

The impact of collagen peptide versus free amino acid ingestion on myofibrillar and connective tissue protein synthesis rates at rest and during recovery from exercise

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1. We hypothesize that the ingestion of 30 g of collagen peptides and 30 g of free amino acids (matching the profile of collagen peptides) will result in greater myofibrillar and connective tissue protein synthesis rates in skeletal muscle tissue at...

Ethische beoordeling	Niet van toepassing
Status	Werving nog niet gestart
Type aandoening	-
Onderzoekstype	Interventie onderzoek

Samenvatting

ID

NL-OMON24853

Bron

NTR

Verkorte titel

Coll-AA study

Aandoening

n.a.

Ondersteuning

Primaire sponsor: Maastricht University and Tessengerlo Group NV

Overige ondersteuning: Maastricht University and Tessengerlo Group NV

Onderzoeksproduct en/of interventie

Uitkomstmaten

Primaire uitkomstmaten

Myofibrillar and connective tissue protein synthesis rates.

Toelichting onderzoek

Achtergrond van het onderzoek

Dietary protein ingestion stimulates muscle protein synthesis rates and further augments the muscle protein synthetic response to a single bout of exercise. The anabolic properties of dietary protein ingestion appear to be largely attributed to the post-prandial rise in circulating plasma essential amino acid concentrations, with leucine being of particular interest. In support, protein supplementation during recovery from exercise has been shown to augment the gains in muscle mass and strength following more prolonged exercise training.

The focus in muscle metabolism research is generally directed towards the post-prandial increase in the synthesis rates of contractile muscle protein, referred to as myofibrillar protein. As a consequence, there is little information on the impact of nutrition and exercise on the synthesis rates of connective tissue protein in skeletal muscle. The collagenous extracellular matrix of muscle tissue has recently regained much interest for its key role in transferring the forces generated by the contractile filaments throughout the muscle and onto the ligaments, tendons, and bone. This connective tissue matrix has been shown to express a high level of plasticity and collagen protein synthesis rates have been shown to rapidly increase in muscle tissue following exercise. However, the impact of protein ingestion with or without prior exercise on connective tissue protein synthesis rates in muscle remains to be established.

A promising dietary protein source is collagen peptides, which are rich in glycine and proline and have, therefore, been proposed as the preferred protein source to support connective tissue remodeling. While the impact of collagen peptide ingestion on connective tissue protein synthesis rates in skeletal muscle and skin tissue remains to be established, recent studies have reported that collagen peptide supplementation can further augment skeletal muscle mass and strength gains following prolonged exercise training. Furthermore, it has been suggested that collagen peptides have anabolic properties that extend beyond the provision of their corresponding amino acid precursors.

Doel van het onderzoek

1. We hypothesize that the ingestion of 30 g of collagen peptides and 30 g of free amino acids (matching the profile of collagen peptides) will result in greater myofibrillar and connective tissue protein synthesis rates in skeletal muscle tissue at rest and during recovery from exercise in comparison with the ingestion of a non-caloric placebo.
2. We hypothesize that 30 g collagen peptides will result in greater myofibrillar and

connective tissue protein synthesis rates in myofibrillar and connective tissue protein synthesis rates in skeletal muscle tissue at rest and during recovery from exercise in comparison with the ingestion of 30 g free amino acids.

3. We hypothesize that the ingestion of 30 g collagen peptides and 30 g of free amino acids will result in greater connective tissue protein synthesis rates in skin tissue in comparison with the ingestion of a non-caloric placebo.

4. We hypothesize that 30 g collagen peptides will result in greater connective tissue protein synthesis rates in skin in comparison with the ingestion of 30 g free amino acids.

Onderzoeksopzet

Muscle biopsies will be taken at time points: -180 min (single leg), 0 min (after exercise and before the beverage; single leg), 180 min (both legs) and 360 min (both legs). Skin biopsies will be collected at time points 0 min and 360 min.

Onderzoeksproduct en/of interventie

Participants (n=15 per group) will perform unilateral resistance exercise followed by the ingestion of either 30 g of collagen peptides, 30 g free amino acids (matching the profile of collagen peptides), or a non-caloric placebo (flavored water).

Contactpersonen

Publiek

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Wetenschappelijk

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Deelname eisen

Belangrijkste voorwaarden om deel te mogen nemen (Inclusiecriteria)

- Males and females
- Aged between 18-35 years
- Healthy, recreationally active (participating in recreational sports activities $\leq$ 3 times per week)
- BMI 18.5 - 30 kg/m²
- No physical limitations (i.e. able to perform all activities associated with daily living in an independent manner)

Belangrijkste redenen om niet deel te kunnen nemen (Exclusiecriteria)

- Pregnant
- Third generation oral contraceptives
- Hormone replacement therapy
- Musculoskeletal disorders
- Use of any medications known to affect protein metabolism (i.e. corticosteroids, non-steroidal anti-inflammatories, or prescribed acne medications).
- Participation in any structured regular exercise program
- Chronic use of gastric acid suppressing medication or anti-coagulants
- Unstable weight over the last three months
- Pathologies of the gastrointestinal tract
- Blood donation in the past 2 months

Onderzoeksopzet

Opzet

Type:	Interventie onderzoek
Onderzoeksmodel:	Parallel
Toewijzing:	Gerandomiseerd
Blindering:	Dubbelblind
Controle:	Placebo

Deelname

Nederland

Status:	Werving nog niet gestart
(Verwachte) startdatum:	01-03-2021
Aantal proefpersonen:	45
Type:	Verwachte startdatum

Voornemen beschikbaar stellen Individuele Patiënten Data (IPD)

Wordt de data na het onderzoek gedeeld: Nog niet bepaald

Ethische beoordeling

Niet van toepassing

Soort: Niet van toepassing

Registraties

Opgevolgd door onderstaande (mogelijk meer actuele) registratie

Geen registraties gevonden.

Andere (mogelijk minder actuele) registraties in dit register

Geen registraties gevonden.

In overige registers

Register	ID
NTR-new	NL9235
Ander register	METC azM/UM : METC 20-104

Resultaten