

## College of Veterinary Medicine Faculty Summaries 2016

### **Luiz Bermudez**

Mycobacterial pathogenesis and new therapies to mycobacterial infection. *Mycobacterium tuberculosis*, *Mycobacterium avium*, *Mycobacterium abscessus* and *Mycobacterium avium* subsp *paratuberculosis*. Infection of the human and animal host, survival mechanism in the host, biofilm and its role in disease. Macrophages, Natural Killer cells and T lymphocyte participation in host defense against mycobacterial infection.

### **Rob Bildfell**

The majority of my research efforts are in the form of pathology-related support services for my colleagues, ranging from projects involving the pathogenesis of neoplasia to virulence mechanisms of *Mycobacterium spp.* I have a strong interest in diseases of wildlife and exotic animal species, as well as diseases of public health significance such as cryptosporidiosis.

### **Linda Blythe**

My current research is in collaboration with Dr. Morrie Craig's lab. We are working to determine the threshold of toxicity of perennial ryegrass infected with endophyte in UAE camels. We have 24 camels on 4 different levels of lolitrem B produced by endophytes in perennial ryegrass, consuming this grass straw over 60 days. Camels are videotaped in UAE twice a week as individuals and I observe them for onset and presence of neurological signs. This is a major importance to the AgFibre and the export industry in order to only ship "safe feed" to the Middle East, a newly opening market.

### **Chris Cebra**

Dr. Chris Cebra main lines of inquiry involve energy metabolism and gastrointestinal disorders. Regarding energy metabolism, he has primarily investigated the diabetes-like characteristics of llamas and alpacas, but has completed projects on cattle and horses as well. Regarding gastrointestinal diseases, he has concentrated on causes of colic, parasitic disorders, and other enteritides of camelids. He has also initiated or collaborated on projects in a number of other areas relevant to large animal internal medicine including equine and camelid peritoneal fluid analysis, diagnostic imaging, infectious diseases, and immunology.

### **Patrick Chappell**

Work in my lab broadly focuses on basic mechanisms underlying endocrine control of reproduction, exploring the role of the molecular circadian clock in the brain's timing of reproduction in female mammals, investigating how circadian disruption may initiate breast and prostate cancers, and how the hormonal control of reproduction evolved from more ancient species such as corals.

### **A. Morrie Craig**

The focus areas of my research are: 1) the detoxification of plant alkaloids, including a long, established history of experience in mycotoxin research, and 2) the bioremediation of organic compounds, including those found on Super Fund sites. Within these two programs, the emphasis has been on defining the metabolic pathway of plant and environmental toxins in the animal and identifying the key microbes and/or genes that contribute to metabolism in the host animal.

### **Lia Danelishvili**

Dr. Lia Danelishvili's research is mainly focused on study the mechanisms of *Mycobacterium tuberculosis* pathogenesis. Dr. Danelishvili's research identifies and characterizes virulence genes and proteins that are required for the early events of macrophage infection, survival and cell-to-cell spread. She studies the molecular mechanisms of the pathogen-host interaction and the associated cellular processes, such as apoptosis, autophagy and necrosis. The multidisciplinary approaches employing bacterial genetics, high throughput screening libraries, gene knockout systems, cell biology, high-resolution microscopy, bioinformatics and mass-spectrometric sequencing are used in the laboratory.

### **Helio De Moraes**

My focus is on vector-borne and emerging infectious disease of dogs and cats.

**Brian Dolan**

Research in my lab is focused on two main areas. The first is the biology of antigen presentation, the process by which the cells of the body alert the adaptive immune system to the presence of intracellular pathogens, such as viruses, or oncogenic transformation. We are trying to determine which cellular pathways are necessary to successfully present the foreign peptide on major histocompatibility complex class I (MHC I) proteins at the cell surface, which serve to flag down disease specific cytotoxic T cells. The second focus of my lab is comparative and ecological immunology. We develop new methods for measuring different aspects of the immunity in wild animals and then relate the immune responses to a variety of ecological parameters to determine how the environment impacts animal health and disease spread.

**Charles Estill**

Dr. Estill is a Theriogenologist in the Department of Clinical Sciences. Research areas of interest include corpus luteum physiology and control, nutritional influences on reproduction, and ontogeny of sexual development. Current projects include collaboration on studies of "A ram model of neuroendocrine determinants of sexual orientation" and "Role of Peroxisome Proliferator-Activated Receptor gamma on prevention/cure of Mastitis".

**Jean Hall**

My research is concerned with how nutrition affects immunity. I am interested in nutrigenomic technology, or the study of how nutraceuticals affect the expression of genes involved in the immune response. My projects involve sheep and cows supplemented with selenium and its effects on immune responses, animal health, and animal production. In particular, we are interested in using selenium as a fertilizer to enhance forages fed to ruminants. I am also interested in the health benefits of dietary n-3 fatty acids and antioxidants in geriatric dog and cat foods. We are currently investigating these supplements in renoprotective foods used to slow the progression of chronic kidney disease in dogs and cats. In conjunction, we are assessing novel renal biomarkers used for monitoring disease progression and therapeutic interventions.

**Claudia Hase**

The genus *Vibrio* consists of a group of Gram-negative bacteria that naturally inhabit aquatic environments worldwide. Among this diverse group of microorganisms are a few human pathogens, namely *Vibrio cholerae* and *Vibrio parahaemolyticus*. In addition, our lab studies some *Vibrio* species that cause disease in aquaculture and corals (*Vibrio coralliilyticus*). We are applying various modern molecular techniques to better understand the virulence properties and environmental survival strategies of these pathogens. In addition, we are developing detection and protection (probiotics) assays that can be used in aquaculture facilities to reduce the economic impact of vibriosis and in coral disease management.

**Michael Huber**

Research projects included surgical manipulation of endometrial cups in mares to manage infertility associated with pregnancy loss, and the impact of bone fragments on joint health. Focusing on some innovative ideas for limiting reproduction in BLM and Tribal horse and burro populations and development of an instrument to facilitate a surgical procedure.

**Ling Jin**

My lab is interested in understanding of the mechanism of viral diseases and virus evolution. Latency of herpesviruses is the main focus of research in my laboratory. My lab uses several different herpesviruses to study the mechanism of herpes virus latency-reactivation cycles, the pathogenesis of herpes viruses, such as Herpes Simplex Virus 1 (HSV-1), Herpes Simplex Virus 2 (HSV-2), Leporid herpesvirus 4 (LHV-4), Koi herpesvirus (KHV) and other animal herpes viruses, and host-virus interaction in central nervous system. In addition, my lab is interested in anti-viral drug development, new emerging viral disease diagnosis, such as deer pox virus, deer adenovirus, goldfish tumor virus. Currently, we have research projects on HSV, LHV-4, KHV, Bovine Herpes Virus 1 (BHV-1), goldfish tumor virus, and deer adenovirus.

### **Jennifer Johns**

Research in our lab focuses in several areas:

- Translational research utilizing mesenchymal stem cells (MSCs). We are currently evaluating 1) how MSCs alter the bone marrow microenvironment and may be altered themselves in canine osteosarcoma (a common bone cancer of dogs), and the resulting impact on tumor progression; 2) the role of MSCs in modulating the host immune response to infectious diseases in veterinary species.
- Clinical research for veterinary diagnostic testing. Current emphasis is on 1) laboratory animal and exotic species testing; 2) diagnostic testing for hematopoietic disorders in domestic animals.

### **Anna Jolles**

Dr. Anna Jolles is a disease ecologist and epidemiologist at Oregon State University, where she has appointments in the College of Veterinary Medicine and the Department of Zoology. The Jolles lab studies the ecology and eco-immunology of infectious diseases in wild mammals. Current study systems include infectious diseases of African buffalo, feline immunodeficiency virus in African lions and Hanta virus in small mammals in Oregon. We collaborate with Dolan's group on comparative immunology across a broad range of mammal species, and with Clint Epps (OSU Fisheries & Wildlife) on pneumonia in desert bighorn sheep.

### **Michael Kent**

Dr. Kent's research focuses on diseases of fishes and parasitology. Currently he is leading projects investigating diseases of importance to zebrafish in research facilities as this fish is now a very important model in biomedical research. Two groups of pathogens that he is studying are mycobacteria and microsporidia that infect zebrafish. He also is investigating diseases of importance in wild salmonid fishes, and presently is studying multiple pathogens associated with pre-spawning mortality in Chinook salmon.

### **Nicole LeBlanc**

My research activities are focused on three dimensional cardiac imaging. Currently, we are evaluating right heart structure in normal dogs and those with right-sided heart disease using advanced imaging modalities (e.g. 3D echocardiography and multi-detector computed tomography). I am also investigating the accuracy and reproducibility of advanced imaging techniques for the diagnosis and treatment of heart disease.

### **Christiane Löhr**

My research focuses on the molecular mechanisms pathology underlying as it applies to a wide range of disease developments and progression are at the core of my research. I am especially interested in carcinogenesis, cancer prevention and treatment and infectious diseases. As a board certified anatomic veterinary diagnostician/pathologist with an appointment in the Veterinary Diagnostic Laboratory I encounter new or poorly understood disease conditions, which with regularity. Such cases provide excellent opportunities to identify specific, potentially novel, causes and mechanisms of disease processes. Currently, my research is focused on the diagnostic challenges associated with invasive cancers, the identification of cancer biomarkers, and potential benefits of dietary intervention for cancer patients. Much of my research is conducted in collaboration with colleagues in the College, on campus and outside the University. I find it very rewarding to provide critical input and data to large projects and to contribute to the training of researchers at all levels.

### **Kathy Magnusson**

Our laboratory is interested in how aging affects brain functions, particularly memory. We have found a selective vulnerability of the NMDA receptor to aging. This decline in NMDA receptors correlates with declines in memory function. We are working on exploring the effects of drug or micronutrient interventions on these receptors during aging with the use of stereotaxic surgery, chronic drug administration, and/or behavioral testing using mice as our model system. We also examine the effects of interventions on receptor binding density, and subunit mRNA and protein expression with the use of receptor autoradiography, in situ hybridization and Western blots, respectively. We are also performing functional MRI studies and developing a virtual memory test for humans, which is similar to our mouse task, in order to enhance the translation between our mouse and human studies.

**Hadi Mansouri**

The effect of IKVAV- Peptide on spinal cord regeneration following spinal cord injury. This research has been done to measure efficacy of local treatment with IKVAV-peptide on spinal cord regeneration following compression injury at T12 in Balb-c mice. Spinal cord injury(SCI) often causes lifelong and devastating neuromuscular consequences with few treatment options. In the short term, using the spinal cord clip clamp mouse model, functional recovery following spinal cord injury is improved using an IKVAV- peptide placed at the site of injury. We showed that nanofibers promoted reactivation of neurons in the gray matter of the spinal cord. Furthermore, increased reactive astrocytes may be a factor in which function of motor neurons may be restored in the short term of 28 days. These findings indicate the possibility that IKVAV-peptide may facilitate the reactivation of neurons which may result in functional improvement following SCI.

Detailed macroscopic, microscopic and ultrastructural study of the alpaca pancreas The camelid pancreas is an organ of great interest. Reported pathological conditions involving the camelid pancreas include pancreatic necrosis and pancreatic atrophy with diabetes mellitus. Compared with other domestic animals, camelids have low plasma concentrations of circulating insulin, partial insulin resistance and a weak insulin response to hyperglycemic challenge. We have found interesting results.

**Erica McKenzie**

Dr. Erica McKenzie is a specialist in large animal medicine and sports medicine and rehabilitation. Her research interests are largely related to exercise physiology and muscle function. Some of her projects have therefore included studying effective drugs for preventing muscle damage in horses, and the study of specific aspects of exercise physiology and disease in racing Alaskan sled dogs. As a large animal clinician, Dr. McKenzie occasionally performs research projects relevant to internal medicine in alpacas.

**Jan Medlock**

My research interests are in infectious diseases and ecology, using my background as an applied mathematician. I am currently working on a variety of subjects, from more theoretical work on dispersal of organisms to more practical projects on influenza, dengue, and African sleeping sickness. I am also interested in the application of mathematics and statistics to biology in general: I have recently begun working with Dr. Shay Bracha to analyze large amounts of genomics and proteomics data on canine cancers.

**Kirk Miller**

Dr. Kirk Miller is Certified in Canine and Feline Practice through the American Board of Veterinary Practitioners. He was in private small animal general practice for more than 12 years before joining the faculty at OSU. Dr Miller is a Clinical Instructor and teaches the Small Animal Primary Care rotation which takes place at the Oregon Humane Society in Portland. His research interests include efficient spay/neuter techniques, infectious diseases, and anorexia in cats.

**Tim Miller-Morgan**

Dr. Tim Miller-Morgan is an extension veterinarian focusing on aquatic species and the ornamental fish industry. He leads the Oregon Sea Grant Aquatic Animal Health Program which provides the ornamental fish industry, aquatic research laboratories, and public aquaria with cutting-edge, scientifically based, conservation minded disease management techniques, consultation and training. Our research focus is on applied research aimed at current and emerging animal health issues generally associated with the management of wild-caught ornamental fish species and the management of disease throughout the chain of custody from the collector/farmer to the end consumer the ornamental fish hobbyists.

**Milan Milovancev**

My research topics can be broadly categorized as (1) cancer related or (2) clinical challenges in soft tissue surgery. My cancer related research centers around improving our understanding of the biologic behavior of canine sarcomas (e.g. soft tissue sarcomas, oral fibrosarcomas, and osteosarcomas) as it relates to development of novel diagnostic, prognostic, and therapeutic methods. The research I perform related to clinical challenges in soft tissue surgery is generated from specific problems encountered during my clinical treatment of patients. These include development of novel minimally invasive surgical techniques, evidence-based evaluations of different surgical methods, and case-based reports.

### **Hong Moulton**

Morpholino oligomers are a class of steric-blocking antisense molecules that have been widely used to knock down gene expression, modify pre-mRNA splicing or inhibit miRNA maturation and activity. Injection of Morpholinos into single-celled embryos of many creatures results in specific knockdown of targeted genes with little toxicity. Morpholino oligomers have revolutionary potential for treatment of a broad range of human diseases, including viral, bacterial, age-related and genetic diseases, but they suffer from poor delivery into cells. My long term research interest has been in inventing and improving methods for enhancing *in vivo* delivery of Morpholinos in a tissue-specific manner for a given disease by chemically modifying and/or formulating Morpholinos. My current research is 1) to develop and validate a high throughput *in vivo* model to assess the efficacy and toxicity of intracellular delivery methods for steric-blocking antisense oligos, and 2) to investigate how host factors affect influenza viral infection using the Morpholino-mediated gene knockdown approach.

### **Debbie Mustacich**

My research interests include determining the ability of antioxidants and bioactive food components to: 1) modulate pathways involved in metabolism and elimination of drugs and environmental toxicants, 2) function as adjuvants for improved recovery following injury and 3) prevent side effects of chemotherapeutic agents. The long-term goal is to decrease nutrient-pharmaceutical drug interactions and improve the body's ability to respond and protect itself from chronic disease, mechanical injury and environmental toxicant exposure, as well as improve quality of life and outcomes for patients by diminishing debilitating side effects of pharmaceutical/chemotherapeutic drugs.

### **Sarah Nemanic**

My clinical research areas of focus are imaging of small animal orthopedic and neoplastic diseases. I collaborate with orthopedic and soft tissue surgeons, oncologists, and clinical and anatomic pathologists. The thematic basis of my research is to determine the best imaging modality to diagnose diseases in small animal patients, with studies comparing CT and MRI, ultrasound and CT, radiographs and CT, and radiographs and ultrasound. Further, I use CT, ultrasound and radiographs to compare orthopedic surgery outcomes.

My teaching research focus is creating computer software applications and testing their effectiveness to improve learning of material in the CVM curriculum. Previously developed software applications include a web based radiographic anatomy application ([veterianry-radiographic-anatomy.oregonstate.edu](http://veterianry-radiographic-anatomy.oregonstate.edu)) and an application that uses 3D CT images in Virtual Reality.

### **Fikru Nigussie**

At present my research is in collaboration with Dr. Kathy Magnusson's lab in exploring the role of NMDA receptors on transient hyperexcitability in Alzheimer's disease (AD) model mice, and its role in early onset AD. We will be manipulating NMDA receptors to examine alteration in hyperexcitability, examine responses of NMDA receptors and long-term potentiation (LTP) in hippocampal slices with the use of multielectrode electrophysiology.

I have interest in researching role of adult hippocampal neurogenesis in learning and memory, regulation of stress and circadian rhythm using animal and cell culture models.

### **Kathy O'Reilly**

- 1). Development of assays for diagnosis and epidemiology of important veterinary and zoonotic diseases. (Prefer MS students only).
- 2). Examination of various aspects of *Bartonella henselae* pathogenesis including reactivation of quiescent infection in cats.

## **Manoj Pастey**

Dr. Pастey's laboratory is conducting research work on the pathogenesis of influenza, HIV, and respiratory syncytial virus (RSV) and developing a new diagnostic method to detect Dengue virus, Bovine Herpes virus, and sexually transmitted infections in clinical samples.

Influenza Research Study: Each year, influenza kills approximately 36,000 people in the United States. These deaths are mainly due to secondary bacterial infection. Therefore, we are focusing our research on identifying biomarkers in blood and urine for respiratory tract dysfunction caused by co-infection of *Staphylococcus aureus* and influenza virus. Accomplishments of the proposed goals will help us predict the evolution of *S. aureus* super-infection in patients with H1N1 influenza virus disease. We are also developing a method for increasing vaccine production in eggs and cell lines by suppressing the expression of cellular genes validated as important in regulating influenza virus replication.

HIV Research Study: Our laboratory is testing a polyherbal vaginal microbicide named "BASANT" that has been shown to inhibit a wide range of sexually transmitted pathogens including HIV. Preliminary studies have also shown safety and acceptability in Phase I (acceptability and toxicity study) human trials in India. Therefore, the next step is to verify the effectiveness of the BASANT in preventing HIV transmission *in vivo*. We are also working on a novel HIV protein that is required for replication in T cells. HIV sequestration in the CNS and the failure of antiretroviral drugs to penetrate through blood-brain barrier to eliminate latent CNS reservoir continues to be a major road block in AIDS therapy. Therefore, we are developing Nanotechnology based delivery systems to target the virus within different tissue compartments.

RSV Research Study: Respiratory Syncytial Virus (RSV) is a leading cause of bronchopneumonia in infants and the elderly. There are no vaccines or effective treatment available. Knowledge of viral and host protein interactions is important for better understanding of the viral pathogenesis and may lead to development of novel therapeutic drugs. In our lab, we have shown that Respiratory Syncytial Virus Matrix (M) protein interacts with cellular adaptor protein complex (AP)-3 and its medium ( $\mu$ ) subunit. We are also looking into the role played by Myeloid cell leukemia-1 (MCL-1), an anti-apoptotic member of the B-cell lymphoma-2 (Bcl-2) family, in Respiratory Syncytial virus pathogenesis.

New Diagnostic method: We are developing a new rapid diagnostic method to detect dengue virus, bovine herpes virus, and sexually transmitted infections at Point-of-Care within 30 mins at room temperature using recombinase polymerase amplification (RPA) technology without the need for sophisticated equipment.

## **Stephen Ramsey**

I'm a systems biologist specializing in computational biology. My long-term goal is to map the networks of gene regulatory interactions (i.e., gene regulatory networks) that underlie normal cellular function and to elucidate how dysregulation of these networks contributes to disease pathogenesis. In working toward that goal on multiple fronts, my collaborators and I often use high-throughput sequencing-based approaches to profile the genome, transcriptome, and chromatin interactions. These types of assays produce heterogeneous data sets for which my lab specializes in carrying out integrated analyses. In terms of specific biological contexts, I am currently working on collaborative studies of gene regulation in (1) atherosclerosis (combining data sets from human population genetic and tissue transcriptomic studies and from mouse transcriptomic studies); (2) cancer (variously using transcriptome and somatic genome data sets from dog, cat, and human cancer cohorts); and (3) innate immunity (using transcriptomic and epigenomic data sets from mouse macrophages). Trainees in my lab can expect to become proficient in computationally analyzing heterogeneous biological data sets using the R/Bioconductor system, Python (numpy, scipy, pandas, scikit-learn), and various Unix command-line tools.

## **Dan Rocky**

**Interactions between chlamydiae and the mammalian host.** All species of chlamydiae are obligate intracellular bacteria that cause disease in a wide variety of animal species. In humans, *Chlamydia trachomatis* and *C. pneumoniae* cause a variety of diseases of the eye, genital tract and lung. These conditions affect millions of people worldwide and lead to billions of dollars in medical expenses yearly in the U.S. alone. Additionally, chlamydial infection is associated with certain types of arthritis and, most surprisingly, arterial sclerosis. Very little is known about how chlamydiae interact with the host to cause a particular chlamydial condition, and why some infected people have serious disease and others are asymptomatic.

**Sasha Rose**

My research revolves around the bacterial physiology, biofilm biology, host-microbe interaction, and novel treatment strategies for nontuberculous mycobacteria. Using various molecular biology and microbiology techniques, such as transposon mutagenesis, proteomics, transcriptomics, in vitro cell models, and in vivo infection models, we can dig deep and dissect these topics, discovering new insights into the pathogenesis and biology of these organisms. I currently collaborate with an industry partner developing novel nanoparticle-based drug therapy that delivers antibiotics directly to the site of infection in the lungs and concentrates them within infected cells, which significantly increases the efficacy of the drug and is translating into new effective options for patients. We are also investigating combination therapy that combines antibiotic with molecules that target virulence, tolerance, or resistance mechanisms in the bacteria to increase the efficacy and reduce the resistance potential of the administered drug.

**Mahfuzur Sarker**

The long-term goal of my research program is to develop strategies to inactivate *Clostridium* spores and to control *Clostridium*-mediated diseases. We mainly focus our work on spores of *C. perfringens* (*Cp*) causing *Cp* food poisoning, which currently ranks as the third most commonly reported food-borne disease in the USA. *Cp* also causes non-food-borne gastrointestinal (GI) diseases in humans and GI diseases in domestic animals. Specifically, we investigate the molecular mechanisms of *Cp*: i) spore heat resistance; ii) spore germination; iii) spore-host interactions; and iv) spore inactivation.

**Katherine Scollan**

My research in the field of veterinary cardiology is focused on three-dimensional imaging of the heart including 3D echocardiography and computed tomography (CT). I am investigating the use of these imaging modalities to assess size and function of the cardiac chambers in normal and diseased hearts. In addition, I perform research in pharmacokinetics and efficacy of antiarrhythmic medications used in dogs and have an interest in the congenital cardiac diseases of camelids.

**Stacy Semevelos**

Her research focuses on comparative orthopaedics, particularly postnatal cartilage development and osteochondrosis in horses. She has discovered molecular expression changes in osteochondrosis and has explored the quantitative and spatial alterations of matrix molecules, growth factors, and cell-to-cell signaling in this important disease. In addition, she has discovered age-related changes in gene and protein expression patterns of matrix molecules, growth factors and paracrine factors in articular cartilage of normal growing horses throughout postnatal development. She has also investigated musculoskeletal disorders of llamas and alpacas, using molecular, biochemical, and histological techniques to evaluate suspensory apparatus breakdown in these species.

**Natalia Shulzhenko**

My laboratory studies interactions between the immune system, metabolism and gut commensal microorganisms (microbiota) in mouse models and human diseases. Microbial cells exceed ten times the number of our own body cells and contribute to several physiological processes. With the advent of new genomic technologies, the role of microbiota in health and disease is a rapidly evolving field of research. We apply novel systems biology approaches such as network reconstruction to analyze host and microbiota simultaneously. Our recent work on chronic enteropathy in immune-deficient hosts revealed a crosstalk between the immune system, the microbiota, and the epithelial cells affecting both intestinal and systemic lipid metabolism. Using metagenomic sequencing, we plan to reveal the microbial players contributing to this disorder and to test them in a mouse model of this disease. In another project, we are studying adverse effects of antibiotics on the intestinal immune system and on microbiota and how this disruption contributes to metabolic syndrome and type 2 diabetes.

### **Susanne Stieger-Vanegas**

My research interests focus broadly in computed tomography and ultrasound of gastrointestinal, complex cardiac, pulmonary and musculoskeletal disease in dogs, calves and New World Camelids. My interest not only includes the CT imaging of clinical patients, but establishing new imaging protocols to improve imaging of diseased veterinary patients using CT. Currently I have a focus in dogs with cardiac abnormalities and New World camelids with gastrointestinal and cardiac disease. In addition, I have a strong interest in understanding if additional techniques such as three-dimensional CT or 3D printing of complex abnormalities can improve the understanding of diagnostic imaging studies and support student teaching. Current ongoing funded projects include CT of the gastrointestinal tract of dogs and New World Camelids with enteropathy, cardiac-gated CT of New World camelids with complex cardiac abnormalities, evaluation of pulmonary disease in calves, evaluation of the healthy and diseased supraspinatus tendon in dogs using ultrasound and MRI.

### **Sue Tornquist**

My areas of research include hematology, metabolic disease and infectious diseases of camelids and use of immunocytochemistry in diagnosis and prognosis of neoplasia.

### **Jennifer Warnock**

I am a Small Animal Surgeon with a practice focus on orthopaedic surgery. My major area of basic science research is on *in vitro* meniscal tissue engineering, using waste tissue obtained during clinical arthroscopy. Meniscal injury and deficiency is a major cause of pain, disability and irreversible osteoarthritis in dogs and humans. As the menisci have minimal to absent healing responses, creating autologous fibrocartilages *in vitro* through tissue engineering may be a viable strategy for addressing the meniscal deficient stifle or knee. My current work has focused on creating fibrocartilage-like tissue from synovial and meniscal cells cultured from clinical patients in need of engineered stifle tissues. Specifically, my lab has synthesized autologous, scaffold free, tensioned neotissues, to avoid the complications seen with use of synthetic, allogeneous, and xenogenic scaffolds in meniscal tissue engineering applications. My clinical research focuses on minimally invasive surgery and validation of surgical techniques. I have a long term goal of bringing discoveries made in my laboratory (following efficacy and safety analysis) to the hospital to benefit my patients.

### **Katja Zellmer**

My general research area is the pathophysiology and treatment of osteoarthritis – especially in horses. More specifically, we are currently investigating different routes of administration of the drug tiludronate, which is a bisphosphonate that decreases bone breakdown. This drug is exciting, as it is the 1<sup>st</sup> time that veterinarians are trying to affect the subchondral bone pathology in the development of osteoarthritis! Another area of research is the use of nanocarriers for the delivery of medication, gene therapy and interfering RNAs into osteoarthritic joints. Further, I am collaborating in the investigation into signaling changes that may be responsible for the development of osteochondrosis (a developmental joint disease) in foals, as well as in the use of synovial-derived cells for bioengineering of meniscal replacements in dogs. In the future, I am hoping that we will determine whether synovial-derived mesenchymal stem cells are of benefit in the treatment of osteoarthritis in horses.