The effects of NAD+-precursor supplementation on energy metabolism in physically compromised elderly.

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

Summary

ID

NL-OMON47902

Source
ToetsingOnline

Brief title
NAD Supplementation Study

Condition

- Other condition

Synonym
Ageing

Health condition

veroudering, energiemetabolisme.

Research involving
Human

Sponsors and support

Primary sponsor: Universiteit Maastricht
Source(s) of monetary or material Support: Top Institute Food and Nutrition

Intervention

Keyword: Elderly, Metabolism, Muscle, NAD

Outcome measures

Primary outcome

The main outcome parameters relate to the anticipated differences in

mitochondrial function and include ex vivo mitochondrial respiratory capacity,

in vivo mitochondtrial capacity, resting- and exercising energy metabolism, and

in vivo mitochondrial capacity.

Secondary outcome

- Glucose tolerance;

- Physical performance;

- Intramuscular cellular lipid content;

- Hepatic fat;

- Physical activity;

- Quality of life;

- Markers of mitochondrial metabolism.

- Blood metabolites and biomarkers.

Study description

Background summary

One of the most striking features of the aging process is the progressive loss

of muscle mass (sarcopenia) and physical function. The loss in skeletal muscle mass and tissue function, leads to mobility impairment, increased risk of falls, physical frailty but also metabolic impairments. Compromised physical function increases the risk of dependence in activities of daily living and care need. Interestingly, it was previously shown in mice, that aging is associated with reduced intracellular NAD+ levels in skeletal muscle. It is now generally accepted that NAD+ metabolism is a main pathway in the regulation of mitochondrial function in skeletal muscle and would be a target for intervention to stimulate mitochondrial function and thereby prevent age-related decline in muscle physical function. To this end, this study aims to determine whether supplementing with the NAD+-precursors NA, NAM and tryptophan can stimulate skeletal muscle mitochondrial function in physically compromised, elderly humans.

Study objective

The main of objective of this study is to determine whether supplementation of NAD+-precursors can stimulate skeletal muscle mitochondrial function in physically compromised, elderly humans. Secondary objectives are the determination of 1) blood and skeletal muscle NAD+ levels, 2) body composition, 3) molecular pathways and gene transcription responsible for improved mitochondrial health and function, 4) physical function and -activity, and 5) glucose tolerance upon NAD+-precursor supplementation.

Study design

A double-blind, randomised, controlled, cross-over intervention trial, in which NAD+-precursor supplementation will be compared to control.

Intervention

The subjects will receive at random the following products: 1) intervention product containing the NAD+-precursors nicotinic acid, nicotinamide, and tryptophan in a whey protein source; 2) control product consisting of an amino acid mix resembling the whey protein source devoid of tryptophan, nicotinic acid and nicotinamide.

Study burden and risks

This study will lead to novel insights with respect to the ability of food constituents to improve mitochondrial function and health in the physically compromised elderly population. However, this study is not expected to be directly beneficial to the participants. The major burden to the subjects is a large time investment. Subjects will be asked to attend the university on, in total, 12 occasions for measurement procedures. Additionally, subjects will be asked to consume a nutritional product containing NAD+-precursors versus a

control on a daily basis for a period of 32 days each. The experimental procedures are without risks, except for blood sampling and sampling of muscle biopsies, which can occasionally cause a local hematoma or bruising. The risk of infection or prolonged bleeding is low due to state of the art techniques and sterility measures. The maximal exercise test and cycling protocol can cause muscle soreness. Measurements performed during the time course of the study can potentially lead to coincidental medical findings. Subjects will be informed about such a finding and possibly be advised to contact a doctor about this.

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

- Males and females

- Age * 65 * 80 years;
- BMI * 20 kg/m2 * 30 kg/m2;
- Normal physical activity levels: maximum of 1 hour per week engagement in a structured exercise session;
- 6-minute walking distance of 465 meters or less;
- Subject should be in sufficient health to participate in the experiments, to be judged by the responsible physician based on the subject's medical history.

Exclusion criteria

- Not meeting all inclusion criteria;
- Smoking;
- Excessive alcohol use and/or drug abuse;
- Subjects with diabetes mellitus type 2;
- Significant food allergies or intolerances concerning the study products;
- Participation in another biomedical study within 1 month before the first study visit, possibly interfering with the study results;
- Medication use known to hamper subject*s safety during the study procedures;
- Subjects who use selective serotonin re-uptake inhibitors (SSRI), or selective norepinephrin re-uptake inhibitors (SNRI), or monoamino oxidase inhibitors (MAO-inhibitors), or clomipramine, or St. John*s wort (Hypericum perforatum);
- Subjects with contra-indications for MRI;
- Subjects who do not want to be informed about unexpected medical findings;
- Subjects who do not want that their treating physician to be informed;
- Co-morbidities to which the intervention or program the may pose as a complicating factor;
- Inability to participate and/or complete the required measurements.

Study design

Design

Study type:	Interventional
Intervention model:	Crossover
Allocation:	Randomized controlled trial
Masking:	Double blinded (masking used)
Control:	Active
Primary purpose:	Treatment

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	29-06-2018
Enrollment:	36
Type:	Actual

Ethics review

Approved WMO

Date:	12-07-2017
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	NL61204.068.17