Effect of meal protein content and acute exercise on the utilization of whey supplement and meal ingested casein.

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Aim and Description:

Beyond the age of 50 years the healthy body starts to lose muscle mass with an annual rate of up to 1-2%. If left untreated, this will lead to decreased muscle strength and may result in loss of independence and quality of life. Increasing the protein intake is one way that has been suggested to effectively attenuate muscle loss. However, it is unknown how increased amounts of protein is utilized in the body and whether such utilization is affected by amount of protein intake that the elderly is adapted to. Similarly, it is unknown whether different kinds of protein (here investigated whey and casein) is taken up and metabolized differently in the body and whether prior muscle contractions affect how these proteins are used for muscle remodelling and again whether these parameters are influenced by the protein level to which the elderly is adapted. To improve our knowledge in these areas, we will include 16 elderly individuals with a daily protein intake between 0.8-1.2 g/kg. They must undergo two 3-wk protein-adaptation periods – one with their normal level of protein intake and one with a high protein intake obtained by a whey supplement at breakfast and lunch meals. The two 3-wk periods will be interspersed by 60 days and conducted in a randomized order in a double-blinded, placebo-controlled design. Before and after each of the 3-wk periods, the subjects must record their daily food intake and collect feces and after each of the adaptation periods complete an acute trial. In the acute trials, the elderly meet in the lab and ingest full-nutrient breakfast and lunch meals providing casein protein labelled with 15N-phenylalanine and a supplement with 13C-leucine whey protein. Further, they will receive an infusion of a third tracer, ring-13C6-phenylalanine, and have muscle biopsies taken and blood drawn from artery and from a femoral and hepatic vein to follow the fate and metabolism of the amino acids originating from different sources. During the acute trials, half of the subjects will perform an acute bout of exercise at lunch time to investigate whether muscle activity affects the utilization of the amino acids from the different proteins. The study design is unique in the use of the intrinsically labelled milk proteins as well as the combination of investigative methods. The results will provide novel in vivo data within an internationally highly prioritized field of research aiming at formulating beneficial strategies of protein intake and exercise to combat age-dependent muscle loss.