

# The effects of intravenous TRH administration on brown adipose tissue activity in healthy, lean men.

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<b>Ethical review</b>	Approved WMO
<b>Status</b>	Recruitment stopped
<b>Health condition type</b>	Other condition
<b>Study type</b>	Interventional

## Summary

### ID

NL-OMON41582

### Source

ToetsingOnline

### Brief title

BATman-study

### Condition

- Other condition
- Endocrine and glandular disorders NEC

### Synonym

Obesity

### Health condition

Obesitas

### Research involving

Human

## Sponsors and support

**Primary sponsor:** Academisch Medisch Centrum

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

## Intervention

**Keyword:** Adipose tissue, brown, Positron-emission tomography, Thyroid hormones, Thyrotropin-releasing hormone

## Outcome measures

### Primary outcome

The degree of <sup>18</sup>F-FDG uptake in BAT, skin temperature, blood pressure, heart rate, and serum TSH, T3, T4, FT4, norepinephrine and normetanephrine after TRH administration, compared to saline administration;

### Secondary outcome

The association between BAT activity and changes in blood pressure, heart rate, and serum TSH, T3, T4, FT4, norepinephrine and normetanephrine.

## Study description

### Background summary

Brown adipose tissue (BAT) is a well known major site of non-shivering thermogenesis in most mammals. It was only recently found to be present and active in human adults. Several studies have shown that BAT activity is increased in adult humans during cold exposure. Animal experiments show that heat production by BAT in response to cold is centrally regulated via cold-sensitive TRH-neurons in hypothalamus and hindbrain, which in turn activate sympathetic neurons in the spinal cord projecting to BAT. In animals, TRH plays a major role in the central regulation of BAT. Hence, central and systemic TRH administration causes a rise in BAT activity, an increase in body temperature and sympathetic tone.

Data suggests that human BAT participates in the control of energy expenditure and adiposity, making it an interesting potential new target for treatment of obesity and diabetes. Whether TRH plays a role in BAT activation in response to cold in humans, is unknown.

In this study, we aim to determine whether TRH administration stimulates BAT activity and sympathetic tone in adult humans.

## **Study objective**

To investigate whether BAT tissue can be activated by intravenous administration of TRH. Secondary objectives are to determine whether intravenous TRH increases the degree of cardiovascular sympathetic stimulation and the response of skin temperature, and whether there is a correlation between the BAT-activity and these changes.

## **Study design**

A double-blind, randomized, placebo-controlled cross-over study.

## **Intervention**

Intravenous TRH administration.

## **Study burden and risks**

Subjects will be invited to the hospital twice with an interval of minimally 7 days. Subjects will be asked to refrain from exercise and to fast 6 hours prior to study participation.

During the study, subjects will receive an intravenous cannula, through which they receive infusions of <sup>18</sup>F-FDG, TRH and saline, and from which 7 blood samples will be collected. Placement of the intravenous cannula can be an unpleasant experience. There is a small chance of developing phlebitis.

Subjects will be exposed to a mild cold (18C) for one hour.

Subjects will undergo dynamic PET-CT imaging, cardiovascular monitoring and temperature monitoring. Side effects after intravenous TRH administration are minimal, and may include nausea, flushing, urinary urgency and changes in blood pressure. The total resulting dose from the whole-body <sup>18</sup>F-FDG PET/CT examinations is 7.2 mSv, which is less than 3 times the annual natural background radiation exposure in the Netherlands. There are no further risks or benefits associated with participation.

## **Contacts**

### **Public**

Academisch Medisch Centrum

Meibergdreef 9  
Amsterdam 1105 AZ

NL  
**Scientific**  
Academisch Medisch Centrum

Meibergdreef 9  
Amsterdam 1105 AZ  
NL

## Trial sites

### Listed location countries

Netherlands

## Eligibility criteria

### Age

Adults (18-64 years)

Elderly (65 years and older)

### Inclusion criteria

Male sex

Age between 30 and 50 years old

BMI range 19 to 25 kg/m<sup>2</sup>

### Exclusion criteria

Treated or untreated hypo- or hyperthyroidism

Renal dysfunction (eGFR >60)

Use of any medication known to affect thyroid hormone metabolism or the autonomic nervous system

Any cardiovascular disease

Recent stay of >2 weeks in the tropics within the last 6 weeks

The desire to conceive within 1 month

## Study design

## Design

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

## Recruitment

NL	
Recruitment status:	Recruitment stopped
Start date (anticipated):	05-06-2014
Enrollment:	15
Type:	Actual

## Ethics review

Approved WMO	
Date:	15-04-2014
Application type:	First submission
Review commission:	METC Amsterdam UMC
Approved WMO	
Date:	24-03-2015
Application type:	Amendment
Review commission:	METC Amsterdam UMC

## Study registrations

### Followed up by the following (possibly more current) registration

No registrations found.

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

ID: 23019  
Source: Nationaal Trial Register  
Title:

**In other registers**

Register	ID
CCMO	NL45656.018.13
OMON	NL-OMON23019