Genomic, Phylogenetic, and Recombinational Characterization of Feline Herpesvirus Field Isolates Using Deep-Sequencing Technology

Principal Investigator
Ellison Bentley, clinical professor, Department of Surgical Sciences

Abstract
Feline herpesvirus is an extremely widespread cause of eye and respiratory disease in cats. Some estimate that over 90% of cats have been exposed to herpesvirus, and half of those continue to shed virus intermittently. Half of those shedding may have recurrent eye problems, some of which are painful and blinding. Treatment has been frustrating as there is a wide spectrum of disease and susceptibility to treatment. This study will collect samples from a geographically diverse area and then compare genomes between different virus strains. Genomic difference may contribute to differences in virulence and response to treatment, which will allow us to develop better prevention and treatment strategies.

An Investigation of Slow CT to Assess Respiratory Motion in Dogs with Pulmonary Lesions for Use in Radiation Therapy Planning

Principal Investigator
Neil Christensen, clinical instructor, Department of Surgical Sciences

Co-Investigator
MacKenzie Pellin, resident, Radiation Oncology

Abstract
Accurate identification of cancerous targets is required for radiation therapy. When treating areas of motion like lung or abdomen, traditional CT scans cause distortion of the target. In humans, may be partially responsible for high rates of lung tumor
recurrence after radiation therapy. Four-dimensional CT is used to image high motion areas in humans; however, the cost of this technology is too expensive for veterinary medicine.

Slow CT scanning (sCT) is an alternative imaging method that can be performed on any CT scanner. Preliminary research using models at the UW School of Veterinary Medicine suggest that sCT may give an accurate depiction of target motion compared to traditional CT. Our study aims to evaluate the effectiveness of sCT for determining target motion in dogs with lung tumors as compared to fluoroscopy. The possible impact on radiation dose and normal tissue toxicity will be compared between radiation plans created using traditional CT and sCT.

Canine Exposure to Ebola Virus in Uganda

Principal Investigator
Tony Goldberg, professor, Department of Pathobiological Sciences

Abstract
Domestic dogs have been implicated as hosts for Ebola. This idea became famous after the controversial forced euthanasia of an Ebola patient’s pet dog in Spain in 2014. As a result, dogs have become maligned in affected areas of Africa, and mass forced canine euthanasia is being considered as part of Ebola emergency response plans in Africa, Europe, and North America. These draconian measures are not evidence-based. To date, only one assessment of exposure of dogs to Ebola virus has been conducted, and the diagnostic methods were non-specific.

We propose to conduct the first specific assessment of canine Ebola virus exposure in an outbreak zone. In 2008, Ebola struck the village of Bundibugyo, Uganda, near the PI’s long-term research site. We will sample dogs from households of Ebola victims, matched controls from unaffected households, and dogs from three control populations. We have the commitment of The United States Army Medical Research Institute of Infectious Diseases (USAAMRIID) for this study. USAAMRIID has a new “virus scanning” assay that detects antibodies to panels of viruses, including Ebola and its relatives, with very high sensitivity and specificity. Their involvement allows us to avoid biological hazards.
Our results will have important implications for canine health and welfare. If dogs do indeed show evidence of specific exposure to Ebola, this must be studied further and considered in response planning. If not, then this knowledge could prevent the unnecessary euthanasia of thousands of domestic dogs around the world.

Ventilation, Thermal Nociception, Food Intake, and Fecal Output Following Administration of a Novel, High-Concentration Buprenorphine Preparation (Simbadol) in Rats

Principal Investigator
Rebecca Johnson, clinical associate professor, Department of Surgical Sciences

Co-Investigator
Molly Allen, resident, Anesthesia and Pain Management

Abstract
Buprenorphine (Buprenex®) is a widely used peri-operative analgesic in animals, including rats. Side effects of buprenorphine administration include mild to moderate respiratory depression, impaired gastrointestinal motility, and pica (consumption of bedding), resulting in gastrointestinal impaction and reduced weight gain.

Recently, high-concentration (1.8 mg/mL) buprenorphine in a 5% dextrose vehicle (Simbadol™) was approved for up to 24 hours of post-operative analgesia in cats when administered at a high dose (0.24 mg/kg once daily versus the Buprenex® dose of 0.02 mg/kg every 6–8 hours); this new formulation is not yet associated with adverse reactions seen with other sustained release buprenorphine preparations (e.g. Buprenex SR™). Given the efficacy of Simbadol™ in cats and the disadvantages of repeated rodent injections (i.e., stress of handling, interference with experimentation, pica, diminished food intake/body weight), a once daily dosing regimen using Simbadol™ in rats is a realistic and attractive prospect.

Adult rats will be used to test the effects of Simbadol™ (0.15, 0.30 and 0.60 mg/kg) on ventilation, analgesia, and food intake/fecal output. Our techniques have proven effective in previous studies, and these studies will be the first to assess this novel, long-lasting buprenorphine preparation in rats. These studies may provide an appealing alternative for the veterinary medical professional to deliver long–lasting analgesia to companion and
laboratory rodents without repeated dosing or the side–effects associated with sustained-release preparations, vastly improving post–operative care and reducing patient morbidity associated with painful states.

Dexmedetomidine–dependent Effects on Nociception and Respiration in Ball Pythons (*Python regius*)

*Principal Investigator*
Stephen Johnson, associate professor, Department of Comparative Biosciences

*Abstract*
Snakes are increasingly more popular as household pets. Unfortunately, when snakes require surgery or need to undergo potentially painful procedures, there are no drugs available that clearly provide long–lasting pain relief. In general, pain management in reptiles is poorly understood, particularly for snakes.

Previously, we showed that morphine provides pain relief in turtles and lizards but not in snakes, even though extremely large dosages were tested. Several other morphine–like drugs were tested in snakes, but there was no evidence of pain relief. Consequently, we explored other non–morphine–like drugs and found that dexmedetomidine appears to provide pain relief with minimal depression of breathing in pilot studies.

This study will carefully test whether dexmedetomidine can be used clinically in ball python snakes and possibly other snake species. If successful, this would represent a significant step forward in providing pain relief to snakes.

Development of a Dehydration–Rehydration Model in Lizards: Improving the Standard of Care for Dehydrated Reptile Patients

*Principal Investigator*
Christoph Mans, clinical assistant professor, Department of Surgical Sciences

*Co–Investigator*
Lily Parkinson, resident, Zoological Medicine
Abstract
Dehydration is a very common consequence of many serious diseases seen in animals, and therefore providing patients with fluids when ill or injured is a cornerstone of treatment. Unfortunately for reptile patients, no research has been conducted to identify the best types of fluids for these unique animals.

This study will be the first to investigate reptile fluid therapy. It will test different dosages of the diuretic drug furosemide, which has been used extensively in mammals but has yet to be studied in reptiles. Furosemide will be used to dehydrate the bearded dragons in the current experiment, but information from this study can be applied to the treatment of diseases such as heart failure in reptile patients. Overall, a plethora of new information will be gained by monitoring these bearded dragons’ blood parameters as they receive furosemide and fluids with far-reaching impacts on the future of reptile medicine.

Oral and Intravascular Contrast–Enhanced Computed Tomographic Evaluation of Small Pet Birds

Principal Investigators
Christoph Mans, clinical assistant professor, Department of Surgical Sciences
Jackie Williams, clinical assistant professor, Department of Surgical Sciences

Abstract
Small pet birds are commonly treated at UW Veterinary Care. Diagnostic imaging is frequently used in conjunction with blood testing to investigate underlying disease. Internal organs most often affected by disease in pet birds include the gastrointestinal tract, liver, and reproductive tract. Complete evaluation of internal organs in computed tomographic (CT) studies can be hindered due to the avian patient’s small size and poor internal detail. Orally and intravascularly administered positive contrast media can aid in identifying internal disease.

In our study, we will use cockatiels to develop imaging protocols that will allow veterinarians to increase the diagnostic value of CT scans performed in small pet birds. The results of this study will have an immediate clinical application for avian patients presented to UW Veterinary Care and to any other clinicians who use CT for the
evaluation of internal disorders in birds.

A Comparison of the Effects of Alfaxalone and Propofol on Laryngeal Function and Quality of Laryngeal Examination in Normal Dogs

Principal Investigator
Lesley J. Smith, clinical professor, Department of Surgical Sciences

Co-Investigator
Robert J. Hardie, clinical associate professor, Department of Surgical Sciences

Abstract
Laryngeal paralysis is an acquired disease of older dogs that results in respiratory difficulty and exercise intolerance due to obstruction of the larynx. In severely affected dogs, respiratory distress can become life threatening, requiring hospitalization, sedation, and endotracheal intubation to relieve the airway obstruction. Definitive diagnosis is made via laryngeal examination, and treatment involves surgically “tying back” the cartilage of the larynx to create a larger opening for breathing. Accurate diagnosis is critical prior to surgery, as laryngeal function is permanently affected, and the risk of aspiration of food and water is increased after tie-back surgery.

The anesthetic propofol is commonly used for laryngeal examination in dogs. Although it is a safe option, propofol is not ideal because it can cause dogs to stop breathing (apnea) for periods of time, making it challenging to assess laryngeal function and potentially risk inaccurate diagnosis. A new anesthetic, alfaxalone, is recently available in the U.S. Alfaxalone has potential advantages over propofol for laryngeal examination, including lower risk of apnea and fewer cardiovascular side effects. It has not been evaluated for its effects on laryngeal function in dogs.

The goal of this study is to compare propofol and alfaxalone for their effect on laryngeal function and the quality of laryngeal examination. Our hypothesis is that alfaxalone has less effect on laryngeal function and provides a better quality of laryngeal examination. Our data will determine which of these anesthetic drugs is most appropriate for use for laryngeal examination, thus minimizing the risk of misdiagnosis of laryngeal paralysis prior to surgical treatment.
Half-Body Radiotherapy in Combination with Chemotherapy for Canine Multicentric Lymphoma: A Recruitment Feasibility Study

Principal Investigator
Michelle Turek, assistant professor, Department of Medical Sciences

Abstract
The treatment for canine lymphoma has remained unchanged for 15 years. Chemotherapy is the therapy of choice. Initial remission rates are high, and dogs in remission enjoy an excellent quality of life. However, relapse is common, and cures are rare. As one of the most common and uniformly fatal diseases in dogs, effective new therapies are in great demand.

Radiation is an effective treatment for select forms of lymphoma in people. To answer the long-standing question about the benefit of radiotherapy as a treatment in dogs with lymphoma, a clinical trial is necessary. The integrated oncology service at UW Veterinary Care is well-suited to execute such a multi-disciplinary trial. To investigate the feasibility of a successful partnership between medical oncology, radiation oncology, and regional private practices, we propose a recruitment and feasibility study. Ten dogs with lymphoma will be recruited to receive radiation in conjunction with chemotherapy. If recruitment and protocol execution are successful, we will be in a position to propose a larger comparative trial to determine if radiotherapy has a role in the treatment of this uniformly fatal disease.