Our Group of Seven

Whether your group consists of artists or animal health researchers, the need for constant encouragement and support is critical to the creative process of painting a masterpiece — or discovering new ways to improve animal health care.

This spring, the Companion Animal Health Fund (CAHF) sparked the imaginative spirits of seven groups of scientists at the Western College of Western College of Veterinary Medicine (WCVM) with more than $80,000 in research funding. The grant money represents the contributions of hundreds of western Canadian pet organizations and owners. With their support, the Fund is backing seven veterinary studies that focus on critical aspects of companion animal health.

Over the next two years, scientists at WCVM — along with their collaborators at the University of Saskatchewan and across Western Canada — will conduct the projects that target diagnostic as well as therapeutic challenges in companion animal health.

What will be the results of their work? *Vet Topics* looks forward to reporting the scientists' findings as they contribute new angles, shades and tones to the overall picture of companion animal health care in Western Canada.

Prognostic factors for survival of cats diagnosed with mammary gland tumours

Drs. Elemir Simko, Monica Salles, Hélène Philibert and Valerie MacDonald, WCVM

Feline mammary adenocarcinomas (MACs) are relatively common and many are life-threatening even after complete excision. The survival range in cats with surgically-excised MACs is wide, but reliable prognostic factors for predicting length of postoperative survival are few.

The predictability of the current grading system for the length of survival of cats with excised MACs is reliable only for a small proportion of the tumours. The WCVM research team's goal is to identify reliable prognostic factors for survival and to enhance predictability of the grading system for all types of MACs.

Researchers will evaluate the pathological features of about 60 feline cases of MACs that were diagnosed by Prairie Diagnostic Services in previous years, then they will correlate these findings with the postoperative clinical follow up information. The pathological features determined to have strong correlation with post-operative survival of cats will be used as additional prognostic factors to enhance predictability of the current grading system.

Sample preparation techniques for soft X-ray scanning and transmission microscopy of animal tissues

Drs. Trisha Dowling and Katherine Ball, WCVM; Drs. Julie Thompson, Robert Blyth and Chithra Karunakaran, Canadian Light Source, Inc.

Soft X-ray scanning and transmission microscopy (STXM) using synchrotron radiation is a powerful research technique that allows tissue samples to be mapped based on chemical elements, chemical species and cellular concentrations of drug compounds. This multi-disciplinary research team is using the technology

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Above: "Meggie." *Photo: Rodger Lourenzo, courtesy of the Manitoba Veterinary Medical Association's Great Manitoba Dog Party Photo Contest.*

with the intent of evaluating the intracellular distribution of gallium, a novel antimicrobial for treating urinary tract infections in dogs caused by uropathogenic *Escherichia coli*.

But before the STXM technique can be developed for future studies, researchers need to understand if traditional tissue sample preparation methods (freezing or embedding) cause significant disruption of intracellular chemical distribution.

In this study, the team will compare two different tissue sample preparation techniques to determine the best method for STXM analysis using synchrotron radiation prior to testing gallium in dogs. The researchers will prepare samples of mice bladder tissue using freezing and embedding methods. Next, the researchers will use STXM to measure intracellular concentrations of sodium, potassium and magnesium (elements that are sensitive markers of intracellular chemical disruption during the tissue preparation process) in the samples.

Finally, the team will compare concentrations from the two different techniques — as well as against literature values — to determine the extent of disruption caused by sample preparation procedures. Based on those findings, the team can confirm the best method of sample preparation for soft X-ray scanning and transmission microscopy of animal tissues.

C-reactive protein as a prognostic indicator in dogs with acute abdomen

Drs. Angelica Galezowski, Marion Jackson and Elisabeth Snead, WCVM

The acute phase response is the body's innate and non-specific reaction to tissue injury. The response includes changes in acute phase proteins (APPs). APPs have been used in the early detection of subclinical disease or altered health status, and in predicting disease development. One of the APPs is C-reactive protein (CRP) — a very rapid and sensitive marker of various acute inflammatory diseases in dogs.

Prairie Diagnostic Services, Saskatchewan's veterinary diagnostic laboratory with a division housed at WCVM, has validated a CRP assay for dogs. In this study, researchers will investigate CRP level changes in dogs diagnosed with *acute abdomen* — a condition that is characterized by sudden onset of abdominal pain and frequently fever, vomiting diarrhea, lethargy, inappetence and nausea.

Currently, there are no published studies evaluating CRP as a prognostic indicator in dogs with acute abdomen. Serum CRP determination could provide a rapid and inexpensive means of evaluating and predicting outcome for these dogs.

Specifically, the research team will correlate CRP levels with clinical outcome, white blood cell changes, the length of hospital stay, fluids administered and overall prognosis. Based on the study's results, researchers can evaluate the prognostic value of CRP levels in dogs suffering from acute abdomen.

Methicillin-resistant *Staphylococcal aureus* (MRSA) in dogs

Drs. Joseph Rubin and Manuel Chirino-Trejo, WCVM; Alice Wong and Steve Sanche, Royal University Hospital

Methicillin-resistant *Staphylococcal aureus* (MRSA) is an emerging pathogen in animals worldwide; very little is known about the strain types or prevalence of MRSA in dogs. With the recent isolation of MRSA from canine patients at WCVM, there's a need for more information on interspecies transmissibility, virulence and antimicrobial resistance. The role of human carriers in the dissemination of MRSA into canine populations is unclear and more studies are required to better understand this pathogen's ecology and epidemiology.

This study will be the first to determine the prevalence of MRSA in dogs owned by people who have tested positive for the bacterium. It will include dogs owned by 100 patients who have tested positive for MRSA in the Saskatoon Health Region. Additionally, researchers will assess the prevalence of MRSA in the general canine population by sampling dogs with no known risk factors for colonization. A total of 500 dogs presenting to the veterinary teaching hospital for routine health checks will be included. The researchers will collect nasal, pharyngeal and rectal samples (swabs) for bacteriological culture from these patients.

The antimicrobial susceptibility to an extensive panel of drugs important in both human and veterinary medicine will be tested. Isolates will be further

characterized with pulsed field gel electrophoresis and multilocus sequence typing to establish strain relatedness. The presence of Panton Valentine leukocidin, an important virulence factor, will also be determined. Characterization of these strains will provide invaluable epidemiologic information regarding MRSA in dogs in Saskatoon and will be very useful as a therapeutic guide to clinicians.

Identification of sentinel lymph nodes in dogs with oral cancer

Drs. Monique Mayer, Valerie MacDonald, James Anthony and Candace Grier, WCVM

Oral cancer is the fourth most common cancer in dogs. While some oral cancers carry a grave prognosis, others respond favourably to treatment and a cure is possible. What veterinary oncologists need to know is whether cancer cells are present or absent in lymph nodes that drain an oral tumour. This information is critical since metastasis to lymph nodes will affect the prognosis given to a dog's family as well as the optimal treatment plan.

In this study, the research team will investigate the efficacy of computed tomography (CT) lymphography to identify the *sentinel lymph node* — the first lymph node to drain an oral cancer. CT lymphography is a simple technique that specialists can perform during preoperative tumour imaging to identify and localize the sentinel lymph node or nodes.

By identifying a sentinel lymph node before surgery, specialists can assess the status of the lymphatic bed draining a tumour with minimal surgical dissection. Biopsy of the sentinel lymph node rather than multiple nodes within the drainage bed would minimize patient morbidity by decreasing the degree of surgical dissection required. The CT images will also help to facilitate surgical biopsy of the lymph node.

The research team will assess the technique in normal dogs and dogs with oral cancer, then use the information to guide lymph node biopsy in dogs with oral tumours treated at WCVM's Veterinary Teaching Hospital.

A serologic study of exposure to tick- and mosquito-borne pathogens in dogs from Saskatchewan

Drs. Sue Taylor, Matthew Gaunt, Elisabeth Snead and Anthony Carr, WCVM

In this study, researchers will determine the prevalence of exposure to a number of tick- and mosquito-borne pathogens in dogs living in Saskatchewan. The list of pathogens includes *Borrelia burgdorferi*, *Ehrlichia canis*, *Anaplasma phagocytophilium*, West Nile virus, *Bartonella vinsonii spp. berkhoffi* and *Dirofilaria immitis*. Altogether, the team will evaluate serum samples from 500 Saskatchewan dogs that are presented to veterinarians between June 15, 2008, and October 15, 2008, and haven't travelled outside of Saskatchewan within the previous 12 months.

While 400 of the samples will be taken from healthy dogs, the remaining samples will be taken from dogs with confirmed polyarthritis, meningitis, thrombocytopenia, endocarditis or fever of unknown origin. This population of dogs with inflammatory disease will come from the WCVM and from other veterinary clinics across Saskatchewan. Besides the blood samples, researchers will also collect more detailed information about each dog.

Once all of the information has been collected and blood sample analysis is completed, the research team will evaluate age, sex, breed, housing (indoor versus outdoor), flea or tick exposure, clinical status (sick versus healthy) and clinicopathologic findings as risk factors for exposure to vector-borne pathogens. V

2008-09 CAHF FELLOWS

This spring, the Companion Animal Health Fund allocated more than $30,000 to its Research Fellowship program — a longtime initiative that annually supports one or more graduate students whose research focuses on some aspect of companion animal health at WCVM.

For the next 12 months, two senior graduate students in WCVM's Department of Small Animal Clinical Sciences will share the honour of being named 2008-09 CAHF Research Fellows. The two graduate students will split the fellowship program's funding, and other sources will provide the rest of the money for their annual stipends. Here are brief biographies of the Fund's new CAHF Fellows:

• **Dr. Bianca Bauer** began her combined Master of Science (MSc) and clinical veterinary ophthalmology residency program in July 2006. This is the first time that WCVM has offered this four-year program that includes two years of research work along with clinical experience in veterinary ophthalmology.

Bauer's research project, which received support from CAHF, focuses on the mutation that induces retinal dysplasia in miniature schnauzer dogs. As part of her work, Bauer has worked on the development of a molecular marker for identifying carrier animals in this breed, and she has investigated these markers in other breeds of dogs with inherited retinal dysplasia.

Bauer presented a portion of her research at the American College of Veterinary Ophthalmologists' annual conference in 2007 and received an award for the best research presentation in the resident forum. Bauer's graduate supervisor is Dr. Lynne Sandmeyer, one of WCVM's two veterinary ophthalmologists.

• **Dr. Barbara Ambros** is in the second year of her three-year Master of Veterinary Science (MVetSc) program and a residency in veterinary anesthesiology. During her program, Ambros' research has focused on two anesthetics: propafol and a new drug called Alfaxan®. Her project has looked at the cardiopulmonary effects on dogs when the anesthesia drugs are given in continuous infusions.

Findings from her research will eventually be published in the *American Journal of Veterinary Research*. Last fall, the graduate student shared first prize for her resident's abstract presentation at the European College of Veterinary Anaesthesia (ECVA) meeting in Leipzig, Germany.

Ambros' graduate supervisor is WCVM veterinary anesthesiologist Dr. Tanya Duke.

Visit www.cahf.usask.ca and click on "Education" to learn more about the CAHF fellowship program and to read about previous CAHF Fellows.