This study examined the influence of enhanced blood lactate removal during active recovery on energy supply and performance during subsequent high-intensity exercise. Nine college soccer players performed treadmill running tests, which consisted of two supramaximal sprints at 120% of VO2max until exhaustion separated by a 30-min period of active recovery between the two sprints. Blood lactate concentrations were measured at rest, immediately after the first sprint, during the recovery period and immediately after the second sprint. Accumulated oxygen deficit (O2 deficit) and accumulated oxygen uptake (VO2) were calculated during each sprint. The delta-accumulated O2 deficit and delta-accumulated VO2 were calculated by subtracting the accumulated O2 deficit and accumulated VO2 during the first sprint from those during the second sprint in each subject, respectively. Time to exhaustion (TTE) was 179.4±53.0 s in the first sprint and 165.6±45.4 s in the second sprint. TTE in the second sprint corresponded to 93.7±11.6% of the first sprint. Accumulated O2 deficit was 4487.3±1265.4ml in first sprint, but was significantly decreased to 3389.4±1156.14ml in second sprint, showing a reduction by 24.9±9.5%. There were no difference in total accumulated VO2 between the two sprints, but the accumulated VO2 during the initial 90 s of the second sprint was significantly higher than that in first sprint. A significant relationship (r=0.933; p<0.001) was found between the delta-accumulated VO2 and TTE in the second sprint expressed by the rate of the first sprint. The rate of blood lactate decrement during active recovery was 95.8±3.4%. The subjects with a greater blood lactate decrement during active recovery showed a higher delta-accumulated VO2 (r=0.683; p<0.05), and a greater TTE in the second sprint expressed by the rate of the first sprint (r=0.754; p<0.05). However, the delta-accumulated O2 deficit in the second sprint was not related to the rate of blood lactate decrement during active recovery and performance in the second sprint. These data suggest that the enhancement of blood lactate removal during active recovery increases the accumulated VO2 and contributes to performance during the subsequent supramaximal sprint.

Keywords: Sport Physiology, Lactate