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Thoroughbred Farms Participate in *Lawsonia Intracellularis* Study

Allen Page, DVM, a PhD student at the University of Kentucky Gluck Equine Research Center, is conducting a study on *Lawsonia intracellularis* involving 14 Thoroughbred farms and 600 Thoroughbreds in Central Kentucky.

L. intracellularis is a bacterium that causes equine proliferative enteropathy (EPE), an emerging intestinal disease of horses that primarily affects weanling foals 4 to 7 months old.

Page began the *L. intracellularis* study in January 2012 with a goal of determining maternal antibodies' role in *L. intracellularis* infection and immunity. The study will be complete in February 2013.

The participating farms collect blood samples from the mares and foals at the time of the foal's birth. After that period, they collect blood samples from the foals monthly to monitor the maternal antibody decline in their circulation.

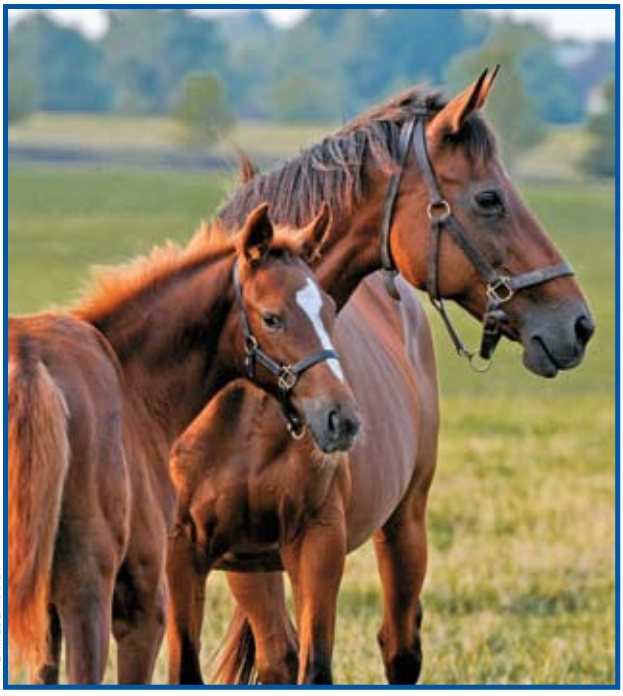
"These farms are participating because they realize how much this research will benefit the industry," Page said. "One of the benefits of conducting research at the Gluck Center is access to the farms around us and how most of them are willing to help with research projects dealing with important and emerging issues."

Page said he is grateful for the farms' participation, and he expects the study results to benefit the industry as a whole.

"If we show maternal antibodies do play a role in protection against *L. intracellularis*, there is a potential to administer hyperimmune plasma much like we do for *Rhodococcus equi* (a pulmonary disease in foals that causes abscesses to form in the lungs)," Page said. "If the antibodies are not important in immunity to *L. intracellularis*, then it'll allow us to look at other aspects of foal and weaning immunity that would suggest why horses in these age groups are uniquely susceptible to the bacterium."

Page, whose research is funded by the Pfizer Animal Health-Morris Animal Foundation (MAF) Veterinary Fellowship for Advanced Study and the Mt. Brilliant Family Foundation, is mentored by David Horohov, PhD, William Robert Mills chair and professor at the Gluck Center.

The Morris Animal Foundation funds this *L. intracellularis* study. UK



ANNE M. EBERHARDT

Participating farms collect blood samples from mares and foals.

>Jenny Blandford is the Foundation Coordinator at the Gluck Equine Research Center.

Articles of Interest

Joint Disease and Cartilage Repair

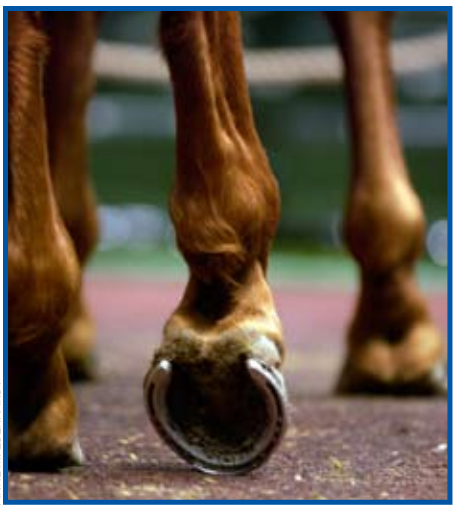
Orthopedic injuries in young horses not only have huge economic impacts on the horse industry but can also be devastating for the horse owner, said James MacLeod, VMD, PhD, John S. and Elizabeth A. Knight chair and professor of Veterinary Science at the University of Kentucky Gluck Equine Research Center.

Joint disease can result from acute traumatic injury or more chronic osteoarthritis, he explained. Either way, it is one of the most common causes of lameness and a primary reason why many horses' athletic careers come to an end. Damage to the cartilage that normally covers the ends of adjoining bones restricts joint movement and frequently becomes painful.

"The result is lameness and a horse that can no longer perform up to its full potential," MacLeod said.

Despite the importance of articular cartilage for normal joint function and pain-free movement, the tissue has very limited ability to repair structural damage, MacLeod said. This is a primary reason why joint disease problems frequently progress and become more serious through life. Interestingly, however, joint cartilage in young foals appears to have greater capacity for repairs. Early in life the tissue is growing rapidly and remodeling structurally in response to the biomechanical forces of movement.

"Unfortunately, when these processes are complete, any enhanced repair potential is lost," he said. Therefore, research studies focused on synovial joint development and maturation can help identify new therapeutic strategies for cartilage repair.



ANNE M. EBERHARDT

Researchers hope to identify new therapeutic strategies for cartilage repair.

Equine researchers are also asking basic questions about cartilage repair in other animal species, MacLeod said. Mexican axolotl salamanders do not appear to have much in common with horses; however, MacLeod's laboratory is using these amphibians' ability to regenerate and repair damaged cartilage as a research model to study equine joint cartilage. The salamander can grow an entire new limb or tail in a few months, and its cartilage cells produce many of the same matrix proteins as do equine cartilage cells.

"We believe that the salamander's ability to repair large cartilage lesions can help us learn which specific repair mechanisms have been lost in horses and other mammals," MacLeod said.

The long-term goal is to develop therapeutic strategies to re-establish these repair processes, MacLeod said. He hopes many lame horses (and arthritic people) will benefit from this research. UK

>Shaila Sigsgaard is a contributing writer for the Bluegrass Equine Digest.

WEED OF THE MONTH

Common name: **Hemp dogbane**
Scientific name: ***Apocynum cannabinum* L.**
Life cycle: **Perennial**
Origin: **North America**
Poisonous: **Yes**

Hemp dogbane, sometimes called Indian hemp, grows throughout most of North America. This creeping, perennial broadleaf weed can reach 5 feet tall, and mature plants are woody at their base. This species is found frequently in pastures and rangeland. It reproduces from seeds and buds on creeping, horizontal roots and from the parent plant's crown buds. Hemp dogbane forms colonies of plants from the roots.

Small white flowers bloom in the plant's terminal, and leaves and stems contain a white, milky sap. This plant has more branching than other milkweed plants, and the leaves contain few, if any, hairs.

Hemp dogbane leaves are toxic to horses at all times, including when accidently dried in hay. The toxic substance is a glycoside that might cause digestive disturbances, diarrhea, and overall weakness.

Controlling hemp dogbane in pastures is very difficult. Mowing is generally ineffective, and herbicidal treatment might require multiple applications. Consult your local Cooperative Extension Service personnel for a list of herbicidal control methods in your area. UK

>William W. Witt, PhD, a plant and soil sciences researcher, provided this information.

Sarcocystis Neurona Genome Project Almost Complete

Dan Howe, PhD, a professor and molecular parasitologist at the University of Kentucky Gluck Equine Research Center, and colleagues are finishing up a three-year *Sarcocystis neurona* genome project. The primary goal of the project, titled "Genome sequence for the apicomplexan *Sarcocystis neurona*," has been to sequence and assemble the *S. neurona* genome.

This protozoan (single-cell) parasite causes equine protozoal myeloencephalitis (EPM), which is one of the most important and commonly diagnosed neurologic diseases in horses in the United States. EPM has a tremendous ongoing impact on the equine industry and equine health due to the considerable cost of diagnosis and care to fully recover an affected horse. Some horses might never recover entirely. Clinical

Sarcocystis Neurona Project

signs vary from horse to horse but include loss of coordination, muscle atrophy, sore back, stumbling, stifle joint locking, and weakness.

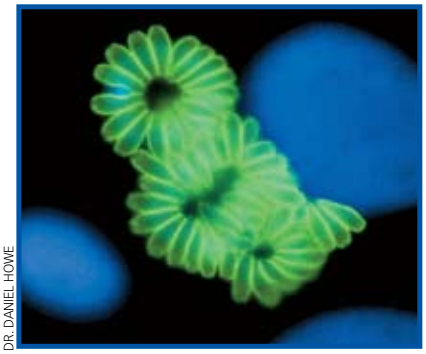
The parasite's life cycle initially begins in the definitive host, which is the opossum that passes the *S. neurona* oocysts and sporocysts in its feces. To complete its life cycle, this parasite needs two hosts, one definitive (final) and one intermediate.

Horses serve as an accidental intermediate host of *S. neurona*. Horses represent a dead end for the parasite life cycle since they cannot pass the disease among themselves. When grazing on pasture, ingesting feed, or drinking water contaminated with opossum feces, the infective stages of the organism pass to the horse's small intestine, where they eventually emerge from a cyst.

The organism's infective stage undergoes several replicative cycles in the blood vessels. In some horses they migrate to the central nervous system where the parasites cause severe neurologic disease. This neurologic damage can cause various signs depending on the area of the central nervous system parasitized.

This project's purpose has been to sequence *S. neurona*, to compare it to related parasites' sequences, and to make the information available to the research community, Howe said.

According to Howe, the study has succeeded in providing new insight about the protozoan that might also shed light on the closely related important human parasites such as *Toxoplasma* and *Plasmodium* (malaria) that are known to cause significant disease in both humans and other mammals.



DR. DANIEL HOWE

Each green petal is an *S. neurona* parasite.

The biology of *S. neurona* resembles that of other pathogenic apicomplexans and is fairly complex with multiple life cycle stages. Howe said the sequencing efforts have revealed molecular diversity among different *S. neurona* strains and other *Sarcocystis* species.

"We have been able to sequence one representative strain at this point, but we hope to obtain genome sequences from at least one, if not several, additional strains," Howe said. "The tremendous drop in the cost of sequencing now makes this feasible. But at this point, there is no evidence to suggest that any one strain type is more important (i.e., more pathogenic) in horses than others."

Howe said the genome sequence will contribute to an increased understanding of *S. neurona* and thereby enhances its value as a comparative model within this important group of pathogens.

"A fully sequenced genome will also provide a resource for characterization of virulence factors and *S. neurona* antigens, which can lead to new protective immunizations or chemotherapeutics against this parasite," Howe said. "However, there is a tremendous amount of data to be interpreted before the initial lab work on potential vaccine candidates and chemotherapeutic agents can get started."

Prior to the *S. neurona* genome project, Howe had been conducting preliminary sequencing studies funded by a gift from Thoroughbred breeders John and Jerry Amerman. Then in 2009 he received a $500,000 grant from the USDA-CSREES (U.S. Department of Agriculture-Cooperative State Research and Extension Service) competitive grants for his research.

The information from this current study will be posted to a public database available for research on EPM. Howe has been collaborating on the project with Chris Schardl, PhD, the Harry E. Wheeler Chair in Plant Mycology and director of the University of Kentucky Advanced Genetic Technologies Center, and Jessica Kissinger, PhD, of the University of Georgia. UK

>Shaila Sigsgaard is a contributing writer for the Bluegrass Equine Digest.

MASTHEAD

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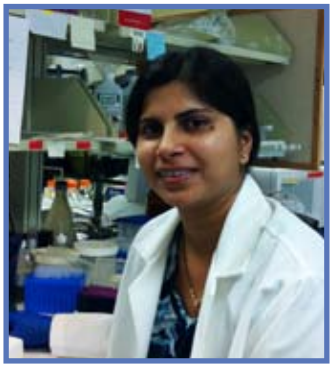
STUDENT SPOTLIGHT



ABLESH GAUTAM

From: **India**

Degrees and institute where received:

BVSc & AH from Jawahar Lal Nehru Agricultural University, Jabalpur, India

MS, Microbiology, from North Dakota State University

Ablesh Gautam chose to come to the University of Kentucky (UK) Gluck Equine Research Center to further her education when the opportunity arose to work in the infectious disease field.

"I really wanted to work on infectious diseases, specifically at the molecular level, and while I was looking for PhD opportunities at the University of Kentucky, I found Dr. Dan Howe's (PhD, professor and molecular parasitologist at the Gluck Center) lab working on equine protozoal myeloencephalitis (EPM), perfectly matching to my research interests."

When Gautam discussed with Howe her interest in his work, he agreed to be her PhD advisor. Gautam's research focus is on the surface antigen (SnSAG) gene family in the protozoan parasite *Sarcocystis neurona*. The protozoan is the most common cause of EPM in horses in America. The single-celled parasite can, after gaining access to the central nervous system, damage any region of the brain and/or spinal cord to various degrees.

S. neurona has a fairly complex life cycle that progresses through multiple developmental stages differing morphologically and molecularly. The *S. neurona* merozoite's surface is covered by multiple related proteins, which are similar to the surface antigen (SAG) gene family of *Toxoplasma gondii*, Gautam said.

"My studies also include examining the expression of these proteins in different life cycle stages and their role in host-parasite interactions," she said. "Specifically, I am bioinformatically identifying new SnSAGs in the draft sequence of the *S. neurona* genome. Furthermore, I am characterizing SnSAGs thus identified, as well as SnSAGs identified previously in our lab, in detail."

As a side project, Gautam is studying the process of glycosylation exhibited by different *S. neurona* proteins. The information acquired from her work will, according to Gautam, help to better comprehend the parasite, its complex life cycle stages, and the host-parasite relationship.

"This will further be useful for developing better diagnostics and preventive and therapeutic measures," Gautam said.

Gautam plans to continue working on infectious diseases at the molecular level, and after earning her PhD she hopes to complete postdoctoral training. UK

>Shaila Sigsgaard is a contributing writer for the Bluegrass Equine Digest.

The Latest in Diagnostic Imaging Modalities for Horses

An accurate diagnosis is imperative to pinpointing and treating lameness in horses. Fortunately, veterinarians today have more sound and accurate options for identifying specific issues than they did just 10 years ago, said Kent Allen, DVM, owner of Virginia Equine Imaging, in The Plains, who presented April 26 at a University of Kentucky Department of Veterinary Science Equine Diagnostic and Research Seminar. That, he shared in his presentation, is good for the horse, the veterinarian, and the owner.

"Absent a diagnosis, medicine is poison, surgery is trauma, and regenerative medicine is witchcraft," he said.

Allen touched on several imaging modalities during his presentation but stressed that, in most cases, any one technique is not enough to reach a proper diagnosis. "Wait until all the information is in before you try to interpret results," he cautioned. "None of these (diagnostic imaging modalities) without a detailed clinical evaluation are a magic answer."

Magnetic Resonance Imaging (MRI)

Magnetic resonance imaging is a technique that uses magnetic fields to create cross-sectional and three-dimensional images. While commonly used by physicians, MRI has only been used in equine clinical cases for the past decade and has come into widespread use just within the past five years.

"I've been waiting for MRI to catch up with the equine profession for about 20 years," Allen said.

This modality provides superior soft tissue and bone detail and often allows practitioners to detect abnormalities earlier than with other modalities.

Allen said veterinarians use two types of MRIs on horses: a standing low-field system and a recumbent high-field system. The low-field magnet allows veterinarians to image a horse using only standing sedation, but Allen relayed that it's difficult to get a good image of areas located above the foot using a low-field system. While the high-field magnet produces a clearer image and allows for imaging of additional body parts (including the pastern, fetlock, knee, hock, and skull), it requires the horse to be placed under general anesthesia.

"The high-field magnet has higher resolution, but the low resolution gives quite a lot of information without having to put the horse through general anesthesia," Allen said. "Typically it's a mix of the two we use in the end."

Allen relayed that MRI (either high- or low-field) is indicated in several cases including:

- When the veterinarian has localized the pain but hasn't yet reached a diagnosis using other imaging modalities;
- When a veterinarian needs a more detailed evaluation to confirm diagnosis so he or she can make treatment and prognosis decisions more accurately; and
- When a veterinarian requires very detailed images of both soft tissue and bone.

He relayed that MRI is the only modality that can diagnose a few conditions, such as swelling in the navicular bone (navicular edema), so it should be considered during diagnostic lameness examinations.

It's not yet possible to obtain an MRI of a horse's entire body, so the problem

Diagnostic Imaging

must be localized to a specific area prior to MRI examination, Allen noted.

Nuclear Scintigraphy (Bone Scans)

Next Allen reviewed the technology behind nuclear scintigraphy, more commonly known as a bone scan. To run a bone scan, veterinarians inject horses with a radioisotope that is absorbed in excess by bony areas undergoing remodeling from injury. Then the veterinarian uses a gamma camera to scan the body, which can identify areas of increased radioisotope uptake.

Unlike some imaging modalities, veterinarians can take multiple bone scan views and combine them to get a picture of the horse's entire skeleton.

The entire process takes two or three hours to put a whole-body picture together, which is helpful as it allows comparisons of uptake in different body parts, said Allen.

Bone scans are indicated in several cases, he relayed, including:

- Difficult to diagnose and multiple limb lameness;
- Axial skeleton (skull, vertebral column, ribs, and sternum) or pelvic injuries;
- Severe lameness of unknown origin;
- Poor performance of unknown origin;
- Suspected fractures not visible on radiographs; and
- Localized lameness with no radiographic or ultrasonographic evidence.

Allen recommended combining bone scans with nerve blocks, clinical evidence, and other imaging modalities to reach a diagnosis and treatment plan.

ANNE M. EBERHARDT

Magnetic resonance imaging has come into widespread use within the past five years.

Digital Ultrasound

Upon its inception into the veterinary world, ultrasound was used primarily for reproductive purposes, but Allen discussed how veterinarians are now using the imaging modality in lameness diagnostics.

A handheld probe placed on the horse's body emits sound waves. Structures inside the body with different densities (e.g., ligaments, tendons, bone, fluid) reflect some of the sound waves back to the probe. These reflections are used to create a digital image of the structures being scanned. Bone appears white, fluid appears black, and all other structures lie somewhere along a gray scale.

Allen relayed that today's digital ultrasound machines and high-resolution probes provide veterinarians with detailed, high-quality images that can identify even the smallest lameness problems. Compared to older analog ultrasound machines, "the digital images are phenomenally better," Allen said. Additionally, he noted that ultrasound can detect defects up to two weeks sooner than can radiographs.

Allen said ultrasound is particularly useful when evaluating soft tissue injuries and some joint issues. He also said ultrasound is very useful for monitoring healing progress and for guiding injections and other techniques.

Diagnostic Imaging

Digital Radiography (X rays)

Veterinarians have used radiographs for years to visualize bony structures inside the body, Allen said, but today's radiograph machines are much more sophisticated than their predecessors. Portable, digital radiograph machines have replaced many old-fashioned machines.

Many veterinarians now employ digital radiography, which presents a radiographic image on a computer screen in about four seconds, he said. This advancement alone can rule out or confirm a catastrophic injury in seconds. Additionally, digital images appear clearer and often more detailed, he said.

Allen said veterinarians most commonly use radiographs to visualize bony tissues but now also use them to guide injections and other procedures.

Lameness Locator

Allen touched briefly on a relatively new diagnostic tool: the lameness locator. Using three sensors placed on the horse's body (one on the poll, one on the pelvis, and one on the right front pastern), the machine yields a semi-quantitative measure of a horse's lameness, Allen said.

Allen said he's been using the commercially available lameness locator as an additional tool when conducting lameness examinations and has been pleased with the results it yields. However, it should be used in conjunction with other diagnostic imaging modalities, which can pinpoint and diagnose a problem identified by the new technology.

Thermography

While not as widely used as a diagnostic imaging tool, Allen uses thermography—which is 10 times more sensitive to temperature than the human hand—to identify inflammatory changes in hooves, joints, bones, tendons, ligaments, muscles, and vertebral columns. He said veterinarians should use thermography in conjunction with a physical examination and other imaging techniques but stressed that thermographic changes can be seen one to two weeks prior to the onset of clinical signs.

Take-Home Message

Although imaging modalities will likely continue evolving, there's no shortage of options for diagnosing lameness. Understanding what the different techniques can accomplish can help an owner understand why a veterinarian recommends what he does for each individual. UK

>Erica Larson is the news editor for *The Horse: Your Guide to Equine Health Care* and TheHorse.com.

Hay Yields Down

MATT BARTON

As many hay producers make their first cutting, they are finding lower-than-normal yields. The lower yields are due to a variety of reasons and depend on the type of hay produced and the producer's location, said Ray Smith, PhD, professor and forage extension specialist with the University of Kentucky College of Agriculture.

An unseasonably mild winter and a warm March allowed the hay crop to mature quicker than normal. Many areas in Western Kentucky have had very little rain this spring, which could help explain lower grass hay yields. Yields are also down in areas of Eastern Kentucky that have received more rainfall. Smith said the lower yields in this area could be caused by producers not applying fertilizer because of the high cost of nitrogen. Another explanation might be that significant temperature swings this spring affected the grasses' growth patterns.

Alfalfa producers and those with grass-clover mixed hayfields, on the other hand, are seeing higher yields than those with just grass hay. "Across the state, the mild winter and good early precipitation led to tremendous early growth of clover this year, and alfalfa yields are good despite some alfalfa weevil damage," Smith said.

Smith encouraged those who haven't made their first cutting of hay this year to do so soon. It is very likely that grass hay producers will get a quality second cutting this year if they receive timely rains.

Smith said alfalfa producers, who should take their second cutting in a few more weeks, will probably get a good second cutting, regardless the amount of rainfall their area receives between now and then. This is because alfalfa has a deep root system and can thrive even in dry areas, he said. UK

>Katie Pratt is an agricultural communications specialist within UK's College of Agriculture.

Panel Discusses Race-Day Drugs and Regulation

The Thoroughbred racing industry is closer to uniformity in medication regulations and penalties than many admit, but agreement on race-day anti-bleeding drugs in a "toxic" environment will require some heavy lifting, officials said May 2.

A panel discussion on race-day medication was part of the first day of the 27th Annual University of Kentucky Equine Law Conference, which is held each year in Lexington the first week of May.

ANNE M. EBERHARDT

Many states are phasing out Salix.

Furosemide, also known as Salix or Lasix, is the only therapeutic medication widely used—legally—on race day. Several states that allow adjunct bleeder medications are in the process of phasing them out under a model rule adopted in 2011.

Rumblings about Salix use began a few years ago, but they erupted last spring when the outgoing and incoming chairmen of the Association of Racing Commissioners International called for a five-year phase-out of its use on race day. Since then the issue has divided the Thoroughbred industry.

"In my thinking Lasix is a classic example of competing

Race-Day Drugs, Regulations

truths," Keeneland president Nick Nicholson said. "And we are an industry that has difficulty with competing truths."

Nicholson outlined what he called the "truths" about Salix:

- Horses bleed in the lungs when stressed;
- Salix is proven to help control exercise-induced pulmonary hemorrhaging;
- Racing and training is much more "predictable" when the drug is used;
- Salix is performance-enhancing and is weakening the breed;
- Salix does not cause breakdowns in races—even the People for the Ethical Treatment of Animals has acknowledged that; and
- Horses train regularly on Salix and other therapeutic drugs in other countries.

Nicholson said there is such strong disagreement because competition is a focal point of horse racing, and "people who like their opinions are attracted to (the sport)."

Nicholson noted his view is based upon working with owners and trainers at race meets as well as buyers and sellers at auctions. He said he has found there isn't enough support for an immediate, all-out ban on Salix, but also no solid support for the status quo.

Nicholson called for a "multi-pronged approach" based on the age and quality of racehorses. He said the impact of Salix on the stud book is primarily at the top level of horse racing, and that such a plan would allow the industry time to gauge how Salix-free racing works.

"We can learn from a multi-pronged phase-in and also find a better way to respect each others' opinions (on the issue)," Nicholson said.

The Keeneland president also said racing must find a way to appeal to the modern patron, with horse and rider safety the top priority. Nicholson said that, with the proper regulatory foundation, "there is no reason Thoroughbred racing can't have a bright future."

Nicholson's common sense approach and respect sat well with fellow panelist Alan Foreman, an attorney who serves as chief executive of the Thoroughbred Horsemen's Association. Foreman did, however, stick by his belief that Salix should be the only legal race-day drug.

"That was the best presentation on medication that I've heard in many years," Foreman said. "Much of what Nick said I would agree with. That tone has been lacking in what I would call a very toxic environment right now.

"I represent horsemen, and in this environment, that gets dismissed immediately."

Foreman said Salix was "welcomed with open arms, almost relief" decades ago because participants didn't believe racing was on a level playing field. He said the Racing Medication and Testing Consortium, a group of 25 major industry stakeholders, determined in the 2000s that Salix is safe and beneficial for racehorses.

"Lost in the current discussion is what is best for the horse," Foreman said.

Foreman said any plan by the American Graded Stakes Committee to withhold grades based on whether or not Salix is banned would be ripe for lawsuits, as would legislation in Congress that defines any equine medication as performance-enhancing.

"I don't think the federal government's running of horse racing would be any better than anything else it does," Foreman said. "It all comes back to the state regulators and the political environment."

> **"Fans are becoming more and more intolerant of drugs in the sports they follow. It's as simple as that."**
>
> Matt Iuliano

Matt Iuliano, chief operating officer for The Jockey Club, which recently floated reformed model medication rules for Thoroughbred racing, said research into Salix has left more questions than answers. He said it hasn't been proven most horses bleed enough to warrant Salix use, and that in the last 20 years the number of starts per horse dropped 40% while the number of horses racing on the anti-bleeding drug doubled to about 95%.

"Science doesn't support (its use), and neither does the rest of the world," Iuliano said. "Fans are becoming more and more intolerant of drugs in the sports they follow. It's as simple as that."

Iuliano also said claims of a level playing field with Salix use are questionable given the fact horses can lose 20-25 pounds with Salix administration, and because the drug alkalinizes in the blood—something akin to a "milkshake" effect. He also said there are three categories of racehorses: bleeders, non-bleeders, and horses that don't run on it.

"A lot of topography exists on a playing field that's supposed to be level," Iuliano said.

The Jockey Club's reformed rules propose uniformity and reason in the penalty system for medication violations. Nicholson, in supporting the changes, said naming drugs that can be used, lower threshold levels for testing of legal drugs, national penalties and enforcement, and accountability of laboratories are necessary.

There also should be a "reasonable vehicle to know when a state is falling behind" in various categories, he said.

"We are much closer to national uniformity than we have ever been," Nicholson said. "We always beat ourselves up over it. Let's get this over the top."

Foreman said the THA in 2001 offered many similar suggestions, and progress has been made; for instance, he noted 12 of 19 drug-testing labs have been internationally accredited. He said that from 2008 to 2009, use of anabolic steroids for non-therapeutic uses was banned.

"The Lasix debate is just the latest example of an industry that beats itself up," Foreman said. "If racing has problems, it must be because we're drugging horses. Racing has the best drug testing and is the only sport that regulates use of medication.

"Here we are 10 years later and we're still talking about the same things," he said. "The industry doesn't want to receive or give itself credit (for progress)." UK

>Tom LaMarra is the news editor for *The Blood-Horse* magazine.

Cloning and Embryo Transfer Legal Issues

One of the hot topics discussed during the 27th Annual University of Kentucky Conference on Equine Law, held May 3, 2012, in Lexington, was the legal implications of cloning and embryo transfer in the horse industry. While the legalities of these topics are not discussed frequently in Kentucky, the center of Thoroughbred breeding that requires live cover, they are issues becoming increasingly prevalent in the sport horse industries.

During the "World of Cloning and Embryo Transfer Issues in the Equine Industry" presentation, Lewis T. Stevens, an attorney from Fort Worth, Texas, first addressed the legal issues surrounding cloning. For instance, three clones of Smart Little Lena, the deceased all-time leading cutting horse sire, are currently standing at stud. In addition, frozen semen from the original Smart Little Lena still circulates. One of the problems with standing these clones at stud is that current DNA testing cannot distinguish the foal of a deceased stallion's frozen semen from the foal of a live clone stallion. This becomes an issue because the American Quarter Horse Association (AQHA) does not permit the registration of clones or their offspring. Cloning continues, however, because certain performance associations, such as the National Cutting Horse Association, allow unregistered horses and clones to participate in competitions.

Stevens then discussed a current case involving cloning that is making headlines. Last month Jason Abraham, a Texas rancher who owns several Quarter Horse clones, and his related entities filed a lawsuit against the American Quarter Horse Association in federal court in Texas alleging violations of the Sherman Antitrust Act as well as the Texas Business and Commerce Code. Abraham claims that breeders can use cloning to reduce genetic diseases in horses and to improve the gene pool. A number of genetic diseases, such as hyperkalemic periodic paralysis (HYPP) and hereditary equine regional dermal asthenia (HERDA), greatly affect Quarter Horses, and Abraham and others claim that cloning can help alter those genes, reduce disease incidence, and clean up the gene pool. Abraham claimed that the AQHA is unfairly restricting competition, driving up horse prices and diminishing cloned horses' value by controlling and limiting the supply of high-quality registered Quarter Horses.

ANNE M. EBERHARDT

Embryo transfer allows bloodlines to continue without cutting short a mare's show career.

Shifting the focus from cloning to embryo transfer, Scott Bennett, DVM, of Equine Services in Simpsonville, Ky., provided a short background on the medical techniques used in embryo transfers and some of the litigation history behind this science. Again, this litigation centered around the AQHA, which prior to 2004 limited registration to one foal per mare per year. With embryo transfers, however, mares are capable of producing several foals a year. In 2004, as a result of a lawsuit brought by Kay Floyd and other breeders, the AQHA changed the rule to allow for multiple foal registrations per mare per year. In that lawsuit, the court determined the one foal per mare per year rule violated antitrust laws because the AQHA was willing to register one foal out of a mare and not others, which is anticompetitive. The AQHA settled with the breeders and now allows for registration of multiple foals per year as a result of embryo transfers.

Bennett went on to discuss the purpose of embryo transfer, which he says he supports. The greatest benefit he discussed is that embryo transfer allows desirable bloodlines to proliferate. Using natural birthing methods, a mare's competitive career must be put on hold to carry a foal to full term. But with embryo transfers, a highly competitive mare that is still sound and competing even later in life can produce foals. This allows for the highest quality bloodlines to continue without cutting short a mare's show career. Additionally, this helps successful mares that might have uterine or cervical disorders preventing them from carrying pregnancies to reproduce.

Both Bennett and Stevens are interested to see how the Abraham lawsuit affects the AQHA and other breed registries. UK

>Katherine W. Ross is an associate at the equine law firm Regard Law Group PLLC, in Lexington.

New Horseman's Card Supports Equine Research

Starting this spring, horse owners and equine enthusiasts once again have an easy way to help raise funds for the University of Kentucky (UK) Maxwell H. Gluck Equine Research Center via The Horseman's Card.

Originally introduced in 1992, The Horseman's Card is a unique credit card with a very specific goal in mind: supporting horse health. Every time a cardholder uses his or her card to make a purchase, the Gluck Center receives a donation at no additional cost to the cardholder. Since its inception the program has generated hundreds of thousands of dollars for equine research.

"With The Horseman's Card you can truly make a difference," said Ed Squires, PhD, Dipl. ACT (hon.), director of UK Ag Equine Programs and executive director of the UK Gluck Equine Research Foundation. "At the heart of our research is the horse. The kind of support that The Horseman's Card provides us is what makes advances in equine health and science possible."

When The Horseman's Card's former card-issuing bank did not renew its

WEST NILE-INNOVATOR® vaccines have helped protect millions of horses from mosquito-borne diseases.[1] And FLUVAC INNOVATOR is the only vaccine with equine influenza virus strain (EIV) KY'97 that helps deliver demonstrated protection against heterologous challenge with Ohio '03,[2] plus rhinopneumonitis (EHV-1 and EHV-4). Together, our INNOVATOR vaccines help offer time-tested disease protection. In fact, the kind of protection we're willing to back up with an equine Immunization Support Guarantee (ISG). To learn more, visit PfizerEquine.com/ISG, or talk to your Pfizer Animal Health representative.

West Nile Innovator® | Fluvac Innovator® | IMMUNIZATION SUPPORT GUARANTEE

Pfizer Animal Health

[1] Market Dynamics Inc, February 2011

[2] Data on file, Study Report No. B671-08-004.R, Pfizer Inc.

New Horsemen's Card

Each time a cardholder makes a purchase, the Gluck Center receives a donation at no additional cost.

contract last year, donations stopped temporarily, but those behind the card viewed it as an opportunity to improve the program. As a result, a lot of thought went into selecting Missouri-based UMB Bank as its new banking partner. Now the card is being reintroduced and funds will once again be heading the Gluck Center's way.

"These funds provide the flexibility to allow us to fund research needs that may become urgent in a given year, such as an outbreak of a disease," Squires said.

Beyond equine research, The Horseman's Card also comes with several other perks. Cardholders now have the ability to personalize their cards with their own photo or to select from five full-color images created by famed equine artist James L. Crow. They also receive VIP discounts from dozens of nationally-recognized equestrian retailers and will benefit from improved customer service.

"We carefully selected our new banking relationship with UMB so we could add a number of exciting features," said the program's founder, Mark Cole. "Additionally, we had a goal of providing a higher level of service and cardholder satisfaction. We especially like the fact that anytime a cardholder has a question or issue with their Horseman's Card, they can speak directly to an actual bank employee—not some third-party vendor in a faraway place.

"Furthermore, every person who loves horses is concerned with the health of the horse, and what better way to enhance horse health than to support one of the world's leading equine research facilities?"

It is important to note that existing Horseman's Card holders will have to reapply if they wish to continue supporting equine health. Cards not held through UMB Bank are still valid as credit cards, but they are no longer associated with equine research and do not qualify for the VIP discounts. Please contact the phone number on the back of your card to verify if your card participates in the VIP program.

Those who support the concept behind The Horseman's Card hope horse enthusiasts will continue to take part in the program because of its benefits for equine research.

For more information about The Horseman's Card or to apply, visit www.horsemanscard.com. Join other equine enthusiasts by liking The Horseman's Card on Facebook, following the card on Twitter, and finding it on Google+. UK

>Amanda Duckworth, on behalf of The Horseman's Card, contributed this information.

UK Gluck Center Faculty to Speak at WCERS

Several faculty members from the University of Kentucky (UK) Gluck Equine Research Center will speak at the West Coast Equine Reproduction Symposium IV to be held Nov. 27-29, 2012, at Santa Ynez Valley Marriott, in Buellton, Calif.

Gluck Center speakers, who are all part of its reproductive health group, include Barry Ball, DVM, PhD, Dipl. ACT, professor and Albert G. Clay Endowed Chair in equine reproduction; Ed Squires, PhD, Dipl. ACT (hon.), director of UK Ag Equine Programs and executive director of the UK Gluck Equine Research Foundation; and Mats Troedsson, DVM, PhD, Dipl. ACT, director of the Gluck Center and chair of the department of veterinary science at UK. Ball and Squires are part of the symposium program committee.

The symposium will provide a two-day forum for discussing timely topics on reproductive management of the problem mare, stallion, and foal for the practicing veterinarian and breeder. On the third day, a wet lab will provide hands-on opportunities to learn about evaluating the problem mare, diagnostic techniques in evaluating stallion fertility, managing poor semen quality/quantity, and examining/interpreting uterine cytology, biopsy, and sperm morphology.

The symposium benefits the 11th International Symposium on Equine Reproduction (ISER) to be held Jan. 26-31, 2014, in Hamilton, New Zealand. UK hosted the last ISER meeting in July 2010. Squires also serves as the chair of the ISER committee.

Eighteen hours of Continuing Education credit are available.

For more information on the symposium, contact Jan Roser, PhD, professor in the Department of Animal Science at the University of California, Davis, at 530/902-1960 or jfroser@ucdavis.edu. More information about the conference is available on the conference website at http://animalscience.ucdavis.edu/WCERS. UK

>Jenny Blandford is the Foundation Coordinator at the Gluck Equine Research Center.

Fourth Annual UK Equine Farm and Facilities Expo

The University of Kentucky's (UK) Ag Equine Programs will host an Equine Farm and Facilities Expo Thursday, May 31, 2012, from 4-8 p.m. EDT at Margaux Farm LLC, located at 596 Moores Mill Road in Midway, Ky. Admission is free and a meal will be provided.

"The expo will allow horse owners and horse farm managers to see a range of equipment and supplies that are currently available for horse farms of all sizes," said Ray Smith, PhD, professor and forage extension specialist for the UK College of Agriculture. "Additionally, UK specialists will provide hands-on instruction techniques about practical aspects of management for equine operations.

"The expo also provides horse owners the chance to attend an informative event on the grounds of a premier horse farm. We are appreciative to Margaux Farm for hosting this event and for opening its gates to the public," Smith said.

"This expo really brings together many facets of the industry, from equipment dealers to nutritionists and university specialists, in one place at one time," said Adam Probst, Woodford County Extension Agent for Agriculture and Natural Resources. "You have the ability to learn about pasture management or nutrition, see the equipment, and witness the results from many of the demonstrations on the farm. There are not many other venues around that allow horse owners this opportunity."

Demonstrations led by UK experts include selecting the right feed, tall fescue, muck management, and herbicides and field renovation options. There will also be a number of informational booths staffed by UK specialists.

To date, corporate sponsors for this year's event include Americas Alfalfas, BASF—The Chemical Company, Central Equipment, McCauley Brothers Feed, Pennington Seed, Southern States, and UK Ag Equine Programs.

Event vendors include Allied Seed LLC, Bevins Motors, Central Kentucky Ag Credit (Lexington and Paris branches), Chrysler at Nicholasville, DOW Chemical Company, Easy Riders Ranch LLC, Farm Credit, Hallway Feeds, Kentucky Thoroughbred Association/Kentucky Thoroughbred Owners and Breeders, Lucas Equine, The Pond Lady, SAS Global Inc., Tractor Supply Company, and Wildcat Ford.

Margaux Farm LLC is a leading Thoroughbred breeding operation focused on producing sound and durable top-quality racehorses. Margaux Farm stands several stallions, including five-time grade 1 winner Devil His Due.

Contact the Woodford County Extension Office at 859/873-4601 to reserve a spot for the Equine Farm and Facilities Expo. For more information about this and other UK Ag Equine Programs events, visit www.ca.uky.edu/equine or e-mail equine@uky.edu. UK

>Holly Wiemers, MA, is the communications director for UK Ag Equine Programs.

Ticks Emerging Earlier than Normal

Ticks typically begin to appear in late spring and early summer as warm weather sets in, but this year ticks were reported three to four weeks earlier than normal, said University of Kentucky Cooperative Extension Service agents.

"I've been receiving calls about ticks for well over a month already from homeowners, farmers, and hunters," said Kenny Perry, Graves County agriculture and natural resources extension agent.

"I'm seeing them earlier than before and expect them to be a problem this year," added Charles May, Perry County agriculture and natural resources extension agent.


CENTERS FOR DISEASE CONTROL AND PREVENTION

Blacklegged ticks are appearing in Kentucky.

The ticks' early appearance is likely due to this year's weather. "Winter survival was probably higher due to the mild winter, and the tick season started earlier because of the warm spring," said Lee Townsend, PhD, extension entomologist with the UK College of Agriculture.

Townsend said the two most common ticks in Kentucky are the lone star tick and the American dog tick. The adult female lone star tick has a white spot on its back. The male is entirely reddish-brown. The American dog tick is reddish brown with mottled white markings on its back. Both tick species are most active from April to September throughout much of Kentucky.

Like Perry and May, Richard Whitis, Pulaski County agriculture and natural resources extension agent, received some very early questions about ticks and tick identification. They were due to the blacklegged tick, a species only occasionally found in Eastern Kentucky before this past winter. Unlike the other two ticks, adult blacklegged ticks are most active in November through April. The blacklegged tick is most commonly found in the Northeast and north central states.

Blacklegged ticks look very different than American dog ticks and lone star ticks. They have a reddish-brown body, dark head, long mouthparts and dark legs. Males have a dark plate covering their whole body while females have a dark plate only covering half of their body. UK

>Katie Pratt is an agricultural communications specialist within UK's College of Agriculture.
Source: edited UK College of Agriculture news release.

UK's Inaugural Western Kentucky Equine Field Day

The University of Kentucky's (UK) Ag Equine Programs will host the inaugural Western Kentucky Equine Field Day Tuesday, June 5, 2012, from 4-8 p.m. CDT at Darling 888 Ranch. The ranch is located at 4770 Grooms Lane Road in Princeton, Ky. Admission is free and a meal will be provided.

"We are pleased to host this inaugural event in Western Kentucky and appreciate Darling 888 Ranch opening its gates to the public for this event," said Bob Coleman, PhD, associate director for undergraduate education in equine science and management and extension horse specialist at UK. "This is a great opportunity for horse owners in Western Kentucky to see a working equine operation and learn practical information they can apply to their own operations. This is also a great opportunity for UK's Ag Equine Programs to take its educational offerings and events across the state, a goal we continually strive for.

"We appreciate the help of agents Shane Bogle and David Fourqurean, who have both been enthusiastic and engaged in the planning process for putting on this event. We also appreciate Darling 888 wanting to participate in helping UK put on quality equine educational programs. We anticipate a great event for the public," Coleman added.

"Darling 888 has utilized the vast knowledge base the UK Cooperative Extension Service has to its benefit," added Shane Bogle, Caldwell County Extension Agent for Agriculture and Natural Resources. "It has been a pleasure working with the ranch team to implement their goals and see the improvements made in such a short amount of time, and then to have them open their doors so freely for the public to see has made for a great partnership."

> **"This is a great opportunity for horse owners in Western Kentucky to see a working equine operation and learn practical information they can apply to their own operations."**
>
> Dr. Bob Coleman

Demonstrations led by UK experts include pasture establishment, weed control in pastures, grazing strategies, and new strategies for parasite control. There will also be a number of informational booths.

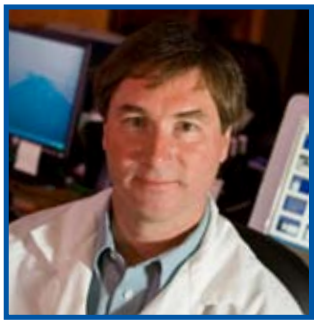
Darling 888 Ranch is a full-service reining facility offering training, breeding, sales, and equine sports medicine. Built in 2007, its industry-leading trainers and staff relocated to Western Kentucky to help build a world-class reining operation. Two National Reining Horse Association past presidents help guide the ranch's operation and acquire the highest caliber horses for the ranch and its clients.

Contact the Caldwell County Extension Office at 270/365-2787 to reserve a spot at the Equine Farm and Facilities Expo. For more information about this and other UK Ag Equine Programs events, visit www.ca.uky.edu/equine or e-mail equine@uky.edu. UK

>Holly Wiemers, MA, is the communications director for UK Ag Equine Programs.

COMMENTARY

Stem Cells and Regenerative Medicine: Pay Attention



As a veterinarian and cell biologist trained during the 1980s, I have witnessed firsthand the transformative impact that molecular biology has had on biomedical research, agriculture, and medicine. Characterizing molecular biology as "transformative" is appropriate. Consider how recombinant DNA methods, transgenics, and now genomics have impacted discovery science, farming practices, the pharmaceutical industry, and clinical diagnostics. The process is not winding down—actually, it is doing just the opposite. We are entering an era of personalized medicine. Along with medical history, a clinical exam, and diagnostic tests, the evaluation and care of patients will increasingly include consideration of an individual's genome. Factoring in of the genome is already the case for known genetic markers with established disease associations. The full resequencing of a patient's DNA (genome), an overall evaluation of gene expression in clinical samples at the RNA or protein levels, and broad screening of metabolites all appear to be coming to clinical practice in the not-too-distant future. Veterinarians and physicians will use this information to help generate the differential diagnoses list for a patient, customize therapeutic strategies, and improve prognostic assessments.

In contrast to molecular biology, I have more recently recognized that cell biology also will likely have a transformative impact on medicine in a similar, not-too-distant time frame. Data are now accumulating from several medical disciplines that multipotent "stem cells" have the potential to facilitate tissue repair. I am not a stem cell expert by any stretch, but two broad mechanistic categories appear to be emerging.

The first category includes indirect mechanisms. Stem cells introduced into a patient have the potential to express and deliver the right mix of factors (cytokines, chemokines, growth factors, etc.) at the correct concentrations and with the appropriate molecular structure to positively modulate the patient's immune response and tissue repair capabilities. The patient's own cellular resources for repair are mobilized and activated. Destructive catabolic (tissue breakdown) processes are switched to a self-sustaining anabolic (tissue growth) response. Interestingly, the introduced stem cells might not need to remain viable in the lesion area for very long to affect this switch.

The second category appears to be more challenging. It involves direct mechanisms in which the introduced stem cells themselves are expected to differentiate into the correct cell types, synthesize and organize the appropriate extracellular matrices, and regenerate normal tissue structures to achieve tissue repair. Both mechanisms work toward restoring tissue structure and function.

The take-home message that I now embrace and will encourage others to consider is "pay attention." Stem cells and regenerative medicine are poised to yield major clinical advances. Many basic questions remain unanswered, and there is much to learn. Our discovery process needs to be driven by rigorous scientific methods and hypothesis-driven experimental biology. However, through access to our diverse patient population, veterinary medicine has every opportunity to lead development and progress in these important areas. Yes, pay attention. UK

>James MacLeod, VMD, PhD, is the John S. and Elizabeth A. Knight chair and professor of veterinary science at the Gluck Equine Research Center. CONTACT: 859/218-1140, jnmacleod@uky.edu

Reprinted from the *Equine Disease Quarterly*, October 2011, Volume 20, Number 4, University of Kentucky, Department of Veterinary Science.

UK Ag Meteorologist Warns of Heat Stress

A significant warming trend is on the way for Kentuckians this Memorial Day weekend. University of Kentucky agricultural meteorologist Tom Priddy said livestock heat stress would increase into the danger category and even approach the emergency category. He expects dry conditions to continue through the upcoming weekend with above-normal temperatures.

"The combination of hot, muggy weather conditions prompts some real concern for humans, as well as livestock and pets," he said. "The livestock heat stress index is a combination of air temperature and humidity. That one-two punch makes it hazardous for people and animals. Dew point temperatures above 65 degrees lead officials to declare conditions dangerous for livestock."

The Livestock Heat Stress Index helps producers know when heat stress could create a problem for their animals. Periods of heat stress call for livestock producers to be vigilant in making sure their animals can withstand the conditions.

Visit the UK Ag Weather Center website at http://weather.uky.edu. UK

UPCOMING EVENTS

May 31, 4 p.m.
Equine Diagnostic Research Seminar Series, Veterinary Diagnostic Laboratory, Martin Nielsen, DVM, PhD, Dipl. EVPC, will speak on equine parasites.

May 31, 4-8 p.m.
Fourth Annual Equine Farm and Facilities Expo, Margaux Farm, Midway

June 5, 4-9 p.m.
Inaugural Western Kentucky Equine Field Day, Darling 888 Ranch, Princeton

June 14-15
4-H State Horse Contest, Clarion Hotel, Lexington

June 30- July 7
Kentucky State 4-H Horse Show, Kentucky Expo Center, Louisville

July 19, 6 p.m.
Kentucky Equine Networking Association (KENA) Meeting, Clarion Hotel, Lexington