# Improving training efficiency in horses

October 19 2011

It is well known that hard training can lead to degradation of muscle protein. A number of nutritional strategies have been developed to counter this but surprisingly there has to date been very little attention paid to the situation in sport horses. Preliminary data showing that nutritional supplements given after exercise may also help prevent muscle breakdown in horses are now provided by René van den Hoven and colleagues in the Institute of Animal Nutrition at the University of Veterinary Medicine, Vienna.

The scientists investigated standardbred trotters (horses used in harness racing) before and after intense exercise on a high-speed treadmill. Because protein degradation within cells takes place by a number of different mechanisms, the researchers investigated potential markers for each of the pathways. They also examined whether the activity of the pathways was affected if the animals received an amino acid/protein supplement (developed for human sportsmen and –women) after exercise.

The results showed that one of the classic pathways for protein degradation, the so-called ubiquitination pathway, was dramatically activated four hours after the exercise period, at least as judged by the level of messenger RNA encoding ubiquitin. This indicates strongly that the horses were breaking down protein in their muscles (by the ubiquitination pathway) as a result of heavy exercise. Importantly, the increase could be significantly reduced by the amino acid/protein supplement. Changes to the other pathways studied were comparatively minor and little affected by the food supplement.

Van den Hoven is cautiously excited by the findings. "It will be important to attempt to verify our results on larger sample sizes," he says, "but the initial indications are that the use of a protein/amino acid mixture can decrease protein degradation in trained horses and thus could have an advantageous effect on muscle mass."

The paper A preliminary study on the changes in some potential markers of muscle-cell degradation in sub-maximally exercised horses supplemented with a protein and amino acid mixture by René van den Hoven, Alexandra Bauer, Sigrun Hackl, Michaela Zickl, Jürgen Spona and Jürgen Zentek is published in the October issue of the *Journal of Animal Physiology and Animal Nutrition* (Vol. 95, pp. 664-675).

**More information:** The scientific article in full text online: onlinelibrary.wiley.com/doi/10 … 96.2010.01097.x/full

Provided by University of Veterinary Medicine -- Vienna