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Title: Central alterations during prolonged exercise in normoxia and hypoxia

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Body: Introduction: Prolonged cycling exercise in normoxia (N) induces fatigue due to both peripheral and central alterations. Interestingly, it has been reported that cerebral perturbations are greater during short-duration isolated exercise in hypoxia (H) compared to N¹. The purpose of this study was to test the hypothesis that central alterations are accentuated in H compared to N during prolonged whole-body exercise. Methods: Ten subjects performed two sessions consisting of 3 80-min cycling bouts at 45% of their relative maximal aerobic power in N and H (FIO₂ = 12%). Before exercise and after each bout, transcranial magnetic stimulation was used to assess corticospinal excitability (motor evoked potential; MEP) and intracortical inhibition (cortical silent period; CSP) of knee extensors. Femoral nerve electrical stimulation was used to measure muscle characteristics. Voluntary activation was also assessed with both types of stimulation. Results: A significant but similar torque reduction was observed at the end of the exercise in N and H. With the exception of CSP, a significant time effect was observed for all parameters. CSP was longer and the reduction of twitch peak torque was lower in H than in N. No other significant differences were observed between N and H. Discussion: Fatigue level was found to be similar between N and H when exercise is performed at the same relative intensity. Even if the brain is importantly affected by hypoxia² as shown by the greater intracortical inhibition, this does not appear to further affect central motor drive. References: ¹ Goodall et al, J Appl Physiol 109: 1842–1851 (2010); ² Verges et al. Am J Physiol Regul Integr Comp Physiol (In press).