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Skeletal muscle protein synthesis in the elderly: Age, gender, and androgen supplementation

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ABSTRACT

Skeletal muscle protein synthesis rates decline with age.

PURPOSE: We sought to determine if DHEA supplementation in elderly men (EM) and elderly women (EW) and low dose testosterone (T) supplementation in EM would raise protein synthesis rates.

METHODS: 87 EM (with low bioavailable T and DHEAS) and 57 EW (with low DHEAS) were studied before and after 1 year in which EM received either T (5 mg/d), DHEA (75 mg/d), or placebo (P) and EW received either DHEA (50 mg/d) or P. To assess age effects, 30 young men and 32 young women were studied on a single occasion as controls. [¹⁵N]phenylalanine and [²H₄]tyrosine tracers were infused and isotopic enrichment was measured in plasma and v. lateralis muscle. Whole body amino acid kinetics were normalized to fat free mass, and mixed muscle protein fractional synthesis rate (FSR) was measured using plasma phenylalanine as the precursor.

RESULTS: Despite induction of elevated androgen levels, no significant differences were seen between treated groups and the P group in either EM or EW. Whole body protein synthesis and muscle FSR were lower in elderly than in young ($P < 0.05$) and were higher in women than men ($P < 0.05$), with no age-by-gender interaction.

CONCLUSIONS: Neither DHEA nor T supplementation for one year had any significant impact on age-related decline in protein synthesis, while both age and gender do impact protein synthesis rates. NIH grants P01 AG14283 and UL1-RR-024150-01