

HEALTH ZONE

2013 AAEP Wrap-up

BY ERICA LARSON
AND DR. NANCY S. LOVING

While your veterinarian is stitching wounds, delivering foals, and monitoring colics, scientists from around the world are performing and publishing research to advance horse health care. So, to bring busy practitioners up to speed on the top studies in a variety of fields, a panel of veterinarians presents a program called the Kester News Hour each year at the annual convention of the American Association of Equine Practitioners. The 2013 convention was held Dec. 7-11 in Nashville, Tenn.

Dr. Lisa Fortier, professor of Large Animal Surgery at Cornell University's College of Veterinary Medicine near Ithaca, N.Y., shared her picks for top surgery- and lameness-related studies; Dr. Carol Clark, of Peterson & Smith Equine Hospital

near Ocala, Fla., tackled medicine topics; and Dr. Pat McCue, a professor of equine theriogenology at Colorado State University's Equine Reproduction Laboratory near Fort Collins, described reproduction studies he deemed most important to veterinarians.

Upper Airway Issues

The first study Fortier described involved a recently identified upper respiratory condition called ventrorostral displacement of the dorsal laryngeal mucosa. The condition occurs when the mucosa on top of the arytenoids (flappers)

progressively obstructs the airway during exercise. The researchers performing the study identified the condition in 12 of 600 racehorses presenting with owner complaints of poor performance and/or abnormal respiratory noise. Most of the affected horses had another concurrent respiratory issue, Fortier said. The condition's etiology (set of causes) remains unclear, and treatment isn't immediately necessary.

She said six of the horses' conditions resolved in six to nine weeks, suggesting this condition could be related to the level of training, immaturity, and airway disease

Equine practitioners get up to speed
on a variety of topics at their
annual convention Dec. 7-11 in Nashville



From left, Drs. Lisa Fortier, Pat McCue, and Carol Clark during the Kester News Hour at the 2013 AAEP convention in Nashville

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“My horses are winning more and it’s no coincidence. They’ve really turned it around!” — Scott Lake, American Trainer of Thoroughbreds, Over 5,000 Career Wins



ALL-TIME WINNING TRAINER GOES FROM SKEPTIC TO ENTHUSIAST

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Scott Lake sees dramatic improvement in his thoroughbreds

By Mark Hansen

When you're one of the top all-time winning thoroughbred trainers, you're not about to jeopardize the health of your horses, your winnings, or your reputation by giving them a new performance supplement without doing your research first. That is why Scott Lake, a thoroughbred trainer with more than 5,000 all-time career wins, was - at first - hesitant to try a supplement that his colleague insisted would dramatically increase his horses' performance.

Scott said, "I was skeptical about trying anything promising to boost EPO levels because I have heard too many horror stories about horses being harmed by doping. But a friend of mine in the industry kept giving me information on this new, all-natural supplement. Then I did my own research, and I realized this isn't the synthetic EPO that damages horses. This is a 100% all-natural supplement, with data to back up its claims."

So Scott chose 6 horses that he felt were under performing to try EPO-Equine®. "The horses had coats that weren't where I thought they should be. They were dull, dry and wiry. Plus, their blood levels were a little messed up, and they were training just 'OK'. I thought, let's try it. Let's see if this supplement will help them."

After feeding his horses EPO-Equine® for a month, Scott noticed a huge improvement. "All of my horses looked better and their coats were shinier. Then 4 of the horses on the supplement won the first time I ran them. Coincidence? I don't think so. They looked better and performed better. They really turned it around. I liked seeing that."

Scott's quite certain that EPO-Equine®, the natural supplement he tried, is making a huge difference in his horses' performance. And because of the results, he plans on putting more of his horses on this natural "blood builder".

But why is it important to "build blood," and how does this supplement work as a blood builder?

Just like in people, a horse's muscles require oxygen. Red blood cells are the oxygen-carrying cells that deliver oxygen to muscles. A higher red blood cell count = more oxygen = more muscle energy. Elevated muscle energy helps the horse perform harder, faster and longer during endurance events.

EPO-Equine® contains a natural "blood-builder." Bioengineers at U.S.-based Biomedical Research Laboratories (BRL) discovered a proprietary strain of *Echinacea angustifolia* that promotes red blood cell production.

Veterinarians at the Equine Research Centre in Canada ran a double-blind trial investigating the blood building properties of the active ingredient in EPO-Equine® in healthy horses. For 42 days, one group of horses was supplemented with the active ingredient in EPO-Equine® and another group of horses was given a placebo.

The supplement delivered significant blood building results, increasing red blood cell count and hemoglobin levels. Optimized blood levels leads to elevated exercise physiology... for remarkable speed, strength and stamina right out of the gate.

Trainers not only trust and rely on EPO-Equine® because it's effective, but also because of its strict quality control, extensive product testing and adherence to banned substance regulations that guarantee safety.

EPO-Equine® does not contain any banned or harmful substances. Every batch of EPO-Equine® is tested by an independent laboratory to guarantee that it's clean for use in competition.

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According to Scott Lake, "I absolutely recommend EPO-Equine® if your horse isn't performing or competing to its potential. Give it a shot. It definitely turned my horses around."

Trainers also find that EPO-Equine® is very affordable at the low price of just \$59.95 per jar. Or even more affordable by saving \$180 when purchasing a 12-jar case for just \$539.55 and getting FREE shipping. EPO-Equine® can be ordered at www.EPOEquine.com or 1-800-557-9055, and comes with a 100% money-back satisfaction guarantee.

PROTAZIL

ANTIPROTOZOAL PELLETS (1.56% diclazuril)

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For the treatment of equine protozoal myeloencephalitis (EPM) caused by *Sarcocystis neurona* in horses.

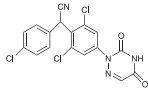
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DESCRIPTION

Diclazuril, (±) 2,6-dichloro-α-(4-chlorophenyl)-4-(4,5-dihydro-3,5-dioxo-1,2,4-triazin-2(3H)-yl) benzeneacetamide, has a molecular formula of C₁₆H₁₀Cl₃N₄O₂, a molecular weight of 407.64, and a molecular structure as follows:



Diclazuril is an antiprotozoal (antiprotozoal) compound with activity against several genera of the phylum Apicomplexa. PROTAZIL[®] (diclazuril) is supplied as oral pellets containing 1.56% diclazuril to be mixed as a top-dress in feed. Inert ingredients include dehydrated alfalfa meal, wheat middlings, cane molasses and propionic acid (preservative).

INDICATIONS

PROTAZIL[®] (1.56% diclazuril) Antiprotozoal Pellets are indicated for the treatment of equine protozoal myeloencephalitis (EPM) caused by *Sarcocystis neurona* in horses.

DOSE AND ADMINISTRATION

Dosage: PROTAZIL[®] (1.56% diclazuril) is administered as a top dress in the horse's daily grain ration at a rate of 1 mg diclazuril per kg (0.45 mg diclazuril/lb) of body weight for 28 days. The quantity of PROTAZIL[®] necessary to deliver this dose is 64 mg pellets per kg (29 mg pellets/lb) of body weight.

Administration: To achieve this dose, weigh the horse (or use a weigh tape). Scoop up PROTAZIL[®] to the level (cup mark) corresponding to the dose for the horse's body weight using the following chart:

Weight Range of Horse (lb)	mLs of Pellets	Weight Range of Horse (lb)	mLs of Pellets
275 - 524	20	1275 - 1524	60
525 - 774	30	1525 - 1774	70
775 - 1024	40	1775 - 2074	80
1025 - 1274	50	-	-

One 2-lb bucket of PROTAZIL[®] will treat one 1100-lb horse for 28 days. One 10-lb bucket of PROTAZIL[®] will treat five 1100-lb horses for 28 days.

CONTRAINDICATIONS

Use of PROTAZIL[®] (1.56% diclazuril) Antiprotozoal Pellets is contraindicated in horses with known hypersensitivity to diclazuril.

WARNINGS

For use in horses only. Do not use in horses intended for human consumption. Not for human use. Keep out of reach of children.

PRECAUTIONS

The safe use of PROTAZIL[®] (1.56% diclazuril) Antiprotozoal Pellets in horses used for breeding purposes, during pregnancy, or in lactating mares has not been evaluated. The safety of PROTAZIL[®] (1.56% diclazuril) Antiprotozoal Pellets with concomitant therapies in horses has not been evaluated.

ADVERSE REACTIONS

There were no adverse effects noted in the field study which could be ascribed to diclazuril. To report suspected adverse reactions, or to obtain a MSDS, or for technical assistance call 1-800-224-5318.

CLINICAL PHARMACOLOGY

The effectiveness of diclazuril in inhibiting merozoite production of *Sarcocystis neurona* and *S. falcatula* in bovine turbinate cell cultures was studied by Lindsay and Dubey (2000). Diclazuril inhibited merozoite production by more than 90% in cultures of *S. neurona* or *S. falcatula* treated with 0.1 mg/mL diclazuril and greater than 95% inhibition of merozoite production (IC₅₀) was observed when infected cultures were treated with 1.0 mg/mL diclazuril. The clinical relevance of this in vitro cell culture data has not been determined.

PHARMACOKINETICS IN THE HORSE

The oral bioavailability of diclazuril from the PROTAZIL[®] (1.56% diclazuril) Antiprotozoal Pellets at a 5 mg/kg dose rate is approximately 5%. Related diclazuril concentrations in the cerebrospinal fluid (CSF) range between 1% and 5% of the concentrations observed in the plasma. Nevertheless, based upon pilot study data, CSF concentrations are expected to substantially exceed the in vitro IC₅₀ estimates for merozoite production (Dirikolu et al., 1999). Due to its long terminal elimination half-life in horses (approximately 43-65 hours), diclazuril accumulation occurs with once-daily dosing. Corresponding steady state blood levels are achieved by approximately Day 10 of administration.

EFFECTIVENESS

Two hundred and fourteen mares, stallions, and geldings of various breeds, ranging in age from 0.6 months to 30 years, were enrolled in a clinical trial. All horses were initially EPM-positive based on the results of clinical examinations and laboratory testing, including CSF Western Blot analyses. Horses were administered PROTAZIL[®] (1.56% diclazuril) Antiprotozoal Pellets at doses of 1, 5, or 10 mg diclazuril/kg body weight as a top-dress on their daily grain ration for 28 days. The horses were then evaluated for clinical changes via a modified Myerhage neurological scale on Day 48 as follows:

- Normal, neurological deficits not detected.
- Neurological deficits may be detectable at normal gaits; signs exacerbated with manipulative procedures (e.g., backing, turning in tight circles, walking with head elevation, truncal swaying, etc.).
- Neurological deficit obvious at normal gaits or posture; signs exacerbated with manipulative procedures.
- Neurological deficit very prominent at normal gaits; horses give the impression they may fall (but do not) and buckle or fall with manipulative procedures.
- Neurological deficit is profound at normal gait; horse frequently stumbles or trips and may fall at normal gaits or when performing usual procedures.
- Horse is recumbent, unable to rise.

Each horse's response to treatment was compared to its pre-treatment values. Successful response to treatment was defined as clinical improvement of at least one grade by Day 48 as a conversion of CSF to Western Blot-negative status for *S. neurona* or achievement of Western Blot-negative CSF status without improvement of 1 ataxia grade.

Forty-two horses were initially evaluated for effectiveness and 214 horses were evaluated for safety. Clinical condition was evaluated by the clinical investigator's subjective scoring and then corroborated by evaluation of the neurological examination videotapes by a masked panel of three equine veterinarians. Although 42 horses were evaluated for clinical effectiveness, corroboration of clinical effectiveness via videotape evaluation was not possible for one horse due to missing neurological examination videotapes. Therefore, this horse was not included in the success rate calculation.

Based on the numbers of horses that seroconverted to negative Western Blot status, and the numbers of horses considered as successes by the clinical investigators, 28 of 42 horses (67%) at 1 mg/kg were considered successes. With regard to independent expert masked videotape assessments, 10 of 24 horses (42%) at 1 mg/kg were considered successes. There was no clinical difference in effectiveness among the 1, 5, and 10 mg/kg treatment group results. Adverse events were reported for two of the 214 horses evaluated for safety. In the first case, a horse was enrolled showing severe neurologic signs. Within 24 hours of dosing, the horse was recumbent, blind, and exhibiting signs of dementia. The horse died, and no cause of death was determined. In the second case, the horse began walking stiffly approximately 13 days after the start of dosing. The referring veterinarian reported that the horse had been fed grass clippings and possibly had laminitis.

ANIMAL SAFETY

PROTAZIL[®] (1.56% diclazuril) Antiprotozoal Pellets were administered to 30 horses (15 males and 15 females, ranging from 5 to 9 months of age) in a target animal safety study. Five groups of 6 horses each (3 males and 3 females) received 0, 5 (5X), 15 (15X), 25 (25X) or 50 (50X) mg diclazuril/kg (2.27mg/lb) body weight/day for 42 consecutive days as a top-dress on the grain ration of the horse. The variables measured during the study included clinical and physical observations, body weights, food and water consumption, hematology, serum chemistry, urinalysis, fecal analysis, necropsy, organ weights, gross and histopathologic examinations. The safety of diclazuril top-dress administered to horses at 1 mg/kg once daily cannot be determined based solely on this study because of the lack of an adequate control group (control horses tested positive for the test drug in plasma and CSF). However, possible findings associated with the drug were limited to elevations in BUN, creatinine, and SDH and less than anticipated weight gain. Definitive test article-related effects were decreased grain/top-dress consumption in horses in the 50 mg/kg group.

In a second target animal safety study, PROTAZIL[®] (1.56% diclazuril) Antiprotozoal Pellets were administered to 24 horses (12 males and 12 females, ranging from 2 to 8 years of age). Three groups of 4 horses/sex/group received 0, 1, or 5 mg diclazuril/kg body weight/day for 42 days as a top-dress on the grain ration of the horse. The variables measured during the study included physical examinations, body weights, food and water consumption, hematology, and serum chemistry. There were no test article-related findings seen during the study.

STORAGE INFORMATION

Store between 15°C to 30°C (59°F to 86°F).

HOW SUPPLIED

PROTAZIL[®] (1.56% diclazuril) Antiprotozoal Pellets are supplied in 2-lb (0.9 kg) and 10-lb (4.5 kg) buckets.

REFERENCES

- Lindsay, D. S., and Dubey, J. P. 2000. Determination of the activity of diclazuril against *Sarcocystis neurona* and *Sarcocystis falcatula* in cell cultures. *J. Parasitology*, 86(1):164-166.
- Dirikolu, L., Lehner, F., Natrass, C., Bentz, B. G., Woods, W. E., Carter, W. E., Karpisliuk, W. G., Jacobs, J., Boyles, J., Harkins, J. D., Granstrom, D. E., and Tobin, T. 1999. Diclazuril in the horse: Its identification and detection and preliminary pharmacokinetics. *J. Vet. Pharmacol. Therap.* 22:374-379.

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in young Thoroughbred racehorses.

Next, Fortier described a study in which scientists evaluated 41 horses that had previously undergone tie-back surgery (a procedure used to treat "roaring"—in which the muscles that open and close the left side of the larynx as the horse breathes are paralyzed—which involves placing one or more sutures that will permanently keep open the left arytenoid cartilage). They used video endoscopy during exercise under saddle to evaluate arytenoid abduction and stability, diagnose any concurrent upper airway problems, and correlate these with the owners' perception of surgery success, she said.

Although 93% of owners thought the surgery was beneficial and 90% believed they saw improved performance post-surgery, the researchers found 79% of horses still had respiratory abnormalities at exercise, and they identified multiple abnormalities in 41% of the horses, Fortier said.

"When investigating cases of ongoing respiratory noise and/or poor performance after tie-back surgery, exercising endoscopy should be performed (to ensure there's not another respiratory problem present) before consideration is given to tie-back revision or retirement of the horse," Fortier concluded.

Lameness

Fortier described a study in which researchers compared two needle placement approaches for either injection or centesis (sampling the synovial fluid in the coffin joint, navicular bursa, and digital tendon sheath) of the digital flexor tendon sheath: the basilar sesamoid

approach (BSA) and the axial sesamoid-eau approach (ASA)—basically, injections from two different directions. The team found that the BSA was faster, 100% successful for injections, and six times more successful when performing centesis than the ASA approach. Thus, Fortier suggested practitioners consider using the BSA approach with an 18-gauge needle.

She then presented a study in which researchers evaluated techniques for injecting diagnostic analgesia (nerve blocks) into the lateral femorotibial stifle joint (the lower outside of the three stifle joints). Fortier said the traditional method can be challenging, so a team of veterinary students tested whether they could accomplish the same effects by injecting the joint through the long digital extensor tendon (LDE).

Fortier said the team achieved a 100% success rate in administering diagnostic analgesia through the LDE, while the success rates for other traditional approaches were lower. She concluded that this approach provides good anatomic landmarks for veterinarians to work with, avoids cartilage and meniscus injury, and is a reliable technique even for inexperienced veterinarians.

Then Fortier described a study in which researchers evaluated the pharmacokinetic and pharmacodynamic variables and local tolerance at the intravenous regional limb perfusion (IVRLP) injection site of the antibiotic marbofloxacin, which is used to treat infections and bacterial issues.

"We would love the ability to use a fluoroquinolone (a class of antibiotic) for efficacy



A horse undergoing a lameness exam

ANNE M. EBERHARDT

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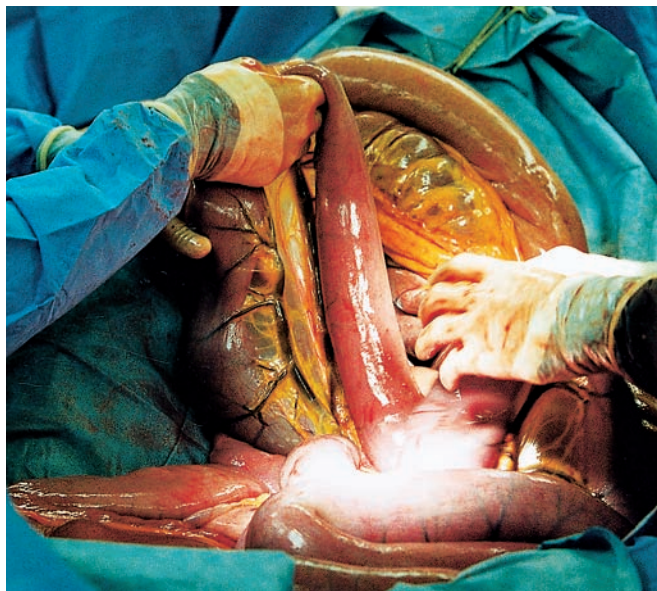
against many Gram-negative and many *Staph* bacteria,” Fortier said. However, researchers have previously found that 70% of horses treated with the cousin drug, enrofloxacin, via IVRLP developed vasculitis (inflammation of blood vessels). So the team on the current study tested marbofloxacin’s efficacy instead.

They found that none of the horses tested developed vasculitis, and the synovial fluid concentrations of the drug were well above the level required to combat enterobacteria and *Staphylococcus aureus*. She also noted that current availability of this drug in the United States is low.

Colic Surgery

Fortier described a study in which scientists evaluated return to use rates after exploratory celiotomy, or colic surgery. Looking at surgical data and six- and 12-month follow-ups, the team found that 77% of the 195 study horses returned to use as athletes. The team determined that horses developing hernias were seven times less likely to return to function, those that developed laminitis were nine times less likely, and those that required colic surgery while on stall rest for a musculoskeletal injury were 11 times less likely.

Along similar lines, Fortier described a study into 85 racehorses’ performance after colic surgery. She said researchers found that 70% of horses that underwent colic surgery returned to racing, compared to 73% of controls, and determined that colic surgery had no significant effect on race performance.



ANNE M. EBERHARDT

Researchers found 70% of horses that underwent colic surgery returned to racing

Bone and Joint Issues

Fortier described a study in which scientists evaluated the risk of infection after 16,624 intra-articular injections in 1,103 Thoroughbred racehorses. Ultimately, 0.0008% of joints developed infections after injections, she said. Risk factors included the individual veterinarian administering the injections and the use of methylprednisolone (or Depo-Medrol) or triamcinolone (0.003% and 0.0002%, respectively). She noted the researchers reported no infections after amikacin injection, but the drug was used in only 5% of the injections.

Next, Fortier described a study in which researchers examined whether early or increased intensity of training and racing would lead to palmar/plantar osteochondral disease (POD) in Thoroughbreds. “POD is a degenerative condition affecting the distal (lower) condyles of the distal cannon bones,” she said. “The condition is believed to be due to injury of subchondral (beneath the cartilage) bone associated with repetitive high strains and strain rate in bone during high-speed racing and training.”

Based on their review of 1,288 condyles, the team found that POD severity was associated with an increased number of lifetime starts, increased gallops in one training session, number of seasons raced, and time between races. Essentially, she said, horses that run too hard, too frequently are more likely to develop POD. She concluded that “cumulative racing exposure may be more important than age at first exercise” for POD development.

EPM

Clark highlighted equine protozoal myeloencephalitis (EPM) diagnosis in the living horse. In one study, researchers determined that the most accurate means of detecting EPM is to use a simple titer ratio of antibodies in serum to those in cerebrospinal fluid. The team concluded that using this titer ratio offered excellent sensitivity and specificity for diagnosing EPM in the live horse, she said.

Hydration

Clark then described a paper in which authors compared the effects of oral vs. IV fluid therapy on whole body hydration. They

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concluded that both “maintenance” (the standard volume used to maintain a sick horse’s hydration to keep normal metabolism and organs functional) and double-maintenance dose IV fluids are effective volumes for restoring hydration in dehydrated horses. However, Clark said, the team found that a triple-maintenance dose of IV fluids did not improve horses’ hydration status and increased urine output; ultimately, horses receiving triple-maintenance doses of IV fluids were less hydrated than those receiving a maintenance or double dose once IV fluid therapy was stopped. Clark also mentioned that the researchers showed that oral fluid replacement—passing fluid through a nasogastric tube into the animal’s stomach—is an excellent means of restoring intestinal water levels.

Blister Beetle Toxicosis

It takes just three ingested blister beetles from hay or pasture to kill an adult horse and, in the next study Clark described, researchers evaluated which treatments work best for treating so-called blister beetle toxicosis. They examined the effectiveness of three gastrointestinal therapies—mineral oil, charcoal, and smectite (or Biosponge)—in rats that had received cantharidin, the toxic substance found in blister beetles. They found that mineral oil was associated with the highest mortality rate: six of eight treated animals died. Three of eight rats died after receiving toxin and no treatment (the control group), Clark said, while two of eight rats died after treatment with charcoal or smectite. The bottom line: Mineral oil—or any lipid soluble—should *not* be used in suspect cases of blister beetle toxicity because it appears to exacerbate cantharidin absorption and increase mortality.

Long Distance Hauling and the Respiratory Tract

Horses that travel long distances are prone to developing respiratory infections, often due to damage to their respiratory tract epithelium caused by environmental factors within the trailer (such as hay or dust), stress, and holding the head in an elevated, fixed position. Clark described a study in which authors evaluated if administration of the bronchodilator clenbuterol could provide relief to traveling horses. The research team administered clenbuterol 12 hours prior to transport and then every 12 hours over the next 48 hours and found it improved tracheal clearance



It takes just three ingested blister beetles to kill an adult horse

of debris by at least 50%. The drug can reduce respiratory disease development following transport, she said. However, allow for appropriate withdrawal times in competition horses.

Inflammatory Mediator Inhibitors

Matrix metalloproteinases (MMPs) are

inflammatory mediators that play an important role in the development of equine conditions such as laminitis, recurrent airway disease, hepatitis, and osteoarthritis. Clark described the results from a study in which authors compared potential MMP inhibitors—specifically, doxycycline, oxytetracycline, flunixin meglumine, and pentoxifylline—to suppress specific MMP components that cause inflammation. Clark said the team found pentoxifylline to be the most useful MMP inhibitor used in the study, followed by oxytetracycline.

Equine Metabolic Syndrome (EMS)

Clark shared a study in which the authors tried to find ways to blunt abnormal insulin responses. Healthy horses (not EMS-affected) were given a large dose of dexamethasone to elicit insulin resistance. Then these horses received metformin (30 mg/kg) one hour prior to receiving oral sugar. The team found that metformin reduced the horses’ insulin response. Clark

Advertisement for Doc's Pellets #1. The background features a horse's legs and the word "STRONGER." in large red letters. The text "STRONGER." is repeated in a smaller font below it. The product name "DOC'S PELLET'S #1" is displayed in a stylized font with "O" in a red circle, "C" in a white circle, and "D" in a blue circle. Below the product name is the website "www.DocProductsInc.com" and the phone number "866-392-2363". At the bottom is the logo for "Doc's Products, Inc." and the text "Dr. Douglas R. Beebe • Lexington, KY".



KEVIN THOMPSON

One study suggested the pH of mares' milk could indicate impending foaling

cies, he said, and found that live foaling rates were not significantly different between adjacent and nonadjacent embryos (whether embryos are fixed together or not); however, the mare's age impacted live foaling rates: Live foal rates in mares 9 years of age or older were lower than in mares younger than 9 years. For best results, McCue stressed that practitioners should never delay in reducing twin pregnancies.

Along the same lines, McCue presented the results of a study in which researchers evaluated pregnancy and foaling rates after another method of twin reduction: transvaginal ultrasound-guided aspiration (TUA). The team found that 49% of the 44 mares evaluated in the study delivered one live foal after TUA and that the highest live foaling rates occurred in mares that underwent TUA before Day 42 of pregnancy.

"Decisions on twin reduction should be made before 35 days," McCue concluded, adding that reductions should take place between Day 30 and Day 35, if possible.

In a recently published review of breeding-induced endometritis (inflammation of the uterine lining), McCue said the researchers diagnosed the condition in 10-15% of mares and that factors such as advanced age, poor perineal conformation, a pendulous (i.e., downward facing or slanted) uterus, and a compromised immune response put mares at a greater risk for developing this condition. He said the researchers identified six hours as the critical time frame for clearing breeding-induced uterine inflammation; mares that failed to clear inflammation by six hours after breeding remained inflamed.

McCue described a study in which researchers set out to test whether mares' milk pH could be a useful indicator of impending foaling. Their results suggest that if the milk's pH is above 6.4, she's not yet ready to foal, he explained. However, once the pH drops below 6.4, the mare will likely foal in the following few days.

McCue said owners can use test strips on the farm to determine mares' milk pH. He said he'd suggest using strips that focus on the mid-section of the pH scale (i.e., 5.5 to 8.0), rather than ones that measure ranges from 1 to 10. **BH**

said the researchers believe metformin has a local intestinal effect on reducing sugar absorption and might be a useful pre-turnout approach to preventing insulin spikes in horses that are at risk for developing EMS or EMS-induced laminitis.

Broodmares and Pregnancy

McCue reported on research in which scientists evaluated whether laparoscopic application of the hormone prostaglandin E2 (or PGE2) to the uterine tube surface could improve fertility in some subfertile mares. The team tested their theory in 20 barren embryo donor mares and eight bar-

ren mares bred to carry their own foals.

McCue said 17 of the 20 donor mares produced an embryo and seven of the eight mares bred to carry a foal became pregnant after veterinarians applied 0.2 mg of PGE2 to the mares' uterine tubes.

"This is not a panacea for all cases," he said—case selection is critical—but this technique could help improve fertility in mares with unexplained infertility.

Moving forward, McCue described a study in which researchers evaluated factors affecting live foal rates in mares that underwent manual twin elimination. Researchers looked at 129 twin pregnan-

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Heart Pounding

Joint Throbbing



Ask your equine veterinarian about the impact of competition on your horse's joint health. She'll probably tell you about Legend® (hyaluronate sodium) Injectable Solution for the treatment of equine non-infectious synovitis.



LEGEND®

(hyaluronate sodium)
INJECTABLE SOLUTION

THE ONE. THE ONLY.

CAUTION: Federal law restricts this product to use by or on the order of a licensed veterinarian. **WARNINGS:** For use in horses only. Do not use in horses intended for human consumption.

Legend® Multi Dose (hyaluronate sodium) Injectable Solution, Legend (hyaluronate sodium) Injectable Solution, BRIEF SUMMARY: Prior to use please consult the product insert, a summary of which follows: **CAUTION:** Federal Law restricts this drug to use by or on the order of a licensed veterinarian. **INDICATIONS:** Legend® Injectable Solution and Legend® Multi Dose Injectable Solution are indicated in the treatment of equine joint dysfunction associated with equine osteoarthritis. **CONTRAINDICATIONS:** There are no known contraindications for the use of Legend® Injectable Solution and Legend® Multi Dose Injectable Solution in horses. **RESIDUE WARNINGS:** Do not use in horses intended for human consumption. **HUMAN WARNINGS:** Not for use in humans. Keep out of reach of children. **ANIMAL SAFETY WARNING: For Legend Injectable Solution 4 mL and Legend Multi Dose Injectable Solution - Not for Intra-articular use. The Intra-articular safety of hyaluronate sodium with benzyl alcohol has not been evaluated. PRECAUTIONS:** Complete lameness evaluation should be conducted by a veterinarian. Sterile procedure during the injection process must be followed. Intra-articular injections should not be made through skin that is inflamed, infected or has had a topical product applied. The safety of Legend Injectable Solution and Legend Multi Dose has not been evaluated in breeding stallions or in breeding, pregnant or lactating mares. **ADVERSE REACTIONS:** No side effects were observed in Legend Injectable Solution clinical field trials. Side effects reported post-approval: Following **Intravenous** use: Occasional depression, lethargy, and fever. Following **intra-articular** (Legend Injectable Solution – 2 mL only) use: joint or injection site swelling and joint pain. For medical emergencies or to report adverse reactions, call 1-800-422-9874. **ANIMAL SAFETY SUMMARY:** Animal safety studies utilizing Legend Multi Dose Injectable Solution were not performed. Legend Multi Dose Injectable Solution was approved based on the conclusion that the safety of Legend Multi Dose Injectable Solution will not differ from that demonstrated for the original formulation of Legend Injectable Solution. Legend Injectable Solution was administered to normal horses at one, three and five times the recommended intra-articular dosage of 20 mg and the intravenous dose of 40 mg. Treatments were given weekly for nine consecutive weeks. No adverse clinical or clinical pathologic signs were observed. Injection site swelling of the joint capsule was similar to that seen in the saline treated control horses. No gross or histological lesions were observed in areas of the treated joint. For customer service or to obtain product information, including a Material Safety Data Sheet, call 1-800-633-3796. Bayer (reg'd), the Bayer Cross (reg'd), Legend® and the horse logo are trademarks of Bayer. © 2010 Bayer HealthCare LLC Bayer HealthCare LLC, Animal Health Division, Shawnee Mission, Kansas 66201 U.S.A., 15802 GHG051412