

Art

... and
science



Researchers Peter Physick-Sheard (left) and Kim McGurrian are helping horses such as Artist – “Art” for short – stay on track with a new pocket-size heart monitor. See page 19

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University of Guelph student research-writing activities are supported by:

Pioneer Hi-Bred Ltd (founding sponsor)	<i>Guelph Mercury</i>
AdFarm	MaRS Landing
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Publications Mail Agreement Number 40064673

Please return undeliverable Canadian addresses to:
Room 437 University Centre, University of Guelph
Guelph ON N1G 2W1 Canada

Printed at Sportwood Printing, September 2008, ISSN 0841-9493

Visit the University of Guelph research site:
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Cover photo: Kyle Rodriguez

Contributor photos: Dave Peleschak

LET'S START HERE

Strong research support for the booming equine sector



Steven N. Liss

Ontario's equine sector is flourishing and scientific and technological advances are vital to this success. The number of horses in the province has grown by almost 30 per cent in the past 10 years, mainly due to a flurry of small horse farms being established as rural Ontario's population expands.

The horse racing industry is thriving as well. Racing generates \$2.6 billion for the province every year, and the equine athletes fuelling this sector have health and performance issues similar to their human counterparts. For example, both equine and human athletes suffer from debilitating joint injuries that require time to repair. Thanks to advances in research, these injuries can be prevented and effectively treated when they occur.

Indeed, advancements in horse health and care go beyond the equine arena. They can – and do – improve human health, through increased knowledge and new technology. To this end, the University established in 2003 the Institute for Animal-Human Links in Health Science Research. It has a specific mandate to link animal-health research with human-health initiatives, and equine studies play a large role in this endeavor.

It's within this bigger context of health promotion, disease prevention and education that Equine Guelph has established itself as a leader in equine research and innovation. It promotes and supports findings by University of Guelph researchers that contribute to the health of rural communities and the environment by providing the know-how to sustainably and responsibly grow the equine sector.

Equine Guelph was launched five short years ago. This edition of *Research* magazine, written and compiled by our team of SPARK student writers, is a testament to Equine Guelph's intrinsic role in the sector's growth. It has galvanized equine research at the university and has brought focus to research challenges and opportunities in support of an exciting and vibrant equine sector.

Steven N. Liss, PhD
Interim Vice-President Research

Research funded by Equine Guelph includes contributions from the E.P. Taylor Equine Research Fund, the Horsemen's Benevolent and Protective Association of Ontario, Ontario Ministry of Agriculture, Food and Rural Affairs, Ontario Racing Commission and the University of Guelph.



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President's Message

A celebration of partnership and growth



In 2003, a partnership between the University of Guelph and the equine industry created Equine Guelph for teaching and research in horse health and well-being.

Today, we have a five-year success story that deserves recognition.

For horse owners and equine industry workers, Equine Guelph offers a certificate program in equine science and a diploma in equine studies. New this fall will be a certificate program in equine business management and an online course in equine journalism intended to expand the stable of writers covering this fast-growing field.

This year, for the first time, Equine Guelph's EquiMania! travelling youth education centre took part in the Royal Manitoba Winter Fair. This award-winning initiative promoting horse health and safety will also launch a new program called "Play Safe, It's Horse Sense" at the Royal Agricultural Winter Fair in Toronto.

On the research front, Equine Guelph enjoys close ties with University of Guelph investigators, including many researchers in the Ontario Veterinary College. A research committee works with industry partners to allocate funding for peer-reviewed research projects. As a result, Guelph researchers have furthered our understanding of disease transmission, the use of new diagnostic tools, horse behaviour and racing performance, and the incidence of racetrack injuries.

A recent provincial report outlined a vision to advance Ontario's horse racing and breeding industry in a socially responsible way, sustained by teaching and research. Among its

recommendations, the report specifically supported equine research and education at the University of Guelph.

Those recommendations come as welcome news. The Ontario Veterinary College has long been a world leader in veterinary health care, learning and research. Ensuring horse health is just part of the wider college mandate of maintaining and improving the health of our companion animals, training veterinarians and scientists, ensuring food safety and public health, and protecting our environment.

Campus-wide, those ideas underpin U of G's leadership role in sustaining and enhancing Canada's ever-important agri-food industry. Earlier this year, the University celebrated the renewal of an enhanced partnership with the Ontario Ministry of Agriculture, Food and Rural Affairs. By supporting innovative research and education at Canada's oldest and largest agricultural school, that partnership yields social, economic, environmental and health benefits for our province, for our country and, indeed, for the world.

On Equine Guelph's fifth anniversary, we celebrate a partnership between the University of Guelph and the equine industry. I invite you to learn about the benefits of that partnership by reading this edition of *Research* magazine.

Alastair J. S. Summerlee
President and Vice-Chancellor
University of Guelph



Equine Guelph's 5th Anniversary

**A Celebration of
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Equine Guelph

For good horse health

Research

- Over \$500,000 is invested annually in peer-reviewed research projects on industry priorities for improved prevention and treatment options that support horse health and well-being.



Education and Training

- Equine Guelph offers you award-winning education programs that focus on lifelong learning – EquiMania! (for youth), weekend workshops, Groom One Certificate, Equine Science Certificate, Certificate in Equine Business Management and the Diploma in Equine Studies – and promotes awareness of opportunities for continuing studies through diploma, degree and advanced degrees at the University of Guelph.

Performance

- State-of-the-art Ontario Veterinary College (OVC) Teaching Hospital facilities offer equipment and the latest diagnostic techniques to address performance issues in otherwise healthy horses.

Healthcare

- Sick and injured horses will receive advanced medical and surgical care through OVC's team of specialized veterinarians, integrating the use of unique resources into a specific plan for each horse.

Industry Development

- Equine Guelph brings together industry partners from all disciplines – ranging from racing to pleasure – to advance the cause of the horse through industry-led initiatives.

www.EquineGuelph.ca

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In five short years, Equine Guelph has made significant strides towards its vision of becoming a global Centre of Equine Excellence. Thanks to industry partners, Equine Guelph's programs are already making a significant difference in the lives of horses.

As the horse owners' and caregivers' Centre at the University of Guelph, Equine Guelph understands the important role that horses play in the lives of people and is developing programs to support the horse and horse owner. We want the very best of health and well-being for all horses – all breeds and disciplines.

Equine Guelph has built a strong, unique partnership between the equine industry and the University of Guelph – bringing together all of the resources at the University to support the horse throughout its life by providing a 'continuum of care'.

Equine Guelph's fifth anniversary marks an occasion to celebrate the Centre's many accomplishments. Over the past five years, Equine Guelph has developed a quality, award-winning education program for the equine industry, which complements the degree and diploma courses offered at the University of Guelph. The research program, funded through Equine Guelph by the industry, has supported multi-disciplined University of Guelph researchers in their achievements in gaining a new understanding of the transmission and diagnosis of MRSA infectious disease, colic, the impact of horse behaviour on racing performance, the incidence of horse injuries at the racetrack and the use of new diagnostic tools. In addition, Equine Guelph continues to support programs at the Ontario Veterinary College towards efforts in the areas of performance and healthcare for both the horse athlete and the backyard pony.

As we stop to reflect and celebrate five years of partnerships and progress, we are already busy planning the next five years as we continue our journey of commitment to improving the lives of horses.

Sincerely,

Dr. Elizabeth Stone, DVM
Dean, Ontario Veterinary College
Co-chair, Equine Guelph
Advisory Council

Dr. Moira Gunn, DVM
Veterinarian
Co-chair, Equine Guelph
Advisory Council





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H.B.P.A. would like to
congratulate and thank Equine
Guelph and their researchers
on the outstanding work
performed over the years.***

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industry in making the "Health
and Welfare of the Horse" a
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Contributors



The University of Guelph Research magazine is written and co-ordinated by students involved in the University's Students Promoting Awareness of Research Knowledge (SPARK) program.



City streets were more familiar than horse barns to these SPARK writers as they approached this equine-themed edition of the University of Guelph Research magazine. But with guidance from Equine Guelph and support from Guelph researchers, they learned a lot about the equine sector. They covered everything from reproduction to racing, and along the way they spent an afternoon at the Arkeil Research Station with members of that facility's herd (with whom they're pictured here).

A fundamental difference between humans and horses such as Elvis, pictured here with third-year



marketing management student Andrea Hruska of Hamilton, is early-stage embryo development. The more we learn about this aspect of reproduction, the better suited we are to tackle difficult questions about infertility in both species. Andrea's story about early pregnancy loss appears on page 15.

In her former life as a flight attendant, Guelph native Arpana Chakravarty gave extra care to



passengers with special health conditions, such as asthma. So this third-year economics student was particularly intrigued to learn that horses such as Afterglow suffer from similar conditions. See her story about a treatment option for the common airway disease on page 12.

Equine athletes work hard and perform in close proximity to each, making the spread of disease and



infection quick. Third-year biological engineering student Matthew DiCicco, pictured here with Smoke, learned about an upcoming vaccine that may help her battle a dangerous bacteria. See the Guelph native's story on page 25.

Fourth-year nutrition and nutraceutical science student Anupriya Dewan, pictured here with Jewel, is usually focused on the health and well-being of humans. But for this issue of *Research*, she found racehorses have their own special needs: Their joints experience some of the highest forces known in nature. See the Brampton native's story on page 21.



Fourth-year public management student Kaitlyn Little, seen here with Jellybean, found drug resistance is not limited to humans. For example, equine parasites are becoming immune to some of the most popular treatments. The St. George native writes about how overusing anti-parasitic drugs in horses can cause health problems on page 31.



An interesting horse fact SPARK Co-ordinator Rebecca Moore happened upon while overseeing this issue of *Research* was the ironic name of this massive Belgian heavy horse: Minnie. The Brantford native and arts and sciences graduate also discovered some eye-opening facts about stallion-semen preservation...and the controversy around the process. See her story on page 14.



Stem cells for recovery

Researcher finds a non-invasive method to determine uptake and healing

BY ANUPRIYA DEWAN

Stem-cell transplants are considered successful when the cells can be conclusively identified at the tissue target, and specific differentiation – the change from stem-cell to desired tissue – has occurred. But how do you know when that's taken place? Initially, stem cells used to treat animal and human injuries were tracked invasively (usually through surgery) using biological markers to label the cells. Imaging modalities such as x-rays, ultrasounds and nuclear medicine have been used widely to track these cells in humans.

Now, University of Guelph clinical studies researcher Prof. Robert Cruz is looking for imaging alternatives – specifically, magnetic resonance imaging (MRI) – to track stem cells in equine patients. This imaging technique has been used with great success in humans.

New pain-management technique

BY ANDREA HRUSKA

The severe post-operative pain a horse experiences in its forelimbs is difficult to treat, and may cause complications during recovery when the animal shifts its weight to uninjured limbs to help cope with the pain. This simple redistribution of weight results in poor circulation, and can cause a serious condition called laminitis, severe inflammation between the hoof and the foot bone. Severe laminitis can't be treated and usually results in the horse being euthanized.

Prof. Alexander Valverde and Dr. Nicola Cribb, Department of Clinical Studies, say opiates – a family of pain medications chosen specifically for their long-lasting effects – directly injected into the forelimb will provide a complete pain-treatment program with little to no side effects.

Effective pain management will keep the horse from developing serious complications, such as laminitis, as well as allowing it to move about.

"It's frustrating when everyone does their best effort to fix a fracture only for the horse to develop complications," says Cribb. "We need to find an efficient way to treat the pain."

The current techniques used to manage pain, including epidurals and intravenous injections, are generally focused on the hind legs, and do little for forelimb pain. As well, these analgesics can cause a variety of side effects, such as stomach ulcers, behaviour modification and constipation. By identifying opiate receptors in the forelimbs of horses, the researchers will be able to inject the pain medication into a specific location.

The researchers have collaborated with Prof. Luis Arroyo, Department of Pathobiology.

Funding for this project has been provided by Equine Guelph. □

Cruz is introducing superparamagnetic iron oxide (SPIO) molecules into the stem cell cocktail. These molecules become embedded in stem cells and can be detected using MRI. He says this would allow stem cells to be tracked in almost any organ system of the body.



Prof. Robert Cruz is using magnetic resonance imaging to non-invasively track the travel of stem cells to their target tissue.

Photo by Martin Schwalbe

He predicts MRI will be successful for tracking the cells and for following them all the way to their specific differentiation stage in equine patients, so invasive methods can be avoided. Researchers can then make sure the cells are implanted correctly and the benefits observed are due to stem-cell assisted healing.

"Once we implant the cells, we have the capability to image these cells in vivo and track them to see where they end up," says Cruz. "We won't need to use invasive methods to track these implanted cells because of SPIO and MRI."

Also involved in this research are Prof. Dean Betts, Department of Biomedical Sciences; Prof. Judith Koenig, Department of Clinical Studies; and Dr. Robert Koch.

Funding for this study is provided by Equine Guelph. □



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Jumping health hurdles

Problems with joint injuries are overcome with stem cells

BY ANUPRIYA DEWAN

Cartilage injuries in horses take a long time to heal and leave the horse susceptible to future injuries. Researchers at the University of Guelph are hoping to help the healing process in a way that will prevent re-injury by healing joints with stem cells derived from umbilical cord blood. The benefits of their work may not be limited to horses – it may hold promise for human athletes as well.

Prof. Dean Betts and Dr. Thomas Koch, Department of Biomedical Sciences, are trying to determine if stem cells can be

used to improve the way cartilage heals after being damaged.

“Today’s treatment options do not regenerate the damaged joint cartilage, but are aimed at reducing the speed of joint cartilage degeneration,” says Koch. “Our hope is to use stem cells to enhance the cartilage repair, if not complete regeneration, to a point where the degenerative process is arrested.” This means the treated horse would be less likely to reinjure itself and would spend more time on the racetrack.

Stem cells from umbilical cord blood are non-invasively obtained at the time of foaling. The cells can be frozen and stored for future use, acting as a sort of injury insurance for the horse.

This means horses destined for an athletic career could have their stem cells isolated at birth and stored in case of an injury later on in life. These cells could be used to aid in the healing process without the risk of immune-rejection in the donor horse.

Better yet, reports from the use of stem cells derived from human umbilical cord blood gives hope that these cells may be used between individuals without the risk of immune-rejection. Essentially, horses other than the donor may still be able to

Photo by GP/Jeff McIntosh



Ian Millar and his horse Redefin (top) are shown training for the 2008 Olympics at Spruce Meadows in Calgary.



Priscilla Lopes-Schliep clears a hurdle during the race that captured her an Olympic bronze medal in Beijing, China.

Photo by GP/Adrian Woyd

benefit from the cord blood-derived stem cells.

And similarities between equine and human joints mean the research may be transferrable to humans in the future.

“Since equine joints are similar to human joints in aspects such as joint thickness and spontaneous athletic injuries, this research may be transferrable to humans,” says Betts. “However, a number of challenges, including surgical techniques, remain before cell-based joint therapy becomes mainstream clinical practice.”

This research was funded by an internationalization grant from the Danish Research Council and operating grants from The Grayson-Jockey Club Research Foundation and Equine Guelph.

Other personnel involved are research project students Tammy Heerkens, Kirill Besonov, Brittany Cameron and Ryan Figueroa from the Department of Biomedical Sciences. ■

Towards better breathing

Protein discovery could help fight asthma

BY ARPANA CHAKRAVARTY

The fungal spores and hay that accompany a deep breath in the barn can cause inflammation in a horse's lungs and eventually airway obstruction, or asthma. Now a University of Guelph researcher is looking at new ways to treat asthma so horses can breathe easy.

Prof. Dorothee Bienzle, Department of Pathobiology, has found a protein called Clara cell secretory protein (CCSP), which is naturally produced in the lower bronchi. It reduces inflammation in the lungs and may be able to treat longstanding asthma.

She says CCSP is depleted in horses with longstanding asthma, and their bodies have lost the ability to produce it by natural means. Although the mechanism by which this occurs is still unknown, Bienzle believes the depletion of CCSP is directly linked to the development of asthma.

Once she finds how much of the protein is left in horses that have asthma, she'll look for ways to replenish CCSP levels with a synthetic form of the protein.

This research was funded by Equine Guelph, the Ontario Ministry of Agriculture, Food and Rural Affairs and the Canada Research Chairs Program. Others involved in the research include Janet Beeler-Marfisi, Paula Katavolos, Mary Ellen Clark and Sherry Wen. 

Asthma vaccine on the horizon

BY ANDREA HRUSKA

Allergic airway disease, one of the most common respiratory diseases facing racehorses, is a leading cause of decreased performance and early retirement. Researchers at the University of Guelph are looking into a virus that may be at the root of the disease. And they hope to create a vaccine against it.

Prof. Laurent Viel, Department of Clinical Studies, says *Rhinovirus* – a group

of viruses that includes the one responsible for the common cold in humans – stimulates the immune system, which may lead to development of allergic reactions to particles entering horses' lungs.

That results in allergic airway disease, also known as equine asthma. Its symptoms include spasms and airway constriction in the lungs, inflammation, coughing and reduced oxygen intake.


"Reducing allergic airway disease could spare many promising racehorse careers," says Viel.

Racehorses are especially prone to developing the disease because they have little time to recover from a *Rhinovirus* infection due to their busy training and

travelling schedule. As well, horses are constantly intermingling on the race circuit, so the condition is easily spread.

Viel hopes to reduce the occurrence of allergic airway disease by targeting the condition's cause – that is, the *Rhinovirus* itself. A vaccine for the virus is currently in the works and, if successful, many horses around the world will be spared the annoyance of a common equine cold.

More importantly, they could avoid a potentially debilitating disease.

Funding for the project has been provided by Equine Guelph, the Ontario Ministry of Agriculture, Food and Rural Affairs and Boehringer Ingelheim (Canada) Ltd., Vetmedica Division. 

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Nutraceuticals, equine style

Natural health products aren't just for humans

BY ROBERT FIELDHOUSE

Horses suffering from inflammation may find relief comes from a combination of nutraceuticals and pharmaceuticals, say University of Guelph scientists.

Prof. Mike Lindinger and his research team from the Department of Human Health and Nutritional Sciences are studying how nutraceuticals – natural-health products derived from plants and animals – might be incorporated into equine diets to achieve health benefits, including reducing inflammation in joints and the respiratory tract.

They're testing several nutraceuticals – including garlic, Sasha's Equine™, acetate, thyme and fenugreek – to determine if and how they work in horses.

"We're studying whether nutraceuticals can be used as alternative treatments for various types of health conditions," says Lindinger. "We're looking at their efficacy, safety and function in horses."


Garlic, for example, is a common human nutraceutical, reported to have anti-cancer, cardiovascular and respiratory benefits. Previous studies suggested garlic was toxic to horses, but Lindinger may have identified an upper limit for a safe dose, so horses can receive the health benefits without incurring the risk.

Lindinger has also verified that eating Sasha's Equine™, an anti-inflammatory product comprised of seafood components – including shark cartilage – and a plant-oil extract, is useful in treating horses' inflamed knee joints.

He's also studied how acetate can help horses replenish glycogen that's depleted during exercise, increasing the rate of muscle recovery from days to just hours.

His next study is on fenugreek, an appetite stimulant that may counteract low body weight.

Others involved in this research include Dr. Wendy Pearson, PhD candidate Amanda Waller, and master's students Kelly Cantafio and Nita Chauhan.

This research is sponsored by Interpath, Emerald Seed Products, Equine Guelph, the United States Equestrian Federation and the Natural Sciences and Engineering Research Council. 

No yolk

Egg-free synthetic semen extender is on this researcher's radar

BY REBECCA MOORE

influenza leave the equine industry at risk, so Merkies is looking at other options.

"Avian influenza is a huge world-wide concern," she says. "If we can find a way to replace the egg yolks used in the extender with a synthetic compound, it will ease fears on the global market."

Here's the challenge. When stallion semen is collected, it's placed in a freezing media to be preserved. This media – also called an extender – varies



Prof. Katrina Merkies is developing a synthetic semen extender to replace potentially biohazardous material.


Photo by Martin Schwalbe

Frozen stallion semen exchange has become a lucrative international industry. But there's a problem: although the practice offers the equine sector a great opportunity to incorporate strong and varied genetic lines into its herds, an ingredient required to safely freeze and transport the sperm has emerged as a potential international biohazard. That ingredient is egg yolk.

Prof. Katrina Merkies, Department of Animal and Poultry Science, Kemptville Campus, is working to replace egg yolk in semen extender, the compound that stallion semen is frozen in. Concerns over avian

in composition. But every version includes a sugar to provide energy for the sperm, an electrolyte solution and cryoprotectants, which protect the sperm during the freezing and thawing processes.

Egg yolk has proven to be an effective cryoprotectant and is popularly used throughout the industry. But because of avian influenza outbreaks, it has also turned into a potential biohazard.

Merkies' research into replacing egg yolk is still in its early stages, but she is motivated by the potential benefit to the industry and the successful replacement of egg yolk in bull-semen extender. 

When cells don't talk

Miscommunication could cause early pregnancy loss

BY ANDREA HRUSKA

Nearly 17 per cent of all horse pregnancies will end in a miscarriage, usually within the first month. That makes early pregnancy a challenge for horse and owner alike. Now, University of Guelph researchers are looking to understand miscommunication among proteins that play a critical role in the failure of early pregnancy, while working towards a solution to horse infertility.

Prof. Keith Betteridge, Department of Biomedical Sciences, and Prof. Tony Hayes, Department of Pathobiology, believe most failed pregnancies in the first month are the result of a communication breakdown between the conceptus (the fluid-filled sphere containing the embryo and nutrients) and the uterus, caused by abnormal proteins or proteins appearing at the wrong time.

The researchers' discoveries may not be limited to the equine sector: they hope this project will also help to improve the understanding of human infertility.

"The more we learn about horses, the more we learn about humans," says Betteridge. "We may be able to make some links to human infertility."

During a normal horse pregnancy, the conceptus travels around in the uterus, sending protein- and hormone-mediated signals to the uterine wall to request nutrients and announce its arrival.

After 15 days in the uterus, at the end of the third week of pregnancy, the conceptus sheds its outer capsule and fixes itself to the uterine wall.

Betteridge and Hayes suspect early miscarriages result from a breakdown in communication between the conceptus and uterus, caused by abnormalities in protein production that either interferes with signals or send the wrong ones.

For example, if the conceptus's signals aren't received by the uterus, its presence will remain unheeded and no nutrients will be sent to feed the growing cells. At that point, the pregnancy is aborted.


The first step in preventing early pregnancy

loss is to identify the abnormalities in proteins and their production that cause miscommunication. To this end, Betteridge and Hayes used a group of 17 mares to produce a succession of pregnancies by artificial insemination. Half of the pregnancies were left to progress normally, while the other half were disrupted by treating the mare with a hormone to breakdown communication between the conceptus and the uterus.

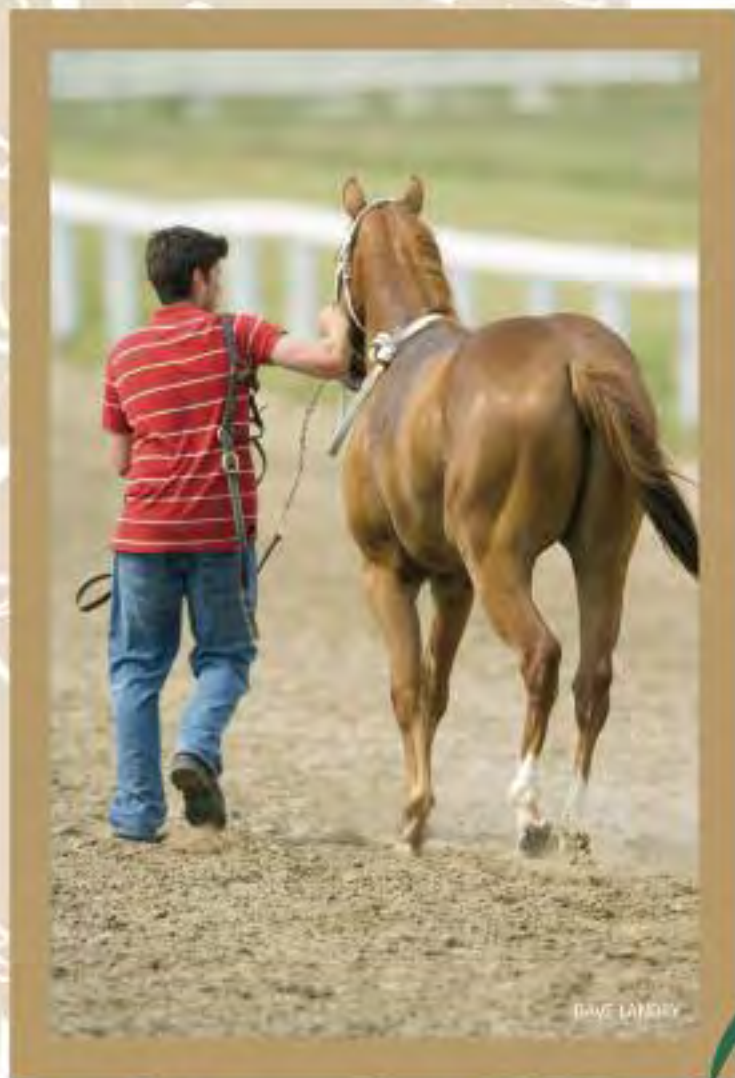
The conceptuses were then flushed from the mares during the third week of the normal and disrupted pregnancies, three or four days after the treatment. The two groups of conceptuses are being compared now to try to identify the abnormal proteins and determine their function.

Ultimately, the researchers hope to develop tests for mares that have problems sustaining early pregnancy because of imbalances in their uterine proteins. As well, they want to develop a way to treat affected mares to correct irregular communication in the uterus so that the embryo can properly fix itself to the uterine wall and grow into a healthy foal.

Other researchers involved in this study include Profs. James Raeside and Chandra Tayade, Department of Biomedical Sciences; Bette Anne Quinn and Prof. Dorothee Bienzle, Department of Pathobiology; Prof. Mario Monteiro, Department of Chemistry; and Dr. Rudolf Waelchli, veterinarian and research assistant.

Funding for this study has been provided by the Natural Sciences and Engineering Research Council, the Ontario Ministry of Agriculture, Food and Rural Affairs, Equine Guelph and the Grayson-Jockey Club Research Foundation Inc. 

Ontario Quarter Horse Racing Industry Development Program



Congratulations to Equine Guelph on five years of developing knowledge through research and for making this knowledge accessible and affordable.

The Ontario Quarter Horse Racing Industry Development Program is working to build a vibrant and sustainable industry with racing, breeding and industry support programs.

The Quarter Horse racing industry will contribute both to a stronger economy in Ontario, and to world-class research that will benefit not only horses in racing and breeding, but all horses. As a current contributor to research, the Quarter Horse racing industry looks forward to being a strong supporter of Equine Guelph into the future.

The Ontario Quarter Horse Racing Industry Development Program is a partnership between the Ontario Racing Commission, the Quarter Racing Owners of Ontario Inc. and Ajax Downs.

From J-track to Graded Stakes

Ajax Downs marked the end of an era on September 21st with the last day of racing on the last official J-Track in North America. A new five-furlong oval racecourse will be introduced in 2009. September 21st also marked the running of the first American Quarter Horse Association recognized graded stakes race at Ajax Downs – the G3 Alex Picov Memorial Championship. To find out more about racing and breeding incentives and industry support programs in the Ontario Quarter Horse racing industry, visit www.ontarioracingcommission.ca



Hard on the heart

New research aims to understand arterial calcification

BY MATTHEW DICICCO

More than a quarter of all thoroughbred horses suffer from pulmonary artery calcification, a condition that hardens the main artery connecting the heart and lungs. This condition is linked to premature death in young, athletic horses, which are particularly susceptible to the disease because their bodies attempt to use calcium to reinforce artery walls stretched thin by the increased blood flow experienced while racing. Instead of helping, the calcium seems to weaken the arteries. Guelph researchers are trying to find out why.

Prof. John Runciman, School of Engineering, and undergraduate students Jeremy Bakker and Matt Teeter are exploring how calcification mechanically affects a horse's arteries. They're working with researchers at the Ontario Veterinary College (OVC) to take a multidisciplinary approach to this complex problem.

"Our portion of the research will hopefully act as the groundwork for understanding the underlying problem of pulmonary artery calcification in horses," says Runciman.

Here's what happens. During a race, thoroughbred horses often run harder than their lungs can naturally handle. Right out of the gate, they experience a four-fold increase in pressure within the arteries of their lungs, including the pulmonary artery. In response to this increase in stress, all of the arteries stretch.

Calcium is part of the natural chemical cocktail response. But calcium's adherence to an arterial wall makes the artery less able to stretch. In addition, the calcium is typically unevenly distributed throughout the arterial wall and forms hard calcium-rich nodules or lesions. These hard spots lead to the overall weakening of the artery.

This phenomenon, called calcification, weakens the artery by limiting the artery

wall's flexibility and strength. Essentially, calcification increases the stiffness of areas in an artery, and has an overall effect of reducing the artery's ability to stretch, thereby weakening it. This situation can be fatal.

To determine calcium's exact impact on an artery's strength, Runciman's team is modelling inflated pulmonary arteries that are meant to correspond to the stress experienced by the arterial walls when the horse is either at rest, or exercising. They're using these 3-D models to identify areas of high stress on the artery wall.

Runciman's study is part of a larger research project in the Department of Clinical Studies at OVC involving Profs. Luis Arroyo and Laurent

Viel. They're looking at the process, cause, origin and development of arterial degeneration in racehorses. It's believed that the mechanical effect that calcification has on the artery wall is an important first step in understanding the impact of arterial calcification on a horse's racing career.


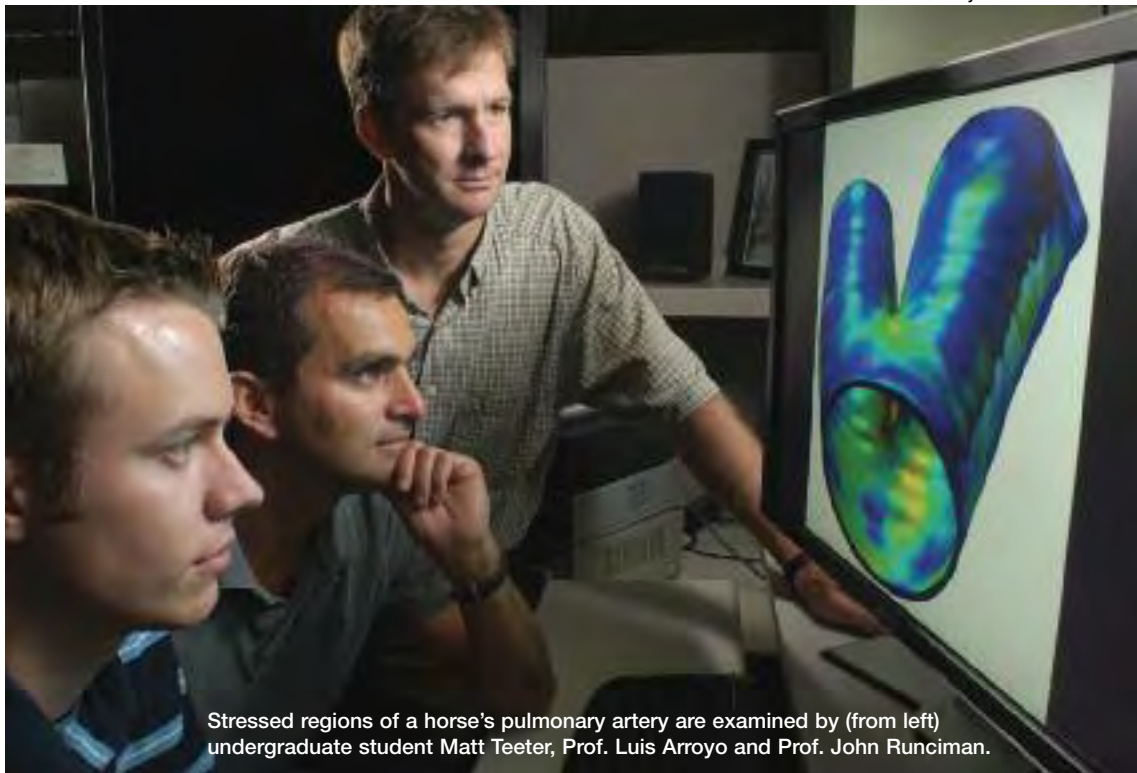
Funding for the research was provided by Equine Guelph. 

Photo by Martin Schwalbe



Stressed regions of a horse's pulmonary artery are examined by (from left) undergraduate student Matt Teeter, Prof. Luis Arroyo and Prof. John Runciman.



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Treating the off beat

Researchers develop new treatment options for longstanding atrial fibrillation

STORIES BY ARPANA CHAKRAVARTY

Longstanding atrial fibrillation (AF) – the quivering of the atrial chambers of the heart – causes arrhythmia, an irregular heartbeat, and prevents horses from functioning at their maximum potential. Conventional methods for treating AF aren't usually effective in horses that have suffered from the condition at length.

In response, University of Guelph researchers Dr. Kimberly McGurrin, Department of Clinical Studies, and Prof. Peter Physick-Sheard, Department of Population Medicine, have developed a new treatment option called transvenous electrical cardioversion (TVEC).

“There are many horses that have chronic fibrillation, and TVEC provides an opportunity to bring the horse back to do

heavy work if the owner wants to pursue it,” says McGurrin.

AF occurs when the normal rhythmic contractions in the top portion of the heart are replaced by rapid, irregular twitching, causing the atria – two of the heart's four chambers – to quiver, or fibrillate. This quivering upsets the rhythm between the atria and lower chambers of the heart, offsetting its regular rhythm.


The condition can affect a horse's ability to perform to its maximum potential, severely limiting its athletic performance and destroying its racing career. While horses with AF are well suited to do light to moderate work, TVEC may be the answer to get horses back on the track.

Traditional chemical methods of treating

atrial fibrillation – specifically, the drug quinidine – can be used only if the condition is detected early on. But the potential side effects, including fainting or death if the drug is not administered properly, are a concern for horse and owner, as some horses react negatively to even small doses of the medication.

But TVEC has been found to be a good treatment alternative for those with AF in any stage – including longstanding. The process involves placing electrodes inside a horse's heart via the jugular vein, safely allowing a charge to pass through the heart to regulate its beat without any of the side effects.

The new technology has held up well in clinical trials. After an eight-year study of



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Photo by Dave Landry




20 horses, researchers found that all the horses responded to treatment. Although they are still working on statistics to confirm their overall impression, they found the majority of horses were able to achieve their previous work potential.

However, horses with rhythmic disturbances can relapse into arrhythmia days, months or even years after treatment. So, there is no guarantee that TVEC will make a horse less prone to further rhythmic disruptions. The breed of horse and how long they have suffered from fibrillation may help determine their probability of relapsing. But overall, TVEC is proving to be a superior form of treatment over conventional chemical methods.

“Before there was no treatment available for all horses,” says McGurrin. “Now there is an option, and people should know of it.”

This research was funded by Equine Guelph, Grayson – Jockey Club Research Foundation, and the Ontario Ministry of Agriculture, Food and Rural Affairs.

Others involved in this research include Dr. Dan Kenney, Professional Care Services. 

Get rhythm

Heartbeat patterns tracked using new compact device

An irregular heart beat is one possible cause of poor performance and sudden death in racehorses. Understanding the normal function of a racehorse’s heart before, during and after a race may help researchers identify irregular heart rhythms more easily, and treat them before they cause debilitating damage.

Prof. Peter Physick-Sheard, Department of Population Medicine, and Dr. Kimberly McGurrin, Department of Clinical Studies, are working on a new way to accurately monitor a horse’s heart rate during natural performance.

The duo has designed a new electrode harness system that allows an electrocardiogram (ECG) device to be affixed to the horse during a race. It’s a marked improvement on conventional ECG methods, they say.

With this new advancement, Physick-Sheard and McGurrin are recording the natural range of a racehorse’s heart function,

so they can better detect and understand irregular heart rhythms.

“Looking at heart rate responses during actual races has never been done before,” says McGurrin. “The new ECG technology will allow us to see if the horse’s heart rate is stable all the way through a race, as well as before and after.”

Previously, exercise ECG scans were recorded as a horse ran on a treadmill. It gave an indication of the heart’s performance, but the results didn’t mimic actual race conditions.

That could change with the new approach, which uses an ECG about the size of an iPod. Physick-Sheard and McGurrin designed it so it can be unnoticeably placed under a horse’s harness. The device allows the race to proceed without distracting the horse or rider, while effectively measuring the heart rate and rhythm of a horse.


Researchers attached the device to standardbred racehorses and collected a total of 343 recordings, each between 45 minutes and two hours 30 minutes long. The collected data will be analyzed using a unique computer program created by Physick-Sheard.

Early results are intriguing. Sustained heart rates can be as high as 270 to 280 beats per minute, and instantaneous rates have been recorded as high as 320 beats per minute. By comparison, conventional treadmill studies indicated a maximum heart rate of around 240 beats per minute. Significant rhythm disturbances have also been identified.

These findings stand to revamp accepted healthy ranges of equine heart function and provide a better foundation for future research.

Physick-Sheard and McGurrin will fully disclose all their preliminary findings to the industry at a track presentation this fall.

This research was funded by Equine Guelph.

Others involved in this research include students Jordan Cook, Amanda Rosborough, Amy Bennett, Kristy DesRoche, Christine Culbert and Sarah Kingma. 

Racehorses’ heart rates will be easier to track thanks to novel technology being developed at the University of Guelph.





Photo by Daniel Kourey

Too early to ditch dirt

BY KAITLYN LITTLE

Polytrack – an all weather synthetic racetrack surface – has been vying to replace traditional surfaces made of turf or dirt by claiming to reduce injuries in horses. But with a price tag of over \$10 million, track owners want to be sure the claims are valid. University of Guelph

researchers are comparing the mechanical properties of different track surfaces as an initial step to justify such an investment.

Profs. Jeff Thomason, Department of Biomedical Sciences, and Antonio Cruz, Department of Clinical Studies, are approaching the question using accelerometry and strain gauges, which measure the impact a hoof experiences when it hits the track. This project is part of a larger study looking at horses' muscular skeletal response to exercise.

"The science behind a race surface is substantial to reducing incidents of injury, since this is a critical environmental factor," says Cruz.

Polytrack was initially used and developed in the United Kingdom as a mixture of sand, synthetic fibres and recycled rubber coated with a wax. Researchers are concerned the North American climate along with the training and racing conditions may influence the product's performance.

To measure the impact a track surface has on a horse, the research team used an accelerometer, a die-sized cube that measures acceleration and deceleration on the horse's hoof, along with the deformation the hoof leaves on the track, which indicates strain levels. For example, the slower the deceleration when the hoof hits the track, the less impact on the horse's hooves and quite possibly the less force transmitted through the joints.

The research team found that on Polytrack, deceleration of the horse hoof


was slower, which reduced impact significantly when compared to the traditional surfaces of turf and dirt. But the reduced impact has not yet been correlated to a reduction in injuries.

"It is possible that one type of injury may decrease while another type may increase," explains Cruz.

Since Polytrack is a relatively new track surface, Cruz is also encouraging a surveillance system to keep track of catastrophic and non-catastrophic injuries. This would mean documenting all injuries at every track that has switched to Polytrack to get a true understanding of injury occurrences.

This may be difficult to achieve. Catastrophic injuries are relative easy to monitor, but non-catastrophic injuries are not because they require reporting from a trainer or owner. But Cruz is adamant such information is necessary to verify the merits of Polytrack. Such surveillance is already in place, co-ordinated by The Jockey Club in the United States.

"Research by itself establishes a baseline but needs continuation to understand if Polytrack is effective in reducing injuries and is a good investment for racetracks," says Cruz.

This research was funded by Equine Guelph and in-kind donations from Adena Springs. 



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Preventing another Derby disaster

Cannon bone health can help predict catastrophic injuries

BY ANUPRIYA DEWAN

When Eight Belles was euthanized on the finish line of the 2008 Kentucky Derby after suffering two broken legs, the reality and devastation of catastrophic high-speed injuries were brought to the fore. These problems, as well as other bone and joint injuries, have a poor prognosis, so researchers at the University of Guelph are working to prevent them in the first place.

Profs. Antonio Cruz and Mark Hurtig and graduate student Juan Tabar, Department of Clinical Studies, are using quantitative ultrasound – technology that uses the changing speed of sound to detect bone density – to spot weak areas in the cannon bone.

The cannon bone connects the knee to the ankle, and takes the majority of a horse's weight when the horse runs. This physical stress can cause racehorses' bones to develop microfractures that become weak spots over time. The research team is hoping to use the condition of the cannon bone as an indicator of impending fractures and osteoarthritis.

"We are looking at quantitative ultrasound in racing horses as a way to predict these catastrophic injuries as part of a larger prevention and intervention program. No one has ever done that before," says Hurtig.

Currently, there is no way to gauge the likelihood of catastrophic injury. Biochemical markers of bone and cartilage metabolism measured in blood or urine may prove useful to an extent. But this method only indicates the total change in bone density, and doesn't show localized cracks or weaknesses that lead to catastrophic injuries and joint disease.

So Cruz and Hurtig are using quantitative ultrasound to measure changes in cannon bone microstructure and organization to determine if cracks, weak spots or holes exist. These conditions


are what they call a surrogate indicator of the damage, suggesting the horse is more likely to have a catastrophic injury when stressed during a race. If a direct link can be made, Cruz and Hurtig hope to use cannon bone scans to identify horses that are at risk and need a reduced workload treatment before they hit the track again.

This research could also impact human

athletes; a past pilot study of University of Guelph cross-country runners showed promise. Horses and humans have a similar bone structure, so the researchers' study of bone stress may be applied to improve treatment of human conditions such as osteoarthritis.

"This research may help determine how osteoarthritis develops. Understanding the mechanism will aid in finding a cure," says Hurtig.

Also involved in this research are graduate student Richelle Neundorf and undergraduate student Luke Hartford.

Funding for Hurtig's study is provided through Equine Guelph, the Canadian Arthritis Network and the Canadian Institutes of Health Research. 

Eight Belles (left) ran alongside Big Brown at the 134th Kentucky Derby, then suffered a catastrophic injury after crossing the finish line.



Photo by AP/Moony Gash

A new approach to airway disease

Researcher sets her sights on improving diagnostic options and capabilities

BY KAITLYN LITTLE

Prof. Heather Chalmers is using ultrasound technology to diagnose common upper-respiratory diseases while a horse is at rest.



Photo by Martin Schwalbe

Upper-airway diseases in racehorses are the largest performance-limiting condition next to lameness, and can decrease performance or even end a horse's career. Until recently, these respiratory conditions had to be diagnosed while the horse was running at peak performance. But a researcher from the University of Guelph is now using ultrasound technology to detect some upper-airway diseases while the horse is at rest.

Prof. Heather Chalmers, Department of Clinical Studies, has begun using ultrasound to diagnose the three most common upper-airway diseases: dorsal displacement of the soft palate, recurrent laryngeal neuropathy and arytenoid chondritis.

The new diagnostic technique is the result of a four-year collaboration between Chalmers, a veterinary radiologist, and equine surgeons, pathologists and internists from the University of Guelph and other veterinary colleges.

"By collaborating with researchers from different fields, we can come up with new answers to old problems," says Chalmers. "Now, a horse with an upper-airway disease can be diagnosed accurately at rest."

Traditional practices for diagnosing respiratory problems involved video endoscopy, a process that uses a small fibre-optic camera to investigate airway failure during a horse's peak performance level. This method requires the horse to run on a treadmill at racing pace, which can prove hazardous and stressful for the

horse. But Chalmers' method allows the horse to remain at rest during tests for upper-airway conditions.

She developed her approach while completing her residency in radiology at Cornell University. There, she worked with surgeons and internists and was influenced by the lack of options for diagnosing airway diseases. The use of ultrasound for horses with upper-airway disease was a previously unexplored option.

So far, Chalmers has successfully used ultrasound to detect dorsal displacement and laryngeal neuropathy. Both conditions are thought to cause changes in the structure of the bones and muscles that support the larynx, and the ultrasound can detect even a small change in the conformation.


Chalmers says that using the ultrasound technology isn't a replacement for traditional video endoscopy, but instead can be used as an option for horses that would benefit from being diagnosed at rest. This could be especially helpful for yearlings that may not have the experience necessary for the treadmill run.

She and her team are now determining if the ultrasound technique can also work to diagnose chondritis, an infection of the larynx. They're working with veterinarians in southern Ontario to find infected horses to test.

Next, Chalmers wants to use ultrasound to examine healthy horses to detect any early changes to their airways, before a disease becomes symptomatic. If it's possible to determine which horses will have problems down the road, the test can be added to the list of screening tests a horse goes through when it is bought or sold.

"If we can predict upper-airway diseases before they happen, and do so accurately, it will then be possible to pass on this information to owners and trainers, buyers and sellers to help them make more informed decisions," says Chalmers.

Also involved in the above research projects are Profs. Laurent Viel, Judith Konig, Jeff Wilson and Jeff Caswell of the University of Guelph, and Prof. Norm Ducharme from Cornell University.

Funding for these research projects was provided by Equine Guelph and the American College of Veterinary Radiology. 

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Hobbled by wobble

BY ANUPRIYA DEWAN

When a horse's legs and brain don't communicate properly, the problem may be spinal ataxia. It's characterized by limb weakness and poor balance, branding the disadvantaged animal a "wobbler." The condition leaves the animal prone to falls and injury.

One cause of spinal ataxia is cervical stenotic myelopathy (CSM), or malformed vertebrae. Now, with the help of magnetic resonance imaging, Prof. Stephanie Nykamp, Department of Clinical Studies, and graduate student Colleen Mitchell are looking to more effectively diagnose and treat the condition.

"We are hoping (magnetic resonance imaging) will lead to improved accuracy in the diagnosis of CSM, and differentiate it from other causes of spinal ataxia, such as protozoal myeloencephalitis, herpes virus, West Nile virus and trauma," says Mitchell.

In horses with CSM, the course of disease may be altered by dietary modification and surgery if diagnosed early. In severe or advanced cases, the only option is euthanasia.

Other causes of spinal ataxia may have supportive or specific treatment regimes which can lead to recovery. Mitchell hopes a combination of advancing technology and her research will result in early and accurate diagnosis of the cause of spinal ataxia, and more effective treatment options.


Funding for the research has been provided by the Ontario Ministry of Agriculture, Food and Rural Affairs and Equine Guelph. 



Photo by Stanislaw Fadyukhin



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A tough bug

Guelph researcher looks towards a vaccine for pneumonia-causing *Rhodococcus equi*

BY MATTHEW DICICCO

***Rhodococcus equi* is a deadly** airborne bacterium found readily in horse manure. It is especially dangerous to a young foal as it effectively hides itself from the horse's immune system, making it nearly impossible to detect before pneumonia develops in the lungs.

The bacterium also changes the way the foal's immune system develops so that it becomes unable to respond effectively to the infection.

Prof. John Prescott, Department of Pathobiology, is working with others on a vaccine to help a foal's immune system properly fight off *R. equi* and the long-term health consequences associated with the bacterium.

The researchers first tried to construct a strain of this bacterium that is less able to cause disease by deleting genes that allow it to survive well. This would allow the recipient to develop immunity but not illness.

As of yet, however, Prescott and his team have not been able to disarm a disease-causing strain of *R. equi* sufficiently to make a suitable vaccine. So the focus of his team has switched to making the vaccine from the key immunogenic proteins of *R. equi*— proteins of the bacterium that cause an immune response.

He says that by adding these components into a harmless *Rhodococcus* strain that they have in the lab, they should produce a similar immune response to that of a disease-causing bacterium that has had survival genes deleted.

"There should be a vaccine within the next five years," he says.


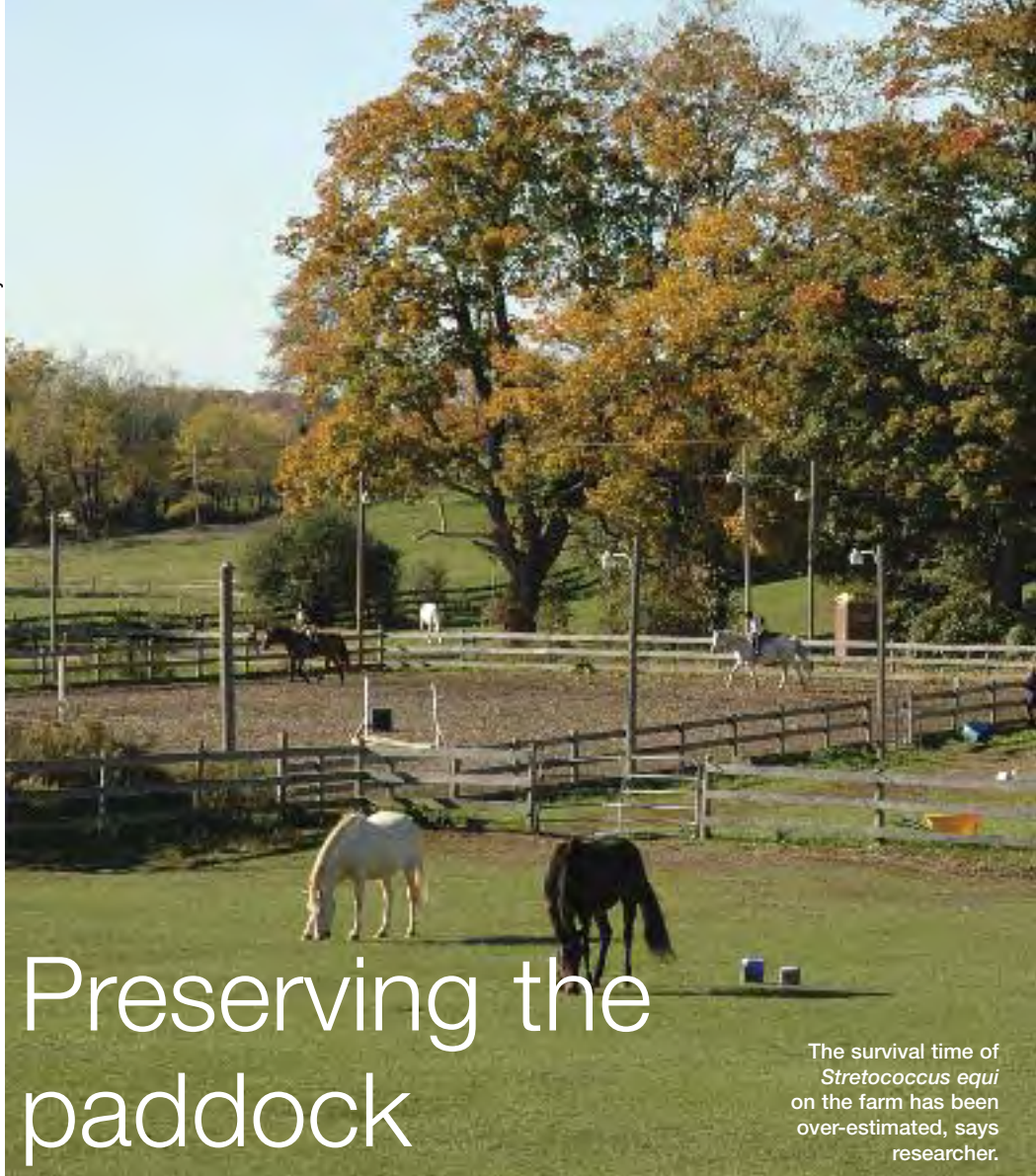
This research is funded by the Natural Sciences and Engineering Research Council and Equine Guelph. 

Photo by Cavalier Creative Communications



Preserving the paddock

The survival time of *Streptococcus equi* on the farm has been over-estimated, says researcher.

BY ARPANA CHAKRAVARTY

The survival time of *Streptococcus equi* on the farm is overestimated, says a University of Guelph researcher. For horse owners, that means it's unnecessary to adhere to the popular practice of quarantining an outdoor farm area for long periods of time – sometimes weeks – after an infected horse passes through.

Prof. Scott Weese, Department of Pathobiology, says the survival time of the bacterium that causes strangles – an infection of the lymph nodes in horses – has only been examined in the lab, and has been exaggerated because of a lab's controlled environment.


For a more complete picture, Weese set out to see how the bacterium stood up to harsh outdoor farm conditions. He found it was able to survive, on average, only one to three days. That's a vast difference from previous estimates that *S. equi* could survive more than two months on a farm.

To reach his conclusion, Weese inoculated materials likely to be found on a horse farm with *S. equi*, including wood, metal and rubber, and exposed them to standard outdoor conditions, including temperature changes, temperature extremes and sunlight.

His results show *S. equi* survives poorly in outdoor environments, especially when exposed to sunlight because the sun's ultraviolet rays help kill it, while keeping the environment drier and less hospitable.

"These results will be able to give people more guidance when dealing with the bug," says Weese. "How long an area will remain infectious is a common question, and no one has had an answer to it, but these results suggest that survival is, in general, fairly short."

This research was funded by Equine Guelph.

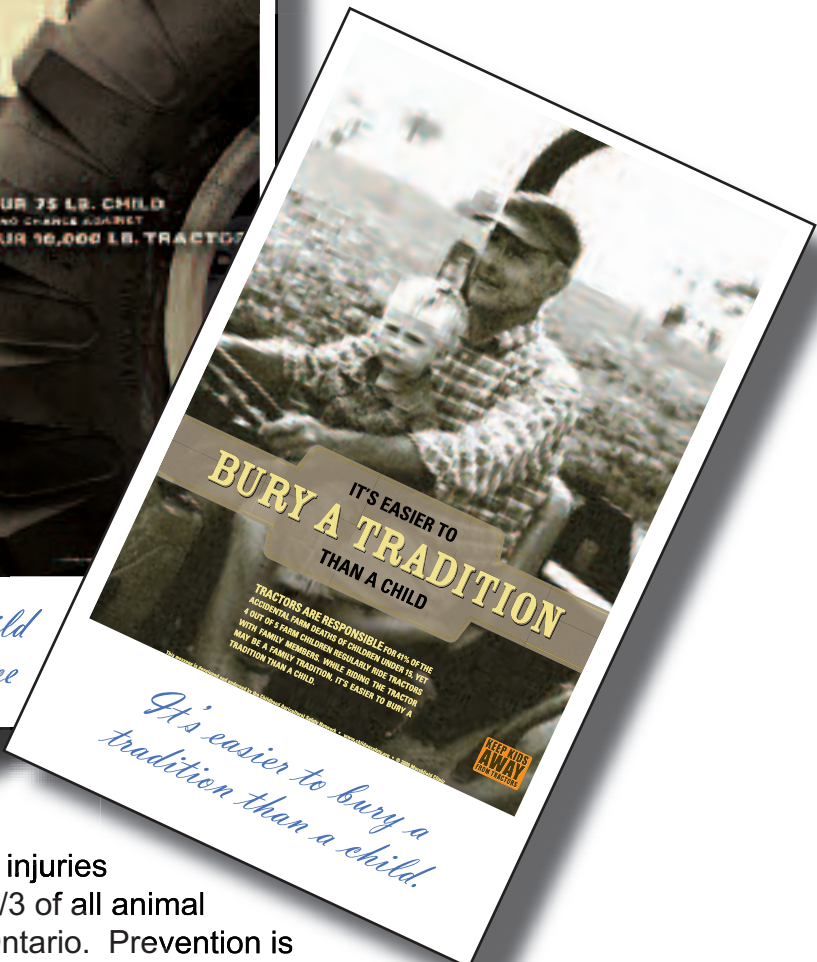
Others involved in this research include summer student Capucine Jarlot. 



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Horse injuries account for 2/3 of all animal related injuries in Ontario. Prevention is key to reducing these numbers. The Farm Safety Association would like to thank Equine Guelph for its continued efforts in making safety a priority, while at the same time educating members of the horse community.

The Farm Safe Association would like to recognize Equine Guelph's success over the past 5 years. Congratulations!



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Faster with more pasture

BY ANDREA HRUSKA

Racehorses allowed to roam daily are less stressed and perform better on the track.

That's the word from Prof. Suzanne Millman, now at Iowa State University with an adjunct appointment to the Department of Population Medicine at the University of Guelph. Millman's graduate student, Michelle Drissler, conducted a survey of nearly 1,300 racehorses in Ontario that revealed stress levels can be reduced, and track performance can be improved, by providing daily turn-out – that is, allowing a horse time to graze or exercise in a pasture or sand paddock.

In fact, racehorses allowed daily turn-out are faster, have higher earnings and run more races than horses that don't have access to a pasture, or are only turned-out once a week.

"We are really happy about these findings," says Millman. "It's reasonable from a biology standpoint to say turn-out is good for the horse because it provides a complex environment, stimulation and allows them to relax. And now we have research to verify that the emotional and physical benefits extend to the track."

In the survey, handlers or groomers were asked a variety of questions about the care horses received and the frequency of stereotypic behaviours indicating stress (ones which are repetitive and appear to serve no purpose). Racehorses averaged the same as leisure


horses, with three to five per cent displaying behaviours indicative of stress.

After comparing racing records with the survey results, Millman's group found a relationship between turn-out time per week and performance. She says it's possible that turning-out racehorses daily will not only fulfill a fundamental need, but may improve their track performance. Turn-out, along with an opportunity to forage on hay or pasture and interact with social companions, will fend off boredom and reduce unwanted behaviours, says Millman.

"Giving a horse access to turn-out is important to relax the horse and will possibly get rid of behaviour problems,"

she says. "There are good reasons to turn horses outside for animal welfare, and now it appears that we have a performance benefit, too."

Millman and Drissler collaborated on this project with Prof. Peter Physick-Sheard, Department of Population Medicine at the Ontario Veterinary College.

This research project has been funded by Equine Guelph and the joint Natural Sciences and Engineering Research Council – Ontario Ministry of Agriculture, Food and Rural Affairs Equine Program. 

Daily turn-out provides racehorses with time to relax and exercise, resulting in better performances on the track.



Photo by Dave Landry

Healthier horse feed

BY ARPANA CHAKRAVARTY

A stubborn fungus growing on horses' feed, forage, bedding and pasture may be contributing to a number of equine health problems and should be avoided, says a University of Guelph researcher.

Dr. Susan Raymond, communications and programs officer for Equine Guelph, completed her PhD by examining how consuming diets naturally contaminated with mycotoxins affects horse health.

In particular, she looked at diets containing *Fusarium* mycotoxins, commonly found in horse feed and forage grown in our temperate climate.

Although not all sub-types of *Fusarium* produce mycotoxins, Raymond has found horses that consume the most troublesome types of the mycotoxins can develop a condition called fusarium mycotoxicosis. It can lead to reduced feed intake, weight loss, immunosuppression, gastrointestinal disorders and poor performance. Mould and subsequent mycotoxin production can occur during wet, cool growing seasons or as a result of damp storage conditions.

Her advice to horse owners is to be aware of the growing, processing and storing conditions of the grain, hay, pasture and bedding given to horses to ensure these supplies are as dry and fungus-free as possible.

"I'm suggesting a pro-active approach to this problem," she says.

This research has been funded by the Ontario Ministry of Agriculture, Food and Rural Affairs and Alltech Inc.

Raymond's advisor was Prof. Trevor Smith, Department of Animal and Poultry Science. ■

Moving forward against mycotoxins

Research program yields technology for better health

BY ANDREA HRUSKA

***Fusarium* isn't the only** mycotoxin-producing mould. Many fungi – which include moulds – produce mycotoxins, which can affect all of a horse's major bodily systems. And much of the groundbreaking research into the health impacts of mycotoxins has happened at the University of Guelph.

Prof. Trevor Smith and PhD candidate Girish Channarayapatna, Department of Animal and Poultry Science, co-authored a chapter in a new book, entitled *Mycotoxins in Farm Animals*, published by Transworld Research Network. In their chapter, the researchers cite some shocking symptoms of mycotoxins, ranging from infertility and decreased immunity to digestive disorders and loss of muscle coordination.

Through his research program, Smith and his collaborators have developed an effective food-additive absorbent that reduces mycotoxin levels during digestion.

"Absorbents should only be used as short-term solutions, but I'm convinced further research will provide horse owners with a long-term mycotoxin answer," he says.

Smith has been researching mycotoxins for more than 30 years. In the early days, mycotoxins weren't believed to be a major cause of disease. Today, fungus control and treatment is considered essential for raising healthy livestock.

The funding for this research project has been provided by the Ontario Ministry of Agriculture, Food and Rural Affairs and Alltech Incorporated. ■



Prof. Trevor Smith (left) and Dr. Susan Raymond are studying the harmful effects of mycotoxin-producing fungi, found in some feed, forage and bedding.

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Researcher stresses monitoring as key to good horse health

BY KAITLYN LITTLE

Roundworms, tapeworms and another parasitic worm called a cyathostome can cause serious illness, and even death, in horses if left untreated. Usually, horses receive dewormers to kill the parasites. But roundworms and cyathostomes in particular are rapidly developing drug resistance in their zeal to survive. And that has one University of Guelph researcher advocating vigilance.

Prof. Andrew Peregrine, Department of Pathobiology, is examining the causes of emerging drug resistance to dewormers, along with potential solutions.

"Steps can be taken to help stave off resistance," he says.

First, he advocates close monitoring, and not relying solely on dewormers for protection. The best approach is fecal monitoring.

"It's extremely important," he says. "If you can identify horses that have large numbers of [parasite] eggs, you can stop them from contaminating the environment."

Peregrine also recommends working with a veterinarian to set up individual deworming programs for each horse farm. Many varieties of dewormers can be administered at different times and intervals throughout the year, depending on a horse's needs. Individualized programs may help stave off resistance and, combined with proper monitoring

and environmental management, will contribute to a horse's inner health.

This research is funded by Equine

Guelph, Pfizer Animal Health and the Ontario Ministry of Agriculture, Food and Rural Affairs. 

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Returning to greener pastures

BY ANDREA HRUSKA

Baby boomers are retreating to Ontario's rural landscape in droves, and horse farms are one of their venues of choice. Industry observers say this urban-to-rural migration has contributed to the 17 per cent jump in the Ontario horse population since 2001. And that may be a good thing because well-managed horse farms can play a role in preserving open space, which can provide habitat for wildlife as well as permanent green cover to help protect source water and prevent soil erosion.

But this movement to greener pastures also brings with it environmental concerns: as the number of horse farms has risen, information and resources to encourage good environmental stewardship have not kept pace.

Bronwynne Wilton, a PhD candidate in the School of Environmental Design and Rural Development at the University of Guelph, polled 600 Ontario horse farms and found a group of people passionate and enthusiastic about horses and their environment. She also found they were under-resourced in the tools and know-how needed to care for the land that sustains them and their lifestyle.

"Horse farms have fallen through the cracks in the Environmental Farm Plan," says Wilton. "They haven't been targeted aggressively, and many are unsure of nutrient [manure] management."

Wilton discovered that most want to participate in the Environmental Farm Plan, a voluntary program that offers checklists of "greener" ways to run a farm, and is connected to provincial and federal programs that help fund the cost of doing so.

However, many horse farm owners can't participate in the various cost-share programs because they aren't – and can't be – registered as "farms" with the provincial government, which is an Environmental Farm Plan requirement. The province defines a farm as an operation that makes a profit from farm sales of at least \$7,000 per year, an amount that does not include income earned from horse boarding or lessons. Consequently, the vast majority of recreational and sport



As the number of baby-boomers buying horse farms increases, so does concern over the lack of resources to teach new owners environmental stewardship skills.

Photo by iStockphoto


horse farms do not qualify as farms under the Ontario government's definition.

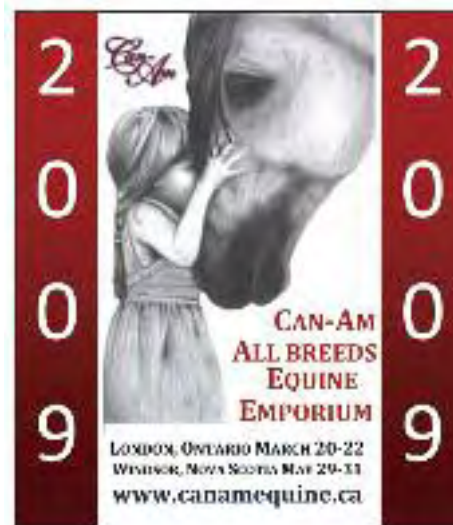
Wilton says that as the number of urbanites buying horse farms increases, so too does concern over the lack of resources to teach new owners safe nutrient management practices and other environmental stewardship skills. For example, poor manure management and muddy paddocks can result in harmful bacteria entering waterways, impacting both water quality and aquatic habitats.

So what's to be done? Wilton suggests that the definition of a farm should be changed so horse farm owners can gain access to provincial funding to implement environmental stewardship initiatives. For example, if a horse farm owner wants to plant buffer strips – shrubs, trees, or grass planted along a stream to prevent manure and pesticides from entering the water – they should have the same access to federal and provincial funding programs as other types of farmers and landowners do.

"Horse farms offer so much to

Ontario," says Wilton. "Changes in policy will help the horse farm do that much more for the environment."

Other researchers for this project include Profs. Bob Brown and Wayne Caldwell, School of Environmental Design and Rural Development, and Prof. Stew Hiltz, Department of Land Resource Science. 



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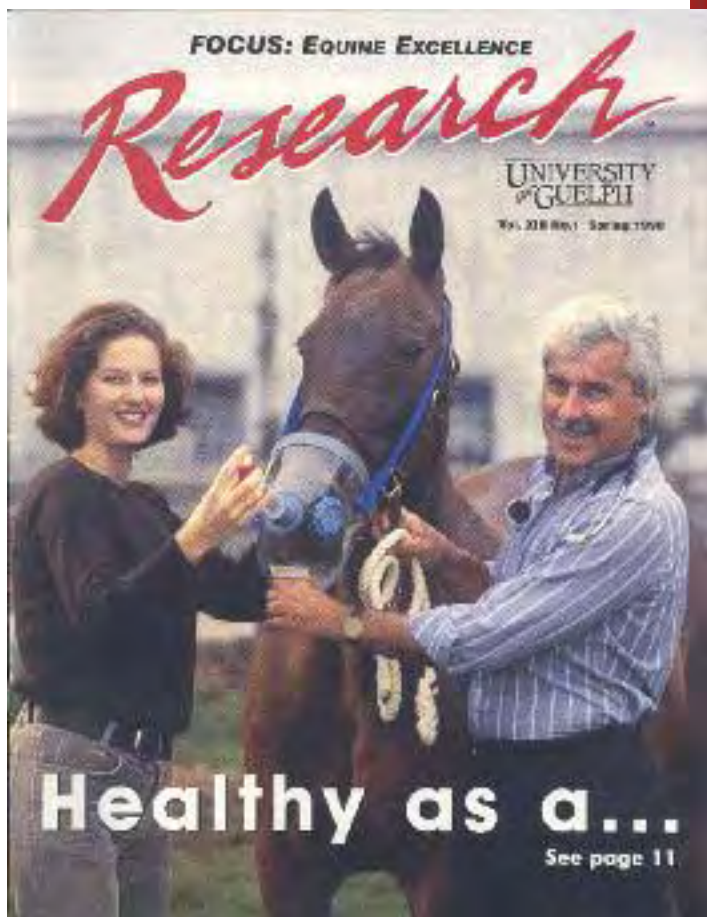
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A decade of equine research progress

Over the past decade we've been proud to dedicate three issues of the University of Guelph *Research* magazine to equine studies, culminating with this edition which recognizes the emergence of Equine Guelph as a leader in the sector.

All three issues, which are archived at <http://www.uoguelph.ca/research/publications/researchMagazines.shtml>, have sported several distinguishing features, including beautiful animals, dedicated researchers and enthusiastic writers.

Equine story assignments are some of the most sought-after topics by SPARK writers, who were anything but reluctant to be photographed at the Arkell Research Station

(see contributors on page 9) with members of the research herd there. They were equally as fascinated with the story topics, which were developed and pursued with Equine Guelph's guidance.

Undertaking an equine research project is like developing a horse. It takes investment, time and patience. But once the foundation is laid, the chute opens and benefits are just around the corner, with discovery, scientific breakthroughs and life-changing applications. It's evidence that research is making a real difference in the everyday lives and health of horses.

In our 10 years of publishing equine-focused *Research* magazines, we've seen stem cell therapy emerge, advancements in joint and limb remediation, a deeper understanding of race track surfaces, progress in respiratory disease treatment, detailed analysis of feed for potential contamination, and much more.

As we look ahead, it's clear how all this research activity is coalescing under Equine Guelph. We look forward to the organization's next anniversary, and another equine research update. **B**

Owen Roberts
Editor

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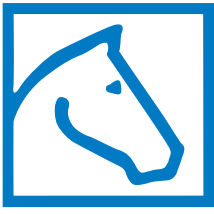
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