Post-exercise whey protein hydrolysate supplementation induces a greater increase in muscle protein synthesis than its constituent amino acid content.

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Source
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Abstract
It is well known that ingestion of a protein source is effective in stimulating muscle protein synthesis after exercise. In addition, there are numerous reports on the impact of leucine and leucine-rich whey protein on muscle protein synthesis and mammalian target of rapamycin (mTOR) signalling. However, there is only limited information on the effects of whey protein hydrolysates (WPH) on muscle protein synthesis and mTOR signalling. The aim of the present study was to compare the effects of WPH and amino acids on muscle protein synthesis and the initiation of translation in skeletal muscle during the post-exercise phase. Male Sprague–Dawley rats swam for 2 h to depress muscle protein synthesis. Immediately after exercise, the animals were administered either carbohydrate (CHO), CHO plus an amino acid mixture (AA) or CHO plus WPH. At 1 h after exercise, the supplements containing whey-based protein (AA and WPH) caused a significant increase in the fractional rate of protein synthesis (FSR) compared with CHO. WPH also caused a significant increase in FSR compared with AA. Post-exercise ingestion of WPH caused a significant increase in the phosphorylation of mTOR levels compared with AA or CHO. In addition, WPH caused greater phosphorylation of ribosomal protein S6 kinase and eukaryotic initiation factor 4E-binding protein 1 than AA and CHO. In contrast, there was no difference in plasma amino acid levels following supplementation with either AA or WPH. These results indicate that WPH may include active components that are superior to amino acids for stimulating muscle protein synthesis and initiating translation.