

Zweig

NEWS CAPSULE

A report from the Harry M. Zweig Memorial Fund for Equine Research at the College of Veterinary Medicine at Cornell University.

If Wishes Were Horses

From a young age, Dr. Gillian Perkins knew that horses would always be part of her life. Becoming a veterinarian was a natural career choice for her. Now, the senior lecturer for Large Animal Medicine has the opportunity to show her love for the species with the studies that she's conducting.

Much of Dr. Perkins' research for the past 4 ½ years has concentrated on trying to unravel the mysteries of the equine herpesvirus-1 (EHV-1), a highly infectious viral disease in horses that can be transmitted by nasal secretions, causing respiratory illness, neurologic disease, and abortions. In 2003, a large outbreak of EHV-1 in Ohio sparked the equine industry's interest in EHV-1 and stressed the need to find effective prevention and treatment of this condition. It just so happened that Dr. Perkins was already involved in studies looking at these very things. Since then the USDA has classified EHV-1 myeloencephalopathy (neurologic disease) as an emerging disease.

"My focus has been primarily on the neurologic strain of the equine



herpesvirus," said Dr. Perkins. "In Ohio, over 30 percent of the 138 horses infected with EHV-1 showed neurologic signs, with the disease being fatal to 12 of those horses.

The neurologic strain of EHV-1 is the most lethal, characterized by a high fever, ataxia, paralysis, and even death. With the disease being so

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easily transmitted, the neurologic strain is particularly worrisome to industries where large populations of horses gather.”

In collaboration with Dr. Klaus Osterrieder, Dr. Perkins has been the principal investigator for two grants funded by the Harry M. Zweig Memorial Fund for Equine Research that focus on the EHV-1. The two doctors are investigating the ability of small interfering RNAs (siRNAs) to inhibit the growth and replication of EHV-1 at the primary site of infection, specifically the upper respiratory tract. Known as the natural defense against viral infection, siRNAs were first discovered in plants. By decreasing the amount of viral shedding from the nose, Drs. Perkins and Osterrieder are hoping to reduce the overall transmission of the virus in a herd of horses. If siRNAs work, Dr. Perkins says, the treatment could be used as an alternative for outbreak situations or given during the

incubation period of a disease. She believes that she and Dr. Osterrieder are the first researchers to test siRNAs in domestic animals.

“We’re also working on developing a vaccine that delivers protection against strangles and equine herpesvirus-1 in a single dose,” said Dr. Perkins. “Strangles is a contagious, upper respiratory tract infection in horses. The goal is to create one vaccine with fewer side effects for the two diseases than current vaccines offer. The existing strangles vaccines can cause abscesses at the injection site or symptoms similar to strangles itself. Most of the EHV-1 vaccines used are a killed version of the virus and are not entirely effective. They may cause an inappropriate immune response that then favors the development of neurologic symptoms. We’re hopeful that using a modified, live EHV-1 virus to deliver a single vaccine for both strangles and equine herpesvirus-1

will result in better prevention against both diseases.”

Dr. Perkins received her DVM from the University of Prince Edward Island followed by an internship at the University of Minnesota. In 1996, she came to Cornell as a resident to work in Large Animal Internal Medicine and became a Diplomat of the American College of Veterinary Internal Medicine. Dr. Perkins joined the faculty in 1998 as a clinical instructor. She currently divides her time between clinical care, teaching DVM students and residents in the Cornell University Hospital for Animals, and research.

“In the animals that I treat in the hospital, I’m able to watch my patient become better and identify research needs,” said Dr. Perkins, who is currently a senior lecturer. “The results aren’t always as immediate in research, but knowing that my work could contribute to the prevention of a disease for all horses is a goal worth working toward.”

Fillies Trot to Victory at Tioga Downs

For more than 25 years, the Dr. Harry M. Zweig Memorial Trot has captured the New York spirit with a high quality racing experience. Originally known as the Empire Classic (in the 1960s), the race draws high caliber horses who handle the rigorous requirements of the Zweig Trot with grace, style, and edge.

“For the last five years or so, the race has grown stronger, improving in a variety of ways,” said Anna Zweig, the widow of the late Dr. Harry M. Zweig for whom the race is named. “The horses are highly competitive, making for a good show and exciting finishes.”

This year was no different, as the following results from the July 10, 2009, race indicate.

Judge Joe remains perfect in '09 in division of Zweig *by Dustin Ross, Tioga Downs & Vernon Downs*

Judge Joe and DR Ackerman captured the \$151,670 first division of the Dr. Harry M. Zweig Memorial on July 10 at Tioga Downs.

The duo got away in the pocket spot as Ray Schnittker and Citation Lindy cut through a torrid opening quarter in 26.4. The field passed the half-mile mark of the race in 56.2 as Russell Hill (John Campbell) began a first-over grind through the third quarter station in 1:25. Campbell got Russell Hill to the front at the top of the stretch, but Judge Joe found room late and dug in to close and win by a neck in 1:55.1. The mile established a new lifetime mark for Judge Joe. Russell Hill (John Campbell) hung on for second, while Neighsay Hanover (Howard Parker) trotted home late for third.

To Stretch, Not Stress

Behind the Scenes with Dr. Jon Cheetham

A tiny, corkscrew-like device, just three millimeters across, is at the center of Dr. Jon Cheetham's work. If it works as hoped Dr. Cheetham will be part of the team responsible for developing a new dynamic treatment to silence roaring in horses.

Recurrent Laryngeal Paralysis, commonly referred to as Roaring, is a condition of the recurrent laryngeal nerve, which controls the muscle that opens the horse's airway. During exercise, a horse's need for airflow can increase by as much as 20 times as compared to the amount he needs when resting. To handle this increased flow, his larynx must fully open. In horses with Recurrent Laryngeal Paralysis, the left side of the larynx is either partially or completely paralyzed, obstructing the airway and reducing performance.

Currently, Dr. Cheetham says, the most common treatment is to place a static suture that permanently opens the airway, compensating for the paralysis. Success rates for this procedure range from 50 to 90 percent and require about eight weeks of recovery time.

"The new device can be described as an intramuscular pacemaker," said Dr. Cheetham, who works with Drs. Norm Ducharme and John Hermanson on the research. "It stimulates the muscle, opening the airway during high-speed exercise. When at rest, the muscle will return to its normal position. We believe this will be an improved option because the device will only open the larynx when the horse is exercising. The larynx can close naturally during swallowing and protect the airway



from feed aspiration. This airway protection is not possible with the older static treatment, and so coughing can occur after surgery."

Dr. Cheetham's interest in horses and veterinary medicine is rooted in his childhood, when he heard his grandfather tell stories of plowing the English soil with horses, as well as his wish to work with his hands and to understand science. He grew up in a small farming village on the edge of the Cheshire Plain in the United Kingdom, coming to Cornell in 2003 to complete a residency in Large Animal Surgery.

Cornell and Ithaca offer everything that Dr. Cheetham is looking for: the privilege to make a difference in a profession and industry that impact people at very personal levels; opportunities to swim and bike in the beautiful surrounding area; and the chance to meet and work with respected people.

"Cornell faculty are excellent clinicians and researchers; good, balanced people; and excellent teachers," said Dr. Cheetham, who became a postdoctoral research associate at the College in 2008. "They know just how to stretch residents and students without stressing them, which means they are always performing at the optimal level."

Thirty Years of Focused Energy

For 30 years, the Dr. Harry M. Zweig Memorial Fund for Equine Research has provided competitive support for projects benefiting every aspect of equine health. To mark this investigation, the Zweig Committee

will present a symposium in November 2009 at the College of Veterinary Medicine in Ithaca, NY, showcasing significant research and highlighting findings.

Sequenced Horse Genome Expands Understanding of Equine, Human Diseases



by Dan Gurvich

A Cornell veterinary immunologist and a mare from his research herd are at the center of what may turn out to be the most important breakthrough for horses since the advent of the horseshoe some 2,000 years ago. The completed map of the horse genome has already enabled advances in equine medicine, from the study of simple genetic traits to complex multi-gene conditions and the genetic regulation of development and healing. In addition, the horse genome holds the potential to shed light on human genetics and disease.

A paper published in the November 6, 2009, issue of the journal *Science*—written by the international Horse Genome Project team that includes Dr. Doug Antczak, Dorothy Havemeyer McConville Professor of Equine Medicine at the Baker Institute for Animal Health—provides a high quality draft of the approximately 2.7-billion DNA base pair sequence, as well as comparative analysis and population genetics of the horse. Among the paper's findings is that the arrangements of genes on individual chromosomes between horses and humans are actually quite similar. This high degree of conserved synteny between horses and humans will assist comparative and translational

researchers in using insights from one species to illuminate the other. The study's authors also note that horse population history has led to important genetic similarities across horse breeds, increasing the feasibility of across-breed mapping.

“The horse genome sequence is changing equine research and clinical medicine fundamentally and completely,” said Antczak, who noted that it also promises insights for human medicine. “Researchers in many areas are rapidly adopting this technology, and those who are not using it may soon find themselves behind the times.”

Antczak has been a leading member of the Horse Genome Project from its inception in 1995. An immunologist, Antczak became involved in genetics while investigating the mechanism that allows a placenta and fetus to avoid destruction by the maternal immune system in pregnant mares. Twilight, a young Thoroughbred mare from Antczak's research herd at McConville Barn had the distinction of being chosen as the DNA donor for the entire horse genome, which was sequenced in 2006 at MIT and Harvard's Broad Institute.

The Horse Genome Project was originally supported by the Dorothy Russell Havemeyer Foundation, and later by other funding agencies, including the U.S. Department of Agriculture. However, in 2005 it received funding through the National Human Genome Research Institute at the National Institutes of Health.

In the area of translational medical application, genome mapping has

already enabled the development of genetic tests for approximately 10 simple inherited genetic diseases, including Severe Combined Immunodeficiency Disease of Arabian horses, Lethal White of Paint horses, HERDA and HYPP of Quarter Horses. Genetic testing for these single-gene disorders, some of them fatal, is becoming standard practice for certain horse breeds and may soon eradicate these conditions.

Another highly promising application of the horse genome is the development of expression arrays. These miniature devices contain probes for all of the 20,000+ genes of the horse on chips that can be used to profile gene activity across the genome, illuminating unknown functions and mechanisms of normal physiology and disease. Expression profiling may one day produce breakthroughs in areas as diverse as lameness, lung disease, reproduction, and immunology. For example, at the College of Veterinary Medicine, Dr. Alan Nixon, Professor of Large Animal Surgery and Director of the Comparative Orthopedics Laboratory, is using equine expression arrays to investigate osteochondritis dissecans, a common and debilitating cartilage disease in growing animals and children. Dr. Dorothy Ainsworth, Professor of Large Animal Medicine, is utilizing the technology to study equine chronic lung disease. And Dr. Tracy Stokol, Assistant Professor of Clinical Pathology plans to apply the expression array developed in Antczak's laboratory to study aspects of equine herpes virus disease.

Hall of Fame Inductees Named

Dr. Doug Antczak



Dr. Alan Nixon



Dr. I.G. Joe Mayhew



by Jenny Blandford, University of Kentucky

Four scientists were inducted into the University of Kentucky Equine Research Hall on Fame in October at Keeneland Race Course by the Gluck Equine Research Foundation. Two of the inductees are professors at the College of Veterinary Medicine at Cornell University and a third is an alumnus.

Douglas F. Antczak and Alan J. Nixon of Cornell University, along with PhD alumnus I.G. Joe Mayhew of Massey University and Peter J. Timoney of UK's Gluck Equine Research Center, were selected for their contributions to equine science and research. Nominated by their peers and colleagues, the four individuals were selected by past Hall of Fame inductees.

Antczak, the Dorothy Havemeyer McConville Professor of Equine Medicine, joined the staff in 1979. In 1994, he became the director of the Baker Institute for Animal Health, a post he held for 15 years. For the past 30 years, Antczak has conducted research in equine immunology, genetics and reproduction. For more than 15 years, Antczak was also a major participant in the Horse Genome Project, which was recently published in *Science*.

Nixon is professor of orthopedic surgery and director of the Comparative Orthopaedics Laboratory and the JD&ML Wheat Orthopaedic Sports Medicine Laboratory at Cornell University. His clinical work and teaching at Cornell focuses on musculoskeletal injury and repair, with a specific interest in regenerative medicine. He also has an adjunct appointment as professor at Colorado State University.

Nixon has authored more than 280 papers and book chapters, two texts on equine orthopedics and is a member of numerous veterinary organizations. He currently has a five-year \$1.8 million National Institutes of Health grant. He also serves as a consultant to the Food and Drug Administration panel on Cell and Gene Therapy.

Established in 1990, the Equine Research Hall of Fame honors international scientific community members biennially who have made equine research a key part of their careers, recognizing their work, dedication and achievements in equine research.

The Harry M. Zweig Memorial Fund for Equine Research honors the late Dr. Harry M. Zweig, a distinguished veterinarian, and his numerous contributions to the state's equine industry. In 1979, by amendment to the pari-mutuel revenue laws, the New York State legislature created the Harry M. Zweig Memorial Fund to promote equine research at the College of Veterinary Medicine, Cornell University. The Harry M. Zweig Committee is established for the purpose of administering the fund and is composed of individuals in specified state agencies and equine industry positions and others who represent equine breeders, owners, trainers, and veterinarians.

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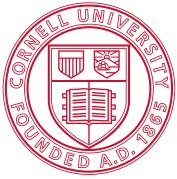
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Zweig News Capsule
S3020 Schurman Hall
Ithaca, NY 14853-6401

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PICTURED ABOVE: Judge Joe, was driven to victory by DR Ackerman as winner of the first division Dr. Harry M. Zweig Memorial Trot.