

# Abstract VF2 Article B

## **Introduction**

The training model live high–train low (LHTL) is thought to improve performance of endurance athletes by the combination of living at altitude and training near sea level. However, no prior study has been able to prove the claim without excluding a potential placebo effect. The aim of the study was to investigate the effects of LHTL on endurance performance by using a double-blinded placebo-controlled study design.

## **Scientific hypothesis of the paper and justification of the chosen methods**

The scientific hypothesis of the paper was that LHTL applies a positive effect on endurance performance, mainly by increasing  $\text{VO}_2\text{max}$ , based on altitude-dependent physiological adaptations. Additionally, potential performance gains was thought to correlate with changes in  $\text{Hb}_{\text{mass}}$ . The choice of the placebo-controlled study design was due to the fact that previous similar studies could not exclude a potential placebo effect.

## **Results and conclusions**

The study concluded that there was no indication for LHTL to improve time-trial performance or  $\text{VO}_2\text{max}$  of highly trained endurance cyclists. Furthermore, the training model did not significantly affect neither  $\text{Hb}_{\text{mass}}$  nor exercise economy, suggesting that LHTL might not be superior to conventional training. Lastly, the results cannot exclude that the performance benefits of LHTL previously reported were unrelated to a placebo effect.

## **Possible weaknesses of the study**

The study assumes that the response to altitude is solely dependent on  $\text{O}_2$  partial pressure and unrelated to barometric pressure, which allowed them to use artificially created normobaric hypoxia as opposed to that experienced living at a natural high altitude. Therefore, there could be other contributing factors which are not taken into account. Furthermore, the number of subjects participating in the study is rather low, increasing a possible interindividual variation affecting

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results. Lastly, the subjects were already highly trained athletes, which may have blunted a potential response compared to less-trained individuals.