Study Reveals Thyroxine Detrimental to Racing Performance and Horse Health

Responding to research needs of the Ontario racing commission (now AGCO), a recent study led by Dr. Janice E. Kritchevsky, at Purdue University College of Veterinary Medicine, reveals use of thyroxine supplementation is deleterious to racehorse's performance and may result in cardiac arrhythmias. Researcher Dr. Janice E. Kritchevsky was selected to do this work by the Equine Guelph Research Committee with AGCO support.

Kritchevsky explains, "Thyroid disorders are actually rare in horses." The concentrations of thyroid hormones, including thyroxine, can be measured in blood. Blood thyroid hormone concentrations outside the normal ranges can lead one to believe hypothyroidism (low production of thyroid hormones) may be the cause of a horse looking a little lethargic. However, abnormal thyroid hormone concentrations can occur after a high grain diet meal, after trailering fatigue, training stress, or if a horse is ill. In actuality, administering thyroid medication to a horse fighting a respiratory infection can compromise the animals natural response to the infection.

Horses that benefit from thyroid hormone supplement tend to be suffering from Equine Metabolic Syndrome (EMS) or insulin resistance, neither syndrome is recognized in fit racehorses and they are both quite rare in other performance animals. Thyroxine supplementation may have a place in treating some over-conditioned (obese) horses at risk for laminitis. To diagnose a thyroid disorder, it is not enough to perform a one-time blood test; instead, a function test must be conducted. In a function test, two thyroid hormones are measured in the blood, then the horse is given a releasing hormone, and the two hormones are measured again. If the thyroid hormone concentrations do not respond normally, then there may be a true thyroid disorder. Kritchevsky adds, "In the case of over conditioned horses, thyroxine supplementation is to be used only until the horse reaches a normal body weight."

The misconception over thyroxine supplement use among horse owners and trainers may stem from the initial reaction to the drug, which can cause a flat or less spirited horse to appear more alert and hypersensitive. In Kritchevsky's study using fit Standardbreds, they did find a behaviour change after administration of Levothyroxine. The horses became quite alert and more difficult to handle but then they fatigued quicker.

When Dr. Kritchevsky gave Levothyroxine (a thyroid supplement) to the horses, it resulted in changes to blood concentrations of all thyroid hormones. Horses given 0.25mg/kg Levothyroxine went to maximum heart rate quicker, but the horse's blood lactate concentration did not change post-exercise, which told the researchers that they had the same level of fitness. The drug was not found to be performance enhancing. In fact, four out of the six horses in the study developed cardiac arrhythmia (irregular heart beat) when treated with Levothyroxine and one developed atrial fibrillation. Atrial fibrillation is a serious performance limiting condition that can be career ending.

Kritchevsky thanks Equine Guelph and AGCO for providing the lion's share of the funding for this important research on thyroxine supplementation. This research was done in response to reports of open containers of thyroxine supplement that were observed during barn visits as part of out of competition testing by ORC (now AGCO). Elevated blood concentration of thyroxine has been documented on numerous occasions on post-race blood testing of horses from Ontario tracks.

Kritchevsky says, *"This is an important problem anywhere! People are using thyroid supplement and it*

does not do what they think it is doing. This research is important for all, including racing commissions. While thyroxine is not a foreign substance, as this study indicates, high levels render the horse unfit to race."

Some officials believe thyroxine should be regulated and next steps in research may include developing an assay to test for a carrier protein that is excreted indicating a high thyroid.