

Votion 2016 Abstract MitoFit Science Camp 2016

OXPHOS capacities correlate with racing performance and indicate risk of developing exercise-induced myopathy.

Link:

Votion DM, Leleu C, Robert C, Serteyn D (2016)

Event: MitoFit Science Camp 2016 Kuehtai AT



In sport horses, OXPHOS capacities, as measured with standardized protocols applied on muscle microbiopsy by high-resolution respirometry (HRR), correlate with fitness level [1]. An optimal OXPHOS system appears to be crucial for athletic performance while OXPHOS impairment might contribute to exercise-induced myopathy. This study aimed to confirm the practical value of HRR to determine athletic ability and for the early detection of muscular dysfunction in two different disciplines requiring opposite stamina: endurance and Standardbred races.

Standardised protocols were applied to a group of 10 trained horses belonging to the national endurance team of France. One month later, all horses participated to a 160 km endurance race. All but one horse completed the ride and out of 47 participants, horses of the team reached the 1st, 2nd, 3rd, 4th, 7th, 9th, 11th, 16th and 19th place. Linear regression analyses indicated that OXPHOS capacities were significantly correlated to finishing place (the first horses had the highest OXPHOS capacities; $R^2=0.76$; $P=0.0021$) and speed (the fastest horses had the highest OXPHOS capacities; $R^2=0.74$; $P=0.0015$). Furthermore, OXPHOS was strongly predictive of the ranking for the four first places. The protocols were also applied on 8 French Standardbred racehorses in active training before the racing season. Reduced OXPHOS parameters were found in two apparently healthy horses. During the racing season, these two horses suffered from several episodes of exercise-induced myopathy [2].

This approach is proposed for the study of athletic capacities in sport horses, evaluation of training programs and early prediction of exercise-induced myopathy.

• *O2k-Network Lab*: [BE Liege Votion DM](#)

Labels: **MIParea**: Respiration, Exercise physiology;nutrition;life style **Pathology**: Myopathy

Organism: Horse **Tissue;cell**: Skeletal muscle

HRR: Oxygraph-2k Event: D2 MitoFit Science Camp 2016

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References

1. Votion DM, Gnaiger E, Lemieux H, Mouithys-Mickalad A, Serteyn D (2012) Physical fitness and mitochondrial respiratory capacity in horse skeletal muscle. PLoS One 7:e34890.
2. Houben R, Leleu C, Fraipont A, Serteyn D, Votion DM (2015) Determination of muscle mitochondrial respiratory capacity in Standardbred racehorses as an aid to predicting exertional rhabdomyolysis. Mitochondrion 24:99-104.

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