Companion Animal Fund
Research Projects – 2015

Efficacy And Tolerability Of Transdermal Phenobarbital For Seizure Control In Cats

Principal Investigator
Heidi Barnes Heller, Department of Medical Sciences

Abstract
Reliable administration of anti-seizure drugs, like phenobarbital, is critical to maintain seizure control in cats. Unfortunately administering oral phenobarbital to cats can be difficult, resulting in inconsistent dosing, stress to the cat and injury to the owner. Furthermore, a missed dose of anti-seizure medications can result in a seizure. The purpose of this study is to compare blood levels achieved using topical phenobarbital to levels achieved using oral phenobarbital in cats with seizures. Additionally, we will compare side effects and ease of administration between oral and topical administration of phenobarbital. Cats will receive oral medication for three months, followed by topical phenobarbital for three months. Our hypothesis is that topical phenobarbital will achieve comparable serum levels to oral phenobarbital, owners will be more satisfied with the topical administration, and that side effects will be minimal and similar to known side effects of phenobarbital.

The Role Of Urothelial Glycosaminoglycans In The Development Of Canine Recurrent Urinary Tract Infections

Principal Investigators
Sara Colopy, Department of Surgical Sciences
Michael Wood, Department of Medical Sciences

Abstract
Recurrent urinary tract infections (UTI) are common in dogs and are associated with poor quality of life due to frequent and painful urination. Repeated courses of antibiotics lead to development of drug-resistant infections. Treatments targeted at preventing UTI would be ideal to avoid the poor quality of life and drug resistance associated with recurrent infections. Glycosaminoglycans (GAGs) lining the bladder surface have been shown to be important in maintaining a tight barrier to bacteria in
the urine. Treatment with GAGs in the bladder reduces the rate of UTI in people. The role of GAGs in development of canine UTI has not been evaluated. The goal of this study is to compare the GAG content in the urine of dogs with and without recurrent UTI. Results of this study would lay the groundwork for future clinical studies evaluating the efficacy of GAG treatment in preventing canine UTI.

Gastrointestinal Transit Time Following Intravenous Lidocaine Infusions In Conscious Dogs Assessed With Barium-impregnated Polyethylene Spheres (BIPS)

Principal Investigator
Rebecca Johnson, Department of Surgical Sciences

Abstract
Lidocaine is a commonly used drug in veterinary medicine for analgesia (pain relief) and to decrease cardiac arrhythmias. In horses, lidocaine is also used to increase gut motility. However, despite the frequent use of lidocaine in dogs, no studies have assessed its effects on their gastrointestinal system. Our specific objective focuses on answering a clinically-important, yet untested question: Do intravenous lidocaine infusions at routine doses decrease gastric and intestinal emptying times in the conscious dog? We will feed barium-infused polyethylene spheres (BIPS) to dogs followed by radiographic BIPS tracking throughout the gastrointestinal tract at various time points to assess this question. All information and inferences gained from these experiments will be novel and may greatly impact the clinical management of our painful patients or patients that require antiarrhythmic therapy since the dose-dependent side effects of lidocaine CRI may preclude its use in certain canine populations.

Evaluation of Gastrointestinal Contract Fluoroscopy In Red-tailed Hawks (Buteo Jamaicensis)

Principal Investigator
Christoph Mans, Department of Surgical Sciences

Abstract
Red-tailed hawks are the most commonly treated birds of prey in wildlife rehabilitation centers as well as the most common species used for falconry in North America. Gastrointestinal (GI) disorders are common in birds of prey, but the work-up of these diseases using diagnostic imaging tools is limited by the lack of established “normal.” Indeed, while contrast fluoroscopy studies are commonly used in parrots for work-up of GI disorders, their use in birds of prey is rare, as normal GI transit, have not yet been established. The aim of this study is to determine the normal GI transit times in healthy red-tailed hawks fluoroscopy following oral administration of a contrast media. In addition, since hooding is a very common technique used in birds of prey to calm and immobilize, the effects of this technique on GI transit times will also be assessed.
Angiotensin Receptor Blockers As A Novel Therapeutic Approach For Glaucoma In Cats: A Pilot Study

Principal Investigator
Gillian McLellan, Department of Surgical Sciences

Abstract
Glaucoma is a leading cause of blindness in animals and humans. We have identified increased amounts of a specific protein (TGFβ) within the eyes of cats with glaucoma. This growth factor may also contribute to worsening of glaucoma in people. In recent years, a widely available blood pressure medication, losartan, has shown promise in treating children with Marfan syndrome, a life-threatening condition in which high levels of TGFβ have also been identified. Our objective is to determine if losartan is effective in slowing or preventing progressive loss of vision in cats with glaucoma. A favorable response to treatment in cats will help to establish an exciting new approach to the treatment of glaucoma, as well as other diseases in which altered TGFβ signaling has been identified, in companion animal and human patients.

Detection Of Copy Number Variants In The Canine Genome And Examination Of Their Association With Canine Cruciate Rupture

Principal Investigator
Peter Muir, Department of Surgical Sciences

Abstract
Cruciate ligament rupture (CR) is a common disabling condition of the knee in dogs that is economically important. CR occurs through a non-contact mechanism and is common in the Labrador Retriever, affecting 5.79% of the breed. CR is a complex trait in which both genetic and environmental factors influence disease risk. Copy number variations (CNVs) are alterations to the DNA of the genome that result in duplication of DNA segments. CNV is associated with disease. In this project, we will analyze the genomes of Labrador Retriever CR cases and controls for the presence of CNVs. We will then determine whether specific CNVs are associated with risk of CR. Comprehensive understanding of the genetic contribution to the CR condition will enable development of a genetic test for disease. Because the genetic contribution to CR consists of many sites in the genome with small effects, genomic selection will likely be needed.

Determination Of Blood Lactate In Healthy And Hospitalized Neonatal Cria And Examination Of Its Association With Survival In Septic And Non-Septic, Critically Ill Neonates

Principal Investigators
Simon Peek, Department of Medical Sciences
Ana Moreira, Department of Medical Sciences
Abstract
Alpacas are the most popular New World Camelid in North America and an important part of the caseload at UW Veterinary Care (UWVC.) Sepsis is the most significant cause of illness and death during the first 30 days of life and early identification of high-risk crias and implementation of intensive care are crucial for a successful outcome. Equine and human medicine lactate values are linked with disease severity and determine the odds of survival for a number of common illnesses seen in intensive care facilities. Lactate levels have also been used as a prognostic indicator and as a tool for monitoring treatment in other species for conditions such as sepsis and colic. No such data exists in alpacas. This study aims to establish normal ranges for alpaca crias and to investigate the diagnostic and prognostic value of blood lactate in sick crias presented for treatment at the UWVC.

The Influence Of Axial Grooves On The Dislodgement Resistance Of Prosthetic Metal Crowns In Dogs

Principal Investigator
Jason Soukup, Department of Surgical Sciences

Abstract
Dental fractures affect nearly 30% of all dogs, many of which require metal crowns in order to properly restore health and strength to the tooth. However, the dislodgement rate of metal crowns in dogs is suboptimal (10-20% dislodgement rate) when compared to humans (1% dislodgement rate). In order to place a metal crown on a tooth, some tooth structure must be removed. This process is referred to as crown preparation. The shape of the tooth after tooth preparation and the specific design of the preparation influence the long-term retention of the metal crown on the tooth. Some preparation design features are known to increase retention in humans. However, these design features have not been evaluated on the unique shape of dog teeth. This study will evaluate the influence of grooves cut into the walls of the tooth during crown preparation on the retention of metal crowns. We hope to develop a more intelligent preparation design that enhances the retention of metal crowns in dogs.

Evaluating ROR2 Inhibition In Canine Malignant Melanoma

Principal Investigator
Timothy J Stein, Department of Medical Sciences

Abstract
Canine malignant melanoma is a highly aggressive malignancy associated with poor overall survival due to local disease recurrence, high metastatic rate, and poor response to conventional anti-cancer therapies. Recent studies suggest that disease recurrence, metastasis, and chemoresistance may be due in part to the presence of a subpopulation
of tumor-initiating cells. The non-canonical Wnt signaling pathway, including the ROR2 receptor, has been implicated in contributing to a phenotype consistent with these tumor-initiating cells. We aim to determine the impact of specifically inhibiting ROR2 activity on tumor-initiating cell formation in canine malignant melanoma cell lines. As noted above, the lack of sustainable disease control warrants investigation of novel therapies. It is possible therapies aimed at ROR2 may be capable of reducing the aggressiveness of canine melanoma cells as well as inhibiting tumor-initiating cells, thereby improving patient outcomes relative to currently available treatments.

**Association Of Relative Regulatory T-Cell Frequency With Progression-Free Survival In Dogs With B-Cell Lymphoma**

*Principal Investigator*
*M. Suresh, Department of Pathobiological Sciences*

*Abstract*
Nearly half of all dogs over 10 years old will die of cancer, and B cell lymphoma (BCL) is one of the most common types. Although treatment with chemotherapy may extend survival, it is currently impossible to reliably predict which dogs will respond to chemotherapy. This clinical study aims to improve our ability to predict how dogs with BCL will respond to chemotherapy. Patients respond to tumors by producing immune cells that kill tumor cells. However, cells known as regulatory T lymphocytes (Tregs) can “turn off” this immune response, allowing the tumor to grow unchecked. Our study will measure both of these cell types in dogs with BCL, to identify patterns associated with dogs that respond well to chemotherapy. We expect this information to help clinicians determine the prognosis and best treatment options for dogs with BCL, and to identify potential new targets for treating this common disease.

**Evaluation Ff Stereotactic Radiotherapy For Canine Sinonasal Tumors Using Helical Tomotherapy**

*Principal Investigator*
*Michelle Turek, Department of Medical Sciences*

*Abstract*
Sinsonal tumors are aggressive cancers of the nasal passages of dogs that cause nose-bleeds, nasal congestion, and pain. Radiotherapy is the treatment of choice to alleviate symptoms and extend life expectancy. Radiation side effects commonly affect normal tissues surrounding the tumor. Specialized radiation equipment, including TomoTherapy®, has made it possible to deliver radiation more precisely, reducing these harmful effects. Since TomoTherapy® allows radiation delivery with fewer complications, it raises the question; can dose to the tumor be safely increased to improve tumor control? Stereotactic radiotherapy is a precision-delivery approach that delivers high-dose radiation in fewer treatments compared to conventional protocols.
We will evaluate the safety and efficacy of stereotactic radiotherapy for sinonasal tumors using TomoTherapy®. We hypothesize that it will be safe and at least as effective as conventional protocols. By providing a shorter treatment with fewer anesthetic episodes, stereotactic radiotherapy may alter the treatment paradigm for sinonasal cancer.

**Ultrasonographic Acoustoelastography Characteristics And Contrast Enhanced Enhancement Pattern Of Splenic Nodules In 50 Dogs**

*Principal Investigator*
*Ken Waller, Department of Surgical Sciences*

**Abstract**
Ultrasonography is non-invasive diagnostic tool used to evaluate for abdominal disease. Splenic nodules and masses are a relatively common finding in dogs of all age ranges and when seen, the lesion may be benign or malignant. Acoustoelastography (AEG) and contrast harmonic ultrasonography (CEUS) have independently proven to help differentiate some types of malignancy from benign lesions. To the investigators knowledge, splenic AEC results have not previously been correlated with the CEUS patterns of similar lesions. The purpose of this study is to prospectively evaluate splenic nodules or masses using AEG techniques, to characterize these lesions and any concurrent metastatic hepatic lesions with CEUS and to correlate these patterns with cytology/histopathology results. The ultimate goal is not to replace cytological sampling, yet it is to establish more refined non-invasive parameters to minimize unnecessary sampling of benign lesions and maximizing sampling of lesions with a higher probability of malignancy.