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 cryptococcosis.

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 Morais
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. We are also interested in studying immune responses in wild animal populations as it relates to 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 inhabitant 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 (*Vibrio tubiashii*) 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 assays that can be used in aquaculture facilities to reduce the economic impact of virbiosis.

Jerry Heidel
My research activities are focused on health issues related to aquatic animals. Currently, we are examining the causes of mortality in ornamental fish, from the time of collection in the field, through holding and shipping, to their arrival and holding at import facilities. By identifying and characterizing health problems associated with infection, environmental change, and handling, we are working towards establishing best practice procedures for the husbandry of these fish during this crucial period, and in so doing, reduce shipping related losses in this industry.

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 in 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.

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.

Christiane Löhr
My research focuses on the molecular pathology as it applies to a wide range of diseases especially carcinogenesis, cancer prevention and treatment and infectious diseases. As a board certified anatomic veterinary pathologist with an appointment in the Veterinary Diagnostic Laboratory I encounter new or poorly understood disease conditions with regularity. Such cases provide excellent opportunities to identify specific, potentially novel, causes and mechanisms of disease processes. 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 human population is aging. The percentage of the population in this country that is over the age of 65 is projected to increase from 12.6% in 2005 to 20% by 2030. With this increase will come a rising financial burden to both families and society, unless we can prevent the declines that are currently associated with aging. Declines in brain functions during aging, including memory and cognitive flexibility, affect almost half of the human population over 65 years of age. This interferes with people's quality of life as they get older. It also can become an economic burden, because they can no longer live independently. Pet animals can also experience these changes, which may limit their functional lifespan. These problems suggest that there is a decline in the optimal functioning of regions of the cerebral cortex and hippocampus. The N-methyl-D-aspartate receptor, a subtype of glutamate receptor, is highly expressed in these brain regions and plays a role in many of the functions that decline during aging. Our laboratory has found a selective vulnerability of the NMDA receptor to aging. This decline in NMDA receptors correlates with declines in memory function. We will be exploring the effects of drug or micronutrient intervention 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 may also be examining 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.

Hadi Mansouri
My current research is in collaboration with Dr. Terri Clark. We are studying the detailed macroscopic, microscopic and ultrastructural study of the alpaca pancreas. The camelid pancreas has been 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 so far. I have also studied the effect of IKVAV-Peptide on spinal cord regeneration following spinal cord injury with two of my colleagues since 2010. 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. Our findings indicated that IKVAV-peptide may facilitate the reactivation of neurons which may result in functional improvement following SCI. At present time, I am in the process to do another research on larynx.

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 current research projects include looking at the natural incidence of dirofilaria immitis in dogs in the northern Willamette Valley and another project evaluating a novel spay technique in cats.

Tim Miller-Morgan
Dr. Tim Miller-Morgan is and 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 wit 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 giving 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 research focuses on using diagnostic imaging to help diagnose diseases or monitor response to treatment in companion animals. I have several on-going research projects in small animal imaging using radiographs, CT, MRI and ultrasound. These projects include CT of awake hyperthyroid cats pre and post methimazole treatment to assess whether volume measured on CT will correlate to dose of methimazole needed to control disease. The CT appearance of the medial retropharyngeal lymph nodes in cats with or without nasal disease including both rhinitis and neoplasia. The radiographic development of the forelimb of giant breed dogs with and without elbow dysplasia and shoulder osteochondrosis. A comparison between MRI and CT for optimal pre-operative imaging of feline injection site sarcomas. A comparison of CT arthrography and MRI for assessing the diseased canine stifle. The use of a stereotaxic apparatus to perform brain biopsies in dogs with intracranial disease.

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 Pastey
Dr. Pastey'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 (μ) 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

My lab's research program combines computational and experimental approaches to map and functionally characterize gene regulatory networks. Our aim is to develop data-driven approaches to “reverse engineer” the regulatory networks that control immune responses in host defense against pathogens and in chronic inflammatory diseases. A comprehensive understanding of these networks is a gateway to being able to predict how the immune system will respond to novel therapies, pathogens, and vaccines. On the computational side, we use integrative machine-learning methods to both identify the genomic regulatory elements that mediate transcriptional control in specific cell types, and to leverage information from genetic epidemiology and from molecular networks to uncover novel molecular regulators of inflammatory responses. On the experimental side, we have been studying the mammalian macrophage (a key constituent of the innate immune system) as both a primary application area and a “test-bed” for integrative methods development. Together with collaborators, we are also employing this systems biology approach in studies of gene regulation in other cell types such as smooth muscle cells and cancer cells.

Dan Rockey

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.

Craig Ruaux

My main research interests fall into two areas. One major area of interest is the role of the neuroendocrine system, particularly serotonin and its receptors, in the production and severity of clinical signs from inflammatory disease of the gastrointestinal tract. We are investigating this area using a variety of techniques, from epithelial cell monolayers in culture through to assessment of serotonin metabolites in urine samples from clinical patients. My second major area is in the assessment of biological variability in clinical parameters, and the influence of different disease states on the degree of variation in clinical chemistries. This area represents an important interface between biological statistics, clinical pathology and the clinic floor.

Mahufzur 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 and musculoskeletal disease in dogs 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 cats with lung disease, dogs 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 can improve the accuracy reading CT studies in evaluators less experienced reading CT studies. Furthermore, I am also interested in establishing new techniques such as elastography to evaluate patients with musculoskeletal disease. Elastography is a relative new technique used in human patients with injuries of the soft tissues and has in human patients so far predominantly been used to evaluate patients with suspected breast cancer. 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 the healthy and diseased supraspinatus tendon in dogs using ultrasound and MRI. In addition, I am involved in a dental study performing tooth root ablations of the tooth bud of the last maxillary molars (wisdom teeth in humans) using pigs as a model for future studies in human patients.

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, allogenous, 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 1st 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.