Effects of Methylphenidate and Sulpiride on Brain and Cognition: An exploratory PET, Pharmaco-fMRI Study

No registrations found.

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

Summary

ID

NL-OMON28994

Source
NTR

Brief title
Baseline dopmaine and cognition

Health condition

Dopamine, cognition, working memory, striatum

Sponsors and support

Primary sponsor: Donders Institute for Brain, Cognition, and Behaviour, Centre for Cognition, Radboud University Nijmegen
Source(s) of monetary or material Support: NWO

Intervention

Outcome measures

Primary outcome

Develop a proxy model of dopamine synthesis capacity, consisting of an optimal combination of behavioural and physiological assessments/predictors that account for as much of the

variance in dopamine synthesis capacity as possible.

Effects of methylphenidate and sulpiride on brain activity and/or behavioural performance on a battery of computerized tasks:

1. Working memory performance

2. Mental motivation (mental effort discounting task)

3. Reward learning (Reversal learning task)

4. Motor motivation (monetary incentive delay task)

Baseline personality questionnaires:

• The Beck Depression Inventory (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961);

• Positive and negative affect scale (Watson et al., 1988)

• The BIS/BAS (Behavioural Inhibition Scale/Behavioural Activation (BIS/BAS) Scale (Carver & White, 1994);

• The Barratt Impulsiveness Scale (Patton, Stanford, & Barratt, 1995);

• Need for Cognition Scale (Cacioppo, Pettz, and Kao, 1984)

• Kaufman Domains of Creativity Scale (Kaufman, 2012)

Baseline assessment of executive function

- Listening span (Daneman and Carpenter, 1980);

- Digit Span (Wechsler 2008);

- Dutch Adult reading test (NLV - Schmand et al., 1991);

- WAIS IV Dutch Adult intelligence scale (Wechsler, 1997);

Baseline assessment of physiological function

- Eye blink rate (Groman et al., 2014)

Secondary outcome

Effects of methylphenidate and sulpiride on behavioural performance on a battery of computerized tasks:

5. Reinforcement learning (Probabilistic selection (RL) task)
6-8. Creativity tasks

Baseline assessment of instrumental behaviour

1. Motivational influences on instrumental behaviour (Pavlovian-instrumental transfer)

Methylphenidate and sulpiride-induced changes in mood and physiological measures

- Positive Affect Negative Affect (PANAS; Watson et al., 1988);

- Mood rating scale (Bond & Lader, 1974);

- Changes in blood pressure, heart rate and body temperature;

- Medical symptoms visual analogue rating scale.

Baseline assessment of various behavioral measures (e.g., social media app use)

Study description

Background summary

Failures of cognitive control are common, not only in neuropsychiatric disorders, but also in the healthy population. These can be remediated with dopaminergic drugs, such as methylphenidate and sulpiride, but there is huge individual variability in the direction and extent of dopaminergic drug effects. We aim to establish the baseline dependency of these dopaminergic drugs, and to develop a proxy-model of baseline dopamine based on machine learning methods, which would provide us with behavioural predictors of the effects of dopaminergic drugs on brain and cognition that maximally generalize to new participants.

Study objective

-

Study design

5 separate time points; 1 intake session, 3 session with drug and placebo condition, F-DOPA PET session. Total testing time: 2.5-6 hours per session, total about 25 hours per participant, at least 1 week in between sessions, with the aim to finish testing within 3 months per participant.

Intervention

Participants will take part in an intake screening, and if included, they will complete a battery of computerized tests after administration of methylphenidate / sulpiride / placebo, in and outside an fMRI scanner, at three separate occasions. Participants will also take part in one F-DOPA PET scan session where entacapone and carbidopa will be administered prior to PET scanning. On the days preceding testing, subjects will have to adhere to some simple restrictions with respect to medication, alcohol and drug intake.

Contacts

Public
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-
Scientific
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Roshan Cools
Nijmegen
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-

Eligibility criteria

Inclusion criteria

1. Healthy volunteers;

2. Age 18 - 45 years;

3. Predominantly right-handed

4. Normal or corrected-to-normal vision;

5. Normal uncorrected hearing;

6. Willingness and ability to give written informed consent and willingness and ability to understand the nature and content, to participate and to comply with the study requirements.

Exclusion criteria

Diagnosis (or history of) psychiatric treatment (e.g., severe depression, anorexia nervosa, severe mood disorders, mania, schizophrenia or borderline personality disorder) / Diagnosis (or history of) neurological treatment / Diagnosis (or history of) endocrine treatment / Diagnosis (or history of) neuroendocrine treatment (e.g., phechromocytoma, hyperthyroidism, Cushing's syndrome) / (History of) melanoma / Presence of prolactin-dependent tumors (e.g., pituitary prolactinoma or breast cancer) / (History of) requent autonomic failure (e.g., vasovagal reflex syncope) / (History of) clinically significant hepatic, cardiac, obstructive respiratory, renal, cerebrovascular, cardiovascular, metabolic, ocular or pulmonary disease/disorders / (History of) epilepsy in adulthood (i.e. no insult after 18 years of age, no current medication for epilepsy and no insult in the last five years) / (History of) drug dependence (opiate, LSD, (meth)amphetamine, cocaine, solvents, or barbiturate) or alcohol dependence / (History of) Raynaud's syndrome / Hypersensitivity to sulpiride, methylphenidate, entacapone, or sulpiride / One first degree or two or more second degree family members with a history of sudden death or ventricular arrhythmia / Suicidality / History of prescribed medication within the last month prior to the start of the study. / History of 'over the counter' medication within the last two months (with exception of occasional use of paracetamol, acetylsalicylic acid, and ibuprofen). / Use of MAO inhibitor, anaesthetic, anti-depressant or anti psychotic drugs within the week prior to the start of the study. / Average use of psychotropic medication or recreational drugs weekly or more. / Cannabis use within 2 weeks prior to the start of the study, and periods of more than 3 months using weekly or more in the last 6 months / Use of psychotropic medication, or of recreational drugs over a period of 72 hours prior to the test sessions, and use of alcohol within the last 24 hours before each measurement. / Average use of more than 3 alcohol beverages daily. / Average use of psychotropic medication or recreational drugs weekly or more. / Habitual smoking, i.e., more than a pack of cigarettes per week a self-reported inability or unease to cease smoking for 24 hours to testing. / Regular use of corticosteroids. / Uncontrolled hypertension, defined as diastolic blood pressure at rest > 95 mmHg or systolic blood pressure at rest > 180 mmHg / Hypotension, defined as diastolic blood pressure < 50 mm Hg or systolic < 95 mm Hg or resting pulse rate < 45 beats/min / Diabetes / Abnormal hearing or (uncorrected) vision. / First degree family member with schizophrenia, bipolar disorder or major depressive disorder

Study design

Design

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

Recruitment

NL

Recruitment status:	Pending
Start date (anticipated):	10-02-2017
Enrollment:	100
Type:	Anticipated

IPD sharing statement

Plan to share IPD: Undecided

Ethics review

Positive opinion

Date:	27-12-2016
Application type:	First submission

Study registrations

Followed up by the following (possibly more current) registration

ID: 43196
Bron: ToetsingOnline
Titel:

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
NTR-new	NL5959
NTR-old	NTR6140
CCMO	NL57538.091.16
OMON	NL-OMON43196

Study results