

## Forschungsgesuch Y. Schutz

### „Effect of 4 weeks of training in hypoxia on the endurance performance and lactate turnover of trained cyclists“

#### Abstract

Living and training at low altitude and adding few key training sessions in hypoxia (Live Low Train High (LLTH)) is a controversial way to improve exercise performance. It has however been shown to improve blood glucose regulation in untrained individuals. Since endurance training and exposure to hypoxia both increase lactate metabolic clearance rate (MCR) we hypothesized that 4 weeks of LLTH would increase more endurance performance and lactate MCR than similar training in normoxia. 14 well-trained cyclists performed 12 training sessions under normobaric hypoxia (~3000m) (HYP group, n=7) or in normoxia (NOR group, n=7) over 4 weeks. Before and after training, lactate and glucose turnover rates were measured by means of an exogenous 30 lactate infusion and stable isotope tracers. Endurance performance was assessed during incremental tests performed in normoxia and hypoxia and a 40-km time-trial (TT) performed in normoxia. After training, TT performance,  $VO_{2max}$  and peak power output were similarly and significantly improved in NOR and HYP (training:  $p < 0.001$ ). Under hypoxic conditions, aerobic performance tended to be increased in HYP. Training and hypoxia had no significant effect on lactate turnover rate. In contrast, glucose MCR was decreased and plasma insulin and glucose concentrations were increased after training in HYP (training x group interaction:  $p < 0.05$ ). Our results show that LLTH has no further effect on sea-level performance and lactate MCR than does training in normoxia, and probably impairs glucoregulation during exercise. These results raise further questions about the effectiveness of a LLTH protocol in improving glucose metabolism and in increasing performance.