

Equine Drug and Research Council

Necropsy Program

In 2008 the racing necropsy program was developed in conjunction with University of Kentucky pathologists at the Livestock Disease Diagnostic Center. The program established an integrated approach to efforts to understand racetrack injuries. All horses that die or are euthanized as a result of a racing injury or incident are submitted for comprehensive post-mortem examination by a specialized pathology group. In 2009, magnetic resonance imaging (MRI) was added to the protocol. A digital radiography system was recently purchased with EDRC funding. The addition of radiography and MRI to the examination process establishes Kentucky as a leader in the evaluation of race related injuries.

Research

In 2009, the EDRC solicited research proposals for funding consideration from the University of Kentucky's Equine Initiative Program. Six proposals, representing a broad spectrum of topics that affect the health, safety, and welfare of racehorses, and racing integrity, were selected for funding. A summary of each proposal follows.

Seroprevalence of lawsonia intracellularis in central Kentucky Thoroughbred weanlings

Principal investigator: David Horohov
Funding amount: \$44,916

Lawsonia intracellularis is the bacterial that has been identified as the cause of Equine Proliferative Enteropathy (EPE) an emerging equine disease that results in chronic weakness, depression, diarrhea, colic, unthriftiness, and muscle wasting. Weanlings appear to be at greatest risk for the infection. The impact and prevalence of the disease within central Kentucky is not known. This study will test blood samples from weanlings to detect antibodies to the organism to determine its prevalence and geographic distribution in central Kentucky. Participating farms will also complete a survey, the contents of which will be used to help identify risk factors for EPE.

This project will provide the groundwork for the development of strategies to prevent the disease or minimize its impact in the population.

Safety and anti-inflammatory efficacy of glucocorticoids in intra-articular therapy in race horses

Principal investigator: James MacLeod
Funding amount: \$99,969

Glucocorticoids (corticosteroids) are administered intra-articularly to treat inflammatory conditions in the joints of race horses. These medications have strong and beneficial anti-inflammatory properties that can promote recovery from joint injury or inflammation, but administrations are not without risk of undesirable side effects.

This project is composed of two phases. One phase will evaluate the effects of three commonly used corticosteroids: betamethasone, methylprednisolone, and triamcinolone corticosteroids on equine cells in cell culture. The response to corticosteroids of both normal and inflamed cells will be evaluated. In the second phase, intra-articular administrations of each of the same corticosteroids will be performed on nine horses. An assessment of the effects of each corticosteroid on bone and cartilage will be performed.

This project is expected to generate scientific data to help identify an optimal therapeutic dose range for intra-articular corticosteroid administration.

Changes in gastrointestinal flora in response to antibiotic therapy

Principal investigator: Laurie Lawrence
Funding amount: \$53,305

Antibiotics are important therapeutic tools in the care of racehorses. However, a potential side-effect of antibiotic therapy is antibiotic-associated diarrhea (AAD). Symptoms can range from mild, and self-correcting to severe, uncontrollable diarrhea which can result in death. The underlying mechanism for AAD is believed to be disruption of the normal bacteria in the gastrointestinal tract and the proliferation of diarrhea causing bacteria. However, not all horses that receive antibiotic therapy develop diarrhea. This raises the question as to why some horses develop AAD while others do not.

This proposal will study the effects of antibiotics on the bacterial population of the equine gastrointestinal tract and identify which normal bacteria are affected by antibiotics.

The results of this project are hoped to help identify strategies to prevent the development of AAD when antibiotic therapy is indicated in the equine patient.

Methods to suppress estrus in race mares

Principal investigator: Edward L. Squires
Funding amount: \$48,092

Signs of estrus (heat) behavior in fillies and mares in training and racing can be very disruptive, and potentially dangerous to horses and their handlers. There is a need to suppress estrus in females that demonstrate these estrogen-induced signs that may include: agitation, frequent urination, squatting and reluctance to move away from stallions or geldings.

There are two approaches to estrus suppression. One is to prevent the development of the estrogen-producing follicles through the exogenous administration of progesterone or progesterone-like hormones. The other approach is to block the effects of the prostaglandin that initiates the series of events that culminates in follicle development.

This proposal will evaluate two approaches to prevent the mare from showing estrus: 1) the injection of a long-acting oxytocin that would alter the secretion of prostaglandin and 2) a single injection of a non-steroidal anti-inflammatory drug to suppress prostaglandin production.

Currently, the most common approach to estrus suppression is through the daily oral administration of a progesterone-like hormone. This protocol carries with it human risk as the medication can be absorbed through the skin. Persons administering the medication are advised to wear gloves and avoid direct contact with the medication.

This proposal is intended to identify a simple, reversible means to control estrus and without human health risk.

Comparison of in vitro antiviral activity of herpesvirus DNA polymerase inhibitors against neuropathogenic and non-neuropathogenic strains of equine herpesvirus-1

Principal investigator: Udeni Balasuriya
Funding amount: \$40,499

Equine herpesvirus-1 is one of the most clinically and economically important viruses of affect the horse. The virus is highly contagious and infection has been responsible for significant economic losses due to respiratory disease, abortion, neurologic disease, and death. Currently there is no vaccine that provides a level of immunity that prevents viral spread between horses. There is an important need to evaluate the efficacy of antiviral drugs to prevent virus shedding and disease spread.

This proposal will identify and compare the effect of 10 human anti-herpesvirus drugs on 65 different strains of Equine herpesvirus. Each drug will also be tested to determine its relative toxicity to equine cells. These studies will be performed using laboratory methods rather than through the deliberate infection of healthy horses.

This study will help identify drugs for subsequent testing in naturally occurring infections in horses, and possibly identify strain-specific susceptibility to different anti-viral medications.

The information generated by this project should improve the ability of veterinarians to manage outbreaks of this highly contagious disease in densely managed populations of horses—such as are found at racetracks and training centers.

Deuterated Internal Standards for Equine Therapeutic Medication Regulation

Principal investigator: Thomas Tobin
Funding amount: \$99,806

With improvements in drug testing technology, the regulation of the use of therapeutic medications in racehorses is increasingly reliant upon the use of

quantitative thresholds to avoid identifying as rule violations the residues of therapeutic medications resulting from legitimate administrations. It is necessary for the laboratory, in its analysis to determine the concentration of a given substance in a blood or urine sample, to use certified, known, purified standards against which the test sample is compared. If a reference standard is not available, the quantitative analysis cannot be reliably performed.

A limited range of certified standards is available, and the Racing and Medication Testing Consortium has recognized that the lack of availability of certified standards is an impediment to effective medication regulation programs.

This proposal intends to synthesize, characterize, certify to ISO-17025 standards, and make available to the analytical community standards for flumethasone (corticosteroid), isoflupredone (corticosteroid), butorphanol (sedative/analgesic), dantrolene (muscle relaxant), xylazine (sedative/analgesic), lidocaine (local anesthetic), mepivacaine (local anesthetic), hydroxyethylpromazine and hydroxyethylpromazine sulfoxide (sedative). The proposed list of standards was identified by the RMTC scientific advisory committee as needed by equine chemists.

The development of the standards as described in this proposal will assist in elevating the quality and consistency of equine drug testing on a national scale.

McKinsey Report Recommendations

The McKinsey Report, commissioned by The Jockey Club in 1990, reviewed the efficiency of equine drug testing programs in horse racing—both in terms of detection and deterrence. The core principle of the McKinsey Report is that a horse demonstrating a deviation from its previous form is of particular interest with respect to drug testing and should be subjected to testing regardless of finish order. The horse with consistent form is not exempted from testing and all winners are still subjected to sampling. At the time of sample delivery to the laboratory, 50% of the samples identified as originating from horses with consistent form will be randomly selected for testing. This randomization is performed at the laboratory and neither the Stewards, the trainer, nor the test barn personnel have control or knowledge of which samples will be tested. Samples are labeled in such a way that the laboratory is unable to identify a horse, race or trainer. Untested samples are retained, and may be tested at any time upon the request of the Commission and with full administrative consequences should a violation be detected. All samples from horses with performances inconsistent with their form will be tested.

The EDRC established a working group to review the Report and determine if its recommendations were applicable to Kentucky's drug testing program. The working group formulated recommendations which were unanimously approved by the EDRC.

The KHRC accepted the recommendations at the January 5, 2010 and has initiated the process required to implement the changes in sampling, testing, and long-term retention of samples.