The effectiveness of a diet with beef as key protein component versus a plantbased diet to support integrated muscle protein synthesis rates in healthy older individuals

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To compare the effectiveness of a diet with beef as key protein source versus an isocaloric and isonitrogenous plant-based diet to stimulate integrated muscle protein synthesis rates over a 10 day period, in healthy older individuals, with and...

Ethical review	Approved WMO
Status	Recruiting
Health condition type	Muscle disorders
Study type	Interventional

Summary

ID

NL-OMON56977

Source ToetsingOnline

Brief title NCBA

Condition

Muscle disorders

Synonym Muscle anabolism, Muscle health

Research involving

Human

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Sponsors and support

Primary sponsor: Universiteit Maastricht **Source(s) of monetary or material Support:** Ministerie van OC&W,National Cattlemen[]s Beef Association (NCBA)

Intervention

Keyword: Exercise, Muscle, Older, Protein

Outcome measures

Primary outcome

The difference in muscle protein synthesis rates in the non-exercised leg,

between the plant-based diet and the omnivorous diet, expressed as FSR (%/day).

Secondary outcome

- Difference in muscle protein fractional synthesis rates in the exercised leg,

between the plant-based and omnivorous diet (calculated similar to rest, but

using muscle biopsy from exercised leg)

- Plasma fasting glucose
- Plasma fasting insulin
- Blood lipid profile
- Blood pressure

Study description

Background summary

Food intake stimulates muscle protein synthesis rates at rest and following exercise. Ingestion of animal-derived proteins generally leads to a greater stimulation of muscle protein synthesis when compared to the ingestion of plant-derived proteins. What is often neglected is that the anabolic properties of protein isolates do not necessarily reflect the anabolic response to the ingestion of the whole-foods from which they are derived. This discrepancy is due to the presence or absence of other components normally found within whole-food matrices, which influence protein digestion and amino acid absorption from animal based and plant based protein sources. A rapid and robust post-prandial release of food-derived amino acids is of particular relevance for older individuals, who typically show a blunted muscle protein synthetic response to feeding. Therefore it is currently unknown how plant-based diets compare to diets containing animal protein in their capacity to stimulate muscle protein syntheses.

Study objective

To compare the effectiveness of a diet with beef as key protein source versus an isocaloric and isonitrogenous plant-based diet to stimulate integrated muscle protein synthesis rates over a 10 day period, in healthy older individuals, with and without exercise.

Study design

Randomized, counter-balanced, cross-over design, researchers and participants are not blinded, analysts are blinded.

Intervention

Over a 10-d period, participants will consume a controlled omnivorous diet (in which ~60% of total protein intake will come from meat based products) followed by a controlled meat-free (i.e. plant-based) diet, for 10 days or vice versa. Both diets will be matched for protein (1.1 g/kg/day) and energy intake. Additionally participants will perform 4 single-legged exercise training sessions, will consume a daily dose of deuterated water and collect saliva samples.

Study burden and risks

The risks involved in participating in this experiment are minimal. The blood sample will be comparable to a normal blood draw and the only risk is a small local hematoma. Muscle biopsies will be obtained under local anaesthesia by an experienced physician, but may cause some minor discomfort. The discomfort is comparable to muscle soreness or the pain one has after bumping into the corner of a table. The ingestion of deuterated water has been applied in numerous published studies and is entirely safe and non-toxic in the amounts provided in the present study. The diet will be composed of familiar food products. There is no direct benefit for the participants, except from their contribution to scientific knowledge on the impact of omnivorous versus vegan meals on the stimulation of muscle protein synthesis.

Contacts

Public Universiteit Maastricht

Universiteitssingel 50 Maastricht 6229 ER NL **Scientific** Universiteit Maastricht

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age Elderly (65 years and older)

Inclusion criteria

Male or Female sex Aged between 65 and 85 year inclusive BMI between 18.5 and 30 kg/m2 inclusive

Exclusion criteria

- Not willing to consume meat/animal-derived food products during the study period

- Any food allergies (e.g. milk, gluten, etc.)

- Participating currently or in the 3 months prior to the study in a structured progressive exercise program.

- Smoking

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 History of diseases or disorders, and/or medication use which might limit participation in or completion of the study protocol, interfere with the execution of the experiment, or potential influence the study outcomes (to be decided by the study team and responsible physician)
Donated full blood 3 months prior to test day

Study design

Design

Study type:	Interventional
Intervention model:	Crossover
Masking:	Open (masking not used)
Control:	Uncontrolled
Primary purpose:	Treatment

Recruitment

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Recruitment status:	Recruiting
Start date (anticipated):	09-12-2024
Enrollment:	50
Туре:	Actual

Ethics review

Approved WMO Date:	29-08-2024
Application type:	First submission
Review commission:	METC academisch ziekenhuis Maastricht/Universiteit Maastricht, METC azM/UM (Maastricht)
Approved WMO Date:	14-11-2024
Application type:	Amendment
Review commission:	METC academisch ziekenhuis Maastricht/Universiteit Maastricht, METC azM/UM (Maastricht)

Approved WMO

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Date:	25-02-2025
Application type:	Amendment
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 CCMO **ID** NL87069.068.24