

Zweig

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



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Genes influence sarcoids in horses

Sarcoids are the most common form of cancer in horses; the skin tumors develop as small bumps under the skin or scaly lesions that can easily be removed by a veterinarian, but can turn lethal in some horses. Until now, little was known about why the papillomavirus behind sarcoids strikes some horses and passes over others. A new study by an international research group led by scientists at the Baker Institute for Animal Health at Cornell's College of Veterinary Medicine reveals that genetic differences in immune function between horses partly accounts for these differences. The results could eventually help scientists design a therapeutic vaccine for sarcoids that could be administered to horses to help their immune systems fight off the infection.

"Many therapies have been proposed as the 'best' treatment for sarcoids," says Doug Antczak, the Dorothy Havemeyer McConville professor of equine medicine who led the study. In some horses, tumors develop as small bumps under the skin or scaly lesions that can easily be removed by a veterinarian, but in other horses the problem becomes much more serious. Surgery, cryotherapy (freezing the tissue), laser treatment, injecting the tumors with drugs to kill the cells, radiation treatment, and immunotherapy have all been shown to cure these more recalcitrant tumors, "but some tumors tend to recur no matter what treatment is used, and there is no universal consensus on a uniformly successful therapy," says Antczak.

Antczak says scientists have known for years that bovine papilloma-virus (BPV) is the most likely culprit behind sarcoid tumors. Recent work from Europe suggests that variants of this virus have become adapted to horses and are probably the cause of most sarcoids.

Antczak and his team used a genome-wide association study to compare the genetic makeup of horses with and without sarcoid tumors at over 50,000 sites in the equine genome. They studied 82 sarcoid-bearing horses from the US and United Kingdom and 272 controls that did not have sarcoids. They found regions



Dr. Doug Antczak

on chromosomes 20 and 22 that tended to be different in horses diagnosed with sarcoids, hard evidence that a horse's genes determine, in part, how susceptible it is to sarcoids.

Interestingly, this genetic link implicates the immune system in sarcoid susceptibility. The region of chromosome 20 associated with sarcoid development is located within a portion of the genome responsible for immune function called the Major Histocompatibility Complex (MHC) class II region. The MHC type that is associated with sarcoid susceptibility is very rare among Standardbred horses, a fact that may explain why sarcoid is diagnosed so rarely in this breed.

Antczak says knowing that the virus takes advantage of horses with a particular immune feature means a therapeutic vaccine for sarcoids could eventually be developed to bolster the immune response and help a horse recover.

Once such a vaccine is developed, "you could identify horses that are genetically susceptible and vaccinate them, or wait and treat them with the vaccine once they develop sarcoids," says Antczak.



Harry M. Zweig Memorial Fund For Equine Research 2016 Awards

NEW

\$58,702 to Dr. Julia Felipe for "Reducing Equine Herpes Virus Viral Load & Recurrence through Epigenetic Control"

\$63,887 to Dr. Lisa Fortier for "Macrophage Regulation of Mesenchymal Stem Cell Function in Tissue Regeneration"

\$72,661 to Dr. Hussni Mohammed for "Factors Predisposed to Musculoskeletal Injuries and Catastrophic Events in Racing Horses"

\$100,000 to Dr. Alan Nixon for "Arthritis Control through Dual Axis Lubricin Over-Expression and Catabolic Cytokine Antagonism"

\$84,750 to Dr. Bettina Wagner for "Effects of Equine Herpesvirus (EHV) Vaccination Frequency on Host Immunity to EHV-1"

\$49,242 to Dr. Gerlinde Van de Walle for "Defining the Relationship between Equine Herpesvirus & Development of the Equine Gastric Ulcer Syndrome (EGUS)"

CONTINUED

\$50,250 to Dr. Robert Gilbert for "Controlled Postponement of Ovulation in Mares"

\$62,715 to Dr. Alan Nixon for "Enhanced Breakdown Screening in Thoroughbred Racehorses through Multimodal Imaging & Serum Biomarker Combinations"

\$82,514 to Dr. Tracy Stokol for "Platelets are a Trojan Horse that Deliver Equine Herpes Virus to Endothelial Cells"



Zweig Memorial Trot 2016

Vernon Downs, Vernon, N.Y.

Sunday, July 24, 2016

Post Time: 6:45 PM

Information: 1-877-888-3766 | www.vernondowns.com/racing

Trooping the colour: an invitation to the Queen's 90th birthday celebration



By Pat Wehle, Harry M. Zweig Memorial Fund Committee member

As a lifelong horseman and admitted “Royal Nerd,” I was thrilled to receive an invitation to attend the Queen’s 90th Birthday Party at Windsor Castle in May. The program was a salute to the Queen from the Commonwealth including 900 horses and 1500 people. It turned out to be truly the trip of a lifetime.

I received the invite to attend thanks to my involvement with a wounded veterans’ program at the Equicenter in Mendon, NY. We provide therapeutic riding for wounded military and their families. There is a high incidence of suicide among our veterans, and therapeutic horseback riding has been shown to make a huge positive difference to veterans’ mental health to the point of preventing potential suicides. I’m thrilled to support this program. Several years ago, we developed a relationship with the Queen’s Household Cavalry Guards, the Queen’s personal bodyguards. Founded in 1660, it’s arguably the most prestigious military unit in the world. Last fall four of the Guardsmen came to visit the Equicenter to see first-hand how our program worked and to meet our veterans. We are eager to share best practices and procedures with anyone interested in the welfare of wounded veterans. The

invitation to the birthday party came through the Household Cavalry Guards Foundation.

To say this was the quintessential example of British Pomp and Circumstance, is an understatement. Horses and bands from Oman, Azerbaijan, Canada, and Fiji among others were featured. The best and most moving performances were I think, the Household Cavalry Musical Ride and the King’s Troop Royal Horse Artillery Musical Drive. It was astounding.

Our group was invited to tour the Knightsbridge Barracks the next day, and also visited the Horse Trust, which accepts retired police horses, some of the Queen’s horses, and rescues horses from the region. They are one of the largest funders of equine research in Europe and may provide opportunities for collaborative research work.

It was truly and extraordinary experience. Above all, we hope this relationship will help us spread the word about dramatic positive effects therapeutic riding has on the health and well-being of our wounded veterans and their families.

Above Left: Patricia Wehle and veterinarian for the Household Cavalry Guards. Above Right: Mercury, a Drum Horse in the Queen’s Band of the Life Guards.

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Still in step

by Teresa Genaro

Zweig Committee Member Bill Wilmot and his wife Joan Taylor were profiled in the March 2016 issue of the New York Thoroughbred Breeder's magazine, discussing their work on Stepwise Farm, their career paths as veterinarians and breeders, and their experiences in running a small, but successful business.

Below is an excerpt from the profile piece. Please visit <http://www.nytbreeders.org/magazine> to read the full story.

Though they've downsized their commercial breeding business, both Wilmot and Taylor remain active in the industry. He serves on the board of the New York State Thoroughbred Breeders' Development Fund; she was elected to the board of New York Thoroughbred Breeders after being appointed last year to fill the spot vacated by Barry Ostrager, who resigned after being appointed to the Civil Branch of the New York state Supreme Court.

Taylor is also designing a series of educational seminars for the state's breeders.

"It's a nice way to help give back to the industry," she said. "We've got some very experienced people in the state, and this is an opportunity for them to share their knowledge."

Sponsored by the Breeders' Development Fund and NYTB, the first seminar, on foaling mares, was held in December at Fasig-Tipton's Humphrey S. Finney sales pavilion in Saratoga Springs. The next is scheduled for April 30 and will focus on raising horses from foals to yearlings.

"We try to do timely topics related to what's going on in the breeding industry at that time of year," Taylor explained. "The first one was very well attended."

With decades of success as commercial breeders behind them, Taylor and Wilmot know what it takes to breed and raise a foal that will sell well, but it's that experience that has tended to keep them humble.

"You always need luck," said Taylor. "You can't ever think you know it all. You can do everything right and things still don't work out. It's an unbelievable gauntlet, from the time you make the decision to breed a mare to picking the stallion to when the hammer falls. It's always great when your horse goes to the sale looking great and has learned to walk and behaves and is well-received. It's rewarding for the whole staff."

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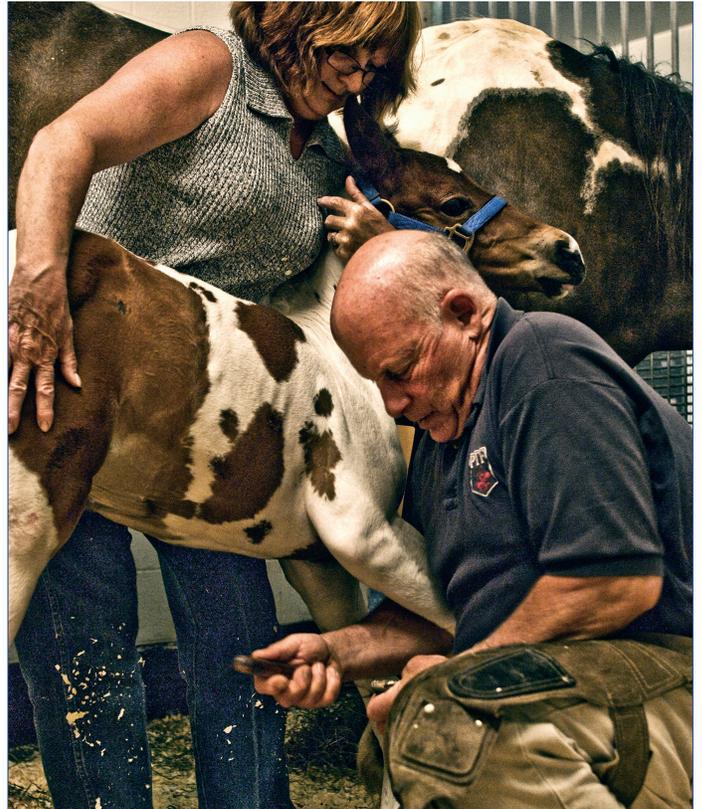


Bill Wilmot and Joan Taylor
Photo credit: Skip Dickstein

Hall of Fame farrier

Cornell Head Farrier Steve Kraus was inducted into the International Horseshoeing Hall Of Fame in Louisville, Kentucky on February 4, 2016. The hall honors farriers around the world who have made significant contributions to the profession. Nominations are submitted by peers, trainers, veterinarians, horse owners, friends and family members, and winners are chosen by current hall members.

Kraus first began horseshoeing as an undergraduate at Cornell, and eventually became head of the Cornell Farrier Program. In this role, Kraus teaches his students the theory behind basic and corrective horse shoeing and hoof trimming; therapeutic methods; splint fabrication and more, followed by hands-on practice under his supervision. He travels and lectures about horseshoeing topics nationwide. Kraus also runs an annual Farrier Conference, now in its 32nd year. Professionals from across the U.S. attend to learn the latest techniques as well as the time-honored crafts of blacksmithing and tool making, taught by experts.



Head Farrier Steve Kraus tends to a foal's hooves.

Cornell Ruffian Equine Specialists using 4DDI robotic scanners to produce real-time 3-D images

Cornell Ruffian Equine Specialists (CRES), an affiliate of the College of Veterinary Medicine at Cornell University, has acquired one of the world's first open-format standing computed tomography (CT) scanners. The EQUIMAGINE™ system, developed by Four Dimensional Digital Imaging (4DDI), uses two or four computer-controlled robots to maneuver around the horse's body. It produces three-dimensional, real-time images that permit equine surgeons to precisely evaluate the structure of the animal's limbs, head, neck and in the near future, torso.

"The quality and resolution of the real-time images created with the 4DDI system far exceed those of existing technology," says CRES Clinical Director Tom Yarbrough. "It represents a giant leap forward in our ability to detect problems at the earliest stages, when they are far easier and less expensive to address."

Existing CT systems require that the horse be anesthetized and lying down. Horses scanned by the 4DDI system are sedated and standing, avoiding the risks associated with anesthesia and prolonged recumbency.

And while existing CTs are limited to the parts of the animal that fit into the cylindrical machines, the new system facilitates an unlimited range of motion and unencumbered access to the horse's entire anatomy. Yarbrough says CRES is now working with 4DDI to integrate a treadmill with the system for motion analysis. CRES surgeons also will use the 4DDI system for preoperative planning and evaluation of complex fracture reconstructions during surgery, as well as rapid evaluation of skull and sinus disease.

Racing continuing education modules reins in thoroughbred fatality rates

Horse racing fatalities are a serious issue being investigated by Zweig-funded researchers. A direct result of this effort is a brand-new continuing education (CE) module titled "Introduction to Thoroughbred Risk and Protective Factors," now available on the Grayson-Jockey Club Welfare and Safety of the Racehorse Summit Website (<http://courses.grayson-jockeyclub.org>).

The module caps of more than a year of collaborative effort between author Dr. Scott Palmer, equine medical director of the New York State Gaming Commission, and Alicia Benben,

academic coordinator and instructor at BCTC-NARA (Bluegrass Community and Technical College-North American Racing Academy).

Data presented in the module represents information obtained from the NYSGC-Cornell University Post Mortem Examination Program and the epidemiological research funded by the Zweig Committee.



Dr. Scott Palmer

"One of the most important aspects of the epidemiological and pathological research we are doing is that we are not just writing scientific manuscripts," says Palmer. "We are bringing this information directly to the horse trainers and veterinarians in a very practical format so that they can help prevent injuries in the future."

According to Palmer, this work has thus far resulted in a 50% decrease in Thoroughbred racing fatalities in the past four years. Prior to starting this program, the thoroughbred fatality rate in New York was 2.1/1000 starts. In 2014, that rate was reduced to 1.3/1000 starts, and in 2015 it was 1.4/1000 starts. In the first six months of 2016, the thoroughbred fatality rate was 1.1/1000 starts. "The referenced CE Module is part of that effort," says Palmer.

This is the fourth course to be offered as part of a Grayson-Jockey Club CE initiative that originated with the Grayson-Jockey Club Welfare and Safety Summit in 2015. These interactive courses are free and can be used for credit for the proposed New York Required CE program for trainer continuing education.



In case you missed it:

Lecture Schedule at 7th Annual Harry M. Zweig Memorial Fund for Equine Research Poster Session & Talks:

- Interleukin-10 Overexpression helps Protect Equine Cartilage in Osteoarthritic Model (Kyla Ortved – Assistant Clinical Professor)
- Early Response of the Equine Corpus Luteum to Pregnancy (Robert Gilbert – Professor)
- The Equine Mesenchymal Stem Cell Secretome as a Novel Therapy in Wound Healing (Gerlinde Van de Walle - Assistant Professor)
- Current Concerns in the Horse Industry (Dr. Ann Dwyer—2013 President of AAEP)
- Immunomodulation to Improve Peripheral Nerve Regeneration (Joy Tomlinson – Cornell Clinical Fellow)

Dr. Hélène Marquis seeks safer strangles vaccine

Strangles, an illness caused by the bacterium *Streptococcus equi*, affects the upper respiratory tract of horses, can last for several weeks and cause serious and long lasting respiratory problems. The disease is highly contagious and outbreaks are difficult to control because a large number of affected horses become carriers. Although the vaccines that are currently available confer moderate protection, they occasionally induce abscess formation and carry a risk of exacerbating the infection.



Through funding from the Zweig Fund, Dr. Hélène Marquis, professor of microbiology and immunology at Cornell, is studying the molecular mechanisms of pathogenicity of *S. equi* and planning to create a safe and protective vaccine against strangles. "One of the major hallmarks of *S. equi* pathogenesis is its ability to resist killing by neutrophils," says Marquis. "Although neutrophils [white blood cells] migrate in large numbers to the site of infection, their ability to phagocytose [consume] and kill *S. equi* is highly compromised."

Marquis says this phenomenon is due in part to *S. equi* having an outer capsule with strong anti-phagocytic and non-immunogenic properties. *S. equi* also possess long hair-like appendages on its surface, known as pili. "We hypothesize that these pili contribute to the ability of *S. equi* to colonize tissues" says Marquis, "and that anti-pilus antibodies can neutralize the anti-phagocytic activity of the capsule and consequently increase the ability of the host's immune system to then kill the bacteria."

To test this hypothesis, Marquis' team will purify pili to generate anti-pilus antibodies, and then test to see if they will increase the efficacy of the host's immune response to the bacteria.

"If the results support our hypothesis, it will imply that elicitation of anti-pilus antibodies in the horse may confer protection against strangles by two mechanisms," says Marquis. "One, by increasing the efficacy of neutrophil and complement-mediated killing of *S. equi*, and two, by compromising the attachment of *S. equi* to tissues."

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.

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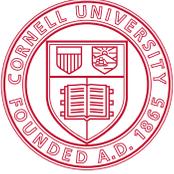
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Welcome to our new Zweig Committee members



Scott Ahlschwede, DVM

*Rood & Riddle Equine Hospital
Saratoga Springs*

Dr. Scott Ahlschwede graduated from Texas A&M College of Veterinary Medicine and began his veterinary career in Lexington, Kentucky as an intern at Rood & Riddle Equine Hospital in 1996. He practiced in the Lexington area for 15 years as an ambulatory veterinarian specializing in reproduction, primary and preventative care, and sales evaluation. In 2012, Ahlschwede moved to upstate New York to develop Rood and Riddle's first practice outside of Lexington, Kentucky.



Laura Javsicas, VMD

Rhinebeck Equine LLP Rhinebeck, NY

Dr. Laura Javsicas received a B.A. in Biology from Cornell University, where she was co-captain of the equestrian team, then attended veterinary school at the University of Pennsylvania. After receiving her VMD in 2004,

she did a one-year internship at the Hagyard Equine Medical Institute in Lexington, Kentucky. Javsicas then completed a three-year residency in equine internal medicine at the University of Florida. Following her residency, she stayed on at the University of Florida as a member of the faculty. In 2009, she moved to Saratoga Springs, where she worked at an equine clinic providing in-hospital internal medicine services and general ambulatory care until joining Rhinebeck Equine in 2013. Javsicas is board certified by the American College of Veterinary Internal Medicine in Large Animal Medicine and has special interests in neonatology, ultrasonography, cardiology, gastrointestinal diseases and emergency/critical care medicine.

And, a very heartfelt thanks to our outgoing Zweig Committee members:

- Jean Brown – Sr. Vice President Operations – Blue Chip Farms, Inc.
- Paul Kelley - Kelley Racing Stable, LLC

Have you visited our Web site lately?

www.vet.cornell.edu/research/zweig

This site provides information on the projects and publications resulting from the Zweig Memorial Fund, and demonstrates the objectives of the Fund in promoting equine health in the racing industry.

The Zweig News Capsule is published twice a year, and can be downloaded in PDF format at <http://bit.ly/ZweigNews>
Please encourage other equine enthusiasts to visit this site.