

# Scientists discover that short-term energy deficits increase factors related to muscle degradation

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Building upon the discovery that a high-protein diet reduces muscle loss when dieting, a new research report published online in *The FASEB Journal* now helps explain why. Protein consumption slows the ubiquitin proteasome system, which is primarily responsible for degrading skeletal muscle.

"Reductions in muscle mass are often an unintended consequence of [weight loss](#), and can have negative health consequences," said Stefan M. Pasiakos, Ph.D., study author from the Military Nutrition Division at the US Army Research Institute of Environmental Medicine in Natick, MA. "It is our hope that the findings from this well-controlled study will significantly contribute to the development of nutritional interventions designed to aid in the preservation of [muscle mass](#) during weight loss."

Pasiakos and colleagues assigned young men and women controlled diets for 31 days that provided [dietary protein](#) at three different levels: 1) Institute of Medicine's (IOM) RDA, 2) twice IOM's RDA, and 3) three times IOM's RDA. Volunteers were given adequate total calories to maintain constant body weight for the first 10 days to allow their metabolism to adapt to the dietary protein level. For the next 21 days, weight loss was induced by restricting the total calories consumed and increasing daily exercise to elicit an average two pound weight loss per week. Study measures were collected in the fasted state and following consumption of a protein-containing mixed-meal, at the end of both the

stable weight maintenance and weight loss phases of the study. All meals were prepared and administered by research staff and exercise was highly controlled and supervised.

"A lot of diets and fitness programs focus on losing weight without regard to the type of weight you are losing, whether it be fat, muscle or water," said Gerald Weissmann, M.D., Editor-in-Chief of *The FASEB Journal*. "Fortunately, it appears that by simply having a high protein intake, you can minimize the amount of muscle you lose during your weight loss effort."

**More information:** John W. Carbone, Lee M. Margolis, James P. McClung, Jay J. Cao, Nancy E. Murphy, Edward R. Sauter, Gerald F. Combs, Jr., Andrew J. Young, and Stefan M. Pasiakos. Effects of energy deficit, dietary protein, and feeding on intracellular regulators of skeletal muscle proteolysis. *FASEB J* December 2013 27:5104-5111, [DOI: 10.1096/fj.13-239228](https://doi.org/10.1096/fj.13-239228)

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