STRATEGIC NUTRITION TO ENHANCE MUSCLE RECOVERY IN SHOW JUMPING AND SPORT HORSES©

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No matter how balanced the diet, exercise causes a disruption to normal cellular processes - creating a need for specific nutritional support. During exercise, the working muscle releases enzymes to breakdown other body tissues and the amino acids, vitamins, minerals and anti-oxidants are donated to repair and build the muscles used in hard work. Once these enzymes are triggered, tissue breakdown is irreversible - protein synthesis rates drop 30%, protein breakdown exceeds protein synthesis and tissue damage may persist for 3-5 days - longer in young horses just beginning training.

Added to this are the hundreds of tiny rips and tears that occur during exertion and damage from the increase in free radicals production that occurs during muscular work. Physical exercise increases muscle use of oxygen, causing an overproduction of free radicals and lactic acid that damage the muscle and result in muscle membrane leakage, fatigue and injury. Plasma increases in CK and AST reflect the leakage of proteins and other substances through muscle membranes.

So what are free radicals and what exactly is oxidative damage? The process by which cells utilise oxygen in the production of energy is called 'oxidation'. During energy generation, most of the oxygen is fully utilised, converting to carbon dioxide and water. However 4 – 5% is not completely used and becomes electrically unbalanced and highly reactive - this is a 'free radical'. To rebalance themselves, free radicals attack body cells to 'steal' an electron - creating havoc and 'oxidative stress' as the damaged body cells then 'steal' an electron from a neighbouring cell. A chain reaction ensues and the body suffers damage as normal processes are disrupted and cell membranes become fragile. This state of tissue damage after work manifests clinically as dullness, loss of appetite, weight loss, muscle soreness and pain. It is also associated with loss of muscle mass and reduced work tolerance and exercise capacity.

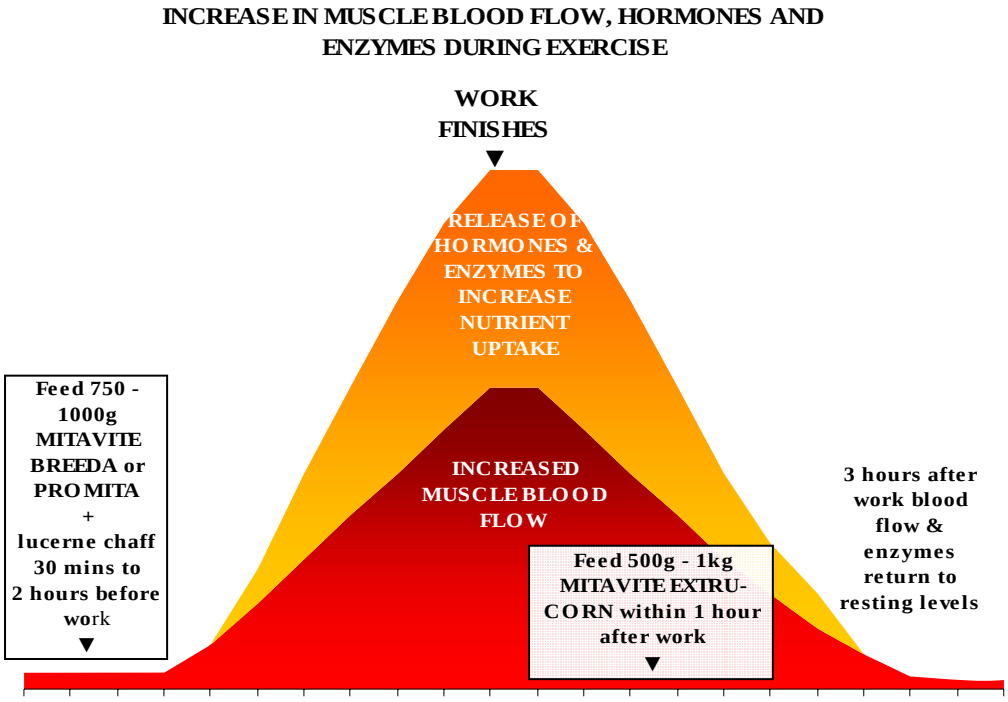
Performance horses need key nutrients at higher levels as the muscles look for the nutritional support they need to adapt to work. Some studies have concluded performance horses don't need additional protein for elite performance – these studies overlook the significance of 'timing' and amino acid profile.

To appreciate how much a horse depends on receiving the correct amino acids is to be aware of how dynamic the equine system is ……. every second the bone marrow makes millions of red cells; every four days blood platelets and the lining of the gastrointestinal tract are replaced; every 10 days, most of the white blood cells are replaced - the number of new cells created in horses that are training and competing is huge.

The second, separate issue is encouraging the building of lean muscle mass. Nutritional strategies that facilitate quick recovery must be chosen because it is during recovery that protein will be working hardest - repairing rips and tears that

occur during training, increasing muscle fibre size and creating new red cells and blood capillaries.

Muscle recovery and body building cannot begin without the necessary nutrients. By supplying the necessities, we can transition the muscle to protein synthesis – ie muscle building - and the bone marrow to increase red cell production.



Blood flow to the muscles and muscle nutrient uptake are greatly increased during exercise. Ensuring the blood is fully loaded with the necessary nutrients takes advantage of this increased supply and shunting of nutrients into muscle cells.

The demand for a constant supply of key nutrients to meet the needs for tissue repair and adaptation, energy generation, protection against oxidative damage from free radicals and resistance to infections, is huge compared to a horse at rest. Recovery from hard exercise and preparation for the next session can be hastened by strategic feeding practices. To maximise the response to training and impact significantly on subsequent exercise capacity, the array of nutrients supplied before work is critical.

The exclusion or a deficiency of even one essential amino acid from the diet will reduce total body protein synthesis and the creation of new cells. If just one amino acid is missing the creation of new cells stops. When given simultaneously, the combination of branched-chain and essential amino acids has a powerful, synergistic effect, stimulating the release of insulin. Insulin is one of the most powerful anabolic hormones in the body - and increasing protein

building 3-fold over resting levels.

Nutrition replacement protocols are based on MITAVTE BREEDA and PROMITA, high in anti-oxidants and precursors, BCAA and essential amino acids.
With correct conditioning and nutritional support, the horse can harmonise the multiple systems necessary to reach genetic potential. This process is assisted by strategic pre-work supplementation with the entire amino acid profile, anti-oxidants and all the micro minerals in the correct amount - let the body do the rest.