One night of partial sleep restriction: effects on metabolism, mood, and stress responsiveness

No registrations found.

Ethical review	Positive opinion
Status	Other
Health condition type	-
Study type	Interventional

Summary

ID

NL-OMON25362

Source
NTR

Health condition

Sleep; metabolism; mood; stress
Slaap; metabolisme; stemming; stress

Sponsors and support

Primary sponsor: Leiden University Medical Center
Source(s) of monetary or material Support: The study is co-financed by Unilever.

Intervention

Outcome measures

Primary outcome

- Metabolic flexibility; measured as change in RQ and lipid levels after a standard meal

- Stress responsiveness; measured as change in stress hormones, heart rate and blood pressure after a mild physical stressor

Secondary outcome

- Tissue ageing; measured in skin

- Intracellular metabolic pathways; measured in subcutaneous white fat and skeletal muscle tissue

- Circadian rhythm in hormone and skin temperature rhythms

Study description

Background summary

In modern daily life, incidental short sleep duration has become a common feature. Chronic short sleep duration is associated with a many adverse health effects, including metabolic disturbances such as obesity, type 2 diabetes and cardiovascular diseases, as well as disturbances in the stress system, negative mood and tissue ageing. These associations may be explained by metabolic disturbances caused by repeated incidental short sleep duration.

This study aims to investigate the effects of a single night of short sleep on metabolism, mood and stress responsiveness. To this end, we will include healthy participants in a cross-over intervention trial and subjects participants to both short and normal sleep.

Study objective

We hypothesize that a single night of short sleep duration (4 hours), compared to normal sleep duration (8 hours) reduces metabolic flexibility, increases insulin resistance and thereby reduces HPA-reactivity. Furthermore, we hypothesize that a single night of short sleep will negatively affect mood and tissue ageing due to dysregulation of HPA-axis. Since BMI is correlated with metabolic inflexibility and insulin resistance, we hypothesize that individuals with a higher BMI will show a more detrimental effect of short sleep on metabolism, HPA-axis reactivity and downstream effects on mood and tissue ageing, than individuals with a lower BMI.

Study design

Outcome parameters will be measured on the day immediately following the sleep intervention.

Intervention

One night of short sleep (4h) will be compared to one night of normal sleep (8h).

Contacts

Public
Albinusdreef 2 / 2333 ZA Leiden

Rosa van den Berg
Dept. of Medicine, Division of Endocrinology and Einthoven Laboratory for Experimental Vascular Medicine
Leiden University Medical Center

P.O.Box 9600

Leiden 2300 RC
The Netherlands
0031 (0) 71- 5268172
Scientific
Albinusdreef 2 / 2333 ZA Leiden

Rosa van den Berg
Dept. of Medicine, Division of Endocrinology and Einthoven Laboratory for Experimental Vascular Medicine
Leiden University Medical Center

P.O.Box 9600

Leiden 2300 RC
The Netherlands
0031 (0) 71- 5268172

Eligibility criteria

Inclusion criteria

- Informed consent

- Male Caucasian

- Age between 18 and 55 years

- BMI between 20 and 35 kg/m2

Exclusion criteria

- Active endocrine disease (e.g. diabetes mellitus type 1 and type 2, thyroid disease, any signs of Cushing’s syndrome, adrenal disease and lipid-associated disorders such as FH)

- Fasting glucose >7.0 mmol/L

- Severe chronic disease (e.g. chronic liver or kidney disease)

- Severe insomnia, sleep disorders or exceptional habitual sleep duration (<6 or >10 h).

- Medication use including the following: lipid lowering drugs, glucocorticoids, sleep medication, hormone replacement, glucose lowering drugs, insulin therapy, antidepressants and psychotropic drugs (last 6 weeks)), anti-coagulants

- Recent time zone travel (last 6 weeks)

- Shift work (last 6 weeks)

- Severe alcohol use (>21 units/week)

- Psychiatric disease

- Drug abuse

- Recent participation to another nutritional or biomedical trial (last 6 weeks)

- Medication use which may interfere with study measurements, as judged by the responsible physician

- Reported weight loss or weight gain (10%) in the last six months prior to the pre-study screening

- Clinically relevant abnormalities in clinical chemistry at screening (to be judged by the study physician)

- Reported use of any nicotine containing products in the six months preceding the study and during the study itself;

- Extreme strenuous exercise during last 3 months, as judged by responsible physician

- Excessive sunbathing during last 3 months, as judged by responsible physician.

Study design

Design

Study type:	Interventional
Intervention model:	Crossover
Allocation:	Non controlled trial

Control: N/A , unknown

Recruitment

NL

Recruitment status:	Other
Start date (anticipated):	01-05-2016
Enrollment:	36
Type:	Unknown

Ethics review

Positive opinion

Date:	06-04-2016
Application type:	First submission

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
NTR-new	NL5680
NTR-old	NTR5824
Other	ABR dossiernummer NL55111.058.15 : Protocol-ID P15.353

Study results

Summary results

Donga,E., van,D.M., van Dijk,J.G., Biermasz,N.R., Lammers,G.J., van Kralingen,K.W., Corssmit,E.P., and Romijn,J.A. (2010a). A single night of partial sleep deprivation induces insulin resistance in multiple metabolic pathways in healthy subjects. J Clin Endocrinol. Metab 95, 2963-2968.

Donga,E., van,D.M., van Dijk,J.G., Biermasz,N.R., Lammers,G.J., van,K.K., Hoogma,R.P., Corssmit,E.P., and Romijn,J.A. (2010b). Partial sleep restriction decreases insulin sensitivity in type 1 diabetes. Diabetes Care 33, 1573-1577.