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One Health

L'Animal et l'Homme, une même santé

11:45 - Exercise modifies the innate immune response in equine bronchial epithelial cells

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Lower airway diseases are common problems in sports and racing horses. In humans, exercise causes increased susceptibility to respiratory infections associated with down-regulated expression of Toll-like receptors (TLRs), co-stimulatory and antigen-presenting molecules. Whether such immunosuppression happens in horses following exercise has not been investigated yet. Because the airway epithelium is a major barrier against airborne infections with important immune functions, we aimed to assess the effect of exercise and training on innate immune responses of equine bronchial epithelial cells (EBEC). Eight horses were sampled by bronchoscopy at rest and 24 hours after a standardized exercise test (SET) both under an unconditioned state and following a 4-month training period. We cultured EBEC *in vitro* and compared their respective expression of TLR1-9 by qPCR and their cytokinic responses following exposure to various TLR ligands by ELISA. The expression of TLRs in EBEC was not modified by a SET or training. Nevertheless, EBEC from trained horses produced less TNF-alpha after treatment with ligands of TLR2 (FSL) and TLR3 (Poly(I:C)) compared with EBEC from unconditioned horses. Additionally, a single SET increased TNF-alpha significantly after treatment with ligands of TLR2 and TLR3 in EBEC from trained horses but not in EBEC from unconditioned horses. In contrast, neither a single strenuous exercise nor training had a significant effect on the production of IFN-beta in EBEC. In summary, although exercise does not impact on TLR mRNA expression, the secretion of TNF-alpha induced by TLR ligands is modulated in an opposite manner after acute and chronic exercise.

12:00 - Early indicators for exertional rhabdomyolysis in standardbred racehorses using high-resolution respirometry

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Reasons for performing study during racing, skeletal muscle mitochondria are the main producers of energy for contraction. Dysfunction of the oxidative phosphorylation (OXPHOS) system may alter performance and result in myopathy. Assessment of muscle oxidative capacity in racehorses might identify animals at risk. **Objectives:** To assess the applicability of high-resolution respirometry (HRR) for early detection of racehorses at risk of exertional rhabdomyolysis (ER). **Study design:** Prospective cohort study. **Methods:** At the start of a competitive racing season, 10 French standardbreds in training underwent a standardized exercise test with determination of speed at onset of lactate accumulation (VLA4) and postexercise serum creatinine kinase activity (CK), and muscle microbiopsy for HRR measurement of OXPHOS and electron transfer system (ETS) capacities with electrons fed into the ETS at different levels of the mitochondrial respiratory chain complexes. Associations between HRR parameters and occurrence of ER over the following racing season were analysed using univariate logistic regression. **Results:** Horses which developed ER during the study period (n=2) were those with lowest OXPHOS/ETS, highest Complex I/Complex I+II OXPHOS and highest Complex I OXPHOS/Complex II ETS ratio (perfect prediction of ER whit ratio of ≤ 0.74, ≥0.60 and ≥0.715 respectively). VLA4 for ER horses was within the range of non-affected horses. Postexercise CK was within normal limits for all horses in the study. **Conclusions: and potential relevance** OXPHOS and ETS capacities and derived ratios seem useful indicators of risk for ER whereas SET results VLA4 and CK were unremarkable in the horses subsequently affected by ER.