Letter to the Editor

Exceptional body composition changes attributed to collagen peptide supplementation and resistance training in older sarcopenic men

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The results reported by Zdzieblik et al.\(^{(1)}\), on gains in fat-free mass (FFM: mean 4.2 (SD 3.3) kg) and loss of body fat (mean –5.5 (SD 3.2) kg) in older sarcopenic men receiving 15 g/d of collagen peptides while resistance training for 12 weeks, are extraordinary. The algebraic difference between the collagen peptide-supplemented and placebo groups in terms of FFM reported by Zdzieblik et al.\(^{(1)}\) was approximately 1.3 kg, which is 2.7 and 5.6 times greater than the standardised mean differences reported in meta-analyses from Cermak et al.\(^{(2)}\) and Finger et al.\(^{(3)}\), which examined the impact of protein supplementation on resistance exercise-induced gains in FFM. Neither meta-analysis reported an impact of protein supplementation on loss of fat mass.

We note that the 4.2 kg gain in FFM in the collagen peptide-supplemented group is unrivalled by any study of protein supplementation in older resistance training sarcopenic men\(^{(2,3)}\). One study, in which men with COPD received 100 mg of testosterone enanthate (injected weekly), comes close to the findings of Zdzieblik et al.\(^{(1)}\), but in this study men receiving testosterone and performing resistance training gained only 3.3 kg of FFM and lost 1.1 kg of fat mass\(^{(4)}\). Were the observed changes\(^{(1)}\) in whole-body FFM representative of skeletal muscle tissue or are changes in other tissues responsible for the greater gains in whole-body FFM?

The constituent amino acid content and protein dose (15 g/d) of collagen peptides ingested contained only 0.4 g of leucine and 1.7 g of arginine, which stimulate muscle protein synthesis and blood flow, respectively\(^{(1)}\); however, this dose of leucine would have been insufficient to induce any effect on muscle protein synthesis\(^{(5,6)}\). In addition, 1.7 g of arginine would not have affected blood flow\(^{(6,7)}\). In their study, Zdzieblik et al.\(^{(1)}\) proposed that the provision of collagen peptides could enhance creatine synthesis. We find this proposition unlikely given the daily provision of only 1.7 g of arginine and 3.3 g of glycine, as there is no evidence that muscle creatine production is substrate-limited. If this thesis were true, then supplemental protein from almost any source (containing similar quantities of arginine and glycine) would promote the same gains in muscle mass and this has not been seen\(^{(2,9)}\).

Collagen peptide-supplemented subjects lost a reported 5.5 kg of fat mass. This loss of fat mass, in 12 weeks, is approximately 80% of that seen in older men following a hypoenergetic diet (–3138 kJ/d) (–750 kcal/d) or –5.1 MJ/d) while exercising for 6 months\(^{(8)}\). There is no obvious mechanism for the magnitude of loss of fat mass. It is notable that neither meta-analysis of protein supplementation in older persons during resistance training reported an effect on fat mass loss\(^{(2,3)}\).

In sum, the changes in body composition in these sarcopenic older men, who exercised three times weekly for 12 weeks and consumed 15 g of collagen peptides, are remarkable\(^{(1)}\). We find little in the way of plausible mechanistic evidence to suggest that either leucine and arginine or arginine and glycine, to allow the synthesis of muscle creatine, could be responsible for such changes. The simultaneous substantial loss of fat mass in these subjects, of a magnitude on par with that seen in much longer weight loss trials, is similarly noteworthy and deserves more explanation than is given by the authors in their article.

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References


