Dr. Dominique-Marie VOTION

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Biography

Dominique-Marie Votion is researcher at the Fundamental and Applied Research for Animals & Health (FARAH) at the Faculty of Veterinary Medicine, Liege University (Belgium). She conducts researches that aim at validating new tools for studying the pathophysiology of equine myopathies.

In 2005, she has initiated the "Atypical Myopathy Alert Group" (AMAG), an informal European epidemio-surveillance network consisting of European equine veterinarians and researchers concerned by the condition. This European network aims to favour the quick diffusion of alert message from the scientific field to the equine sector thus favouring the setting of preventive measures edited from ongoing epidemiological investigations.

Her interest for the muscle in healthy and myopathic horses includes the study of the mitochondrial function and since 2007, she is an active member of the Mitochondrial Physiology (MiP) society. She has validated the technique of high-resolution respirometry in horses that enables to monitor the mitochondrial respiratory function in small permeabilized muscle samples.

Abstract

Assessing skeletal muscle mitochondrial function with high-resolution respirometry

The maximal oxygen uptake (VO_{2max}) is an important variable that correlates with athletic performance in human, horses and dogs. The VO_{2max} integrates all components of the respiratory cascade (from inspired air to O_2 consumption at the level of mitochondria) but cardiac output is the principal determinant of VO_{2max}. Indeed, VO_{2max} is O_2-supply limited because the mitochondrial oxidative capacity largely exceeds the capacity of the respiratory and cardiovascular systems to deliver O_2. The muscle (like the cardiovascular system) is highly adaptable and responds to training by improving the arterial-venous O_2 extraction owing to several adaptations such as increasing the density of the capillary bed, increasing the mitochondrial density and intramyocyte oxidative enzymes. Thus, training contributes to increase the aerobic capacity of the *muscle* with subsequent improvement of O_2 utilization at maximal (*i.e.* at VO_{2max}) and submaximal exercise. Increased aerobic capacity of the *muscle* tightens metabolic control which reduces glycolysis and glycogen utilization.

Our study aims at determining muscle oxidative phosphorylation (*OXPHOS*) capacity in trained and untrained horses using a minimally invasive technique: the muscle microbiopsy technique combined with high-resolution respirometry (HRR). This technique is used to better understand exercise physiology and potentially identify *OXPHOS* defects in myopathic animals and poor performers.