

# Human Brown Adipose Tissue Histological and Mitochondrial Respiratory Analysis

Published: 30-03-2010

Last updated: 02-05-2024

Primary; • To study the mitochondrial respiration in human BATSecondary; • Apply histological protein stainings and mitochondrial content analysis of human brown adipose tissue • Relate mitochondrial activity and content to the amount of UCP1, body...

<b>Ethical review</b>	Approved WMO
<b>Status</b>	Recruiting
<b>Health condition type</b>	Other condition
<b>Study type</b>	Observational invasive

## Summary

### ID

NL-OMON47232

### Source

ToetsingOnline

### Brief title

BAT analysis

### Condition

- Other condition
- Appetite and general nutritional disorders

### Synonym

obesity

### Health condition

obesitas

### Research involving

Human

## Sponsors and support

**Primary sponsor:** Universiteit Maastricht

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

## Intervention

**Keyword:** brown adipose tissue, Mitochondrial respiration, Skeletal muscle, Thermogenesis

## Outcome measures

### Primary outcome

The primary endpoint will be the quantification of mitochondrial respiration in human BAT. Secondary endpoints will be histological protein stainings and mitochondrial content analysis of human BAT. An UCP-1 immunofluorescence assay will be used to detect UCP-1.

### Secondary outcome

none

## Study description

### Background summary

Obesity is considered as a chronic disease in the modern western society. It is associated with many comorbidities, enormous health costs and a decrease in length and quality of life. Searching for a cause of the increase in obesity, explaining this development in a metabolic perspective shows new insights. Serendipity caused a renewed interest in the metabolic value of brown adipose tissue (BAT), after it showed to be active on FDG-PET-CT-imaging. Recently BAT showed to be present and active in adult human, with a decreased activity in obesity.

After showing active BAT in man, its metabolic function needs further investigation. Human BAT needs to be evaluated in its activity and physiologic functionality in the human body as a whole. In this way the purpose of BAT can be determined. Therefore we want to propose to study human BAT on a cellular level using mitochondrial respiration techniques. In this way human BAT activity in different subjects can be evaluated. Varying body compositions and

ages will be included to create a diverse data pool.

## **Study objective**

Primary;

- To study the mitochondrial respiration in human BAT

Secondary;

- Apply histological protein stainings and mitochondrial content analysis of human brown adipose tissue
- Relate mitochondrial activity and content to the amount of UCP1, body fat percentage and body mass index

Compare activity and histology of BAT with white adipose tissue (WAT) and skeletal muscle

## **Study design**

Analysis of operative BAT, WAT and skeletal muscle biopsies of the supraclavicular and neck region.

Patients indicated for surgery in the supraclavicular and neck region, specifically patients diagnosed with hyperparathyroidea, struma, benign thyroid gland tumours, implantation of a vagal neurostimulator for epilepsy and cervical surgery for neurologic pathology will be included.

## **Study burden and risks**

Routine surgery is performed with the addition of a BAT, WAT and skeletal muscle biopsy. There is no increase of peroperative morbidity and mortality for the patient.

Informed consent will be obtained. The only extra intervention consists of taking one extra blood sample. This will be done together with the blood sampling for routine purposes before surgery. The surgical operating field is identical with or without biopsy. Previous studies have shown the highest amount of active BAT in the neck and supraclavicular region. For this reason, biopsies will be obtained from patients indicated for surgery in the neck. The biopsy will be taken paying attention to the anatomical location of the laryngeal nerve.

## **Contacts**

### **Public**

Universiteit Maastricht

Postbus 616 Postbus 616  
Maastricht 6200 MD

NL  
**Scientific**  
Universiteit Maastricht

Postbus 616 Postbus 616  
Maastricht 6200 MD  
NL

## **Trial sites**

### **Listed location countries**

Netherlands

## **Eligibility criteria**

### **Age**

Adults (18-64 years)

Elderly (65 years and older)

### **Inclusion criteria**

Patients indicated for surgery in the supraclavicular and neck region are included. More specific, patients diagnosed with hyperparathyroidea, struma, benign thyroid gland tumours, implantation of a vagal neurostimulator for epilepsy and cervical neurologic disorders, aged 18-65 years will be included.

### **Exclusion criteria**

Only patients indicated for elective surgery will be included. Patients undergoing acute surgery because of critical illness are excluded. In this patient group informed consent is difficult to obtain and severe inflammation could influence BAT-, WAT- and skeletal muscle responses. Patients with pre-operative malign tumours will be excluded.

## **Study design**

## Design

**Study type:** Observational invasive

Masking: Open (masking not used)

Control: Uncontrolled

Primary purpose: Basic science

## Recruitment

NL

Recruitment status: Recruiting

Start date (anticipated): 01-05-2010

Enrollment: 180

Type: Actual

## Ethics review

Approved WMO

Date: 30-03-2010

Application type: First submission

Review commission: METC academisch ziekenhuis Maastricht/Universiteit Maastricht, METC azM/UM (Maastricht)

Approved WMO

Date: 30-08-2010

Application type: Amendment

Review commission: METC academisch ziekenhuis Maastricht/Universiteit Maastricht, METC azM/UM (Maastricht)

Approved WMO

Date: 28-07-2011

Application type: Amendment

Review commission: METC academisch ziekenhuis Maastricht/Universiteit Maastricht, METC azM/UM (Maastricht)

Approved WMO

Date: 24-09-2012

Application type: Amendment

Review commission: METC academisch ziekenhuis Maastricht/Universiteit Maastricht, METC azM/UM (Maastricht)

Approved WMO

Date: 29-07-2015  
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	ID
CCMO	NL31367.068.10