University of Kentucky

Bluegrass Equine DIGEST

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Research on *Streptococcus* in Horses Reviewed

THE HORSE STAFF

Streptococcus equi **is the bacterium behind strangles, a contagious respiratory infection characterized by fever, nasal discharge, and abscesses under the jaw and throat latch.**

Tiny bacteria and viruses can cause serious health problems for horses. These microscopic malefactors also present challenges for researchers who study them in hopes of discovering better prevention and treatment methods. The researchers, however, don't give in. They spend their careers carefully studying microbes that impact our horses. And when it's time to move on and enjoy a well-deserved retirement, it's gratifying to look back and see what's been accomplished.

John Timoney, MVB, MRCVS, DSc, PhD, Keeneland Chair of Equine Infectious Diseases at the University of Kentucky's (UK) Gluck Equine Research Center, reviewed what scientists have learned about streptococcal infections—important in the horse industry for a variety of reasons—along with some questions that remain unanswered, during a mini-symposium held in honor of his retirement. He delivered his lecture Oct. 7 at The Club at UK's Spindletop Hall, in Lexington.

Timoney described his research in detail for attendees. Following are a few important findings for horse owners to understand.

Streptococcus Basics

There are two key *Streptococcus* species in horses: *S. equi* and *S. zooepidemicus*. *S. equi* is a clonal descendant of an ancestral strain of *S. zooepidemicus*—essentially, it was formed based on an ancient *S. zooepidemicus* strain. Despite their similar names and origins, decades of observation and research have shown that these organisms behave very differently, Timoney said.

S. equi causes strangles, a contagious infection of the tonsils and adjacent lymph nodes characterized by fever, nasal discharge of mucus and pus, swollen lymph nodes, and abscesses under the jaw and at the throat latch. *S. equi* infections typically don't spread to other areas of the body, Timoney said. The bacterium infects only equids, is antigenically invariant (has only one immunological strain), and resists phagocytosis (One way the horse's immune system works is by binding cells called phagocytes to offending microbes. The phagocytes eventually kill the microbes through a process called phagocytosis.). Infection is very pyogenic (characterized by abundant pus formation) and is, in most cases, cleared from the tonsils relatively quickly by the horse's local mucosal immune response.

In contrast, *S. zooepidemicus* impacts a broad range of species, including horses, dogs, and even humans. In the horse it causes lower respiratory and reproductive tract infections that can lead to abortions. *S. zooepidemicus* is an opportunistic bacterium that can take advantage of primary virus (such as influenza and herpes) infection of the airways. It is antigenically variable, moderately pyogenic, and has a low resistance to phagocytosis. It persists in the tonsil because it evades local immune responses, Timoney said.

S. zooepidemicus in the Respiratory Tract

For many years, researchers have known that it's completely normal for a variety of *S. zooepidemicus* serovars

In This Issue

Streptococcus research

(basically, different immunologic variants of the bacterium) to live in healthy horses' tonsils, Timoney said. However, his research group showed that a single serovar was responsible for disease in the horse's lower respiratory tract. Serovars causing disease have proteins anchored to their surfaces that appear to be important in determining whether they can cause disease. That said, they're still trying to determine exactly why some strains are pathogenic and others live in the tonsil without causing harm.

Strangles Vaccines

Reports of a strangulating equine disease (hence the name "strangles") associated with abscessing lymph nodes date back to the 13th century. However, the first reported use of a strangles vaccine preceded the first scientific discoveries about the infection, Timoney said. In 1791, a scientist described using pus-contaminated lint to carry out "lip inoculations," which were widely used, he said. The contaminated lint was rubbed on a scratch made inside a healthy horse's lip, thereby causing a mild immunizing infection.

In the 1800s, researchers learned that strangles transmission was associated with pus and contaminated drinking buckets, and by the late 1880s they'd determined that *S. equi* was the causative agent.

Since that time, researchers have tested, used, and then scrapped several vaccines for a variety of reasons. In 1997, the first intranasal strangles vaccine was introduced. And from 2007 to 2009, researchers from Sweden, the United Kingdom, and the United States published papers on experimental strangles vaccines using recombinant proteins predicted from the genomic DNA sequence of *S equi*. None of these experimental vaccines has yet been marketed.

Timoney added that research will eventually lead to better vaccines. This, however, will require further investigation of the protective immunity that develops in the horse recovering from strangles.

Protective Immunity

That said, Timoney noted that researchers have gained substantial information about the horse's immune responses to *Streptococcus* bacteria over the years. For instance, he said, we know that:

- In 75% of horses, infection results in resistance to future infection;
- Vaccination or infection with live, but not killed, *S. equi* prompts a protective response from the horse's immune system;
- Recovery from *S. equi* infection depends on efficient bacterial immune-mediated clearance from the tonsils; and
- Although *S. equi* and *S. zooepidemicus* share many similar proteins and virulence factors, one organism does not cross-protect the horse against the other.

Many important questions about protective immunity remain, including the identity of the protective immunogens (which prompt the immune response), where these immunogens are processed, and the roles of humoral (in which antibody levels in the blood increase) and cell-mediated responses (in which disease-fighting white blood cells are summoned to destroy pathogens) in clearing infection.

What's Next?

Despite the progress Timoney and his colleagues have made, questions also remain about the equine *Streptococcus* bacteria.

Regarding *S. zooepidemicus*, it's still unclear how the single variant (clone) that invades the respiratory tract is selected from multiple variants living in the tonsil. Additionally, researchers are still trying to determine how this clone causes necrohemorrhagic pneumonia (lesions characterized by death of lung tissue and hemorrhage), which can lead to respiratory failure and death, he said.

For *S. equi*, researchers are trying to determine why the horse's guttural pouches serve as an evolutionary dead-end for the bacteria, Timoney said. Protracted carriage of *S equi* in this location leads to loss of virulence and pathogen fitness as a result of an accumulation of mutations and deletions in its DNA—essentially, genetic changes. An understanding of pathogen fitness might also help clarify why *S. equi* is pathogenic only for equids. UK

>Erica Larson is the news editor for *The Horse: Your Guide To Equine Health Care*.

Masthead

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The Horse: Your Guide To Equine Health Care

Erica Larson, News Editor
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Do Foals and Yearlings Need Fecal Egg Counts of Zero?

Foals and yearlings are the groups of horses most susceptible to parasitic disease. As such, they're generally also treated most intensively with deworming agents.

Traditional deworming practices dictate that young horses should be treated on a strict rotational program to eliminate the strongyles and ascarids that could cause serious disease. But do we really need to eliminate all parasites from young horses' bodies?

Jennifer L. Bellaw, a PhD student at the UK Maxwell H. Gluck Equine Research Center, in Lexington, and colleagues recently determined that this might not be the case. She and colleagues evaluated the impact of two deworming regimens—one rotational and one daily—on fecal egg counts (FECs), growth rates, and body condition scores in young Thoroughbreds.

The team found that FECs were not significantly different between groups,

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Good overall management practices can help compensate for the effects of parasitism.

but were significantly influenced by horse age, with strongyle counts increasing continually and ascarid counts peaking at 4.5 months of age.

That said, "the horses in our study had near perfect body condition scores and growth rates matching … reference growth rates for Kentucky Thoroughbreds, even when their fecal egg counts weren't zero," Bellaw relayed.

Good overall management practices can help compensate for the effects of parasitism, and growth rates appear to be good indicators of the level of management necessary to negate parasitism's deleterious effects, she added.

With that in mind, Bellaw said, "a parasite control program for young horses, foals in particular, should be more strategic and be based on horse age and parasites present."

Initial deworming treatments for foals should target ascarids, while later treatments should target strongyles. But with current levels of anthelmintic resistance found in today's parasites, it is unlikely that a given anthelmintic will be efficacious against both ascarids and strongyles. As such, it's important to use products that are still effective against the targeted parasites. "Those formulating control programs should always consider the parasites to target at a given time and which drugs are still efficacious against those target parasites," Bellaw said.

While FECs are a useful tool for diagnosing parasitic infection and determining anthelmintic efficacy, they do not provide information on overall horse health or an indication of the horse's disease risk. Controlling parasites within young horses is one piece of a larger management approach that should encourage optimal growth and body condition scores. UK

>Katie Navarra has worked as a freelance writer since 2001. She owns and enjoys competing a dun Quarter Horse mare.

Pandora's Box: Equine Genomics

Equine genetics has been of great interest to humans for millennia. While we might not have used that term specifically, the recording of equine parentage, births, and deaths was a practice that pre-dated the compulsory recording of human births and deaths in Great Britain by over a century. The term "genomics" covers all aspects of genes, including their structure and function, not just the science of heredity.

The genome is all of the DNA, divided up and packaged as chromosomes, in each cell. The DNA molecule, the unit of heredity, is made up of four nucleotide bases—guanine, cytosine, adenine, and thymine—in a sequence. The equine genome consists of about 2,700 million base pairs, which is similar in size to the human genome.

Less than 3% of the genome actually codes for proteins. The remaining 97% was formerly termed "junk DNA" but we now know it orchestrates the use of the entire genome, as regulatory elements. Individuals have differences in the sequences of the nucleotides. This is pretty obvious—we have greys and bays but they are still horses. However, not all of the sequence differences are that obvious, and sequence differences can be

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Individuals within the same species have differences in DNA's nucleotide sequences. This is pretty obvious—we have chestnuts and greys, but they are all still horses.

whole sections of sequence or just single nucleotides. A single nucleotide polymorphism (SNP, usually pronounced "snip") is a single nucleotide in a sequence that differs between individuals at a low-population frequency.

Approximately 10 million SNPs have been found in the collective equine genome. It

Equine Genomics

is important to remember that SNPs aren't necessarily mutations that have any effect on the organism. Indeed, SNPs are less likely to be found in the protein coding genes of the genome as these areas have been heavily selected for functionality by evolution. Any change in DNA sequence that did not benefit the animal would reduce its chances of survival in the gene pool.

Science uses selected SNPs as a crude road map of the genome. By way of analogy, a set of directions are like a SNP map. If I gave you some directions, they might be: "Turn right at the pub, then take the second left after the church." The pub and the church have no actual bearing on the destination, they are just guiding landmarks, and so it is with SNPs. SNPs that sit close together on a chromosome are likely to be inherited together. Using commercial SNP arrays (called "SNP chips"), molecular biology techniques can rapidly hone in on a region of the genome that is different between horses in terms of its SNP frequency.

SNP analysis is immensely useful for narrowing down the search for areas of the genome harboring genetic traits of interest, whether they be a trait relating to disease or a desired trait. Studies using this approach are called genome-wide association studies, or GWAS (pronounced "gee-waahs").

The SNP-GWAS approach has helped identify regions of interest in the genome in diseases such as lavender foal syndrome, polysaccharide storage myopathy, recurrent laryngeal neuropathy, foal immunodeficiency syndrome in Fell and Dales ponies, osteochondrosis dissecans, guttural pouch tympany in Arabians and German warmbloods, recurrent uveitis in German warmbloods, insect bite hypersensitivity, and hydrocephalus in Friesians.

We have only just started to uncover the wealth of information the equine genome holds. Continued efforts for funding and research will yield more mind-blowing results than our imagination can fathom. Watch this space!

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>This is an excerpt from *Equine Disease Quarterly,* funded by underwriters at Lloyd's, London.

Commentary: Advancements in Understanding Genomics and Horses

In the October issue of the *Equine Disease Quarterly,* Emma Adam, BVetMed, MRCVS, Dipl. ACVIM, ACVS, PhD, discusses the new genomics tools available to study horse diseases. Her authorship of this article is particularly noteworthy since Emma initially trained as a veterinary surgeon before returning to university to complete a PhD studying joint diseases in horses. In doing so, she discovered that genomic tools were an effective way to address problems that were not resolvable using earlier technologies.

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Dr. Emma Adam compared gene expression in joints and other collagenous tissues at different stages of life and then assessed which genes had an impact on healthy growth of that tissue.

Her article presents the "nuts and bolts" of horse genomics. As a point of reference, in 1990 we had only characterized 50-100 genes for the horse and confirmed the chromosome location for a mere seven of them. Fast forward to 2009, and the whole genome sequence for the horse had been determined. The immediate application of the sequence data at the time was to identify DNA mutations responsible for well-known diseases of the horse. However, that was only the beginning.

There was a drive to find out how genes function. Everything that we do to a horse turns genes on or turns them off. If genes are defective, it can result in development of disease. Genes are also important for performance. Some genes have variants that affect such things as type of gait, optimal racing distance to reach performance potential, and behavior. Many genes interact with management practices such that horses might be more reactive or, alternatively, less responsive to certain feeding programs, training regimens, or vaccinations. Breeders and trainers attempt to optimize management. These observations clearly suggest that genomics information has a place both in veterinary practice and in the stable yard.

Emma also has been among the scientists developing tools to investigate genes, their expression, and their impact on horses. Before genomics, we basically fed, trained, or treated horses then observed them to assess what the clinical or phenotypic effects might be. Emma's studies pioneered another approach. Her studies entailed comparing gene expression in joints and other collagenous tissues at different stages of life, including several stages of embryonic development, and then assessing which genes had an impact on healthy growth of that tissue. Understanding the genes that contribute to tissue development and repair should lead to development of veterinary therapeutics that benefit the health and welfare of the horse and rider.

Emma is not alone in pioneering the use of genomics for research on horses. A quick survey of veterinary publications reveals scientists using genomics to study reproduction, lameness, respiratory diseases, infectious diseases, immunology, and more. We do not need to become molecular geneticists to enjoy horses any more than we need to become mechanics to drive a car. But we need to know, appreciate, and encourage development of these new approaches. Watch that space!

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>This is an excerpt from *Equine Disease Quarterly,* funded by underwriters at Lloyd's, London.

Fire Ant Surveillance for Horse Farms

The red imported fire ant can be found in parts or all of Alabama, Arkansas, California, Florida, Georgia, Louisiana, Mississippi, New Mexico, North Carolina, Oklahoma, Puerto Rico, South Carolina, Tennessee, Texas, and Virginia. Occasionally, it has been found in Kentucky, Maryland, and Missouri. Fire ants like to establish colonies in open sunny fields and pastures. Soil moisture and winter temperatures round out the major environmental factors that limit this invasive insect's spread. Climate changes, along with the insect's adaptability, point to a continued gradual expansion of its boundaries.

The fire ant's impact extends beyond the pain of its legendary sting. No significant adverse effects to the health of foals or mature horses have been reported in states in which fire ants are widely established. But, in addition to causing injury to workers, animals, and wildlife, this small insect affects pasture maintenance and hay production, damages equipment, and increases costs. Horse-farm managers in fire ant-infested areas have adjusted their management practices and developed strategies to live with this pest.

SANFORD PORTER/USDA AGRICULTURAL RESEARCH SERVICE

The fire ant's range is expanding northward and westward, meaning more horse owners will have to deal with the invasive insect.

The gradual northward and westward expansion of the fire ant's range exposes more farm managers and stable and pleasure horse owners to this important pest. Those living along the expansion front should become familiar with some of fire ant basics and watch for ant activity that seems out of the ordinary.

The ant's hallmark is its familiar mound, but there is one major difference when it comes to fire ants: Their mound is the typical pile of loose, fine soil but without a central opening. Instead, fire ants enter and leave their colonies through underground tunnels that radiate from the mound. Mound heights range from a few inches in mowed areas to 18 inches in undisturbed areas. Repair of a fire ant mound collapsed by a heavy rain results in a loose, fluffy pile of soil a few days later.

Fire ants look like typical ants. They are small but vary from 1/8- to 1/4-inch in length. The head, thorax, and legs are red to brown with a black abdomen. Positive identification of fire ants requires collecting approximately a dozen specimens in rubbing alcohol and taking them to your local cooperative Extension office. This must be done carefully. Disturbing the mound usually prompts numerous ants to pour out and climb up any vertical surface to sting the intruder. Other ant species scurry about when the colony is disrupted, working to protect the queen and move their brood to a safe place.

Collect the ants carefully to keep from being stung. Do this by wearing dishwashing gloves dusted in baby powder; the

THE GRASS GUIDE

TIMOTHY (*Phleum pratense*)

Life cycle: Cool-season perennial
Native to: Eurasia
Uses: Pasture and hay
Identification: Bluish-green ribbed leaves with a cylindrical seed head and a corm, or bulb, just above the roots.

Timothy is a good perennial grass that can survive harsh winters and wet soils better than most other cool-season grasses. Most often grown for hay, timothy produces high yields at first cutting, but slow regrowth results in low yields thereafter. Timothy is not normally recommended for pasture because it has poor grazing tolerance.

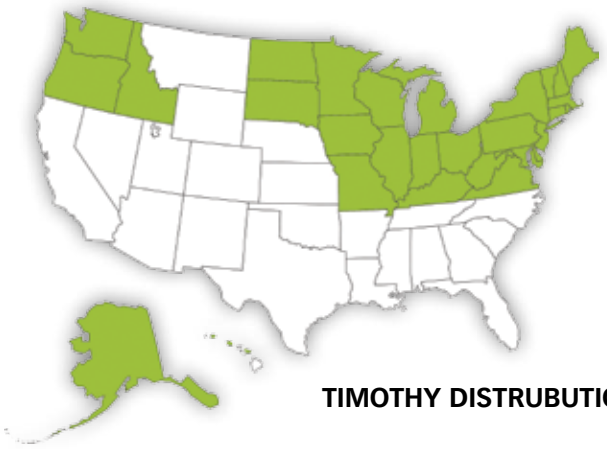
In northern states and Canada, timothy is productive for four to five years, but longevity averages two years in the transition zone. Timothy grass' seed head often resembles that of foxtail but it still retains the same bluish-green color of the leaf blades. UK

Above: Timothy's seed head looks similar to a foxtail head but is green in color.

Left: Timothy stolon and roots.

Below: Timothy growing in a field.

>Information provided by AnnMarie Kadnar, graduate student; Krista Lea, MS, coordinator of the UK Horse Pasture Evaluation Program; and Ray Smith, PhD, professor and forage extension specialist. All three are part of UK's Department of Plant and Soil Sciences.



TIMOTHY DISTRUBUTION

Fire Ants

ants cannot crawl up dusted surfaces. Stay as far away from the mound as possible during collection, and watch for ants crawling on your shoes.

Follow up a positive identification of fire ants with a careful examination of the property in spring or late fall to determine the number and location of active mounds. Manage fire ants by carefully applying baits or drenching mounds with insecticides labeled for fire-ant control. Take advantage of the excellent information available on fire-ant management.

For more information, see the Extension publication *Identifying Fire Ants* at articles.extension.org/pages/11278/identifying-fire-ants.

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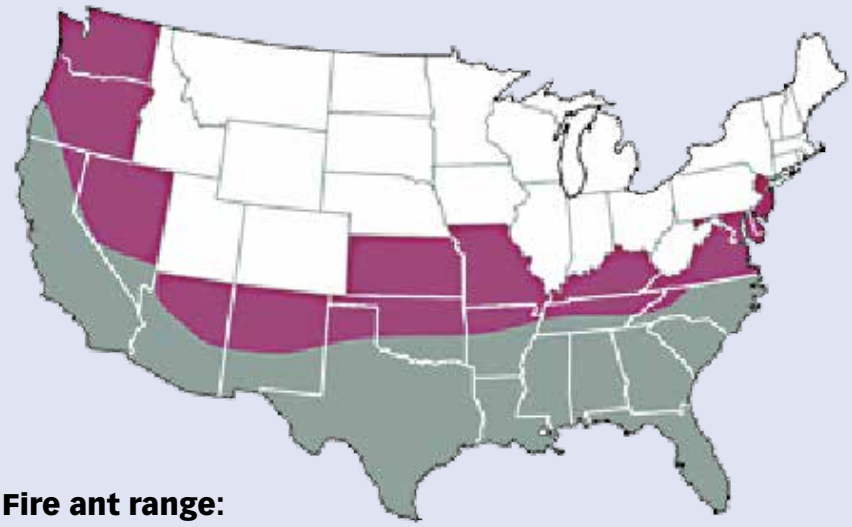
>This is an excerpt from *Equine Disease Quarterly,* funded by underwriters at Lloyd's, London.

Figure 1. Fire ant colonies in the United States



Source: ars.usda.gov/Research/docs.htm?docid=9165&pf=1&cg_id=0

GRAD STUDENT *SPOTLIGHT*

ASHLEY WAGNER-WELLS

From: Cheriton, Virginia

Degree and institutions where received:
BS in Animal Science and Poultry Sciences, Virginia Tech;
MS in Animal and Poultry Science with an emphasis in nonruminant nutrition, Virginia Tech;
PhD in Animal and Food Sciences with an emphasis in equine nutrition, University of Kentucky.

Ashley Wagner-Wells chose to study equine protein metabolism and skeletal muscle physiology at UK under the guidance of Kristine Urschel, PhD. Specifically, for her dissertation, she looked at factors affecting equine skeletal muscle protein synthesis.

Also during her time at UK, Wells studied the effects of advanced age on horses' whole-body protein synthesis and skeletal muscle mechanistic target of rapamycin signaling—a signaling pathway that, when activated, stimulates translation initiation of a protein and, ultimately, protein synthesis. She also examined the effect of gluteus medius muscle (which is located in the horse's hind end and forms the swell or round of the croup) sample collection depth on postprandial (post-feeding) mammalian target of rapamycin (mTOR) signaling in mature Thoroughbred mares. Due to the fact that muscle fiber type changes with gluteal muscle depth, and the mTOR pathway has been shown to react to stimuli differently in various fiber types, Wells wanted to verify that sampling depth did not affect the signaling pathway. She found that although there were changes in the fiber types, there were no differences in the signaling pathway.

The last project Wells worked on during her time at UK was studying developmental regulation of the activation of skeletal muscle's translation initiation factors in response to feeding in horses.

When asked what her most valuable takeaway from the program was, Wells said, "As horses grow and mature, their ability to activate the signaling pathway that is responsible for protein synthesis and, thus, muscle mass accretion is lowered with age. Inflammation that is associated with aging in geriatric animals may be one of the culprits for this phenomenon."

Wells also appreciated Urschel's motto in her laboratory: "Mistakes are okay. Mistakes happen, but if you keep record of everything you do, mistakes can be learned from." She said the motto is something that goes far beyond lab work and well into life.

Wells also met her husband during her time at UK, so she considers that a valuable personal take away.

Wells graduated in 2011 and now works as a technical sales manager with Probiotech International, a feed additive company. She has many responsibilities, including research and new product development, product formulations, sales, marketing, and regulatory, to name a few. UK

>Alexandra Harper, MBA, is the operations and communications coordinator for the UK Ag Equine Programs.

Peterson Named UK Ag Equine Programs Director

Racing and equestrian surfaces authority Mick Peterson, MS, PhD, has been named director of UK Ag Equine Programs and Dickson Professor of Equine Science and Management. He will start January 2017.

In addition to leading UK Ag Equine Programs, Peterson will conduct research on the biomechanics and mechanical properties of living tissues as they relate to musculoskeletal disease detection and prevention. His teaching responsibilities will include undergraduate and graduate courses in the areas of biomechanics, instrumentation, and/or mechanics of materials related to equine athletes in the Department of Biosystems and Agricultural Engineering.

"Since its founding, the equine program at UK has become one of the premier equine programs in the world," said Peterson. "The potential for future growth in teaching, research, and outreach is tremendous, which can greatly benefit the equine industry and the university. I am thrilled to be a part of this exciting program and look forward to working with a broad range of stakeholders."

Peterson comes to UK from the University of Maine, where he served as a mechanical engineering professor. His research has linked traditional understanding of engineering mechanics and materials to the biomechanics of animals. His research emphasis has been on the manner in which dynamic response can be used to characterize materials.

During the course of his career, Peterson has worked on a range of equine and animal biomechanics topics, including the impact of exercise on bone density, the development of biomechanical models, durability of cetacean epidermis, the measurement of inertial properties of the equine forelimb, biomechanics of whale interaction with fishing gear, cetacean acoustic response, marine hydroacoustics, and equine gait kinematics on treadmills and tracks.

Peterson said his greatest passion is understanding racing and equestrian surfaces. Originating in work 20 years ago on a new medical imaging technique, this work has gradually grown from an interest in the effect of exercise on bone remodeling to a focus on applying concepts from manufacturing quality control to improved racing surface consistency for the protection of horses and riders.

COURTESY DR. MICK PETERSON

Peterson said his greatest passion is understanding racing and equestrian surfaces. Here, he studies the dirt track at Churchill Downs.

"The fact that we are hiring our first full-time director reflects how the program has grown and evolved," said Nancy Cox, PhD, dean of the college. "We are privileged to attract such a prominent leader to this position; Mick's passion for the equine industry and this program is genuine and is matched by our faculty, staff, and students. We will be able to take our service to this signature industry to another level under his leadership and couldn't be more thrilled by what the future holds for this program."

Peterson collaborated with C. Wayne McIlwraith, BVSc, PhD, DSc, FRCVS, Dipl. ACVS, a professor at Colorado State University (CSU), to found the Racing Surfaces Testing Laboratory, a nonprofit organization that is supported by the horse racing industry and

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Leptospira interrogans serovar Pomona (*L. pomona*) can cause devastating problems for your horse. LEPTO EQ INNOVATOR® is the first vaccine developed specifically for horses to help prevent leptospirosis caused by *L. pomona*. It helps prevent infections of the blood caused by *L. pomona*, which could, but has not been demonstrated to, help reduce the potential risk of equine recurrent uveitis, abortion and acute renal failure caused by *L. pomona*.* Intensive safety and efficacy trials have demonstrated LEPTO EQ INNOVATOR safely helps prevent *L. pomona* infections with 0% urinary shedding.[1-4] Field safety trials have shown the vaccine is 99.9% reaction free.[2-4] To learn more, visit LEPTOEQINNOVATOR.COM.

*Currently, there are no vaccines available with USDA-licensed label claims against equine abortions, uveitis or acute renal failure due to *L. pomona*.

[1] Data on file, Study Report No. B850R-US-12-011, Zoetis LLC.
[2] Data on file, Study Report No. B951R-US-13-043, Zoetis LLC.
[3] Data on file, Study Report No. B951R-US-13-046, Zoetis LLC.
[4] Data on file, Study Report No. B951R-US-15-092, Zoetis LLC.

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Peterson Named Director

provides research, testing, and materials characterization services for the industry.

Prior to joining the University of Maine as a faculty member in 1999, Peterson was an assistant professor of mechanical engineering at CSU and before that a post-doctoral research associate and instructor at Northwestern University.

Peterson earned his doctorate and master's degrees from Northwestern University and a bachelor's in mechanical engineering from General Motors Institute. He also completed additional graduate work at Yale University, Cornell University, and the University of Connecticut in material science, mathematics, mechanics, and signal processing.

He has had additional academic appointments and affiliations with the Swedish University of Agriculture, in Upsalla; the University of Central Lancashire, in Preston, United Kingdom; and the University of Colorado, Boulder.

He currently serves on the Jockey Club Welfare and Safety of the Racehorse Surfaces Committee and as executive director of the Racing Surfaces Testing Laboratory.

Peterson has published 80 journal articles, three book chapters, 81 conference proceedings, presented 67 additional papers at conferences, and has received six patents. UK

>Holly Wiemers, MA, APR, is the communications and managing director of UK Ag Equine Programs.

Upcoming Events

November, 15
Kentucky Equine Networking Association (KENA) Meeting, Networking 6 p.m.; Dinner 6:30 p.m.

November 17
UK Department of Veterinary Science Equine Diagnostic and Research Seminar Series: Nathan Slovis, DVM, Dipl. ACVIM, CHT, Hagyard Equine Medical Institute, will speak about infectious disease diagnosis, at 4 p.m. at the UK Veterinary Diagnostic Laboratory

November 19
Reproductive Diseases in Horses Symposium, 8 a.m. – 5 p.m., Hilton Lexington Green

Registration Open for Reproductive Diseases in Horses Symposium

The UK Gluck Equine Research Center will host the Reproductive Diseases in Horses Symposium on Saturday, Nov. 19 at the Hilton Lexington Green in Lexington, Kentucky.

This symposium will focus on reproductive diseases in horses and is targeted toward veterinarians, regulatory officials, farm managers, and breed registry representatives. Experts will present information on pathology, diagnostic techniques, and genetic factors in mares and stallions in relation to reproductive diseases. Talks will also cover the infectious diseases leptospirosis and contagious equine metritis.

The symposium is partially funded by a USDA National Institute of Food and Agriculture-Agriculture and Food Research Initiative grant titled, "Identification of genetic factors responsible for establishment of equine arteritis virus carrier state in stallions."

Seven-and-a-half hours of continuing education (CE) is pending approval by the Kentucky Board of Veterinary Examiners for veterinarians and veterinary technicians. CE sheets must be signed at the meeting to receive credit.

Register online at reproductivediseasessymposium.eventbrite.com.

SYMPOSIUM SCHEDULE

8:00-8:30 a.m.	REGISTRATION
8:30-9:00	Update on USDA-NIFA grant on identification of genetic factors responsible for the establishment of EVA carrier state in stallions *Udeni Balasuriya, BVSc, MS, PhD, UK Gluck Equine Research Center*
9:00-9:45	Pathology of the stallion's reproductive tract *Dickson Varner, DVM, PhD, Dipl, ACT* *Texas A&M College of Veterinary Medicine*
9:45-10:15	Diagnostic techniques for evaluating breeding soundness in mares *Etta Bradecamp, DVM, Dipl. ACT, ABVP, Rood & Riddle Equine Hospital*
10:15-10:30	BREAK
10:30-11:00	Diagnosis and treatment of fungal infection *Kristina Lu, VMD, Dipl. ACT, Hagyard Equine Medical Institute*
11:00-11:30	Ovarian abnormalities in mares *Karen Wolfsdorf, DVM, Dipl. ACT, Hagyard Equine Medical Institute*
11:30-noon	Genetic causes of embryonic losses in mares *Ernie Bailey, PhD, UK Gluck Equine Research Center*
Noon-1:30 p.m.	LUNCH & LECTURE: Reproductive tract infections in horses and their impact *Peter Morresey, BVSc, MACVSc, Dipl. ACT, ACVIM* *Rood & Riddle Equine Hospital*
1:30-2:15	Biomarkers for feto-placental well-being in the mare *Barry Ball, DVM, PhD, Dipl ACT, UK Gluck Equine Research Center*
2:15-3:00	Equine Placental Pathology *Alan Loynachan, DVM, PhD, Dipl. ACVP, UK Veterinary Diagnostic Laboratory*
3:00-3:15	BREAK
3:15-4:00	Leptospirosis *Jacqueline Smith, PhD, UK Veterinary Diagnostic Laboratory*
4:00-4:45	Contagious Equine Metritis *Peter Timoney, FRCVS, PhD, UK Gluck Equine Research Center*
4:45	CLOSING REMARKS *Ed Squires, MS, PhD, Hon. Dipl. ACT, UK Gluck Equine Research Center*

>Jenny Evans, MFA, is the interim executive director of the Gluck Equine Research Foundation and marketing and promotion specialist senior of the Gluck Equine Research Center.

UK Equine Research Hall of Fame Inducts New Members

Norm Ducharme, DVM, MSc, Dipl. ACVS; **Sue Dyson, MA, Vet MB, PhD, DEO, FRCVS**; and **Susan Stover, DVM, PhD, Dipl. ACVS,** were inducted into the UK Equine Research Hall of Fame on Oct. 25 at the Hilary J. Boone Center on the UK campus for their contributions to equine science and research.

The following day, each presented a seminar as part of the 14th Mary Passenger Memorial Lecture on Equine Medicine and Surgery, co-sponsored by Hagyard Equine Medical Institute, at the UK Gluck Equine Research Center.

Videos of the lectures presented by Ducharme, Dyson, and Stover will be posted on TheHorse.com in the coming months.

Doug Antczak, VMD, PhD, introduced his colleague, Norm Ducharme, DVM, MSc, Dipl. ACVS, who was nominated by faculty at Cornell University.

Wayne McIlwraith, BVSc, PhD, DSc, FRCVS, Dipl. ACVS, of Colorado State University, introduced Sue Dyson, MA, Vet MB, PhD, DEO, FRCVS, whom he nominated to the Hall of Fame.

John Pascoe, BVSc, PhD, Dipl. ACVS, introduced his wife, Susan Stover, DVM, PhD, Dipl. ACVS, whom he nominated on behalf of the University of California, Davis, faculty.

Dean Nancy Cox, PhD, welcomes Hall of Fame guests.

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