



# THE WINN FELINE FOUNDATION

For the Health and Well-Being of All Cats

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## **2006 FELINE HEALTH GRANT AWARDS**

*Eleven studies funded for a total of \$131,364*

The Winn Feline Foundation is pleased to receive proposal from veterinary researchers around the world who are interested in improving feline health. Out of over 40 proposals for 2006, our team of outstanding veterinary consultants helped the Foundation select the best studies for funding. We look forward to seeing the results of these studies and being able to share them with the veterinary community as well as cat owners and pedigreed cat breeders.

### **CONTINUATION OF PREVIOUSLY FUNDED STUDIES**

#### **Improving our knowledge of the feline genome**

*Targeted gene mapping in gaps of the feline/human comparative map*

William Murphy, PhD; Terje Raudsepp, MSc, PhD; Bhanu Chowdhary, MVSc, PhD.  
College of Veterinary Medicine and Biomedical Sciences, Texas A&M University,  
College Station, TX; \$13,700.

Several hundred genetic diseases and other traits of interest have been described in the domestic cat. While a fraction of these traits have been characterized at the genetic level, only a handful of studies have identified the causative mutation(s). Our long-term goal is to develop the necessary gene mapping tools for feline geneticists to identify and characterize genes causing disease in cats. The current cat gene map contains over 1,900 markers mapped in a feline radiation hybrid (RH) panel. This study will cytogenetically map 110 large-insert clones from the feline genome assembly to connect the cat gene maps to each feline chromosome. The cytogenetic map will add an extra level of quality control to the feline genome maps, which will better enable feline researchers to identify the genetic bases of feline diseases and will enhance the health of the species.

### **NEW STUDIES**

#### **A new way to assess critically ill cats**

*Skin CO<sub>2</sub> and O<sub>2</sub> values and venous blood gas information in critically ill cats*

Beth Streeter, DVM, DACVECC; Piper Wall, DVM, PhD. Iowa State University College of Veterinary Medicine, Ames, IA and Iowa Methodist Medical Center, Des Moines, IA; \$2,320

Critically ill patients of all species often have blood flow and acid/base problems. In small patients such as cats and human infants, the amount of blood available for safe removal to monitor acid/base status is very limited. Therefore, skin CO<sub>2</sub> and O<sub>2</sub>

monitoring is frequently used in critically ill human infants to trend blood flow and acid/base status. In cats, obtaining such information currently requires taking blood samples, which can prove more detrimental (increases in patient stress and decreases in patient red blood cell mass) than justifiable by the potential information gain. Thus, this study is to determine if skin CO<sub>2</sub> and O<sub>2</sub> monitoring is feasible and potentially clinically useful in critically ill cats. Skin CO<sub>2</sub> and O<sub>2</sub> monitoring is non-invasive and continuous and could prove very useful to monitor critically ill cats without causing stress or discomfort.

### **A new medication to treat cats with hypertrophic cardiomyopathy**

*A prospective randomized controlled investigation of the use of carvedilol in cats with hypertrophic cardiomyopathy*

Meg Sleeper DVM, DACVIM (Cardiology); Nick Russell, BVSc, MVS, MACVSc.  
Mathew J Ryan Veterinary Hospital, University of Pennsylvania, Philadelphia, PA;  
\$15,000.

Hypertrophic cardiomyopathy (HCM) is the most commonly diagnosed cardiomyopathy in cats. Cats with HCM typically have diffuse or focal thickening of the left ventricle of the heart. This may be associated with abnormal heart function that results in obstruction of blood ejection from the left ventricle, called hypertrophic obstructive cardiomyopathy (HOCM). HCM and HOCM may lead to congestive heart failure, arterial thromboembolism, fainting or sudden death. Numerous large clinical trials have demonstrated beneficial effects of beta-blocker agents (BBAs) in humans with congestive heart failure. There is no published evidence of clinical efficacy of BBAs in veterinary medicine. Carvedilol is a third generation BBA. Carvedilol has been demonstrated to improve left ventricular function, reduce infarct size and protect against lethal reperfusion injury in feline experimental models of regional myocardial ischemia. Two studies have demonstrated efficacy of BBAs in reducing left ventricular obstruction in cats with HOCM. However, no conclusive controlled clinical trials have been published that evaluate the efficacy and effect of BBAs on mortality in cats with naturally occurring cardiomyopathy and congestive heart failure. Therefore, the aims of this study are to evaluate the efficacy of carvedilol in cats with HCM, or HOCM, and congestive heart failure, and evaluate the effect of carvedilol on mortality in this population of cats.

### **A new topical eye medication for feline herpesvirus infection**

*Is cidofovir effective against feline herpesvirus infection?*

Lynne Sandmeyer, DVM, DVSc, DACVO; Dorothee Bienzle, DVM, PhD, DACVP;  
Joseph Wolfer, DVM, DACVO. Western College of Veterinary Medicine, Saskatoon,  
Saskatchewan, Canada (Sandmeyer), Ontario Veterinary College, University of Guelph,  
Guelph, Ontario, Canada (Bienzle, Wolfer), \$8,585

Infection with FHV is the most common cause of eye disease in cats. After an initial infection with sneezing and runny eyes, the virus hides in the nervous system and may not cause disease for years. During times of stress and other infections the virus becomes re-activated and can then cause severe eye disease. Medicated eye drops currently available either have to be administered very frequently or are irritating to the eye, and are therefore not practical. Cidofovir is a new drug active against FHV and may be

effective, even if used only once a day. Therefore, in this study it will be determined whether cidofovir is useful for FHV treatment of naturally infected cats.

### **Investigation of an inherited form of blindness in Persians**

*Heritable progressive retinal atrophy in Persians*

Leslie Lyons, PhD. University of California, Davis, CA; \$10,570

Like humans, cats experience types of naturally occurring inherited vision problems, called progressive retinal atrophy (PRA). Because research has been extensive for human blindness, we can use this information to improve the health of felines. Our goal is to investigate the progression of an inherited blindness in Persians and decipher which gene results in the disease. Persian cats are the most popular cat breed throughout the world. Many other breeds use Persians to change the body and facial structures of other breeds as allowable outcrosses. Thus, health problems in Persians can be spread quickly and widely in the cat world if unchecked. The Persian vision problems start very early, at about 4 – 8 weeks of age and progress very rapidly. Cats become completely blind by 15 weeks of age, but do not have other health issues. This disease is caused by a mutation in one gene and two copies of that mutation are required to cause blindness. Carrier cats, cats with one copy of the mutation, are perfectly healthy, but when bred, they can pass the mutation on to their offspring. Thus, a genetic test is required to detect these cats so that they do not spread the mutation. The disease has to be clinically very well defined in order to match this disease to one that is found in humans. If a good match can be made, then markers for that gene can be developed for the cat rather efficiently and used to detect carriers. Also, if we know which gene is mutated, we may understand how the genes function and be able to give better medications to slow or stop the blindness. A chromosomal segment has been recently identified that is statistically associated with the Persian form of PRA. It is most likely that a gene within the segment is responsible for the Persian blindness and a mutation test will be feasible in the near future.

### **Hypertrophic cardiomyopathy in Ragdolls**

*Molecular evaluation of the feline myosin binding protein C gene in Ragdoll cats with familial hypertrophic cardiomyopathy*

Kathryn M. Meurs, DVM, PhD, DACVIM (Cardiology); Mark D. Kittleson, DVM, PhD, DACVIM (Cardiology). College of Veterinary Medicine, Washington State University (Meurs) and School of Veterinary Medicine, University of California, Davis (Kittleson); \$14,991. **This study was partially funded by the efforts of many Ragdoll breeders**

Feline hypertrophic cardiomyopathy (HCM) is the most common cause of heart disease in the adult cat. Affected cats are at risk of sudden death, breathing difficulties or development of a blood clot. Increasingly, feline HCM is noted to be inherited, with examples reported in the Maine Coon, Ragdoll, British shorthair, and Scottish Fold breeds, among others. We demonstrated that HCM is associated with a mutation in the myosin binding protein C gene in the Maine Coon cat. In human beings, the disease is commonly associated with a mutation in one of several genes that encode for sarcomeric proteins, most commonly the myosin binding protein C and the beta myosin heavy chain gene. Causative mutations have been identified in over 140 regions of the cardiac myosin binding protein C gene alone. The Ragdoll cat also has a heritable form of the disease.

We prospectively collected pedigrees and medical information and DNA samples from 3 families of Ragdoll cats with familial HCM. We performed an initial study of affected Ragdoll cats and determined that the Maine Coon defect is not present. However, we only evaluated one small region of the gene. Given the importance of this gene in both humans and Maine Coon cats with HCM we hypothesize that a mutation in a different region of the gene is associated with the development HCM in the Ragdoll. The objective of this study is to evaluate the DNA of this gene in both affected and unaffected cats for a causative mutation.

### **Do dietary trans-fatty acids play a role in feline diabetes?**

*Effect of dietary trans-fatty acids on serum insulin in cats*

Patricia A. Schenck, DVM, PhD; Sarah K. Abood, DVM, PhD. Michigan State University, Lansing, MI; \$14,173.

Diabetes affects cats, especially older or overweight cats. As in humans, the incidence of diabetes in cats is increasing, and dietary components may play a role in its development. *Trans*-fatty acids (TFA), a particular type of fat, have been shown to contribute to diabetes and other health problems in humans. For this reason, starting in January of 2006, the amount of dietary TFA in human food products will be required on nutritional labeling in the United States. TFA are not naturally occurring, but are produced during processing of fats and oils for inclusion in foods, including pet foods. Currently little is known regarding the presence of TFA in animal diets. The objectives of this study are to determine the levels of TFA in 90 commercial diets commonly fed to cats, and to correlate the dietary TFA intake to serum indicators of diabetes in 60 cats. Results may lead to specific dietary recommendations regarding TFA levels in feline diets.

### **Are changes in bone density associated with high blood calcium in cats?**

*Bone dynamics in cats with idiopathic hypercalcemia*

Dennis J. Chew, DVM, DACVIM; Kelly Cairns, DVM. The Ohio State University, Columbus, OH; \$10,000.

Recently, cats are being more frequently identified with an elevated level of calcium in their blood for which no cause is found after routine testing. This is called “idiopathic hypercalcemia”, and can lead to urinary bladder stones and possible kidney failure. It is speculated that this condition may be the result of increased bone resorption in these cats, leading to decreased bone density. This study will evaluate bone density and bone metabolism of cats with idiopathic hypercalcemia as compared to healthy control cats using dual energy x-ray absorptiometry (DEXA) scanning and various blood and urine tests. The results of this study may help guide future treatment for this condition.

### **What is the relationship between hyperthyroidism and liver disease in cats?**

*Characterization of hepatic disease and function in hyperthyroid cats with persistently high serum alanine aminotransferase (ALT) levels post <sup>131</sup>I treatment.*

Mark E. Peterson, DVM, PhD, DACVIM; Leyenda Harley, DVM; John Broussard, DVM, DACVIM; Anthony Fischetti, DVM, DACVR; Keith Baer, DVM, DACVP; Jörg

M. Steiner, med.vet., Dr.medvet., PhD, DACVIM, DECVIM. The Animal Medical Center, New York, NY; \$14,940.

Hyperthyroidism is the most common feline endocrine disease, causing serious abnormalities in many organs. Most cats with hyperthyroidism have elevated liver enzymes for unknown reasons. So far, the association between hyperthyroidism and liver disease has been poorly documented. Liver enzymes will often return to normal once cats are treated for their hyperthyroidism. However close to 50% of cats will still have moderate to severe elevations in the liver enzyme alanine aminotransferase (ALT). In humans with hyperthyroidism, liver changes have included fat infiltrates and areas of focal necrosis. The prevalence of hepatic disease in cats with hyperthyroidism and the type of liver changes present have not yet been determined. This study will be looking at the relationship between feline hyperthyroidism and the functional and structural damage that may be present in their livers. It will be looking at those cats with persistently high liver-specific enzymes, despite treatment with radioiodine.

### **Do bacterial infections play a role in some liver diseases of cats?**

*Prospective evaluation for bacterial infection in hepatic tissue and bile of cats with diffuse hepatobiliary disease*

Mark P. Rondeau, DVM, DACVIM; Megan J. Morgan, VMD; Allyson Berent, DVM; Shelley C. Rankin, PhD; Tom Van Winkle, VMD, DACVP; Frances S. Shofer, PhD. University of Pennsylvania School of Veterinary Medicine, Philadelphia, PA; \$13,740.

Inflammatory liver diseases as a group are the second most common type of liver disease in cats. There is some evidence that bacterial infection causes this class of disease, but that fact has not been clearly proven. The goal of this study is to evaluate whether bacterial infection of the liver and/or bile is more common in cats with inflammatory liver disease than in cats with other types of liver disease or normal cats. Cats presenting to our hospital with evidence of liver disease where a liver biopsy is recommended will be enrolled. Liver biopsy and gall bladder bile samples will be obtained from all cats. Both samples will be examined by a pathologist to determine what the underlying disease is. The samples will be tested for bacterial infection using traditional methods and by using a newer method called real time PCR (RT-PCR) which identifies bacterial DNA in the sample. We hope that this test will provide a method of more rapidly identifying the offending bacteria (it takes a few hours as compared to days for traditional methods) and may identify some bacteria that cannot be identified by traditional methods. We also hope to show whether bacteria are more commonly isolated from liver biopsy tissue or from gall bladder bile. If we are able to identify the bacteria that most commonly cause inflammatory liver disease in cats and determine how best to find them, this will improve the diagnosis and treatment of this common disease for our future feline patients.

### **Evaluation of a new drug for treatment of chronic renal failure in cats**

*Control of renal secondary hyperparathyroidism in cats with chronic renal failure: a new approach using calcimimetic drugs*

Thomas K. Graves, DVM, PhD, DACVIM; Melissa R. Riensche, DVM. University of Illinois, Urbana, IL; \$13,345.

Chronic kidney failure is a common problem affecting millions of cats each year. Current management strategies are inadequate and many cats still exhibit significant signs of illness and have an overall reduced quality of life. The buildup of multiple toxins in the bloodstream plays a significant role in kidney failure. Parathyroid hormone (PTH) is one such toxin identified in people with kidney failure. PTH is produced in small glands in the neck called parathyroid glands. PTH is critical in the control of calcium and phosphorus in the body. In cats the role of PTH as a significant toxin has not been substantially explored. Studies in human beings have shown that PTH can be responsible for long-term consequences of kidney disease, including mineralization of various tissues, decreased ability to fight off infection, and anemia. Recently a new class of drugs was developed for human medicine to treat elevated levels of PTH. These drugs are called calcimimetic drugs, and they cause decreased PTH production. We believe the use of calcimimetic drugs may prolong survival and increase quality of life for cats with chronic kidney failure, similar to results in human beings.

**For more information, contact:**

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