

# COLIC

## Grayson-Jockey Club Research Archives

*Equine colic is an unfortunately common condition that affects horses of all ages, breeds, and disciplines. This condition refers to any sort of abdominal pain in horses, and while in some cases it may be so mild that you don't even notice, a severe case could be deadly. In fact, it's one of the leading causes of equine death, after old age.*



*Grayson is proud to have funded the following projects to find better treatment for this dangerous malady.*

### Effect of NSAIDs on Anion Transport in the Equine Colon

University of Florida, *Principal Investigator: David Freeman*

*CO-PIs: Anje Bauck, Sadavisan Vidyasagar, Guy D. Lester, Ruethaiwan Vinijkumthorn, Jami Claire*

This proposal was designed to improve management of horses with right dorsal colitis, an insidious life-threatening form of colic for which all horses on phenylbutazone are at risk.

Year: 2020 TOTAL - \$25,149

### Non-Invasive Evaluation of Host-Microbiota Interactions

Texas A&M University, *Principal Investigator: Canaan Whitfield-Cargile*

*CO-PIs: Michelle Coleman, Noah Cohen, Ivan Ivanov, Ana Chamoun Emanuelli, Robert Chapkin*

The aim of this study was to develop a non-invasive platform to serve as a diagnostic test for gastrointestinal inflammation prior to severe disease and to reveal how bacteria in the gut influence horse health.

Years: 2019-2020 TOTAL - \$92,570

### Ethyl Pyruvate Improves Survival In Large Colon Volvulus

Michigan State University, *Principal Investigator: Susan J. Holcombe*

*Co-PIs: Lorraine Sordillo; Eric Schroeder (OH State); Peter Morreseey (Rood & Riddle);*

*Callie A. Fogle (NC State); Carrie Jacobs & Louise Southwood Parente (U of PA)*

This study proposed to demonstrate the effectiveness of ethyl pyruvate to decrease intestinal damage and improve survival in horses with large colon volvulus.

Year: 2017 TOTAL - \$66,184

### Flunixin or Firocoxib in Postoperative Colic Patients

North Carolina State University

*Principal Investigator: Anthony Blikslager*

*Co-PIs: Jennifer Davis; Callie Fogle; Leandi Kruger; Ashwini Poopal; Vanessa Cook (MI State UN);*

*Louise Southwood (UN of PA); Bettina Wagner (Cornell)*

The purpose of this project was to provide an evidence-based approach to the optimal treatment of horses with small intestinal strangulating obstruction in order to reduce endotoxemia and increase survival.

Years: 2015-2016 TOTAL - \$122,601

### Colonic Pathophysiology in Horses Administered Phenylbutazone

Louisiana State University

*Principal Investigator: Rebecca S. McConnico*

*Co-PI: Rustin Moore*

Years: 2002-2003 TOTAL - \$68,261

### The Role of Volatile Fatty Acids and Calcium in Gastric Ulcer Disease

University of Tennessee

*Principal Investigator: Frank M. Andrews*

*Co-PIs: Jennifer Nadeau; Steve Patton*

Years: 2001-2002 TOTAL - \$68,825

### Excitatory & Inhibitory Neuromuscular Transmission in the Horse Cecum

Washington State University

*Principal Investigator: David A. Schneider*

*Co-PI: Gilbert Burnes*

Years: 2001-2002 TOTAL - \$52,203

### Effect of Diet and Fluid Administration on Colonic Ingesta

Marion duPont Scott Equine Medical Center Virginia-Tech

*Principal Investigator: Nathaniel A White II*

*Co-PIs: Marco Lopes; Mark Crisman*

Year: 2000 TOTAL - \$35,037

### Pathogenesis of Acid Injury in the Non-Glandular Region of the Equine Stomach

University of Tennessee

*Principal Investigator: Frank M. Andrews*

*Co-PI: Steve Patton*

Years: 1999-2000 TOTAL - \$37,110

# INFECTIOUS DISEASE

## Grayson-Jockey Club Research Archives



*All the types of infectious diseases that affect horses are too numerous to name. Through research proper treatments are found, as well as determining how they are transmitted and how to contain outbreaks in the horse population.*

*Grayson is proud to have funded the following infectious disease projects:*

### Persistence Of Antimicrobial Resistance In Horse Farms

Auburn University, *Principal Investigator: Laura Huber*

*CO-PIs: Nathan Slovis (Hagyard Equine Medical Institute), Noah Cohen (Texas A&M), L. Salvador (University of Georgia)*

This project will determine the effect of antimicrobial pressure on multidrug resistant -R. equi persistence in the soil of horse breeding farms in a 5 year period.

YEARS: 2022-2023 TOTAL- \$ 93,978

### Does Antibiotic Treatment Change The Microbial Resistome

Texas A&M University, *Principal Investigator: Paul Morley*

*CO-PIs: John Pipkin, Lee J. Pinnel, Maggie M. Murphy, Gregg Veneklassen (Timber Creek Vet Hosp)*

This research will compare four antibiotic treatments to these protocols that can be selected to treat bacterial infections while also lessening the risks for promoting antibiotic resistance.

YEARS: 2022-2023 TOTAL- \$ 171,824

### Trained Immunity In Foals

Texas A&M University, *Principal Investigator: Angela Bordin*

*CO-PIs: Noah Cohen, Michael Golding, Bibiana Petri da Silveira*

This project will study how giving oral live bacteria protects foals against infection by *Rhodococcus equi*, the cause of severe and debilitating pneumonia in foals, for future development of a vaccine.

YEARS: 2022-2023 TOTAL- \$149,589

### Influence Of Vitamin D And Cortisol In R. Equi Infection

University of Georgia, *Principal Investigator: Kelsey Hart*

*CO-PIs: Londa Berghaus, Roy Berghaus, Clare Ryan, Monica Venner (SVM Hanover-Germany)*

This study will investigate how blood levels of cortisol and vitamin D are related to the development and progression of *Rhodococcus equi* pneumonia in foals after natural exposure.

YEARS: 2022-2023 TOTAL- \$113,770

### Development of a Vectored Vaccine to Equine Rotavirus A

Louisiana State University, *Principal Investigator: Mariano Carossino*

*CO-PIs: Udeni B. R. Balasuriya, Konstantin G. Kousoulas, Frank M. Andrews, Come Thieulent, M. Vissani & V. Parreño (Natl de Tecn Agro), M.Barrandeguy (U Salvadore)*

A novel viral vectored vaccine against equine rotavirus A G3 and G14, the leading cause of foal diarrhea, will be designed and evaluated in mares and a neonatal mouse model as proof-of-concept.

Year: 2022 TOTAL -\$ 86,948

### Novel Strangles Vaccine Using CD40-Targeted Delivery

Texas A&M University, *Principal Investigator: Luc Berghman*

*CO-PIs: Jill Wright Skrobarczyk, Noah Cohen, Angela Bordin*

This project will be targeting bacterial components of *Streptococcus equi* spp. *equi* to the horse's immune surveillance cells (the APCs) that will result in a fast and strong immune response that will protect against strangles.

Year: 2022 TOTAL -\$ 69,630

### Immunogenicity in Foals of an mRNA Vaccine For R. Equi

Texas A&M University, *Principal Investigator: Noah Cohen*

*CO-PIs: Angela I. Bordin, Rebecca Legere, Jeroen Pollet (Baylor), Christina Poveda (Baylor)*

This study proposes to develop an mRNA vaccine delivered by inhalation to protect foals against pneumonia caused by *Rhodococcus equi*.

Year: 2022 TOTAL \$75,807

### Environmental Origins of Equine Antimicrobial Resistance

University of Georgia, *Principal Investigator: Brandy Burgess*

*CO-PIs: Erin M. Beasley, Paul S. Morley, Noelle R. Noyes*

This study will elucidate how antimicrobial resistance and virulence determinants are shared among horses and hospital environment, as well as the role antimicrobial exposure plays at this interface.

Years: 2021-2022 TOTAL - \$ 50,694

### New Generation Equine Influenza Bivalent VLP Vaccine

University of Kentucky, *Principal Investigator: Thomas Chambers*

*CO-PIs: David W. Horohov, Stephanie Reedy, J Daly - University of Nottingham UK,*

*A Cullinane - Irish Equine Center, Ireland, Celia Abolnik, University of Pretoria - South Africa,*

*M O'Kennedy -CSIR Bioscience South Africa, A Mabetha - CSIR Bioscience South Africa*

We propose to create a novel, safe and effective vaccine for equine influenza based on the 21st-century technology of noninfectious virus-like particles produced in plants.

Years: 2021-2022 TOTAL - \$ 115,358

### Passive Immunization of Foals With RNA-Ab Against R equi

Baylor College of Medicine, *Principal Investigator: Jeroen Pollet*

*Co-PIs: Angela Bordin, Ellen Ruth Morris, Philip Felgner, UC DAVIS*

With the use of inhalation therapy, this project intent is to deliver the genetic code for a protective antibody against *Rhodococcus equi* into the lung cells of newborn foals, to rapidly protect them against infection.

Year: 2021 TOTAL - \$88,616

### Developing an Improved Serological Test for Strangles

Texas A&M University, *Principal Investigator: Noah Cohen*

*Co-PIs: Angela Bordin, Ellen Ruth Morris, Philip Felgner, UC DAVIS*

The purpose of this project is to develop a more accurate blood test to identify horses infected with the bacterium that causes strangles to improve control and prevention of strangles.

Year: 2021 TOTAL - \$95,369

### Expanding Knowledge of the Micro-Biome in Mares & Foals

University of Kentucky

This project is to provide sampling and analysis including PCR, genomic and microbiology of the micro-biome in mares and foals.

Year 2021 TOTAL - \$10,000

### Improving Fungal Diagnosis In Horses

Cornell University, *Principal Investigator: Soon Cheong*

*Co-PIs: Craig Altier, Mariana Diel de Amorim, Laura Goodman, Patrick Craine*

The goal of this project is development of a diagnostic test that can rapidly detect, identify, and determine the antifungal susceptibility profile of clinical equine samples to improve treatment outcomes of fungal infection in horses.

Years: 2020-2021 TOTAL - \$118,651

### Dynamics of Vitamin D in Hospital Foals

The Ohio State University, *Principal Investigator: Ramiro Toribio*

*Co-PIs: Teresa Burns, Laura Dunbar, Katarzyna Dembek (IA State), Stephen Reed (Rood & Riddle), Nathan Slovis (Hagyard), Ahmed Kamr*

Critically ill foals often have low blood levels of vitamin D; the goal is to investigate if their levels over time are associated with the severity of their disease and mortality.

Years: 2020-2021 TOTAL - \$133,076

### Inhibiting EHV-1 with Anti-Inflammatory Drugs

University of North Carolina Wilmington, *Principal Investigator: Arthur Frampton*

*Co-PIs: Jacob Kazenelson, Jeanette Black*

This study uses a tissue culture model system to test the ability of specific drugs to reduce the damaging hyper-inflammatory response that is observed in EHV-1 infected horses suffering from Equine Herpesvirus Myeloencephalopathy (EHM).

Years: 2020-2021 TOTAL - \$79,200

### Passive Immunization of Foals with RNA-Ab Against R equi

Baylor College of Medicine, *Principal Investigator: Jeroen Pollet*

*CO-PIs: Amadeo Biter, Cristina Poveda, Texas A & M: Noah Cohen, Luc Berghman, Angela Bordin, Raquel Rubia Rech*

This project reviewed delivery of the genetic code for a protective antibody against *Rhodococcus equi* into the lung cells of newborn foals by inhalation therapy to rapidly protect them against infection.

Year: 2020 TOTAL - \$77,022

### Anti-PNAG Plasma for Preventing R. equi Foal Pneumonia

Texas A&M University, *Principal Investigator: Noah Cohen*

*CO-PIs: Angela Bordin, Susanne Kahn*

Transfusion of plasma is the only licensed product for preventing *Rhodococcus equi* pneumonia, and this study was designed to demonstrate development of a plasma product superior to that available currently.

Year: 2020 TOTAL - \$90,268

### Uncovering The Blood B Cell Immune Response To EHV-1

Cornell University, *Principal Investigator: Tracy Stokol*

*Co-PIs: John Parker, Charles Danko, Iwijn De Vlaeminck, Maria Julia Felipe, Mridusmita Saikia*

The purpose of this study was to identify changes in B cell immunity after EHV-1 vaccination by sequencing individual blood B cells and generate a sequencing database to uncover new antibodies against EHV-1.

Year: 2019 TOTAL - \$101,462

### Investigating Metabolic Stress And Viral Hepatitis

Cornell University, *Principal Investigator: Sabine Mann*

*Co-PIs: Thomas Divers, Joseph Wakshlag, Tracy Stokol, Josh Ramsay (WA ST), Stephen Reed (Rood and Riddle), Drs. Yarbrough/Nordberg (McGaughey & Pletcher), Dr. Cheney (Northrop)*

This project studied metabolic pathways and hepatic viral infection to find a relationship with maladaptation to training syndrome/high Gamma-glutamyl transferase to help improve the health and performance of race horses.

Year: 2018-2019 TOTAL - \$117,333

### Host Factors Involved In EHM Pathogenesis And Latency

Michigan State University, *Principal Investigator: Gisela Soboll Hussey*

*Co-PIs: Lutz Goehring, Patty Weber, Dr. Luyendyk, Lila Zarski, Jessica Prenni (CSU)*

This study was for the development of tools to protect horses from EHV-1 infection, compare the immune responses in old and young horses to identify the mechanisms causing clinical EHM.

Year: 2018-2019 TOTAL - \$125,998

### AMPK Agonists And Insulin Dysregulation In Horses

The Ohio State University, *Principal Investigator: Teresa Burns*

*Co-PIs: James Belknap, Laura Dunbar, Mauria Watts*

This project directly impacts the treatment of equine metabolic syndrome by assessing the efficacy of two drugs, metformin and acetylsalicylic acid, in the treatment of equine insulin dysregulation.

Year: 2018-2019 TOTAL – \$112,034

### Host-Directed Control Of R. Equi Foal Pneumonia Part II

Texas A & M University, *Principal Investigator: Angela Bordin*

*Co-PIs: Londa Berghaus, Courtney Brake, Magnus Hook, Kelsey Hart and Glennon Mays (U of GA),*

This was the second phase of a 4 year project that began in 2016, and proposed the use an inhaled product applied directly into the lungs to increase immune responses to protect foals against *Rhodococcus equi*, a bacterium that causes severe pneumonia in foals.

Year: 2018-2019 TOTAL - \$229,034

### **Epidemiology Of Drug-Resistant R. Equi At Horse Farms**

University of Georgia, *Principal Investigator: Kelsey Hart*

*Co-PIs: Laura Huber, Noah Cohen (Texas A&M), Nathan Slovis (Hagyard Equine Medical)*

This study was set up to determine if isolates of *Rhodococcus equi* highly resistant to antibiotics are widespread at horse breeding farms in Kentucky.

Year: 2018-2019 TOTAL - \$117,990

### **Cytotoxic T-Cell Immunity to Equine Herpesvirus Type 1**

Cornell University, *Principal Investigator: Doug Antczak*

*Co-PIs: Rebecca T. Ingram; Julia Kydd; Brian Rudd; Donald Miller;*

*Nikolaus Osterrieder, (Freie U Berlin); Gisela Sobel Hussey, (MI ST)*

The goal of this research was to develop critically needed knowledge about how the horse immune system responds to equine herpesvirus type1 vaccination and infection.

Years: 2017- 2018 TOTAL - \$133,103

### **Anticoagulants As Thromboprophylaxis For EHV-1 Infection**

Cornell University, *Principal Investigator: Tracy Stokol*

*Co-PIs: Priscila Serpa; Marjory Brooks; Thomas Divers; SallyAnne Ness; Gail Babcock;*

*Mark Papich (NC State)* This study was set up to block blood clotting with drug to attempt to prevent abortion and neurological disease from occurring in horses infected with EHV-1.

Year: 2017 TOTAL - \$116,818

### **EHV-1 And Latency**

Ludwig Maximilians University, *Principal Investigator: Lutz S.Goehring*

*Co-PIs: Carlos E Medina Torres; Kaspar Matiasek; Josh Slater; Ana Maria Ulloa;*

*Gisela Soboll-Hussey (MSU)*

Years: 2016-2017 TOTAL - \$107,862

This project studied about EHV–1 latency locations; about prevalence in horse populations, and if different latency stages exist in hopes of finding 'stages' which would allow interventional strategies.

### **A Novel Vaccine Against Equine Strangles**

Texas A & M University, *Principal Investigator: Noah Cohen*

*Co-PIs: Angela I. Bordin; Michelle C. Coleman; Courtney Brake (U of GA);*

*Gerald B. Pier & Colette Cywes–Bentley (Harvard)*

Years: 2016-2017 TOTAL - \$119,155

A study of a concept for a vaccine to protect horses against the disease known as Strangles with good preliminary data suggesting this vaccine will be safe and effective.

### **Host-Directed Control Of R. Equi Foal Pneumonia Part I**

Texas A & M University, *Principal Investigator: Angela Bordin*

*Co-PIs: Noah Cohen; Steve Giguere; Londa Berghaus; Magnus Hook;*

*Courtney Brake & Glennon Mays (U of GA)*

This project is a 4 year grant completed in two phases which preposed the use an inhaled product applied directly into the lungs to increase immune responses to protect foals against *Rhodococcus equi*, a bacterium that causes severe pneumonia in foals.

Years: 2016-2017 TOTAL - \$189,189

### **Fitness And Persistence And Of Drug Resistant R. Equi**

University of Georgia, *Principal Investigator: Steeve Giguere*

*Co-PIs: Noah Cohen (Texas A&M); Jose Vazquez–Boland (U of Edinburgh)*

The purpose of this study was to determine if drug-resistant *Rhodococcus equi* can persist in the environment and if resistant strains were more likely to cause disease than susceptible strains.

Years: 2016-2017 TOTAL - \$95,498

### **IGGS(T) Antibodies Identify Foals at Risk for R. Equi**

University of Kentucky, *Principal Investigator: David Horohov*

This project involves the validation of a new test for *Rhodococcus equi* infections in foal.

Year: 2016 TOTAL - \$62,407

### **Validation of Stall-Side Strangles Diagnosis Using Lamp**

University of Pennsylvania, *Principal Investigator: Ashley Boyle*

The aim was to validate a stall–side test that could be used for fast, sensitive, accurate, and cost efficient diagnosis of strangles (*S. equi*) carriers (a highly infectious equine respiratory disease).

[LAMP means loop– mediated isothermal nucleic acid amplification.]

Year: 2016 TOTAL - \$22,330

### **Steroid / Neurosteroid Dynamics in Critically Ill Foals**

The Ohio State University, *Principal Investigator: Ramiro Toribio*

*Co-PIs: Katarzyna Dembek; Stephen Reed (Rood & Riddle); Nathan Slovis (Hagyard);*

*Kelsey Hart (UN of GA)*

This study proposed to elucidate the importance of stress hormones as well as hormones that affect neurological function in the development and progression of diseases of newborn foals.

Years: 2015-2016 TOTAL - \$ 101,518

### **A Guinea Pig Model of Rhodococcus equi Pneumonia**

Texas A&M University, *Principal Investigator: Angela Bordin*

*Co-PIs: Noah Cohen; David McMurray; Jeffrey Cirillo; Canaan Whitfield-Cargile;*

*Courtney Brake; Ellen Alexander*

This novel studied was to determine is a guinea pig model of *R. equi* pneumonia would help to better understand the disease in foals, and evaluate novel approaches for controlling and preventing *R. equi* pneumonia.

Years: 2015-2016 TOTAL - \$21,221

### **Inhibition Of Type–I Interferon Response By EHV–1**

University of Kentucky, *Principal Investigator: Thomas Chambers*

*Co-PIS: David Horohov; Udeni Balasuriya; Fatai Oladunni; Stephanie Reedy*

This project explored the mechanism of equine herpesvirus-1 blockage of an immune defense pathway and its relationship to equine herpesviral myeloencephalopathy, a serious condition affecting horses.

Years: 2015-2016 TOTAL - \$133,931



### MicroRNAs as Novel Biomarkers or Insulin Resistance

Colorado State University, *Principal Investigator: Tanja Hess*

*Co-PIs: Jason Bruemmer; Bridget McIntosh; Rebecca Splan (VA Tech)*

In an effort to improve the diagnosis, management and treatment of the many horses and ponies who suffer from metabolic disorders related to insulin dysregulation, an investigation of the ability of novel, small, gene-regulating molecules called microRNAs were used as convenient and accurate biomarkers for equine insulin resistance.

Years: 2015 TOTAL - \$35,008

### Role of Biofilm in Infectious Endometritis in the Horse

Colorado State University, *Principal Investigator: Ryan Ferris*

*Co-PIs: Brad Borlee; Grace Borlee*

This project was designed to obtain a better understanding of the role of bacterial biofilm in conferring protection to the host immune system and antibiotics is crucial to development of therapeutic protocols for treatment of endometritis in mares. (Biofilm: A matrix which provides a 'protective' blanket' for the wall of the uterus.)

Years: 2015 TOTAL - \$22,485

### Etiology of IAD and Performance in Racehorses

Purdue University, *Principal Investigator: Laurent L. Couetil*

*Co-PIs: Kathleen Ivester; Sandra Taylor; George Moore; Rose Raskin; Gena Hammac; Jyothi Thimmapuram; Donna Griffey; Anisa Dunham*

Years: 2014-2015 TOTAL - \$98,811

### Anhidrosis in Foals Treated With Macrolides

University of Florida, *Principal Investigator: Robert MacKay*

*Co-PIs: Chris Sanchez, Martha Mallicote, Amy Stieler, James Burrow, Julia Conway*

This project was set up to do a simple test to show that impaired sweating is the cause of overheating not only in foals given erythromycin but also in some foals treated with azithromycin, clarithromycin, and even the exciting new antibiotic, gamithromycin.

Years: 2014-2015 TOTAL - \$142,533

### Platelet Inhibitors Potential Antithrombotics for E

Cornell University, *Principal Investigator: Tracy Stokol*

*Co-PIs: Marjory Brooks; Bettina Wagner; Gerlinde Van de Walle; Thomas Divers; Sally Ness; Christine DeLeonardis*

This study researched for evidence of platelet and coagulation activation during the acute phase of EHV1 infection and that horses demonstrating more profound activation response would have more severe fever. Part of the study was to compare the inhibitory effects of 4 antiplatelet drugs on EHV1 induced platelet activation.

Year: 2014 TOTAL - \$63,368

### **R. equi Pneumonia: Can a Novel Vaccine Protect Foals?**

Texas A&M University, *Principal Investigator: Noah Cohen*

*Co-PIs: Suresh Pillai; Michelle Coleman; Joana Rocha; Courtney Brake; Waithaka Mwangi; Robert Alaniz; Steeve Giguère (UN of GA)*

This proposal was set up to evaluate the ability of a vaccine to protect foals against infection with R. equi as an essential next step in our efforts to develop a vaccine against R. equi. and subsequently other infections such as Strep equi, the causative agent of strangles.

Year: 2014 TOTAL - \$74,067

### **Assessment of a Rhodococcus Equi Vaccine in Foals.**

University of Edinburgh, *Principal Investigator: Jose Vazquez-Boland*

*Co-PIs: Mariela Scotti; Iain MacArthur; Macarena Sanz; & David Horohov (UN of KY); John Prescott (UN of Guelph)*

This study was to determine if protection against this bacterium Rhodococcus equi could be achieved by targeting it with a vaccine to prevent infection when still at its initial "colonization" stages in the airways before the bacteria become established in the lung.

Year: 2014 TOTAL-\$62,106

### **Evaluation of a Rapid Test for Salmonella**

Colorado State University, *Principal Investigator: Paul Morley*

*Co-PIs: Nathan Slovis; Brandy Burgess; Kristy Pabilonia; Christina Weller; Justine Elam (Hagyard)*

Years: 2013-2014 TOTAL - \$57,424

### **Development of Alternative Models to Study EHM**

Michigan State University, *Principal Investigator: Gisela Soboll Hussey*

*Co-PIs: Lutz Goehring; Andras Komaromy; Anthony Pease; Stephen Hussey; J. Prenni & C. Broccardo (CO State); Nik Osterrieder, Freihe (UN Berlin); Josh Slater (Royal Vet LONDON)*

Years: 2013-2014 TOTAL - \$129,267

### **Molecular Determinants of EHV-1 Fusion and Spread**

University of North Carolina Wilmington, *Principal Investigator: Arthur Frampton*

*Co-PI: Jekaterina Barsova*

Years: 2013-2014 TOTAL -\$78,500

### **Gallium: An Alternative to Macrolides Against R. equi EPM**

Texas A&M University, *Principal Investigator: Noah Cohen*

*Co-PIs: M. Keith Chaffin; Nathan Slovis- (Hagyard Equine Med.); Steeve Giguère (UN of GA)*

Year: 2013 TOTAL - \$40,100

### **The Interaction Between Anthelmintic Treatment and Vacci EPM**

University of Kentucky, *Principal Investigator: Martin Nielsen*

*Co-PIs: Thomas Chambers; David Horohov; Stephanie Reedy; Holli Gravatte; Alejandra Betancourt; Jennifer Bellaw; Stine Jacobsen*

Year: 2013 TOTAL - \$60,466

### Liposomal Gentamicin for the Treatment of R. Equi

University of Georgia, *Principal Investigator: Steeve Giguère*

*Co-PIs: Alexandra Burton; Robert Arnold*

Years: 2012-2013 TOTAL - \$92,320

### Vitamin D and Innate Immunity in the Horse

University of Georgia, *Principal Investigator: Mary Hondalus*

*Co-PIs: Steeve Giguère; Kimberly Goldbach*

Year: 2012 TOTAL - \$49,942

### Do NSAIDs Affect the Immune Response of Horses to Vaccination?

University of Kentucky, *Principal Investigator: David Horohov*

*Co-PIs: Thomas Chambers; Allen Page; Whitney Zoll*

Year: 2012 TOTAL - \$54,776

### Determinants of Immune Protection Against Babesia Equi

Washington State University, *Principal Investigator: Robert Mealey*

*Co-PI: Donald Knowles*

Years: 2011-2012 TOTAL - \$150,000

### Molecular Characterization of EHV-1

University of Kentucky, *Principal Investigator: Udeni Balasuriya*

*Co-PIs: R. Frank Cook; Yanqiu Li; Pamela Henney; Peter Timoney; Kathryn Smith*

Years: 2010-2011 TOTAL - \$95,361

### Rapid PCR Diagnosis of Equine Botulism

University of Pennsylvania, *Principal Investigator: Raymond Sweeney*

*Co-PIs: Amy Johnson; Robert Whitlock; Susan McAdams*

Years: 2010-2011 TOTAL - \$33,665

### Toxins TCD A, B of C Difficile

University of Kentucky, *Principal Investigator: Sergey Artiushin*

*Co-PIs: John Timoney; Sridhar Velineni; Sridhar Velineni*

Year: 2010 TOTAL - \$45,855

### Prevention of EHV-1 Myeloencephalitis

Oklahoma State University, *Principal Investigator: Lara Maxwell*

*Co-PIs: Richard Eberle; Jerry Ritchey; Charles MacAllister; Dianne McFarlane*

Years: 2009-2010 TOTAL - \$104,431

### Cell Signaling/Receptor Molecules for EHV-1

University of North Carolina Wilmington, *Principal Investigator: Arthur Frampton*

Years: 2009-2010 TOTAL - \$77,578

### **Botulism, Real-Time PCR Test**

University of Pennsylvania, *Principal Investigator: Robert Whitlock*  
*Co-PIs: Raymond Sweeney; Susan McAdams; Amy Johnson*  
Year: 2009 TOTAL - \$21,600

### **Development of an Equine In Vitro Respiratory Model to Study Virus-Host Interactions**

Colorado State University, *Principal Investigator: Gisela Soboll*  
*Co-PIs: Gabriele Landolt; D. Paul Lunn*  
Years: 2008-2009 TOTAL - \$97,480

### **The Neurologic EHV-1 Marker: Correlation or Causation?**

Cornell University, *Principal Investigator: Nikolaus Osterrieder*  
Years: 2008-2009 TOTAL - \$97,534

### **Neuropathogenesis of EHV-1 Infection in Horses**

Colorado State University, *Principal Investigator: Lutz S. Goehring*  
*Co-PIs: D. Paul Lunn; Alan Schenkel*  
Years: 2008-2009 TOTAL - \$92,231

### **R. Equi Pneumonia: Does the Magnitude of Airborne Exposure Predict Disease Development?**

Texas A & M University, *Principal Investigator: Noah Cohen*  
*Co-PIs: Craig Carter (UN of KY); Morgan Scott; M. Keith Chaffin*  
Years: 2008-2009 TOTAL - \$137,798

### **Molecular Epidemiology of EAV: 2006 Occurrence in the United States**

University of Kentucky, *Principal Investigator: Udeni Balasuriya*  
*Co-PI: Peter Timoney*  
Year: 2008 TOTAL - \$31,967

### **Efficacy of Valacyclovir Against Neuropathogenic EHV-1**

Oklahoma State University, *Principal Investigator: Lara Maxwell*  
*Co-PIs: Brad Bentz; Charles MacAllister; Richard Eberle; Jerry Ritchey*  
Years: 2007-2008 TOTAL - \$74,375

### **Control of Rhodococcus equi pneumonia Using Gallium**

Texas A & M University, *Principal Investigator: M. Keith Chaffin*  
*Co-PIs: Noah Cohen; Ronald J. Martens*  
Years: 2007-2008 TOTAL - \$153,286

### **Enhancing Interferon Gamma Expression in Foals**

University of Kentucky, *Principal Investigator: David Horohov*  
*Co-PIs: C. Meranmt; C. Breathnach*  
Years: 2007-2008 TOTAL - \$154,821

### **Tetramers for Precise Measurement of Immunity to EHV-1**

Colorado State University, *Principal Investigator: D. Paul Lunn*  
*Co-PIs: Gisela Soboll; Julia Kydd; Nick Davis-Poynter ; Klaus Osterreider*  
Years: 2006-2007 TOTAL - \$116,641

### **Biology of Neuropathogenic Strains of Equine Herpesvirus-1**

University of Kentucky, *Principal Investigator: George Allen*  
*Co-PI: David Azbill*  
Years: 2006-2007 TOTAL - \$60,000

### **Rapid Diagnostic Assay for Streptococcus Equi**

University of Kentucky, *Principal Investigator: John Timoney*  
Years: 2006-2007 TOTAL - \$88,198

### **Detection of Antibodies to EAV by Microsphere Immunoassay**

University of Kentucky, *Principal Investigator: Udeni B. R. Balasuriya*  
*Co-PI: Peter Timoney*  
Year: 2006 TOTAL - \$24,702

### **Sequencing the Rhodococcus Equi Genome**

University of Bristol, *Principal Investigator: Jose Vazquez-Boland*  
*Co-PIs: John Prescott; Julian Parkhill; Wim Meijer; Julian Davies; Shinji Tkaj; Iain Sutcliffe*  
Years: 2005-2006 TOTAL - \$50,000

### **Evaluation of a Rapid MRSA Test for Horses**

University of Guelph, *Principal Investigator: Scott Weese*  
Years: 2005-2006 TOTAL - \$26,750

### **Immune Response of Young Foals Exposed to Rhodococcus**

University of Kentucky, *Principal Investigator: David Horohov*  
*Co-PI: Duane Chappell*  
Years: 2005-2006 TOTAL - \$145,382

### **Gallium Therapy to Control Rhodococcus Equi Pneumonia**

Texas A & M University, *Principal Investigator: Ronald Martens (Visiting Professor)*  
*Co-PIs: Noah Cohen; M. Keith Chaffin; Lawrence Bernstein*  
Year: 2005 TOTAL - \$49,796

### **New Tools for Detection of Leptospira in Horses**

University of Kentucky, *Principal Investigator: Sergey Artiushin*  
*Co-PI: John Timoney,*  
Year: 2005 TOTAL - \$34,892

### **EHV-1 Vaccines for Generation of Cytotoxic Lymphocytes**

Colorado State University, *Principal Investigator: D. Paul Lunn*

*Co-PI: S. Marulasiddappa*

Years: 2004-2005 TOTAL - \$95,650

### **Vaccine Potential of a Riboflavin-Requiring Strain of R. Equi**

Harvard School, *Principal Investigator: Mary Hondalus*

*Co-PI: Hugh Townsend*

Years: 2004-2005 TOTAL - \$116,757

### **Are Mares a Source of Rhodococcus Equi for Their Foals?**

Texas A & M University, *Principal Investigator: Noah Cohen*

*Co-PIs: Nathan Slovis; George Mundy*

Years: 2004-2005 TOTAL - \$87,013

### **Inhibition of Endotoxin with Adenosine Receptor Agonists**

University of Georgia, *Principal Investigator: Thomas Murray*

*Co-PIs: James Moore; Michel Vandenplas*

Years: 2004-2005 TOTAL - \$77,462

### **Genetic Determinants of Equine Herpesvirus-1 CNS Disease**

University of Kentucky, *Principal Investigator: George Allen*

*Co-PI: Nick Davis-Poynter*

Years: 2004-2005 TOTAL - \$60,000

### **Production of Antibodies to Selected Equine Cytokines**

University of Kentucky, *Principal Investigator: David Horohov*

Years: 2004-2005 TOTAL - \$79,100

### **Systemically Immunogenic Surface & Secreted Proteins of S. Equi**

University of Kentucky, *Principal Investigator: John Timoney*

*Co-PI: Sergey Artiushin*

Year: 2004 TOTAL - \$42,450

### **Molecular Epidemiology & Evolution of Sarcocystis Neurona, Agent of EPM**

Michigan State University, *Principal Investigator: Linda Susan Mansfield*

*Co-PIs: Thomas S. Whittam; A. Mahdi Saeed*

Years: 2003-2004 TOTAL - \$52,455

### **IL-12 as an Adjuvant in a DNA Vaccine for Rhodococcal Pneumonia**

Washington State University, *Principal Investigator: Diana Stone*

*Co-PI: Steve Hines; Travis McGuire; Melissa Hines*

Years: 2003-2004 TOTAL - \$91,063

### **Response of Foals to Vaccination Against West Nile Virus**

University of California – Davis, *Principal Investigator: W. David Wilson*

*Co-PI: Judy E. Mihalyi*

Year: 2003 TOTAL - \$21,281

### **Mucosally Immunogenic Surface Expressed Proteins of Streptococcus Equi**

University of Kentucky, *Principal Investigator: John Timoney*

*Co-PIs: John Walker; Sergey Artiushin*

Year: 2003 TOTAL - \$46,500

### **Respiratory Immune Response of Young Foals**

Louisiana State University, *Principal Investigator: David W. Horohov*

*Co-PI: Dale Paccamonti*

Years: 2002-2003 TOTAL - \$129,930

### **Equine Genes, Microarrays and Responses to Gram-Positive Toxins**

University of Georgia, *Principal Investigator: Michel Vandenplas*

*Co-PIs: L. H. Pratt; M. M. Cordonier-Pratt; J. N. Moore; A. Gingle; D. J. Hurley*

Years: 2002-2003 TOTAL - \$76,000

### **Role of Streptococcus Bovis Exotoxins in Equine Laminitis**

University of Missouri, *Principal Investigator: Philip Johnson*

*Co-PIs: Andria Cogswell; Nat Messer; John Kreeger*

Years: 2002-2003 TOTAL - \$98,150

### **Development of a Refined Equine Model for Equine Protozoal Myeloencephalitis**

The Ohio State University, *Principal Investigator: William Saville*

*Co-PIs: R. W. Stich; S. M. Reed; M. J. Oglesbee*

Years: 2001-2002 TOTAL - \$101,384

### **Identification of Immunogenic Proteins Unique to Streptococcus Equi**

University of Kentucky, *Principal Investigator: John Timoney*

*Co-PI: John Walker*

Years: 2001-2002 TOTAL - \$90,250

### **Practical Equine DNA Vaccination: Mucosal Vectors and the "Prime/ Boost" Strategy**

University of Wisconsin, *Principal Investigator: D. Paul Lunn*

*Co-PIs: Chris Olsen; John Timoney; David Watkins*

Years: 2001-2002 TOTAL - \$89,650

### **Role of DI Particles in Persistent EAV Infection of Stallions**

University of California – Davis, *Principal Investigator: N. James MacLachlan*

*Co-PIs: Udeni Balasuriya; Jodi Hedges*

Years: 2000-2001 TOTAL - \$67,101

### **Development and Testing of Genetic Vaccines for Vesicular Stomatitis**

Colorado State University, *Principal Investigator: Richard A. Bowen*

Years: 2000-2001 TOTAL - \$48,020

### **Development of BCG Expressing VapA as a Vaccine Against R. Equi**

Harvard School, *Principal Investigator: Mary K. Hondalus*

*Co-PIs: Barry Bloom; Mary Rose Paradis*

Years: 2000-2001 TOTAL - \$101,630

### **Pathogenesis of Equine Protozoal Myeloencephalitis**

Washington State University, *Principal Investigator: Debra Sellon*

*Co-PIs: Donald Knowles; Carol Wyatt; Melissa Hines*

Years: 2000-2001 TOTAL - \$104,976

### **Pathogenesis of Vesicular Stomatitis in Horses**

University of Georgia, *Principal Investigator: Elizabeth Howerth*

*Co-PIs: David Stallknecht; P.O.E. Mueller*

Years: 1999-2000 TOTAL - \$57,405

### **Characterization of the Pyrogenic Mitogen of Streptococcus Equi**

University of Kentucky, *Principal Investigator: John Timoney*

*Co-PIs: Sergey Artiushin; Abhineet Sheoran*

Years: 1999-2000 TOTAL - \$57,182

### **DNA Vaccination Against Rhodococcus Equi Pneumonia**

University of Guelph, *Principal Investigator: J.F. Prescott*

Years: 1999-2000 TOTAL - \$65,200

### **Generation of Protective Immunity to Equine Herpes Viral Infection Using DNA**

University of Wisconsin, *Principal Investigator: D. Paul Lunn*

*Co-PI: Chris W. Olsen*

Years: 1999-2000 TOTAL - \$79,817



# LAMINITIS

## Grayson-Jockey Club Research Archives

A disease where the tissues that attach the hoof to the underlying coffin bone become damaged and inflamed. It not only leads to loss of performance but is second only to colic as the biggest cause of premature death in horses. There are three “types” of laminitis:

**Endocrine** - generally occurs secondary to equine metabolic syndrome and pituitary pars intermedia dysfunction (PPID, equine Cushing’s disease).

**Sepsis** - develops following a systemic illness such as colitis, metritis, pneumonia, grain overload, etc.

**Supporting-limb** - develops after a musculoskeletal injury in the opposite limb, as the horse bears excessive weight on the supporting limb.



Grayson is proud to have funded the following projects in finding answers to Laminitis.

### Sirolimus For The Control Of Insulin Dysregulation

University of Pennsylvania, *Principal Investigator: Andrew Van Eps*

*CO-PIs: Darko Stefanovski, Mary Robinson Jeaneen, Amanda Adams (University of Kentucky), Maggie Grieter (University of Kentucky), Rachel Stocker-Parks Seth Hatfield (University of Kentucky), Francois Bertin (University of Queensland), KulpDemia de Tonnere (University of Queensland)*

This study will evaluate the drug sirolimus (a potent suppressor of insulin production) for the treatment of insulin dysregulation (the most important cause of laminitis) in horses.

YEARS: 2022-2023 TOTAL- \$ 216,569

### Understanding And Preventing Supporting Limb Laminitis

University of Pennsylvania, *Principal Investigator: Andrew Van Eps*

*CO-PIs: H. Galantino-Homer, Julie Engiles, Darko Stefanovski, Matthew Ford, Jennifer Macklin, Lynne Cassimeris- Lehigh University, Teresa Burns - The Ohio State University, Mauria Watts- The Ohio State University*

We aim to make supporting limb laminitis preventable through analysis of archived model tissues, a multi-center limb motion study of horses at risk, and development of a prototype therapeutic device.

Years: 2021-2022 TOTAL - \$ 148,181

### AMPK Agonist Combination Therapy and ID in Horses

The Ohio State University, *Principal Investigator: Teresa Burns*

*Co-PI: Laura K. Dunbar*

By completing this work, this study was designed to characterize a combination therapy to improve equine insulin resistance that is administered orally and well tolerated.

Years: 2020-2021 TOTAL - 151,121

### **Endocrinopathic Laminitis: Pathophysiology and Treatment**

The Ohio State University, *Principal Investigator: James Belknap*

*Co-PIs: Teresa Burns, (Heads Lab); Mauria R. Watts; Andrew van Eps (UN of Queensland)*

The purpose of this study was to determine if continuous digital hypothermia is effective and therefore indicated in the management of endocrinopathic laminitis, the most common form of the disease.

Years: 2017-2018 TOTAL - \$116,148

### **Prevention of Supporting Limb Laminitis**

University of Queensland, *Principal Investigator: Andrew Van Eps*

*Co-PIs: Dean Richardson (Cornell), James Belknap & Mauria Watts (Ohio State)*

This study was set up to show the potential efficacy of a novel pneumatic boot to prevent lamellar changes leading to supporting limb laminitis and may provide an effective clinical preventive.

Years: 2015-2016 TOTAL - \$188,169

### **Events Affecting Laminar Adhesion in Equine Sepsis**

The Ohio State University, *Principal Investigator: James Belknap*

*Co-PI: Mauria Watts, Andrew Van Eps (UN of Queensland), Scott Napper (UN of Saskatchewan)*

This project looked into providing targets for pharmaceutical therapies to either replace or augment continuous digital hypothermia.

Years: 2014-2015 TOTAL - \$165,391

### **Weight Bearing; Perfusion and Bioenergetics in Laminitis**

University of Queensland, *Principal Investigator: Andrew Van Eps*

*Co-PIs: Dean Richardson (Cornell), James Belknap & Mauria Watts (Ohio State)*

This research was designed to confirm the cause of supporting limb laminitis and to test potential therapeutic interventions.

Years: 2014-2015 TOTAL - \$82,125

### **Laminar Signaling in Supporting Limb Laminitis**

The Ohio State University, *Principal Investigator: James Belknap*

*Co-PI: Samuel Black (UN of MA)*

Years: 2012-2013 TOTAL - \$131,740

### **Targeting 5-HT in Equine Laminitis**

University of Georgia, *Principal Investigator: Thomas Robertson*

*Co-PIs: Benjamin Brainard; James Moore; Robert Arnold; John Peroni*

Years: 2012-2013 TOTAL - \$50,292

### **Digital Hypothermia in Laminitis: Timing & Signaling**

The Ohio State University, *Principal Investigator: James Belknap*

*Co-PIs: Andrew van Eps; Mauria Watts*

Years: 2011-2012 TOTAL - \$88,522

### Lamellar Energy Failure in Supporting Limb Laminitis

The University of Queensland, *Principal Investigator: Andrew van Eps*  
*Co-PIs: Simon Collins; Christopher Pollitt; Dean Richardson (UN of PA)*  
Years: 2011-2012 TOTAL - \$81,060

### In Vivo Gene Transfer for Laminitis

University of Pennsylvania, *Principal Investigator: Dean Richardson*  
*Co-PIs: Jeffrey Mason; Andrea Phillips; James Wilson*  
Years: 2010-2011 TOTAL - \$70,865

### Endotoxemia as Predisposing Factor for Laminitis

University of Tennessee, *Principal Investigator: Nicholas Frank*  
Year: 2010 TOTAL - \$41,490

### Effect of Digital Hypothermia on Inflammatory Injury in Laminitis

The Ohio State University, *Principal Investigator: James Belknap*  
*Co-PI: Mauria Watts*  
Years: 2008-2009 TOTAL – \$82,109

### Transcriptomics and Proteomics of Equine Laminitis

University of Pennsylvania, *Principal Investigator: Hannah Galantino-Homer*  
*Co-PIs: Neal Rubinstein; James Orsini; Chris Politt (UN of Queensland Australia)*  
Years: 2008-2009 TOTAL - \$137,269

### Efficacy of Lidocaine in the Treatment of Equine Laminitis

The Ohio State University, *Principal Investigator: James Belknap*  
*Co-PI: Samuel J. Black*  
Years: 2007-2008 TOTAL - \$80,747

### Levothyroxine as a Treatment for Insulin Resistance

University of Tennessee, *Principal Investigator: Nicholas Frank*  
Years: 2007-2008 TOTAL - \$56,876

### Leukocyte & Vascular Function in Endotoxemia & Laminitis

University of Georgia, *Principal Investigator: Thomas Robertson*  
*Co-PIs: David Hurley; John Peroni; Thomas Krunkosky*  
Year: 2007 TOTAL - \$29,852

### Use of Microarrays to Characterize Endotoxemia in Vivo

University of Georgia  
*Principal Investigator: Michel L. Vandenplas*  
*Co-PIs: J. Moore; M. Cordonnier-Pratt; L Pratt*  
Year: 2005 TOTAL - \$22,745

### **Efficacy of Recombinant Equine Gonadotropins**

University of California - Davis

*Principal Investigator: Janet Roser*

*Co-PI: Irving Boime*

Year: 2004 TOTAL - \$51,258

### **Ischemia-Reperfusion Injury in Equine Laminar Arteries**

University of Georgia

*Principal Investigator: Stephen Lewis*

*Co-PIs: John Peroni; Jon Graves; Tom Robertson*

Years: 2003-2004 TOTAL - \$56,000

### **Role of Endothelin-1 in the Pathophysiology of Equine Laminitis**

Louisiana State University, *Principal Investigator: Rustin Moore*

*Co-PI: S. C. Eades*

Year: 2003 TOTAL - \$53,430

### **Functional Analyses of Equine Laminar Arteries**

University of Georgia

*Principal Investigator: John Peroni*

*Co-PIs: Stephen Lewis; Jon Graves*

Years: 2002-2003 TOTAL - \$44,089

### **Role of Endothelin and Nitric Oxide in Equine Laminitis**

Louisiana State University, *Principal Investigator: Rustin Moore*

*Co-PIs: Susan Eades; Ashley Holm; C.S. Venugopal; Julian Oliver*

Years: 1999-2000 TOTAL - \$89,892

# MISCELLANEOUS (OTHER)



## Grayson-Jockey Club Research Archives

*Pharmacology, radiology, and DNA mapping are just a few of the many types of research studies that would fall into this category.*

*Grayson is proud to have funded the following projects:*

### Fentanyl Matrix Patches In Horses

University of Georgia, *Principal Investigator: Rachel Reed*

*CO-PIs: Londa Berghaus, Heather Knych (UC- Davis)*

The aim is to show that fentanyl administered via patches placed on the skin is well absorbed and represents a promising means of providing clinically relevant continuous pain relief to horses.

YEARS: 2022-2023 TOTAL- \$ 32,105

### Pharmacokinetics of Oral Mycophenolate Mofetil in Horses

The Ohio State University, *Principal Investigator: Gwendolen Lorch*

*CO-PIs: Riley Thompson, Christianne Magee, Gerrit Bouma,*

*Budhan Pukazhenthii (Smithsonian Cons. Bio)*

This proposal will evaluate the pharmacokinetics of orally administered mycophenolate mofetil as a safe, effective and inexpensive immunosuppressant drug for management of equine immune-mediated.

Year: 2022 TOTAL -\$ 65,029

### Mitigation of Equine Recurrent Uveitis Through SOCS

University of Florida, *Principal Investigator: Joseph Larkin*

*CO-PIs: Wesley Smith, Sonal Tuli, Daniel Gibson, Caryn Plummer, Jorge Hernandez*

This project seeks to design a topical eye drop, using a natural protein, which helps to prevent pain and blindness associated with equine recurrent uveitis.

Years: 2021-2022 TOTAL - \$ 150,610

### Predicting Exercising Arrhythmias With Resting ECGS

University of Minnesota, *Principal Investigator: Molly McCue*

*CO-PIs: S. Durward-Akhurst, Anna Lytle, K Jeevaratnam- University of Surrey,*

*C Marr, Rosssdales Vet Surgeons*

This project will use at rest ECGs to identify horses with irregular heart rhythms at exercise that can cause sudden cardiac death (SCD), allowing for increased monitoring and improved understanding of SCD.

Years: 2021-2022 TOTAL - \$ 119,477

### Thoroughbred Sales Radiology-Ultrasonography Study

Colorado State University, *Principal Investigator: C. Wayne McIlwraith*

*Co-PIs: Chris Kawcak, Frances Peat, David Frisbie, Kurt Selberg, Jeffrey Berk, EQ Med Associates- KY*

This study was designed to improve the industry's understanding of the significance of sesamoiditis, ultrasonographic suspensory branch changes, and stifle lucencies in sales yearlings and two-year-olds.

Year: 2018-2019 TOTAL - \$143,624

### Unraveling Complex Traits by Defining Genome Function 2

University of California- Davis, *Principal Investigator: Carrie Finno*

*Co-PIs: Rebecca Bellone, Nicole Kingsley, Erin Burns, Ted Kalbfleisch (UN of Louisville), Jessica Peterson, (UN of Nebraska)*

This project is designed to create an atlas of gene regulation in the horse.

Year: 2018-2019 TOTAL - \$199,990

### Novel Analgesic Combination in Horses Part II

University of Minnesota, *Principal Investigator: Alonso Guedes*

*Co-PIs: Troy Trumble; Prathibha Mangedarage*

A study to develop a medication strategy for joint inflammation/pain to provide pain relief as well as help protect the joint cartilage from damage caused by chemical mediators of inflammation.

Year: 2018 TOTAL - \$69,130

### Predicting the Risk of Equine Fatal Injury During Racing

University of Glasgow, *Principal Investigator: Tim D. Parkin*

*Co-PI: Stamatis Georgopoulos*

The project used the Equine Injury Database (EID) to better predict and identify horses at greatest risk of fatal injury during racing and provide measures to further reduce the number of horses dying on North American racetracks.

Years: 2017- 2018 TOTAL - \$83,360

### Unraveling Complex Traits By Defining Genome Function

University of California, Davis, *Principal Investigator: Carrie Finno*

*Co-PIs: Jessica Peterson; Rebecca Bellone; Erin Burns; Katerine Hilburger; James MacLeod (UK); Ted Kalbfleisch (U of Louisville); Sara Nilson (U of Nebraska)*

This proposal was designed to define the critical next step to understand underlying mechanisms of disease by developing a database of tissue– specific gene expression and regulation in the healthy adult horse.

Year: 2016-2017 TOTAL - \$199,177

### **Novel Analgesic Combination In Horses Part I**

University of Minnesota, *Principal Investigator: Alonso Guedes*

*Co-PIs: Troy Trumble; Christophe Morisseau; Bruce Hammock (UC Davis)*

A study of a novel, likely more efficacious and potentially safer approach than currently available options to manage pain in horses.

Year: 2016-2017 TOTAL - \$92,099

### **Microsphere Encapsulated EPCs and Wound Vascularization**

Auburn University, *Principal Investigator: Anne Wooldridge*

*Co-PIs: Elizabeth Lipke; Fred Caldwell; Ning Cheng; Randolph Winter*

This study reviewed injectable hydrogel microsphere scaffolds containing endothelial progenitor cells for a potential novel therapy to decrease healing time in distal limb wounds in the horse.

Years: 2015-2016 TOTAL - \$76,226

### **Characterization of Intra-Articular Isoflupredone**

University of California – Davis, *Principal Investigator: Heather Knych*

*Co-PIs: Michelle Mitchell; Linda Harrison (Willow Oak)*

This study was designed to provide valuable information for establishing a threshold concentration and withdrawal time for intra-articular isoflupredone acetate in horses.

Years: 2014-2015 TOTAL - \$90,069

### **Pharmacodynamic Evaluation of Omeprazole**

University of Queensland, *Principal Investigator: Paul Mills*

*Co-PIs: Ben Sykes & Katja Sykes (BW Sykes Consultancy)*

The aim of this study was to review omeprazole and develop a revised set of treatment recommendations for the treatment of gastric ulcers in the horse.

Years: 2014 TOTAL - \$52,745

### **Factors Affecting Omeprazole Pharmacokinetics in Horses EPM**

University of Queensland, *Principal Investigator: Paul Mills*

*Co-PIs: Ben Sykes (BW Sykes Consultancy); C. McGowan (UN of Liverpool/UK)*

Year: 2013 TOTAL - \$19,640

### **Effect of CYP2D Genetic Polymorphisms on Drug Metabolism EPM**

University of California- Davis, *Principal Investigator: Heather Knych*

*Co-PIs: Carley Corado; Amy Young*

Year: 2013 TOTAL –\$81,647

### **Systemic Effects of Analgesic Combos in Horses**

University of Florida, *Principal Investigator: Linda Christine Sanchez*

*Co-PIs: Johanna R. Effenbein; Robert MacKay; Sheilah Robertson*

Years: 2010-2011 TOTAL - \$64,219

### Ethyl Pyruvate & Endotoxemia in Horses

Michigan State University, *Principal Investigator: Susan Holcombe*

*Co-PIs: Vanessa Cook; Andrew Brown; Eric Schroeder; Lorraine Sordillo*

Year: 2010 TOTAL - \$63,040

### Pharmacokinetics/Pharmacodynamics of Quinapril

North Carolina State University, *Principal Investigator: Jennifer Davis*

*Co-PIs: Babetta Breuhaus; Karin Kruger*

Year: 2010 TOTAL - \$31,553

### Hydrocortisone Replacement Therapy in Septic Foals

University of Georgia, *Principal Investigator: Michelle Henry Barton/*

*Co-PIs: Kelsey Hart; Amanda Martabano House; Michel Vandenplas; Steve Giguère; Julia Flaminio (Cornell)*

Years: 2008-2009 TOTAL - \$49,306

### Effect of Flunizin on Lidocaine Plasma Protein Binding

Kansas State, *Principal Investigator: Butch KuKanich*

Year: 2008 TOTAL - \$8,217

### Calcium/Magnesium & Hormones in Septic Foals

The Ohio State University, *Principal Investigator: Ramiro Toribio*

Years: 2007-2008 TOTAL - \$37,600

### Tramadol in Horses

Auburn University, *Principal Investigator: Allison Stewart*

Year: 2007 TOTAL - \$20,000

### Effect of Compounding and Storage on Drug Stability

North Carolina State University, *Principal Investigator: Mark Papich*

Year: 2006 TOTAL - \$14,152

### Development of a Maintenance Fluid for Horses

Michigan State University, *Principal Investigator: Harold Schott II*

*Co-PI: Gary Carlson*

Years: 2005-2006 TOTAL - \$109,941

### Effect of Fentanyl on Visceral & Somatic Nociception in Horses

University of Florida, *Principal Investigator: Linda Christine Sanchez*

*Co-PIs: Cynthia Kollias-Baker; Sheilah Robertson*

Year: 2004 TOTAL - \$46,730



**Electrical Cardioversion of Atrial Fibrillation in the Horse**

University of Guelph, *Principal Investigator: P. W. Physick-Sheard*

Years: 2002-2003 TOTAL - \$8,394

# MUSCULOSKELETAL

## Grayson-Jockey Club Research Archives



The horse's musculoskeletal system consists of the bones, cartilage, muscles, ligaments, and tendons. Their primary function is to support of the body, provide motion, and protect vital organs. There are 205 bones in the horse's skeleton. Twenty of these bones are in each foreleg and 20 in each hind limb, for a grand total of 80 bones in the four equine legs. These studies focus on joint health, arthritis, bone regeneration, and imaging advancements to make safe diagnosis in the horse.

Grayson is proud to have funded the following projects:

### [PET MRI Sport Horse Fetlock](#)

University of California-Davis, *Principal Investigator: Mathieu Spriet*

*CO-PIs: Charlene Pige, Erin Porter (University of Florida), Natasha Werpy (Equine Diagnostic Imaging), Katie Garrett (Rood & Riddle Equine Hospital)*

This study will compare 18F-NaF Positron Emission Tomography (PET) with Magnetic Resonance Imaging (MRI) for assessment of fetlock injuries in sport horses.

YEAR: 2023 TOTAL- \$116,490

### [Motion Of The Proximal Sesamoid Bones On Uneven Footing](#)

University of California-Davis, *Principal Investigator: Susan Stover*

*CO-PIs: Sarah K Shaffer, Tanya C Garcia*

This study proposes to determine how hoof conformation, shoeing, and uneven racetrack surfaces could contribute to fetlock breakdowns.

YEARS: 2022-2023 TOTAL- \$34,763

### [Immunomodulation And Exosomes To Enhance Tendon Healing](#)

The Ohio State University, *Principal Investigator: Sushmitha Durgam*

*CO-PIs: Hilary Rice, Charles Bowlby*

This study aims to characterize M1 and M2 macrophage-derived inflammatory factors and assess their impact on superficial digital flexor tendon tenocyte activities while examining the potential of extracellular vesicles/exosomes to enhance tendon healing.

YEARS: 2022-2023 TOTAL- \$74,898

### [Development of a Palmar Osteochondral Disease Model](#)

Colorado State University, *Principal Investigator: Chris Kawcak*

*CO-PIs: Lauren Smanik, Kurt Selberg, Holly Stewart, Jennifer Daniels, Christine Battaglia*

The goal of this proposal is to develop an experimental model of palmar osteochondral disease in horses to better study disease progression and facilitate development of improved treatment strategies.

Year: 2022 TOTAL - \$95,790

### Treatment of Joint Injury With Mesenchymal Stromal

University of Guelph, *Principal Investigator: Thomas Koch*

*CO-PIs: Mark Hurtig, Keith Russell*

Evaluation of equine umbilical cord blood-derived mesenchymal stromal cells to treat joint injuries in horses.

Years: 2021-2022 TOTAL - \$ 116,960

### Optimizing Bone Growth to Reduce Equine Fracture

University of Illinois Urbana-Champaign, *Principal Investigator: Mariana Kersh*

*CO-PIs: Annette McCoy*

Reduction in distal limb fractures through exercise in young horses would have a significant positive impact on horse welfare and the economics and public perception of the horse industry.

Years: 2021-2022 TOTAL - \$ 118,583

### Injury Prediction From Stride Derived Racing Load

University of Melbourne, *Principal Investigator: Chris Whitton*

*CO-PIs: Peta Hitchens, Adelene Wong, Ashleigh Morrice-West*

By studying patterns in bone fatigue accrual over time in racehorses, we will better, and earlier, identify horses at risk of limb injury, facilitating timely evidence based preventative strategies.

Years: 2021-2022 TOTAL - \$ 189,308

### Diagnosis Of Incipient Condylar Stress Fracture

University of Wisconsin–Madison, *Principal Investigator: Peter Muir*

*CO-PIs: Corinne Henak, Sabrina Brounts, Carla Winsor, Jordan Gruel,*

*C Whitton - University of Melbourne*

F Malekipour - University of Melbourne, Seamus Hoey, University of Dublin

This study will save the lives of racehorses by establishing screening using fetlock CT for diagnosis of horses with a high risk of imminent serious injury for personalized clinical care.

Years: 2021-2022 TOTAL - \$ 134,951

### Hyperthermia and Acidosis in Exertional Muscle Damage

Oklahoma State University, *Principal Investigator: Michael Davis*

*Co-PIs: Montana Fulton, K Williamson, Waypoint Vet Ed, Warrick Bayly (Washington State)*

This project will identify an underlying cause of exercise-associated muscle fatigue and soreness and allow trainers to more precisely condition horses with fewer training days lost to muscle soreness.

Year: 2021 TOTAL - \$137,167

### Bisphosphonates and Fatal Musculoskeletal Injury

Cornell University, *Principal Investigator: Heidi Resink*

*Co-PIs: Eve Donnelly, Sean McDonough, Husni Mohammed, Wayne Schwark, Anthony Condo, Kira Noordwijk, Erik Taylor, Scott Palmer (NY State Game), George Maylin ( Morrisville State)*

This project looks at determining the prevalence of bisphosphonate use in racehorses and whether bisphosphonates are associated with fatal musculoskeletal injury which is essential to equine welfare and the future of racing.

Years: 2020-2021 TOTAL - \$114,006

### **Enhancing the Efficacy of MSCs for Tendon Healing**

North Carolina State University, *Principal Investigator: Lauren Schnabel*

*Co-PIs: Kristen Messenger*

This proposal examines the tendon inflammatory environment following acute injury and the effect of such an environment on mesenchymal stem cells (MSCs), with the goal of improving MSC treatment efficacy.

Years: 2020-2021 TOTAL - \$100,687

### **SDFT Adaptation in Thoroughbred Racehorses**

The Ohio State University, *Principal Investigator: Sushmitha Durgam*

*Co-PIs: Susan Stover (UC Davis), Matthew Stewart (Un of Illinois)*

The impact of training and racing on (mal)adaptations in superficial digital flexor tendon hierarchical structure will be evaluated to delineate the pathophysiology of this common injury in racehorses.

Years: 2020-2021 TOTAL - \$56,904

### **Bisphosphonate Effects on Biomarkers and Bone Metabolism**

University of California- Davis, *Principal Investigator: Heather Knych*

*Co-PIs: Carrie Finno, Mathieu Spriet, Rick Arthur, Anna Dahlgren, Kirsten Kanarr, Kelsey Seminoff*

This study will allow for development of sensitive and alternate methods for detection of bisphosphonates.

Years: 2020-2021 TOTAL - \$212,237

### **Novel Delivery of Antimicrobials into Equine Joints**

University of Melbourne, *Principal Investigator: Simon Bailey*

*Co-PIs: Ted Whitem, Jamie Wearn, Andrew Woodward*

This study is for the development and testing of, a novel (gel) carrier formulation for the antibiotic Cefuroxime, injection into horses' joints for application as a treatment of joint infections.

Years: 2020-2021 TOTAL - \$87,692

### **Diagnostic Assay for Recurrent Exertional Rhabdomyolysis**

University of Minnesota, *Principal Investigator: Molly McCue*

*Co-PIs: James Mickelson, Samantha K Beeson, Emmeline Hill (Un Dublin), Lisa Katz (Un Dublin)*

This study was to identify a comprehensive set of genetic markers that allow RER risk prediction before horses tie-up and preemptive management to decrease the frequency and severity of clinical disease.

Years: 2020-2021 TOTAL - \$137,640

### **Novel Treatment for Recurrent Exertional Rhabdomyolysis**

Michigan State University, *Principal Investigator: Stephanie Valberg*

*CO-PIs: Lorraine Sordillo, Marisa Henry, Deborah Velez-Irizarry, Jeff Gandy,*

*Joe Pagan (KY EQ Research), Clara Fenger (EQ Integrated Med)*

This project was to determine if a potent antioxidant coenzyme Q10, not subject to withdrawal times, can benefit horses with tying up by replenishing diminished muscle coQ10 levels and decreasing oxidative stress.

Year: 2020 TOTAL - \$56,942

### **Antimicrobial Properties of Equine MSCs**

Colorado State University, *Principal Investigator: Laurie Goodrich*

*CO-PIs: Steve Dow, Wayne McIlwraith, Valerie Johnson, Lynn Pezzanite, Nikki Phillips, Tom Schaer (PENN), Lauren Schnabel (NCSU)*

This study was designed to validate TLR activated equine mesenchymal stem cells as an effective, novel therapy in treating multi-drug resistant infections.

Years: 2019-2020 TOTAL - \$198,056

### **Robotic CT for Assessing of Bone Morphology**

University of Pennsylvania, *Principal Investigator: Kyla Orved*

*CO-PIs: Mary Robinson, Kathryn Wulster, Dean Richardson, Joanne Haughan, Jessica Morgan, Kara Brown, Tom Schaer, Josh Benson*

The focus on screening fetlock joints using standing robotic CT and biomarker analysis to prevent catastrophic injuries in the Thoroughbred racehorse.

Years: 2019-2020 TOTAL - \$105,869

### **Standing PET of the Racehorse Fetlock**

University of California-Davis, *Principal Investigator: Mathieu Spriet*

*Co-PIs: Scott Katzman, Larry Galuppo, Sue Stover*

This project was designed to validate a Positron Emission Tomography (PET) technology for early detection of fetlock lesions in standing horses to prevent catastrophic breakdowns in racehorses.

Year: 2019 TOTAL - \$134,477

### **Racehorse Stride Characteristics- Injury and Performance**

University of Melbourne, *Principal Investigator: Chris Whitton*

*Co-PIs: Peta Hitchens, Adelene Wong*

A study to identify changes in stride characteristics of racehorses over time to determine identify those parameters that can be used as an early indicator of injury or that are key to injury development.

Year: 2019 TOTAL - \$87,737

### **Development of Limited View 3D Imaging**

Colorado State University, *Principal Investigator: Chris Kawcak*

*Co-PIs: Martine Duff, Kurt Selberg, Holly Stewart, Wayne McIlwraith, Xiaochuan Pan and Emil Sidky (UN of Chicago)*

The goal of this proposal was to develop a point-of-care, 3-dimensional imaging technique that can be used to better characterize and prevent injuries in racehorses.

Year: 2018-2019 TOTAL - \$198,836

### **Underlying Cause of Recurrent Exertional Rhabdomyolysis**

Michigan State University, *Principal Investigator: Stephanie Valberg*

*Co-PIs: Deborah Velez-Irizarry; ; Keri Gardner; Melissa Schott*

The aim of this study was to determine if stress-induced modification to the skeletal muscle calcium release channel forms the basis for tying up in thoroughbreds and to pinpoint a target for development of effective new treatments.

Year: 2018 TOTAL - \$57,643

### **Platelet Lysate Therapy in Infectious Arthritis**

North Carolina State University, *Principal Investigator: Lauren Schnabel*

*Co-PIs: Jessica Gilbertie; Julie Long; Tom Schaer, (U of PA)*

This proposal examined the antibacterial properties of platelets to treat joint infections in horses more effectively than conventional therapies, with the goal of reducing morbidity and mortality.

Years: 2017- 2018 TOTAL - \$101,440

### **Bone Marrow Mononuclear Cells for Equine Joint Therapy**

Virginia Maryland CVM, *Principal Investigator: Linda A. Dahlgren*

*Co-PIs: Bruno C. Menarim; Christopher R. Byron; Xin M. Luo; Anne E. C. Nichols*

The results from this study will pave the way to investigate a new cell therapy from equine bone marrow as a targeted regenerative therapy for horses suffering from arthritis.

Years: 2017- 2018 TOTAL - \$99,620

### **Synovial Oxylipid Profiles: Role Of Omega-3 Fatty Acids**

Michigan State University, *Principal Investigator: John Caron*

*Co-PIs: Lorraine Sordillo; Jeffrey Gandy; Jennifer DeVries*

This project was a first step in establishing science-based guidelines for the nature and amount of dietary polyunsaturated fatty acids that will prevent or delay osteoarthritis in horses.

Year: 2017 TOTAL - \$37,307

### **PET Imaging Of the Equine Distal Limb**

University of California, Davis, *Principal Investigator: Mathieu Spriet*

*Co-PIs: Scott Katzman; Larry Galuppo; Pablo Espinosa*

A study of Position Emission Tomography (PET) imaging as a diagnostic tool, newly available to the horse, that will allow detection of lesions not identified with other techniques.

Year: 2016-2017 TOTAL - \$82,014

### **Immune Properties of Autologous and Allogeneic BMDMSCs**

Colorado State University, *Principal Investigator: Laurie Goodrich*

*Co-PIs: Steve Dow; Aimee Colbath; C. Wayne McIlwraith; Jennifer Phillips;*

*Frank Barry (UN of Ireland)*

Designed to answer important question of whether allogeneic mesenchymal stem cells derived from bone marrow (BMDMSCs) are a viable alternative to autologous BMDMSCs in the horse.

(Autologous means cells from the horse's own bone marrow; allogeneic means from another, healthy horse.)

Years: 2015-2016 TOTAL - \$115,890

### **Contrast Enhanced CT for Detection of Cartilage Injury**

Colorado State University, *Principal Investigator: Christopher Kawcak*

*Co-PIs: Bradley Nelson; Laurie Goodrich; C. Wayne McIlwraith; Myra Barrett;*

*Mark Grinstaff & Rachel Stewart ( Boston UN); Natasha Werpy (UN of FL)*

This project reviewed critical evaluation of CCECT as a method for the detection of early osteoarthritis in horses and for applications of its use in clinical patients.

Years: 2014-2015 TOTAL - \$178,226

### **Serum Biomarkers for Equine Laminitis**

University of Pennsylvania, *Principal Investigator: Hannah Galantino-Homer*  
*Co-PIs: Julie Engiles; Susan Megee; Bettina Wagner -Cornell*  
Years: 2013-2014 TOTAL - \$142,147

### **Acoustoelastography to Monitor Injured Equine Tendon**

University of Wisconsin–Madison, *Principal Investigator: Sabrina Brounts*  
*Co-PIs: Sarah Duenwald–Kuehl; Ray Vanderby; Roderic Lakes*  
Years: 2013-2014 TOTAL - \$89,344

### **Motor Responses in Equine Cervical Stenotic Myelopathy EPM**

Iowa State University, *Principal Investigator: Cody Alcott*  
*Co-PIs: Nicholas Jeffery; David Wong; Brett Sponseller; Andrea Manternach*  
Year: 2013 TOTAL - \$32,848

### **Detection of Lameness in Racehorses at the Gallop EPM**

University of Missouri, *Principal Investigator: Kevin Keegan*  
*Co-PIs: Joanne Kramer; Marco Lopes; David Wilson; Shannon Reed; P. Frank Pai*  
Year: 2013 TOTAL - \$71,422

### **Stem Cell Homing After IV Regional Limb Perfusion**

Cornell University, *Principal Investigator: Alan Nixon*  
*Co-PIs: Ashlee Watts; Whitney Linnenkohl; Hussni Mohammed; Michael Scimeca*  
Years: 2012-2013 TOTAL -\$150,000

### **Treatment of Experimental Equine Laminitis with Doxycycline**

Louisiana State University, *Principal Investigator: Susan Eades*  
*Co-PIs: Lee Ann Fugler; Daniel Paulsen*  
Years: 2012-2013 TOTAL - \$58,400

### **AAV-IRAP Gene Therapy to Prevent Osteoarthritis**

Colorado State University, *Principal Investigator: Laurie Goodrich*  
*Co-PIs: David Frisbie; Natasha Werpy; C. Wayne McIlwraith; R J Samulski (UN of NC)*  
Years: 2011-2012 TOTAL - \$134,635

### **Generation of Equine iPS Cells for Regenerative Therapy**

Cornell University, *Principal Investigator: Lisa A. Fortier*  
*Co-PIs: John Schimenti; Lauren Schnabel*  
Years: 2011-2012 TOTAL - \$97,352

### **Cell & Growth-Factor Dependent Tenogenesis**

University of California – Davis, *Principal Investigator: Martin Vidal*

*Co-PIs: Keith Baar; Kerstien Padgett*

Years: 2011-2012 TOTAL - \$80,332

### **Equine Bone Regeneration with Adults Stem Cells**

Louisiana State University, *Principal Investigator: Mandi Lopez*

*Co-PIs: Jeff Gimble (Stem Cell Lab Pennington BioMed)*

Years: 2010-2011 TOTAL - \$157,830

### **Orthopaedic & Genetic Roles in Wobblers Syndrome**

University of Kentucky, *Principal Investigator: James N. MacLeod*

*Co-PIs: Jennifer James, Stephen Reed, Neil Williams; Neil Williams; Anthony Pease (MI State UN)*

Years: 2010-2011 TOTAL - \$102,193

### **Clinical Admin of Doxycycline for Arthritis**

Cornell University, *Principal Investigator: Lisa Fortier*

*Co-PIs: Lauren Schnabel; Thomas Divers; Mark Papich (NC State)*

Year: 2010 TOTAL - \$63,073

### **Developing eqBMP-2 for Bone and Cartilage Repair**

University of Illinois, *Principal Investigator: Matthew Stewart*

*Co-PIs: Dan Peck; Brendan Harley; Christopher Evans (Harvard)*

Years: 2009-2010 TOTAL - \$87,286

### **Incidence of Nonfatal Injuries in Racing Thoroughbreds**

Colorado State University, *Principal Investigator: C.Wayne McIlwraith*

*Co-PIs: Ashley Hill; Jeff Blea (S. CA UN); Michael Peterson (UN of MN); R. Arthur (UC-Davis)*

Year: 2009 TOTAL - \$44,397

### **Mesenchymal Stem Cell Treatment**

Washington State University, *Principal Investigator: Robert Schneider*

*Co-PIs: Stavros Yiannikouris; Chad Marsh; Sarah Sampson; Greg Roberts;*

*David Frisbie & John Kisiday (CSU)*

Year: 2009 TOTAL - \$40,570

### **Differentiated Stem cells for Cartilage Repair**

Cornell University, *Principal Investigator: Alan Nixon*

*Co-PIs: Ashlee Watts; Kyla Ortved*

Years: 2008-2009 TOTAL - \$147,328



### **Equine Cord Blood Stem Cells - From Farm to Point of Care**

University of Guelph, *Principal Investigator: Dean Betts*

Years: 2008-2009 TOTAL - \$83,132

### **Effects of Joint Geometry on Fetlock Joint Disease**

Colorado State University, *Principal Investigator: Chris Kawcak*

*Co-PIs: Christian Puttlitz; Tim Parkin; C. Wayne McIlwraith; Kenton Morgan*

Years: 2007-2008 TOTAL - \$80,480

### **Hydroxyapatite Coatings to Prevent Pin Loosening in Horses**

Purdue University, *Principal Investigator: Timothy Lescun*

Years: 2007-2008 TOTAL - \$69,039

### **Bactericidal Implant Analysis in a Prosthetic Infection Model**

University of Pennsylvania, *Principal Investigator: Dean Richardson*

*Co-PIs: Thomas Schaefer; Noreen Hickok; Christopher Adams*

Years: 2007-2008 TOTAL - \$100,206

### **Patient-Side Constructs for Cartilage Regeneration**

Cornell University, *Principal Investigator: Lisa Fortier*

*Co-PIs: Alan Nixon; Julia Flaminio*

Years: 2006-2007 TOTAL - \$178,542

### **Growth Factor Enhanced Progenitor Cells for Tendon Healing**

University of Illinois, *Principal Investigator: Allison Stewart*

*Co-PIs: Jennifer Barrett; Matthew Steward*

Years: 2006-2007 TOTAL - \$44,320

### **MRI Characterization of the Hindlimb Suspensory Ligament**

North Carolina State University, *Principal Investigator: Michael Schramme*

*Co-PIs: Dianne Little; Anthony Pease; W. Rich Redding; Keith Linder*

Year: 2006 TOTAL - \$23,890

### **Gene Transfer of BMP-2 for Enhancing Fracture Healing**

Colorado State University, *Principal Investigator: David Frisbie*

*Co-PI: Louise Southwood*

Years: 2005-2006 TOTAL - \$74,506

### **Acceleration of Third Metacarpal Fracture Healing with rhBMP-2**

University of Wisconsin-Madison, *Principal Investigator: Mark Markel*

*Co-PIs: Ryland Edwards; Maria Faria; Yan Lu*

Years: 2005-2006 TOTAL - \$135,278

### **Culture & Characterization of Equine Marrow Stem Cells**

Louisiana State University, *Principal Investigator: Jill Johnson*  
*Co-PIs: Martin Vidal; Jeffrey Gimble; Rustin Moore; Mandi Lopez*  
Year: 2005 TOTAL - \$17,432

### **Molecular Therapy for Bone Healing in Horses**

The Ohio State University, *Principal Investigator: Alicia Bertone*  
*Co-PIs: John Mattoon; Alan Litsky; Christopher Evans; Stephen Weisbrode; Jeffrey Bartlett*  
Year: 2005 TOTAL - \$55,995

### **Tetracyclines as Therapeutics for Equine Arthritis**

Cornell University, *Principal Investigator: Lisa Fortier*  
*Co-PI: R.A. Greenwald*  
Year: 2004 TOTAL - \$71,544

### **Epidemiology of Proximal Sesamoid Fractures in Thoroughbreds**

University of California – Davis, *Principal Investigator: Susan Stover*  
*Co-PIs: Ian Gardner; Lucy Anthenill*  
Year: 2004 TOTAL - \$62,416

### **Effects of Early Exercise on Osteochondral Tissues**

Colorado State University, *Principal Investigator: Christopher Kawcak*  
*Co-PIs: C. Wayne McIlwraith; Neil Broom; Elwyn Firth*  
Years: 2003-2004 TOTAL -\$68,523

### **Significant Contributions to Hoof & Sole by Lamina & Bars**

Michigan State University, *Principal Investigator: Robert Bowker*  
Years: 2003-2004 TOTAL - \$64,641

### **Chondroprotection for Impacted Equine Cartilage Explants**

Michigan State University, *Principal Investigator: Michael Orth*  
*Co-PIs: Angela Schlueter; John Caron*  
Years: 2003-2004 TOTAL - \$49,715

### **Growth Factor Gene Transduced Stem Cells for Cartilage Repair**

Cornell University, *Principal Investigator: Alan Nixon*  
*Co-PIs: Paul Robbins; Chris Beinlich*  
Years: 2002-2003 TOTAL - \$101,254

### **Does Suspensory Apparatus Injury or Its Risk Factors Increase Risk for Metacarpal Condylar Fracture in the Thoroughbred Racehorse?**

University of California – Davis, *Principal Investigator: Susan Stover*

*Co-PIs: Ian Gardener; Bill Johnson; Ashley Hill*

Years: 2001-2002 TOTAL - \$69,834

### **The Safety of Shockwave Therapy in Performance Horses**

Iowa State University, *Principal Investigator: Scott McClure*

*Co-PIs: Iona Scone; Richard Evans; Viren Amin; Mark Williamson*

Year: 2001 TOTAL - \$50,000

### **Basis for Pharmacologic Treatment of Flexural Deformities**

Michigan State University, *Principal Investigator: Steven Paul Arnoczky*

*Co-PI: John Stick*

Year: 2001 TOTAL - \$33,364

### **Muscle Glycogen Metabolism in Horses**

The Ohio State University, *Principal Investigator: Kenneth Hinchcliff*

*Co-PIs: Catherine Kohn; Richard Sams; Lynn Taylor; Veronique Lacombe; Steven Devor*

Year: 2001 TOTAL - \$94,967

### **Further Evaluation of the Effect of Shoeing on Impact Trauma in the Racehorse**

University of Pennsylvania, *Principal Investigator: David Nunamaker*

*Co-PIs: Barbara Dallap; Raymond Boston; Chris Ryan; Mary Hazzard; Rob Sigafos; John Fisher*

Years: 2001-2002 TOTAL - \$63,410

### **Serum Markers for Detection of Musculo-Skeletal Injury in Horses**

Colorado State University, *Principal Investigator: David Frisbie & R. Clark Billingham*

*Co-PIs: R.C. Billingham; C. Wayne McIlwraith*

Years: 2000-2001 TOTAL - \$98,792

### **Hoof Wall Epidermal Laminae: Adaptive Response to Stress**

Michigan State University, *Principal Investigator: Robert Bowker*

*Co-PI: Diane Troyer*

Years: 2000-2001 TOTAL - \$69,708

### **Intramuscular Calcium Regulation in Exertional Rhabdomyolysis**

University of Minnesota, *Principal Investigator: Stephanie Valberg & Esther Gallant*

*Co-PIs: Esther Gallant; J.R. Mickelson*

Years: 2000-2001 TOTAL - \$100,172

### **Stem Cell Induced Chondrogenesis for Cartilage Repair**

Cornell University, *Principal Investigator: Alan J. Nixon*

*Co-PIs: Chris Evans; Marcus White*

Years: 1999-2000 TOTAL - \$97,621

### **A Dynamometric Horseshoe for Assessing Forces Associated with Racing Surfaces**

University of California – Davis, *Principal Investigator: Maury Hull*

*Co-PI: Susan Stover*

Year: 1999 TOTAL - \$35,408

### **Effects of Toe Grabs on the locomotor Patterns of Galloping Horses**

Washington State University, *Principal Investigator: Marc H. Ratzlaff*

*Co-PI: David Hutton*

Year: 1999 TOTAL - \$44,411

### **Gene Therapy for Equine Arthritis**

University of Pennsylvania, *Principal Investigator: Dean Richardson*

*Co-PI: Brian Foley*

Years: 1999-2000 TOTAL - \$69,100

# REPRODUCTION (THERIO)



## Grayson-Jockey Club Research Archives

Research in this area includes stallion fertility issues, placentitis, mare reproductive loss, endometritis, infections and environmental issues that can affect reproduction.

Grayson is proud to have funded the following projects:

### Equine Placentitis: New Approaches To An Old Problem

University of California-Davis, *Principal Investigator: Pouya Dini*

*CO-PIs: Bart C Weimer, Richard V. Pereira, Fabio Lima, Machteld van Heule, Margo Verstraete*

The goal of this study is to identify pathogens involved in placentitis and investigate their interaction with the placenta using bioinformatics and in vitro studies to develop better diagnostic and treatment methods.

YEARS: 2022-2023 TOTAL- \$ 112,520

### Evaluating EVs From Equine Fetally-Derived MSCs

Colorado State University, *Principal Investigator: Fiona Hollinshead*

*CO-PIs: Riley Thompson, Christianne Magee, Gerrit Bouma, Budhan Pukazhenthii (Smithsonian Cons. Bio)*

This project will be evaluating extracellular vesicles (EVs) from equine fetally-derived mesenchymal stem cells as an endometritis therapeutic.

YEAR: 2022 TOTAL- \$ 45,418

### Protein Based in Vivo Diagnostic for Endometrial Biofilm

University of Kentucky, *Principal Investigator: Mats Troedsson*

*CO-PIs: Barry Ball, Carleigh Fedorka, A. Miki Bojesen (UN Copenhagen)*

This project researched successful management of bacterial biofilms in the uterus as an accurate diagnostic in vivo assay.

Year: 2020 TOTAL -\$48,145

### Nocardioform Placentitis

University of Kentucky

This project was the funding of collection and storage of Nocardioform placentitis samples for future research at the University of Kentucky and with collaborative partners.

Year: 2020 TOTAL - \$90,000

### Intrauterine Antibiotics May Augment Placentitis Therapy

North Carolina State University, *Principal Investigator: Christopher Bailey*

*Co-PIs: Mark Papich, Maria Correa, Karen Von Dollen, Nathan Long (Clemson)*

This proposal explored the potential for intrauterine antibiotic treatment to improve foal survival and health in mares with ascending placentitis.

Year: 2019 TOTAL - \$63,873

### **Firocoxib Properties in Equine Pregnancy & Placentitis II**

University of Florida, *Principal Investigator: Margo Macpherson*

*Co-PIs: Malgorzata Pozor; Susanne Benson*

This project was designed to provide a fundamental step toward determining if specific drugs (including firocoxibs) are performing expected functions, such as resolving inflammation, in pregnancies threatened by placentitis.

Year: 2018 TOTAL - \$49,467

### **Evaluation of Kisspeptin the Pregnant Mare**

Colorado State University, *Principal Investigator: Christianne Magee*

*Co-PIs: Caleb Brown; Kelly Kirkley*

A study of how kisspeptins are involved in equine pregnancy and if they can serve as a biomarker for pregnancy compromise.

Years: 2017- 2018 TOTAL - \$113,063

### **Metabolomic Profiling Of Placentitis Biomarkers In Mares**

North Carolina State University, *Principal Investigator: Christopher Bailey*

*Co-PIs: Theresa Beachler; Sara Lyle; John Gadsby; Samuel Jones; Hanna Gracz (NMR Consult)*

This project reviewed metabolomic profiling of mares with placentitis to allow development of screening and specific assays to improve treatment outcome.

Year: 2017 TOTAL - \$90,453

### **Firocoxib Properties in Equine Pregnancy and Placentitis**

University of Florida, *Principal Investigator: Margo MacPherson*

*Co-PIs: Steve Giguère; Malgorzata Pozor; Susanne Benson; Kevin Shelton;*

*Maron Calderwood Mays; Sara Lyle*

A study to determine if potent anti-inflammatory properties of firocoxib have the potential to significantly inhibit inflammation, and subsequent preterm delivery of foals, from mares with placentitis.

Years: 2015-2016 TOTAL - \$128,657

### **Evaluation of Biofilm From Equine Uterine Bacteria EPM**

Colorado State University, *Principal Investigator: Ryan Ferris*

*Co-PIs: Brad Borlee; Reg. Biocontainment Lab; IDR Center*

Year: 2013 TOTAL - \$42,054

### **Towards a Treatment for Testicular Degeneration**

University of Pennsylvania, *Principal Investigator: Regina Turner*

*Co-PI: Karen Schlingmann*

Years: 2012-2013 TOTAL - \$109,732

### **Pharmacokinetics of Ceftiofur Sodium in Equine Pregnancy**

University of Florida, *Principal Investigator: Margo Macpherson*

*Co-PIs: Malgorzata Pozor; Thomas Vicroy; Steeve Giguère*

Year: 2012 TOTAL - \$36,633

### **Hemorrhagic Anovulatory Follicle Syndrome**

Southern Illinois University Carbondale, *Principal Investigator: Eduardo Gastal*

*Co-PIs: Sheryl King; Dale Buchanan Hales; Buffy Ellsworth; Melba Oliveira Gastal; Angela Renee Baerwald (UN of Saskatchewan Canada); J. Cuervo-Arango Lecina (UN of Card.- Spain)*

Years: 2011-2012 TOTAL - \$68,227

### **Use of Recombinant Equine FSH in Anestrous Mares**

University of California – Davis, *Principal Investigator: Janet Roser*

*Co-PIs: Geraldine Meyers-Brown; Anthony Claes*

Year: 2011 TOTAL - \$86,747

### **Factors for Success & Failure of Early Pregnancy**

University of Guelph, *Principal Investigator: Keith Betteridge*

*Co-PIs: M. A. Hayes; JI Raeside; B.N. Lillie; L.G. Arroyo*

Years: 2010-2011 TOTAL - \$95,360

### **Prevention of Placentitis-Induced Labor in Mares**

Mississippi State University, *Principal Investigator: Peter Ryan*

*Co-PIs: Richard Hopper; David Christiansen; Avery Cooley; Michelle LeBlanc (Rood & Riddle); Barry Fitzgerald & David Horohov (UN of KY)*

Year: 2009 TOTAL - \$47,325

### **Mechanisms of Maintenance and Loss of Early Pregnancy**

University of Guelph, *Principal Investigator: Keith Betteridge*

*Co-PI: M. A. Hayes*

Years: 2008-2009 TOTAL - \$150,000

### **Xenografting to Study Testicular Function in Stallions**

University of Pennsylvania, *Principal Investigator: Ina Dobrinski*

*Co-PI: Regina Turner, new PI*

Years: 2008-2009 TOTAL - \$134,455

### **Effect of Angiotes and Aspirin on Mare Uterine Perfusion**

University of California – Davis, *Principal Investigator: Irwin I. M. Liu*

*Co-PI: Eugene P. Steffey*

Years: 2007-2008 TOTAL - \$108,856

### **Seminal Plasma Proteins SPP $\alpha$ and SPP $\beta$ in Equine Semen**

University of Florida, *Principal Investigator: Mats Troedsson*

*Co-PI: William Buhi*

Years: 2007-2008 TOTAL - \$77,218

### Gene Expression Profile of Equine Endometrium

University of Florida, *Principal Investigator: Alan Ealy*

*Co-PI: Mats Troedsson*

Year: 2007 TOTAL - \$27,500

### Role of the Embryonic Capsule in Success of Early Pregnancy

University of Guelph, *Principal Investigator: Keith Betteridge*

*Co-PI: M. Anthony Hayes*

Years: 2006-2007 TOTAL - \$147,739

### Role of Y-Chromosome Factors in Regulating Stallion Fertility

Texas A & M University, *Principal Investigator: Bhanu Chowdhary*

*Co-PIs: Terje Raudsepp; Dickson Varner*

Years: 2006-2007 TOTAL - \$50,000

### Treatment Efficacy on Pregnancy Outcome in Equine Placentitis

University of Florida, *Principal Investigator: Margo Macpherson.*

*Co-PI: Thomas Vicroy*

Years: 2005-2006 TOTAL - \$70,445

### Accelerated Regression of Endometrial Cups and eCG

Cornell University, *Principal Investigator: Douglas Antczak*

*Co-PI: Dietrich Volkmann*

Years: 2002-2003 TOTAL - \$89,958

### Hormonal Function in Mares Suffering From The Mare Reproductive Loss Syndrome (MRLS)

Cornell University, *Principal Investigator: Dietrich Volkmann*

Year: 2002 TOTAL - \$13,150

### Is Administration of Frass or Starved Caterpillars by Nasogastric Tube Associated With Early Pregnancy Loss in The Mare?

*Rood & Riddle Equine Hospital & University of Kentucky, Principal Investigator: Bill Bernard*

*Co-PIs: Bruce Webb; Michelle LeBlanc*

Year: 2002 TOTAL - \$46,530

### Production & Efficacy of Recombinant Equine Bonadotropins

University of California Davis, *Principal Investigator: Janet Roser*

*Co-PI: Irving Boime*

Year: 2002 TOTAL - \$51,000



### **Study of Bacteria Associated with Mare Reproductive Loss Syndrome**

University of Kentucky, *Principal Investigator: James Donahue*

*Co-PI: Stephen Sells*

Year: 2002 TOTAL - \$22,300

### **Semen Lipid Analysis in Stallions with Unexplained Subfertility**

Texas A & M University, *Principal Investigator: Steven Brinsko*

*Co-PIs: Dickson Varner; Terry Blanchard; Larry Johnson; Sheri Rigby; John Bauer;*

*Margo Macpherson*

Years: 2001-2002 TOTAL - \$44,238

### **Mares With Delayed Uterine Clearance: Is Nitric Acid Involved?**

Texas A & M University, *Principal Investigator: Judy Delp*

*Co-PI: Michael Delp*

Year: 2001 TOTAL - \$24,519

### **The Insulin-Like Growth Factor System and Stallion Infertility**

University of Florida, *Principal Investigator: Margo Macpherson*

*Co-PI: Rosalia Simmen*

Year: 2000 TOTAL - \$23,102

### **Myometrial Ca<sup>2+</sup> Signaling in Mares with Persistent Endometritis**

Texas A & M University, *Principal Investigator: Robert Burghardt*

*Co-PIs: Terry Blanchard; Dixon Varner; Sherri Rigby; R. B. Mouneimne*

Years: 1999-2000 TOTAL - \$93,310

### **Placentitis: Pathophysiology, Diagnosis and Treatment**

University of Florida, *Principal Investigator: Michelle LeBlanc*

*Co-PI: Guy Lester*

Years: 1999-2000 TOTAL - \$78,090

### **Interactions Among Prostaglandin F<sub>2a</sub>, Oxytocin and Conceptuses**

University of Kentucky, *Principal Investigator: Karen Jean McDowell*

Years: 1999-2000 TOTAL - \$40,500

# RESPIRATORY

## Grayson-Jockey Club Research Archives



*Viral respiratory infections are common in horses; most notable are equine herpesvirus infection, equine influenza, and equine viral arteritis. Grayson has funded many studies in this area that are listed under Infectious Diseases.*

*The aim of this research is for optimal airway passage, including improving the environment of the horse, the study of equine asthma and treatments for EIPH.*

*Grayson is proud to have funded the following projects:*

### [Asthma Performance and Omega-3s in Racing Thoroughbreds](#)

Purdue University, *Principal Investigator : Laurant Couetil*

*Co-PIs: Carla Olave, John Burgess, Laura Murray, Jae Hong Park, George Moore, Jeff Blea (Von Bluecher, Blea & Hunkin, Inc.), Drs. Hay & Langsam (Teigland, Franklin and Brokken DVM's, Inc), Clayton McCook (Equine Sports Med)*

The main purpose of this study was to investigate the variability of asthma severity in horses racing across the US, its effect on performance and determine if omega-3 PUFA supplementation is beneficial.

Years: 2020-2021 TOTAL - 210,016

### [Effect Of Nebulized Lidocaine In Treating Equine Asthma](#)

Tufts University, *Principal Investigator: Melissa Mazan*

*Co-PIs: Daniela Bedenice, Jill Minuto, Bettina Wagner (Cornell)*

This proposal evaluates the efficacy of inhaled lidocaine in equine asthma in reducing airway inflammation and hyper-responsiveness by promoting an anti-inflammatory lung environment.

Years: 2020-2021 TOTAL - \$129,040

### [Effects of Low-Dust Forage On Lung Health of Athletic Horses](#)

Purdue University, *Principal Investigator: Laurent Couetil*

*Co-PIs: Jae Hong Park, George Moore, Kathleen Ivester, Calra Olave, Laura Murray, John Burgess, Abhijit Mukhopadhyay*

This project was designed to provide a non-pharmaceutical solution to the widespread problem of equine asthma by evaluating the benefits of low-dust forage to racing Thoroughbreds.

Year: 2018-2019 TOTAL - \$126,457

### [Is EIPH A Consequence Of High Left Atrial Pressures?](#)

Washington State University, *Principal Investigator: Warwick Bayly*

*Co-PIs: Raymond Sides; James H Jones (UC Davis); Renaud LeGuillette (U of Calgary-CA)*

This study was to test the theory that EIPH occurs because very high pressures in the left side of the heart during exercise result in pressures in the lungs' smallest vessels that cause them to break and bleed.

Year: 2017 TOTAL - \$144,036

### **Thyro-Hyoid Muscle Training to Treat DDSP**

Cornell University, *Principal Investigator: Normand Durchame*  
*Co-PIs: Marta Cercone; Jonathan Cheetham; John Hermanson;*  
*Richard Piercy & Justin Perkins (Royal Vet)*

This project was to gain better knowledge of DDSP (Dorsal Displacement of the Soft Palate) and create new treatment options and prophylactic training methods to prevent or reduce the occurrence of DDSP in young horses starting training.

Year: 2016-2017 TOTAL - \$217,728

### **Efficacy of Furosemide Dosed 4– VS 24–Hours Period**

University of California – Davis, *Principal Investigator: Heather Knych*  
*Co-PIs: Michelle Mitchell; Linda Harrison (Willow Oak)*

This study was designed to test the suggestion that the therapeutic levels of furosemide, necessary to reduce the increases in physiological parameters associated with strenuous exercise and EIPH, are maintained for as long as 24 hours post-administration to racehorses.

Years: 2015 TOTAL - \$183,839

### **Mitigating EIPH if Race Day Medication is Banned**

Washington State University, *Principal Investigator: Warwick Bayly*  
*Co-PIs: Debra Sellon; Fairfield Bain; Nicolas Villarino; Carolina Lopez; Ray Sides*

The purpose of this study was to identify treatments that can be given before race day and still reduce the severity of EIPH without endangering the horses' health.

Years: 2015 TOTAL - \$148,196

### **Pulmonary Microvascular Function and EIPH**

Michigan State University, *Principal Investigator: Frederik Derksen*  
*Co-PIs: William Jackson; Kurt Williams; N. Edward Robinson; Alice Stack*

Years: 2012-2013 TOTAL - \$123,219

### **Early Diagnosis of Recurrent Laryngeal Neuropathy**

Cornell University, *Principal Investigator: Jonathan Cheetham*  
*Co-PIs: Amy Yeager; Margret Thompson; Norm Ducharme; Hussni Mohammed*

Years: 2011-2012 TOTAL - \$87,920

### **Pulmonary Vein Remodeling in EIPH**

Michigan State University, *Principal Investigator: Frederik Derksen*  
*Co-PIs: Kurt Williams; Alice Stack; Jeffery Gandy; Lorraine Sordillo; N. Edward Robinson;*  
*H. de Feijter-Rupp*

Years: 2010-2011 TOTAL - \$131,596

### **Mapping Pulmonary Venous Occlusion in EIPH**

Michigan State University, *Principal Investigator: Frederik Derksen*  
*Co-PIs: Kurt Williams; Edward Robinson; David Todem*  
Years: 2008-2009 TOTAL - \$124,644

### **Environmental Particulates and Airway Mucus in Racehorses**

Michigan State University, *Principal Investigator: N. Edward Robinson*  
*Co-PIs: Susan Holcombe; Frederik Derksen*  
Years: 2006-2007 TOTAL - \$151,248

### **Efficacy of Furosemide in Treatment of EIPH**

The Ohio State University, *Principal Investigator: Kenneth Hinchcliff*  
*Co-PIs: Alan Guthrie - Took over project; Paul Morley; Richard Sams*  
Years: 2006-2007 TOTAL - \$98,000

### **Blood-induced Pulmonary Fibrosis in Horses**

Michigan State University, *Principal Investigator: Frederik Derksen*  
*Co-PIs: Bruce Uhal; Edward Robinson; Kurt Williams*  
Years: 2005-2006 TOTAL - \$113,479

### **Clara Cell Protein in Recurrent Airway Obstruction**

University of Guelph, *Principal Investigator: Dorothee Bienzle*  
Years: 2004-2005 TOTAL - \$53,000

### **Role of Neurokinin-A in Equine Obstructive Pulmonary Disease**

Louisiana State University, *Principal Investigator: Changaram Venugopal*  
*Co-PIs: Rustin Moore; Gary Wise*  
Years: 2003-2004 TOTAL - \$106,920

### **Effect of Airway Inflammation and Mucus on Racehorse Performance**

Michigan State University, *Principal Investigator: Susan Holcombe*  
*Co-PIs: N. E. Robinson; Frederik Derksen; John Kaneene; Elizabeth Carr; Ron Genovese*  
Years: 2002-2003 TOTAL - \$83,261

### **Furosemide Continuous Rate Infusion in the Horse**

North Carolina State University, *Principal Investigator: Sarah Gardner*  
*Co-PI: Clarke Atkin*  
Year: 2002 TOTAL - \$14,987

### **The Effect of the Hyoepiglotticus Muscle on the Epiglottis in the Horse**

Michigan State University, *Principal Investigator: Susan Holcombe*  
Year: 2000 TOTAL - \$16,884

**Does Cytokine Production Correlate with Reversible Airway Obstruction in COPD and SPAOPD Horses?**

Louisiana State University, *Principal Investigator: David Horohov*

*Co-PIs: Thomas Seahorn; Ralph Beadle*

Years: 1999-2000 TOTAL -\$106,810

**Neuromuscular Basis for Dorsal Displacement of the Soft Palate**

Michigan State University, *Principal Investigator: Susan Holcombe*

*Co-PI: N.E. Robinson*

Year: 1999 TOTAL - \$51,047

# TRACK / SURFACES

## Grayson-Jockey Club Research Archives



*The surface that a horse trains and competes on can impact their health and performance. Researchers found that hard surfaces, shallow footing depths, and compacted footing could increase horses' injury risk. In comparison, a soft or deep arena surface has too much cushion, making the footing unstable. As the surface shifts under the hoof, the horse is forced to work harder for balance and support, which can often lead to inflammation of the leg's soft tissues and other injuries.*

*Grayson is proud to have funded the following projects to find answers to competition surfaces:*

### Training Programs for Prevention of Fetlock Injury

University of California- Davis, *Principal Investigator: Susan Stover*

*CO-PIs: David P. Fyhrie, Tanya Garcia-Nolen, Sarah Shaffer*

The purpose of this study was to predict proximal sesamoid bone fracture in racehorses from a calibrated computational model that incorporates training programs, track surface properties, and bone's reparative processes.

Years: 2019-2020 TOTAL - \$83,331

### Training and Surfaces for Injury Prevention

University of California- Davis, *Principal Investigator: Susan Stover*

*Co-PIs: David Fyhrie; Tanya Garcia; Sarah Shaffer*

This study was to assess the Risk for bone fracture in the fetlock joint due to training program and race surface properties to determine using computer models that simulate bone damage and repair.

Year: 2016-2017 TOTAL - \$183,582

### Optimization of Racetrack Surface Properties

University of California – Davis, *Principal Investigator: Susan Stover*

*Co-PIs: Jennifer Symons; David Hawkins; David Fyhrie; Shrinivasa Upadhyaya*

This study was designed to create a computer modeling and simulation approach to be used to create an economical tool for investigation of race surface characteristics on fetlock motion, and thus risk for injury.

Years: 2014-2015 TOTAL - \$50,648

### Race Surface Optimization for Fetlock Injury Prevention

University of California – Davis, *Principal Investigator: Susan Stover & Mont Hubbard*

*Co-PIs: Shrinivasa Upadhyaya; Tanya Garcia; Jacob Setterbo*

Year: 2010 TOTAL - \$61,864

### **Track Banking & Asymmetry of Hoof Loading**

University of Guelph, *Principal Investigator: Jeffrey Thomason*  
*Co-PIs: M. Peterson (UN of Maine); C. W. McIlwraith (UN of COL);*  
*B. Woodward (Woods Hole Oceanographic)*  
Year: 2010 TOTAL -\$36,761

### **Validation of Laboratory Assessment of Track Surfaces**

University of California – Davis, *Principal Investigator: Susan Stover*  
*Co-PIs: Mont Hubbard; Jacob Setterbo; Shrinivasa Upadhyaya; Tanya Garcia*  
Year: 2009 TOTAL - \$49,786

### **Performance Parameters for Engineering Track Management**

Colorado State University, *Principal Investigator: C. Wayne McIlwraith*  
*Co-PI: Michael Peterson (UN of Maine)*  
Year: 2008 TOTAL - \$43,838

### **Effects of Dirt, Turf & Polytrack Racing Surfaces on Hoof Loads**

University of California – Davis, *Principal Investigator: Susan Stover*  
*Co-PI: Maury Hull*  
Year: 2005 TOTAL - \$51,294

### **The Horse-Racetrack Interface: the Effect of Shoeing on Impact Trauma**

University of Pennsylvania, *Principal Investigator: David Nunamaker*  
*Co-PIs: Barbara Dallap*  
Years: 1999-2000 TOTAL -\$52,335