

Reducing early atrophy with leucine during immobilization of skeletal muscle

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1) In both younger and older adults, 3 days of disuse via unilateral lower-limb immobilization will result in muscle atrophy and coincide with decreased rates of "cumulative" muscle protein synthesis (MPS) during disuse. 2) In both younger and older...

Ethische beoordeling	Positief advies
Status	Werving nog niet gestart
Type aandoening	-
Onderzoekstype	Interventie onderzoek

Samenvatting

ID

NL-OMON23203

Bron

NTR

Verkorte titel

REALISM

Aandoening

Healthy young adults and elderly both male and female

Ondersteuning

Primaire sponsor: Maastricht University

Overige ondersteuning: Maastricht University

Onderzoeksproduct en/of interventie

Uitkomstmaten

Primaire uitkomstmaten

The main study endpoint is cumulative FSR as a measure of muscle protein synthesis rates (MPS) based on the oral tracer deuterium oxide. In order to determine cumulative FSR, the

following parameters will be measured via GC-C-IRMS and GCMS respectively:

- Muscle protein-bound L-[2,3,3,3-2H4]-alanine enrichment (expressed as MPE)

- Plasma free L-[2,3,3,3-2H4]-alanine enrichment (expressed as MPE)

- Saliva 2H2O enrichment (Expressed as APE)

- Fractional breakdown rates (FBR) of muscle protein based on 3,3-D2 phenylalanine tracer dilution in plasma and muscle free pool.

- Fractional synthesis rates (FSR) of muscle protein based on L-[ring-13C6]-phenylalanine tracer incorporation into bound muscle protein.

Toelichting onderzoek

Achtergrond van het onderzoek

Recovery from an injury, illness, and/or disease is associated with periods of skeletal muscle disuse. The physical inactivity resulting from muscle disuse leads to a loss of muscle mass and strength. This loss of muscle mass and strength can result in difficulties with daily activities, reduced sports performance, and in some cases a loss of independence. Muscle loss is particularly problematic for older adults who are already at a greater risk for low muscle mass and strength due to age-related sarcopenia. In fact, the loss of muscle mass with ageing, may in part be caused by more frequent short periods of muscle disuse and reduced physical activity. During this study, a one leg cast will be applied for 3 days in order to investigate the effects of such short term immobilization on the loss of muscle mass. Thereby, we want to investigate whether the use of the nutritional supplement Leucine (an amino acid/ building block of proteins) can prevent the muscle loss during these 3 days of immobilization.

Doel van het onderzoek

1) In both younger and older adults, 3 days of disuse via unilateral lower-limb immobilization will result in muscle atrophy and coincide with decreased rates of “cumulative” muscle protein synthesis (MPS) during disuse. 2) In both younger and older adults, leucine supplementation during 3 days of disuse via unilateral lower-limb immobilization will attenuate the decline in cumulative MPS and loss of muscle mass. 3) In younger adults, 3 days of disuse via unilateral lower-limb immobilization will increase postabsorptive muscle protein breakdown (MPB) rates and decrease postabsorptive MPS rates. 4) In younger adults, leucine supplementation during 3 days of disuse via unilateral lower-limb immobilization will reduce the increase in postabsorptive MPB rates and decline in postabsorptive MPS rates following immobilization.

Onderzoeksopzet

Screening: subject eligibility + informed consent

3 visits to the university, 3 days of single leg immobilisation, pre and post muscle biopsies. 4 days of D2O intake 3 days of leucine/placebo supplementation

Onderzoeksproduct en/of interventie

- Single leg immobilisation
- Leucine supplementation

Contactpersonen

Publiek

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Deelname eisen

Belangrijkste voorwaarden om deel te mogen nemen (Inclusiecriteria)

- Male or female age 18-35 or 60-80 years of age inclusive
- Healthy, Moderately active
- BMI not lower than 18.5 and not higher than 30 kg/m²

- Having given informed consent

Belangrijkste redenen om niet deel te kunnen nemen (Exclusiecriteria)

- Previous participation in a ^{13}C amino acid tracer study within the last 5 years
- Lower limb and/or back injuries
- A history of thrombosis/cardiovascular disease
- Use of anticoagulants
- Musculoskeletal/orthopedic disorders
- Structured resistance exercise training
- Use of corticosteroids
- Current use of protein supplements
- Diabetes (type I or II)
- Use of tobacco products
- Pregnant
- Hormone replacement therapy
- Third generation oral contraceptives

Onderzoeksopzet

Opzet

Type:	Interventie onderzoek
Onderzoeksmodel:	Parallel
Toewijzing:	N.v.t. / één studie arm
Blinding:	Dubbelblind
Controle:	Placebo

Deelname

Nederland
Status: Werving nog niet gestart
(Verwachte) startdatum: 01-03-2016
Aantal proefpersonen: 48
Type: Verwachte startdatum

Ethische beoordeling

Positief advies
Datum: 06-01-2016
Soort: Eerste indiening

Registraties

Opgevolgd door onderstaande (mogelijk meer actuele) registratie

ID: 45771
Bron: ToetsingOnline
Titel:

Andere (mogelijk minder actuele) registraties in dit register

Geen registraties gevonden.

In overige registers

Register	ID
NTR-new	NL5501
NTR-old	NTR5636
CCMO	NL55456.068.15
OMON	NL-OMON45771

Resultaten