Live high, train low increases muscle buffer capacity and submaximal cycling efficiency

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Protocol:

- 23 nights sleeping at the equivalent of 9800 feet
- Training at 2000 feet.

Conclusion:
"This is the first study to show that hypoxic exposure, per se, increases muscle buffer capacity. Further, reduced VO2 during normoxic exercise after LHTL suggests that improved exercise efficiency is a fundamental adaptation to Live High - Train Low."

Abstract
This study investigated whether hypoxic exposure increased muscle buffer capacity (bgrm) and mechanical efficiency during exercise in male athletes. A control (CON, n=7) and a live high:train low group (LHTL, n=6) trained at near sea level (600 m), with the LHTL group sleeping for 23 nights in simulated moderate altitude (3000 m). Whole body oxygen consumption (V·O2) was measured under normoxia before, during and after 23 nights of sleeping in hypoxia, during cycle ergometry comprising 4×4-min submaximal stages, 2-min at 5.6 ± 0.4 W kg-1, and 2-min 'all-out' to determine total work and V·O2peak. A vastus lateralis muscle biopsy was taken at rest and after a standardized 2-min 5.6 ± 0.4 W kg-1 bout, before and after LHTL, and analysed for bgrm and metabolites. After LHTL, bgrm was increased (18%, $P < 0.05$). Although work was maintained, V·O2peak fell after LHTL (7%, $P < 0.05$). Submaximal V·O2 was reduced (4.4%, $P < 0.05$) and efficiency improved (0.8%, $P < 0.05$) after LHTL probably because of a shift in fuel utilization. This is the first study to show that hypoxic exposure, per se, increases muscle buffer capacity. Further, reduced V·O2 during normoxic exercise after LHTL suggests that improved exercise efficiency is a fundamental adaptation to LHTL.