Equine Health Studies Program

2008-2010 Equine Research Report

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

The Louisiana State University School of Veterinary Medicine is pleased to once again present the Equine Health Studies Program’s Equine Research Report, which covers scientific activities of the program from 2008 through 2010. Central to the program’s mission is the health, well-being and performance of horses supported through state-of-the-art research that benefits the horse-owning public in Louisiana and beyond. As a former equine surgeon and faculty member, I have watched the EHSP grow and flourish, as evidenced by contents of this Research Report, translating research into practical solutions for our broad-base constituents and clients. In addition to its research prowess, the program’s dedicated faculty and staff provide clinical service, education, and community outreach.

The EHSP has made significant advances in research collaborations with industry to extend its work in the areas of laminitis prevention; lameness, orthopedics and biomechanics; reproductive disorders; respiratory and gastrointestinal diseases including the treatment and prevention of gastric ulcer disease; equine Cushings disease; and surgery that will impact equine veterinary care for years to come.

The EHSP continues to build and maintain strong relationships and community engagement with the stakeholders of Louisiana so that it can be responsive to the needs of horses in the region. In the aftermath of Hurricanes Gustav and Ike and the Gulf Oil Spill, the SVM was able to step in and help with the rescue and care of animals and wildlife in south Louisiana. The EHSP, in concert with the SVM and the Louisiana State Animal Rescue Team, has been on the forefront of emergency preparedness, and continues to be a model for other veterinary institutions. Additionally, the EHSP continues to provide strong leadership within the State and has been actively involved with referring veterinarians, the Louisiana Racing Commission, the Louisiana Horse Council, the Louisiana Thoroughbred Breeders Association, and many other organizations to provide the horsemen with the latest information and quality service.

Through the dedicated efforts of its faculty and staff, and the continued facility and equipment enhancements in support of its activities, this multidisciplinary program is a real “Point of Pride,” reflects a very positive trajectory, and continues to bring national and international recognition to the School.

Sincerely,

Peter F. Haynes, DVM, DACVS
Dean
The Louisiana State University 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 teaching students and extending service to the public. It is important for our faculty to continue building through extra-mural support and we have been very fortunate to have a number of sources that include federal (NIH, USDA), state (Equine health appropriation) and private/industry (Grayson, Elanco, Boehringer Ingelheim Vetmedica, Zinpro Corporation, Centaur Corporation, Seabuck Equine, LLC, 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 as one of the top priorities of the School.

Sincerely,

James E. Miller, DVM, MPVM, PhD
Interim Associate Dean for Research & Advanced Studies
Professor of Epidemiology & Community Health
LETTER FROM OUR DIRECTOR

It's my pleasure to introduce the 2008-10 Equine Research Report from the Equine Health Studies Program (EHSP), Louisiana State University (LSU) School of Veterinary Medicine (SVM)! As director, I am honored to present this research report documenting the productive faculty here at LSU.

The EHSP team continues to work toward the missions of clinical service, teaching, and research. As you can see in the contents of this report, faculty and staff continue to provide high quality biomedical research to address the health needs of the horse industry in Louisiana, the U.S., and the world. I congratulate each and everyone in the program for their continued commitment and devotion to excellence of the EHSP!

As you read this report, the EHSP biomedical research team at the LSU SVM 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 areas of Emergency Response, Gastrointestinal Disease, Laminitis, Musculoskeletal Injury and Lameness, Orthopedics, Reproduction, Respiratory Physiology and Disease, and Colic Surgery. Each study in this report highlights benefits to the horse industry in Louisiana and surrounding regions. Many of these research findings were presented at national and international meetings, including the American Association of Equine Practitioners, American College of Veterinary Surgery, American College of Veterinary Internal Medicine, British Equine Veterinary Association, World Congress on Disaster and Emergency Medicine, Veterinary Orthopedic Society, The Laminitis Society, Applied Equine Nutrition and Training Conference, South African Equine Veterinary Association, Association Argentina de Veterinaria Equina, and the American Society of Animal Science. As you can see, researchers in the EHSP are sought after speakers at many major conferences throughout 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, Merck-Merial Veterinary Student Summer Research Program, Boehringer-Ingelheim Vetmedica, Pennington Biomedical Research Foundation, Applied Biosystems, Howard Hughes Medical Institute, National Wetlands Research Center, and National Institutes of Health, among others.

Furthermore, we owe our deepest gratitude to the horses that participated in these investigational 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 (IACUC) within the 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 identity was 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 to the benefit of the people and horses of Louisiana. 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 world.

Sincerely,
Frank M. Andrews, DVM, MS, DACVIM
Professor and Director
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, Professor and Director Equine Health Studies Program, Veterinary Clinical Sciences

Dr. Andrews received his DVM and MS in Veterinary Medicine from Washington State University in 1983. He completed 1 year in private practice at Associated Veterinary Clinics, Inc. in Walla Walla, Washington and completed an internal medicine residency in 1988 at The Ohio State University, College of Veterinary Medicine. Dr. Andrews became board certified in Large Animal Internal Medicine in 1989 and was on the faculty at the University of Tennessee, College of Veterinary Medicine from 1988-2008. Dr. Andrews is currently the LVMA Equine Committee Professor and Director of the Equine Health Studies Program. Dr. Andrews’ 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).

Steven A. Barker, Professor and Director Equine Medication Surveillance Laboratory, Comparative Biomedical Sciences

Dr. Barker is a professor of veterinary physiology, pharmacology and toxicology at the LSU School of Veterinary Medicine in the Department of Comparative Biomedical Sciences. He received his BS in 1971, his MS in 1973, and his PhD in 1978, all from the University of Alabama in Birmingham. Dr. Barker is also the director of the Analytical Systems Laboratory and the director of the Equine Medication Surveillance Laboratory. He has served as the State Chemist to the Louisiana State Racing Commission since 1987.

Ralph E. Beadle, Professor Emeritus, Equine Medicine, Veterinary Clinical Sciences

Dr. Beadle was born and raised in Montana. He completed his pre-veterinary and veterinary education at Colorado State University, where he was awarded a DVM in 1967. He spent the next five years at the University of Georgia, where he worked in the Equine Clinic and obtained a PhD in Veterinary Physiology. After a period of two years spent at Michigan State University, he has been at LSU for the rest of his professional career. During the first seven years at LSU, he was in the Department of Veterinary Physiology, Pharmacology and Toxicology, where he taught both physiology and pharmacology. From that time until September 1999, he was in the Department of Veterinary Clinical Sciences, where he worked in the Medicine Section of the Equine Clinic. He retired in September 1999, but since that time has continued to be involved in the activities of the Department of Veterinary Clinical Sciences as a professor emeritus. His research interests involve non-sweating horses, horses with recurrent obstructive airway disease, and horses affected with acute and chronic laminitis.

Hermann H. Bragulla, Assistant Professor, Comparative Biomedical Sciences

Dr. Bragulla received his DVM (1984) and PhD (1986) in Veterinary Medicine from the Ludwig-Maximilians-University in Munich/Germany. He became a certified specialist for veterinary anatomy (1991) and received his habilitation (1996) from the Free University Berlin in Berlin/Germany. Dr. Bragulla was on the faculty of the Department of Veterinary Anatomy, School of Veterinary Medicine, Free University Berlin, from 1988 – 2004. He started as an instructor (1988 – 1996) and was promoted to assistant professor (1996 – 2004). Dr. Bragulla’s research focuses on the comparative and developmental morphology of digital end organs such as the equine hoof concerning the age-related normal structure versus disease-related changes in the structure of keratinized tissues and changes in the papillary body and blood supply of connective tissues of digital end organs.

Daniel J. Burba, Professor Equine Surgery, Veterinary Clinical Sciences

Daniel J Burba was born in west central Pennsylvania. He completed an undergraduate study in Biology at Morehead State University, Morehead, KY and attended the College of Veterinary Medicine at Auburn University. 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
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, Gamma Sigma Delta Agriculture Honor Society, Veterinary Wound Management Society, American Association of Equine Practitioners, American Veterinary Medical Association, and American Association of Veterinary Clinicians. Dr. Burba's main interest is in orthopedics and laser cribbing surgeries.

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

Dr. Carter received her DVM in Veterinary Medicine from Louisiana State University in 2000 and completed a rotating internship in small animal medicine and surgery at LSU 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 in Veterinary Clinical Sciences (VCS). Dr. Carter became board certified in Veterinary Ophthalmology 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, Assistant Professor 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 for both private and government companies. She received her DVM from the LSU School of Veterinary Medicine in 2001. After working in private practice for one year, she began her combination Equine Internal Medicine Residency/Graduate Program at LSU in 2002. Dr. Chapman completed her residency in 2005 and became a Diplomate of the American College of Veterinary Internal Medicine (Large Animal). She received a Masters of Science in Veterinary Clinical Sciences in December 2006. She performs Mobile Equine Medicine Consultation throughout the state of Louisiana and Equine Ambulatory Medicine to the local Baton Rouge community.

**Shafiqul I. Chowdhury, Professor Molecular Virology, Pathobiological Sciences**

Dr. Shafiqul Chowdhury received his DVM (1978) and MS (1980) in Veterinary Medicine from Bangladesh Agricultural in University in 1978. He received his PhD in 1987 from Free University of Berlin, Germany. Dr. Chowdhury became Full Professor in the College of Veterinary Medicine, Kansas State University in 2002. He joined LSU School of veterinary medicine in 2008. Dr. Chowdhury's research focuses on molecular pathogenesis of equine herpes type 1 (EHV-1) neuropathogenesis and development of an efficacious vaccine against EHV-1. His EHV-1 research is funded by a corporate grant.

**Anderson daCunha, Assistant Professor Anesthesiology, Veterinary Clinical Sciences**

Dr. da Cunha is an assistant professor of veterinary anesthesiology in the Department of Veterinary Clinical Sciences. He is also service chief of Anesthesia Services in the Veterinary Teaching Hospital & Clinics. Dr. da Cunha received his DVM from Federal University of Parana in 2000, his MS from Federal University of Santa Maria in 2002 and after his residency at North Caroline State University (2006) he became a diplomate of the American College of Veterinary anesthesiologists in 2009.

**Fabio Del Piero, Professor of Pathology, Pathobiological Sciences**

Dr. Del Piero started his career in pathology in the late eighties and worked at University of Milano, Animal Health Trust UK, Cornell University, and University of Pennsylvania. He joined LSU in 2012 and he is currently Professor of Pathology in the Department of Pathobiological Sciences. Dr. Del Piero investigations focus on comparative pathology with emphasis on equine pathology, and infectious diseases.
Susan C. Eades, Professor Equine Medicine, Veterinary Clinical Sciences

Dr. Eades graduated from the LSU School of Veterinary Medicine in 1982, 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 Theriogenology, Veterinary Clinical Sciences

Dr. Eilts is originally from the Minneapolis/St. Paul area in Minnesota. He graduated from high school in West St. Paul, Minn., and then attended the University of Minnesota as a pre-veterinary medicine student. He 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 LSU as an assistant professor in 1984. He became board certified in the American College of Theriogenologists in 1986. His main clinical interest and research is basic reproduction management in the horse.

Joseph Francis, Associate Professor, Comparative Biological Sciences

Dr. Francis is an associate professor in the Department of Comparative Biomedical Sciences. He received his BVSc and his MVSc in 1990 and 1994, respectively, both from Madras Veterinary College (India). In 1999, Dr. Francis received his PhD from Kansas State University. His research focuses on the brain mechanisms regulating cardiovascular function, specifically the understanding of the central nervous system interactions of the cytokine renin-angiotensin-aldosterone system in heart failure.

Lorrie Gaschen, Associate Professor Radiology, 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 in the Netherlands in 2001. She is a Diplomate of Diagnostic Imaging and a European Specialist in Veterinary Diagnostic Imaging. Dr. Gaschen is a Professor and service chief of Diagnostic Imaging in the LSU School of Veterinary Medicine’s Veterinary Teaching Hospital & Clinics. She joined the faculty at LSU in January 2006. Dr. Gaschen’s research interests are in vascular imaging and ultrasound of the gastrointestinal tract and pancreas and MRI.

Marjorie S. Gill, Professor Farm Animal Services, Veterinary Clinical Medicine

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 July 1984. Dr. Gill’s clinical interests are in farm animal medicine, small ruminant medicine and surgery, animal behavior, and urogenital, gastrointestinal and ophthalmological surgery.

Jeff Gimble, Professor, Pennington Biomedical Research Center

Dr. Gimble is a professor at the Pennington Biomedical Research Center and an adjunct professor in the Department of Veterinary Clinical Sciences. He received his BA from Dartmouth College in 1976. He received his MA, PhD, and MD from Yale University in 1980, 1981, and 1982, respectively. Dr. Gimble collaborates on numerous adult stem cell projects within the EHSP.
Samithamby Jeyaseelan, Associate Professor and Director of Lung Biology Laboratory, Pathobiological Sciences

Dr. Jeyaseelan received his DVM degree in Veterinary Medicine from the University of Peradeniya, Sri Lanka in 1992. He completed his PhD degree in Pulmonary Immunology at the College of Veterinary Medicine, University of Minnesota in 2001. He completed his first postdoctoral training at Yale University in Pulmonary Immunology from 2001-2003 and second postdoctoral training at National Jewish Health/Colorado Health Sciences Center in Lung Biology from 2003-2004. Dr. Jeyaseelan was on the faculty at National Jewish Health/Colorado Health Sciences Center from 2004-2007. Dr. Jeyaseelan is currently an Associate Professor of Immunology in Pathobiological Sciences and Director of the Lung Biology Laboratory. Dr. Jeyaseelan’s 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 editorial boards of Clinical and Vaccine Immunology and Infection and Immunity. Dr. Jeyaseelan’s research program is funded by the National Institutes of Health and Flight Attendant Medical Research Institute.

Jill R. Johnson, Professor Emeritus Equine Medicine, Veterinary Clinical Sciences

Dr. Johnson is a native of South Dakota. She graduated from veterinary school at the University of Minnesota, then stayed on and completed her MS degree in Veterinary Surgery and Radiology. She joined the faculty of the LSU School of Veterinary Medicine in 1977. She is a specialist in internal medicine (Diplomate, American College of Veterinary Internal Medicine) and equine practice (Diplomate, American Board of Veterinary Practitioners). 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. Current research involves the spatial-temporal study of hospital-acquired infections in the large animal hospital.

Michael T. Kearney, Biostatistician and Instructor, Pathobiological Sciences

Michael received his MS and MApStat degrees from LSU in 1980 and 1981, respectively. He manages statistical consulting for the School of Veterinary Medicine with primary emphasis on linear models, repeated measures analyses, and nonparametric statistics. He teaches graduate courses in Biostatistics and using SAS to analyze research data. He also offers a professional curriculum elective for veterinary statistics.

Konstantin G. Kousoulas, Professor and Director BIOMMED, Pathobiological Sciences

Dr. Kousoulas is a professor of veterinary virology in the department of Pathobiological Sciences at the School of Veterinary Medicine. He is also a professor of veterinary science in the LSU Agricultural Experiment Station, an adjunct professor of biological sciences in the College of Basic Sciences and an adjunct professor in the Department of Microbiology and Immunology at the LSU Health Sciences Center in New Orleans. Dr. Kousoulas is the director of the LSU School of Veterinary Medicine’s Division of Biotechnology & Molecular Medicine. He received his BS in 1975 from Fairleigh Dickinson. In 1977, he received his MS and in 1981, he received his PhD, both from Pennsylvania State University. Dr. Kousoulas’ research interests are in molecular biology and pathogenesis of herpes and corona viruses; experimental approaches in his laboratory involve advanced molecular biology, molecular genetics and cell biology to study viral attachment, viral penetration into cells, cellular receptors and virus spread. Other interests include the development of vaccines to combat animal and human viral infections, the application of viral vectors for gene therapy, and the utilization of computers for biological research and teaching.
Jose A. Len, Theriogenology Instructor, Veterinary Clinical Sciences

Dr. Len received his DVM in veterinary medicine 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, Rep. of Panama until 1999. From 1999 to 2005, Dr. Len was the veterinarian and manager of Haras Cerro Punta, a thoroughbred breeding farm in the Republic of Panama. Dr. Len completed a theriogenology residency in 2008 at Louisiana State University, School of Veterinary Medicine and became board certified in Theriogenology in 2009. Currently he is an instructor in Theriogenology and PhD candidate at Louisiana State University, School of Veterinary medicine. Dr. Len's research is focused in the improvement of processes for semen chilling and freezing and efficient use of spermatozoa for intracytoplasmic sperm injection (ICSI) in the horse.

Mandi J. Lopez, Associate Professor and Director, Laboratory for Equine and Comparative Orthopedic Research, Veterinary Clinical Sciences

Dr. Lopez is from the Pacific Northwest. She received her bachelor’s degree from Humboldt State University in Arcata, California and attended veterinary school at 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 board certified by the American College of Veterinary Surgeons. Dr. Lopez has several patents for biomedical devices and has expertise in both applied and basic research. She came to LSU in January 2004 and directs the Laboratory of Equine and Comparative Orthopedic Research (LECOR).

Sara K. Lyle, Assistant Professor Theriogenology, Veterinary Clinical Sciences

Dr. Lyle was born and raised in Gainesville, Fla. She obtained her BS in Chemistry at Duke University and her DVM from the University of Florida. She completed a residency in theriogenology in 1990 and her MS in reproduction in 1991 at the University of Florida. She is board certified by the American College of Theriogenologists. She joined LSU in 2002 and completed a PhD in 2008, and is currently an Assistant Professor. 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, Assistant Professor Equine Surgery, Veterinary Clinical Sciences

Dr. McCauley joined the equine faculty in the Department of Veterinary Clinical Sciences in February 2006. Prior to joining the faculty at LSU, Dr. McCauley was employed in a busy private referral practice in northeast Texas. He completed his BS in Microbiology and his DVM at Texas A&M University. He successfully 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 double boarded by the American Board of Veterinary Practitioners (Food Animal Practice) and the American College of Veterinary Surgeons (Large Animal Surgery).

Rebecca S. McConnico, Associate Professor Equine Medicine, Veterinary Clinical Sciences

Dr. McConnico is originally from north central Ohio, where she lived for 18 years. She obtained her BS in Animal Science from the University of Arkansas, her DVM from Louisiana State University, and her PhD and clinical residency in large animal internal medicine from North Carolina State University. She is board certified in Large Animal Internal Medicine and her 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 (eg., 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-School of Veterinary Medicine’s
Disaster program, a training and response program based on community involvement which hinges on growing partnerships with other LSU units, non-government groups, and state and federal government entities.

**Mustajab Mirza, Assistant Professor Equine Surgery and Emergency Service, Veterinary Clinical Sciences**

Dr. Mirza received his DVM from the College of Veterinary Sciences Lahore affiliated with the University of Agriculture, Faisalabad, Pakistan in 1992. He received his MS degree from LSU 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 services for the LSU Equine Clinic. 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, Associate Professor Equine Surgery, Veterinary Clinical Sciences**

Dr. Mitchell, originally from Perth, Scotland, 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 June 2004. He then remained on the hospital staff at the University of Minnesota, where he worked as the equine emergency clinician/surgeon until July 2005, when he joined the LSU School of Veterinary Medicine. He is board certified by the American College of Veterinary Surgeons. His clinical interests include orthopedic, laparoscopic and respiratory surgery. His research interests include orthopedic implants and laminitis.

**Dale L. Paccamonti, Professor and Head, Veterinary Clinical Sciences**

Dr. Paccamonti, originally from Kankakee, Ill., completed his undergraduate and veterinary education at Michigan State University, receiving his DVM 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 School of Veterinary Medicine in 1988, where he is currently head of the Department of Veterinary Clinical Sciences and a full 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 Veterinary Teaching Hospital & Clinics.

**Daniel B. Paulsen, Professor and Director LADDL, Pathobiological Sciences**

Dr. Paulsen received his BS in 1975, his DVM in 1977, and his MS in 1978, all from Kansas State University. In 1989, he received his PhD from Oklahoma State University. Dr. Paulsen’s major research interests are bovine respiratory disease with emphasis on Mannheimia haemolytica, Pasteurella multocida, Infectious bovine rhinotracheitis, bovine virus diarrhea, 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.

**Kenneth Pierce, Assistant Professor Ophthalmology, Veterinary Clinical Sciences**

Dr. Pierce, a native New Orleanian, received his Bachelor of Science from Tuskegee University in 2001 and his Doctorate of Veterinary Medicine from Louisiana State University School of Veterinary Medicine in 2005. In 2006 Dr. Pierce 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 Masters degree in 2011. Dr. Pierce became a Diplomate of the American College of Veterinary Ophthalmologists in August 2011.

Cherie Pucheu-Haston, Assistant Professor Dermatology, Veterinary Clinical Sciences

Dr. Cherie Pucheu-Haston received her DVM from Louisiana State University in 1992, 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 in 1993-1995, and achieved board certification in Veterinary Dermatology in 1995. 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 (minor Biotechnology) from NCSU in 2006. She completed three years as a postdoctoral research associate in the Immunotoxicology Branch of the United States Environmental Protection Agency, as a grantees from the University of North Carolina-Chapel Hill Curriculum in Toxicology. Dr. Pucheu-Haston returned to LSU in 2011 as an Assistant Professor in Veterinary Dermatology. 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.

Nathalie Rademacher, Dr.med.vet., Assistant Professor Radiology

Dr. Rademacher received her DVM from the Justus-Liebig-University in Giessen, Germany in 2000 and her Dr.med.vet. from the Vetsuisse Faculty in Bern, Switzerland. After completion of 1 year small animal internship in private referral center in Switzerland, she completed a diagnostic imaging residency in 2006 at the Vetsuisse Faculty, Zurich, Switzerland. Dr. Rademacher became board-certified in Diagnostic Imaging with the European College of Veterinary Diagnostic Imaging (ECVDI) in 2007 and with the American College of Veterinary Radiology (ACVR) in 2010. Since 2007, she is employed as an Assistant Professor in Radiology, tenure track at LSU. 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 M. Riggs, Assistant Professor Equine Surgery, Veterinary Clinical Sciences

Dr. Riggs is originally from Memphis, Tennessee and received a B.S. in biology from Saint Louis University. She received her DVM from the University of Tennessee College of Veterinary Medicine in 2001. She completed a 1 year 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 board certified by the American College of Veterinary Surgeons. Dr. Riggs’ research focuses on lameness, laminitis and fracture repair biomechanics.

Gary A. Sod, Assistant Professor Farm Animal Services, Veterinary Clinical Sciences

Dr. Sod received his MA in Mathematics and PhD in Applied Mathematics from the University of California at Berkeley. The next 12 years were spent doing research in mathematical and computational physics, resulting in the writing of a monograph on numerical methods in fluid dynamics and 42 journal publications. Dr. Sod served as a professor in the Department of Mathematics and an adjunct professor in the Department of Mechanical Engineering and at Tulane University from 1985 through 1997. Dr. Sod then attended the LSU School of Veterinary Medicine and obtained his DVM in 2001. He has since completed an equine internship and food animal medicine and surgery residency at LSU and a large animal surgery residency in conjunction with the Sawtooth Equine Service in Idaho and LSU. He is presently an assistant professor with the Farm Animal Medicine and Surgery service. Dr. Sod received the American College of Veterinary Surgeons Research Publication Award in 2004 and 2006, the Mark S. Bloomberg Memorial Resident Research Award from the Veterinary Orthopedic Society in 2004 and 2005, and the LSU Rainmaker Research Award in 2009. His research interests include orthopedic surgery, biomechanics and the design of orthopedic implants specific to the equine patient. He has designed 5 orthopedic plates, 1 interlocking intramedullary pin and 2 screws for use in long bone fractures and joint arthrodesis in the equine patient. One screw design has been adopted by Acumed for human fracture patients.
This work has resulted in the writing of a book on the biomechanics of fractures and fracture repair. He has tested and designed orthopedic implants for numerous companies, including, Acumed, BioMedtrix, IMEX, Innovative Animal Products, Securos, and Synthes. Synthes, Inc. has awarded Dr. Sod a 3 year grant for the design of equine specific orthopedic implants.

**Eric Storey, Assistant Professor Ophthalmology, Veterinary Clinical Sciences**

Dr. Storey is an assistant professor of ophthalmology in the Department of Veterinary Clinical Sciences and a veterinary ophthalmologist in the Veterinary Teaching Hospital and Clinics. He received his BS and DVM from Auburn University in 1996 and 1999, respectively. Dr. Storey received his MVSc from University of Saskatchewan (Canada) in 2003. He completed his ophthalmology internship in 2000 at the University of Illinois, and he completed his residency in 2003 at the University of Saskatchewan. He 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, Professor, Veterinary Clinical Sciences**

Dr. Venugopal is a veterinarian who graduated from Kerala Veterinary College and Research Institute of Kerala University, India. After practicing as a veterinarian in the Kamadhenu Dairy Farm for five years, he pursued advanced studies and received a Master of Science degree in neuropharmacology from Calicut University, India. Later he moved to the US for higher studies and received another 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, MA. Then he worked as a postdoctoral fellow at Harvard Medical School and, in 1981, joined the faculty at LSU School of Veterinary Medicine. 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 is a recipient of Faculty Distinguished Scholar Award (2003) from LSU SVM and 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 NIH, USDA and Grayson Jockey Research Foundation and grants from NIEHS and LA Board of Regents as co-PI. In the area of teaching, Dr. Venugopal received honor roll in merit teaching 1994 to 1999 and the best teacher award (2008) by the class of 2011.
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**MCCONNICO**


**MITCHELL**


**PACCAMONTI**


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**VENUGOPAL**


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**CHAPMAN**


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Dr. Gary Sod:
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Dr. C.S. Venugopal:


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. Since the last research report (2006-2007) we have upgraded and added some key facilities and equipment. These include the naming of the EHSP physiology and pharmacology laboratory as the Charles V. Cusimano Equine Physiology & Pharmacology Laboratory, updating of the Equine Performance Evaluation Laboratory and Lameness Pavilion, the Equine Cell & 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 School of Veterinary Medicine support the research activities of the EHSP. The information highlights the updates and facilities since the last research report.

**Charles V. Cusimano Equine Physiology & 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 Pavilion
Force Plate Analysis in the Pfeiffer-Burt Lameness 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. We recently added a dynamic endoscope that 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.

High-speed treadmill with Coda Motion analysis system attached
Dynamic Endoscope

Laboratory for Equine and Comparative Orthopedic Research

The Laboratory for Equine and Comparative Orthopedic Research was established and designed to facilitate a strong association between clinical and basic orthopedic research for advancement of orthopedic knowledge across species and disciplines. The Laboratory for Equine and Comparative Orthopedic Research 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 hybrid linker 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.

**EHSP Clinical Facilities and Equipment**

The Veterinary Teaching Hospital is staffed 24/7 with board certified and internationally recognized veterinary specialists (internal medicine, surgery, anesthesiology, and radiology) and highly-skilled veterinary technicians that provide clinical service to the horse-owning public. Since the last research report, the LSU Veterinary Teaching Hospital has added a new modern state-of-the-art MRI unit that 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.

**MRI Unit**

The clinical facility has 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®). We have 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 basic, cutting-edge 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 Division of Biotechnology and Molecular Medicine (BIOMMED) within the LSU School of Veterinary Medicine 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.
Disaster Preparedness

LSU Veterinary School associate professor speaks at World Congress on Disaster and Emergency Medicine

The 17th World Congress on Disaster and Emergency Medicine (WCDEM) closed on June 3. Held in Beijing, China, the Congress hosted more than 1,600 participants from 57 countries.

The 17th WCDEM was held in conjunction with the 14th Annual Meeting of the Chinese Society for Emergency Medicine. With the scale and frequency of disasters increasing, the 17th WCDEM was more relevant than ever. This year alone marks one of the worst in terms of disasters—the earthquake, tsunami, and nuclear reactor issues in Japan; floods in Australia; earthquakes in New Zealand; and floods and tornados in the United States. Research, experiences, and lessons learned from these recent events, and many others, were presented by delegates at the 17th WCDEM.

LSU School of Veterinary Medicine’s expanding disaster training program was highlighted with two presentations by Rebecca S. McConnico, DVM, PhD, DACVIM (LSU SVM 1987), associate professor of veterinary medicine in the Department of Veterinary Clinical Sciences. Dr. McConnico’s presentations were added as part of a special veterinary component of this international meeting due in part to expanding global concerns about societal responsibilities for including animals in local, regional, and federal disaster planning. Dr. McConnico’s presentation topics were biosecurity considerations for equine emergency sheltering and experiential learning in disaster response for veterinary students and veterinarians.

TOP: Dr. Rebecca McConnico, associate professor of veterinary medicine at LSU’s School of Veterinary Medicine, and Dr. Dick Green, international director of emergency response, International Fund for Animal Welfare, in front of the conference banner in Beijing, China.

BOTTOM: Attending the World Congress on Disaster and Emergency Medicine are (from left) Dr. John Madigan, Medicine, professor of equine medicine, University of California Davis, School of Veterinary; Dr. Heather Case, director of the American Veterinary Medical Association’s Scientific Activities Division and the Louisiana State Animal Response Team coordinator of emergency preparedness and response; Dr. Rebecca McConnico, associate professor of veterinary medicine at LSU’s School of Veterinary Medicine; and Dr. Diane McClure, associate professor, Western University of Health Sciences.
LSU Veterinary School dedicates laboratory in honor of Charles V. Cusimano

The LSU School of Veterinary Medicine recently dedicated the Equine Physiology and Pharmacology Laboratory in honor of Charles V. Cusimano. “Our purpose in recognizing Mr. Cusimano is to say, ‘Thank you’ for his enduring support and valuable efforts to the school and the Equine Health Studies Program,” said Frank Andrews, DVM, PhD, director of the EHSP.

Mr. Cusimano’s family and friends, as well as many LSU faculty and staff, gathered at the LSU SVM on March 3 for the dedication ceremony. Dean Peter F. Haynes served as master of ceremonies. “Today is all about Charles V. Cusimano, his passion and support for LSU and the School of Veterinary Medicine, and his central and pivotal role in establishing our Equine Health Studies Program,” said Dean Haynes.

Representing the LSU System was President John Lombardi, and representing the LSU Baton Rouge campus was Chancellor Mike Martin, who said, “Great universities are known by the company they keep, and it’s great to keep the kind of company that the Cusimanos bring to this campus. It sends a message to those folks out there that this is a first-rate place because we deal with first-rate people.”

Dr. Mike Strain (LSU SVM 1983), Louisiana Commissioner of Agriculture & Forestry, told the crowd about working with Mr. Cusimano to secure dedicated funds for the EHSP from slot machine proceeds from Louisiana’s racetracks. “It took seven years to make this work,” said Dr. Strain. “One year we got the bill going, but it was bogging down. In 2003, Charlie comes to me and says, ‘We’re going to see Mike [Foster].’ We went to see the governor and got his support, but the bill kept getting referred to different committees. On the last day, at the last hour, we got the bill through and began a research program that has paid huge, huge dividends.”

Charles Vincent Cusimano, a native of New Orleans, Louisiana, graduated from Louisiana State University with a BS in petroleum oil and gas engineering. He has been a dedicated supporter of LSU and the School of Veterinary Medicine, particularly the Equine Health Studies Program. His contributions have been instrumental in the success of the program and have helped to transform it into a world-renowned research institution.

Photo: From left, Dean Peter F. Haynes and Commissioner of Agriculture & Forestry Mike Strain (LSU SVM 1983) congratulate Charles Cusimano during the dedication of the Equine Physiology and Pharmacology Laboratory. Mr. Cusimano was joined on stage by his wife, Violet Cusimano.
Cusimano attended LSU on a football scholarship, lettered for four years, and played in the Cotton Bowl in 1946 and the Sugar Bowl in 1950. Cusimano also studied law at Loyola University in New Orleans and did postgraduate work in geology at the University of Oklahoma.

Cusimano is a former member of the Louisiana State University Board of Supervisors who began his service in 1974 and served as chairman in 1995-1996. He was admitted to the LSU Law Hall of Fame in 1987 and the Engineering Hall of Distinction in 1999. In addition, he helped establish religious centers on all of LSU’s campuses.
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 campaign to generate funds to enhance all aspects of our program.

Our endowment is comparatively small, so each gift is extremely special to us and will make an important and immediate impact on our programs. Our fundraising efforts have been principally through private, charitable, tax-deductible gifts, as well as some other special events and activities. All gifts are tax-deductible and can be pledged with a portion given annually over a period of a few years. We hope that you will consider assisting us with our fundraising efforts for facility enhancements, endowed/distinguished professorships and chairs, and/or scientific advances.

An endowed gift is a permanent gift. The principal is invested and returns annual interest. Part of the annual interest is reinvested to increase the principal, and part is used for the intended purpose (such as a professorship/chair or research). Endowed funds are usually named for the benefactor or for a designated honoree.

Professorships and Chairs
The state of Louisiana has a matching program for Endowed Professorships and Endowed Chairs. The School currently has only one Endowed Chairs and three Endowed Professorships, none of which are in the area of equine health and performance. Endowed positions are vital to our instructional and investigational programs. The individuals in these positions will serve as leaders of teams of equine clinicians and investigators that conduct cutting-edge scientific investigations.

Equine Biomedical Research
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.

General EHSP Support Fund
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
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.

Equine Reproduction
Gifts can be made to the EHSP Equine Reproductive Center. These funds will be used to construct a state-of-the-art equine reproductive center that will provide diagnosis and treatment of horses with medical or surgical problems that lead to infertility or decreased conception rates.
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, including the Equine Intensive Care Unit and the Equine Reproduction Unit.

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 Ky Mortensen via telephone (225-578-9590) or e-mail (kmortensen@vetmed.lsu.edu).

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BIOMECHANICAL ALGORITHM TO QUANTIFY FORCES FROM EQUINE MOTION AT THE SADDLE POSITION

Authors/Investigators
Laxmi R Nandana Kaidapuram, BTech,MS; Mandi J Lopez, DVM, MS; Lin Xie, BS

Description of the Problem
There is no scientific method or algorithm in literature to determine the most appropriate horse for each individual based on functional parameters of the horse and the rider in therapeutic riding.

Study Purpose/Objectives
Therapeutic horseback riding is a common component of many physical therapy programs. Forces transferred to the rider vary with horse size, breed and gait. Interaction between a horse and rider is a complex problem of coupled dynamic body interactions. The potential forces transferred to the rider may be predicted by quantification of the forces on to a static weight from the horse back at the level of the saddle. To accomplish this task, an algorithm to quantify forces at the saddle level from ground reaction forces was developed using a combination of direct and indirect dynamic analysis to test the hypothesis that the forces transferred to a static weight at the saddle level on can be predicted by the breed and weight of the horse.

Approach
Seven adult horses were used for data collection: 3 Thoroughbreds, 3 Quarter Horses and 1 Paso Fino (4 geldings and 3 mares), 5-14 years; 387-580 kg. Simultaneous, real time kinetic, kinematic and back force data on a static weight was collected at a walk using an integrated system consisting of a force platform, active motion detection system, and wireless force transducers, respectively. Infrared light emitting markers were glued to the skin at 22 specific anatomical landmarks. A customized surcingle fixture to hold a 12kg weight on top of wireless force transducers were used for data collection at the saddle level. Kinematic data and ground reaction forces (GRF) were collected. Forces at the saddle level were measured with a wireless load force system which was synchronized with the force platform and motion capture system using a double mouse. Data was collected from a minimum of four trials from all horses at a walk (1.3-2.0 m/s). Inverse dynamic analysis was used to calculate the fore and hind limb joint forces to the level of the shoulder and hip. Virtual segments were created from the shoulder to the spine, and the segments were modeled as series of springs and dampers. The energy absorption coefficients were derived through a series of iterations to align the inverse dynamic solutions of the fore- and hind limb data with the forces measured at the back.

Results/Conclusions
Forces at the saddle level on to a 12 kg. weight are shown in Figure 1 for three breeds of horses. For all the horses, the first peak value occurs within the first 25-50% of the stride cycle. Though the overall pattern of the force is same for all the horses, there is significant variation in peak and valley values from breed to breed and horse to horse. Peak-to-peak force on the 12 kg. weight is proportionated to 60 kg., which is equivalent to an average rider weight. Paso Finos produce forces at the saddle level that are 115% more than Thoroughbreds and 45% more than Quarter Horses. Forces at the saddle level are based on breed of the horse, and it doesn’t show any significant variation with weight of the horse. In contrast, ground reaction forces depend on the weight of the horse irrespective of the breed.
Forces at the saddle level on a 12 kg. weight at the rider level of Thoroughbreds, Quarter Horses, and Paso Fino.

**Acknowledgements**

This study was supported by the EHSP.

**Year Completed**

2011

**Published Manuscripts/Abstracts**

Laxmi R Nandana Kaidapuram,BTech,MS; Mandi J Lopez,DVM,MS; Lin Xie, BS, Biomechanical algorithm to quantify forces from equine motion at the saddle position. A poster was presented at the 2011 meeting of the American College of Veterinary Surgeons.
AN IN VITRO BIOMECHANICAL COMPARISON BETWEEN DYNAMIC COMPRESSION PLATES HAVING A ROUGHENED CONTACT SURFACE AND DYNAMIC COMPRESSION PLATES HAVING A POLISHED CONTACT SURFACE FOR THE FIXATION OF OSTEOTOMIZED EQUINE THIRD METACARPAL BONES

Authors/Investigators:
Gary A. Sod, DVM, PhD, Laura M. Riggs, DVM, PhD, Diplomate ACVS, Colin F Mitchell, BVMS, MS, Diplomate, ACVS, George S. Martin, DVM, MS, MBA, Diplomate, ACVS, Marjorie S. Gill, DVM, MS, Diplomate, ABVP

Year Completed:
2010

Published Manuscripts/Abstracts:


A MECHANICAL COMPARISON OF EQUINE PROXIMAL INTERPHALANGEAL JOINT ARTHRODESIS TECHNIQUES: AN AXIAL LOCKING COMPRESSION PLATE AND TWO ABAXIAL TRANSARTICULAR CORTICAL SCREWS VERSUS AN AXIAL DYNAMIC COMPRESSION PLATE AND TWO ABAXIAL TRANSARTICULAR CORTICAL SCREWS

Authors/Investigators:
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Year Completed:
2010
Published Manuscripts/Abstracts:


AN IN VITRO CYCLIC FATIGUE COMPARISON OF A MODIFIED 5.5 MM LOCKING COMPRESSION PLATE FIXATION WITH A 5.5 MM LOCKING COMPRESSION PLATE FIXATION OF OSTEOTOMIZED EQUINE THIRD METACARPAL BONES

Authors/Investigators:
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Year Completed:
2009

Published Manuscripts/Abstracts:
In Vitro Tissue Generation by Adult Equine Multipotent Stromal Cells on Collagen Scaffolds

Authors/Investigators
Lin Xie, BS; Anna Marsano, PhD; Yanru Zhang, PhD; Jeffrey Gimble, MD, PhD; Gordana Vunjak-Novakovic, PhD; Mandi J. Lopez, DVM, MS, PhD

Description of the Problem
Adult equine multipotent stromal cell (MSC) research supports the potential of the cells to restore normal tissue structure and function when combined with biocompatible scaffolds. Therefore, there is great potential to accelerate tissue repair with equine stromal cell therapy in combination with other well-established medical and surgical techniques. To derive the greatest benefits from equine stromal cell applications and propel the technology into clinical trials, it is necessary to optimize equine MSC-scaffold constructs in vitro. Adult equine adipose- (ASC) and bone marrow-(BMSC) derived multipotent stromal cell adipogenesis, osteogenesis and chondrogenesis on commercially available bovine collagen I (COLI) scaffolds were quantified in this study.

Study Purpose/Objectives
The overall goal of this study was optimization of adult equine multipotent stromal cell interactions with biocompatible scaffolds for purposes of advancing clinical application of equine tissue regeneration technology. Several hypotheses were tested to support this goal. The first hypothesis was that equine BMSCs and ASCs have indistinguishable cell seeding, attachment, viability, and distribution on COLI scaffolds. The second, two-part hypothesis was that BMSC – COLI scaffold constructs are superior to ASC – COLI scaffold constructs for osteogenesis and chondrogenesis while ASC – COLI scaffold constructs demonstrate higher superior adipogenesis.

Approach
Cells in this study were isolated from 4 adult Thoroughbred horses from 7 to 10 years old. Bone marrow (BM) was collected from sternebrae and adipose tissue was collected from superficial gluteal fascia. The collection procedure was approved by the Institutional Animal Care and Use Committee. The cell surface marker profile of loaded cells was established just prior to loading by flow cytometry. Adult equine BMSCs and ASCs were loaded into COLI scaffolds (10x7x3mm) at a loading density of 106 cells/ml by perfusion bioreactors (Figure 1). Scaffolds were equally divided into sections which were subsequently cultured for 7, 14 or 21 days in stromal or adipogenic, osteogenic, or chondrogenic medium in triplicate. The mRNA levels of tissue specific genes of cell-scaffold constructs were quantified by RT-PCR. Cell-scaffold constructs were also assessed for cell distribution and viability, cell number, microstructure, and ultrastructure by confocal laser microscopy, DNA quantification, light microscopy, and scanning electron microscopy, respectively. All values are reported as mean ± standard error (SE). Student’s t test was performed to compare the effects of cell type on cell loading efficiency. Three-way ANOVA was used to compare the effects of cell type, post-loading culture time and induction medium on the cell viability. Different combination effects were evaluated with Tukey’s post-hoc tests. Significance was considered at P<0.05.

Results/Conclusions
Loading efficiency was 74.6% ± 14.4% and 85.8% ± 9.2% for BMSCs and ASCs, respectively. Both cell types were positive for CD29, CD44, and CD105, and BMSCs were additionally positive for CD73 and CD90. Cells were uniformly distributed in the scaffold immediately after loading. The mRNA levels of collagen I and sex determining Region Y-box 9 (Sox9) were significantly
higher in BMSC constructs while lipoprotein lipase (LPL) mRNA levels were significantly higher in ASC constructs at all time points (Figure 2). Tissue specific micro- and ultrastructural changes were evident in cell-scaffold constructs cultured in induction versus stromal medium (Figure 3).

Benefits to/Impact on the Equine Industry

This study evaluated the in vitro behavior of two types of adult equine MSCs on COLI scaffolds. Both cell types had high viability and proliferation, confirming the suitability of COLI scaffolds for cell growth. Furthermore, COLI scaffolds supported cell differentiation into distinct mesenchymal tissues. This systematic and comprehensive in vitro evaluation of interactions between COLI scaffolds and equine MSCs proved their potential to support diverse mesenchymal tissue generation for equine industry.

Take Home Message

The versatility and suitability of type I collagen scaffolds for equine adult MSC tissue regeneration was confirmed by parallel generation of distinct mesenchymal tissues by paired ASCs and BMSCs.

Acknowledgements

Funding for this project was provided by the LSU Equine Health Studies Program.

Year Completed

2010–2011
ISOLATION AND CHARACTERIZATION OF EQUINE LAMINAR PROGENITOR CELLS

Authors/Investigators
Vanessa Marigo, DVM; Marilyn A. Dietrich, BS, MSc; Frank Andrews, DVM, MS; Jeffrey M. Gimble, MD, PhD; Mandi J. Lopez, DVM, MS, PhD, DACVS

Description of the Problem
The laminar tissue is a very unique structure that balances forces within the equine hoof. It has two major components, the dermal component, attached to the coffin bone, and the epidermal component, attached to the hoof wall, preventing the distal phalanx from rotating in response to tension from the deep digital flexor tendon. Failure of this complex relationship results in laminitis. This disease affects about 15% of horses in the United States each year, and 75% of those affected, more than 8,000, lose their lives. Costs associated with this devastating condition exceed $10 million per year for diagnosis, treatment, and lost revenues. Laminitis is a multifactorial disease making identification of specific causes and treatment difficult. Knowledge of equine laminar cells physiology will contribute to understand, prevent or reverse the damage caused by laminitis.

Study Purpose/Objectives
The objective of this project was to isolate primordial cells from equine laminar tissue characterize the proliferation rate, identify cell surface markers expression and estrogenic differentiation potential in vitro.

Approach
Cells were isolated from laminar tissue from horses euthanized for reasons other than the present research. The in vitro expansion characteristics of cells were determined with cell doubling number (CD) and doubling time (DT) assays. Limit dilution assays were used to quantify colony forming units for fibroblasts (CFU-F). Cells from passages 1 and 3 cultured in stromal medium were submitted to flow cytometry of fluorescein isothiocyanate (FITC) and phicoerithrin (PE) labeled cells to identify CD44, CD29 and CD105, which are progenitor cells surface markers. To address the osteogenic potential cells isolated from the laminar tissue were maintained in stromal media until 70% confluence, when media was changed to osteogenic induction media (DMEM-Ham’s F12, 10% FBS, 1% antibiotic/antimycotic solution, β-glycerophosphate (10 μmol/L), dexamethasone (20 nmol/L), and sodium 2-phosphate ascorbate (50µg/mL). Cells were then cultured for 21 more days and media were. Cells were rinsed with 150mM NaCl 3 times and fixed in 70% ETOH. After fixation, cells were stained with a 2% Alizarin Red solution in distilled water.

Results/Conclusions
Cells had similar proliferation rates from passages 1 to 6. The overall mean ± SEM CD for P1 was 1.14±0.26 and P6 was 1.26±0.16 and DT for P1 was 2.30±0.57 and P6 was 5.19±1.14 days. The cells do not double as efficiently in later passages compared to earlier passages, however this difference is not statistically significant. Primary fibroblastic phenotype (CFU-F) occurred at a frequency of 1 per 552 nucleated cells, 1 per 302 nucleated cells and 1 per 457 for passages 1, 3 and 6 respectively. Cells from passage 1 and 3 were had more than 70% positive staining for CD44, CD29 and CD105 suggesting these cells are progenitor cells. After osteogenic induction cells then formed round colonies that stained with alizarin red indicating calcification.
Take Home Message

Our study showed that the cells harvested from equine laminar tissue have a constant proliferation rate in vitro until passage 6, express specific cell surface markers and can be differentiated into osteoblasts. The significance of this project is that isolation and characterization of adult stromal cells from the equine laminae will provide a new target area for research efforts to prevent and cure the disease. The findings have significant potential to enhance understanding and treatment of equine laminitis. Moreover, it can be a new model to investigate laminitis in vitro.

Acknowledgements

This study was supported by LSU Equine Health Studies Program.

Year Completed

2011

Published Manuscripts/Abstracts

Marigo, V., DVM, Gimble, J.M., MD, PhD; Andrews, F., DVM, MS; Lopez, M.J., DVM, MS, PhD, DACVS. Characterization of Stromal Cells from Equine Laminae in vitro. Abstract at ACVS Veterinary Symposium, 2011.
LAMINITIS

TREATMENT OF EXPERIMENTAL EQUINE LAMINITIS WITH DOXYCYCLINE

Authors/Investigators

Susan Eades and Lee Ann Fugler

Matrix metalloproteinases (MMPs) are enzymes present normally in connective tissue including the laminar tissue that holds the coffin bone into the hoof capsule. These enzymes breakdown proteins in collagen to remove connective tissue during normal processes of hoof growth and repair. However, excessive matrix metalloproteinase activity is thought to lead to excessive breakdown of laminar tissue allowing deviation of the coffin during laminitis. Oxytetracycline is an antibiotic that has other properties in addition to its ability to kill bacteria. Oxytetracycline is also capable of inhibition of MMP enzymes allowing it to be used in people with severe gingival disease and other disease where excessive collagen breakdown occurs. As a result the partial success associated with use of oxytetracycline in people, practitioners have employed doxycycline for use in horses with laminitis. The purpose of this study was to determine the effectiveness of doxycycline, oxytetracycline, and pentoxifylline (PTX) in the treatment of equine laminitis using a corn starch overload (CSO) model.

The administration of PTX significantly decreased the severity of lameness associated with laminitis (Fig 1). Doxycycline and oxytetracycline administration did not alter the severity of laminitis caused by corn starch. Pentoxifylline reduced MMP production; however, results of these studies also suggest that PTX also decrease laminitis pain by reducing inflammation.

Figure 1. Lameness grades associated with laminitis in untreated (control) horses and horses treated with pentoxifylline (PTX)

Pentoxifylline is a medication used in people to reduce some of the symptoms of muscle cramping and pain associated with arterial diseases. This medication has also demonstrated the ability to reduce scar tissue formation in chronic diseases of the kidney and lungs. Pentoxifylline decreased the severity of lameness associated with laminitis induced by corn starch. The therapeutic effects of PTX in CHO may involve MMP inhibition and antiinflammatory effects. Pentoxifylline can be used by veterinarians to reduce the severity of laminitis associated with intestinal diseases and metritis.
PHARMACOKINETICS AND CLINICAL SAFETY OF ORAL PASTE FIROCOXB, A COX-1 SPARING NSAID, IN FOALS

Authors/Investigators
McConnico RS, Khodadad JL, Koch CE

This study evaluated pharmacokinetics and clinical safety of an oral paste formulation of a commercially available COX1-sparing NSAID in clinically healthy pony foals in a randomized controlled clinical trial. Values for complete blood count, serum chemistry profile, urinalysis, pharmacokinetic assay, and gastric endoscopy were evaluated in eighteen Shetland pony foals treated with firocoxib (0.1 mg/kg, PO, q 24 h) or placebo for 14 days. Foals were divided into 3 treatment groups. Group 1 and 2 foals received firocoxib while a 3rd group was administered an oral placebo. Gastric endoscopy was performed on group 1 and 3 foals prior to treatment and on days 7 and 14 to monitor for the presence of gastric ulcers. Group 2 and 3 foals had blood and urine samples taken sequentially for pharmacokinetic analysis, CBC, serum chemistry evaluation, and urinalysis. Physical examinations were performed prior to treatment and daily for 17 days. Data were analyzed using anova and paired t-tests (P<0.05). None of the foals presented adverse clinical effects. There were no significant changes in CBC, biochemical profiles within groups, or differences between groups. Pretreatment gastric endoscopy scores were not significantly different from evaluations at 7 and 14 days. Firocoxib was quickly absorbed with an observed maximum concentration at 2 hr, the first sampling interval, for the majority of animals. Firocoxib plasma concentrations decreased in a log-linear manner after reaching the maximum concentration and steady state concentrations were achieved by the 7th dose. Based on the sampling times after the final and 14th dose, an average half life of 1.3 days was estimated. Administration of firocoxib did not cause any adverse effects on gastrointestinal, or hematological or serum biochemical variables, appears to have been well tolerated, and follows a predictable pharmacokinetic pattern in 4-6 week old foals.

RIGHT COLONIC PATHOPHYSIOLOGY IN HORSES ADMINISTERED PHENYLButAZONE

Authors/Investigators
Rebecca S. McConnico, DVM, PhD; Timothy W. Morgan, DVM, PhD; Cathleen C. Williams, MS, PhD; Jeremy D. Hubert, BVSc, MRCVS; Rustin M. Moore, DVM, PhD

Study Purpose/Objectives
To determine pathophysiologic effects of phenylbutazone (PBZ) on equine right dorsal colon (RDC).

Approach
Animals—12 healthy adult horses.

Procedures—A controlled cross-over observational study was conducted. Clinical and serum variables, colonic inflammation (histologic grading) and measurement of myeloperoxidase [MPO] activity, malondialdehyde [MDA] concentrations, and prostaglandin E2 [PGE2] concentrations), ingesta volatile fatty acid (VFA), and arterial blood flow in the RDC were evaluated for a
21-day period in horses administered PBZ (8.8 mg/kg, PO, q 24 h) or a control substance.

Results—Data from 8 horses were used for analysis. Plasma albumin concentrations decreased significantly from days 10 to 21 during PBZ treatment, compared to during the same days for control treatment. Phenylbutazone treatment caused neutropenia (< 3.0 x 103 cells/L). No other clinical or hematologic abnormalities were detected between PBZ or control treatments. Two horses developed colitis while on PBZ. No significant differences were detected in the RDC between PBZ and control treatments for MPO activity, MDA and PGE2 concentrations, or for histologic evidence of inflammation. Arterial blood flow in the RDC was significantly increased during PBZ treatment, compared with values for controls. Differences were identified in VFA production during PBZ treatment, compared with control treatment, with a decrease in acetic acid concentrations over time.

Results/Conclusions
Prolonged phenylbutazone administration caused hypoalbuminemia, neutropenia, changes in RDC arterial blood flow, and changes in VFA production. Equine veterinarians should monitor serum albumin concentrations and neutrophil counts and be extremely cautious when making dosing recommendations for phenylbutazone treatment.

Published Manuscripts/Abstracts

Acknowledgements
Support for this project was provided by the Grayson Jockey Club Research Foundation Incorporated.

NEW APPROACHES IN TREATING EQUINE GASTRIC ULCER SYNDROME

Authors/Investigators
Dr. Frank Andrews, Dr. Michelle Woodward, Dr. Patrick Loftin, Dr. Joshua Cartmill, Dr. Nan Huff, Michael L. Keowen, Frank Garza, Jr.

EGUS is a common problem in horses. All ages and breeds are susceptible, but the prevalence is especially high in Thoroughbred race horses, probably because of the intense exercise they undergo during training and racing. It is estimated that 60% to 90% of performance horses (between 500,000 and 700,000 animals in the U.S. alone) are affected by EGUS, which translates to millions of dollars of lost revenue each year in training and racing days and in the cost of treatment. In addition, EGUS can be a painful condition, causing considerable suffering among affected horses and foals.
EGUS is a complicated syndrome with a number of potential causes, but risk factors include stress, being transported, diet, stall confinement, intermittent feeding or fasting, intense exercise, racing, and the use of non-steroidal anti-inflammatory drugs (NSAIDs). Clinical signs of EGUS, which are present in about half of the horses diagnosed with EGUS, tend to be vague and include abdominal pain or colic, diarrhea, rough hair coat, poor appetite, depression, and decreased performance. It is poor performance that makes EGUS an economically significant condition in the racehorse industry.

There are a number of commercial antiulcer drugs that can be used to treat EGUS, such as equine formulations of omeprazole and ranitidine (both of which are also used in human medicine). But these drugs are expensive—often costing $40 or more per day—and must be used for at least 28 days for complete healing. This can cause a financial strain for horse owners, who may not be able to afford to treat their animals for the prescribed length of time, or may use the drugs at sub-therapeutic doses, or even substitute other medications or feed supplements that are ineffective. Hence, the prevalence of EGUS remains high even with effective treatment options available.

Dr. Andrews has been looking for a more cost-effective means of managing EGUS, which led him to explore alternative approaches. In the veterinary community as well as in human medicine, there is increasing interest in herbs and other plants that have therapeutic applications, and one such plant that shows promise for treating EGUS is the seabuckthorn, Hippophae rhamnoides.

The seabuckthorn is a deciduous berry-producing shrub that grows in high elevations across Eurasia from the Atlantic coast of Europe to northwestern China. Since antiquity the plant has been associated with improving the health of horses; in fact, the genus name Hippophae is Latin for “shining horse,” alluding to the beautiful coats of horses that feed on it.

A liquid equine feed additive derived from seabuckthorn berries, SeaBuck Complete™, is now available, and Dr. Andrews has been investigating its efficacy in treating and preventing gastric ulcers in Thoroughbreds. “Seabuckthorn berries are highly nutritious,” said Dr. Andrews, “and are a very good source of vitamins, trace minerals, amino acids, and antioxidants. Extracts from these berries have been used to successfully treat mucosal injury in humans and rats, so we are looking at this product as an alternative to omeprazole in treating EGUS.” In a small study involving eight adult female horses, he found that SeaBuck Complete™ seemed to prevent existing ulcers from worsening under stress, which commonly happens among performance horses.

Now he wants to continue investigating the use of seabuckthorn products using SeaBuck™ Gastro Plus, a new product from the manufacturers of SeaBuck Complete™, to see if his initial findings will be confirmed. He has submitted a pre-proposal for a Morris Animal Foundation grant to expand his research and hopes to start a follow-up clinical trial in the near future.

In addition, Dr. Andrews will be mentoring a student in the Merial/NIH Veterinary Scholars Program this summer. Alyssa Auer, who is finishing her first year at Purdue University School of Veterinary Medicine, will be at LSU SVM for a 12-week research program beginning in May, 2010, and will be working closely with Dr. Andrews on a project entitled, “Efficacy of seabuckthorn berry pulp and oil on treatment and prevention of gastric ulcers in horses.”

If Dr. Andrews’s research confirms the value of seabuckthorn extracts in managing EGUS, it will be a boon for horses and their owners alike. At recommended doses, seabuckthorn supplements cost much less than the price of a course of omeprazole, making it more likely that horse owners will be able to continue treatment for as long as necessary. “We expect seabuckthorn-treated horses will have significantly fewer and less severe gastric ulcers on endoscopic examination than untreated controls,” he said. “We believe this research is likely to produce an immediate beneficial outcome on the morbidity caused by gastric ulcers in performance horses.”
EXPERIENTIAL LEARNING IN DISASTER RESPONSE FOR VETERINARY STUDENTS AND VETERINARIANS

Authors/Investigators


The Louisiana State University School of Veterinary Medicine has taken advantage of its physical presence amidst a disaster prone region of the United States (US) to incorporate veterinary students, faculty veterinarians, and staff as first responders as a means of experiential training for animal disaster response. Through a 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, this veterinary school has developed a disaster response program that includes animal emergency response planning, evacuation, sheltering, emergency triage, and technical rescue expertise. Specific debriefing sessions from each of the disaster response scenarios have enabled the emergence of a functional all-hazards disaster response plan and specialized responder training.

Over the past decade, this team has worked closely with local and regional resource providers to develop improved response activities to care for animals and the people who care for them including Tropical Storm Allison (2001), Hurricanes Katrina & Rita (2005), Hurricanes Rita 7 Ike (2008), North Louisiana Flood (2009), and the Deep Water Horizon Gulf Oil Spill (2010). These experiential learning opportunities by way of organized community engagement have provided rigorous training opportunities for veterinary students and veterinarians at LSU surrounding area. These recent response activities where veterinary students and veterinarians were able to provide the work force and work first hand with certified emergency responders to provide and training activities demonstrate a successful model for veterinary training providing robust training experiences and subsequent course development to address identified gaps in veterinary disaster response training.
LARMOF’s Procedure for Treatment of Cribbing in Horses: Is it Working?

Authors/Investigators
D.J. Burba, DVM, Dipl. ACVS, Anna Guzman

Cribbing, also referred to a crib-biting is considered an acquired stereotypic oral behavior that affects 4 to 5% of the horse population. The exact cause of cribbing is not known. However, multiple factors may contribute to the reason a horse wants to crib. These include boredom, frustration, stress, diet, illness, neurological, and possibly hereditary. Cribbing is considered for the most part a nuisance; however there are potential sequelae that may develop as a result of cribbing. A cribbing horse may lose weight, perform poorly, have frequent bouts of colic, and develop excessive wear of the upper incisors. These sequelae develop as a result of the frequency of the cribbing behavior.

There have been various non-surgical as well as surgical procedures have been described with various success rates. Dr. Forssell described the first surgical procedure to alleviate cribbing. This entailed resection of portion of the paired sternomandibularis, omohyoideus, and sternothyrohyoideus muscles. Unfortunately this resulted in a poor cosmetic outcome which was unappealing to owners. A modification to this technique was published in which resection of the ventral branch of the spinal accessory nerves were performed in lieu of the sternomandibularis muscles.

Articles were published reporting the success of surgical procedures by numerous surgeons. The success rates were not impressive in most of the reports. This may be due to a tendon-like fibrous union developing between the cut ends of the muscles. It is hypothesized that this fibrous union can be reduced by a more rostral transection of the insertion of the sternohyoideus and omohyoideus. A more rostral transection of the insertion of these muscles was reported in 2002 from LSU EHSP in which a revision of the modified Forssell’s techniques was performed in 10 horses with 100% success. Since then, the procedure has been performed on a total of 100 horses. The purpose of this study is to look at the success of the laser assisted revised modified Forssell’s (LARMoF) surgical procedure to alleviate cribbing in horses.

Material and Methods
100 cases were reviewed from November 1994 to July 2010 and included in the study. Case records were reviewed and information retrieved included duration of cribbing prior to surgery, gender, age, breed, use, and complications post-surgery if any. A telephone questionnaire was performed as part of the study to gather information from the owner including the long-term outcome of the surgery. The same surgical procedure previously described was used.

Results
Information from owners was obtained for 82 cases (Table 1). The number of horses that ceased cribbing was 68/82 (83%). Most of the owners were pleased with the cosmetic outcome of the procedure (81/82, 99%). Of the horses (14/82) that surgery failed to alleviate cribbing, the time post surgery cribbing behavior resumed ranged from 5 months to 3 years (Table 2). However all reported less frequent episodes of the behavior. A few of the owners (5/85, 6%) felt that the horse’s performance was altered negatively post-surgery. This included 2 racing Thoroughbreds, 2 cutting horses, and 1 Warmblood used for dressage.
Table 1. Information obtained from owners and records of cases in which LARMoF surgery was performed to alleviate cribbing.

<table>
<thead>
<tr>
<th>Number of respondents</th>
<th>82/100</th>
</tr>
</thead>
<tbody>
<tr>
<td># of horses still owned by original owner</td>
<td>49/82</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Geldings</td>
<td>44</td>
</tr>
<tr>
<td>Mares</td>
<td>36</td>
</tr>
<tr>
<td>Stallions</td>
<td>2</td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>7 months-16 yrs.</td>
</tr>
<tr>
<td>Median</td>
<td>6.5 yrs.</td>
</tr>
<tr>
<td>Duration of cribbing</td>
<td></td>
</tr>
<tr>
<td>&lt;=2 yrs</td>
<td>44</td>
</tr>
<tr>
<td>&gt;2 yrs</td>
<td>38</td>
</tr>
<tr>
<td>Horses still living:</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>69</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
</tr>
<tr>
<td>Unknown</td>
<td>11</td>
</tr>
<tr>
<td>Breeds</td>
<td></td>
</tr>
<tr>
<td>Appaloosa</td>
<td>1</td>
</tr>
<tr>
<td>Arabian</td>
<td>2</td>
</tr>
<tr>
<td>American Saddle Brd</td>
<td>1</td>
</tr>
<tr>
<td>Connemara</td>
<td>1</td>
</tr>
<tr>
<td>Irish Hunter</td>
<td>1</td>
</tr>
<tr>
<td>Paso Fino</td>
<td>1</td>
</tr>
<tr>
<td>Pony</td>
<td>1</td>
</tr>
<tr>
<td>Paint</td>
<td>1</td>
</tr>
<tr>
<td>Quarter Horse</td>
<td>51</td>
</tr>
<tr>
<td>Thoroughbred</td>
<td>11</td>
</tr>
<tr>
<td>Warmblood</td>
<td>9</td>
</tr>
<tr>
<td>Use</td>
<td></td>
</tr>
<tr>
<td>barrel racing</td>
<td></td>
</tr>
<tr>
<td>breeding</td>
<td></td>
</tr>
<tr>
<td>cutting</td>
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</tr>
<tr>
<td>dressage</td>
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<tr>
<td>jumping</td>
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</tr>
<tr>
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<td>reining</td>
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</tr>
<tr>
<td>roping</td>
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</tr>
<tr>
<td>trail</td>
<td></td>
</tr>
<tr>
<td>working cow horse</td>
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</tr>
</tbody>
</table>

Table 2. Cases in which LARMoF surgery failed to alleviate cribbing.

<table>
<thead>
<tr>
<th>Number of failed surgeries</th>
<th>14/82</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>2-10 yrs</td>
</tr>
<tr>
<td>Median</td>
<td>5 yrs.</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Mares</td>
<td>6</td>
</tr>
<tr>
<td>Geldings</td>
<td>8</td>
</tr>
<tr>
<td>Duration of cribbing</td>
<td></td>
</tr>
<tr>
<td>&gt;2 yrs</td>
<td>9</td>
</tr>
<tr>
<td>&lt;=2 yrs</td>
<td>5</td>
</tr>
</tbody>
</table>
**Discussion**

Results revealed that the LARMoF technique is more successful in alleviating cribbing than techniques previously reported except one (table 3). Hakansson et al, reported an 89% (92/103 horses) success; however the Forssell’s technique was used which caused a cosmetic defect in neck which is not appealing to owner. Of the surgeries that failed in our study, nearly twice as many horses had been cribbing more than 2 years compared to cases that had cribbed less than two years prior to surgery (9 vs 5). Complications did occur in 17/82 (21%). This included post-op hematoma/seroma formation, prolonged drainage as defined as more than 2 weeks post surgery, post-operative infection, and partial dehiscence. Of these, surgery failed to alleviate cribbing in 10 horses. So it appears complications also increase the incidence that surgery will not alleviate cribbing. This may be due fibrous tissue formation contributing to the horse’s ability to continue cribbing. It was interesting to note that box stall confinement was part of the daily life of all cases reported.

**Conclusion**

LARMoF is an effective technique for alleviating cribbing in horses. Further work is needed to reduce the complications associated with the surgery.

**Table 3. Surgical success rate of previous reports of alleviating cribbing in horses.**

<table>
<thead>
<tr>
<th>Author</th>
<th># of horses</th>
<th>% success</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forssell (F)</td>
<td>76</td>
<td>80</td>
</tr>
<tr>
<td>Hakansson (F)</td>
<td>103</td>
<td>89</td>
</tr>
<tr>
<td>Herman (F)</td>
<td>73</td>
<td>53</td>
</tr>
<tr>
<td>Hakansson (MF)</td>
<td>111</td>
<td>50</td>
</tr>
<tr>
<td>Turner (MF)</td>
<td>35</td>
<td>57</td>
</tr>
<tr>
<td>Hamm (MF)</td>
<td>150</td>
<td>60</td>
</tr>
<tr>
<td>Schofield (MF)</td>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>Fjeldborg (MF)</td>
<td>30</td>
<td>60</td>
</tr>
<tr>
<td>Firth (N)</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Baker (N)</td>
<td>100</td>
<td>60</td>
</tr>
</tbody>
</table>