

Short-Term Growth Hormone Treatment Does Not Increase Muscle Protein Synthesis in Experienced Weight Lifters

Yarasheski et al studied whether recombinant human growth hormone (GH) administration enhances muscle protein anabolism in experienced weight lifters. The fractional rate of skeletal muscle protein synthesis and the whole body rate of protein breakdown were determined using a constant intravenous infusion of C^{13} leucine in 7 young adult males who were experienced weight lifters. The studies were performed at the beginning and at the end of 14 days of subcutaneous GH administration at $40 \mu\text{g}/\text{kg}/\text{d}$, which is the dosage used often in treatment of GH-deficient patients ($0.3 \text{ mg}/\text{kg}/\text{d}$). GH administration increased fasting serum insulin-like growth factor 1 (IGF-1) levels (Figure 1), but did not increase the fractional rate of muscle protein synthesis or reduce the rate of whole body protein breakdown from 103 ± 4 to $108 \pm 5 \text{ } \mu\text{mol}/\text{kg}/\text{h}$. The authors state that the findings suggest that short-term GH treatment does not increase the rate of muscle protein synthesis or reduce the rate of whole body protein breakdown, metabolic alterations that would promote muscle protein anabolism in experienced weight lifters attempting to further increase muscle mass.

Yarasheski KE, Zachwieja JJ, Angelopoulos TJ, et al. *J Appl Physiol.* 1993;74:3073-3075.

Editor's comment: These authors previously reported that recombinant human GH at $40 \mu\text{g}/\text{kg}$ given 5 d/wk to healthy sedentary young men in conjunction with a 12-week muscle-building exercise program produced increments in muscle protein synthesis rate and muscle strength comparable to those achieved by sedentary young men doing an identical muscle-building exercise program but receiving placebo injections. However, the earlier study did not exclude the possibility that GH administration might augment muscle protein synthesis during the early phase of treatment, since muscle protein synthesis was determined only before and after 3 months of GH treatment.

The previous study (Am J Physiol. 1992;25:E261-E262, abstracted previously in GGH. 1992;8[1]14) did not consider the possibility that GH administration might enhance muscle protein synthesis in experienced weight lifters or bodybuilders who had already achieved a large muscle mass using heavy resistance exercise training or that GH administration might further increase muscle mass by supplementing with another potential anabolic stimulus. This study is important because skilled weight lifters and bodybuilders represent the most likely abusers of GH for muscle anabolism.

As is characteristic of these authors, the studies were done in an exquisite manner. The data speak for themselves. GH in such patients is not of value in increasing muscle mass. Pass the word along to the athletes who wish to spend astronomical sums of money in the hope that they will increase their competence.

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