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Protein Modification Responds to Exercise Intensity and Antioxidant Supplementation

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Abstract

Purpose: To assess the effects of different exercise intensities and antioxidant supplementation on plasma protein modification.

Methods: Trained men (n = 41) from a homogenous population were randomly assigned to perform cycle ergometer exercise either at 70% or 80% of individual $V'O_{2max}$. Each intensity group was randomly assigned to receive either juice powder concentrate (JPC 70%, n = 11; JPC 80%, n = 10) or placebo (Plac 70%, n = 10; Plac 80%, n = 10) capsules for 28 wk. Four controlled exercise bouts and blood collections were conducted at baseline and study weeks 4, 16, and 28. Blood samples were drawn before (BE), immediately after (IE), and 30 min (30M) and 30 h (30H) postexercise. These samples were analyzed to estimate concentrations of carbonyl groups on plasma proteins (CP) and the redox state of human serum albumin (HSA).

Results: In the Plac group, CP concentrations increased at 80% of $V'O_{2max}$ IE and 30M, returning to preexercise concentrations by 30H ($P < 0.05$). At both 16 and 28 wk, the Plac groups had significantly higher BE and 30H CP concentrations than the JPC groups ($P < 0.05$). The reduced fraction of HSA, human mercaptalbumin (HMA), decreased at all four exercise tests at both exercise intensities IE and 30M, returning to preexercise values by 30H ($P < 0.05$). Supplementation had no influence on HSA.

Conclusions: These results indicate that CP concentrations increase with 80% $V'O_{2max}$ intensity. The JPC group had lower baseline CP levels after 16 and 28 wk and no exercise-induced CP increase. HSA is reversibly shifted to a more oxidized state by recent intense exercise.