Genetic influences on autonomic nervous system activity and the pro-inflammatory state: the moderating role of mental health status.

Published: 09-09-2010
Last updated: 03-05-2024

We will test a new theoretical model that assumes that mental health status interacts with the genetic factors influencing sympathovagal balance and the pro-inflammatory state. The results will be published in scientific magazines, and/or presented...

Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Cardiac disorders, signs and symptoms NEC
Study type	Observational non invasive

Summary

ID

NL-OMON34118

Source
ToetsingOnline

Brief title
Twin family research on mental and physical health

Condition

- Cardiac disorders, signs and symptoms NEC
- Immunodeficiency syndromes
- Mood disorders and disturbances NEC

Synonym
cardiovascular disease depression

Research involving
Human

Sponsors and support

Primary sponsor: Vrije Universiteit
Source(s) of monetary or material Support: VU-AMS research fund (3e geldstroom;salary PhD) + NWO-BBMRI (3e geldstroom;49870 Euro)

Intervention

Keyword: autonomic nervous system, genetics, mental health, pro-inflammatory state

Outcome measures

Primary outcome

Autonomic Nervous System:

- Heart rate,

- Heart Rate Variability (Total IBI Power, SDNN, RMSSD, HF-IBI power, LF-IBI

power, VLF-IBI power, peak-valley RSA), Respiration Rate,

- Systolic and Diastolic BP

- Pre-ejection period (PEP)

- Left ventricular ejection time (LVET)

- Cardiac autonomic balance (CAB)

- Cardiac autonomic regulation (Co-AR)

Pro-inflammatory state:

- TNFa,

- IL-6,

- soluble IL-6 receptor,

- CRP,

- Fibrinogen

Mental health:

- Spielberger Trait Anxiety Inventory

- YASR anxious/depression subscale

- EPQ neuroticism subscale

- Rosenberg Self-esteem

- Happiness Scale

- Satisfaction with Life

Covariates:

- Sex and age

- Socioeconomic status (educational attainment, current profession)

- Regular leisure time exercise

- Major stressful life events

- Body Mass Index & Waist-Hip Ratio

- Current smoking & alcohol use

- Medication use (current)

- Pittsburg Sleep Quality Inventory (PSQI)

- Groningse Slaap Kwaliteit Lijst (GSKL)

- POMS (Profile Of Mood States) * shortened version

- Cortisol (Awakening levels + AUC)

Secondary outcome

None

Study description

Background summary

Repeated and prolonged sympathetic nervous system (SNS) activity coupled to decreased parasympathetic nervous system (PNS) activity and the presence of low-grade inflammation both lead to an increase in the risk for cardiovascular disease.
Genetic association and family studies suggest that genetic factors are a source of individual differences in pro-inflammatory status as well as autonomic nervous system activity, although a large scale twin study on these traits has not yet been undertaken. Based on theoretical notions, poor mental health state has been cited as a second potential contributor to chronic low-grade inflammation as well as to a shift towards higher sympathetic and lower vagal cardiac control. To date the empirical evidence for this notion is weak, and the observed association between mental health and sympathovagal balance or inflammatory cytokines or acute phase reactants are modest at best. Here we propose a new theoretical model that assumes that mental health status interacts with the genetic factors influencing sympathovagal balance and the pro-inflammatory state. We will use the twin-sibling design to determine the genetic main effects and the gene-by-mental-health interaction effects on individual differences in 1) pro-inflammatory cytokines and acute phase proteins, and 2) 24-hour cardiac sympathovagal balance. We will further test the hypothesis that sympathovagal balance and the pro-inflammatory state can exert a mutual influence on each other.
Previous cross-sectuonal studies have already suggested an association between these two sets of risk factors, but the causality of this association is unclear. To test bidirectional causality we will combine existing data on the sympathovagal balance at baseline in 1998-2003 and inflammation at a first follow-up in 2004-2008 to a new round of data collection of sympathovagal balance in a second follow-up in twins in 2010-2012. During the new study we will collect:
1. 24-hour electrocardiogram and impedancecardiogram measurements by means of the ambulatory VU-AMS device to assess heart rate variability (RSA) as a measure of cardiac vagal control and the pre-ejection period (PEP) as a measure of cardiac sympathetic control.
2. Mental health status using validated Dutch translations of the Spielberger Trait Anxiety Inventory, the YASR anxious/depression subscale, the EPQ neuroticism scale, the
Rosenberg Self-esteem questionnaire, the Happiness and
Satisfaction with Life scales.
3. A number of covariates including sex and age, socioeconomic status (educational attainment, current profession), regular exercise behavior, major life events, body mass index and waist-hip ratio, blood pressure, salivary cortisol, current medication use, and sleep quality.

Study objective

We will test a new theoretical model that assumes that mental health status interacts with the genetic factors influencing sympathovagal balance and the pro-inflammatory state. The results will be published in scientific magazines, and/or presented at congresses, and can be of importance in the prevention of depression and cardiovascular disease.

Study design

During the new study we will collect the following data in 160 MZ twins, 100 DZ twins and 160 siblings:
1. 24-hour electrocardiogram and impedancecardiogram measurements by means of the ambulatory VU-AMS device to assess heart rate variability (RSA) as a measure of cardiac vagal control and the pre-ejection period (PEP) as a measure of cardiac sympathetic control.
2. Mental health status using validated Dutch translations of the Spielberger Trait Anxiety Inventory, the YASR anxious/depression subscale, the EPQ neuroticism scale, the
Rosenberg Self-esteem questionnaire, the Happiness and
Satisfaction with Life scales.
3. A number of covariates including sex and age, socioeconomic status (educational attainment, current profession), regular exercise behavior, major life events, body mass index and waist-hip ratio, blood pressure, salivary cortisol, current medication use, and sleep quality.

Study burden and risks

There are no familiar risks in measuring ECG or ICG with external electrodes.

The burden for the subjects is kept at a minimum by using nonivasive techniques and a small measurement apparatus. In addition, the duration of the study is being kept at a minimum because subjects are visited at home.

Contacts

Public
Vrije Universiteit

van der boechortstraat 1
1081 BT Amsterdam
NL
Scientific
Vrije Universiteit

van der boechortstraat 1
1081 BT Amsterdam
NL

Trial sites

Listed location countries

Netherlands

Eligibility criteria

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

Inclusion criteria

Twin or sibling of twin, registered in the Netherlands Twin Registry (NTR), previous participation in NTR BioBank, 18-50 years of age, living in the Netherlands

Exclusion criteria

Pregnancy, current heart disease, pacemaker or metal objects due to bone fracture

Study design

Design

Study type: Observational non invasive

Masking:	Open (masking not used)
Control:	Uncontrolled
Primary purpose:	Basic science

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	01-11-2010
Enrollment:	600
Type:	Actual

Ethics review

Approved WMO

Date:	09-09-2010
Application type:	First submission
Review commission:	METC Amsterdam UMC

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	NL33117.029.10