Drugs and performance

Florida Equine Performance Laboratory helps form racing's drug policies

BY DENISE STEFFANUS

PATRICK COLAHAN, D.V.M., director of the Equine Performance Laboratory at the University of Florida, believes the information generated by his team to determine the effects and clearance times of common drugs used on the racetrack benefits the racing industry worldwide.

Drugs selected for investigation include common medications that may have performance-altering potential but for which the elimination time is unknown; medications for which jurisdictions wish to establish rules to control use in racing horses; drugs for which the Florida Racing Laboratory at the University of Florida is improving methods of detection; and any other medication or substance of regulatory importance.

The drug investigations aim to determine the potential of a drug to alter racing performance, the elimination time for certain therapeutic drugs, and the duration and intensity of a specific drug's effect. Drug studies also provide jurisdictions with the information they need to set threshold concentrations for certain drugs in the testing laboratory.

Most recently, the Performance Laboratory studied more than 40 drugs commonly used in horse racing, plus it took a look at common causes for positive tests, such as caffeine.

The study was conducted in two parts: One part determined the time it takes for specific drugs to be eliminated (clearance times) in horses that are maintained at a reasonable level of physical fitness; the second portion assessed the effects, if any, on performance of the drugs studied. All drugs were administered either according to the label dosage recommendations or at the dosage typically administered at the racetrack.

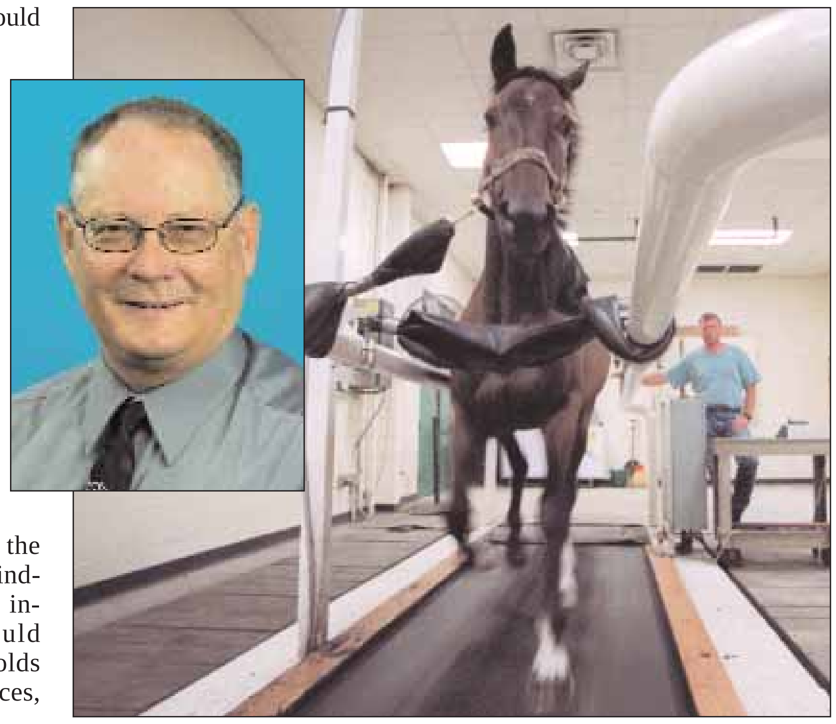
Unique testing herd

The Performance Laboratory is unique in that, for drug studies, it maintains a herd of 20 racing-age Thoroughbreds in athletic condition, rather than just a handful of non-Thoroughbred, sedentary horses at pasture. The horses in Colahan's study are exercised regularly so they are able to run a mile on a treadmill in two minutes without undue stress, making them more representative of actively racing horses than those used in other drug studies.

"Fitness probably makes a difference," Colahan said, explaining that compared with athletes, sedentary horses at pasture typically have a lot more body fat in which the horse can store certain drugs and thereby extend clearance times. In contrast, exercise accelerates heart rate and metabolism, which could shorten clearance times in athletic horses.

"The simplest way to do the study, rather than estimate all those [variables], is to do the studies in horses that are exercised," Colahan said.

The Florida Legislature funded the Equine Performance Laboratory in 1995 and charged Colahan with the task of gaining a better understanding of the relationship between the duration of the effects of certain therapeutic drugs and the duration of their detectability in test samples. Based on the laboratory's sound scientific findings, jurisdictions using the information generated could confidently establish thresholds for certain therapeutic substances, and race-day test results lower than those thresholds would not be reported as violations.



Photos courtesy of University of Florida College of Veterinary Medicine

Put to the test Dr. Patrick Colahan (inset left), director of the University of Florida's Equine Performance Laboratory, recently studied more than 40 drugs commonly used in racing to determine clearance times and assess their effects

Assists Racing Lab

The Florida Racing Laboratory, one of only four accredited testing laboratories in the U.S. involved in racehorse testing, is an internationally accredited analytical toxicology laboratory that tests samples for prohibited substances, develops new and improved tests to detect

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and identify these substances, conducts research in various areas of analytical toxicology, and trains scientists in the field of analytical toxicology. It provides primary testing services for Florida, New Hampshire, and Kentucky, and split-sample or referee sample testing for several other jurisdictions, including California and Louisiana.

The Racing Laboratory uses the data arising out of the drug-elimination portion of the Performance Laboratory's study to determine when a drug most likely was administered, based on the amount of drug found in the serum or urine sample at the time of testing.

Richard Sams, Ph.D., director of the Florida Racing Laboratory, said the new information generated by the study is not about leveling the playing field.

"It's a matter of fairness," Sams said.

Sams explained that the presence of a controlled therapeutic substance—no matter how small an amount was detected—historically has been deemed a violation, with no negotiation.

"Under the rules, those findings constituted violations," he said. "But the horsemen were just incensed that drugs that had short-lasting therapeutic effects were being detected days or weeks after administration when they no longer were producing effects during the time of the race, but still they resulted in a positive finding. Banamine is a real obvious example that comes to mind."

Said Colahan: "Some of the important medications we have investigated are trimethaprim/sulfa and pyrimethamine for treatment of EPM [equine protozoal myeloencephalitis], procaine from procaine penicillin versus from a nerve block, and albuterol inhaled versus oral."

In determining a drug's effects, if any, on performance, Colahan used incremental stress tests. During an incremental stress test, the horse is exercised on a treadmill until it is fatigued.

"The bottom-line measure of a performance effect would be whether the horse could run longer or faster," Colahan said. "The treadmill gives you the ability to impose an exercise regime, and the horse serves as its own control, with the drug and without the drug."

"What I can tell you is that these anabolic steroids last a lot longer than people think they do. Using the label dose, for instance, of boldenone, there are concentrations in horses that are easily detectable for time periods approaching six months. And there is a considerable variation between individual horses in the elimination of that drug as well."

Dr. Patrick Colahan of the Equine Performance Laboratory at the University of Florida

Some interesting results

Colahan found that the EPM treatment trimethaprim/sulfa and pyrimethamine did not affect performance, as he suspected.

"People were using it on horses that they thought were a little bit off or might be having a problem, and they were getting a lot of positives tests," he said. One of his recommendations to the Florida Division of Pari-Mutuel Wagering was to amend the rules regarding use of these drugs.

Although these results were no surprise, some of his other findings were.

Colahan said he found that inhaled albuterol, a bronchodilator, administered to horses right before exercise will improve their performance. This was a surprise because a study at Tufts University in 1999 found that "aerosolized albuterol did not enhance aerobic performance in eight clinically normal Standardbreds." Colahan said he did not expect the result he obtained because the amount of the drug administered via inhalant is minimal.

In contrast, Colahan found orally administered albuterol to be an ineffective therapy based on blood levels of the drug.

There was good news for trainers and grooms who like to treat their horses with chocolate and cola. Colahan found that even horses with high levels of caffeine did not perform better.

"So trace amounts of caffeine are not significant as far as affecting a horse's performance," Colahan said. "All it does is give the horse a positive test. That was the whole reason we did that study.

"You certainly can give a horse enough intravenous caffeine that it would have an effect on the horse physiologically, but that wasn't our point. We gave horses the amount of caffeine they would have gotten from drinking a cola so the Division [of Pari-Mutuel Wagering] could have a basis to write rules regarding trace amounts of caffeine."

Based on the results for this substance, Colahan recommended the rule on trace amounts of caffeine be amended.

Procaine is a drug used in nerve blocks, but it also is regularly combined with penicillin to reduce the pain of its administration via injection.

"The final result of this study was that you cannot tell whether someone has used procaine as a local nerve block or in a penicillin injection, based upon the concentrations that you get from a nerve block versus procaine penicillin," Colahan said. "You can have a very effective nerve block with very low concentrations of procaine."

Colahan had hoped to be able to differentiate between the two uses, based on concentrations, to give trainers a break who used procaine penicillin to treat wounds or abscesses in racing horses. Unfortunately, that was not the case.

Other drugs

Data generated by a study of the bleeder medication furosemide (Salix) have yet to be formatted.

"There are multiple ways of administering furosemide that are not always in accordance with the rules that are written for its administration," Colahan said, "such as 50-50 IV [intravenous] and IM [intramuscular] or half of it at four hours IM and half of it IV two hours later."

He said the different methods and routes of administration do cause differing results. Those results are forthcoming.

Colahan's laboratory has performed extensive testing on four anabolic steroids—testosterone, nandrolone, stanozolol (formerly manufactured as Winstrol), and boldenone (Equipoise). Information generated by this testing has been the basis for new rules governing anabolic steroid use.

"What I can tell you is that these anabolic steroids last a lot longer than people think they do," Colahan said. "Using the label dose, for instance, of boldenone, there are concentrations in horses that are easily detectable for time periods approaching six months. And there is a considerable variation between individual horses in the elimination of that drug as well.

Because of the long clearance time, this extensive study of anabolic steroids took more than 14 months to complete, and Colahan believes his laboratory might be the only one in the world equipped with the knowledgeable personnel and fit horses to get it up and running quickly.

"That was no small accomplishment," he said. "We were able to step in and do it in a short period of time without a lot of gearing up. I'm proud that we had the horses and the people available to do that."

Colahan and his team have developed a method for determining the effects of nonsteroidal anti-inflammatory drugs (NSAIDs), such as phenylbutazone and Banamine, on inflammation and blood flow to organs.

By testing a blood sample, the Performance Laboratory can tell how these different NSAIDs should be used and how long they have an effect.

"The test can also be used to detect which drug has been given," Colahan said. "Since there are a lot of these drugs now becoming available, such as Equioxx and Surpass, we think this test will be very important clinically and for enforcement."

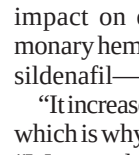
Another interesting drug Colahan has been investigating for its impact on exercise-induced pulmonary hemorrhage (bleeding) was sildenafil—Viagra.

"It increases peripheral blood flow, which is why people take it," he said. "We tested it for its effect on the pulmonary vasculature, because sildenafil decreases the blood pressure in a part of the circulatory system to the lungs. People have thought that it might play a role in bleeders. In our study, we did not find an effect on the arterial pulmonary pressure, so it doesn't appear, at least at doses that are reasonably close to the high doses used in humans, that it would be effective for reducing the number of bleeders or the severity of bleeding in horses."

Ongoing work

The Equine Performance Laboratory and the Racing Medication and Testing Consortium have renewed their contract, so the laboratory will continue to provide scientific information upon which the consortium can formulate recommended rules and regulations.

"The whole point of the Racing Medication and Testing Consortium is to provide for uniform testing and regulation throughout the country, but probably the data we generated will be used internationally, as well," Colahan said.



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