

# Zweig

NEWS CAPSULE

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

## To make patient-side care possible

Dr. Lisa Fortier is committed to discovering the most effective regenerative therapies for tendon and cartilage damage. Although her primary concern is to improve the quality of life for horses, her work is relevant to human medicine, as the horse is recognized as a marvelous model for diseases that afflict people, too.

With generous support from the Zweig Fund, Fortier and her team conduct biologically-based research designed to improve the cellular response to injury of tendon and cartilage. Enhancing the healing response on a cellular and molecular level, Fortier says, may ultimately improve the quality of repair, improve the prognosis for return to performance, and decrease the incidence of re-injury. Their research is based on a trilogy: stem cells, growth factors, and a suitable scaffold. In addition, the goal with any new therapy developed is to complete the procedure using a simple joint scope with just one visit to the operating room for which some new and improved equipment is necessary. The long-term goal is to develop a regenerative methodology that can be utilized by all equine surgeons, not just those in an academic setting.



In her research, Fortier uses self-derived adult stem cells. They are abundant, pose no risk of rejection from the patient's immune system, and her lab group has developed and verified a marker that can be used

to enrich the stem cells from a bone marrow sample. We now need to take advantage of this information and develop a method to isolate stem cells from a bone marrow sample right in

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# To make patient-side care possible

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the operating room. To complete the trilogy, platelet rich plasma provides the growth factors (stored in platelets) and the scaffold (a framework to which stem cells cling, thus holding them in the desired location).

“Generation of the optimal platelet rich plasma is one of the issues driving our equipment needs,” said Fortier. “There are more machines than cereals in the grocery store to do this, but they all produce a different ratio of platelets and white blood cells. We need platelets to enhance repair, but a minimal number of white blood cells because our work indicates that the presence of white blood cells can be directly correlated to the loss of normal tissue. One of the major projects in the laboratory is to determine what the optimal ratio of platelets to white blood cells is and then to use this information to drive the industry towards generation of a machine to match our needs.”

“To make regenerative medicine-based surgery a realistic option for our clients, Fortier says it needs to be a one-day, one trip to the operating room procedure. “We need to be able to collect bone marrow directly before surgery, extract the stem cells and generate the platelet rich plasma while the horse is being prepared for surgery,” said Fortier. “This way,

when the horse is ready, we will have the necessary stem cells and platelet rich plasma to complete the repair procedures.”

Fortier earned her DVM at Colorado State and completed a PhD and large animal surgery residency at Cornell. She is the president of the International Cartilage Repair Society, and she and her husband, Dr. Alan Nixon, Professor of Large Animal Surgery at the College, have three children.



Fortier, pictured in front, with several members of her research team, including (from left) Ms. Emily Sundman, Drs. Julia Flaminio, Catherine Hackett, and Taralyn McCarrel.

## Zweig format to change in 2012

The Dr. Harry M. Zweig Memorial Trot for 3-year-olds (an open and filly division) will have a new format and a new purse when the rich and historic race goes postward in 2012.

Starting with the yearlings being nominated in 2010 to race as 3-year-olds in 2012, the single final and consolation format will replace the current practice of racing divisions.

## 2010 Grants Awarded

### New

\$97,729 to Dr. Norm Ducharme for “Tissue Engineered Cartilage in the Equine Airway”

\$71,563 to Dr. Lisa Fortier for “Optimization of Platelet Rich Plasma Components for the Treatment of Tendonitis”

\$56,884 to Dr. Robert Gilbert for “Controlled Postponement of Ovulation by Progestagen Treatment”

\$48,000 to Dr. Vicki Meyers-Wallen for “Generation of a Molecular Resource to Identify Gene Mutations Causing Inherited Equine Sterility and Infertility”

\$47,068 to Dr. Alan Nixon for “Targeted Delivery of Stem Cells for Pro-Inflammatory Cytokine Suppression in Arthritic Joints”

### Continuation

\$35,000 to Dr. Douglas Antczak for “Expression Microarrays and Equine Placental Development”

\$35,774 to Dr. Sylvia Bedford-Guaus for “Further Characterization of the Specific Activity and Ultrastructural Localization of Phospholipase C zeta in Fertile and Subfertile Stallions”

\$50,887 to Dr. Bettina Wagner for “Analysis of Innate Immune Response to EHV-1 Infection”

### Supplemental

\$800 to Dr. Susan Fubini for “Indices of Intra-Abdominal Fibrinolysis in Colic Foals: Pathogenic and Prognostic Markers”

Behind the scenes with Dr. Vicki Meyers-Wallen

## Triumvirate of passions ... and a career is born



Genetics is the foundation of life. It affects all that we are – physically and mentally – and has the capacity to determine our fate. Dr. Vicki Meyers-Wallen has directed much of her research according to this premise, having solidified the direction her scientific investigations would take while working under the guidance of Dr. Donald Patterson, recognized as the father of veterinary medical genetics. In a part-time position with Dr. Patterson while a veterinary student at Penn, and then as a Resident in Medical Genetics, she explored her interest in three areas: small animal genetics, reproduction, and pediatrics.

“Combining my interests has made a fascinating career,” said Dr. Meyers-Wallen. “Reproductive genetics is

at the root of healthy babies and holds the keys to eliminating disorders of sexual development. We can prevent a wide range of issues and make life a lot easier for people and animals when we deepen our understanding of genetics.”

Genetic disorders of equine sexual development, such as undescended testes, sex reversal, testicular feminization,

and uterus masculinus are, together, the major reported cause of inherited sterility or infertility reported in horses, according to Dr. Meyers-Wallen. Equally devastating, many horses are carriers, meaning they do not exhibit symptoms, but can pass the mutated genes to offspring.

A one-year grant from the Zweig Fund has Dr. Meyers-Wallen and her Research Associate, Dr. S. Pujar, well on their way down this equine medical genetics path, with the goal of developing a molecular testing panel to identify the equine counterparts of 15 genes known to cause disorders of sexual development in humans and other mammals. The final diagnostic panel will be available at the College’s Animal Health Diagnostic Center,

readily accessible to the New York State horseracing industry and will require either a blood or hair sample for DNA testing. This genetic test may someday replace the current practice of ultrasound and physical examination, and will be capable of definitively diagnosing carrier and affected horses before investments in breeding and training are made.

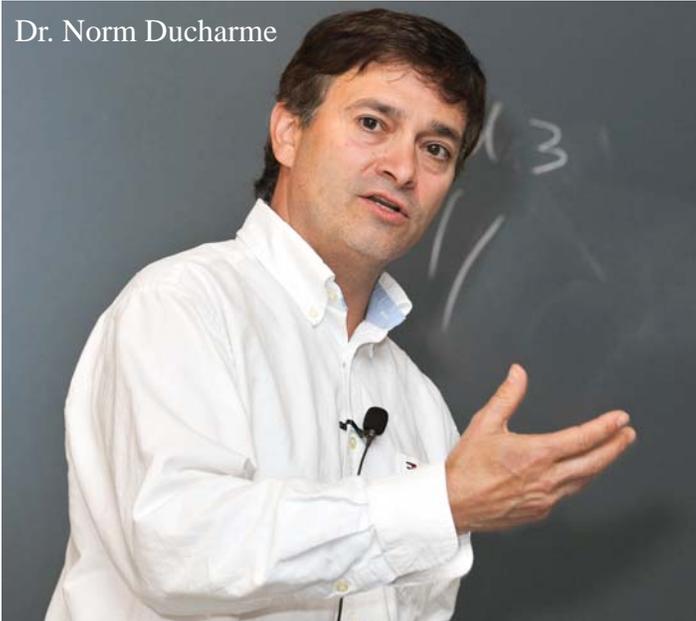
“Sterility and infertility in affected horses cause losses to the industry, and for owners, a reduction in the economic value of individual horses,” said Dr. Meyers-Wallen. “Desirable performance traits in sterile horses are lost to the equine gene pool; affected horses often have associated undesirable physical or behavioral features that require surgical correction, incurring significant expenses for the owner; and, early identification will prevent unknowing investments in young horses that have no breeding value.”

Society has a national system in place to objectively record the incidence of inherited disorders in humans, but there is no such system for horses, according to Dr. Meyers-Wallen, who is an Associate Professor of genetics and reproduction.

“We have no reliable source to determine how prevalent these conditions are,” said Dr. Meyers-Wallen. “Owners and veterinarians rarely seek a definitive diagnosis, choosing instead to cut their financial losses and sell the horse without following up on potential carriers in the pedigree, which allows the mutant genes to remain in the gene pool. Our genetic test will provide the means to eliminate reproductive disorders from horse populations.”

# Zweig enthusiasts celebrate 30 years of focused energy

Dr. Norm Ducharme



Members of the Harry M. Zweig Memorial Fund for Equine Research committee celebrated 30 years of focused energy at the College of Veterinary Medicine in November 2009 with presentations and a wine and cheese reception. Featured speakers at the event included the following:

**Sophy A. Jesty**, Harry M. Zweig Clinical Fellow  
 “Researching Cardiac Disease, From Mice to Men to Horses”

**Bettina Wagner**, Harry M. Zweig Assistant Professor (2009-2011)  
 “The Equine Immune System”

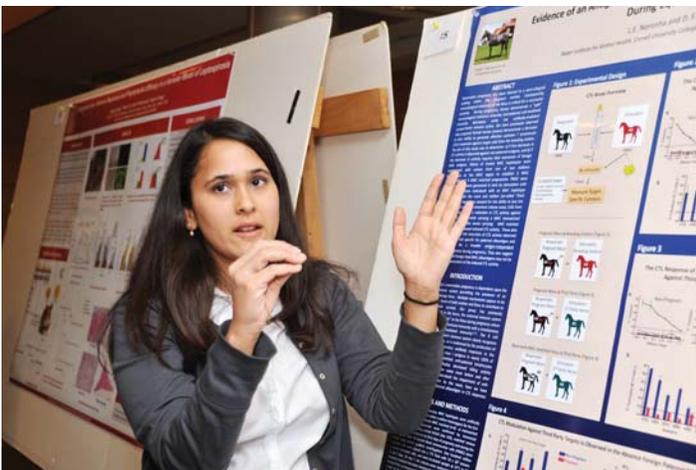
**Julia Flaminio**, Harry M. Zweig Assistant Professor (2006-2008)  
 “Immunity Against *Rhodococcus equi*: The Horse’s Point of View”

**Alexander Travis**, Associate Professor  
 “Nanoscale Energy Production for Implantable Medical Devices: Moving from Science Fiction to Reality”

**Sylvia Bedford-Guaus**, Assistant Professor  
 “Molecular Characterization of Equine Phospholipase C Zeta (PLC): A Protein Required for Stallion Sperm Fertility”

**Norm Ducharme**, Professor and Medical Director, Equine and Farm Animal Hospitals at the Cornell University Hospital for Animals  
 “Zweig Impact on Upper Airway Surgery”

Dr. Julia Flaminio



The celebration featured a poster session where nearly 30 researchers shared insights from Zweig-funded research. The posters were created by faculty, graduate students, and residents. Pictured: Dr. Leela Noronha



The Harry M. Zweig Memorial Fund for Equine Research committee. Jean Brown is not pictured. Joseph Lynch (standing, second from left) attended as a delegate for John Sabini.

## Dr. Robert Tugel joins committee



A horse enthusiast for nearly half of a century, Dr. Robert Tugel is the newest committee member of the Harry M. Zweig Memorial Fund for Equine Research. As such, he is looking forward to his role in continuing the Committee's long-standing commitment to quality-of-life-changing research.

"I've been following the work of this fund—the results that come from the projects supported—for almost 20 years," said Dr. Tugel, who is the owner of Farmington Equine Associates. "The new information that is learned, the new procedures that are safely and successfully tried, the improved quality of life for horses, is amazing. I am looking forward to my responsibilities to ensure that the funding continues to be strategically channeled for the benefit of horses and the profession."

Tugel's practice currently supports three veterinarians and is located at the Finger Lakes Race Track. Given the track's relatively long season (from mid-April through early December), the practice does not have to follow its clients south in the winter. This, Tugel says, is both an unusual situation for veterinarians who serve race horses and personally gives him the opportunity to enjoy one of Cornell's favorite winter sports: ice hockey.

After earning his DVM at the University of Missouri in 1980, Tugel worked at a general equine practice in upstate New York for three years before joining Dr. Robert Carr '63 at the Finger Lakes Race Track veterinary practice. Carr introduced Tugel to the clinicians at the Cornell University Equine Hospital.

"I've had many successful interactions with the clinicians at the Cornell Equine Hospital and am continually impressed with their ability to improve the performance capacity and quality of life for Thoroughbreds," said Tugel, adding that there is nothing more exciting than watching a Thoroughbred in the final stretch. "I'm looking forward to continuing these interactions in a way that will benefit the whole profession."

## Have you visited our web site lately?

[www.vet.cornell.edu/public/research/zweig/index.htm](http://www.vet.cornell.edu/public/research/zweig/index.htm) provides information on the projects and publications that have resulted from funding by the Zweig Memorial Fund. It also demonstrates the objectives of the Zweig Memorial Fund in promoting equine health with regard to the racing industry. Please encourage equine enthusiasts to visit the site.

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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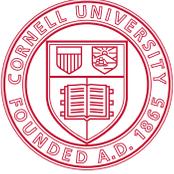
**Anna Zweig**

Middlebrook Farm

**Brian Zweig**

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Join College faculty and racing enthusiasts at the 2010 Harry M. Zweig Memorial Trot on Sunday, August 29, at Tioga Downs. This marks the fifth year the Zweig Trot has been run at the track.

