Carbohydrate-Protein Complex Increases the Rate of Muscle Glycogen Storage after Exercise

K. M. Zawadzki, B. B. Yaspelkis 3rd, and J. L. Ivy
Department of Kinesiology, University of Texas, Austin 78712.

Abstract
Carbohydrate, protein, and carbohydrate-protein supplements were compared to determine their effects on muscle glycogen storage during recovery from prolonged exhaustive exercise. Nine male subjects cycled for 2 h on three separate occasions to deplete their muscle glycogen stores. Immediately and 2 h after each exercise bout, they ingested 112.0 g carbohydrate (CHO), 40.7 g protein (PRO), or 112.0 g carbohydrate and 40.7 g protein (CHO-PRO). Blood samples were drawn before exercise, immediately after exercise, and throughout recovery. Muscle biopsies were taken from the vastus lateralis immediately and 4 h after exercise. During recovery the plasma glucose response of the CHO treatment was significantly greater than that of the CHO-PRO treatment, but the plasma insulin response of the CHO-PRO treatment was significantly greater than that of the CHO treatment. Both the CHO and CHO-PRO treatments produced plasma glucose and insulin responses that were greater than those produced by the PRO treatment (P less than 0.05). The rate of muscle glycogen storage during the CHO-PRO treatment [35.5 +/- 3.3 (SE) mumol.g protein-1.h-1] was significantly faster than during the CHO treatment (25.6 +/- 2.3 mumol.g protein-1.h-1), which was significantly faster than during the PRO treatment (7.6 +/- 1.4 mumol.g protein-1.h-1). The results suggest that postexercise muscle glycogen storage can be enhanced with a carbohydrate-protein supplement as a result of the interaction of carbohydrate and protein on insulin secretion.