Neuronal communication in Autism Spectrum Disorders: synchrony and coherence in the motor system

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Ethical review	Approved WMO
Status	Will not start
Health condition type	Developmental disorders NEC
Study type	Observational non invasive

Summary

ID

NL-OMON32406

Source
ToetsingOnline

Brief title
Neuronal communication in Autism Spectrum Disorders

Condition

- Developmental disorders NEC

Synonym
autism, Pervasive developmental disorder

Research involving
Human

Sponsors and support

Primary sponsor: Universitair Medisch Centrum Sint Radboud
Source(s) of monetary or material Support: Ministerie van OC&W,Karakter;kinder- en jeugdpsyciatrische instelling

Intervention

Keyword: autism spectrum disorders, coherence, connectivity, synchrony

Outcome measures

Primary outcome

(1) Time-frequency analyses will be applied to calculate MEG power in a given frequency band (beta), over a given timeinterval for a given group of sensors. Mean beta-power will be calculated for each group and compared between groups. (2) Coherence between MEG signals recorded over motorcortex and EMG signals recorded at the right first dorsal interosseus (FDI) muscle will be calculated. Mean coherence for a given time and frequency interval will be calculated for each group and comparisons will be made.

Secondary outcome

not applicable

Study description

Background summary

Autism Spectrum Disorders (ASD) are a group of developmental disorders classically defined in terms of a triad of impairments in social interaction, communication and behavioural flexibility (DSM IV). Besides these core impairments, abnormalities are also seen in several other behavioural and neuropsychological domains like the sensory and motor domain. Research from different fields (e.g. genetics, neurochemistry and neuroimaging) suggests that ASD are based on a pathophysiological substrate that affects brainfunction globally. One theory that has received a lot of attention is the *disconnectivity theory*. This theory states that functional brain areas are underconnected in autism, while connections within functional areas would be atypically strong causing dysfunctional neuronal communication and collaboration. Because synchronization of oscillatory neuronal activity is thought to be a mediator of effective neuronal communication the theory is formulated that atypical synchronization plays part in ASD being a

disconnectivity disorder. However, more research is needed to test this hypothesis, focusing on both short-range and long-range synchronization between neuronal groups.

Study objective

The overall objective of this study is to increase our understanding of the neural basis of ASD. The first main objective is to test the hypothesis that ASD, compared to a contrast group (ADHD) and a healthy control group, is based on dysfunctional neuronal connectivity, in which local and long-range neuronal synchrony is disturbed. The second main objective is to test the hypothesis that motor impairments in autism are correlated to dysfunctional synchronization and that, while motor impairments decrease with age, dysfunctions in synchronization too decrease with age.

Study design

To test our hypotheses the motor system will serve as a modelsystem to measure on. Synchronization patterns over motorcortex and coherence between neuronal activity in motorcortex and spinal alpha-neurons will be characterized during a simple motortask using magnetoencephalography (MEG) and electromyography (EMG).

Study burden and risks

MEG/EMG recording sessions will take no longer than 45 minutes divided into three blocks with brakes in between. Answering questionaires will take approximately half an hour. The proposed study includes brain imaging procedures that have already been applied to a very large scale in normal subjects and in subjects with various conditions (including ASD), and without side-effects or unwanted effects. The staffs of the FC Donders Centre and the Department of Psychiatry (including Karakter Child and Adolescent Psychiatry) have considerable expertise in the application of these brain imaging procedures, and scientific research with patients with ASD. The proposed study does not include invasive measures. The anticipated scientific merits justify the proposed study, in spite of the fact that no therapeutic or other direct benefit to the participants is to be expected.

Contacts

Public
Universitair Medisch Centrum Sint Radboud

postbus 9101

6500 HB Nijmegen
Nederland
Scientific
Universitair Medisch Centrum Sint Radboud

postbus 9101
6500 HB Nijmegen
Nederland

Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adolescents (12-15 years)
Adolescents (16-17 years)
Children (2-11 years)

Inclusion criteria

(1) To be included in the Autism Spectrum Disorders- group the participant should meet criteria for Autistic disorder or Asperger Disorder as specified in the DSM-IV. To be included in the ADHD-group the participant should meet criteria for ADHD as specified in the DSM-IV. (2) Age between 8 and 18 years old.

Exclusion criteria

ASD-group: Co-morbid neuropsychiatric disorders like ADHD, tic-disorders and epilepsy.
ADHD-group: Co-morbid neuropsychiatric disorders like ASD, tic-disorders and epilepsy.
Typically developed group: neuropsychiatric disorders like ASD, ADHD, tic-disorders and epilepsy.

Study design

Design

Study type:	Observational non invasive
Intervention model:	Other
Allocation:	Non-randomized controlled trial
Masking:	Open (masking not used)
Control:	Active
Primary purpose:	Basic science

Recruitment

NL

Recruitment status:	Will not start
Start date (anticipated):	01-01-2008
Enrollment:	60
Type:	Anticipated

Ethics review

Approved WMO

Application type:	First submission
Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)

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	NL20667.091.07