

Muscle: 'Hard to build, easy to lose' as you age

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(PhysOrg.com) -- Have you ever noticed that people have thinner arms and legs as they get older? As we age it becomes harder to keep our muscles healthy. They get smaller, which decreases strength and increases the likelihood of falls and fractures. New research is showing how this happens -- and what to do about it.

A team of Nottingham researchers has already shown that when [older people](#) eat, they cannot make muscle as fast as the young. Now they've found that the suppression of muscle breakdown, which also happens during feeding, is blunted with age.

The scientists and doctors at The University of Nottingham Schools of Graduate Entry Medicine and Biomedical Sciences believe that a 'double whammy' affects people aged over 65. However the team think that weight training may "rejuvenate" muscle blood flow and help retain muscle for older people.

These results may explain the ongoing loss of muscle in older people: when they eat they don't build enough muscle with the protein in food; also, the insulin (a hormone released during a meal) fails to shut down the muscle breakdown that rises between meals and overnight. Normally, in young people, insulin acts to slow muscle breakdown. Common to these problems may be a failure to deliver nutrients and hormones to muscle because of a poorer [blood supply](#).

The work has been done by Michael Rennie, Professor of Clinical

Physiology, and Dr Emilie Wilkes, and their colleagues at The University of Nottingham. The research was funded by the UK's Biotechnology and Biological Sciences Research Council (BBSRC) as part of ongoing work on age-related muscle wasting and how to lessen that effect.

Research just published in the [American Journal of Clinical Nutrition](#) compared one group of people in their late 60s to a group of 25-year-olds, with equal numbers of men and women. Professor Rennie said "We studied our subjects first — before breakfast — and then after giving them a small amount of insulin to raise the [hormone](#) to what they would be if they had eaten breakfast, of a bowl of cornflakes or a croissant."

"We tagged one of the amino acids (from which proteins are made) so that we could discover how much protein in leg muscle was being broken down. We then compared how much amino acid was delivered to the leg and how much was leaving it, by analysing blood in the two situations.

"The results were clear. The younger people's muscles were able to use insulin we gave to stop the muscle breakdown, which had increased during the night. The muscles in the older people could not."

"In the course of our tests, we also noticed that the blood flow in the leg was greater in the younger people than the older ones," added Professor Rennie. "This set us thinking: maybe the rate of supply of nutrients and hormones is lower in the older people? This could explain the wasting we see."

Following this up led Beth Phillips, a PhD student working with Professor Rennie, to win the Blue Riband Award for work she presented at the summer meeting of The Physiological Society in Dublin. In her research Beth confirmed the blunting effect of age on leg blood flow after feeding, with and without exercise. The team predicted that weight

training would reduce this blunting. "Indeed, she found that three sessions a week over 20 weeks 'rejuvenated' the leg blood flow responses of the older people. They became identical to those in the young," said Professor Rennie.

"I am extremely pleased with progress," he said. "Our team is making good headway in finding more and more out about what causes the loss of muscle with age. It looks like we have good clues about how to lessen it with weight training and possibly other ways to increase blood flow."

More information: The team's research, published in the *American Journal of Clinical Nutrition*, can be accessed online at www.ajcn.org/papbyrecent.dtl "Blunting of insulin inhibition of proteolysis in legs of older subjects may contribute to age-related sarcopenia" by Emilie A Wilkes, Anna L Selby, Philip J Atherton, Rekha Patel, Debbie Rankin, Ken Smith, and Michael J Rennie, 2009 *AmJ Clin Nutr* (In press).

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