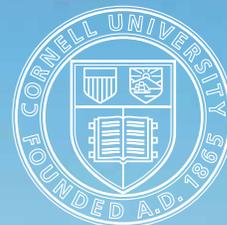


Zweig NEWS



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

No. 57 June 2014

Cornell opens equine hospital close to Belmont

Cornell's College of Veterinary Medicine opened Cornell Ruffian Equine Specialists, a referral and emergency care hospital, near the Belmont Racetrack backstretch on Long Island in Elmont, N.Y. on March 31, 2014.

The College has signed a lease-buy agreement with Racebrook Capital Advisors LLC for the former Ruffian Equine Medical Center. Consistent with Zweig's longstanding interest in equine health, the new hospital will provide elective equine specialty services to horses referred by their attending veterinarians. Full emergency and critical care services are also available.

Cornell Ruffian Equine Specialists will partner with referring veterinarians to meet the needs of the New York state racing and surrounding sport horse communities. The 22,000-square-foot facility will provide state-of-the-art surgical, imaging, diagnostic and rehabilitation services to enhance equine health.

Dr. Alan Nixon, a renowned equine orthopedic surgeon and director of the Comparative Orthopedics Laboratory, will serve as the chief medical officer. Drs. Lisa Fortier and Norm Ducharme, pioneers in regenerative and laryngeal procedures, will also offer advanced surgical procedures. The hospital will be staffed by Cornell veterinarians and technicians and will offer a full complement of advanced orthopedic and soft tissue surgery and regenerative therapies, an

internal medicine service and a broad array of diagnostic modalities, including advanced imaging such as MRI, CT, nuclear scintigraphy, high-speed treadmill endoscopy, arthroscopy and laboratory services.

"We are looking forward to joining the well-established horse-racing and sport horse communities in the area, adding value to veterinarians, trainers and owners in the region and supporting the critical equine industry in the state of New York," said Dr. Michael I. Kotlikoff, the Austin O. Hooey Dean of Veterinary Medicine at Cornell. "The hospital will be within walking distance of Belmont Park, recognized as one of the world's premiere thoroughbred horse-racing facilities, and is easily accessible to the many sport horse enthusiasts located in and around the area. Our goals are to improve the health and safety of the equine athlete and by so doing to strengthen one of the world's premiere racing programs."

"This is an exciting initiative for Cornell," said Nixon. "Through the establishment of Cornell Ruffian Equine Specialists, Cornell will honor Ruffian's legacy. She established herself as one of the greatest racehorses to set foot on the track and is known as the perfect champion and a courageous filly. The new center will continue the sense of inspiration and achievement surrounding Ruffian, and we are eager to partner with the referring veterinarians to do so. We have multiple goals for our new hospital, all of which are patient-centered, client-responsive and community-minded."

CORNELL Ruffian Equine Specialists

INSIDE: NEW CORNELL EQUINE HOSPITAL

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5 BREAKING DOWN BLOOD CLOTS



2014 Research Awards

New

\$60,960 to Dr. Dorothy Ainsworth for "Fine Mapping of Candidate Genes Contributing to Equine Left Recurrent Laryngeal Neuropathy (RLN) in Thoroughbred Horses – Phase II"

\$49,350 to Dr. Robert Gilbert "Effect of Early Pregnancy on Function of the Equine Corpus Luteum"

\$173,259 to Dr. Alan Nixon for "Evaluation of Lubricin as a New Biotherapeutic for Equine Joint Disease"

Continued

\$50,000 to Dr. Douglas Antczak with Rebecca Tallmadge and Nikolaus Osterrieder for "T-cell Mediated Immunity and Vaccine Development in Horses"

\$67,000 to Dr. Thomas Divers with Dr. Bud Tennant for "Etiology and Prevention of Equine Serum Hepatitis (Theiler's Disease)"

\$88,499 to Dr. Bettina Wagner with Gillian Perkins for "Innate Immune Mechanisms and T-cell Responses to Equine Herpesvirus Type 1 in Latently Infected and Naïve Horses"

Revised / Renewed

\$52,696 to Dr. Lisa Fortier for "Cellular Biomarkers of Early Cartilage Injury Measured *in vivo* with Multiphoton Imaging."

\$162,786 to Dr. Bettina Wagner for "A Novel Strategy to Boost Antibody Production to EHV-1 in Neonates"

\$10,000 to Dr. Rolfe Radcliffe for "En Bloc Removal of Intravascular Thrombi via an Extracorporeal Bypass Circuit in Experimentally Induced Jugular Thrombosis in Horses"



Zweig Memorial Trot 2014

Vernon Downs, Vernon, N.Y.

Friday, August 29, 2014

Post Time: 6:45pm

Dr. Scott Palmer appointed Equine Medical Director

The New York State Gaming Commission and the Cornell University College of Veterinary Medicine today announced the appointment of Scott E. Palmer, VMD as the state's Equine Medical Director after conducting an international search. Dr. Palmer, a renowned veterinarian from New Jersey with more than three decades of experience in providing medical care for horses, will oversee the health and safety of horses at all New York State Thoroughbred and Standardbred racetracks. Dr. Palmer will be responsible for all aspects of equine health, safety, and welfare at New York racetracks and will advise the Commission on equine medication policies as well as the safety and condition of racetrack facilities and surfaces. He will supervise all on-track regulatory veterinarians and the New York State Equine

Drug Testing Program laboratory. He will oversee equine testing procedures, ensure compliance with regulatory protocols, investigate incidents, and monitor the Commission's necropsy program. He will serve as an Adjunct Professor at Cornell University's College of Veterinary Medicine, where he will be responsible for developing and coordinating continuing education programs for veterinarians and trainers related to medication and equine injuries. He will coordinate equine sports medicine research and collaborate with faculty on epidemiological studies to analyze equine safety issues.



A unique feature of equine pregnancies

In horses and their close relatives, unusual cells of the placenta invade the mother's womb during early pregnancy. Called endometrial cups, they behave much like cells from metastatic tumors, leaving the placenta and migrating into the uterus, where they secrete the pregnancy hormone, equine Chorionic Gonadotrophin (eCG). Although endometrial cup cells are unique to the horse family, similar invasive cells have been described in human placentas. In both humans and horses these invading placental cells interact with the mother's immune system and are thereby thought to contribute to maternal immunological tolerance of the fetus.

Dr. Doug Antczak was recently invited to commemorate the 100th anniversary of the discovery of the endometrial cups in the inaugural volume of the Annual Review of Animal Biosciences. The paper describes the progression of discoveries in reproduction, evolution, and immunology that followed, as well as future questions that remain to be addressed. It documents the milestones in the study of endometrial cups, but it is also a testament to the success of the Zweig Fund as a program to jumpstart research relevant to equine health. In 1979 one of the first Zweig Fund grants was awarded to Antczak, who had just begun his faculty appointment at

Cornell. That project, on maternal immune recognition of pregnancy, began a 35 year collaboration and friendship between Antczak and Dr. W. R. Allen.

In the following years Antczak and Allen and their students and staff discovered how placental cells, particularly endometrial cups, control expression of histocompatibility genes to avoid destruction by the mother's immune system. They learned how the mother's immune system is regulated during pregnancy to prevent deleterious anti-fetal immune reactions. Finally, they developed and characterized models of pregnancy failure using embryo transfer between horses and donkeys and the use of sterile hybrid mules as embryo recipients. Taken together, these studies have advanced our understanding of how mother, fetus, and placenta communicate and compromise during pregnancy to bring about the miracle of birth.

This fruitful collaboration is an excellent example of how the Zweig Fund has enabled equine scientists and clinicians at Cornell to build strong long-lasting research programs. Such programs have attracted additional funding from national agencies and foundations, produced new information and clinical applications, and provided training for a generation of students who are now pursuing successful independent careers.



Locating Lyme disease

Romping through summer fields seems like a harmless pleasure for horses. But just one bite from the wrong tick can rob an animal of that pastime. The bacteria *Borrelia burgdorferi* live in certain species of ticks, and can infect animals the ticks bite with Lyme disease. Lyme disease can cause a slew of debilitating symptoms from arthritis to outright lameness, cardiac complications, kidney disease, and neurological symptoms from chronic pain and weakness to paralysis. It's important to diagnose the disease early because it becomes progressively harder to treat as the bacteria hide in the joints and organs of their hosts.

"The bacteria that cause Lyme disease are particularly difficult to detect," explained Dr. Bettina Wagner, associate professor in the Department Of Population Medicine and Diagnostic Sciences and director of serology at the Animal Health Diagnostic Center (AHDC) at Cornell. "After infection they tend to hide where they can't be detected. They bury in the joints of dogs, causing arthritis or lameness, or in severe cases kidney disease, the so-called 'Lyme nephritis'. In humans and horses they can also enter the central nervous system, causing pain, paralysis, or behavioral alterations. By the time such clinical signs appear, the bacteria are not in circulation anymore and cannot be detected by tests that target the pathogen directly."

Infection with the bacteria causes the immune system to produce antibodies, protective proteins in the blood, specially tailored to identify, bind and fight specific pathogens such as harmful bacteria. Diagnosticians can test blood samples to see whether an animal made antibodies in response to *B. burgdorferi* bacteria. If the antibodies are detectable, the animal is likely infected.

"The Lyme Multiplex assay has been offered through the AHDC at Cornell since 2011," said Wagner, "The new test exceeds its predecessor in accuracy, specificity, and analytical sensitivity. It is fully quantitative which is important to make treatment decisions and to follow-up on treatment success."



The Lyme Multiplex assay for horses and dogs was developed by Wagner and her colleagues at Cornell. It detects antibodies to three different antigens of *B. burgdorferi* simultaneously in one test. Multiplex technology has been around for the last decade, but the Animal Health Diagnostic Center (AHDC) is the first veterinary diagnostic laboratory that used it for Lyme disease testing. Different kinds of antibodies can be found in the body at different stages of infection. The new test can distinguish and measure these differences, giving more information about the disease.

"With the Lyme Multiplex assay, we can not only distinguish between infection and vaccination, but between early and chronic infection stages," Wagner noted. "That was not possible before the Lyme Multiplex Assay was available. Previously, we were able to say whether an animal was infected, but not when or how far the infection has developed."

The test helps veterinarians to make advanced decisions about treatment. Antibiotic treatment of Lyme disease is much more effective during the early infection stages. The longer the infection persists, the more difficult it gets to treat or cure. If veterinarians decide to treat an animal for Lyme disease, they usually conduct Lyme Multiplex follow-up testing to see if the treatment was successful.

"We look at the improvement of clinical signs and for a clear decline of antibodies in the blood," Wagner said. "With the information the Lyme Multiplex assay gives us before and after treatment, we can measure its success and better manage Lyme disease in animals."

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Breaking down blood clots

A clot cutting off blood to the wrong place can spell disaster or death for unborn foals and even adult horses. When the infectious disease equine herpes virus-1 (EHV-1) causes its infamous effects, abortions and adult neurological disease, blood clots are to blame.



Clinical pathologist Dr. Tracy Stokol has been investigating how the virus triggers these clots. Her Zweig-funded work investigating the role of platelets in the pathogenesis of EHV-1 infection has shown that EHV-1 virus particles seem to be binding to platelets, small cells in blood involved in clotting.

When incubated together with platelets at a multiplicity of infection (MOI) of 1 – a ratio of 1 virus particle per platelet – particles of the neuropathogenic strain Ab4 and abortion-inducing strain RaCL11 induced platelet activation within 10 minutes. Activation causes the release of P selectin, a protein that platelets use to bind to other cells, such as the cells lining blood vessels. The viral gene product glycoprotein B was also amplified from platelets, suggesting that the virus is binding to them directly.

“We are excited to discover that EHV-1 activates platelets,” said Stokol. “Platelets play a crucial role in thrombosis, a major cause of abortion and neurological symptoms due to EHV-1. If platelets are involved in the pathogenesis of these EHV-1-associated disease syndromes, administration of platelet-inhibiting medications such as Plavix or aspirin may prove useful in the treatment of infected horses.”

Stokol is planning several experiments to address the many remaining questions regarding how EHV-1 activates platelets. These include projects that will determine if virus-mediated platelet activation requires other clotting proteins in blood, if the virus uses known cell receptors, such as MHCII, to bind to and then activate platelets, and if inhibitors, such as Plavix and aspirin, can prevent the virus-induced platelet activation.

She is continuing an innovative technique involving growing equine endothelial cells, which line blood vessels, in a microfluidic device to determine whether virus-activated platelets show increased binding to these cells, which could spur clotting and potentially inflammation.

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 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.

CORNELL UNIVERSITY COLLEGE OF VETERINARY MEDICINE 2014 HARRY M. ZWEIF MEMORIAL FUND COMMITTEE

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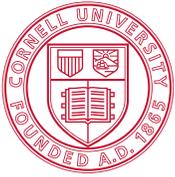
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Cornell Ruffian Equine Specialists held its Grand Opening Celebration on May 7, 2014!
Visit us at: <http://ruffian.cornell.edu/> and www.facebook.com/CornellRuffian

From left: Drs. Alan Nixon, Michael Kotlikoff, Lisa Fortier, Samuel Hurcombe, Lorin Warnick, Norm Ducharme, and Gabriel Cook.