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## **Effects of training at simulated altitude on performance and muscle metabolic capacity in competitive road cyclists.**

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Differences between the effects of training at sea level and at simulated altitude on performance and muscle structural and biochemical properties were investigated in 8 competitive cyclists who trained for 3-4 weeks, 4-5 sessions/week, each session consisting of cycling for 60-90 min continuously and 45-60 min intermittently. Four subjects, the altitude group (AG), trained in a hypobaric chamber (574 torr = 2300 m above sea level), and the other four at sea level (SLG). Before and after training work capacity was tested both at simulated altitude (574 torr) and at sea level, by an incremental cycle ergometer test until exhaustion. Work capacity was expressed as total amount of work performed. Venous blood samples were taken during the tests. Leg muscle biopsies were taken at rest before and after the training period. AG exhibited an increase of 33% in both sea level and altitude performance, while SLG increased 22% at sea level and 14% at altitude. Blood lactate concentration at a given submaximal load at altitude was significantly more reduced by training in AG than SLG. Muscle phosphofructokinase (PFK) activity decreased with training in AG but increased in SLG. All AG subjects showed increases in capillary density. In conclusion, work capacity at altitude was increased more by training at altitude than at sea level. Work capacity at sea level was at least as much improved by altitude as by sea level training. The improved work capacity by training at altitude was paralleled by decreased exercise blood lactate concentration, increased capillarization and decreased glycolytic capacity in leg muscle.

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