Effects of live-high, train-low hypoxic exposure on lactate metabolism in trained humans.

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Abstract:
We determined the effect of 20 nights of live-high, train-low (LHTL) hypoxic exposure on lactate kinetics, monocarboxylate lactate transporter proteins (MCT1 and MCT4) and muscle in-vitro buffering capacity (betam) in well-trained athletes. 29 trained cyclists/triathletes were divided into one of three groups: 20 consecutive nights of hypoxic exposure (LHTLc), 20 nights of intermittent hypoxic exposure (four 5-night blocks of hypoxia, each interspersed with 2 nights of normoxia, (LHTLi), or control (CON). Rates of lactate appearance (Ra), and disappearance (Rd) were determined from a primed, continuous infusion of L-[U-(14)C]-lactic acid tracer during 90 minutes of steady-state exercise (60 min at 65% VO2peak followed by 30 min at 85% VO2peak). A resting muscle biopsy was taken pre and post 20 nights of LHTL for the determination of betam and MCT1 and MCT4 protein abundance. Ra during the first 60 min of exercise was not different between groups. During the last 25 min of exercise at 85% VO2peak Ra was higher compared with exercise at 65% of VO2peak, and was decreased in LHTLc ($P<0.05$) compared with the other groups. Rd followed a similar pattern to Ra. Although Rox was significantly increased during exercise at 85% compared to 65% of VO2peak, there were no differences between the three groups or across trials. There was no effect of hypoxic exposure on betam or MCT1 and MCT4 protein abundance. We conclude that 20 nights of continuous hypoxia exposure decreased whole-body Ra during intense exercise in well-trained athletes. However, muscle markers of lactate metabolism and pH regulation. Were unchanged by the LHTL intervention.