Brain activation patterns associated with tasting calories independent of sweetness.

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The primary objective of this study is to assess whether oral exposure to caloric and non-caloric stimuli elicits discriminable responses in the brain independent of sweetness. This knowledge will help us to better understand the role of energy…

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

Summary

ID

NL-OMON37176

Source
ToetsingOnline

Brief title
Braintaste

Condition

- Other condition

Synonym
Niet van toepassing

Health condition

Niet van toepassing

Research involving
Human

Sponsors and support

Primary sponsor: Wageningen Universiteit
Source(s) of monetary or material Support: EFPRO (FOCOM project)

Intervention

Keyword: Carbohydrates, Energy sensing, Taste activation

Outcome measures

Primary outcome

The main study parameter/endpoint is taste activation in response to exposure to different caloric and non-caloric food stimuli.

Secondary outcome

The 1st secondary study parameter/endpoint is taste activation in response to caloric and non-caloric stimuli during hunger and during satiety.

The 2nd secondary study parameter/endpoint is the correlation between taste activation in response to exposure to caloric and non-caloric stimuli and subject characteristics like reward sensitivity and impulsivity.

Study description

Background summary

Humans easily prefer and select carbohydrate rich foods because of their inborn preference for sweet taste. However, recently done studies indicate that a nongustatory factor, caloric content, might also play a role in the formation of preference for these foods. Nutritive and non-nutritive sweeteners have been shown to differentially affect brain activation during oral exposure. Furthermore, oral exposure to a carbohydrate solution during exercise improved performance, but oral exposure to an artificial sweetener solution did not. Above findings suggest the existence of an oral carbohydrate receptor that responds to carbohydrates rather than to sweetness. However, whether this

receptor responds to all carbohydrates or only to specific ones, and whether energy (carbohydrate) sensing takes place in the absence of sweetness is not yet known.

Study objective

The primary objective of this study is to assess whether oral exposure to caloric and non-caloric stimuli elicits discriminable responses in the brain independent of sweetness. This knowledge will help us to better understand the role of energy sensing in the formation of food preferences and food selection.

The 1st secondary objective is to determine the effect of hunger on taste activation in response to caloric and non-caloric stimuli, i.e. to establish whether there is an interaction between hunger and stimulus energy content.

The 2nd secondary objective is to establish in how far subject characteristics like reward sensitivity and impulsivity correlate with brain responses elicited by tasting caloric and non-caloric stimuli.

Study design

The study has a randomized crossover design (within subject design) in which participants taste a fixed amount of six food stimuli during a scan session on two occasions, while hungry and while sated. Stimuli are subdivided in (i) three sweet caloric food-stimuli (solutions of glucose, fructose and maltodextrin + sucralose), (ii) one non-sweet caloric food-stimulus (solution of maltodextrin), (iii) one sweet non-caloric food-stimulus (solution of sucralose) and (iv) one non-sweet non-caloric food-stimulus that is perceived as neutral (control stimulus: water). The order in which participants are exposed to these stimuli is randomized and counterbalanced. During a sensory test subjective ratings for the food stimuli are obtained and individual taste thresholds are assessed.

Intervention

There are two interventions:
-Honger and sated; Participants will undergo one scan while sated (a meal will be offered to the participants by the researchers) and one scan while hungry.
-Exposure to divers types of sugars and sweeteners; during the two scans different types of sugars and sweeteners will be offered to the participant in a randomized order.

Study burden and risks

The study will consist of an intake session (approx. 45 min), a training session (approx. 30 min), a sensory test (approx. 45 min) and the actual

experiment (hunger scan session: approx. 60 min; sated scan session: approx. 90 min) on separate days. Participants will visit the sensory laboratory in Wageningen once to take the sensory test. For the fMRI experiment, participants will visit the MRI facility in Hospital Gelderse Vallei (Ede) twice. During fMRI subjects will taste the stimuli, and rate their pleasantness (liking), desirability (wanting) and sweetness. The study is non-therapeutic to the participants. The risk associated with participation is negligible.

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

See page 8 and 9 of the protocol
-Gender: female
-Age: 18-35 year

-BMI: 18.5-25.0 kg/m2
-Healthy (as judged by the participant)

Exclusion criteria

See page 9 and 10 of the protocol
-Restraint eating (women: score > 2.80)
-Lack of appetite
-Having difficulties with swallowing/eating
-Usage of an energy restricted diet during the last two months
-Weight loss or weight gain of 5 kg or more during the last two months
-Stomach or bowel diseases
-Diabetes, thyroid disease, other endocrine disorders
-Having a history of neurological disorders
-Having taste or smell disorders
-Usage of daily medication other than oral contraceptives or paracetamol
-Being pregnant or lactating
-Smoking more than one cigarette/cigar a day
-Being allergic/intolerant for products under study
-Exclusive consumption of *light* versions of products
-Avoidance of *light* versions of products
-Working at the Division of Human Nutrition (WUR)
-Current participation in other research from the Division of Human Nutrition (WUR)
-Having a history of or current alcohol consumption > 28 units per week
-Having a contra-indication to MRI scanning

Study design

Design

Study type:	Interventional
Intervention model:	Crossover
Masking:	Open (masking not used)
Control:	Uncontrolled
Primary purpose:	Other

Recruitment

NL
Recruitment status: Recruitment stopped

Start date (anticipated):	13-11-2012
Enrollment:	30
Type:	Actual

Ethics review

Approved WMO Date:	02-11-2012
Application type:	First submission
Review commission:	METC Wageningen Universiteit (Wageningen)

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	NL41579.081.12