Investigation on white matter integrity in autism with diffusion-weighted magnetic resonance imaging

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Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Other condition
Study type	Observational invasive

Summary

ID

NL-OMON34688

Source
ToetsingOnline

Brief title
White Matter Integrity in Autism

Condition

- Other condition
- Developmental disorders NEC

Synonym
Autism

Health condition

neurosciences

Research involving
Human

Sponsors and support

Primary sponsor: Universitair Medisch Centrum Groningen
Source(s) of monetary or material Support: NWO MaGw 400-08-089

Intervention

Keyword: autism, connectivity, white matter

Outcome measures

Primary outcome

Diffusion-weighted images will be analyzed to estimate voxelwise diffusion parameters and connectivity distributions, as well as indices of whole brain connectivity. These results, as well as other structural, functional and behavioral parameters, will be compared between healthy individuals and autistic patients by means of standard parametric and nonparametric statistical procedures.

Secondary outcome

n.a.

Study description

Background summary

Patients with a diagnosis of autism spectrum disorder display deficits in social interaction and language production, as well as in other highly integrative cognitive functions, reflected in stereotyped and repetitive behaviours. In recent years it has been proposed that these symptoms could be due to an imbalance of the ratio between short and long range information transfer and processing in the brain. New techniques to analyze diffusion-weighted magnetic resonance (DW-MRI) images can now be used to examine structural integrity parameters of specific white matter fiber bundles in the brain, as well as to recover probabilistic maps of the anatomical connectivity of specific brain regions. These tools are therefore suitable to test the underconnectiv-ity/overconnectivity hypothesis which has been advanced

for autism spectrum disorder.

Study objective

We aim at performing a thorough analysis of structural and hodological (i.e. connectional) properties of white matter in autistic patients, at the level of resolution allowed by diffusion-weighted MR images. This will include an analysis of integrity pa-rameters at the level of the single voxel and in specific fibre bundles. We will then per-form whole-brain tractography to quantify differences between healthy individuals and autistic patients in the ratio of long- and short-range anatomical connections as a function of the distance. We will also use the results from tractography to evaluate differ-ences in connectivity-based cortical parcellation. Our theoretical goal is to determine what kind of evidence can be found by means of DW-MRI which can be predicted by the underconnectivity/overconnectivity hypothesis.

Study design

For this study we will use diffusion-weighted and other structural (T1 and T2-weighted) and default-mode functional (EPI T2*-weighted) magnetic resonance images, as well as several behavioral parameters. The subject will not be required to perform any task inside the scanner.

Study burden and risks

The experiments will not entail more than minimal risk to the participants. The study is not intended to benefit the subjects directly. However, the data collected during this study could improve our understanding of autism and human cognition at large. In particular, this investigation could help us clarify why autistic individuals are unable to recognize the state of mind of someone else.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

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

Inclusion criteria

•Physically healthy males with IQ in the normal range
•Between 18 and 55 y.-o.
•DSM-IV diagnosis of Autism Spectrum Disorder established by an experienced clinician, and above cut-off scores on the ADOS for participants in the ASD group.
•Normal vision and hearing.

Exclusion criteria

•Neurological problems (including epilepsy),
•Use of drugs that may influence the task performance.
•MR incompatible implants in the body
•Claustrophobia
•The wish not to be informed of brain abnormalities that may be noticed in the scan
•(Suspected) Pregnancy
•Red tattoos

Study design

Design

Study type: Observational invasive

Intervention model:	Other
Allocation:	Non-randomized controlled trial
Masking:	Open (masking not used)

Primary purpose: Other

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	01-03-2011
Enrollment:	80
Type:	Actual

Ethics review

Approved WMO

Date:	16-04-2010
Application type:	First submission
Review commission:	METC Universitair Medisch Centrum Groningen (Groningen)

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	NL31577.042.10