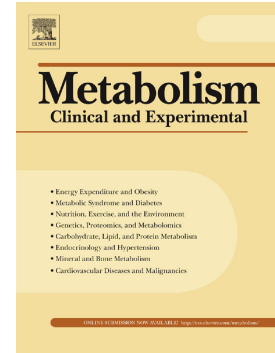


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Keto-adaptation enhances exercise performance and body composition responses to training in endurance athletes

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Title. Keto-adaptation enhances exercise performance and body composition responses to training in endurance athletes.

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ABSTRACT

Background. Low-carbohydrate diets have recently grown in popularity among endurance athletes, yet little is known about the long-term (>4 wk) performance implications of consuming a low-carbohydrate high fat ketogenic diet (LCKD) in well-trained athletes.

Methods. Twenty male endurance-trained athletes (age 33 ± 11 y, body mass 80 ± 11 kg; BMI 24.7 ± 3.1 kg/m²) who habitually consumed a carbohydrate-based diet, self-selected into a high-carbohydrate (HC) group ($n = 11$, %carbohydrate:protein:fat = 65:14:20), or a LCKD group ($n = 9$, 6:17:77). Both groups performed the same training intervention (endurance, strength and high intensity interval training (HIIT)). Prior to and following successful completion of 12-weeks of diet and training, participants had their body composition assessed, and completed a 100km time trial (TT), six second (SS) sprint, and a critical power test (CPT). During post-intervention testing the HC group consumed 30–60g/h carbohydrate, whereas the LCKD group consumed water, and electrolytes.

Results.

The LCKD group experienced a significantly greater decrease in body mass (HC -0.8 kg, LCKD -5.9 kg; $P = 0.006$, effect size (ES): 0.338) and percentage body fat percentage (HC -0.7%, LCKD -5.2%; $P = 0.008$, ES: 0.346). Fasting serum beta-hydroxybutyrate (β HB) significantly increased from 0.1 at baseline to 0.5 mmol/L in the LCKD group ($P = 0.011$, ES: 0.403) in week 12. There was no significant change in performance of the 100 km TT between groups (HC -1.13 min.sec, LCKD -4.07 min.sec, $P = 0.057$, ES: 0.196). SS sprint peak power increased by 0.8 watts per kilogram bodyweight (w/kg) in the

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