

# Moderate amounts of protein per meal found best for building muscle

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For thousands of years, people have believed that eating large amounts of protein made it easier to build bigger, stronger muscles. Take Milo of Croton, the winner of five consecutive Olympic wrestling championships in the sixth century BC: If ancient writers are to be believed, he built his crushing strength in part by consuming 20 pounds of meat every day.

No modern athlete would go to such extremes, but Milo's legacy survives in the high-protein diets of bodybuilders and the meat-heavy training tables of today's college football teams. A recent study by University of Texas Medical Branch at Galveston metabolism researchers, however, provides evidence that strongly contradicts this ancient tradition. It also suggests practical ways to both improve normal American eating patterns and reduce muscle loss in the elderly.

The study's results, obtained by measuring muscle synthesis rates in volunteers who consumed different amounts of lean beef, show that only about the first 30 grams (just over one ounce) of dietary [protein](#) consumed in a meal actually produce muscle.

"We knew from previous work that consuming 30 grams of protein — or the equivalent of approximately 4 ounces of chicken, fish, dairy, soy, or, in this case, lean beef — increased the rate of muscle protein synthesis by 50 percent in young and older adults," said associate professor Douglas Paddon-Jones, senior author of a paper on the study published in the September issue of the [Journal of the American Dietetic Association](#). "We asked if 4 ounces of beef gives you a 50 percent

increase, would 12 ounces, containing 90 grams of protein, give you a further increase?"

The UTMB researchers tested this possibility by feeding 17 young and 17 elderly volunteers identical 4- or 12-ounce portions of lean beef. Using blood samples and thigh muscle biopsies, they then determined the subjects' muscle protein synthesis rates following each of the meals.

"In young and old adults, we saw that 12 ounces gave exactly the same increase in muscle protein synthesis as 4 ounces," Paddon-Jones says. "This suggests that at around 30 grams of protein per meal, maybe a little less, muscle protein synthesis hits an upper ceiling. I think this has a lot of application for how we design meals and make menu recommendations for both young and older adults."

The results of the study, Paddon-Jones points out, seem to show that a more effective pattern of protein consumption is likely to differ dramatically from most Americans' daily eating habits.

"Usually, we eat very little protein at breakfast, eat a bit more at lunch and then consume a large amount at night. When was the last time you had just 4 ounces of anything during dinner at a restaurant?" Paddon-Jones said. "So we're not taking enough protein on board for efficient muscle-building during the day, and at night we're taking in more than we can use. Most of the excess is oxidized and could end up as glucose or fat."

A more efficient eating strategy for making muscle and controlling total caloric intake would be to shift some of extra protein consumed at dinner to lunch and breakfast.

"You don't have to eat massive amounts of protein to maximize muscle synthesis, you just have to be a little more clever with how you apportion

it," Paddon-Jones said. "For breakfast consider including additional high quality proteins. Throw in an egg, a glass of milk, yogurt or add a handful of nuts to get to 30 grams of protein, do something similar to get to 30 for lunch, and then eat a smaller amount of protein for dinner. Do this, and over the course of the day you likely spend much more time synthesizing muscle protein."

Source: University of Texas Medical Branch at Galveston ([news](#) : [web](#))

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