

## Center for Veterinary Health Sciences – FY2009 Research Abstracts

### Department of Veterinary Pathobiology

#### **“*In Vitro* and Animal Models for Emerging Diseases and Biodefense”, Part A: “*In Vitro* Screens for Antimicrobial Activity”- Drug-Screening Contract**

The CVHS is currently using *in vitro* assays to screen test substances for activity against emerging “infectious agents”. Work involves screening of compounds for antimicrobial activity against several biodefense-related bacterial pathogens and drug resistant strains in Categories A, B, and C. Testing materials are submitted through NIAID. Work also includes screening of a 10,000 compound diversity library for leads on new drugs. This seven-year IDIQ contract runs through September 29, 2010. The work performed under this contract is part of the NIAID Biodefense Research Resources Program.

**Sponsors:** NIH, NIAID, DMID, Contract HHSN266200400004I

**PI/PD:** William W. Barrow

#### **Early and Rapid Detection of Prions**

The goal of the research is to develop a cervid (white-tailed deer, mule deer, or elk) cell culture model system for prion propagation, which can be used for antemortem detection of prions. To accomplish this, a library of transformed cervid cell lines was established from primary cultures of brain, spleen, lymph node and bone marrow. Exposure of these transformed cell lines to brain from elk with chronic wasting disease demonstrated propagation of mis-folded cervid prion.

**Sponsors:** U.S. Army Medical Research and Materials Command, Small Business Innovative Research, Phase II

**PI/PDs:** Ken Clinkenbeard

DNA Solutions, Inc: Brandt Cassidy

#### **Economic Development for Oklahoma Cattle Producers through Applied Animal Health Studies and Modern Vaccine Discovery and Production**

The objective is to determine infectious agents and host responses that cause respiratory disease and/or defend cattle from disease. Naturally occurring cattle diseases at Noble Foundation, privately owned, USDA, and OSU herds are being investigated. Emphasis is primarily on bovine viral diarrhea virus infection and pasteurellosis. Vaccination programs are being evaluated and new recommendations given.

**Sponsor:** The Noble Foundation, Ardmore, OK.

**PI/PDs:** Anthony W. Confer, S. Mady Dabo, Robert W. Fulton, Jerry W. Ritchey  
Department of Veterinary Clinical Sciences: John G. Kirkpatrick, Robert A. Smith

#### **Bovine Respiratory Disease: Risk Factors, Pathogens, Diagnosis, and Management**

The project determines changing patterns, geographical differences, risk factors, and management practices related to bovine respiratory disease. The influence of various bacteria and viruses is studied. In addition, the pharmacokinetics and efficacy of newer therapies and new-generation vaccines are evaluated. The host-pathogen relationship is characterized at the molecular level.

**Sponsor:** Oklahoma Agricultural Experiment Station

**PI/PDs:** A. W. Confer, R. W. Fulton, R. J. Panciera, K. D. Clinkenbeard, R. J. Morton

#### **Immunoproteomic Approach to Identify and Characterize**

Immunologically Important *Mannheimia haemolytica* Outer Membrane Proteins. Using immunoproteomic approach, outer membrane protein antigens that are important in stimulating immunity to *M. haemolytica* are being identified and sequenced. The genes are then cloned and expressed for functional studies of antibodies to these important antigens.

**Sponsors:** USDA CSREES, National Research Initiative Competitive Grant

**PI/PDs:** A. W. Confer, S. Ayalew

### **Characterization of Tick Genes Involved in the Tick Developmental Cycle and Transmission of the Cattle Pathogen, *Anaplasma marginale***

The vectorial capacity of ticks for *Anaplasma marginale* is most likely dependent upon both tick cell and pathogen interactions that involve pathogen adhesion proteins, tick cell receptors and a series of tick cell proteins that mediate the trafficking of the pathogen throughout ticks. In this research we will identify and characterize genes differentially expressed in tick cells in response to infection with *A. marginale*. These key genes will then be tested as vaccine antigens aimed at reducing the vectorial capacity of ticks for transmission of *A. marginale*.

**Sponsor:** Oklahoma Agricultural Experiment Station

**PI/PDs:** OSU Center for Veterinary Health Sciences, Katherine M. Kocan, José de la Fuente, Edmour F. Blouin

### **Functional Genomic and Proteomic Analysis of Differential Gene Expression in Tick Cells in Response to Infection with the Cattle Pathogen *Anaplasma marginale***

Control of ticks and tick-borne pathogens by vaccination will avoid the use of acaricides that result in selection of drug-resistant ticks and environmental pollution. We have demonstrated the feasibility of developing vaccines targeted at the reduction of tick infestations and interruption of pathogen transmission. In this research we will identify genes expressed by tick cells in response to *A. marginale* infection that may prove to be useful in vaccine development.

**Sponsors:** Oklahoma Agriculture Experiment Station, Animal Health Funds

**PI/PDs:** Center for Veterinary Health Sciences, Jose de la Fuente, Katherine M. Kocan, Edmour F. Blouin

### **Characterization of Tick-Protective Antigens and Development of a Vaccine for the Control of Lone Star Tick Infestations on Cattle**

The Lone Star tick (LST), *Amblyomma americanum*, is the primary pest of cattle in central and eastern U.S. Four key LST tick protective antigens identified previously will be characterized and tested as vaccine candidate antigens. Control of ticks on cattle, without the use of acaricides, will avoid selection of drug-resistant ticks and environmental pollution, and contribute to the overall reduction of LST populations.

**Sponsor:** USDA – National Research Initiative Competitive Grants Program

**PI/PDs:** José de la Fuente, Katherine M. Kocan, Edmour F. Blouin

### **Prevalence of *Brucella canis* Infection in a Fighting Pit Bull Population**

*Brucella canis*, the causative agent of canine brucellosis, is a zoonotic disease that causes abortion and infertility in dogs and flu-like illness, lymphadenopathy and recurrent fevers in humans. This study proposes to determine the prevalence of *B. canis* infection, using serology and polymerase chain reaction, among a population of >400 fighting pit bulls and associated breeding animals. This could assist in determining the public health risk of dogfighting operations and unregulated dog breeding operations.

**PI:** Tamara Gull

### **Acquisition, Cultivation and Characterization of Canine Geographic Isolates of *Anaplasma phagocytophilum* and *Ehrlichia canis***

Canine geographic isolates of *Anaplasma phagocytophilum* and *Ehrlichia canis* will be obtained, isolated in tick cell culture and characterized.

**Sponsor:** Pfizer Animal Health, Inc.

**PI/PDs:** KM Kocan, EF Blovin, J de la Fuente, SE Little

### **Development of a Killed Erythrocyte-derived Vaccine for Bovine Anaplasmosis**

The objective of this research is to select geographic isolates of *Anaplasma marginale* for use in a killed erythrocyte-derived vaccine for bovine anaplasmosis. Isolates of *A. marginale* will be selected that will likely protect against a wide range of U.S. geographic isolates of *A. marginale*. The isolates will be characterized, amplified in cattle for development of Master Seed Stocks.

**Sponsor:** SolidTech Animal Health, Inc.

**PI/PDs:** Katherine M. Kocan, Edmour F. Blouin, José de la Fuente.

SolidTech Animal Health, Inc.: Richard D. Hansen.

### **Defining the Mechanism of RNA Interference in Tick Cells**

The goal of this study is to identify genes involved in RNA interference (RNAi) in ticks. Genes involved in the tick RNAi machinery will be identified in cultured tick cells and then selected genes will then be tested in ticks. After injection of ticks with complementary double stranded RNA for gene silencing of target genes, the ticks will be allowed to feed to test for the effect of gene silencing on the tick feeding, mortality and reproduction.

**Sponsor:** OSU Center for Veterinary Health Sciences, Research Advisory Committee

**PI/PDs:** Ruchira Mitra, Katherine M. Kocan, José de la Fuente, Victoria Naranjo, Edmour F. Blouin.

### **Walter R. Sitlington Endowed Chair in Food Animal Research**

Funds generated by this endowed chair support the overall Tick and Tick-borne Pathogen Vaccine Development Laboratory for the conduct of the various research projects.

**Sponsor:** Center for Veterinary Health Sciences

**PI/PD:** Katherine M. Kocan

### **Matching grant for purchase of a Sorvall Legend RT Plus Refrigerated Centrifuge**

Matching grant funded for acquisition of a refrigerated centrifuge.

**Sponsor:** OSU Center for Veterinary Health Sciences, Research Advisory Committee

**PI/PDs:** Katherine M. Kocan, José de la Fuente, Edmour F. Blouin, Susan E. Little, Mason V. Reichard

### **Baboon Research Resource Program**

Baboons are an important animal species used in biomedical research. This program will develop a breeding colony of baboons in Oklahoma and supports research aimed at improving the breeding efficiency of baboons in captivity, defining viruses that naturally infect baboons, and improving the basic well-being and behavior of captive-bred baboons.

**Sponsor:** NIH, NCRR

**PI/PDs:** R. Eberle, J. d'Offay, M. Reichard

University of Oklahoma Health Sciences Center: Gary White

### **Development of an SPF Baboon Colony**

Indigenous viruses can have a major adverse effect on the results of biomedical research studies using animals, particularly where immunosuppression is involved. This program supports derivation of a colony of baboons that are free of all known herpesviruses and most retroviruses.

**Sponsor:** NIH, NCRR

**PI/PD:** R. Eberle

University of Oklahoma Health Sciences Center: Gary White

### **Bovine Viral Diarrhea Disease Virus (BVDV) Vaccines: Antibody Response to Heterologous BVDV Strains**

The study will determine the range of heterologous immunity in calves receiving modified live virus (MLV) or killed BVDV vaccines. Currently there are two recognized antigenic types and several subgenotypes of BVDV: BVDV1a, 2a, 1b, and 2b. The study will determine if these vaccines induce antibodies to these four BVDV subtypes.

**Sponsors:** Novartis Animal Health, Pfizer Animal Health, Fort Dodge Animal Health

**PI/PDs:** Robert W. Fulton, Anthony W. Confer

### **Bovine Viral Diarrhea Virus: Diversity of BVDV Strains and Impact on Diagnosis, Vaccinations, and Control Programs**

Bovine viral diarrhea viruses (BVDV) isolates from persistently infected (PI) cattle will be obtained from feedlot cattle. The isolates will be subtyped by sequencing a region of the 5'-UTR. Subgenotypes to be detected will include those of worldwide epidemiology. The BVDV subgenotypes expected in North America are: BVDV1a, 1b, 2a, and 2b. Molecular diagnostic tests including reverse transcriptase PCR and real time PCR will be evaluated to detect these diverse BVDV subgenotypes in peripheral blood, serums and ear notch samples of infected animals. Cytopathic BVDV 1b strains as potential vaccine strains will be sequenced to permit detection by genomic tests allowing differentiation of vaccine strains from field strains in vaccinated animals. The prevalence of PI animals in Oklahoma beef herds will be determined using immunohistochemistry and antigen capture ELISA (ACE) on ear notches. The PI strains

will be subtyped. Vaccination records will be obtained to determine use of BVDV vaccines or lack thereof in herds with PI animals. Potentially new subtypes may warrant additional subtypes in the vaccines.

**Sponsor:** Oklahoma Agricultural Experiment Station

**PI/PDs:** Robert W. Fulton, A. W. Confer, D.L. Step

#### **Antibiotic Administration and Vaccination with Live Bacterial Vaccine in Calves**

This study will determine if an antibiotic given calves that have been administered avirulent *Pasteurella haemolytica* and *Pasteurella multocida* vaccine will decrease the immune responses to the immunogens. Calves will receive Micotil antibiotic and Once PMH *Mannheimia haemolytica* and *P. multocida* vaccine. The calves' sera will be tested for *M. haemolytica* and *P. multocida* antibodies.

**Sponsor:** ELANCO Animal Health, Division of Eli Lilly and Company

**PI/PDs:** Robert W. Fulton, Anthony W. Confer

#### **Bovine Viral Diarrhea Virus (BVDV) in Oklahoma Beef Operations: Impact of Infections and Economic Benefits to Control Programs**

This study will identify infected beef breeding herds and develop a control program for beef herds stressing biosecurity and vaccination. Samples to be tested will be ear notches for the immunohistochemistry and antigen capture ELISA (ACE) using the newborn calves. BVDV isolates will be collected from infected animals and subtyped. Stocker cattle entering the OSU Sparks facility will be tested as well. Educational programs will be provided for producers regarding BVDV control. The enhanced economic benefit for marketing BVDV free stocker calves will be investigated.

**Sponsor:** Team Initiative Program, Oklahoma Agricultural Experiment Station

**PI/PDs:** Robert W. Fulton, Clint Krehbiel, DL Step

#### **Evaluation of Viral Vaccine Containing Infectious Bovine Rhinotracheitis Virus (IBRV), Bovine Viral Diarrhea Virus 1 and 2 (BVDV), Parainfluenza -3V (PI-3V), and Bovine Respiratory Syncytial Virus (BRSV) in Preventing Infection and Respiratory Disease in Cattle**

The purpose of the study will be to determine if pre-weaning vaccination of ranch calves with viral vaccine: (1) reduces respiratory disease; and (2) reduces transmission of viruses in calves moved from auction markets and commingled with the fresh calves under feedlot conditions.

**Sponsors:** Fort Dodge Animal Health, Schering Plough Animal Health, BI Animal Health

**PI/PDs:** Robert W. Fulton, A.W. Confer

#### **Rapid Diagnosis of Viruses Involved in Bovine Respiratory Diseases**

The purpose of the study will be to determine if use of reverse transcriptase PCR testing aids in the diagnosis of viruses involved in bovine respiratory disease. Samples including nasal swabs, serums, and lung samples collected at necropsy will be tested for viruses using the PCR tests for bovine viral diarrhea viruses, bovine herpesvirus 1, bovine respiratory syncytial virus, and bovine coronavirus. The tests results will be compared to use of standard tests including cell culture isolation for viruses. Genomic tests have advantages as cell culture tests are not often rewarding for viral identification. A higher recovery rate for these viruses is expected by PCR.

**Sponsors:** Oklahoma Agricultural Experiment Station, 1433 Animal Health Research

**PI/PD:** Robert W. Fulton

#### **Bovine Viral Diarrhea Viruses (BVDV) for Evaluation of Antigen Capture ELISA (ACE)**

This study will provide samples from bovine virus diarrhea virus (BVDV) infected animals to be used to evaluate an antigen capture ELISA (ACE) test. BVDV is represented by four different subgenotypes in the United States, BVDV1a, 1b, 2a, and 2b. The ACE test is currently used to detect persistently infected (PI) cattle by testing for BVDV antigen in fresh ear notches collected in PBS. By using field isolates as compared to known reference strains maintained in research laboratories, the ACE test should be validated against current naturally occurring field strains.

**Sponsor:** IDEXX Laboratories

**PI/PD:** Robert W. Fulton

#### **Generation of Samples for Use in Comparative Studies on Different BVDV Test Platforms**

This study will provide bovine viral diarrhea virus (BVDV) positive tissue samples for use in evaluating

real time PCR tests to detect persistently infected (PI) cattle. Samples will include ear notch samples from PI cattle infected with BVDV 1a, 1b or 2a viruses. These cattle will represent naturally occurring PI cattle maintained for this study. The samples will be sent to reference laboratories (state and university) providing BVDV diagnosis by real time PCR. The samples will be tested by at least four reference laboratories. Attempts will be made to determine the endpoint whereby samples can be pooled to test for positive animal's samples.

**Sponsor:** USDA, ARS, National Animal Disease Center (NADC)

**PI/PD:** Robert W. Fulton

### **Efficacy of an Experimental IBR-BVD-PI3-BRSV-VL5 Vaccine in Protecting Pregnant Heifers and Fetuses against a Bovine Viral Diarrhea Virus Type 1b Challenge**

This objective of this study is to demonstrate efficacy of an IBR, BVDV, PI3V, BRSV, Campylobacter fetus, and leptospiral bacterin prebreeding vaccine in protecting pregnant heifers and their fetuses against challenge exposure to seeder calves persistently infected with BVDV 1b at approximately 75 days of gestation.

**Sponsor:** Pfizer Veterinary Medicine Research and Development

**PI/PDs:** Robert W. Fulton, Bill J. Johnson, DL Step, Clint Krehbiel

### **Bovine Coronavirus: Role in Respiratory Disease**

Bovine respiratory diseases (BRD) also referred to as "Shipping Fever" represents significant losses to cattlemen. There are several viruses contributing to the BRD which has a polymicrobial etiology. These include bovine herpesvirus, parainfluenza -3 virus, bovine respiratory syncytial virus, and bovine viral diarrhea viruses along with *Mannheimia haemolytica*, *Pasteurella multocida*, *Histophilus somni*, and *Mycoplasma spp.* The bovine coronavirus (BCV) has emerged as another virus which contributes to BRD. Measuring the BCV role in BRD has been hampered by lack of tools for the study of this virus both in vitro and in animal studies. The purpose of this study will be to develop means of propagating the BCV in cell cultures, developing and validating a serologic test for BCV antibodies to demonstrate active infections, developing an immunohistochemistry assay to detect BCV in infected cells and tissues, and a challenge model to demonstrate the disease induced by BCV. An attempt will be made to develop live and inactivated BCV vaccines for cattle.

**Sponsors:** Oklahoma Agriculture Experiment Station, USDA Section 1433 Animal Health Research Funds

**PI/PDs:** Robert W. Fulton, A.W. Confer, R. Eberle, D.L. Step

### **Bovine Coronavirus in Respiratory Disease: Methods of Study, Pathogenesis, and Development of Challenge Model for Efficacy Studies**

Bovine coronavirus (BCV) represents an infectious agent contributing to bovine respiratory disease (BRD) in cattle. This study will investigate the role of BCV in clinical cases of BRD by viral isolations from clinically ill cattle, and the use of serology to detect active infections in commingled cattle under feedlot conditions. Serologic tests will include ELISA and viral neutralization tests to detect BCV antibodies. BCV isolated from affected cattle will be characterized as BCV and propagated with viral quantification. A challenge model will be developed to measure infectivity and pathology caused by BCV in susceptible cattle. This challenge model will be used to measure resistance to BCV in cattle immune and susceptible to BCV.

**Sponsor:** Pfizer Veterinary Medicine Research and Development

**PI/PDs:** Robert W. Fulton, Anthony W. Confer, Richard Eberle, D.L. Step

### **Veterinary Medical Diagnostic Program**

The Veterinary Medical Diagnostic Program at the Oklahoma Animal Disease Diagnostic Laboratory (OADDL) serves to: 1) investigate and document the types of injuries sustained by horses involved in horse racing and in race training related activities on racetracks that fall under the jurisdiction of the Oklahoma Horse Racing Commission (OHRC), 2) monitor this population of migrating horses for the presence of any epizootic disease(s) that may pose a threat to the Oklahoma horse industry, and 3) evaluate the overall effects of all other aspects (including diet and stress) of racing and race training on the health and well being of Oklahoma's racehorses. This program is the result of an alliance formed between the OHRC and OADDL.

**Sponsors:** Oklahoma Horse Racing Commission, Oklahoma Bred Program  
**PI/PDs:** Bill J. Johnson, Grant B. Rezabek

**Epidemiology of American Canine Hepatozoonosis: the Susceptibility of Selected Prey of Carnivores to Infection with *Hepatozoon americanum* and the Role of Vertical Transmission**

*Amblyomma maculatum* has been identified as the definitive host and vector of *Hepatozoon americanum* in dogs throughout the southern U.S. Transmission to dogs, an obligate intermediate host, occurs through ingestion of the infected tick. However, dogs are rarely infested with any of the 3 feeding stages of the tick. Immature ticks, stages that acquire the parasite, feed preferentially on smaller mammals and ground-dwelling birds; therefore, dogs are an unlikely source of infection for the tick definitive host. A naturally reservoir for the parasite has not been identified. However, cystozoites, a quiescent, infectious stage of the parasite, develops in the tissues of experimentally exposed laboratory rodents, making canine exposure through predation of infected prey (potential paratenic or facultative intermediate hosts of *H. americanum*) a possible mode of transmission. The primary goals of this research are: 1) to determine the natural vertebrate reservoirs for *Hepatozoon americanum*, 2) to determine the susceptibility of select vertebrate species known to be preferred hosts of immature *Amblyomma maculatum* to infection with *H. americanum*, 3) to determine the susceptibility of common prey of canids to infection with *H. americanum*, and, 4) to determine if vertical transmission from canine dam to offspring occurs. Experimental transmission trials to laboratory raised rodents, birds and lagomorphs will be conducted. Comparisons of *Hepatozoon* isolates from wild-caught vertebrates to canine isolates will be made through morphology, histopathology and DNA sequencing. Vertical transmission will be investigated through the natural birth of puppies from a chronically infected carrier dog and monitoring of the offspring by weekly DNA analysis of the puppies' blood. Identifying the natural reservoirs of the parasite and methods of transmission will help implement preventative measures for susceptible dogs to a non-curable, potential fatal parasitic disease.

**Sponsor:** OSU Center of Veterinary Health Sciences, Research Advisory Committee

**PI/PDs:** Eileen M. Johnson, Kelly E. Allen, Roger J. Panciera, Susan E. Little, Sidney A. Ewing

**Natural History of *Borrelia lonestari***

This project examines the natural maintenance cycle of *Borrelia lonestari*, a putative agent of southern tick-associated rash illness (STARI) or "southern Lyme disease" in lone star ticks, white-tailed deer, and other wildlife species. The work involves both evaluation of naturally infected ticks and wild animals and experimental confirmation of the proposed maintenance cycle.

**Sponsor:** NIH NIAID

**PI/PDs:** Susan E. Little

Co-PI/PDs: OSU/CVM, Edmour Blouin, Kathy Kocan

University of Georgia at Atlanta: Michael Yabsley, Kevin Keel

**Diagnosis of *Borrelia lonestari***

This project seeks to develop better diagnostic assays for *Borrelia lonestari*, a putative agent of southern tick-associated rash illness (STARI) or "southern Lyme disease." Research projects include experimental infection of white-tailed deer and rabbits and development of microbiologic, molecular, and serologic techniques to identify infected animals with the ultimate goal of developing diagnostic assays for use in people.

**Sponsor:** NIH NIAID

**PI/PDs:** Susan E. Little

University of Georgia at Atlanta: Michael Yabsley

**Transmission of *Ehrlichia canis* by *Rhipicephalus sanguineus***

This project examines the transmission dynamics at play as *Ehrlichia canis* is moved between dogs by the brown dog tick, *Rhipicephalus sanguineus*.

**Sponsor:** Bayer Animal Health

**PI/PDs:** Susan E. Little, Kathy Kocan, Eileen Johnson, Sidney Ewing

***Ehrlichia ewingii* Infection and Exposure Rates in Dogs**

*Ehrlichia ewingii* commonly infects dogs in areas of the US where lone star ticks predominate. This

project seeks to document the prevalence of *E. ewingii* infection and exposure in dogs from the Ozark Plateau and use samples acquired from naturally infected dogs to refine diagnostic assays for *E. ewingii* and other, closely-related rickettsial pathogens of dogs and people.

**Sponsor:** IDEXX

**PI/PDs:** Susan E. Little, Sidney Ewing, Jim Meinkoth

### **Assembly of Human Respiratory Syncytial Virus (HRSV)**

HRSV infects virtually every person on the planet and presents a serious, worldwide, disease burden. Available therapies are not adequate, and a better understanding is needed of the virus life cycle. In this project, the molecular mechanisms of virus assembly are investigated, and the role of the viral matrix and transmembrane glycoproteins therein determined. With an improved understanding of virus assembly, the project aims to: 1) control the virion assembly process such that the quality of anti-HRSV vaccine preparations can be improved, and 2) create new concepts for antiviral therapies.

**Sponsor:** Oklahoma Center for the Advancement of Science and Technology (OCAST)

**PI/PD:** Tom Oomens

### **Efficacy of Nucleoside Analogs for Treatment of Monkey B Virus Infection in Mice**

Monkey B virus (BV, *Cercopithecine herpesvirus-1*) is a  $\alpha$ -herpesvirus indigenous to macaque monkeys that cause serious, often fatal disease when transmitted to humans. Typically, BV infections involve researchers and animal technicians that work with macaque monkeys and acquire the infection via bites or scratches from monkeys shedding BV; therefore, BV is the major occupational biohazard concern for persons working with and around macaque monkeys. The optimal therapy for human BV infections remains unknown. The goal of this project is to use a murine BV model system to compare several existing anti-herpetic drugs to identify the one that is most efficacious.

**Sponsor:** ACLAM Foundation

**PI/PD:** Jerry Ritchey, Richard Eberle, Lara Maxwell

## **Department of Physiological Sciences**

### **Mechanisms and Functions of Human Sulfotransferases**

The major goals of this project are to elucidate human sulfotransferase (SULT) chemical and kinetic mechanisms, to understand physiologic functions of SULTs, and to investigate their relevance to human health in physiologic and pathologic conditions. Research focuses on: 1) mechanisms of enzyme catalysis, substrate inhibition, and product activation of human SULTs, 2) effects of clinical widely used drugs on human sulfotransferase catalytic activities, and 3) oxidative regulation mechanisms of human SULTs.

**Sponsor:** NIH

**PI/PD:** Guangping Chen

### **Cancer Drugs Induction of Human Sulfotransferases**

Studies in this project focus on sulfotransferase (SULT) induction by cancer drugs. Rats, human hepatic carcinoma cell line, Hep G2, and human intestinal carcinoma cell line, Caco-2, are used for these studies. Enzyme activity assay, Western blot, RT-PCR, site directed mutagenesis, plasmid transfection, small interfering RNA (siRNA) gene silencing, promoter gene deletion, DNA footprinting, and electrophoretic mobility shift assay are used to determine the SULT gene regulation and nuclear receptor mediated SULT induction mechanisms.

**Sponsors:** American Cancer Society, State of Oklahoma

**PI/PD:** Guangping Chen

### **Fat Adaptation in Horses Undergoing Aerobic Training**

Burning fat instead of glycogen during exercise is believed to delay the onset of fatigue caused by substrate depletion. In this study, we are investigating whether improvements in fat-burning capacity can be achieved through feeding a high-fat diet during training.

**Source:** Oklahoma Agricultural Experiment Station

**PI/PDs:** Michael Davis

Michigan State University: Ray Geor

### **Mechanisms of Exercise-Induced Insulin Sensitivity**

Aerobic training is known to increase insulin sensitivity, making it a desirable therapy for humans and animals with Type 2 diabetes. In this study, we are investigating the mechanisms by which exercise episodes, both individually and collectively, improve insulin sensitivity.

**Source:** Diabetes Action Research and Education Foundation

**PI/PDs:** Michael Davis

Michigan State University: Ray Geor

North Carolina State University: Shannon Pratt-Phillips

### **Thermoregulation in Brachycephalic Dogs**

Brachycephalic dogs are believed to be less capable of thermoregulation due to the conformation of their upper airways, leading many airlines to prohibit shipping of these dogs. This study will objectively characterize the thermoregulatory capacity of these dogs relative to dogs with longer noses to determine more precisely the appropriate guidelines for shipping.

**Source:** American Kennel Club Canine Health Foundation

**PI/PD:** Michael Davis

### **Prolonged Activation of P2X7R Leads to Alveolar Epithelial Type I Cell Death by Suppressing Wnt/beta-catenin Pathway**

The goal of this student seed grant is to study intracellular signaling leading to alveolar epithelial cell death.

**Sponsor:** Oklahoma State University Center for Veterinary Health Sciences

**PI/PD:** Yujie Guo (Mentor: Lin Liu)

### **The Role of Proteoglycans and Inflammation in Biliary Cyst Development**

This proposal's focus is on biliary epithelial cysts and how proteoglycan levels influence inflammation and cyst formation. This proposal focuses on the role biliary epithelial cellular proteoglycans influence cystic lesion development using proteomic tools.

**Sponsor:** University of Alabama at Birmingham recessive PKD core center

**PI/PD:** Myron Hinsdale

### **Genetic Modifiers of Organ Dysfunction in PKD**

This proposal's focus is on the role that proteoglycans and inflammation have on renal and liver dysfunction in polycystic kidney disease. These experiments utilize multiple mouse models in combination with our *Xylt2*<sup>-/-</sup> mice to examine lesion severity.

**Sponsor:** Oklahoma Center for Advancement of Science and Technology

**PI/PD:** Myron Hinsdale

### **Molecular Mechanisms of Lung Surfactant Secretion**

Lung surfactant is a surface-active material that stabilizes alveoli. It is synthesized and secreted by lung epithelial type II cells. The long-term objective of this proposed project is to elucidate the molecular mechanisms of lung surfactant secretion from type II cells including transport of secretory granules to and fusion with the plasma membrane. Deficiency of lung surfactant is the cause of respiratory distress syndrome in premature infants. Accomplishing the goals of this proposal may give a valuable insight to the therapy of pulmonary diseases such as neonatal respiratory distress syndrome.

**Sponsor:** National Institutes of Health R01 HL052146

**PI/PD:** Lin Liu

### **Mechanisms of Alveolar Fluid Transport**

The goal of this project is to investigate the roles of chloride channels of alveolar epithelial type I and type II cells in fluid secretion of fetal lungs, and in maintaining fluid homeostasis of adult and injured lungs.

**Sponsor:** National Institutes of Health R01 HL083188

**PI/PD:** Lin Liu

### **Role of MicroRNAs in Bronchopulmonary Dysplasia**

The major goal of this project is to identify microRNAs involved in bronchopulmonary dysplasia using microRNA microarray and examine their functions.

**Sponsor:** National Institutes of Health R21HL087884

**PI/PD:** Lin Liu

### **MicroRNA Expression Profiling in Idiopathic Pulmonary Fibrosis**

The goal of this project is to identify and characterize microRNAs changed in idiopathic pulmonary fibrosis using the IPF patient lung samples from the Lung Tissue Research Consortium.

**Sponsor:** National Institutes of Health R03HL095383

**PI/PD:** Lin Liu

### **Molecular Signaling in Alveolar Epithelial Cells**

The goal of this grant is to understand molecular signaling in alveolar epithelial cells with a focus on cell-cell communication and the integration of multiple signaling pathways.

**Sponsor:** Oklahoma State University Center for Veterinary Health Sciences Research Advisory Committee

**PI/PD:** Lin Liu

### **Effect of Hyperoxia on VEGF Family Gene Expression in Neonatal Rat Lung and Cultured Pulmonary Microvascular Endothelial Cells**

Vascular endothelial growth factor-A (VEGF-A) and the related protein placental growth factor (PLGF) regulate blood vessel growth. VEGF regulation has been well studied in a variety of settings, but little is known about regulation of PLGF. Hyperoxia exposure is associated with abnormal vessel development in both animals and humans. These studies assessed VEGF and PLGF expression in: 1) lungs of normal and hyperoxia-exposed neonatal rats, and 2) cultured human lung microvascular endothelial cells (HMVEC-L) to test the hypothesis that hyperoxia exposure increases the ratio of PLGF to VEGF in the lung.

**Sponsor:** Oklahoma State University Center for Veterinary Health Sciences Research Advisory Committee

**PI/PDs:** Pamela G. Lloyd, Lin Liu

### **Regulation of Placenta Growth Factor by Hemodynamics and Reactive Oxygen Species**

Ischemic cardiovascular disease is highly prevalent in diabetics and accounts for most of the mortality in this patient group. Stimulation of collateral artery growth (arteriogenesis) to create a physiological "bypass" is a promising treatment concept; however, greater understanding of the mechanisms controlling arteriogenesis is needed before such treatments are a reality. This research will investigate fundamental mechanisms regulating the key arteriogenic growth factor PLGF as a basis for developing new, noninvasive treatments for ischemic CVD. A variety of *in vitro* and *in vivo* model systems will be used to identify key regulatory mechanisms controlling PLGF expression in health and disease.

**Sponsor:** National Institutes of Health

**PI/PD:** Pamela G. Lloyd

### **Allometry of Hepatic Metabolism of Vinblastine in Dogs**

Mast cell tumors (MCT) are one of the most common skin cancers in all ages of dogs with a higher incidence in geriatric dogs. Surgical excision is the first line of treatment for MCT. In advanced stages, dogs experience better outcomes when surgical excision is combined with radiation therapy or chemotherapy. Vinca alkaloids are widely used as chemotherapy for the treatment of mast cell tumors. Dogs tolerate these vinca alkaloid and prednisone regimens well. However, therapy is successful in less than 50% of treated dogs, perhaps because of under dosing. The main objective of this study is to develop novel dosing equations to accurately predict the dosages of vinca alkaloids in dogs. The proposed dosing equations would be especially beneficial for breeds at the extremes of body sizes, such as the toy breeds (e.g., Chihuahuas and Boston terriers) and the giant breeds (e.g., Mastiffs and Great Danes). In addition, breeds at particular risk for mast cell tumors, including Boxers, Boston terriers, English bulldogs, Golden retrievers, Labrador retrievers, Cocker spaniels, Schnauzers, Shar peis, and Pugs would especially benefit from this study. Our work is expected to lay the foundation for further

definitive research on the efficacy of new dosing algorithms in canine patients with mast cell tumors and other cancers that are responsive to the vinca alkaloids.

**Sponsor:** Morris Animal Foundation

**PI/PDs:** Lara Maxwell, Jerry Ritchey, Satyanarayana Achanta, Jeff Bryan

### **Prevention of EHV-1 Myeloencephalitis by Delayed Therapy**

Our research team has recently found that the use of the antiviral drug valacyclovir early in the course of equine herpes virus (EHV-1) infection can protect horses from clinical disease. This protective effect of drug treatment was seen both when valacyclovir was given before EHV-1 infection and when treatment was given just after horses started to develop fevers from infection. However, outbreaks of neurological EHV-1 may not be recognized until many horses have been infected with the virus for a longer period of time. When viral disease has had time to become established in a horse, drug therapy may not be as effective as when therapy is begun early after infection. Therefore, more effective antiviral drugs may be necessary to avert neurological disease once the infection has become established. Valacyclovir might also be effective later in the course of infection, given its ability to control infection when given soon after horses spike a fever. Until the veterinarians and authorities dealing with an EHV-1 outbreak know which drugs will be effective at different stages of EHV-1 disease, these drugs cannot be used in the best way possible, so horses may receive no treatment or an ineffective treatment. We will determine whether delayed therapy with antiviral drugs can protect horses from EHV-1. In addition, we would perform immunological tests to try to identify the horses that will be most susceptible to clinical disease, so that horses with these characteristics could be identified during an outbreak and preferentially treated with antiviral drugs.

**Sponsor:** Grayson Jockey Club

**PI/PDs:** Lara Maxwell, Jerry Ritchey, Richard Eberle, Charles MacAllister, Dianne McFarlane

### **Initiating Factors of Neurodegeneration**

Parkinson's disease and age are both characterized by a loss of functional dopamine-producing neurons. Several aging factors have been implicated in the development of dopaminergic neuronal loss including misfolding of a nerve protein known as alpha-synuclein (a-syn). The long-term goal of our research program is to understand how aging results in the accumulation of misfolded a-syn and a loss of functional neurons and why the process is accelerated in those individuals with Parkinson's Disease using two novel animal models; spontaneous neurodegeneration in aged baboons and a highly prevalent neurodegenerative disease of aged horses.

**Sponsors:** NCRR, NIH 1K01RR023946-01A1

**PI/PD:** Dianne McFarlane

### **The Effect of Season, Latitude and Breed on Equine Pituitary Function**

Seasonal variation in pituitary activity, resulting in increased production of pars intermedia (PI) hormones in the fall, occurs in many species including the horse, presumably to prepare them metabolically and physically for winter. It is unknown what triggers seasonal PI activation, and when in the year it begins. We hypothesize that hormone release from the healthy equine pituitary pars intermedia is regulated by seasonal change in day length. Therefore, we expect plasma concentrations of PI hormones to increase starting in July, when day length begins to shorten. We also expect that horses residing in latitudes further from the equator, where the seasonal change is more extreme, to have a more pronounced seasonal hormone increase compared to those residing closer to the equator. Finally, we expect thrifty breeds (ponies, Morgan horses) to have a more robust seasonal increase in PI hormone concentration compared to light breeds and horses with PPID to have no seasonal hormone variation.

**Sponsor:** American College of Veterinary Internal Medicine Foundation

**PI/PD:** Dianne McFarlane

### **Presynaptic Modulation of Anticholinesterase Toxicity**

The project evaluates contribution of presynaptic endocannabinoid signaling in the selective toxicity of organophosphorus insecticides.

**Sponsors:** National Institute of Environmental Health Sciences, R01 ES 009119-11

**PI/PDs:** Carey Pope, Jing Liu Pope

### **miRNA Regulation of the Wnt/beta-catenin Pathway During the Trans-Differentiation of Alveolar Epithelial Cells**

The goal of this predoctoral fellowship is to study roles of miRNAs in alveolar epithelial cell differentiation.

**Sponsors:** American Heart Association, Midwest Affiliate

**PI/PD:** Yang Wang (Mentor: Lin Liu)

### **Role of miR-375 in Fetal Lung Development by *in utero* Gene Delivery**

The goal of this student seed grant is to investigate functional roles of miR-375 in lung development.

**Sponsor:** Oklahoma State University Center for Veterinary Health Sciences

**PI/PD:** Yang Wang (Mentor: Lin Liu)

### **The Effect of Season on Inflammatory Response in Baboons**

Immune function is influenced by many factors including season, stress, disease, antigen exposure, age, and hormones. The effect of season on immune response in baboons is unknown. Seasonal variation in immune response could have profound implications in experimental design and interpretation of experimental data as well as disease risk and general herd health. It is our long term goal to understand the influence photoperiod and light source has on immune function in baboons. This project will determine the effect that season and photoperiod has on inflammatory response in baboons.

**Sponsors:** NCCR, NIH 2P40RR012317-11, Baboon Research Resource Program

**PI/PDs:** Dianne McFarlane

University of Oklahoma Health Sciences Center: Gary White

### **Novel Antimicrobial Peptides as Anti-sepsis Drugs**

This project evaluates the efficacy of novel peptides against microbial infection and their relative toxicity.

**Sponsor:** Oklahoma Center for the Advancement of Science and Technology

**PI/PDs:** Glenn Zhang, Carey Pope

### **Role of Vitamin A in Modulation of Gene Expression in the Cumulus-Oocyte Complex**

The central hypothesis of this work is that specific patterns of early gene expression in the cumulus-oocyte complex during the maturation phase affects subsequent developmental capacity; these patterns are subject to influences of the local environment and can be characterized by examining the stimulatory effect of certain nutrient, including vitamin A (9-cis Retinoic Acid (RA)). It follows that identification of the positive effects of 9-cis RA will provide a view of a transcript profile having positive influence on subsequent embryo development. The effect of 9-cis RA stimulation on maternal transcriptional activity and transcript profile, and the impact on the oocyte transcript profile will be separated by analysis of the cumulus cells alone, the oocyte alone, versus the cumulus-oocyte complex as a whole, using subtractive hybridization. These results are expected to yield a better understanding of the early transcriptional profile and those genes critical to developmental potential. Benefits may include targets for testing developmental potential of preimplantation embryos and better production methods.

**Sponsors:** Oklahoma Agricultural Experiment Station

**PI/PDs:** Jerry Malayer

## **Department of Veterinary Clinical Sciences**

### **Veterinary Medicine Biomedical Laser Laboratory**

Since the establishment of the Biomedical Laser Laboratory within the OSU Center for Veterinary Health Sciences, research to establish protocols for clinical applications in veterinary medicine has been a primary objective. In addition, the use of laboratory models has resulted in transfer of technology to both industry and human medicine. Work will continue concentrating on the clinical applications of biomedical lasers coupled with collaborative research protocols involving basic scientists (engineers, physicists) and clinicians.

**Sponsors:** McCasland Foundation, Kerr Foundation

**PI/PD:** Kenneth E. Bartels

### **Transrectal Near-infrared Optical Tomography for Prostate Imaging**

This project is a collaboration between OSU colleges (School of Electrical and Computer Engineering and the Center for Veterinary Health Sciences), and the University of Oklahoma Health Sciences Center. It involves development of trans-rectal ultrasound probe using an animal model to image and differentiate malignant tumors in the prostate.

**Sponsor:** U.S. Army Prostate Cancer Research Program.

**Co-PIs:** Kenneth E. Bartels, Reed W. Holyoak, Jerry W. Ritchey

### **Use of Annexin V for Selectively Targeting Single-Walled Carbon Nanotubes and L-Methioninase to the Tumor Vasculature for Breast Cancer Treatment**

This project is a collaborative project with the University Of Oklahoma Health Sciences Center School Of Pharmacy, the University Of Oklahoma School Of Chemical, Biological, and Materials Engineering, and the OSU Center for Veterinary Health Sciences. Investigations involve using near-infrared laser light to photochemically activate a new anti-cancer drug in the fight against breast cancer.

**Sponsor:** Department of Defense Breast Cancer Research Program

**PI/PD:** Kenneth E. Bartels

### **Efficacy of *Bdellovibrio bacteriovorus* Strain 109J in the Treatment of Experimentally Induced Infectious Bovine Keratoconjunctivitis Using an In Vitro Cell Culture Model**

The safety and efficacy of bacteria *Bdellovibrio bacteriovorus* strain 109J (*Bb*) as a treatment for infectious bovine keratoconjunctivitis (IBK) or pinkeye is being evaluated in vitro, using Madin-Darby bovine kidney (MDBK) and bovine corneal epithelial cells as infection models of IBK. Data obtained (treatment dosage & interval) will be further tested in vivo using young calves experimentally infected with *Moraxella bovis*, the bacteria causing pinkeye.

**Sponsors:** Center of Biomedical Research Excellence, University of Oklahoma Health Sciences Center, Oklahoma State University Research Advisory Committee

**PI/PDs:** Melanie Boileau

Veterinary Pathobiology, Oklahoma State University: Kenneth Clinkenbeard, Jared Taylor  
University of Oklahoma Health Sciences Center: John Iandolo

### **Pathologic Changes Associated With Injectable Carprofen in Pigeons (*Columba livia*)**

Post operative pain management has become an important consideration in avian species. This study was undertaken to determine if there were any pathologic changes on necropsy and histologic examination following single and repeated injections of the nonsteroidal analgesic carprofen at an empirical dose.

**Sponsor:** Center for Veterinary Health Sciences

**PI/PDs:** Tawnia Zollinger, John P. Hoover, Armando Burgos

Department of Statistics: Mark E. Payton

### **Comparison of Biochemical Profile Values of Paired Serum and Plasma Samples of Birds**

The small size of many avian and exotic patients limits the amount of blood that can be safely drawn for diagnostics tests (1% of body weight in grams). This study was undertaken to compare standard biochemistry values of plasma from lithium heparin tubes with those of serum from clot tubes on paired samples from hyacinth macaws (*Anodorhynchus hyacinthinus*), Indian runner ducks (*Anas platyrhino*) and American flamingoes (*Phoenicopterus ruber*), and establish the species-specific reference ranges for plasma biochemical values in these three avian species.

**Sponsor:** Center for Veterinary Health Sciences, Department of Veterinary Clinical Sciences

**PI/PDs:** Keri Franco, John P. Hoover

Department of Statistics: Mark E. Payton

Tulsa Zoo and Living Museum: Kay Backues

### **Establishment of a Reference Range for Serum Thyroid Hormones in African Spurred Tortoises (*Geochelone sulcata*)**

Tortoises, especially the larger *Geochelone* species, are popular both as pets and captive display species. The African Spurred or Sulcata Tortoise (*Geochelone sulcata*) is a popular pet species but the normal ranges for thyroid hormones have not been previously reported. Hypothyroidism or goiter has been reported in Galapagos Tortoises (*Geochelone elephantopus*) and Aldabra Tortoises (*Geochelone*

*gigantea*) and may occur in Sulcata Tortoises. This study was undertaken to establish reference range for serum total T4 (TT4) free T4 (FT4) and total triiodothyronine (TT3) and free T3 (FT3) in Sulcata Tortoises.

**Sponsor:** Center for Veterinary Health Sciences, Department of Veterinary Clinical Sciences

**PI/PDs:** Keri Franco, John P Hoover

Department of Statistics: Mark E. Payton

### **Evaluation of Anticoagulants and Hematology in Bull Sharks (*Carcharhinus leucas*)**

Little is known of the normal blood values and blood cells of marine species of fish. The blood cells of marine species are acclimated to high salinity and osmolality and often lyse or are deformed when placed in blood tubes with an anticoagulant. Wild caught juvenile bull sharks (*Caracharhinus leucas*) undergoing conditioning for manual handling by the keepers at the Oklahoma Aquarium in Jenks, Oklahoma. Blood samples obtained by venipuncture of the ventral tail vein from 5 sedated sharks were divided and placed in clot tubes for biochemical profiles and lactate determination (a measure of stress in sharks), and in anticoagulant tubes containing heparin, dry EDTA, and heparin with EDTA respectively for hemograms and blood gas analyses. Wright's stained blood smears were made from each of the three anticoagulant samples to determine the percentages of blood cell types and to compare the respective percent of blood cells that had been lysed or were unrecognizable in the three anticoagulant samples.

**Sponsors:** Center for Veterinary Health Sciences, Department of Veterinary Clinical Sciences and Oklahoma Aquarium, Jenks, Oklahoma

**PI/PDs:** Theresa MacNab, Connie Ketz-Riley, John Hoover, K. Alexopoulos, J. Money

### **Evaluation of Plasma Protein C Activity in Young Dogs with Portosystemic Vascular Shunts (PVS) and Microvascular Dysplasia (MVD) Prior to and Following Treatment**

Evaluation of plasma activated Protein C (APC) levels may offer a simple noninvasive test to determine when a portogram is warranted to identify the location of a congenital PVS for potential surgical intervention, or when congenital MVD is present and dietary management should be the primary means of patient management. Follow up APC levels may provide a simple, objective, and non-invasive assessment of improvement in liver function of dogs with PVS after surgical correction. The objectives of this study are to determine if plasma APC values distinguish between dogs with PVS and MVD, and to assess changes in APC values after ligation with dietary treatment for PVS, and with dietary treatment alone for MVD.

**Sponsor:** Center for Veterinary Health Sciences, Department of Veterinary Clinical Sciences

**PI/PDs:** Simona Buoncompagni, Justin Thomason, John Hoover

Department of Statistics: Mark E. Payton

South Texas Veterinary Specialists: Ronald Walton

### **Pancreatic Lipase (cPL) in Clinically Normal Miniature Schnauzers**

Miniature schnauzers are predisposed to primary hyperlipidemia, a known risk factor for pancreatitis, and have a hereditary predisposition for idiopathic pancreatitis, that may give positive IDEXX SNAP<sup>®</sup> cPL<sup>™</sup> tests in schnauzers that have chronic subclinical pancreatitis or other gastrointestinal disorders. Veterinarians relying heavily on this test to confirm the diagnosis and may misdiagnose pancreatitis when that is not the primary cause for the clinical signs. The specificity of the cPL<sup>™</sup> test is questioned and a high prevalence of positive tests in clinically normal miniature schnauzers (false positives) is suspected. The objective of this study is to survey the prevalence of positive cPL<sup>™</sup> dogs in clinically normal miniature Schnauzers.

**Sponsor:** Center for Veterinary Health Sciences, Department of Veterinary Clinical Sciences

**PI/PDs:** Brandy Dugas, John Hoover, Jill Brunker

Department of Statistics: Mark E. Payton

### **A Comparison of Computed Tomography with and without Subarachnoid Contrast to Standard Myelography in the Localization of Hansen type 1 Intervertebral Disc Disease**

The ability of computed axial tomography (CAT scan) to accurately localize and diagnose intervertebral disc ruptures without the use of subarachnoid contrast (dye around the spinal cord) will be evaluated in dogs with naturally occurring intervertebral disc ruptures. The hypothesis is that CAT scan without

subarachnoid contrast will be as diagnostically accurate as standard myelography and post-myelogram CAT scan.

**Sponsors:** OSU Department of Veterinary Clinical Sciences

**PI/PDs:** Mark Rochat, Brent Newcomb, Jason Arble

### **Quantitative Analysis of the Vascular Supply of the Feline Tibia**

Tibial fractures are the second most common long bone fracture type in the cat. Clinical observations suggest that tibial fractures in cats are prone to delayed and non-union. Although a poor blood supply to the tibia has been anecdotally reported as a significant risk factor for delayed union and non-union complications, there exists no detailed description of the vascular anatomy of the feline tibia. The aims of this study are: to quantitatively describe the vascular supply to the tibia, to determine if the vascular supply is significantly different from that of dogs, and if the vascular supply changes with age.

**Sponsors:** OSU, Center for Veterinary Health Sciences, Department of Veterinary Clinical Sciences, Cohn Family Chair for Small Animals

**PI/PDs:** Mark Rochat, Danielle Pawloski, Jerry Ritchey, Mark Payton

### **Effect of Dexamethasone Sodium Phosphate 0.1% on Intraocular Pressure in Normal Dogs Treated with Latanoprost 0.005%**

Glaucoma (increased pressure inside the eye) is a common and potentially blinding disease in dogs. The most effective class of drugs for treating glaucoma in dogs is prostaglandin analog drugs, and the one most commonly used in dogs is latanoprost. Often the dog will also have concurrent intraocular inflammation, particularly if the glaucoma occurs following cataract surgery. This study assesses if a commonly used anti-inflammatory drug (dexamethasone 0.1%) interferes with the effect of latanoprost when both drugs are used together.

**Sponsors:** OSU Department of Veterinary Clinical Sciences

**PI/PDs:** Margi Gilmour, Terry Lehenbauer

### **Comparison of Intravenous Carprofen, Meloxicam and Flunixin Meglumine for Reducing Intraocular Inflammation in Dogs**

Veterinary ophthalmologists routinely perform ocular surgery on dogs that causes inflammation in the eye. Administering medication before surgery is the ideal way to minimize post-operative inflammation and thereby minimize pain. Non-steroidal anti-inflammatory drugs are commonly given just prior to surgery for their ocular anti-inflammatory effects. This study is designed to compare two newer anti-inflammatory drugs with possibly less side-effects, with an older anti-inflammatory drug with well-known ocular effects. The results of this study will help veterinarians select the best drug for ocular inflammation with the least side-effects.

**Sponsors:** OSU Department of Veterinary Clinical Sciences

**PI/PDs:** Margi Gilmour, Terry Lehenbauer

### **Oklahoma Animal Disease Diagnostic Laboratory**

The Oklahoma Animal Disease Diagnostic Laboratory provides accessible and accountable diagnostic service for Oklahoma veterinarians and animal owners in all 77 counties. Early detection of diseases provides the starting point for reducing their incidence and threat. The Laboratory also acts as a frontline sentinel for new and emerging diseases. OADDL promotes and protects the health and economic welfare of Oklahomans, supports the teaching and research missions of the OSU College of Veterinary Medicine, and conducts self-supported research aimed at developing more precise test procedures for commonly encountered, as well as emerging and foreign animal diseases, that may produce catastrophic losses (e.g., bovine viral diarrhea, malignant catarrhal fever, parvovirus disease, avian influenza, equine viral arteritis and encephalitis, and toxicoses related to oilfield wastes and agricultural chemicals). The Laboratory conducts research and diagnostic tests for morbillivirus infections of marine mammals. OADDL is a member of the National Animal Health Laboratory Network and does surveillance testing for Avian Influenza, novel H1N1, exotic Newcastle Disease and Classical Swine Fever in Oklahoma livestock and birds. The Laboratory maintains full accreditation by the American Association of Veterinary Laboratory Diagnosticians.

**PI/PDs:** Bill J. Johnson and staff