Protein hydrolysate versus intact protein intake as means to promote muscle protein anabolism: fiber-type specific effects of exercise?

Published: 06-11-2006
Last updated: 20-05-2024

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Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Other condition
Study type	Interventional

Summary

ID

NL-OMON30340

Source
ToetsingOnline

Brief title
Protein hydrolysate versus intact protein and exercise

Condition

- Other condition

Synonym
loss of muscle mass, sarcopenia

Health condition

preverntie sarcopenie

Research involving

Human

Sponsors and support

Primary sponsor: Universiteit Maastricht
Source(s) of monetary or material Support: Ministerie van OC&W

Intervention

Keyword: dietary protein, muscle, protein synthesis, resistance exercise

Outcome measures

Primary outcome

All interventions will affect muscle protein synthesis. With the application of amino acid tracer methodology we are able to determine muscle (fiber-type specific) protein synthesis.

Secondary outcome

Study A: differences in rate of uptake/absorption for the intestine using the application of intrinsically milkproteins.

Study description

Background summary

Food intake and in particular the ingestion of protein or amino acids has been shown to be powerful stimulus to promote net muscle protein anabolism. The quantity and quality of the ingested protein strongly modulate protein metabolism. It has been speculated that the ingestion of a protein hydrolysate would be more effective in promoting muscle protein anabolism compared to the ingestion of an intact protein source. However, scientific evidence to support the proposed differences in the metabolic response to the ingestion of an intact protein or its hydrolysate remains to be established in vivo in humans. Besides nutrition, exercise has been shown to be a powerful stimulus to promote muscle protein synthesis. The activation of muscle protein synthesis following resistance exercise has been suggested to be muscle fiber-type specific. However, there is no data available in humans whether the exercise stimulus is necessary to attain maximal muscle protein synthesis rates or that the intake

of protein is already enough to maximally stimulate protein synthesis. In addition, in vivo measurements of muscle protein synthesis rates following exercise in type I and II muscle fibers are not available yet.

Study objective

The first aim of this proposal is to determine the surplus value of the ingestion of a protein hydrolysate compared to an intact protein as a means to improve protein digestibility, to maximize plasma amino acid availability and/or to stimulate muscle protein anabolism. The second aim of this proposal is to study the additional effect of resistance exercise in the stimulation of protein synthesis by protein intake. In addition we aim to investigate, whether protein synthesis rates are different between muscle fiber-types following resistance exercise.

Study design

Muscle protein synthesis will be measured using stable isotope methodology following the ingestion of either an intrinsically label protein hydrolysate or intact protein (study A), following one legged resistance exercise with protein supplementation (study B), and following resistance exercise in type I and II muscle fibers (study C). This study design will be used to determine the surplus value of the ingestion of a protein hydrolysate (study A), the execution of resistance exercise (study B) in stimulating muscle protein synthesis. In study C we will determine fiber-type specific muscle protein synthesis rates.

Intervention

Study A: intake of protein hydrolysate versus intact protein
Study B: resistance exercise versus rest
Study C: resistance exercise

Study burden and risks

The risks involved in participating in this experiment are minimal. Insertion of the catheters in a vein is comparable to a normal blood drawn and the only risk is of a small local hematoma. This is the same for the muscle biopsy. The incision made for obtaining the muscle biopsy will be done by an experienced physician and will heal completely. The labeled amino acids tracers applied in this experiment are not radioactive and are completely safe. De test beverages are made from normal nutritional ingredients and for this reason do not form any health risks.

Screening 3 h
1RM test 0.5h (study B and C)

Visiting University 8 (study B and C)-16h (study A)

For study A subjects will visit the university 19h, for study B and C subjects will visit the University for 11.5 h

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)
Elderly (65 years and older)

Inclusion criteria

BMI < 30, male, normoglycemic

Exclusion criteria

BMI > 30, diabetes, other disease states, regular physical exercise

Study design

Design

Study type:	Interventional
Intervention model:	Crossover
Allocation:	Randomized controlled trial
Masking:	Double blinded (masking used)

Primary purpose: Prevention

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	01-01-2007
Enrollment:	36
Type:	Actual

Ethics review

Approved WMO

Date:	06-11-2006
Application type:	First submission
Review commission:	METC academisch ziekenhuis Maastricht/Universiteit Maastricht, METC azM/UM (Maastricht)

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL14378.068.06