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Sports Medicine Symposium for Equine Practitioners

MSG to laboratory animals can produce delayed, but permanent defects in hormone secretion and drug metabolism, contributing to long-term, serious health consequences. Another of their studies found that prenatal administration of either one of the two substances can result in a multitude of long-term reproductive, growth, hepatic and neural dysfunctions. One finding, in particular, is disturbing: neonatal administration of phenobarbital can induce a delayed but permanent elevation in the activities of several hepatic drug metabolizing enzymes. These enzymes break down specific substances, when their activities are elevated, these drugs are broken down faster. One would expect such elevated activity right after administration of phenobarbital, but not much later. However, it appears that at sexual maturity, when gender dependent differences in drug metabolism appear, the hepatic drug metabolizing enzymes are induced again and remain overexpressed for the rest of life. In rats exposed as neonates to phenobarbital this results in a shorter lifespan, and a great increase in tumor formation.

Neonatal exposure to MSG has a different effect on growth hormone production. It causes a permanent reduction in the secretion of growth hormone which leads to a reduced production of the drug-metabolizing enzymes. This hampers the metabolization of drugs and toxic substance. The reduced quantity of growth hormone leads to stunted growth and irreversible obesity. Like phenobarbital, defects resulting from neonatal exposure to MSG are not apparent until adulthood.

Dr. Shapiro and his group are currently working to answer these questions: How do the chemicals induce the defects? How are the defects expressed? The group has observed that, when the production of growth hormone is disturbed, the level of drug metabolizing enzymes is affected. They found that in male and female rats, prenatally exposed to phenobarbital, there were permanent defects in the expression of these enzymes. The mechanism by which the abnormal profile of growth hormone disrupts the enzyme expression is not known, and the group proposes to investigate it.

It is known that men, exposed perinatally to phenobarbital, have a considerable higher incidence of delayed puberty, undescended testes, and genital abnormalities. In women this exposure leads to irregular menstrual cycles and problems during pregnancy. Both sexes score lower on IQ tests as adults. Further, phenobarbital is a known carcinogen that induces the overexpression of selected hepatic enzymes that can increase the metabolism of innocuous compounds into carcinogenic and toxic metabolites. Perinatal exposure to the barbiturate has been reported to subsequently increase the risk of cancer in adult rats and children.

Phenobarbital and MSG are just two substances that can have an impact on drug metabolism. There are many other compounds that are in drugs or food and their impact on human metabolism is unknown. One of these, aspartame, is used widely as a sweetener. "Our studies with rats have shown that the sweetener, containing an amino acid like MSG, could produce subtle developmental defects in growth hormone secretion," explains Dr. Shapiro. "It is estimated that children consume almost 100 mg of aspartame per kg of body weight per day, a level approaching the adverse doses found in animal studies. Children under the age of five are particularly vulnerable, their hepatic and neuroendocrine differentiation are still incomplete and early constant exposure to low levels of food additives could permanently alter hormone secretion, the expression of hepatic drug metabolizing enzymes and/or their responses to inducing agents. Such effects could unknowingly affect the efficacy of drug therapy or the susceptibility to chemically-induced cancers in adulthood."

Sports Medicine Symposium for Equine Practitioners

Saturday, March 22 and Sunday, March 23, 2003

Registration/participation fee: $175 Saturday only; $200 Saturday plus Sunday wet labs.

March 22: Lecture Topics

Performance problems in the Race Horse—Dr. Ben Martin
Performance problems in the Sport Horse—Dr. Elizabeth Davidson
Cardiovascular Problems in the Equine Athlete—Dr. Virginia Reef
Obscure Lameness Problems in the Equine Athlete—Dr. Mike Ross
Exercise Physiology: What You Need to Know—Dr. Ric Birks
Evaluation of Cardiac Output and Myocardial Function in Exercising Horses—Dr. Mary Durando
Muscular Problems associated with Poor Performance—Dr. Jill Beech
Motion Correction for Standing Equine MRI—Dr. Lexi Lawrence
Suspensory desmitis and its response to treatment with high energy extracorporeal shock wave therapy—Dr. Olga Seco
Where we stand and where we are moving toward with respiratory surgery—Dr. Eric Parente
All presenters with exception of Dr. Mary Durando are New Bolton Center faculty/clinicians

March 23: Wet Labs

Station A - High speed treadmill demonstration
Station B - Endoscopic evaluation of upper airway dysfunction detected at speed
Case discussions at 2 stations - half of participants in each group
Station C - Lameness videos
Station D - Scintigraphic case evaluations

CE credits: 8 hours
Registration limited to 80 for Saturday sessions, 60 (max.) for Sunday wet labs

Saturday Sessions will be held in Woerner Amphitheatre, George D. Widener Hospital for Large Animals, New Bolton Center, Kennett Square, Pa.

Wet Labs to be held in the new Scott Equine Sports Medicine Building, Jeffords Treadmill Building, Scintigraphy station, New Bolton Center.

Please contact Office of Development, New Bolton Center, for detailed information and registration forms. Tel: 610-444-5800. ext. 2500 or email Patricia Hall at <phall@vet.upenn.edu>