Increased IGF mRNA in Human Skeletal Muscle after Creatine Supplementation.

Basic Sciences

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Abstract:
Purpose: We hypothesized that creatine supplementation would facilitate muscle anabolism by increasing the expression of growth factors and the phosphorylation of anabolic signaling molecules; we therefore tested the responses of mRNA for IGF-I and IGF-II and the phosphorylation state of components of anabolic signaling pathways p70s6k and 4E-BP1 to a bout of high-intensity resistance exercise after 5 d of creatine supplementation.

Methods: In a double-blind cross-over design, muscle biopsies were taken from the m. vastus lateralis at rest and 3 and 24 h postexercise in subjects who had taken creatine or placebo for 5 d (21 g[middle dot]d-1). For the first 3 h postexercise, the subjects were fed with a drink containing maltodextrin (0.3 g[middle dot]kg-1 body weight[middle dot]h-1) and protein (0.08 g[middle dot]kg-1 body weight[middle dot]h-1).

Results: After creatine supplementation, resting muscle expressed more mRNA for IGF-I (+30%, $P < 0.05$) and IGF-II (+40%, $P = 0.054$). Exercise caused an increase by 3 h postexercise in IGF-I (+24%, $P < 0.05$) and IGF-II (+48%, $P < 0.05$) and by 24 h postexercise in IGF-I (+29%, $P < 0.05$), but this effect was not potentiated by creatine supplementation. The phosphorylation states of p70s6k and 4E-BP1 were not affected by creatine at rest; phosphorylation of both increased (150-400%, $P < 0.05$) to similar levels under placebo and creatine conditions at 3 h postexercise plus feeding. However, the phosphorylation state of 4E-BP1 was higher in the creatine versus placebo condition at 24 h postexercise.

Conclusion: The increase in lean body mass often reported after creatine supplementation could be mediated by signaling pathway(s) involving IGF and 4E-BP1.