Effect of ResvidaTM on fat oxidation and mitochondrial biogenesis in healthy obese subjects

Published: 30-09-2009
Last updated: 06-05-2024

The objectives of the study are 1) whether ResvidaTM is capable of increasing mitochondrial content and function in healthy obese subject, 2) whether the ResvidaTM induced increase in mitochondrial content and function is accompanied by a better fat...

Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Lipid metabolism disorders
Study type	Interventional

Summary

ID

NL-OMON35600

Source
ToetsingOnline

Brief title
ResvidaTM and mitochondrial function

Condition

- Lipid metabolism disorders

Synonym
impaired fat oxidation, impaired lipid catabolism

Research involving
Human

Sponsors and support

Primary sponsor: Universiteit Maastricht
Source(s) of monetary or material Support: Ministerie van OC&W,TIFN

Intervention

Keyword: fat oxidation, lipid accumulation, lipolysis, mitochondrial biogenesis and function

Outcome measures

Primary outcome

The primary outcome parameter is the difference in mitochondrial number,

intrinsic function and fat oxidative capacity after a 4 week treatment with

ResvidaTM compared to the placebo trial.

Secondary outcome

Secondary endpoints are the differences in skeletal muscle and liver lipid

content, and lipolysis in skeletal muscle and adipose tissue after 4 weeks

ResvidaTM or placebo supplementation.

Study description

Background summary

There is now a general consensus that the combination of excessive energy intake and a low capacity to oxidize fat will lead to muscular fat accumulation and insulin resistance. It is known for many years that physical activity is the most powerful treatment to combat obesity and insulin resistance, but it is also known that it is difficult to get people to exercise. A major breakthrough in this field has come from the nutrition field, with the finding that resveratrol, a natural polyphenolic compound, could serve as an *exercise mimetic* by protecting mice from many detrimental effects of diet-induced obesity. Therefore we would like to investigate if resveratrol has the same effects in obese humans as it does in mice on a diet-induced-obesity diet. This information can then be used to develop new treatment for obesity. Therefore, we would like to investigate whether ResvidaTM can increase mitochondrial number together with an increased intrinsic activity and whether this will lead to a better control of fatty acid handling in muscle.

Study objective

The objectives of the study are 1) whether ResvidaTM is capable of increasing

mitochondrial content and function in healthy obese subject, 2) whether the ResvidaTM induced increase in mitochondrial content and function is accompanied by a better fat oxidation, and 3) whether ResvidaTM increased lipolysis in skeletal muscle and adipose tissue, thereby contributing to an improved fatty acid handling

Study design

18 Healthy obese (BMI 30-35 kg/m2) male subjects, aged between 45-65 years old, who are not engaged in regular programmed exercise are included in a randomized, double blind cross-over design. Each subject will participate in two interventions, in random order, en separated by a wash-out period of at least 4 weeks. Each intervention period includes a 4 week (30 days) supplementation with ResvidaTM or placebo. Before the start of the study, subjects will be screened to access eligibility, which will a include a medical questionnaire, a measurement of body weight and body composition (DEXA scan) to determine fat content and drawing of a fasted blood sample. On day 0 subjects will come to the university. A fasted blood sample will be drawn and body weight will be checked. Hereafter, subjects will be offered a breakfast. After consumption of the breakfast subjects will be asked to perform a maximal aerobic capacity test. Before the test begins, heart rate and blood pressure will be checked. During the test an ECG will be performed by an experienced and trained person. Thereafter subjects can go home and they will receive enough capsules for the first week of the intervention.Additional bloodsamples will be taken weekly as well as a body weight measurement (day 7, 14, 21). During these weekly visits, subjects will receive enough capsules for the next week. On day 25 in vivo mitochondrial function and liver fat content will be measured with MR spectroscopy. On day 28, in the evening, subjects will stay in the respiration chamber during 36 hours and energy expenditure and fat oxidation will be measured. During the stay in the respiration chamber blood will be sampeled every 12 hours and during the last 24 hours urine will be collected voor measurement of protein loss and for the measurement of metabolomics. On day 30, in the morning, subjects will leave the respiration chamber and a blood sample will be taken for measurement of total blood cell count, coagulants, electrolytes, liver- and kidney function. In addition, an ECG will be performed and blood pressure and heart rate will be measured. Thereafter, a muscle biopsy will be taken and subsequently the microdialysis trial will be started in which lipolysis in muscle en adipose tissue will be measured. At the end of the microdialysis trial, a fat biopsy will be taken.

Intervention

Subjects will receive ResvidaTM or placebo in random order. ResvidaTM is a food supplement and is regulated as a food component. ResvidaTM and placebo are supplied by DSM Nutritional Products, ltd. For the product ResvidaTM the maximal approved daily dosage in humans is 150 mg/ day. For higher doses the

safety concerns are not yet investigated. Therefore, we have chosen to supplement the subjects with a dose of 150 mg/ day, spread out over doses of 75 mg twice a day with lunch and diner.

Study burden and risks

Before the start of the study, subjects will be screened to access eligibility which will include a medical questionnaire, measurement of body weight and body composition (DEXA scan). A fasted bloodsample will also be drawn (duration: 1 hour). Thereafter, they will be randomized and undergo two intervention periods of 4 weeks separated by a wash-out period of at least 4 weeks. The subjects will come to the University 6 times (day 0, 7, 14, 21, 25, 28). During these visits at the University, a bloodsample will be taken weekly as well as a weekly measurement of body weight (day 0, 7, 14, 21), a maximal aerobic capacity test will be performed (day 0) and in vivo mitochondrial function and liver fat content will be measured with MRS (day 25). In addition, subjects will stay in the respiration chamber for 36 hours (2 nights and 1 day) (day 28-30) after which a muscle biopsy will be taken and the microdialysis trial will be started. At the end of the microdialysis trial, a fat biopsy will be taken.

Contacts

Public
Universiteit Maastricht

P.O Box 616
6200 MD Maastricht
Nederland
Scientific
Universiteit Maastricht

P.O Box 616
6200 MD Maastricht
Nederland

Trial sites

Listed location countries

Netherlands

Eligibility criteria

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

Inclusion criteria

* Male sex
* Age 45-65 years
* Body fat percentage > 25, BMI 30-35 kg/m2
* Sedentary
* Stable dietary habits
* Willingness to abstain from ingestion of resveratrol-containing foods
* Healthy

Exclusion criteria

* Female sex
* Unstable body weight (weight gain or loss > 3 kg in the last three months)
* Total body fat (%) < 25%
* Fasting plasma glucose > 6.1 mmol/l
HB < 7.8 mmol/l
* Engagement in programmed exercise > 2 hours total per week
* Impaired kidney and/ or hepatic function
* First- or second-degree family member with type 2 diabetes mellitus
* Any medical condition requiring treatment and/or medication use
* Intake of dietary supplements except vitamins and minerals
* Unwilling to restrict high-resveratrol-containing foods
* Current alcohol consumption > 20 grams/day
* Participation in another biomedical study within 1 month before the first screening visit
* A contraindication to MRI scanning. These contra-indications include patients with the following devices:
o Central nervous system aneurysm clips
o Implanted neural stimulator
o Implanted cardiac pacemaker of defibrillator
o Cochlear implant
o Insulin pump
o metal containing corpora aliena in the eye or brains

Study design

Design

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

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	10-11-2009
Enrollment:	18
Type:	Actual

Ethics review

Approved WMO

Date:	30-09-2009
Application type:	First submission
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	NL28654.068.09
Other	www.clinicaltrials.gov