Equine Health Studies Program

2014 Equine Research Report

Scientific studies conducted to help advance equine health and well-being
LETTER FROM OUR DEAN

The LSU School of Veterinary Medicine (LSU SVM) is pleased to once again present the Equine Health Studies Program (EHSP) Equine Research Report, which covers scientific and scholarly activities of the program from 2011 through 2013. The EHSP continues to focus on the health, well-being and performance of horses by delivering state-of-the-art research and clinical services that benefit the horse-owning public. As a former equine surgeon and faculty member, I have watched the EHSP grow and flourish, as evidenced by the contents of this research report. Since its inception in 2005, the EHSP has been translating research into practical solutions for our broad-based constituents and clients in addition to delivering clinical services, education and community outreach to referring veterinarians and clients.

The EHSP continues to make significant contributions to our understanding of the complex mechanisms of horses in health and disease. The EHSP collaborates with other universities, industry and foundations to discover new treatment and preventative measures for lameness, gastrointestinal disease, endocrine disease and respiratory disease, which collectively result in a significant yearly loss of revenue to the equine industry. More specifically, EHSP faculty scientists are actively studying a number of common diseases, including osteoarthritis, laminitis, long bone fracture repair, gastric and colonic ulcer disease, Equine Cushing’s disease, and inflammatory and allergic airway disease (summer pasture associated obstructive pulmonary disease).

The EHSP continues to build and maintain strong relationships and community engagements with Louisiana stakeholders so that it can respond to the needs of horses and horse owners. In the aftermath of Hurricane Isaac, the EHSP and the LSU SVM, in concert with the Louisiana State Animal Response Team, were able to help horses and other large animals in need by supplying personnel for search and rescue, triage of injured animals, and clinical and surgical care. The EHSP has been and continues to be on-alert to respond to the needs of horses and is a model for emergency preparedness for other veterinary institutions. Additionally, the EHSP continues to provide strong leadership and the latest information to horse owners through its continued involvement with referring veterinarians, the Louisiana State Racing Commission, the Louisiana Equine Council, the Louisiana Thoroughbred Breeders Association, the Louisiana Horse Rescue Association and many others.

In closing—just a few comments as I get ready to ride off into the sunset after nearly 40 years in the saddle here at the LSU SVM—my engagement in developing our large animal clinic, as well as my tour as an administrator, have been most rewarding, both personally and professionally. In the final analysis, it’s always about the people, and our programs here have been blessed by many strong relationships with the equine community. I could not be more proud of the emergence and productivity of our EHSP as it continue to benefit horses throughout the world. I am always humbled by the dedication of our faculty and staff and their continued commitment to the mission of the EHSP and the LSU SVM. I have truly appreciated everyone’s support and know that the EHSP will continue to bring national and international recognition to the School.

My best personal regards,
Peter F. Haynes, DVM, DACVS, Dean
The LSU School of Veterinary Medicine continues to promote a high level of support for equine health through teaching, research and service. The equine industry is an integral part of the Louisiana livestock community, especially the racing industry. Our Equine Health Studies Program is the basis for the research effort that investigates and provides up-to-date and pertinent information for educating students and extending service to the public.

It is important for our faculty to continue building through extra-mural support, and we have been fortunate to have a number of sources that include federal (National Institutes of Health, USDA), state (equine health appropriation) and private/industry (Grayson Jockey Club Research Foundation, Elanco, Boehringer Ingelheim Vetmedica, Zinpro Corporation, Centaur Corporation, Seabuck Equine, SmartPill Corporation, Pall Corporation) funding. The faculty contributing to the program are to be commended for their concerted efforts to ensure that equine health remains one of the top priorities of the LSU SVM.

Sincerely,

James E. Miller, DVM, MPVM, PhD
Interim Associate Dean for Research and Advanced Studies
Professor of Epidemiology and Community Health

School of Veterinary Medicine
Veterinary Teaching Hospital
Equine Clinic

Providing comprehensive, advanced medical, surgical and reproductive care for horses

Services include lameness and performance evaluation (including a high speed treadmill), advanced diagnostic imaging (MRI, CT, ultrasound, radiology), dynamic endoscope, emergency and critical care, mare and stallion fertility, internal medicine, laparoscopic and arthroscopic surgery, laser surgery, and integrative medicine (acupuncture and massage and shock wave therapy).

Skip Bertman Drive at River Road, Baton Rouge, LA 70803 • 225-578-9500 • www.vetmed.lsu.edu
Once again it is my pleasure to introduce the Equine Research Report from the LSU School of Veterinary Medicine Equine Health Studies Program (EHSP). As director of the program, I am honored to present this research report documenting the productive faculty here at the LSU SVM.

The EHSP team remains committed to the health, well-being and performance of horses through veterinary research, education and clinic and public service (our mission). As you can see from the contents of this report, dedicated faculty and staff continue to provide high quality biomedical research to address the health needs of horses. I congratulate each and everyone in the program for their continued commitment and devotion to excellence.

The EHSP biomedical research team has diverse research interests with one major goal: to improve the health and welfare of the horse. Investigators represented in this report contributed important information in the areas of disaster response, gastrointestinal disease, laminitis, dermatology, diagnostic imaging, reproduction, respiratory physiology and disease and surgery. Each study in this report highlights benefits to the horse and the equine industry. Many of these research findings were presented at national and international meetings, including the American Association of Equine Practitioners, the American College of Veterinary Surgery, the American College of Veterinary Internal Medicine, the Veterinary Orthopedic Society, the Laminitis Society, the Applied Equine Nutrition and Training Conference, the Brazilian Association of Equine Practitioners and the American Society of Animal Science. EHSP researchers continue to be sought-after speakers at major conferences throughout the region and the world.

The biomedical research outlined in this report and state-of-the-art facilities on campus are a direct result of support from the Louisiana Governor’s Biotechnology Initiative Grants Program, Louisiana Board of Regents Enhancement Grants Program and recurrent funding through the State Legislature resulting from Louisiana racetrack slot machine revenue. Also, funding for many of these important projects was provided from extramural sources, including the Grayson Jockey Club Research Foundation, the Morris Animal Foundation, the Merial-NIH Veterinary Student Summer Scholars Program, Boehringer-Ingelheim Vetmedica, Elanco Animal Health, the Pennington Biomedical Research Foundation, the National Wetlands Research Center, the National Institutes of Health, SmartPak®, Zinpro Corporation and Purina, among others. Furthermore, we owe our deepest gratitude to the horses that participate in these studies. The research findings presented in this report would not have been possible without the availability and use of horses. All biomedical research on animals at LSU is conducted under Federal Guidelines for the Humane Care and Use of Animals and approved by the Institutional Animal Care and Use
Committee within the LSU SVM. Horses were carefully and compassionately used for the advancement of equine health to discover more effective methods to diagnose, treat and prevent illness and injuries. These horses are valued members of our program and are treated with kindness and dignity. In some cases, data obtained from medical records may have been used to identify specific risk factors and treatment outcomes for important diseases or injuries. All client and animal identities were kept in strict confidence and will not be released under any circumstances.

The faculty and staff of the EHSP are proud to present this research report and look forward to the continued participation in the biomedical research program as it moves forward. As part of the EHSP team, I am committed to furthering the health, well-being and performance of horses everywhere. Also, with continued support from the horse industry and the state of Louisiana, we can further promote and establish the EHSP at the LSU SVM as the premier equine biomedical program in the southern region and the world.

Sincerely,

Frank M. Andrews, DVM, MS, DACVIM
LVMA Equine Committee Professor
Equine Health Studies Program Director

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Our Mission: The LSU Equine Health Studies Program will become a premier equine biomedical center in the 21st century through leading-edge research of equine diseases, contemporary instruction of professional veterinary students and veterinarians in advanced studies programs, and enhanced continuing education of the horse-owning public and private equine practitioners, with the ultimate goal of providing state-of-the-art diagnostic and therapeutic capabilities for critically ill and injured horses, and optimal clinical service to horsemen in Louisiana and the surrounding region.
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**Frank M. Andrews, DVM, MS, DACVIM, LVMA Equine Committee Professor and Director of the Equine Health Studies Program, Veterinary Clinical Sciences**

Dr. Andrews received his DVM and MS from Washington State University in 1983. He completed one year in private practice at Associated Veterinary Clinics, Inc. in Walla Walla, Wash., and completed an internal medicine residency in 1988 at The Ohio State University College of Veterinary Medicine. Dr. Andrews became a diplomate of the American College of Veterinary Internal Medicine in 1989 and was on the faculty at the University of Tennessee College of Veterinary Medicine from 1988-2008. His research focuses on investigating treatment and prevention of gastric ulcer disease, gastric emptying and gastrointestinal motility, and treatment of pituitary par intermedia dysfunction (Equine Cushing's Disease).

**David Beehan, DVM, MS, DACT, Instructor of Theriogenology, Veterinary Clinical Sciences**

Dr. Beehan joined the faculty of the LSU SVM in 2012. He received his MVB from the Veterinary College of Ireland in Dublin in 2006. He received his MS and completed his theriogenology residency in 2012, both at the LSU SVM. He is a diplomate of the American College of Theriogenologists. Dr. Beehan's research interest is investigating biofilm forming *Escherichia coli* isolates collected from the equine reproductive tract, examining their formation and pathogenesis and evaluating and developing new treatments.

**Daniel J. Burba, DVM, DACVS, Professor of Equine Surgery, Veterinary Clinical Sciences**

Daniel J Burba was born in west central Pennsylvania. He completed his undergraduate study in biology at Morehead State University, in Morehead, Ky., and received his DVM from the Auburn University College of Veterinary Medicine. Dr. Burba was accepted into an internship program in large animal medicine and surgery at Oklahoma State University and subsequently completed a residency in equine surgery in 1990. Dr. Burba became a diplomate of the American College of Veterinary Surgeons in 1995. He has received such rewards as the Carl J. Norden Distinguished Teaching Award and has been on the teaching merit honor roll of the Gamma Sigma Delta Honor Society of Agriculture. Dr. Burba has published numerous book chapters on equine wound management, as well as several journal articles and abstracts. He is a member of Phi Zeta Veterinary Medicine Honor Society, the Gamma Sigma Delta Agriculture Honor Society, the Veterinary Wound Management Society, the American Association of Equine Practitioners, the American Veterinary Medical Association and the American Association of Veterinary Clinicians. Dr Burba’s main interests are in orthopedics and laser cribbing surgeries.

**Renee T. Carter, DVM, DACVO, Assistant Professor of Ophthalmology, Veterinary Clinical Sciences**

Dr. Carter received her DVM from the LSU SVM in 2000 and completed a rotating internship in small animal medicine and surgery at the LSU SVM in 2001. She completed a four-year comparative ophthalmology residency and fellowship at the University of Madison-Wisconsin in 2006 and returned to LSU as an assistant professor. Dr. Carter became a diplomate of the American College of Veterinary Ophthalmologists in 2007 and her research focuses on corneal wound healing disorders and the role of leptospirosis in the pathogenesis of equine recurrent uveitis.

**Ann Chapman, DVM, MS, DACVIM, Assistant Professor of Equine Medicine, Veterinary Clinical Sciences**

Dr. Chapman was born and raised in Harrisburg, Penn. She received her BA in biology from Gettysburg College in 1990 and worked in laboratory research in both government and private sectors. She received her DVM from the LSU SVM in 2001. After working in private practice for one year, she began her combination equine internal medicine residency/graduate program at the LSU SVM in 2002. Dr. Chapman completed her residency in 2005 and became a diplomate of the American College of Veterinary Internal Medicine. She received an MS in 2006 from the LSU SVM. She performs mobile equine medicine consultation throughout Louisiana and equine ambulatory medicine to the Baton Rouge community.
Shafiqul Chowdhury, DVM, MS, PhD, Professor, Pathobiological Sciences

Dr. Chowdhury received his DVM and MS degrees from Bangladesh Agricultural University (Bangladesh) and a PhD from the Goethe Institute, (Germany). He completed a post-doctoral fellowship in the Department of Microbiology at the University of Texas Health Sciences Center in Houston, Texas. Dr. Chowdhury was a research scientist at Bayer Animal Health and was on the faculty at Kansas State University College of Veterinary Medicine for 18 years before coming to LSU in 2008. His research interests include gene characterization and vaccine development for Equine Herpes Virus 1 and Bovine Herpes Virus 1. He recently completed a USDA grant and works closely with industry.

Anderson daCunha, DVM, MS, DACVA, Assistant Professor of Anesthesiology, Veterinary Clinical Sciences

In addition to being an assistant professor of veterinary anesthesiology, Dr. da Cunha is also service chief for the Anesthesia Service in the LSU Veterinary Teaching Hospital. He received his DVM from Federal University of Parana in 2000 and his MS from Federal University of Santa Maria in 2002. He completed his residency at North Caroline State University in 2006, and he is a diplomate of the American College of Veterinary Anesthesiologists.

Susan C. Eades, DVM, PhD, DACVIM, Professor of Equine Medicine, Veterinary Clinical Sciences

Dr. Eades received her DVM in 1982 from the LSU SVM and then completed an internship in large animal medicine and surgery and a residency in large animal internal medicine at the University of Pennsylvania's New Bolton Center. She then completed a PhD in veterinary physiology at the University of Georgia. Her doctoral studies concentrated on intestinal vascular and nonvascular smooth muscle physiology and pharmacology. Upon completion of her PhD, Dr. Eades began as an assistant professor of large animal medicine at the University of Georgia College of Veterinary Medicine, where she remained through 1997. She returned to LSU in 1998 as an associate professor of equine medicine. Dr. Eades’ clinical interests include equine internal medicine; however, she has a special interest in cardiology and ultrasound. Her research interests include intestinal disease and laminitis.

Bruce E. Eilts, Professor Emeritus of Theriogenology, Veterinary Clinical Sciences

Dr. Eilts is originally from the Minneapolis/St. Paul area in Minnesota. He attended the University of Minnesota as a pre-veterinary medicine student and obtained a BS in veterinary science in 1975 and his DVM in 1977, both from the University of Minnesota. He was in private practice for one year before returning to the University of Minnesota to obtain an MS in theriogenology in 1982. After two and a half years in a private practice in southern California, he came to the LSU SVM as an assistant professor in 1984. He became board certified in the American College of Theriogenologists in 1986, and his main clinical and research interests are in basic reproduction management in the horse.

Filipe Espinheira, LMV, ACVO, Assistant Professor of Veterinary Ophthalmology, Veterinary Clinical Sciences

Dr. Espinheira received his LMV in Veterinary Medicine from Tras-os-Montes e Alto Douro University (Portugal) in 2002. He was a Leonardo DaVinci scholar in small animal medicine and surgery at Barcelona University for six months before working in a private small animal practice in Porto (Portugal). In 2006 he completed a small animal internship at Animal Medical Centre (England). After that, Dr. Espinheira worked in a small animal practice in Birmingham (England). In 2008 he completed a surgical fellowship at Michigan State University, and in 2012 he completed a residency in comparative ophthalmology at the University of Wisconsin. Dr. Espinheira is a diplomate of the American College of Veterinary Ophthalmology, and his clinical interests are in ophthalmology with a special interest in cornea, ocular surgeries and glaucoma.
Jon Fletcher, DVM, DACVIM, Assistant Professor of Companion Animal Medicine, Veterinary Clinical Sciences

Dr. Fletcher received his DVM from the LSU SVM in 2005. He completed a small animal medicine and surgery rotating internship at Auburn University before returning to LSU for his small animal internal medicine residency, which he completed in 2008. He started an internal medicine practice in a private specialty hospital, where he remained for four years before returning to the LSU SVM to join the faculty in 2012. Dr. Fletcher’s clinical interests include canine and feline endocrinology. He is the section head of the Veterinary Endocrinology Laboratory and his research interests include diabetes mellitus, obesity and endocrine diagnostic techniques.

Lorrie Gaschen, DVM, PhD, DECVDI, Professor of Diagnostic Imaging, Veterinary Clinical Sciences

Dr. Gaschen received her BS and DVM degrees from the University of Florida in 1985 and 1990, respectively. She received her PhD from the University of Utrecht (Netherlands) in 2001. She is a diplomate of the European College of Veterinary Diagnostic Imaging. In addition to her role as a professor in VCS, Dr. Gaschen is also service chief for the Diagnostic Imaging Service in the LSU Veterinary Teaching Hospital. She joined the faculty at LSU in 2006. Dr. Gaschen’s research interests are in vascular imaging and ultrasound of the gastrointestinal tract and pancreas and MRI.

Marjorie S. Gill, DVM, MS, DABVP, Professor of Farm Animal Services, Veterinary Clinical Sciences

Dr. Gill received her DVM and MS degrees from Iowa State University in 1976 and 1984, respectively. She is a diplomate of the American Board of Veterinary Practitioners (Food Animal Practice). She joined the faculty at LSU in 1984, and her clinical interests are in farm animal medicine, small ruminant medicine and surgery, animal behavior, and urogenital, gastrointestinal and ophthalmological surgery.

Samithamby Jeyaseelan, DVM, PhD, Professor, Pathobiological Sciences

Dr. Jeyaseelan received his DVM degree from the University of Peradeniya (Sri Lanka) in 1992. He received his PhD in pulmonary immunology from the University of Minnesota College of Veterinary Medicine in 2001. He completed his first post-doctoral training at Yale University in pulmonary immunology in 2003 and his second post-doctoral training at National Jewish Health/Colorado Health Sciences Center in lung biology in 2004, where he was also on the faculty from 2004-07. In addition to being a professor in PBS, Dr. Jeyaseelan is also the director of the Lung Biology Laboratory. His research focuses on investigating the mechanisms underlying lung inflammation and host defense in response to bacterial pathogens. Dr. Jeyaseelan has published more than 40 original articles and more than 12 review articles. He serves as an associate editor of the Journal of Immunology, academic editor of PLoS One and serves on the editorial boards of Clinical and Vaccine Immunology and Infection and Immunity. Dr. Jeyaseelan’s research is funded by the National Institutes of Health and Flight Attendant Medical Research Institute.

Jill R. Johnson, DVM, MS, DACVIM, DABVP, Professor Emeritus of Equine Medicine, Veterinary Clinical Sciences

Dr. Johnson is a native of South Dakota and received her DVM from the University of Minnesota, where she also received her MS degree in veterinary surgery and radiology. She joined the faculty of the LSU SVM in 1977. She is a diplomate in both the American College of Veterinary Internal Medicine and the American American Board of Veterinary Practitioners (Equine Practice). Her past research activities have centered on immunogenetics and immunology, methods of quantifying exercise training using the global positioning system (GPS) and development of tissue culture models to study diseases. Her current research involves the spatial-temporal study of hospital-acquired infections in the large animal hospital.
Jose A. Len, MVZ, MS, DACT, Instructor of Theriogenology, Veterinary Clinical Sciences

Dr. Len received his DVM from the Universidad de Guadalajara (Mexico) in 1994. He then worked as the Panamanian Racing Commission veterinarian at the Hipodromo Presidente Remon Racetrack in Panama City until 1999. From 1999-2005, Dr. Len was the veterinarian and manager of Haras Cerro Punta, a thoroughbred breeding farm in the Republic of Panama. He completed a theriogenology residency in 2008 at the LSU SVM and is a diplomate of the American College of Theriogenologists. Dr. Len’s research is focused on the improvement of processes for semen chilling and freezing and efficient use of spermatozoa for intracytoplasmic sperm injection in the horse.

Mandi J. Lopez, DVM, MS, PhD, DACVS, Associate Professor, Veterinary Clinical Sciences

From the Pacific Northwest, Dr. Lopez received her BS from Humboldt State University in Arcata, Calif., and received her DVM from the University of California, Davis. She completed a food animal internship at Kansas State University prior to going to the University of Wisconsin, where she completed a residency in large animal surgery and obtained MS and PhD degrees. She then did a post-doctoral fellowship in applied biomechanics. Her areas of interest are comparative orthopedic research and surgery. Dr. Lopez is a diplomate of the American College of Veterinary Surgeons and holds several patents for biomedical devices and has expertise in both applied and basic research. She came to LSU in 2004 and directs the Laboratory of Equine and Comparative Orthopedic Research (LECOR).

Sara K. Lyle, DVM, MS, PhD, DACT, Assistant Professor of Theriogenology, Veterinary Clinical Sciences

Dr. Lyle is from Gainesville, Fla., and received her DVM from the University of Florida in 1985. She also completed a residency in theriogenology in 1990 and received her MS in reproduction in 1991, both at the University of Florida. She is a diplomate of the American College of Theriogenologists. Dr. Lyle joined the faculty at the LSU SVM in 2002 and received her PhD from the LSU SVM in 2008. Her clinical interests include mare infertility and assisted reproductive technologies. Her research interests include reproductive immunology (equine) and assisted reproductive technologies in horses.

Charles T. “Chuck” McCauley, DVM, MS, DABVP, DACVS, Assistant Professor of Equine Surgery, Veterinary Clinical Sciences

Dr. McCauley joined the equine faculty at the LSU SVM in 2006. Prior to that, Dr. McCauley was employed in a busy private referral practice in northeast Texas. He received his DVM from Texas A&M University and completed an internship and residency in food animal medicine and surgery at Oklahoma State University. In addition, Dr. McCauley completed a residency in large animal surgery (equine emphasis) at Purdue University. He is a diplomate of both the American Board of Veterinary Practitioners (Food Animal Practice) and the American College of Veterinary Surgeons (Large Animal Surgery).

Rebecca S. McConnico, DVM, PhD, DACVIM, Professor of Equine Medicine, Veterinary Clinical Sciences

Dr. McConnico is originally from north central Ohio but received her DVM in 1987 from the LSU SVM. She received her PhD from and completed a clinical residency in large animal internal medicine at North Carolina State University. She is a diplomate of the American College of Veterinary Internal Medicine. Dr. McConnico’s clinical interests include equine critical care and internal medicine. She is also a certified veterinary acupuncturist. The long term goals of Dr. McConnico’s research collaborations are elucidating the pathophysiologic mechanisms associated with intestinal diseases in horses and determining the link between these diseases and other related abnormalities (e.g., laminitis, endotoxemia, myositis), with the broader intention of preventing, attenuating and determining effective treatment modalities for these life-threatening conditions. Additionally, Dr. McConnico is integrally involved in the development of the LSU SVM’s disaster preparedness and response program, which provides training and disaster response in partnership with other LSU units, non-government groups, and state and federal government entities.
Mustajab Mirza, DVM, MS, Assistant Professor of Equine Surgery, Veterinary Clinical Sciences

Dr. Mirza received his DVM from the College of Veterinary Sciences Lahore affiliated with the University of Agriculture (Pakistan) in 1992. He received his MS degree from the LSU SVM in 1998. Dr. Mirza’s primary interests are repair of long bone fractures and pathogenesis of colics in equids, laminitis, ophthalmology and advanced wound healing. He primarily provides after-hours emergency equine services for the LSU Veterinary Teaching Hospital. Dr. Mirza’s research interests are in long bone fractures, performance limitations, advanced therapeutics for osteoarthritis and gastrointestinal disease in the horse.

Colin F. Mitchell, BVMS, MS, DACVS, Associate Professor of Equine Surgery, Veterinary Clinical Sciences

Originally from Perth, Scotland, Dr. Mitchell received his veterinary medical degree from the University of Edinburgh. He then completed an internship at the University of Prince Edward Island prior to entering a combined three-year equine surgery residency and MS graduate program at the University of Minnesota, which he completed in 2004. He then remained on the hospital staff at the University of Minnesota, where he worked as the equine emergency clinician/surgeon until 2005, when he joined the faculty at the LSU SVM. He is a diplomate of the American College of Veterinary Surgeons, and his clinical interests include orthopedic, laparoscopic and respiratory surgery. His research interests include orthopedic implants and laminitis.

Dale L. Paccamonti, DVM, MS, DACT, Professor and Head, Veterinary Clinical Sciences

Dr. Paccamonti is originally from Kankakee, Ill., and received his DVM from Michigan State University in 1981. After four years in a mixed practice in Chestertown, Md., he pursued advanced training at the University of Florida, where he completed a residency in theriogenology and received his MS degree in 1988. Dr. Paccamonti is a diplomate in the American College of Theriogenologists. He joined the faculty at the LSU SVM in 1988, where he is head of the Department of Veterinary Clinical Sciences and a professor of theriogenology. Dr. Paccamonti’s primary research interests include the study of infertility in mares, assisted reproduction techniques in horses, factors affecting sperm motility in stallions, semen cryopreservation in stallions, and the process of fetal maturation and parturition in mares. He also collaborates in reproductive research in other domestic species. He shares responsibility for clinical theriogenology cases in all species presented to the LSU Veterinary Teaching Hospital.

Romain Pariaut, DVM, DACVIM, DECVIM, Associate Professor of Veterinary Cardiology, Veterinary Clinical Sciences

Dr. Pariaut joined the faculty of the LSU SVM in 2007. He received his DVM from the Univeriste de Lyon (France) in 2003. He completed an internship in small animal medicine and surgery and a specialty internship in the Emergency & Critical Care Unit at the School of Veterinary Medicine in Lyon, and then served there as a clinical instructor. Dr. Pariaut completed a residency in cardiology at Cornell University and served as a staff veterinarian and cardiology consultant in Lyon. He also served as a senior veterinarian in the Cardiology Service at the University of California, Davis before joining the faculty at LSU. He is a diplomate of both the American College of Veterinary Internal Medicine (Cardiology) and the European College of Veterinary Internal Medicine (Companion Animal).

Daniel B. Paulsen, DVM, MS, PhD, DACVP, Professor, Pathobiological Sciences

Dr. Paulsen received his DVM in 1977 and his MS in 1978, both from Kansas State University. In 1989, he received his PhD from Oklahoma State University. Dr. Paulsen’s major research interests are in bovine respiratory disease with emphasis on Mannheimia haemolytica, Pasteurella multocida, infectious bovine rhinotracheitis and bovine respiratory coronavirus; pathogenesis, bacterial genetics, respiratory immunity and vaccinology; toxicologic pathology associated with inhaled toxins and effects of inhaled substances on the pathogenesis of asthma; and application of immunohistochemical techniques in equine respiratory disease and laminitis. In addition to being a professor in PBS, Dr. Paulsen is the director of the Louisiana Animal Disease Diagnostic Laboratory.
Kenneth Pierce, DVM, MS, DACVO, Assistant Professor of Ophthalmology, Veterinary Clinical Sciences

Dr. Pierce was born in New Orleans, La., and received his DVM from the LSU SVM in 2005. In 2006 he completed a small animal medicine and surgery internship at the University of Tennessee College of Veterinary Medicine. In 2007 Dr. Pierce traveled to southern California to complete a specialty ophthalmology internship with Eye Care for Animals and B. Braun, Inc. He then completed a four year comparative ophthalmology residency at Michigan State University and received his MS in 2011 from MSU. Dr. Pierce is a diplomate of the American College of Veterinary Ophthalmologists.

Cherie Pucheu-Haston, DVM, PhD, DACVD, Assistant Professor of Dermatology, Veterinary Clinical Sciences

Dr. Pucheu-Haston received her DVM in 1992 from the LSU SVM and completed an internship in small animal medicine and surgery at LSU in 1993. She received her residency training in veterinary dermatology at North Carolina State University from 1993-95 and is a diplomate of the American College of Veterinary Dermatology. She worked as a specialist in private practice for seven years, then returned to NCSU in 2002 to pursue advanced graduate training. She received her PhD in immunology (with a minor in biotechnology) from NCSU in 2006. She completed three years as a post-doctoral research associate in the Immunotoxicology Branch of the U.S. Environmental Protection Agency, as a grantee from the University of North Carolina-Chapel Hill. Dr. Pucheu-Haston returned to LSU as a faculty member in 2011. Her research interests include identification of factors involved in the development and perpetuation of atopic dermatitis, the relationships between allergic skin diseases and hypersensitivity in other organ systems (asthma, gastrointestinal disease) and the identification of genomic or proteomic biomarkers of allergic sensitization.

Patricia Queiroz-Williams, DVM, MS, Assistant Professor of Veterinary Anesthesiology, Veterinary Clinical Sciences

Dr. Queiroz-Williams joined the faculty of the LSU SVM in 2007. She received her DVM from the Universidade Federal de Minas Gerais (Brazil) in 1996 and her MS from the Universidade Estadual Paulista School of Medicine (Brazil) in 2002. She also completed a residency and her MS in anesthesiology at the Universidade Estadual Paulista (Brazil).

Nathalie Rademacher, Med.Vet., DACVR, DECVDI, Assistant Professor of Diagnostic Imaging

Dr. Rademacher received her Med.Vet. from the Justus-Liebig-University (Germany) in 2000 and her Dr.med.vet. from the University of Berne (Switzerland) in 2003. After completion of a small animal internship in private referral center in Switzerland, she completed a diagnostic imaging residency in 2006 at the Vetsuisse Faculty (Switzerland). Dr. Rademacher is a diplomate of both the European College of Veterinary Diagnostic Imaging and the American College of Veterinary Radiology. She joined the faculty of the LSU SVM in 2007. Dr. Rademacher’s research focus is ultrasound in small and large animals, contrast enhanced ultrasound of the pancreas in dogs and cats, elastographic ultrasound application and lung ultrasound in dogs.

Laura Riggs, DVM, PhD, DACVS, Assistant Professor of Equine Surgery, Veterinary Clinical Sciences

Dr. Riggs is originally from Memphis, Tenn., and received her DVM from the University of Tennessee College of Veterinary Medicine in 2001. She completed a large animal internship followed by a large animal surgery residency at the University of Georgia. In 2007 she received her PhD in veterinary physiology from the University of Georgia with research studying biomarkers in equine laminitis. Dr. Riggs is a diplomate of the American College of Veterinary Surgeons. Her research focuses on lameness, laminitis and fracture repair biomechanics.

Eric Storey, DVM, MVSc, DACVO, Associate Professor of Ophthalmology, Veterinary Clinical Sciences

Dr. Storey received his DVM from Auburn University College of Veterinary Medicine in 1999 and his MVSc from the University of Saskatchewan (Canada) in 2003. He completed his ophthalmology internship in 2000 at the University of Illinois and his residency at the University of Saskatchewan in 2003. Dr. Storey is a diplomate of the American College of Veterinary Ophthalmologists. His research interests are in glaucoma, inherited retinal disease and equine recurrent uveitis.
Changaram S. Venugopal, BVSc, MSc, MS, PhD, Professor, Veterinary Clinical Sciences

Dr. Venugopal received his BVSc from Kerala Veterinary College and Research Institute at Kerala University (India). After practicing veterinary medicine at the Kamadhenu Dairy Farm for five years, he pursued advanced studies and received his MSc in neuropharmacology from Calicut University (India). He later received his MS degree in cardiovascular pharmacology and a PhD in pulmonary pharmacology from the Massachusetts College of Pharmacy and Allied Health Sciences in a cooperative program with Harvard University in Boston, Mass. Then he worked as a post-doctoral fellow at Harvard Medical School and, in 1981, joined the faculty at the LSU SVM. He received the New Investigator Award grant from the National Institutes of Health in 1983 and the Beecham Award for Research Excellence in 1985. He received the Faculty Distinguished Scholar Award in 2003 from the LSU SVM and the Distinguished Alumni Award from his alma mater in 2005. His research interests include recurrent airway obstruction in horses, mediators of airway hyperreactivity, pathophysiology of insulin resistance in equine laminitis, pharmacology of vasculature, and oxidative stress in equine respiratory diseases. He is the recipient of research grants as principal investigator from the National Institutes of Health, the USDA and the Grayson Jockey Research Foundation, as well as grants from the National Institute of Environmental Health Science and the Louisiana Board of Regents as co-principal investigator. In the area of teaching, Dr. Venugopal has been on the honor roll in merit teaching from 1994-99, and he received an LSU School of Veterinary Medicine Teaching Award in 2008.
Long-time Staff Member Retires

Earnestine Holmes retired on May 30, 2013, as a research associate after 27 years of dedicated service to the LSU SVM. She joined the LSU SVM staff as a medical research technologist in 1986 in the Department of Veterinary Physiology and Pharmacology (now Comparative Biomedical Sciences), where she worked with Dr. Changaram Venugopal. She moved to the Equine Health Studies Program (EHSP) in 2004, where Dr. Venugopal’s research activities were concentrated. She also had the opportunity to work with several other faculty members at the LSU SVM. Everyone Earnestine has worked with highly regards her work ethic and congeniality. According to one faculty member, “Earnestine was a well organized, meticulous and dependable co-worker. She doesn’t just show up for work; she thinks about the work, plans the work ahead of time and then shows up for work with a clear idea of what she is going to do that day.”

Earnestine was directly responsible for training several high school students during the summer through the USDA minority programs and worked with veterinary students on programs through Merck-Merial, the Morris Animal Foundation and the National Institutes of Health. At least six graduate students received direct help from her for their dissertation/thesis work. Because of her superb work quality, knowledge and attitude towards work, she co-authored more than 30 research papers during her tenure at the LSU SVM.

A native of Jackson, Miss., Earnestine graduated from Jackson State University (where she was on the Dean’s List) in 1978 with a major in biology. In 1985, she obtained her certification as a medical laboratory technician (MLT-ASCP) from Louisiana Tech Institute/River West Medical Center in Baton Rouge, La. She came to the LSU SVM as a medical research technologist, then was promoted to a medical research specialist, then to research associate. During her tenure here, she won the LSU SVM Research Support Award in 1991 and the LSU SVM Academic Support Award in both 1994 and 2013.

Some of the EHSP research projects she was involved with include therapeutic agents in reducing oxidative stress in horses during recurrent airway obstruction, interaction of endothelin receptors and oxidative stress, insulin resistance in equine digital vessels in laminitis, neurokinin receptors and endothelin receptor alteration in equine recurrent airway obstruction.

Earnestine is active in her church and is dedicated to her family; she balances her time and activities between the family and church. Earnestine resides in Baker, La., with her husband, Thad Holmes, and their son, Timothy.
**David Beehan, MVB, DACT**

Dr. Beehan (Athgarvan, Co. Kildare, Ireland) received his MS degree on December 14, 2012, from the Department of Veterinary Clinical Sciences (VCS). His thesis was entitled, “The Effects of Iodixanol Present during Equine Semen Cryopreservation,” and his major advisor was Sara Lyle, DVM, PhD (LSU SVM 2008), DACT, assistant professor of theriogenology. Dr. Beehan is currently an instructor of theriogenology at the LSU SVM and is pursuing his PhD.

**Vanessa Pinto, DVM**

Dr. Pinto (São Paulo, Brazil) received her MS on May 18, 2012, from VCS. Her thesis was entitled, “Isolation and Characterization of Adult Progenitor Cells from Healthy and Laminitic Hoof Tissue.” Dr. Pinto’s major advisor was Mandi J. Lopez, DVM, MS, PhD, DACVS, associate professor.

**Myra Durham, DVM**

Dr. Durham (Walnut Cove, N.C.) received her MS degree in August 2012 from VCS. Her thesis was entitled, “Evaluation of Plasma Sprayed Hydroxyapatite Coated AO Cortical Screws in Equine Third Metacarpal Bone,” and her major advisor was Laura Riggs, DVM, PhD, DACVS, assistant professor of equine surgery. Dr. Durham is a clinic instructor at the North Carolina State University College of Veterinary Medicine.

**Florence Polle, DVM**

Dr. Polle (Toulouse, France) received her MS degree in August 2012 from VCS. Her thesis was entitled, “Role of Intraocular Leptospira Infections in the Pathogenesis of Equine Recurrent Uveitis in the Southern United States,” and her major advisor was Renee Carter, DVM (LSU SVM 2000), DACVO, assistant professor of veterinary ophthalmology. Dr. Polle is working in private practice in Normandy, France.

**Saybl Sprinkle**

Sprinkle (Cedar Park, Texas) received her MS degree in August 2011 from VCS. Her thesis was entitled, “Biomechanical Evaluation of Medial and Lateral Approaches for Experimentally Created Medial Condylar Fractures of the Equine Third Metacarpal Bone,” and her major advisors were Gary Sod, DVM (LSU SVM 2001), MA, PhD, assistant professor of farm animal health management, and Laura Riggs, DVM, PhD, DACVS, assistant professor of equine surgery. Sprinkle is enrolled in veterinary school in Australia.

**Lin Xie, MS**

Dr. Xie (Linyi, Shandong, China) received her PhD on May 18, 2012, from VCS. Her dissertation was entitled, “Optimization of Adult Multipotent Stromal Cell-Bioscaffolds Interactions for Tissue Regeneration with Bioreactors.” Dr. Xie’s major advisor was Mandi J. Lopez, DVM, MS, PhD, associate professor. Dr. Xie is completing a post-doctoral fellowship.

**Nan Zhang**

Nan Zhang, BS (Taiyuan, Shanxi, P. R. China), received her PhD in August 2013 from VCS. Her dissertation was entitled, “Optimization of Feline Adipose-derived Multipotent Stromal Cell Isolation and Canine Cranial Cruciate Ligament Regeneration with Intra-articular Adipose-derived Multipotent Stromal Cells,” and her major advisor was Mandi Lopez, DVM, PhD, DACVS, associate professor, and director of the Laboratory for Equine and Comparative Orthopedic Research.
TEXTBOOK CHAPTERS


Proceedings


Gaharan, S., McConnico, R. S. (2011). Emergency Response for Oiled Birds During the Gulf Coast Oil Spill. www.phscofevents.org/index.cfm


**Lay Publications**


McConnico, R. S. Commentary: Disaster Planning and Mitigation. Equine Disease Quarterly, Gluck Equine Research Center, Department of
Veterinary Science, University of Kentucky, Lexington, KY. (2011)


CONTINUING EDUCATION PRESENTATIONS

International


Riggs, L. M. (November 2012). Basic Course of Osteosynthesis in Equines, Universidad Nacional Autonoma de Mexico Facultad de Medicina Veterinaria y Zootecnia, Mexico City, Mexico.

National


Andrews, F. M. (July 2012). Missouri Veterinary Medical Associate Equine Meeting. Missouri VMA and Boehringer Ingelheim Vetmedica, Columbia, MO.

Andrews, F. M. (February 2012). University of Tennessee Annual Conference, University of Tennessee College of Veterinary Medicine, Knoxville, TN.


Chapman, A. M. (September 2012). Southwest Veterinary Symposium, Southwest Veterinary Symposium, Dallas, TX.


McConnico, R. S. (November 2012). North Carolina Veterinary Conference, North Carolina Veterinary Medical Association, Raleigh, NC.

McConnico, R. S. (June 2012). Pacific Veterinary Conference, California Veterinary Medical Association, San Francisco, CA.


Storey, E. S. (February 2012). Winter Meeting, “Glaucoma,” Arkansas Veterinary Medical Association, Hot Springs, AR.

**State and Local**


Burba, D. J. (February 2011), 104th Winter Meeting, “Update on Equine Joint Disease Therapies,” Arkansas Veterinary Medical Association, Hot Springs, AR.

Burba, D. J. (February 2011), 104th Winter Meeting ArVMA, “Lameness Caused by Difficult Distal Limb Problems,” Arkansas Veterinary Medical Association, Hot Springs, AR.

Burba, D. J. (February 2011), 104th Winter Meeting ArVMA, “Lavage of Synovial Structures,” Arkansas Veterinary Medical Association, Hot Springs, AR.

Burba, D. J. (February 2011), 104th Winter Meeting ArVMA, “Sinus and Guttural Pouch Infections,” Arkansas Veterinary Medical Association, Hot Springs, AR.

Burba, D. J. (February 2011), 104th Winter Meeting ArVMA, “Basics of Skin Grafting,” Arkansas Veterinary Medical Association, Hot Springs, AR.

Burba, D. J. (February 2011), 104th Winter Meeting ArVMA, “Management of Limb Wounds,” Arkansas Veterinary Medical Association, Hot Springs, AR.

Burba, D. J. (February 2011), 104th Winter Meeting ArVMA, “Overview of Wound Management in the Horse,” Arkansas Veterinary Medical Association, Hot Springs, AR.

Burba, D. J. (February 2011), 104th Winter Meeting ArVMA, “Treatment of Equine Foot Disorders,” Arkansas Veterinary Medical Association, Hot Springs, AR.


Burba, D. J. (July 2012), Equine Lay Dentistry Short Course. LSU Equine Health Studies Program, Baton Rouge, LA.

Chapman, A. M. (February 2012), Continuing Education Meeting, “Equine Ophthalmology,” Northeast Louisiana Veterinary Medical Association, Monroe, LA.

Eilts, B. E. (January 2012), Louisiana Veterinary Medical Association Winter Meeting. Louisiana Veterinary Medical Association, Shreveport, LA.

Eilts, B. E. (May 2012), North East Louisiana Veterinary Medical Association. North East Louisiana Veterinary Medical Association, Monroe, LA.


Gill, M. S. (February 2011), Arkansas VMA, “Case Presentations in Cattle Part II,” Arkansas VMA, Hot Spring, AR.

Gill, M. S. (February 2011), Arkansas VMA, “Management of Umbilical Masses in Calves,” Arkansas VMA.

Gill, M. S. (February 2011), Arkansas VMA, “Small Ruminant Anesthesia/Analgesia,” Arkansas VMA, Hot Springs, AR.

Gill, M. S. (February 2011), Arkansas VMA, “Small Ruminant Neurological Diseases,” Arkansas VMA, Hot Springs, AR.

Gill, M. S. (February 2011), Arkansas VMA, “Small Ruminant Parasitology,” Arkansas VMA.

Gill, M. S. (February 2011), Arkansas VMA, “Urolithiasis in Small Ruminants,” Arkansas VMA.


Lopez, M. J. (April 2011), “Alcoholism and Adult Stem Cells: A Rat’s Tale,” Loyola University Medical Center, Maywood, IL.

Lopez, M. J. (February 2011), Saturday Science Series, “The Healing Horse- Enhancing Therapeutic Riding Through Motion Analysis,” Louisiana State University, Baton Rouge, LA.

Lopez, M. J. (January 2012), Annual Meeting of Louisiana Therapeutic Riding Association, “The Healing Horse- Enhancing Therapeutic Riding Through Motion Analysis.”


McConnico, R. S. (February 2011), Southern States Cooperative Advanced Equine Feed Master Meeting, “Equine Disaster Planning & Mitigation,” Southern States, Raleigh, NC.

McConnico, R. S. (February 2011), Southern States Cooperative Advanced Equine Feed Master Meeting, “Personal Equine Safety for Field Personnel,” Southern States, Raleigh, NC.

Pucheu-Haston, C. M. (November 2011), Annual Dermatology Conf, LSU School of Veterinary Medicine, “Clinically Relevant Abstracts from NAVDF 2011,” Baton Rouge, LA.

Queiroz-Williams, P. (September 2011), LSU Anesthesia Continuing Education, “Pain Pathways,” Baton Rouge, LA.

Queiroz, P. (August 2012), LSU School of Veterinary Medicine Technician Training Program, LSU SVM Anesthesia Service, Baton Rouge, LA.

**Refereed Publications**


two abaxial transarticular cortical screws. Veterinary Surgery, 40(5), 571-578.


**Scientific Abstracts**

**Oral Presentations**

Andrews, F. M., Equine Endocrine Summit: Clinical Efficacy of Pergolide in Horses at LSU, as part of the FDA Trial. Boehringer Ingelheim VetMedica, Boston, MA. (September 2012).


**Poster Presentations**


Andrews, F. M., Annual ACVIM Forum, “Effect of Egusin 250 and SLH on Gastric Ulcer Scores, Gastric Fluid pH and Total CO2 in Horses,” American College of Veterinary Internal Medicine, New Orleans, LA. (June 2012).


Kaidapuram, L. R. N., Amaya, A. P., Lopez, M. J. Phi Zeta Research Emphasis Day, “Development and Validation of Biomechanical Models to Quantify Thoroughbred and Quarter Horse Back Forces at the Walk,” LSU School of Veterinary Medicine, Baton Rouge, LA. (September 2011).


Lopez, M. J., Feng, D., Pinto, V., Dessauer, J., Simcoe, R., Phi Zeta Research Emphasis Day, “Isolation and Regulation of Fresh and Revitalized Laminar Stem Cells,” LSU School of Veterinary Medicine, Baton Rouge, LA. (September 2012).


McConnico, R. S., Heidorn, N., 17th World Congress on Disaster and Emergency Medicine, “Biosecurity Considerations for Equine Emergency Sheltering,” Beijing, China. (June 2011).
McConnico, R. S., Wolfson, W., Taboada, J., Poirrier, R., 17th World Congress on Disaster and Emergency Medicine, “Experiential Learning in Disaster Response for Veterinary Students and Veterinarians,” Beijing, China. (June 2011).


Published Abstracts


McConnico, R. S., Wolfson, W., Taboada, J., Poirrier, R. (2011). Experiential Learning in Disaster Response for Veterinary Students and Veterinarians. 17th World Congress on Disaster and Emergency Medicine.


Other Educational Contributions

Editorials


Interviews & Annotations


**Funded Proposals**


Baia, Petrisor, Riggs, Laura M, Riggs, Laura M, “Histomorphometric and Surface Topography Analysis of Stainless Steel Implants with Different Surface Treatment,” Sponsored by Charles V. Cusimano Equine Physiology & Pharmacology Laboratory, Equine Health Studies Program, Louisiana State University, $8,000. (August 2012 - Present).

Burba, Daniel J, Andrews, Frank M, “Prevalence of Gastric Ulcers in Horses that Crib Bite - Clinical Study,” Sponsored by Equine Health Studies Program, Louisiana State University, $5,000 (October 2012 - Present).


Eades, Susan C, Fugler, Lee Ann, “Effects of Hyperinsulinemic Laminitis in Thoroughbred Horses on C-Reactive Protein,” Sponsored by LSU Equine Health Studies Program, Louisiana State University, $12,000. (September 2012 - Present).


Lopez, M. J., Pinto, V., Bragulla, H. “Isolation and In Vitro Expansion and Differentiation of Adult Equine Laminar Stem Cells from Normal and Laminitic Horses,” Sponsored by LSU SVM and USDA, $7,000. (October 2011-September 2012)

Lopez, M. J., Pinto, V., Bragulla, H. “Modifications of Equine Laminar Cells due to Laminitis,” Sponsored by LSU Equine Health Studies Program, $6,000. (July 2011-June 2012).


Lopez, Mandi J., “Elucidation of the Roles of MiR203 and Mitochondrial denovo Fatty Acid Synthesis in Equine Laminitis,” Sponsored by the LSU Equine Health Studies Program, $12,000. (August 2012 - Present).


Lopez, M. J., Kaidapuram, L. R. N., “Generation of a Computer Model of Equine Motion to Study Therapeutic Riding,” LSU Equine Health Studies Program, $3,300. (July 2010-June 2011)

Lopez, M. J., Pinto, V., “Isolation and Characterization of Adult Stromal cells from the Equine Laminae,” LSU Equine Health Studies Program, $8,800. (July 2010- June 2011)


Lyle, Sara K., Durand, Rebecca, Perry, Rita, Taylor, Virginia, “Effect of Contextually Congruent Stallion Vocalization on Uterine Pressure in Pony Mares,” Sponsored by LSU School of Veterinary Medicine, $5,000. (May 2011 - August 2011).


McConnico, Rebecca S., “Faculty Scholarship for Equine Acupuncture Training,” Sponsored by Chi Institute of Traditional Chinese Veterinary Medicine, Private, $4,000. (January 2011 - August 2011).


McConnico, Rebecca S., “Veterinary Disaster Training Program,” Sponsored by LSU Stephenson Disaster Management Institute, $2,000. (April 2011 - May 2011).
McConnico, Rebecca S., Mirza, Mustajab H., Wolfson, Wendy, "Disaster Management Training Program," Sponsored by American Veterinary Medical Foundation, Other, $20,000. (March 2011 - February 2012).

McConnico, Rebecca S., “Adele Dilschneider Private Donation,” $25,000. (December 2012 - Present).


Polle, F., Carter, R. T., Storey, E. S., “Prevalence of Intraocular Bacterial Infections in Clinically Normal Horses from Louisiana,” Sponsored by Veterinary Clinical Sciences, CORP grant, Louisiana State University, $4,000. (December 2010 - May 2011).


Queiroz, P., Shih, A. C., Pariaut, Romain, Bandt, Carsten, Ricco-Pereira, Carolina, Vigani, Alessio, “Evaluation and Validation of Pulse Pressure Variation (PPV) and Strove Volume Variation (SVV) Use in Fluid Status in Pony Foals,” Sponsored by LSU School of Veterinary Medicine. (September 2010 - April 2011).


AWARDS

Andrews, Frank M.
President (January 2005 - June 2012); Board Member (January 2002 - June 2012) Equine Protozoal Myeloencephalitis Society.

Teacher Merit Honor Roll, LSU SVM (2012)

Burba, Daniel J.
Teaching Merit Honor Roll, Gamma Sigma Delta, LSU. (April 2011).

Carter, Renee T.
Dean’s Teacher Merit Honor Roll, LSU School of Veterinary Medicine. (April 2011).

Teacher Merit Honor Roll, Gamma Sigma Delta, Louisiana State University. (April 2011).

Flagship Faculty Member. (January 2011).

Chapman, Ann M.
Dean’s Teacher Merit Honor Roll, LSU School of Veterinary Medicine. (April 2011 and April 2012).

Teaching Enhancement Fund, LSU/Campus Federal Credit Union. (January 2011).

da Cunha Anderson F.
Dean’s Teacher Merit Honor Role, LSU School of Veterinary Medicine. (April 2011 and April 2012).

Melissa Newman (Mentor), The Society of Phi Zeta. (September 2011).

Eades, Susan
SVM Distinguished Scholar, LSU School of Veterinary Medicine. (July 2012).

Gaschen, Lorrie
Dean’s Teacher Merit Honor Role (Years I and II), LSU School of Veterinary Medicine. (May 2011 and May 2012).

Faculty Distinguished Service Award, LSU School of Veterinary Medicine. (May 2011).

Gill, Marjorie S.
Gamma Sigma Delta Teaching Merit Honor Roll, Gamma Sigma Delta Agricultural Honor Society. (April 2012).
Lopez, Mandi J.

American College of Veterinary Surgeons, Large Animal Regent Nomination. (October 2012).

First Place (Tie) Phi Zeta Research Emphasis Day Post Competition, Tau Chapter, Phi Zeta. (September 2012).

First Prize (Tie) Phi Zeta Research Emphasis Day Competition, Tau Chapter, Phi Zeta. (September 2012).

Second Place Medical Student Research Day, New Orleans Medical School. (October 2012).

Lyle, Sara K.

Dean's Teacher Merit Honor Roll, LSU School Veterinary Medicine. (April 2012).

McConnico, Rebecca S.

2010 SVM Class of 2012 Highest Rating Teacher Award, LSU School of Veterinary Medicine, Class of 2012. (May 2011).

Campus Federal Credit Union Teaching Enhancement Award, Campus Federal Credit Union. (March 2011).

2012 SVM Class of 2013 Teacher Merit Honor Roll, LSU School of Veterinary Medicine, Class of 2013. (May 2012).

Merchant, Sandra R.

Dean's Teacher Merit Honor Roll, LSU School of Veterinary Medicine. (April 2012).

Mitchell, Colin F.

Dean's Teacher Merit Honor Roll, LSU School of Veterinary Medicine. (April 2011).

Teacher Merit Honor Roll, Gamma Sigma Delta, LSU Chapter. (April 2011).

Mirza, Mustajab H.

Dean's Teacher Merit Honor Roll. (April 2012).

Pariaut, Romain

Dean's Teacher Merit Honor Roll. (April 2011 and April 2012).

Teacher Merit Honor Roll, Gamma Sigma Delta, LSU Chapter. (April 2011).

Pucheu-Haston, Cherie M.

Dean's Teacher Merit Honor Roll, LSU School of Veterinary Medicine. (April 2012).

First place, clinical research category, Phi Zeta Research Emphasis Day. (September 2012).
Queiroz-Williams, Patricia
Dean's Teacher Merit Honor Roll, LSU School of Veterinary Medicine. (April 2011).

Rademacher, Nathalie
Dean's Teacher Merit Honor Roll, LSU School of Veterinary Medicine. (April 2011).

Summer Research Award, MAF. (March 2011).

Riggs, Laura M.
Dean's Teacher Merit Honor Roll, LSU School of Veterinary Medicine. (April 2011 and May 2012).

Storey, Eric S.
Dean's Teacher Merit Honor Roll, LSU School of Veterinary Medicine. (April 2011).

Army Achievement Medal, U.S. Department of the Army. (January 2011).


Armed Forces Reserve Medal (AFRM) with "M" device, United States Army. (March 2012).

Global War on Terror Expeditionary Medal, U.S. Department of the Army. (March 2012).


Offices Held in Professional Societies

Andrews, Frank M.
Member of the American College of Veterinary Medicine, General Examination Validation Committee (2011-Present).

Carter, Renee T.
Member of the Credentials Committee (October 2009 - October 2013), American College of Veterinary Ophthalmologists.

Gaschen, Lorrie
Treasurer (2003-December 2014), European College of Veterinary Diagnostic Imaging.

Past-President (2010-2011), Veterinary Ultrasound Society of the American College of Veterinary Radiology.

Treasurer (2009-present), European Large Animal Diagnostic Imaging Society.
HONORS AND AWARDS

Gaschen, Lorrie continued

Secretary (2009-2012), Large Animal Diagnostic Imaging Society of the American College of Veterinary Radiology

Scientific Advisory Committee Member (2008-present), World Small Animal Veterinary Association

Board Member (2003-present), European College of Veterinary Diagnostic Imaging

Merchant, Sandra R.

Secretary (2001 - 2013), National Federation of the Blind of Louisiana.

Paccamonti, Dale L.

Chair, ABVS Executive Committee (2010 - 2011), American Veterinary Medical Association

EDITORIAL REVIEW BOARDS

Andrews, Frank

Editorial Board, Equine Veterinary Education (2012 - Present).

Eades, Susan

Editorial Review Board Member, Compendium Continuing Education Practicing Veterinarian (2005 - Present).

Gaschen, Lorrie

Editor, Associate Editor, Veterinary Radiology and Ultrasound (2007-present).

Lopez, Mandi J.

Editorial Review Board Member, Veterinary Surgery (2000 - Present).

Associate Editor, Associate Editor of Invited Reviews and Themed Issues, Veterinary Surgery (2008-Present).

Editor, Associate Editor, Veterinary Surgery (2012).

Pariaut, Romain


Riggs, Laura M.

Editorial Review Board Member, Veterinary Surgery (ACVS Journal) (January 2010 - Present).
STATE-OF-THE-ART FACILITIES AND EQUIPMENT

The Equine Health Studies Program is an interdepartmental, multidisciplinary equine biomedical program within the LSU School of Veterinary Medicine that is dedicated to the health, well-being and performance of horses through veterinary research, education, and service. A diverse group of faculty, graduate students, post-doctoral fellows and staff conduct cutting-edge research in equine health and disease. The program maintains a herd of approximately 90 horses and ponies for teaching and research. Three research barns in the facility contain over 40 stalls and several pastures and paddocks are available for turnout and housing. We have upgraded and added some key facilities and equipment, including the renaming and dedication of the EHSP physiology and pharmacology laboratory as the Charles V. Cusimano Equine Physiology and Pharmacology Laboratory and the updating of the Equine Performance Evaluation Laboratory and Lameness Pavilion, the Equine Cell and Tissue Culture Laboratory, the Laboratory for Equine and Comparative Orthopedic Research, and the Equine Molecular Laboratory. Additionally, the clinical facilities and equipment within the Veterinary Teaching Hospital and other core research facilities and resources within the LSU SVM support the research activities of the EHSP.

Charles V. Cusimano Equine Physiology and Pharmacology Laboratory

Numerous faculty and graduate students conduct scientific investigations involving equine physiology, pharmacology, and pathophysiology, including but not limited to vascular and nonvascular smooth muscle physiology, pathology, and pharmacology (digital and intestinal vasculature, bronchial, uterine and intestinal smooth muscle), mucosal injury due to non-steroidal-anti-inflammatory drugs, mucosal physiology and permeability, endotoxemia, laminitis, and development and testing the effects of medications on hemodynamics. We currently have 15 Ussing's chambers systems and multiple tissue baths for measuring gastrointestinal mucosal permeability and injury and muscular contraction.

Ussing's chambers for gastrointestinal permeability studies
Tissue baths in the Charles V. Cusimano Physiology and Pharmacology Laboratory.

Laminitis Research Laboratory

Pfeiffer-Burt Lameness and Performance Pavilion

The Pfeiffer-Burt Lameness and Performance Pavilion (75’ x 125’ ) is a modern facility for evaluation of locomotion in horses. Several research projects evaluating the efficacy of pharmaceutical and nutraceutical agents and feed additives for treatment of lameness in horses are being evaluated in this facility.

Lameness examination in the Pfeiffer-Burt Lameness and Performance Pavilion
Equine Performance Evaluation Laboratory

The Equine Performance Evaluation Laboratory (EPEL) is equipped with a high-speed treadmill for exercising horses at speeds that mimic racing conditions. A Coda Motion System digital motion analysis system that incorporates markers on the horse into digital images to evaluate gait and lameness is also available (see image below). Evaluation of the dynamics of the upper airway can be achieved by a dynamic endoscopic system. The dynamic endoscope can evaluate the upper airway in research and clinic horses exercising on the high-speed treadmill or working in their natural environment, such as the racetrack or riding arena.
Dynamic Endoscope

Laboratory for Equine and Comparative Orthopedic Research

The Laboratory for Equine and Comparative Orthopedic Research (LECOR) was established and designed to facilitate a strong association between clinical and basic orthopedic research for advancement of orthopedic knowledge across species and disciplines. LECOR is specifically designed and equipped for translational orthopedic research from the molecular/genetic level to the structural level.

The laboratory is equipped with the most modern equipment for molecular/genetic work, including an MJ Research Chromo4 Detector and DNA Engine 200 for DNA fragment amplification and Quantitative PCR, a UVP hybrilinker for blot analysis and a Synergy HT multi-detection microplate reader for ELISA assays. Housed within the laboratory is a Leica DM 4000 light microscope with fluorescent, polarizing and phase contrast capabilities. The microscope is equipped with the latest in digital image capture equipment and software. Additionally, there is a PathScan Enabler to obtain ultra high quality images from 1 x 3 inch glass slides. A custom-designed servohydraulic axial torsional Material Testing System with a Flex Test SE Controller and equipped with a Multiple Gage Length Axial Extensometer makes nearly any level of mechanical tissue testing possible, from the tissue and bone level to joint and whole limb testing.

Presently, several state-of-the-art diamond saws are available for both orthopedic hard and soft tissue microscopic and ultrastructural sample preparation. A section of the laboratory is devoted to histologic preparation of both calcified and decalcified tissue samples. Areas
of research focus include the pathophysiology of hip dysplasia, the development and implementation of novel orthopedic devices and cranial cruciate ligament disease. Also, the laboratory is active in equine stem cell research, regenerative medicine and tissue culture. The laboratory focuses on translation of basic scientific research to the live horse. Projects within the laboratory include growth of laminar cells for use as an in vitro model of laminitis and bone marrow stem cells for use in tendon healing.

**Equine Orthopedics and Biomechanics**

We have developed a solid research program in the area of equine orthopedics and biomechanics. This has led to the development of numerous orthopedic implants designed specifically for equine use, which is critical for the advancement of equine orthopedics and fracture repair. These equine specific orthopedic implants have distinct advantages over those intended for human application. The EHSP is unique in that it is the only school of veterinary medicine in the country that is designing and testing equine specific orthopedic implants. An integral part of this research program was the development of a finite element computer model that allows for the biomechanical testing of an orthopedic implant applied to an equine bone or bones. This allows for changes in implant design to be made and tested using the finite element model prior to in vitro biomechanical testing. This computer aided design approach allows for more efficient use of the limited cadaver specimens. This research has direct and often immediate clinical applications. We are presently advising and performing biomechanical tests on prototype large animal orthopedic implants for Synthes Vet, Inc., Innovative Animal Products, and IMEX Veterinary, Inc.

**Clinical Facilities and Equipment**

The Veterinary Teaching Hospital is staffed 24/7, 365 days a year with board certified and internationally recognized veterinary specialists and highly-skilled veterinary technicians that provide clinical service to the horse-owning public. In 2009, the LSU Veterinary Teaching Hospital added a new modern state-of-the-art MRI unit for evaluation of soft tissue and bony lesions in the head, neck, and limbs of horses with hard to diagnose clinical conditions, including foot and lower limb lameness.
The hospital has also added new digital endoscopy equipment (Karl Storz, Inc.) to diagnose conditions of the upper and lower airways, esophagus, stomach and reproductive tract.

**Diagnostic and Research Endoscopy**

Standing endoscopy of esophagus, stomach, and duodenum (see story ‘Researching Gastric Ulcer Disease” on page 60).

**Equine Reproduction/Theriogenology Laboratory**

The Equine Reproduction/Theriogenology Laboratory has complete facilities for the evaluation, chill-transport, and cryopreservation of spermatozoa, including light and phase-contrast microscopes and a computer-assisted spermatozoal analysis system (Spermvision®). There are three ultrasound machines with 5-7.5 MHz linear array transducers and a 5-7.5 MHz sector array transvaginal transducer for oocyte collection by follicular aspiration or twin reduction by aspiration. A fourth ultrasound system equipped with a 3.5 sector and 5-7.5 microconvex array is available for transabdominal imaging. An Olympus endoscope is also available for hysteroscopic examination and for hysteroscopic low-dose insemination. Laparoscopy is available and used for oviductal insemination and for minimally invasive placement of intrauterine catheters. We maintain a close collaborative relationship with the Equine Biotechnology Laboratory, which is part of the LSU Agricultural Center. This facility has tissue culture laboratories and micromanipulators that make possible such advanced assisted reproductive techniques as intracytoplasmic spermatozoal injection and nuclear transfer (cloning).
Equine Molecular Biology Research Laboratory

The Equine Molecular Biology Research Laboratory is equipped to support the molecular biology aspects of research conducted by the EHSP investigators. The missions of this laboratory are to perform research to explain the molecular basis of disease with a view to improved clinical approaches; to train scientists, students, and visitors at all levels; and to develop new instruments and methods in equine molecular biology. We also have direct access to the core facilities within the LSU SVM Division of Biotechnology and Molecular Medicine (BIOMMED) for quantitative Real-Time PCR, primer/probe design, Quantity One for DNA fragment visualization and analysis, SDS-PAGE analysis, MagnaPure automated nucleic acid extraction, and microarray spotters and readers. Current investigations utilizing this laboratory include study of key mediators in equine laminitis, metabolic disease, gastrointestinal disease, summer pasture-associated recurrent obstructive airway disease, bone healing and mechanisms of pain sensation and modulation. The capabilities of this laboratory have expanded in light of the increasing importance of the molecular biological approach to the investigation of equine health and disease.
MAGNETIC RESONANCE IMAGING IN FOALS WITH SEPTIC ARTHRITIS

Authors/Investigators
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Introduction
Septicemia and its secondary complications, such as septic arthritis and osteomyelitis, remain a common, often severe, rapidly progressive clinical problem in neonatal foals. Radiography is often used; however, it has limited ability to detect early bony changes. Magnetic resonance imaging (MRI) is the current standard in imaging the distal extremity in adult horses because it allows assessment of the cartilage, subchondral bone and bone marrow cavity, as well as the joint capsule and surrounding ligaments. No study has been performed to assess MRI for the distal extremity of foals.

Objectives
The purpose of this original study is to establish the MRI protocols for the extremities in foals and describe the MRI findings associated with septic arthritis. It is hypothesized that MRI will be more sensitive for the presence and extent of osteomyelitis and joint effusion than radiography, and MRI will have the ability to show cartilage damage, which is not possible with radiography.

Methods
- Affected septic arthritis group: Foals < 6 months of age with distal extremity joint pain, heat, swelling, lameness and fever, and a joint fluid analysis positive for inflammation of either the fetlock, carpus or tarsus and diagnosed clinically with sepsis.

- Control group: Foals < 6 months of age negative for septic arthritis.

- Distal extremity joints were scanned in a 1.5T magnet (Hitachi Echelon™) with a human knee coil. Foals were scanned under general anesthesia with client consent. Cadaver limbs from foals humanely euthanized for reasons unrelated to this study were scanned within 24 hours of euthanasia.

- Routine radiographic exams were performed on each joint.

- All images were examined by a board-certified radiologist.
• MRI and radiographic findings were compared.

• MRI findings of both groups were compared.

Results
• A total of 10 foals (six live, four cadaver) for a total of 23 joints were included in the study. Ages ranged from 1.5 weeks-16 weeks.

• Five of the 10 septic joints (three foals) had bony abnormalities not present in controls.

• Tenosynovitis was detected as sheath effusion with a heterogeneous intensity on T2 weighted (T2 W) and Proton Density (PD) sequences in the long and common digital extensor tendon in one affected foal with no bony lesions.

Take Home Message
• Epiphyseal, physeal, metaphyseal, articular and subchondral bone signal abnormalities were detected in five out 10 affected joints of septic foals that could not be detected radiographically prior to MRI exam.

• A hyperintense zone surrounded by a hypointense halo in affected foals is similar to the MRI characteristics of osteomyelitis in humans.

• The increased hyperintense signal indicates an active lesion, and the areas of decreased hypointense signal indicate a non-active lesion, most likely sclerosis or necrosis.

• Joint lavage performed prior to MRI could contribute to the presence of joint distention and mixed signal and amorphous appearance within the joint in some foals. However, the same findings were present in two foals without prior joint lavage. Fibrous adhesions are likely responsible for this finding.

• MRI is more sensitive than radiography in the detection of early bony lesions due to osteomyelitis and of articular involvement within the joints in the distal extremities of foals diagnosed clinically with septic arthritis.

• Further investigation is warranted to examine a larger population to determine the prognostic value of the presence of MRI abnormalities in the joints of septic foals.

• MRI may represent a new “one imaging” modality for septic foals in the future.

References


**Funding**

This project was funded by the Morris Animal Foundation.

**Year Completed**

2012

**Acknowledgements**

A special thanks to the LSU SVM diagnostic imaging technicians for performing radiographs and MRI exams, and to the clinicians—Drs. Frank Andrews, Charles McCauley, Rebecca McConnico, Colin Mitchell and Laura Riggs—for recruiting foals for this study. All of the procedures were approved by the Louisiana State University Institutional Animal Care and Use Committee.
Characterization of IgE-mediated cutaneous immediate and late-phase reactions in non-allergic horses

Authors/Investigators
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Introduction
Intradermal injection of anti-immunoglobulin E in dogs and humans induces immediate- and late-phase cutaneous reactions that grossly and histologically mimic spontaneous allergic dermatitis. Similar histologic studies have not been performed in horses. To characterize the gross and histologic response of horse skin to anti-IgE, six clinically-normal horses were injected intradermally with polyclonal rabbit anti-canine IgE (anti-IgE) and rabbit immunoglobulin G (IgG). Wheal measurements and biopsies of the injection sites were obtained before injection and 20 minutes, 6 hours, 24 hours, and 48 hours after injection. Tissue sections were stained with H&E, Luna (eosinophils) and Toluidine Blue (mast cells). Cells were counted in 1cm2 of dermis at four depths: superficial dermal (A), superficial follicular (B), deep follicular (C), and deep follicular to appendicular (D). Wheal diameters were significantly greater in anti-IgE treated skin samples when compared to IgG-treated samples at 20 minutes and 6 hours. There were significantly more mononuclear cells (24 hours), granulocytes (6 hours, 24 hours), and eosinophils (6 hours, 24 hours, 48 hours) in anti-IgE samples compared to IgG samples. Dermal depth was a significant factor for eosinophil numbers, with counts significantly increased in anti-IgE samples in the deeper (B, C and D) but not superficial (A) dermis when compared to IgG samples. In addition, for anti-IgE samples, there were significantly more eosinophils in depths C and D when compared to depths A and B at 24 hours. Visibly degranulated mast cells were significantly increased for anti-IgE when compared to IgG samples. This study documents the unique cellular response to anti-IgE injection in equine skin.

Objectives
The objectives of this study were to characterize the gross and histologic response of horse skin to anti-IgE and to develop a model for studying IgE-mediated inflammation in the horse. The hypothesis was that injection of anti-IgE would induce changes similar to those seen in humans.

Methods
Six clinically normal horses were injected intradermally with polyclonal rabbit anti-canine IgE (anti-IgE) and rabbit immunoglobulin G (IgG). Wheal measurements and biopsies of the injection sites were obtained before injection and 20 minutes, 6 hours, 24 hours, and 48 hours after injection. Tissue sections were stained with H&E, Luna (eosinophils), and Toluidine Blue (mast cells). Cells were counted in 1 mm2 of dermis divided over four depths: superficial dermal (A), superficial follicular (B), deep follicular (C), and deep follicular to adnexal (D).
Results

Wheal diameters were significantly greater in anti-IgE treated skin samples when compared to IgG-treated samples at 20 minutes and 6 hours. There were significantly more mononuclear cells (24 hours), granulocytes (6 hours, 24 hours), and eosinophils (6 hours, 24 hours, 48 hours) in anti-IgE samples compared to IgG samples. Dermal depth was a significant factor for eosinophil numbers, with counts significantly increased in anti-IgE samples in the deeper (B, C and D) dermis when compared to IgG. For anti-IgE samples, there were significantly more eosinophils in depths C and D when compared to depths A and B at 24 hours. Degranulated mast cells were significantly increased for anti-IgE over IgG.

Take Home Message

The injection of anti-IgE in equine skin resulted in a response that was overall similar to both humans and canines. However, horses appear to have an element of depth that can be significant, especially in regards to eosinophils. This study documents the unique cellular response to anti-IgE injection in equine skin. This model may used for future evaliation of equine allergic dermatitis.

Funding

This study was funded by a Charles V. Cusimano Equine Health Studies Program grant, Equine Health Studies Program (EHSP), Louisiana State University School of Veterinary Medicine. The authors declare no conflicts of interest.

Year Completed

2014
TREATMENT OF EXPERIMENTAL HYPERINSULINEMIC LAMINITIS WITH PENTOXIFYLLINE: PRELIMINARY RESULTS

Authors/Investigators
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Introduction
Laminitis is a crippling disease of horses resulting from structural failure of the digital laminae, the critical tissue that suspends the axial skeleton in the hoof capsule. Equine laminitis associated with endocrine dysfunction is a current focus of laminitis research. Laminitis has been induced by use of a prolonged euglycemic hyperinsulinemic clamp technique (p-EHC) in ponies and in Standardbred horses; therefore, this model has been used to study laminitis associated with insulin resistance and endocrinopathic laminitis. Preliminary studies by Dr. Sam Black at the University of Massachusetts Amherst have demonstrated that similar matrix metalloproteinase (MMP) alterations and subsequent matrix degradation within the digital laminae play an integral part in the pathophysiology of laminitis induced by both carbohydrate overload and insulin resistance. Studies in our laboratory have shown that pentoxifylline is a potent MMP inhibitor in the horse and that it effectively reduces lameness in a corn starch overload model of laminitis. Its effectiveness in the treatment/prevention of hyperinsulinemic laminitis has not been evaluated.

Objectives
There are two goals for this study: (1) to determine that hyperinsulinemic laminitis can be successfully induced with a p-EHC model in Thoroughbred horses using similar methods established for Standardbred horses; and (2) to evaluate the effects of pentoxifylline on lameness induced with the p-EHC model of laminitis.

Methods
Laminitis was induced via a p-EHC technique described by de Laat et al. Horses were administered an intravenous bolus of insulin (45 miu/kg) followed by an infusion of insulin (6 miu/kg) and 50 percent dextrose (10 µmol/kg) to achieve a steady state euglycemic hyperinsulinemia for 48 hours or until Obel grade 2 laminitis was achieved. Horses in the treatment group received pentoxifylline (8.5 mg/kg in 1L NaCl IV over 30 minutes) immediately prior to the insulin/dextrose infusion, then every 12 hours thereafter. Horses in the control group received the insulin/dextrose infusion to induce euglycemic hyperinsulinemia but received no treatment. Serum insulin concentrations were measured in both groups every hour for the first 12 hours followed by every eight hours thereafter. Three blood samples for determining insulin sensitivity were collected 10 minutes apart immediately prior to the insulin bolus and again during the steady state period. Clinical signs (Obel grade lameness, heart rate, respiratory rate, body temperature, mucous membrane color, capillary refill time, and digital pulses) were monitored. Insulin and glucose concentrations will be assayed to establish that the euglycemic hyperinsulinemic clamp was achieved. Differences in Obel grade lameness between treatment and control groups will be evaluated by use of nonparametric statistical tests once all data are collected.
Results

Preliminary results for eight horses are available to date (four control horses and four pentoxifylline treated horses). Laminitis Obel grades are depicted in Table 1.

<table>
<thead>
<tr>
<th>Treatment Group/Horse</th>
<th>Obel Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control p-EHC</td>
<td></td>
</tr>
<tr>
<td>Horse 1</td>
<td>0</td>
</tr>
<tr>
<td>Horse 2</td>
<td>2</td>
</tr>
<tr>
<td>Horse 3</td>
<td>2</td>
</tr>
<tr>
<td>Horse 4</td>
<td>2</td>
</tr>
<tr>
<td>Pentoxifylline + p-EHC</td>
<td></td>
</tr>
<tr>
<td>Horse 5</td>
<td>0</td>
</tr>
<tr>
<td>Horse 6</td>
<td>0</td>
</tr>
<tr>
<td>Horse 7</td>
<td>2</td>
</tr>
<tr>
<td>Horse 8</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 1. Preliminary results of laminitis Obel grades in horses administered insulin/dextrose in a euglycemic hyperinsulinemic clamp (p-EHC) and receiving either no treatment (control p-EHC) or treatment with pentoxifylline (pentoxifylline + p-EHC).

Take Home Message

These preliminary results suggest that pentoxifylline and other MMP inhibitors could be beneficial treatments for horses with laminitis associated with insulin resistance and endocrinopathic laminitis. Further study of the safety and efficacy of novel MMP inhibitors for endocrinopathic laminitis is of importance to the equine industry.

Funding

Funding for this project was provided by the LSU Equine Health Studies Program and USDA Formula Funds.

Year Completed

In progress.
Comparison of in vitro responses of digital vessels of clinically healthy horses and horses with laminitis

Authors/Investigators
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Introduction
Based on our previous study, the in vitro responses of insulin-resistant equine digital vessels to insulin are contractions, whereas those of the non-resistant vessel are relaxations. Vessels can be experimentally made insulin resistant by incubating them for 30 minutes in a tissue bath that has a high concentration of insulin. Endothelial dysfunction and hyperinsulinemia play a major role in equine laminitis. Hyperinsulinemia leads to insulin resistance of blood vessels. Thus, insulin resistance results in interference of blood flow to the lamina of the equine foot.

Objectives
The primary objective of this study was to compare the responses of the digital vessels of clinically healthy horses and those of the laminitic horses. In addition, the objective also included a comparison of vessel responses after experimental induction of insulin resistance using the previously published methodology for induction of insulin resistance.

Methods
Digital palmar vessel segments (artery and vein) were collected from clinically healthy horses and horses with laminitis immediately after euthanasia. The animals (three normal and four laminitic) were selected based on the results of the physical examination and history. Laminitis was confirmed later by histological examination of the lamina. Vessel segments were cleaned and arterial and venous rings (3mm wide) were cut. All the rings were set in tissue baths for in vitro response studies. One side of the ring was fixed to the bottom of the bath and the other side to a force transducer interfaced with a polygraph. Oxygen was bubbled from a tank containing 95 percent O₂ and 5 percent CO₂. An initial tension was applied to each ring and allowed to equilibrate for 30 minutes in the tissue bath containing warm (37°C) Tyrode's solution. Of the four arterial rings prepared from each horse, two rings were used as non-resistant and the other two were made insulin-resistant. Venous rings were used similarly. All these rings were contracted using phenylephrine (10-6.5M). When the contraction reached a plateau, a single dose of insulin (10-5M) was added to all rings, and response was monitored for 30 minutes. The phenylephrine response was considered 100 percent and the responses of the rings to insulin were reported as a percentage of the response to phenylephrine. SAS (version 9.3) software was used to analyze the data as a mixed effects model in a repeated measure analysis of variance in a three-way factorial arrangement of treatments. When significance was detected in the overall model, post hoc comparisons were performed using Tukey's test for main effects comparisons, and a pair-wise t test of least squares means for interaction comparisons. All comparisons were considered significant at p< 0.05.
**Results**

The results showed that the responses of the non-resistant arterial and venous rings of laminitic horses were significantly different from those of the clinically healthy horses (p<0.0001). However, when the rings from these groups were made insulin-resistant, the significant difference between the groups disappeared. In the laminitic group, responses of insulin-resistant and non-resistant vessels did not show a difference; whereas, in the clinically healthy group, resistant and non-resistant vessel responses differed significantly (p<0.0001). In all experiments, arterial and venous rings followed the same pattern of responses, but the magnitudes were different. The arterial responses were greater than those of the venous rings.

**Take Home Message**

The findings suggest that the vessel responses to insulin are altered in horses with laminitis. Insulin resistance could be a factor for this alteration in responses.

**Funding**

The study was supported by the LSU Equine Health Studies Program

**Year Completed**

2011-2012

**Effects of pentoxifylline and losartan on insulin-resistant and non-resistant equine digital vessels**

**Authors/Investigators**

Changaram S. Venugopal¹, Earnestine Holmes¹, Catherine Koch¹, Michael Kearney², Susan C. Eades¹

¹Department of Veterinary Clinical Sciences, LSU SVM; ²Department of Pathobiological Sciences, LSU SVM

**Introduction**

Endothelial dysfunction plays an important role in equine laminitis. In our previous studies, we had successfully demonstrated experimental induction of insulin resistance in equine digital palmar vessels of clinically healthy horses in vitro. Insulin normally produces relaxation of vessels; however, when vessels were made insulin resistant, the response to insulin was turned to a contraction. Thus, insulin resistance was suggested to be a triggering mechanism for laminitis. Therefore, experimental induction of insulin resistance could be used to evaluate effectiveness of potential drugs for their therapeutic role.

**Objectives**

The overall goal of this study was to find a suitable agent that could counteract the contractile response of insulin resistant equine digital blood vessels to insulin. Specifically in this study, the experimental induction methodology we previously published was used to evaluate the effectiveness of pentoxifylline and losartan in counteracting the contractile responses of insulin-resistant digital blood vessels.
Methods

Digital palmar vessel segments (artery and vein) were collected from clinically healthy horses immediately after euthanasia. Their fasting insulin levels were below 65 p mol/L and glucose levels were 5.614 m mol/L. After cleaning the vessel segments, 3 mm wide arterial and venous rings were cut. All the rings were prepared for in vitro response studies by fixing one side of the ring to the floor of the tissue bath and the other side to a force transducer interfaced with a polygraph. Oxygen was bubbled from a tank containing 95 percent O₂ and 5 percent CO₂. An initial tension was applied to each ring, and they were allowed to equilibrate for 30 minutes in the tissue bath containing warm (37°C) Tyrode's solution. Two rings from each vessel type were used for each drug (pentoxifylline or Losartan). One ring was incubated with insulin (10-5M) for 30 minutes to induce insulin resistance; whereas, the other ring was kept non-resistant. All rings were contracted with phenylephrine (10-6.5M). When the contraction reached a plateau, pentoxifylline (10-5M) was applied to two rings (one resistant and the other non-resistant). Losartan (10-5 M) was applied to the other two rings. The drugs were allowed to stay for 5-10 minutes, then insulin (10-5M) was added to the bath and the response was monitored for 30 minutes. The responses were calculated by considering the contractile response to phenylephrine as 100 percent and the rest of the responses as a percentage of the phenylephrine contraction. SAS (version 9.3) software was used to analyze the data as a mixed effects model in a repeated measures analysis of variance in a three-way factorial arrangement of treatments. When significance was detected in the overall model, post hoc comparisons were performed using Tukey’s test for main effects comparisons, and a pair-wise t test of least squares means for interaction comparisons. All comparisons were considered significant at p< 0.05.

Results

Overall, insulin-resistant and non-resistant vessel rings showed a significant difference in response to insulin regardless of their pretreatment with pentoxifylline or losartan. With losartan, insulin resistant vessel rings showed an increase in response from the phenylephrine contracted level; whereas, non-resistant rings showed a relaxation response (p =0.005). After pretreatment with pentoxifylline, insulin-resistant rings showed a decrease in response to insulin, and non-resistant rings showed a contraction (p=0.003).

Specifically, losartan pretreatment caused non-resistant venous rings to relax and resistant rings to contract (p=0.002). On the other hand, losartan pretreatment on arterial rings caused both resistant and non-resistant rings to contract non-significantly. Pentoxifylline pretreatment caused venous rings to relax without significant difference between resistant and non-resistant ring. However, arterial rings that were resistant relaxed whereas, non-resistant rings contracted. The difference was significant (p=0.005).

Take Home Message

Experimental induction of insulin resistance in blood vessels alters their responses from normal. Upon comparison, pentoxifylline appears to be more beneficial in causing relaxation than losartan on insulin-resistant vessels.

Funding

The study was supported by the LSU Equine Health Studies Program.

Year Completed

2011-2012
Mechanisms of Specific & Non-Specific Cyclooxygenase Blockade in Equine Right Dorsal Colonic Mucosa

Authors/Investigators
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Introduction
NSAIDs have been demonstrated both clinically and experimentally to possess ulcerogenic properties in the alimentary tract of the horse via suppression of prostaglandin-mediated protection of the gastrointestinal mucosa. The right dorsal colon is documented as the most common site of damage in horses with signs of NSAID-associated focal colitis (i.e., right dorsal colitis [RDC]). COX-2 specific NSAIDs have been shown to have less adverse side effects in many species including humans, and may be less damaging to the equine colon.

Objectives
The objective of this study was to determine if a specific COX-2 inhibitor, such as meloxicam (MXC), is safer to administer in horses, compared to the most commonly used NS-COX inhibitor, phenylbutazone (PBZ).

Methods
Tissue samples were obtained from the right dorsal colon of seven horses after being euthanized for reasons other than this study. Twelve samples were taken from each horse and placed in six groups (MXC, PBZ, Control, MXC+PGE2, PBZ+PGE2, Control+PGE2). With the use of Ussing chambers, mucosal integrity was observed by calculating the electrical conductance (G), short circuit current, and resistance (R), as well as using radiolabeled mannitol to achieve a quantitative value using nuclear scintillation. Samples were stored in 10 percent formalin and evaluated for histopathologic lesions.

Results
Data was analyzed using a general linear models procedure. Conductance over time, flux of mannitol, and frequency distribution of histologic findings were analyzed for effect of the treatments. Phenylbutazone significantly increased Isc (short circuit secretory response) over time, beginning at 150 minutes, compared with values for either MXC and control (untreated) sections of the right dorsal colon. Phenylbutazone caused tissue conductance to remain stable and unchanged over the entire time period compared to MXC and control treated tissues. PGE2 treatment plus PBZ followed a pattern similar to untreated control tissues and MXC-treated tissues. COX-2 inhibitor drugs, such as PBZ, may play a role in regulating the chloride channel and secretory response in the equine right dorsal colon. Tissue conductance increased in MXC and control tissue compared to PBZ treated tissues after 150 minutes. Determination of effective analgesic NSAID drugs with the least adverse side effects will give equine clinicians the ability to choose the best therapeutic agent to improve the
overall health and well-being of their equine patients.

Effects of selective and non-selective cyclooxygenase inhibitors on mucosal barrier integrity in the equine right dorsal colon

Authors/Investigators
Adam McMahan¹, Catherine Koch¹, Rebecca McConnico¹

¹Department of Veterinary Clinical Sciences, LSU SVM

Introduction
Non-selective COX NSAIDs that act to inhibit both COX-1 and COX-2 pathways are commonly used for treatment of pain and lameness in horses. These drugs, however, have been shown to possess a role in the pathogenesis of RDUC (right dorsal ulcerative colitis) by reducing GI mucosal barrier integrity. It is speculated that the reduction in barrier integrity by non-selective NSAIDS is via inhibition of prostaglandin-mediated (PGE2) protection of GI mucosa. COX-2 selective NSAIDs, on the other hand, have been shown to have decreased adverse side effects, including GI ulcers, in many species by selecting for COX-2 and preserving synthesis of cytoprotective PGE2 by COX-1.

Objectives
To determine the relative effects of selective and non-selective COX inhibitors on equine GI mucosal barrier integrity, Meloxicam (MXC), known to preferentially inhibit the COX-2 pathway in other species, was compared to phenylbutazone (PBZ), a non-selective COX inhibitor commonly used to treat pain in horses. The overall objective of this study was to measure trans-epithelial electrical resistance (TER), a measure of mucosal barrier integrity, in response to NSAID treatment. In addition, lipopolysaccharide (LPS) flux, a measure of tissue permeability, in response to treatment was evaluated.

Methods
Intestinal tissues (RDC) were harvested from horses being euthanized for reasons other than gastrointestinal disease. The tissues were prepared, mounted and bathed in oxygenated Ringers solution in Ussing chambers for measurement of transepithelial resistance and tissue permeability for approximately four hours duration. Treatment groups included Control, MXC, PBZ, MXC+PGE, PBZ+PGE, and PGE with treatments added after 30 minutes. Fluorescence-labeled LPS was added to the mucosal side after one hour, and serosal solutions analyzed for fluorescence.

Results
A significant (P<0.05) decrease in trans-epithelial resistance (TER) over time was observed in both MXC and PBZ treated tissues when compared to control tissues over the four hour period in the Ussing chambers. There was no significant difference, however, between the TER of MXC and PBZ treated tissues when compared to one another. In this case, MXC, known to be a COX-2 selective inhibitor in other
species, seems to behave similarly to a COX-1 inhibitor in the equine right dorsal colon. This is further confirmed by the fact that when PGE2 was added to the treatment baths along with the MXC, TER returned to values similar to those of untreated control tissue. As PBZ is known to be a non-selective COX inhibitor, it was expected and confirmed that addition of PGE2 to treatment baths along with PBZ would result in a TER similar to that of control tissue. Permeability data was inconclusive for this study and may require additional repetitions for statistical significance to be appreciated.

**The Effect of SmartGut® Ultra on the Non-Glandular Gastric Ulcer Scores and Gastric Juice pH**

**Authors/Investigators**
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¹Department of Veterinary Clinical Sciences, LSU SVM; ²Tuskegee University School of Veterinary Medicine

**Introduction**
Equine Gastric Ulcer Syndrome (EGUS) is common and prevalence ranges from 60 to 90 percent. Ulcers occur primarily in the nonglandular (squamous) portion of the stomach due to its lack of resistance to the erosive effects of gastric acids (hydrochloric, volatile fatty and bile acids). Horses with this condition perform poorly, which makes it a significant economical problem within the horse industry. Currently the FDA-approved pharmaceutical agent, GastroGard® (omeprazole; Merial Ltd., Duluth, GA), a proton pump inhibitor, is effective in treating equine ulcers; however, long term treatment is expensive, and increased gastric juice pH might have a negative effect on digestion. SmartGut Ultra (SmartPak Equine LLC, Plymouth, MA), a supplement containing a proprietary mixture of botanicals and other ingredients that protect the stomach from the erosive effects of gastric acid, might be a less expensive alternative to prevent ulcers from recurring after omeprazole treatment.

**Objectives**
The purpose of this study was to test the effects of SmartGut Ultra (SmGU) on gastric ulcer scores and gastric juice pH in stall-confined Thoroughbred horses during and after omeprazole treatment.

**Methods**
Eight healthy Thoroughbred and Thoroughbred-cross horses from the Equine Health Studies Program (EHSP) herd were used in this study. The study was performed as a 42-day two-period crossover consisting of a treatment group (SmGU; n=8) and an untreated control (n=8). All horses were stall-confined and fed mixed grass hay and sweet feed (Omolene® 100; Gray Summit, MO). Horses were assigned to the two treatment groups stratified by gastric ulcer score recorded on Day 1 of period 1. Treated horses were fed SmGU (40g, twice daily) added to the sweet feed, and control horses received no supplement. Prior to beginning
the study, horses underwent physical examination. From days 1-14, all horses were treated with omeprazole (GastroGard® paste, Merial Limited, Duluth, GA; 4mg/kg, orally q24h), then omeprazole was discontinued for the remainder of the study. All horses remained stall-confined. From days 28-35, all horses underwent feed-deprivation, where they were muzzled and deprived of feed for 24 hours and then fed for 24 hours for a total of 96 hours to induce ulcers. During the feed-deprivation days, horses were fed 10 percent of their normal sweet feed and treated horses received the SmGU. From days 35-42, horses returned to their normal diet to allow for recovery. Gastroscopy was performed on all horses on Day 0, 14, 28, 35 and 42, and nonglandular gastric ulcer number (NGN) and severity (NGS) scores were assigned by the PI (FMA) who was masked to treatment. During gastroscopy, gastric juice was aspirated and pH measured.

**Results**

On Day 1 before omeprazole or SmGU-treatment, NGN and NGS scores were not statistically different (P>0.05) in the SmGU treated group compared to the untreated controls. By Day 14, NGN and NGS scores significantly decreased (P<0.05) in both groups. The NGN score remained significantly lower in the SmGU-treated horses when compared to the untreated controls on Days 28 and 35. By Day 42, NGN and NGS scores were not significantly different in either group. Gastric juice pH was significantly higher on Day 14 in both groups, when compared to other days, but there was not a treatment effect on gastric juice pH at any day during the study.

**Take Home Message**

- SmartGut Ultra (40 gm, mixed with feed twice daily) was readily eaten by all horses and did not result in adverse reactions in any of the horses in this study.

- Two weeks after omeprazole treatment (Day 28), the number of gastric ulcers increased significantly in the untreated control group, which was likely due to a rebound in acid secretion.

- SmartGut Ultra prevented the increase in the number of gastric ulcers two weeks after omeprazole treatment and blunted the increase in the number of gastric ulcers after feed-deprivation.

- SmartGut Ultra treatment did not increase gastric juice pH in any of the horses in this study.

- SmartGut Ultra supplement added to feed prevents the worsening of gastric ulcers in stall-confined horses after omeprazole treatment without altering gastric juice pH.

- Supplementation with SmartGut Ultra might be an affordable alternative as an aid in protection of the nonglandular stomach from the rebound acid effects in horses after omeprazole treatment is discontinued and in stall-confined horses undergoing intermittent feeding.

[Mean Non-Glandular Number scores in SmGU-treated and control horses on days -1 (before treatment), 14, 28, 35 and 42 of treatment. Different lower case letters denote significant differences (P<0.05)]

[Mean Non-Glandular ulcer severity SmGU-treated and control horses on days -1 (before treatment), 14, 28, 35 and 42 of treatment. Different lower case letters denote significant differences (P<0.05)]

[Mean gastric juice pH in SmGU-treated and control horses at days -1 (before treatment), and days 14, 28, 35 and 42 of treatment. The (*) denotes a significant difference (P<0.05) when compared to the other days.]
References


Funding

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Year Completed

2012
Technical large animal disaster response

Authors/Investigators

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The LSU School of Veterinary Medicine (LSU SVM) continues to combine community service with experiential learning opportunities by taking advantage of its physical presence amidst a disaster prone region of the United States (U.S.) to incorporate veterinary students, faculty veterinarians, and staff as first responders. Through a continued solid partnership with the Louisiana State Animal Response Team (LSART) and others, including the LSU Fire and Emergency Training Institute (LSU FETI) and humane organizations, we continue to advance our expertise with disaster response as we develop a nationally-recognized program that includes animal emergency response planning, evacuation, sheltering, emergency triage, and technical rescue expertise. Beginning in 2001 with Tropical Storm Allison, through Hurricanes Katrina, Rita, Gustav, Ike, the 2010 Deep Water Horizon Oil Spill, and numerous flood scenarios, these experiential learning opportunities have provided rigorous training opportunities for veterinary students and veterinarians in Louisiana.

Hurricane Isaac provided unusual challenges involving chemical and biological haz-mat situations with horses. Hurricane Isaac, a Category 1 hurricane, made landfall on the southeastern coast of Louisiana on August 28, 2012. The storm’s large size, path and slow pace created up to 14 feet of storm surge, resulting in devastating flooding in Louisiana’s southeastern parishes. The flood waters were made even more dangerous by potential contamination with oil, coal, and chemicals produced by refineries. Four horses were rescued from slack water situations and transported for emergency management and critical care for injuries sustained in the hurricane’s aftermath. The horse were triaged in the field by LSU SVM/LSART partnership responders and then hospitalized at the LSU Veterinary Teaching Hospital. Horse 1 presented with a degloving injury of the right hind limb and multiple other wounds and lacerations. The gelding developed neurologic signs and was euthanized four days after presentation; necropsy was consistent with Salmonella septicemia and disseminated mycosis due to Candida krusei, the first case of its kind reported in a horse. Horse 2 presented with severe dermatitis and cellulitis attributable to chemical exposure and pneumonia and was euthanized due to severe bilateral sinking laminitis. Horse 3 sustained a degloving injury of the left hind limb and was euthanized due to intractable pain 10 days after presentation. Horse 4 was the least severely affected and was discharged following debridement, closure, and cast immobilization of heel bulb lacerations on the left front and right hind feet. This case series illustrates the need for preparation and early evacuation as a way to avoid grave, life-ending injuries in equids and livestock caused by hurricanes and their aftermath.
Validation of a colic surgery and survival prediction model

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Introduction
Colic is the leading cause of death in horses. Time is crucial in these cases, as the horse’s condition can deteriorate quickly. However, upon arrival, an immediate diagnosis is often challenging, and therefore giving an accurate prognosis is generally not possible. For these reasons, a valid, simple, and reliable colic prediction model would help clinicians rapidly determine the need of surgery and the likelihood of survival. A colic model for surgery and prognosis was developed 20 years ago. However, this model has not been validated for horses admitted to the LSU Veterinary Teaching Hospital (VTH) with acute colic.

Objectives
• We aim to validate a colic prediction model that was developed in 1990 and to determine its accuracy in predicting the likelihood of surgery and death.

• We hypothesize that the colic model will accurately predict the probability of surgery and survival in horses presented to the LSU VTH with acute colic.

Methods
• Horses presenting to the VTH with acute colic from 8/20/12 to 7/13/13 were studied.

• Clinical parameters including age, sex, breed, rectal exam, frequency of pain, peripheral pulse character and frequency of abdominal sounds were used to validate the surgical model.

• Clinical and laboratory parameters, including age, sex, breed, peripheral pulse character, heart rate, surgical or medical treatment, capillary refill time and packed cell volume (PCV), were used to validate the prognosis model.

• Clinical and laboratory parameters were collected and entered into an Excel spreadsheet created by Dr. Nathaniel White, using Bayes’ theorem that calculated the post-test probability of both surgery and survival.

• The Hosmer-Lemeshow goodness of fit chi square (GOFCS) was used to assess if each model fit the data. A chi square value of > 15.51 using 8 degrees of freedom was considered significant if it yielded a P < 0.05.
Results

- 71 horses were evaluated for acute colic.
- 25/71 (35%) had surgery.
- 46/71 (65%) were treated medically.
- 17/71 (24%) were euthanized.
- 1/25 (4%) died after surgery.
- 53/65 (82%) survived to discharge.
- The model was an accurate estimate of the probability of surgery (5.18; \( P > 0.05 \)).
- The model was not an accurate estimate of the probability of survival (15.88; \( P < 0.05 \)), as only one horse died after surgery.

Take Home Message

- In this report, 35% of horses presented to the VTH with acute colic require surgery.
- 35% of horses were treated medically.
- 82% of horses presenting to the VTH survived to discharge.
- The colic model (rectal palpation, frequency of abdominal pain, peripheral pulse character, and frequency of abdominal sounds) was able to accurately predict surgery in the population of colic horses presented to the VTH.
- The colic model (peripheral pulse character, heart rate, surgical or medical treatment, capillary refill time and packed cell volume) was not able to accurately predict survival in the horses; however, there was a trend towards model fit.
- One reason for the non-fit of the prognosis model might have been due to the fact that only one treated horse died.

The study here shows that clinical parameters, as part of the physical examination, are excellent at predicting surgery, whereas clinical and laboratory parameters are needed to predict survival in horses presenting to the VTH with acute colic. Survival is high (82 percent) in horses presenting to the LSU VTH with acute colic.
References


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EVALUATING THE EFFECTS OF IODIXANOL PRESENT DURING SEMEN CRYOPRESERVATION OF EQUINE SPERMATOZOA

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Introduction
The increased use of centrifugation cushion media has led to the development of numerous iodixanol-based commercially available cushions, but to date there have been few safety studies investigating what effects the presence of these products would have on equine sperm quality if inadvertently retained during cryopreservation.

Objectives
The objectives of this study were to determine what effects the semen centrifugation cushion Optiprep™ (60 percent iodixanol in water) would have on sperm motility, plasma membrane integrity (viability), acrosome integrity and DNA quality (COMPαt) if present during the cryopreservation of equine sperm.

Methods
Eighteen ejaculates from six stallions were collected, centrifuged without a cushion at 900 x g for 10 minutes to remove the supernatant, and then re-suspended to 200 x 10⁶ cells/ml with 0 percent, 2.5 percent and 5 percent Optiprep™ in an egg-yolk glycerol-based extender and cryopreserved. Before and after cryopreservation sperm motility was assessed by computer assisted sperm analysis, and samples were stained with SYBR-14/PI for plasma membrane integrity and PI/fluorescent isothiocynate-PNA for acrosome integrity and assessed by flow cytometry. Sperm DNA quality was evaluated using the sperm chromatin structure assay and assessed by flow cytometry.

Results
The 5 percent Optiprep™ treatment group showed significantly greater plasma membrane integrity and DNA quality after cryopreservation. In contrast, the 5 percent Optiprep™ treatment group had significantly more damaged acrosomes than either of the other treatment groups. These findings suggest that the presence of iodixanol during cryopreservation may have a beneficial effect by protecting the plasma membrane and DNA, but an exact mechanism of action is unknown.

Published Manuscripts/Abstracts
CUSHIONED VS. NON-CUSHIONED CENTRIFUGATION: SPERM RECOVERY RATE AND INTEGRITY

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Introduction
Centrifugation of equine semen is a common step during fresh-cooled and frozen semen processing. Described detrimental effects of centrifugation on spermatozoa include reduced motility, plasma membrane integrity, acrosomal membrane integrity and expected spermatozoal loss of 20-40 percent, and, as a result, centrifugation forces are kept conservatively low at 400 – 600 x g. Spermatozoal centrifugation cushions have been designed to help protect spermatozoa against the physical stresses of centrifugation and improve recovery rate by using increased centrifugation forces and time. However, few studies that support the use of cushions use similar centrifugation protocols to compare cushion and cushion free spermatozoal centrifugation, making the interpretation of results difficult.

Objectives
The objectives of this study were to compare sperm recovery rate, sperm motility (total and progressive), sperm plasma membrane integrity and acrosomal integrity after cushioned or non-cushioned centrifugation of equine semen subjected to equivalent centrifugation time and forces, by using centrifugal forces (900 and 1800 x g) that are greater than commonly recommended (400 – 600 x g) for non-cushioned centrifugation and lower centrifugation time (10 min) than commonly used for cushioned centrifugation (20 min).

Methods
Semen collected three times from six light breed stallions was extended to 25 x 106 sperm/mL and centrifuged at CON (non-centrifuged), 900NC (no-cushion), 900C (cushion), 1800NC and 1800C x g for 10 minutes. Sperm concentration, motility (TM and PM), and intact plasma membranes (PLM) and acrosomes (ACR) pre- and post-centrifugation (D0) and after 24 hours (D1) of cooling were evaluated.

Results
The recovery rate in the CON (100 ± 0.0), 900NC (93.7 ± 2.9) and 1800NC (96.7 ± 2.6) groups was significantly higher than the 900C (68.7 ± 4.6) and 1800C (79.6 ± 3.5) groups. The D1 TM and PM of the 900NC (75.2 ± 3.8 and 71.1 ± 4.1) and 900C (76.2 ± 3.7 and 72.4 ± 4.0) groups were significantly higher than the 1800NC (71.7 ± 4.1 and 67.3 ± 4.4) and 1800C (71.6 ± 4.1 and 67.2 ± 4.4) groups. The D1 PLM of the CON, 900NC, 900C, 1800NC and 1800C groups were not different. The ACR on D1 was significantly lower for the CON (93.0 ± 2.4) group compared to all other groups. Centrifugation of semen with a cushion solution substantially reduced the recovery rate compared to non-
cushioned centrifugation and contradicts all previous publications. We concluded that the optimal recovery rate while preserving sperm integrity was obtained in the 900NC group.

Published Manuscripts/Abstracts
Len JA, Beehan DP, Lyle SK, Eilts BE. Cushioned vs. Non-Cushioned Centrifugation: Sperm Recovery Rate and Integrity. Theriogenology 80(6), 648-653

PROGRESSIVE MOTILITY & PLASMA MEMBRANE INTEGRITY OF EQUINE SPERMATOZOA COOLED FOR 96 HRS

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Introduction
The common storage period for cooled equine semen is 24-48 hours, but storage of up to 80 hours has reportedly resulted in pregnancies.

Objectives
Our objectives were to compare the spermatozoal progressive motility and plasma membrane integrity of extended semen, with or without centrifugation and supernatant removal, and after cooling for 96 hours.

Methods
A single ejaculate from six stallions, on an every other day collection regime, was used for this study. Collected semen was extended to 25 x 106 spermatozoa/ml, divided into three treatments: non-centrifuged (control), centrifuged at 900 x g (900) and 1800 x g (1800) for 10 minutes. After centrifugation, supernatant was removed, and sperm pellets were re-extended to their original volume with fresh extender and placed in a passive cooling device before being transferred to a refrigerator for cool storage. At 0, 48 and 96 hours, progressive motility and plasma membrane integrity were measured using computer-assisted semen analysis and SYBR-14/PI fluorescent probes, respectively.

Results
Progressive motility was higher at 48 hours and 96 hours for both 900 (70.8 ± 3.4% & 48.8 ± 4.2% respectively) and 1800 (65.6 ± 3.8% & 54.5 ± 4.2%, respectively) than the control (41 ± 4.1% and 20.9 ± 2.8%, respectively). Plasma membrane integrity at 48 hours and 96 hours was greater in 900 (73 ± 4% and 76.8 ± 3.6%, respectively) compared to 1800 (72.2 ± 4% and 74.7 ± 3.8%, respectively) and control (69.9 ± 4.2% and 69.8 ± 4.3%, respectively). We conclude that progressive motility and plasma membrane integrity of spermatozoa are better preserved after cool storage for 96 hours, when seminal plasma has been partially removed by centrifugation.
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SPERM PLASMA MEMBRANE INTEGRITY DURING SPERM EXTRA-GONADAL RESERVE DEPLETION IN STALLIONS

Authors/Investigators

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Introduction

Extra-gonadal reserve (EGR) depletion is an important practice in stallion reproduction to ensure optimal semen quality prior to chilling and cryopreservation, but it requires up to seven consecutive days of semen collection to establish. The sperm plasma membrane integrity is an important measure of sperm quality, and it has not been evaluated during equine sperm EGR depletion.

Objectives

The objectives of the study were to estimate sperm output and evaluate the equine plasma membrane during sperm EGR depletion in healthy stallions. We hypothesized that the sperm plasma membrane integrity will improve during sperm EGR depletion.

Methods

Six light breed, sexually-rested stallions were collected daily for seven days to deplete the extra-gonadal sperm reserves. On collection days 1, 3, 5 and 7, a semen sample was obtained for sperm concentration and plasma membrane integrity evaluation. A hemocytometer was used to estimate sperm concentration, and the fluorescent probes SYBR-14/PI were used to evaluate the sperm plasma membrane integrity.

Results

The regression equation predicting sperm output (x) for stallions collected daily during sperm EGR depletion was: log x = 8.95 x 109 – 0.185 x 109 * (day). Intact plasma membrane (mean ± SE) were 60 ± 3%, 71 ± 3%, 71 ± 2% and 69 ± 2% for day 1, day 3, day 5 and day 7, respectively. There was a significant difference between the percentage of intact sperm plasma membranes between day 1 and days 3, 5 and 7, but no significant difference between days 3, 5 and 7. We can conclude that plasma membrane integrity of equine sperm improved from the first collection (day 1) to the third collection (day 3); however, thereafter no improvement of sperm plasma membrane was observed. This indicates that during sperm EGR depletion, the number of sperm cells with intact plasma membrane has maximally improved by day 3 and may have the same quality as sperm cells collected after the sperm EGR depletion.

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How You Can Support the EHSP and Enhance the Health, Well-Being and Performance of Horses

There are many ways individuals, foundations and companies can help support the LSU School of Veterinary Medicine’s Equine Health Studies Program. The EHSP is dedicated to the health, well-being and performance of horses through veterinary research, education and service. In order to fulfill our mission of becoming one of the premier equine biomedical centers in the country, we have initiated a plan to generate funds to enhance all aspects of our program.

Professorships and Chairs

Endowed chairs and professorships provide perpetual support for outstanding faculty members. Donors give at least $1.2 million to establish a chair, and the state provides an $800,000 match, yielding a total endowment of $2 million. A professorship is funded through a $180,000 gift from a donor that the state matches with $120,000, yielding a $300,000 endowment. Each chair or professorship is named by the donor who funds it. A portion of the earnings generated by the endowment fund for a chair is typically spent to supplement the chair holder’s salary, as well as provide additional income for such special purposes as purchasing publications that complement the chair’s work, hiring graduate and post-doctoral students to assist in research projects, and buying research equipment that could not otherwise be made available. An endowed professorship provides resources to recognize a professor for academic achievement and enables him or her to pursue research and/or innovative teaching methods.

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Private gifts can provide funds for leading-edge science specific to the horse. With the limited amount of state and federal funding available for equine scientific investigations, funds from private, charitable gifts are critical to improve successful prevention and treatment of illnesses and injuries that can be performance-limiting, career-ending and even life-threatening.

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Gifts can be made to the General EHSP Support Fund (a non-endowed account). These funds may be used to purchase equipment for equine scientific investigations. Additionally, they are used for continuing education for the horse-owning public and private equine veterinarians. These funds also are used to assist with other educational, promotional and fundraising activities.

Equine Farrier Unit (right)

Gifts can be made to the Pfeiffer-Burt Lameness and Farrier Unit. These funds will be used to supplement current funding to provide equipment for diagnosis and treatment of medical and surgical conditions of the equine hoof.

Memorial Gifts and Naming Opportunities

Your gift may be used to honor or memorialize a beloved horse, family member, or friend. Naming opportunities exist for endowed gifts like scholarships, professorships and chairs. Newly constructed facilities and novel projects offer a wide variety of naming opportunities.
Again, any gift will be very special to the LSU School of Veterinary Medicine’s Equine Health Studies Program and will make a dramatic and immediate impact on our teaching, service and scientific investigation programs. We thank you for your generosity and support. To learn more about how your gift will assist the EHSP with its mission, please visit our website (www.equine.vetmed.lsu.edu) or contact Dr. Frank Andrews via telephone (225-578-9500) or e-mail (fandrews@vetmed.lsu.edu).

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