Exercise & ROS

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High-Resolution FluoRespirometry, exercise and ROS

Research Article | Physical activity and inactivity

Acute HIIE elicits similar changes in human skeletal muscle mitochondrial H_2O_2 release, respiration and cell signaling as endurance exercise even with less work

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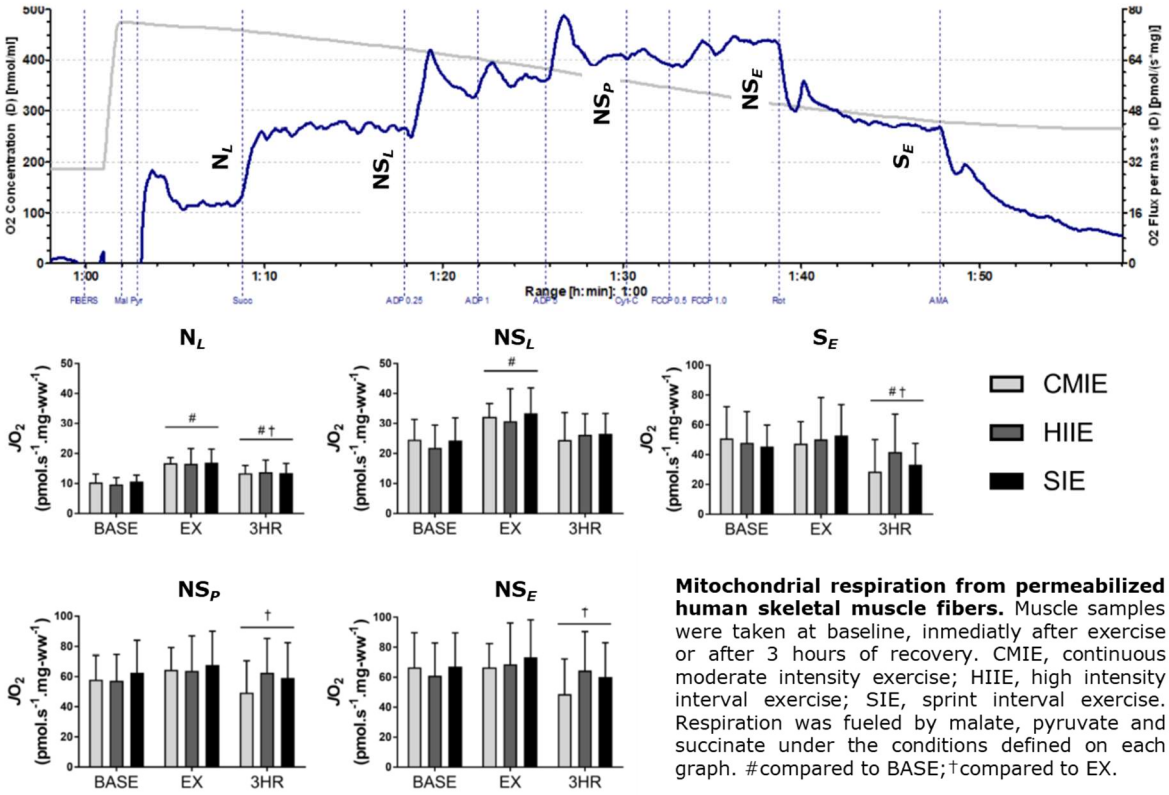
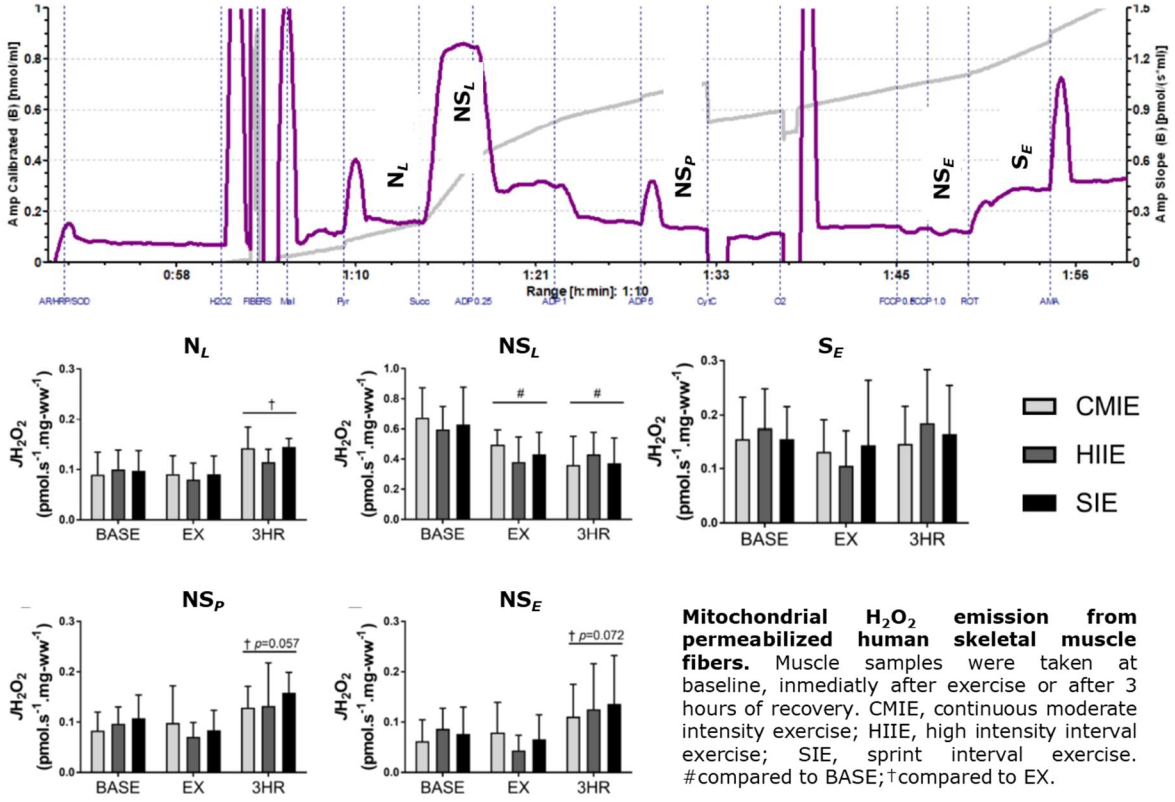
Intermittent exercise performed at high intensities has similar dynamic effects on muscle mitochondrial function compared with endurance exercise, irrespective of whether total workload is matched



Mitochondrial respiration from permeabilized human skeletal muscle fibers. Muscle samples were taken at baseline, inmediatly after exercise or after 3 hours of recovery. CMIE, continuous moderate intensity exercise; HIIE, high intensity interval exercise; SIE, sprint interval exercise. Respiration was fueled by malate, pyruvate and succinate under the conditions defined on each graph. #compared to BASE;†compared to EX.

Post-exercise showed an increase oxygen consumption (JO_2) into the NS-pathway in LEAK state and a decrease in the OXPHOS and ETS states 3-hours later

H_2O_2 emission (JH_2O_2) is lower in LEAK state immediately after exercise but trend to be increased 3-hours later in OXPHOS and ETS states linked to the NS-pathway



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The study provides novel evidence that mitochondrial function (respiration and H_2O_2 emission) in human skeletal muscle are transiently altered in a respiration state-dependent manner in the hour following continuous moderate and high intensity interval exercise

Interestingly, only two minutes of sprint interval exercise was sufficient to elicit similar responses as 30 minutes of continuous moderate intensity aerobic exercise

Reference: Trewin AJ, Parker L, Shaw CS, Hiam D, Garnham AP, Levinger I, McConell GK, Stepto NK (2018) Acute HIIE elicits similar changes in human skeletal muscle mitochondria H_2O_2 release, respiration and cell signalling as endurance exercise even with less work. Am J Physiol Regul Integr Comp Physiol.