

Anabolic resistance with aging

L.J.C. van Loon, Maastricht University Medical Centre, Department of Human Biology, PO Box 616, NL-6200 MD, Maastricht, The Netherlands.

Skeletal muscle protein is constantly being synthesized and broken down, with a turnover rate of about 1-2% per day. The rate of skeletal muscle protein synthesis is regulated by two main metabolic stimuli, food intake and physical activity. Food intake, or more specifically protein ingestion, directly elevates muscle protein synthesis rates. The dietary protein derived essential amino acids act as signaling molecules activating anabolic pathways and provide precursors for muscle protein synthesis. Ingestion of a meal-like amount of dietary protein elevates muscle protein synthesis rates for several hours, providing evidence that 'you are what you just ate'. When food is ingested after a bout of physical activity the post-prandial muscle protein synthetic response is augmented, with higher muscle protein synthesis rates sustained over a more prolonged period of time. In other words, when you ingest protein following a bout of physical activity 'you become even more of what you just ate'. In contrast, when protein is ingested following a period of inactivity the post-prandial muscle protein synthetic response is blunted, coined anabolic resistance. Therefore, disuse makes you 'become less of what you just ate'. These concepts play a key role in the prevention and management of sarcopenia.