

The effect of meat texture on promoting muscle protein synthesis in elderly humans

Published: 16-07-2010

Last updated: 30-04-2024

The objective of this study is to test whether meat structure plays an important role in protein digestion, to maximise the amino acid availability and to stimulate the muscle protein growth in elderly people.

Ethical review	Not approved
Status	Will not start
Health condition type	Muscle disorders
Study type	Interventional

Summary

ID

NL-OMON34460

Source

ToetsingOnline

Brief title

Dietary interventions for muscle mass

Condition

- Muscle disorders

Synonym

sarcopenia

Research involving

Human

Sponsors and support

Primary sponsor: Universiteit Maastricht

Source(s) of monetary or material Support: Ministerie van OC&W

Intervention

Keyword: ageing, dietary protein, muscle, protein synthesis

Outcome measures

Primary outcome

Muscle growth

Secondary outcome

Protein digestion

Study description

Background summary

Aging is accompanied by a decline in skeletal muscle mass. This loss is a consequence of an imbalance between muscle synthesis and muscle break down. The muscle synthesis is strongly stimulated by the intake of food, especially by protein. It seems that this process is declined in elderly people in comparison to young persons. Especially the protein digestion and absorption rate from food in the intestine plays an important role. Proteins stimulate the muscle growth due to the supply of the building blocks, the amino acids. After a meal, the availability of amino acids in the blood is essential for the regulation of muscle growth. An increase in this availability is possible by using proteins which will be digested fast. The concept of fast and slow digested proteins have been extracted from research with milk proteins. This research has been shown that fast digested proteins cause a faster absorption of the amino acids, a faster delivery to the muscle and as a consequence the amino acids are faster incorporated in the muscle. Whether this concept is also applicable to other protein sources in the daily nutrition, like meat, is still unknown. Meat is an important protein source for many adults and is almost daily consumed. Various meat products got their own different meat structure. This structure might be complete for the protein absorption rate from meat and the subsequent muscle protein synthesis. However, scientific evidence for this proposition is still lacking.

Study objective

The objective of this study is to test whether meat structure plays an important role in protein digestion, to maximise the amino acid availability

and to stimulate the muscle protein growth in elderly people.

Study design

Twelve subjects between the age of 65-85 years will be selected for this study. Each person participates in two test days, in which the effect of meat structure (intact or minced: beef steak or minced beef, respectively) on protein digestion and muscle protein synthesis will be tested. The two test days will be separated by 14 days. A cross-over design will be used to prevent the between-persons-variation in chewing and gastrointestinal tract functionality. Furthermore, the food intake preceding the test day will be standardised by using a food diary: each subject will fill in a food diary 48 hours before the first test day, so that he will be able to use exactly the same diet before the second test day. Additionally, we will use a constant stable amino acid isotope infusion during the test days to determine the protein breakdown, synthesis and muscle synthesis (as previously described in MEC 02-060, MEC 03-090, MEC 05-028 en MEC 06-3-064).

Intervention

Intake of beef meat, intact or minced: Beef steak of minced beef, respectively.

Study burden and risks

The risks involved in participating in this experiment are minimal. Insertion of the catheters in a vein in the arm and on the hand can cause a small local hematoma. This is the same for the muscle biopsy. The incision made for obtaining the muscle biopsy will heal completely in two days. Possibly, the subject might have a dull feeling in his leg when the effect of the anaesthesia is gone. The muscle biopsies will be performed by an experienced physician. The labeled amino acids tracers applied in this experiment are not radioactive and are completely safe. The vacuum-packed and pre-weighed meat meals are normal food products and have been cleared for human consumption.

Total time investment is 20 hours per subject.

General screening: 3 hours.

Test day: 2 x 8 1/2 hour.

Contacts

Public

Universiteit Maastricht

Universiteitssingel 50

6229 ER Maastricht
Nederland
Scientific
Universiteit Maastricht

Universiteitssingel 50
6229 ER Maastricht
Nederland

Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age

Adults (18-64 years)

Elderly (65 years and older)

Inclusion criteria

Non-obese male subjects (BMI<30), between the age of 65 and 85 years

Exclusion criteria

Type II diabetes or other known diseases, use of medication, female, other ages or BMI than indicated above, participation in any regular exercise program.

Study design

Design

Study type: Interventional

Intervention model: Crossover

Masking:	Open (masking not used)
Control:	Uncontrolled
Primary purpose:	Prevention

Recruitment

NL	
Recruitment status:	Will not start
Enrollment:	12
Type:	Anticipated

Ethics review

Not approved	
Date:	16-07-2010
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
ClinicalTrials.gov	NCT
CCMO	NL32698.068.10