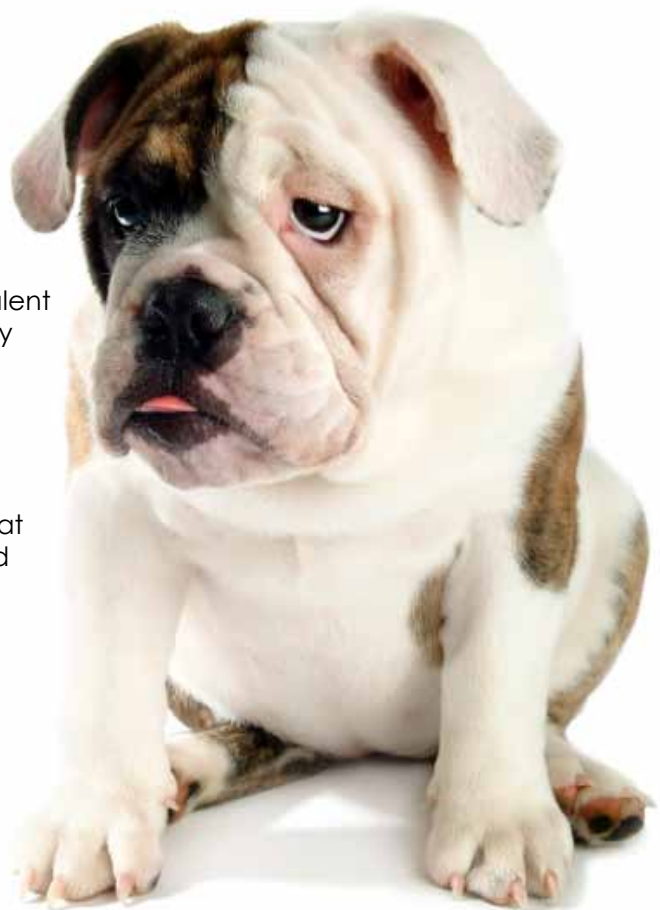
METABOLIC DISORDERS

Studying Tumors that Cause Cushing's Disease

Dr. Miriam J. Kool, University of Utrecht, Netherlands, Pfizer Animal Health–Morris Animal Foundation Fellowship, D09CA-913

Total Fellowship Cost: \$176,000

Cushing's disease is a condition that affects older dogs, and it is one of the most common canine endocrine disorders. It can be caused in most cases by a small, benign tumor in the pituitary gland or sometimes in the adrenal gland. Though more prevalent in some breeds, such as Dachshunds and terriers, any dog can contract Cushing's disease. Cushing's leads to excessive drinking, eating and urinating; lethargy; abdominal enlargement; panting; muscle weakness and recurrent urinary infections. This researcher will study adrenocortical tumors, which cause Cushing's disease. The fellow's project, which she will conduct at the University of Utrecht in the Netherlands, may lead to a better understanding of tumor pathogenesis.





METABOLIC DISORDERS

Testing a Drug for Preventing Urinary Tract Infections

Dr. Michael Wood, North Carolina State University, First Award Grant, D12CA-321

Total Study Cost: \$36,208

Approximately 14 percent of all dogs will develop a urinary tract infection (UTI) during their lifetime, and about 5 percent of these dogs will have recurrent infections. In recent years, an increase in antibiotic resistance has led to the need for new treatments, especially in patients prone to repeat infections. This study will evaluate a drug commonly used to treat arthritis in dogs for its ability to help block infection and prevent future UTIs. If the drug is proved successful, this study could have tremendous potential to change how veterinarians manage recurrent UTIs in dogs. It also has the potential to help owners prevent UTIs in their pets.

REGENERATIVE MEDICINE

Reprogramming Canine Stem Cells to Develop New Therapies

Dr. Deborah Guest, Animal Health Trust, United Kingdom, Pilot Study, D12CA-803

Total Study Cost: \$11,286

Dogs suffer from many orthopedic, neurological and cardiovascular injuries and diseases that could be treated with cell replacement therapies. One potential therapy is the use of induced pluripotent stem cells (iPSCs), which are artificially produced by reprogramming adult cells back to an embryonic state, thereby giving them the ability to grow indefinitely in culture and the potential to turn into any cell type. These iPSCs have enormous therapeutic potential because they can be used to grow genetically identical cells for use in transplantations without risk of being rejected by the dog's immune system. To date, iPSCs have been successfully derived from adult human, mouse, monkey, pig, horse and sheep cells, but little has been done in dogs. The researcher will determine the factors and culture conditions required to generate canine iPSCs. This study will form the basis of future work to further characterize iPSCs and determine their potential to be used therapeutically in dogs and as a novel tool for studying canine inherited diseases.

“ By having this funding available, we have made significant progress in addressing the important unanswered questions underlying the pathogenesis of inflammatory bowel disease in German Shepherds. ”

— Dr. Karin Allenspach, University of London

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STOMACH/GASTROINTESTINAL DISORDERS

Identifying the Cause of Emerging Gallbladder Disease in Dogs

Dr. Jody L. Gookin, North Carolina State University, D12CA-044

Total Study Cost: \$57,371

The gallbladder plays many important roles in digestive health and function, including storing and concentrating bile. Dogs can develop gallbladder mucocele, a condition in which the gallbladder slowly becomes obstructed or ruptures after a large immobile mass of congealed content, presumed to be mucus, becomes stuck. Veterinarians do not know why dogs get mucoceles, or what the congealed mass of mucus is really composed of, and there is no human counterpart to this condition. Gallbladder removal is the most common treatment for dogs with a mucocele, but although their long-term prognosis is good after surgery, 22 to 50 percent of dogs do not survive to discharge. The researchers will collect bile and gallbladder tissue from dogs undergoing gallbladder removal surgery and determine how they differ from that of healthy dogs. The hope is that the study will help reveal the underlying cause of this emerging disease so that it can be prevented or reversed.

STOMACH/GASTROINTESTINAL DISORDERS

Studying Genetic Factors for Inflammatory Bowel Disease in German Shepherds

Dr. Karin A. Allenspach, University of London, United Kingdom, D10CA-051

Total Study Cost: \$99,201

German Shepherds are particularly susceptible to inflammatory bowel disease (IBD), an inflammation of the intestinal tract resulting in weight loss, vomiting or diarrhea. Currently, IBD can be controlled but not cured, and many dogs require lifelong immunosuppressive therapy. The researchers previously identified an imbalance in the intestinal bacteria in German Shepherds with IBD and a genetic mutation in the toll-like receptor 5 gene. German Shepherds with this mutation carry an eight times higher risk for developing IBD. The researcher will study how this mutation may alter the immune response to intestinal microbes, specifically Enterobacteriaceae, in German Shepherds with IBD. Data gained in this study could help identify new therapeutic agents tailored to treat individual dogs according to their genotype.





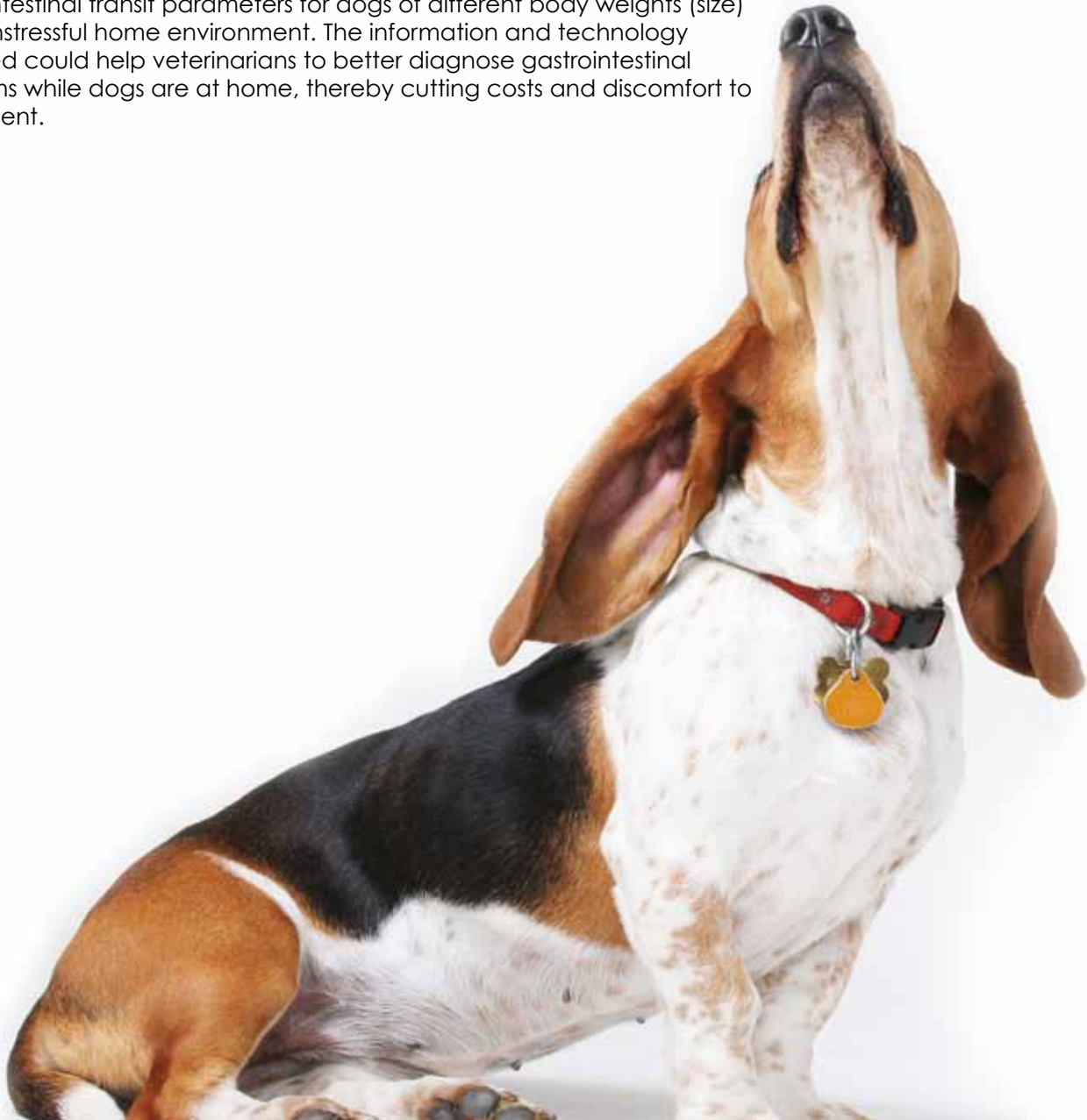
STOMACH/GASTROINTESTINAL DISORDERS

Investigating a Noninvasive, At-Home Diagnostic Technique for Gastrointestinal Disorders

Dr. Pedro Boscan, Colorado State University, D10CA-016

Total Study Cost: \$90,344

Gastrointestinal disorders such as vomiting, diarrhea and weight loss are common and often associated with altered gastrointestinal motility, which is difficult to diagnose. Without a definitive diagnosis, it is difficult to treat motility disorders. The SmartPill is a novel, noninvasive, wireless sensor capsule developed for the study of gastrointestinal motility disorders. Researchers will use the SmartPill technology to determine the gastrointestinal transit in dogs in their home environment. The results will establish for the first time the normal gastrointestinal transit parameters for dogs of different body weights (size) in a nonstressful home environment. The information and technology obtained could help veterinarians to better diagnose gastrointestinal problems while dogs are at home, thereby cutting costs and discomfort to the patient.



Cats & Dogs

CANCER

Examining the Role of Stem Cells and Genes in Mammary Tumor Development

Dr. Gerlinde R. Van de Walle, Ghent University, Belgium, D12MS-002

Total Study Cost: \$97,656

Mammary tumors are among the most common cancers in female dogs and cats. Surgical removal is the most widely accepted treatment option for mammary tumors in small companion animals, but this treatment has a high incidence of tumor recurrence and metastatic disease. There is an urgent need for better understanding of the genes involved in tumor suppression. One tumor suppressor gene, SYK, has been little studied but appears to affect breast tumor development and aggressiveness in humans. Accumulating evidence indicates that mammary stem cells are the primary target cells for cancer development, and SYK has been found in the mammary cells of dogs and cats. The researchers will examine SYK and mammary stem cells and their role in cancer development in an effort to better understand how different genes affect mammary tumors.

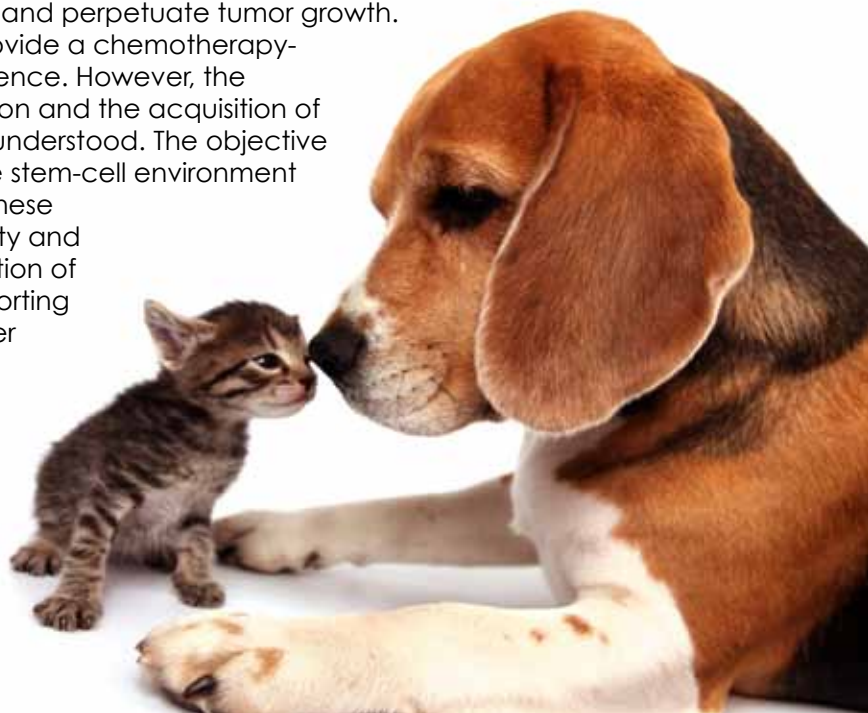
CANCER

Understanding Mechanisms that Contribute to Early Changes in Cancer Stem Cells

Dr. Alex Davies, University of California–Davis, Pfizer Animal Health–Morris Animal Foundation Fellowship, D10MS-906

Total Fellowship Cost: \$176,000

Treatment-resistant cancer poses a significant threat to animal health and well-being. Recent evidence from a number of cancer studies suggests the existence of a population of cancer stem cells that give rise to and perpetuate tumor growth. In addition, cancer stem cells are thought to provide a chemotherapy-resistant pool of cells that lead to disease recurrence. However, the mechanisms that drive cancer stem-cell formation and the acquisition of chemotherapy-resistant properties are not well understood. The objective of this research is to identify early changes in the stem-cell environment that contribute to cancer stem-cell formation. These changes may include altered cell-division polarity and the accumulation of genetic damage. Completion of this research will provide important insights supporting the design of future therapeutics to block cancer progression.





INFECTIOUS DISEASES

Understanding Disease Transmission from Humans to Pets

Dr. Meghan Davis, John Hopkins University, Pilot Study, D12MS-800

Total Study Cost: \$11,880

Methicillin-resistant *Staphylococcus aureus* (MRSA) is known as a “super bug” that is resistant to beta-lactam and many other antibiotics. A skin infection in humans and animals, MRSA becomes dangerous when it enters the body, sometimes through a cut, and attacks the bloodstream, lungs and urinary tract. Although MRSA is not always a serious infection, in some cases it can be life threatening. MRSA is often spread by direct hand or skin contact, but it can also be transmitted through contaminated environments, such as those in households, hospitals and veterinary clinics. The bacterium may spread among animals and humans living in the same home. This study will evaluate a companion animal’s risk of contracting MRSA in the home of human outpatients diagnosed with an MRSA soft-tissue infection. This study will also evaluate home environmental contamination, particularly on animal bedding, which may serve as a persistent source of MRSA exposure for animals. Improved knowledge of MRSA transmission between people and companion animals within a household will provide recommendations for veterinary hospital surveillance and clinical interventions. An important question this study hopes to answer is whether companion animals exposed to humans with MRSA infection should be tested or treated, even if they do not yet show signs of infection. This work will benefit companion animals by suggesting possible interventions to reduce their exposure to MRSA at the household level, hence lowering their risk of developing this painful and potentially fatal infection.

NUTRITION/OBESITY

Searching for Factors in Obesity Development

Dr. Lori D. Gutzmann, University of Missouri, Pfizer Animal Health–Morris Animal Foundation Fellowship, D12MS-900

Total Fellowship Cost: \$176,000

Surveys indicate that an estimated 20 to 40 percent of dogs and cats are overweight to obese. Even a moderately overweight condition is associated with a reduced length and quality of life and an increased risk for development of severe diseases. Osteoarthritis, diabetes mellitus and urinary tract diseases are among several chronic maladies associated with being overweight. Despite the health significance of obesity, little is known about specific mechanisms that lead to obesity in dogs and cats. The body weights of mature dogs and cats increase after neutering by about 25 to 30 percent, provided food intake is not restricted. This undesired effect of neutering is a major contributor to the problem of obesity. The researchers will identify factors underlying the variation in post-neutering weight gain and look for predictive biomarkers for post-neutering weight gain. This knowledge will further basic understanding of energy balance regulation in companion animals and in turn benefit others where energy balance is an important variable.

PAIN MANAGEMENT

Studying an Analgesic Drug Therapy in Animals

Dr. Kristen M. Messenger, North Carolina State University, Pfizer Animal Health–Morris Animal Foundation Fellowship, D10MS-910

Total Fellowship Cost: \$176,000

Effective pain management remains a chief concern for veterinarians. Pain has been demonstrated to worsen and lengthen illness as a result of the body's stress response and to heighten sensitivity to pain even years later. In extreme cases, pain can be a contributing cause of death. In the case of animals, it can be difficult to know with certainty how much pain is being experienced. This study will examine differences in individual patient response to analgesic drugs to address the questions of why some animals respond to the drugs administered and others do not and why adverse effects and exaggerated responses occur in some animals but not others. These data will help further scientists' understanding of the effects of analgesic drug therapy and help veterinarians better manage pain in animals.







Special thanks to the following people who helped in the creation of this piece.

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