Effect of weight status and different weight-loss methods on gut-brain interactions

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Ethical review	Approved WMO
Status	Recruiting
Health condition type	Other condition
Study type	Interventional

Summary

ID

NL-OMON43908

Source
ToetsingOnline

Brief title
Weight, Weight-loss and gut-brain interactions

Condition

- Other condition
- Appetite and general nutritional disorders

Synonym
corpulence, morbidly overweight, 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: food reward, gastrointestinal hormones, gut-brain axis, Weight loss and weight maintenance

Outcome measures

Primary outcome

To determine the optimal interaction of gut hormones and brain activity for

successful weight loss and sustained weight maintenance this study will examine

the effect of interaction of gastrointestinal hormone release on neural network

activation through a) caloric restriction; b) caloric restriction with

malapsorption or c) weight stability on food reward processing and decision

making in the brain as well as on gastrointestinal hormone release.

Secondary outcome

- Secondary contributions to this main parameter are:

changes in body composition

changes in hunger perception (TFEQ)

Study description

Background summary

While exposure to an obesogenic environment has increased for almost every individual in western society, not everyone is equally susceptible to overeating and not everyone becomes obese. Teasing apart the physiological underpinnings of those individual seemingly protective- differences may contribute to the development of successful preventive measures and treatment. Neuroimaging studies started to deliver important insights into the

neuroanatomical determination of individual eating behavior. However, food intake is not only determined by the brain, but is orchestrated by an interaction of peripheral hormones with neural circuits and decision-making processes. This interactive axis is also referred to as the gut-brain axis. While individual aspects of the axis have been studied extensively, detailed insight in the interaction of gut and brain in the regulation of food intake is lacking.

Study objective

The current study aims to investigate the effect of a) caloric restriction (very low calorie diet (VLCD)); b) caloric restriction with mechanical restriction and physiological changes through malapsorption (Roux- en- Y bypass (RYGB) surgery); and c) no restriction on gut-brain interactions to find an optimal balance for weight loss and long-term sustained weight maintenance.

Study design

In a repeated measures design a total of 45 obese (body mass index (BMI) > 30 * 45) study participants will be investigated. Participants will either undergo a weight loss period of 10% of initial body weight by means of VLCD intervention (n=15), RYGB surgery (n=15) or or will stay weight stable (n=15).

Intervention

One subject group (n=15) will undergo a diet intervention, which consists of a very low calorie diet (VLCD; Modifast) containing 2.1MJ/d for 1 to 2 months, until they lost 10% of their initial body weight.
This intervention will be compared with 2 other groups; one group will undergo RYGB surgery and one group will be weight stable. However, these surgical procedures will proceed as planned and according to the standard clinical practice, and will in no way be changed.

Study burden and risks

This research is beneficial to the subjects, in that they all, being obese, will either loose body-weight or receive health related information. Subjects included in the diet induced weight loss group will lose 10% of their initial weight, which is beneficial their health. All participants will have to come visit the metabolic research unit Maastricht (MURM) on 2 different occasions, once before the weight loss procedure and once after.
FMRI is a non-invasive standard method for to determine blood oxygenation in areas of interest without any significant risks (See document section K6 for standardized and approved methods for conducting fMRI experiments involving human subjects). It is a technique that utilizes magnetic fields and low-energy radio frequencies to visualize brain structures and brain function. Through

careful screening procedures subjects with metallic fragments in their body will be excluded from the study since the fMRI magnet exerts a force on ferromagnetic objects. Furthermore, two small blood samples will be take, which does not pose any other risks for the subjects, other than its usual risk of minor bruising.
One subject group will lose 10% of initial body weight using a VLCD. There are no risks for the subjects in consuming the VLCD (Modifast, together with the recommended fruit and vegetables) as the macronutrient composition and vitamins/minerals content meet the Dutch recommended daily allowance. This VLCD will demand some energy from the subjects at home. However, due to extensive experience with VLCD in our laboratory and due to the benefit of weight loss for the participants we anticipate enough will-power to complete these 2 months VLCD.
This intervention will be compared with 2 other groups; one group will undergo RYGB surgery and one will stay weight stable. RYGB is an operation that first divides the stomach into a small upper pouch and a much larger lower "remnant" pouch and then re-arranges the small intestine to connect to both, in this way bypassing part of the small intestine. Surgical procedures will proceed as planned and will in no way be changed. Therefore, further explanation is beyond the scope of this protocol.

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)
Elderly (65 years and older)

Inclusion criteria

In order to be eligible to be included in the RYGB subject group of this study, a subject must qualify for weight loss surgery with RYGB, as evaluated by a physician at intake for surgery. Furthermore, ALL subjects (RYGB, VLCD and Control) must meet all of the following criteria:
- Subject, male or female, is age 18 to 60 years of age.
- Subject must be able to understand and be willing to sign an informed consent document.
- Subject must be willing and able to participate in all aspects of the study and agree to comply with all study requirements for the duration of the study.
- For the RYGB group: subject has a body mass index (BMI) of 30 to 45 plus one or more co-morbid diseases expected to improve with weight loss, including but not limited to hypertension, dyslipidemia, obstructive sleep apnea, or diabetes mellitus, as evaluated by physician at intake. For the VLCD and control group: subject has a BMI of > 30 * 45.
- Subject must be of sufficient and stable medical health, as evaluated by physician at intake.
- Subjects included in the RYGB subject group must have failed standard obesity therapy of diet, exercise, behaviour modification, and pharmacologic agents either alone or in combination, as assessed at the intake for surgery by a physician.
- For the fMRI measurements inclusion criteria are as follows: not having any metallic fragments in the body, being right-handed. Because of the different brain laterality in left- and right-handed subjects we chose to include only right-handed subjects. Hence the results can be compared between the subjects.

Exclusion criteria

A potential subject who meets any of the following criteria will be excluded from participation in this study:
- Subject has history of/or signs and/or symptoms of gastro-duodenal ulcer disease, by physician at intake.
- Subject has had significant weight loss in the last 3 months (>5kg).
- Subject has a history or is diagnosed with eating disorders.
- Subject has renal and/or hepatic insufficiency, by physician at intake.
- Subject has thyroid disease, which is not controlled with medication, as evaluated by physician at intake.
- Female subject who is pregnant (i.e., has a positive urine or blood pregnancy test prior to the procedure), is suspected to be pregnant, is lactating or is of childbearing potential but refuses to use adequate contraception during the study.
- Female subject who started birth control pills less than 3 months before enrollment, or who

plans to start taking birth control pills during the study.
- Subjects who cannot discontinue either prescription or over the counter weight loss medications for at least 30 days prior to the start of the study as well as during the trial period.
- Subjects who have started medications within the last 3 months that are known to cause weight gain.
- Subjects who have cardiac pacemakers or other electronic implantable devices.
- Subjects who have psychiatric disease including but not limited to manic-depressive disorder, schizophrenia, borderline personality disorder, depression or suicidal tendencies.
- Subject currently uses or has a history of illicit drug(s) or abuses alcohol (defined as regular or daily consumption of more than 4 alcoholic drinks per day).
- Subject has participated in a clinical study with an investigational new drug, biological, or therapeutic device within * 28 days prior to enrollment in this study, and does not agree to abstain from participation in other clinical trials of any kind during this study.
- Presence of contra-indications for f-MRI, as mentioned in the screening form and informed consent of the faculty of psychology (see section E2 and F1).
- Claustrophobia
- Being left-handed
- Metallic fragments in the body

Study design

Design

Study type:	Interventional
Intervention model:	Other
Allocation:	Non-randomized controlled trial
Masking:	Open (masking not used)
Control:	Active
Primary purpose:	Prevention

Recruitment

NL

Recruitment status:	Recruiting
Start date (anticipated):	03-09-2013
Enrollment:	45
Type:	Actual

Ethics review

Approved WMO Date:	01-05-2013
Application type:	First submission
Review commission:	METC academisch ziekenhuis Maastricht/Universiteit Maastricht, METC azM/UM (Maastricht)
Approved WMO Date:	09-10-2013
Application type:	Amendment
Review commission:	METC academisch ziekenhuis Maastricht/Universiteit Maastricht, METC azM/UM (Maastricht)
Approved WMO Date:	10-01-2014
Application type:	Amendment
Review commission:	METC academisch ziekenhuis Maastricht/Universiteit Maastricht, METC azM/UM (Maastricht)
Approved WMO Date:	20-07-2016
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
ClinicalTrials.gov	NCT01740050
CCMO	NL42676.068.12