The effect of cold acclimation on brown adipose tissue.

No registrations found.

Ethical review	Positive opinion
Status	Recruitment stopped
Health condition type	-
Study type	Interventional

Summary

ID

NL-OMON20696

Source
NTR

Health condition

Brown adipose tissue
Cold acclimation
Skeletal muscle
Non-shivering thermogenesis

Sponsors and support

Primary sponsor: Maastricht University Medical Centre + (MUMC+)
Source(s) of monetary or material Support: This study is financed by the NWO-TOP grant (Netherlands Science Foundation ZonMw, TOP 92109037) provided to W.D. van Marken Lichtenbelt

Intervention

Outcome measures

Primary outcome

1. Standard uptake values (SUVs) of FDG of active brown adipose tissue with the PET/CT-scans, one time prior and one time post the cold acclimation period (2x 2hour);

2. Energy expenditure with indirect calorimetry, one time prior, half way and one time post the cold acclimation period (3x 3hour);

3. Skeletal muscle mitochondrial uncoupling with the muscle biopsy, one time before and one time post the cold acclimation period (2x 30minutes).
BRITE cell recruitment with the fat biopsy, one time prior and one time post the cold acclimation period (2x 30minutes).

Secondary outcome

1. Body temperatures (core and skin temperatures) with iButtons and a telemetric pill, one time prior, half way and one time post the cold acclimation period;

2. Skin perfusion with laser Doppler flowmetry, one time prior, half way and one time post the cold acclimation period;

3. Blood parameters, among others insulin, glucose, free fatty acids and thyroid hormones, one time prior, half way and post the cold acclimation period;

4. Body composition with a DXA-scan, one time prior and post the cold acclimation period.

Study description

Background summary

The volunteers will undergo two PET/CT-scans, in which cold-induced BAT activity will be measured before and after a cold acclimation period of 10 days. To investigate the role of the skeletal muscle mitochondrial uncoupling and BRITE cell recruitment a muscle and fat biopsy sample will be taken prior to the acclimation period and afterwards. Finally, body composition will be determined with a DXA-scan, and skin perfusion and relevant body temperatures will be measured as well.

Study objective

Chronic cold exposure will increase:

1. Basal metabolism and facultative thermogenesis;

2. Brown adipose tissue activity and volume;

3. Skeletal muscle mitochondrial uncoupling and result in BRITE cell recruitment.

Study design

Participation will take approximately 70 hours.

Intervention

The volunteers will undergo two PET/CT-scans, in which cold-induced BAT activity will be measured before and after a cold acclimation period of 10 days. To investigate the role of the skeletal muscle mitochondrial uncoupling and BRITE cell recruitment a muscle and fat biopsy sample will be taken prior to the acclimation period and afterwards. Finally, body composition will be determined with a DXA-scan, and skin perfusion and relevant body temperatures will be measured as well.

Cold acclimation is achieved by exposure to an environmental temperature of 16 degrees (cold room) for 10 consecutive days. The first day the subjects will remain in this cold room for 2 hours, the second day for 4 hours and days 3-10 for 6 consecutive hours. The subjects are dressed in t-shirt, shorts and flip flops. For these 6 hours, the subjects are instructed to refrain from physical activity as much as possible. Watching TV and working on a computer are activities that can be done.

Contacts

Public
Universiteitssingel 50
Anouk Lans, van der
Maastricht 6229 ER
The Netherlands
+31 (0)43 3884259
Scientific
Universiteitssingel 50
Anouk Lans, van der
Maastricht 6229 ER
The Netherlands
+31 (0)43 3884259

Eligibility criteria

Inclusion criteria

1. BMI 18-25;

2. Age 18-30;

3. Females: On oral contraceptive;

4. Caucasians.

Exclusion criteria

1. Diabetes Mellitus;

2. Females: Pregnancy;

3. Participate in physical activity more than 2x/week;

4. Use of Beta-blockers;

5. Cardiovascular diseases;

6. Asthma or other obstructive pulmonary diseases;

7. Elevated fasting blood glucose level (> 5.6 mmol/L);

8. Participation in earlier research that included a PET/CT-scan;

9. Radiation therapy due to medical treatment.

Study design

Design

Study type:	Interventional
Intervention model:	Parallel
Allocation:	Non controlled trial

Control: N/A , unknown

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	01-12-2011
Enrollment:	20
Type:	Actual

Ethics review

Positive opinion

Date:	28-02-2012
Application type:	First submission

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
NTR-new	NL3190
NTR-old	NTR3341
Other	METC / CCMO : 11-3-052 / NL37639.068.11;
ISRCTN	ISRCTN wordt niet meer aangevraagd.

Study results

Summary results
N/A