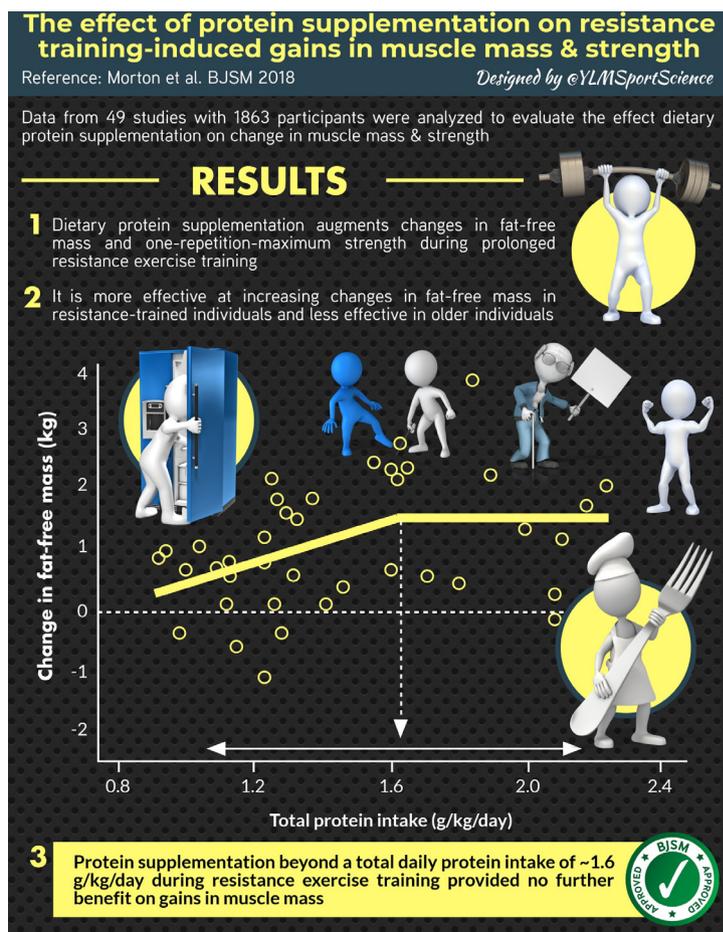


Infographic. The effect of protein supplementation on resistance training-induced gains in muscle mass and strength

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When you lift weights you get stronger and your muscles can get bigger, a process we call hypertrophy, and these changes can mean a big advantage in certain sports. We all 'know' that we need to consume supplemental protein when we lift weights to get bigger muscles, right? But what's the real (science-based) answer? A meta-analysis is a way of looking at all of the studies that have been done in a particular area of science. In our study,¹ we performed a meta-analysis of all of the published studies on the topic of protein supplementation and looked at how much extra muscle men and women gained and how much stronger they got. **We found that protein supplementation did result in a greater amount of muscle gained, but not by much: about (1 pound).** We also found that

people got a little stronger: about a 9% boost. Protein supplementation was more effective in people who were previously trained and was less effective in older persons (>60). We saw no difference between supplement types or if the supplement was food as opposed to a special protein product. We also performed an analysis in which we look at muscle gained in these studies versus the total amount of dietary protein eaten. What we found was that gains in muscle were seen with protein intakes up to 1.6 g of protein/kg of body weight/day. That protein intake is about twice the recommended intake level by most agencies. However, beyond that intake there was no further benefit. So yes, protein supplementation helps you gain muscle when you lift weights, but it is not

much. Protein supplementation also helps you gain strength, but again it is a small effect. Importantly, for reasons we do not understand, **protein works better in trained persons (people who have been lifting weights for a while).** If you are over age 60, then extra protein still may help but it is an even smaller effect. **Finally, a daily protein intake above a level of 1.6 g/kg (or 0.7 g/lb) does not appear to help you gain more muscle with resistance training.**

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REFERENCE

1 Morton RW, Murphy KT, McKellar SR, et al. A systematic review, meta-analysis and meta-regression of the effect of protein supplementation on resistance training-induced gains in muscle mass and strength in healthy adults. *Br J Sports Med* 2018;52:376–84.