Blood-brain barrier function: The key to successful cognitive aging?

No registrations found.

Ethical review	Positive opinion
Status	Recruitment stopped
Health condition type	-
Study type	Observational non invasive

Summary

ID

NL-OMON24107

Source Nationaal Trial Register

Brief title MAAS BBB

Health condition

Cognitive aging/ cognitieve veroudering

Blood-brain barrier leakage/ bloed-hersenbarrière lekkage

Sponsors and support

Primary sponsor: Maastricht University **Source(s) of monetary or material Support:** Nederlandse organisatie voor Wetenschappelijk Onderzoek (Research Talent Grant) and Maastricht University

Intervention

Outcome measures

Primary outcome

• Episodic memory

- Hippocampal volume
- Blood-brain barrier leakage

Secondary outcome

- Learning
- Basic processing speed
- Complex information processing inhibition
- Global cognition
- Cortical thickness
- WMHs
- Small cortical infarcts
- Lacunes
- Microbleeds
- Enlarged perivascular spaces
- White matter integrity

Study description

Background summary

The brain is vulnerable to age-related pathologies, which can result in cognitive decline. Nevertheless, some people age successfully, while others suffer substantially from this cognitive decline. To date, the exact mechanism of cognitive aging remains unclear. A potential initiating mechanism is Blood-Brain Barrier (BBB) breakdown. BBB breakdown can cause a suboptimal environment for neuronal cells and results in several pathological changes, which may eventually lead to neuronal damage and cognitive decline. Most techniques to detect BBB breakdown are not sensitive enough to detect the subtle leakage that characterizes normal aging, so that previous BBB studies did not focus on normal cognitive aging. A promising method to detect subtle BBB leakage in vivo in humans is Dynamic Contrast-Enhanced (DCE) Magnetic Resonance Imaging (MRI). Recently, we developed a new DCE MRI scan sequence, making our DCE MRI scan sensitive enough to detect subtle globally distributed leakage spots. We will use this innovative DCE MRI scan in a successfully aging sample. We have been allowed access to the MAastricht Aging Study (MAAS) database to collect our sample, which provides the unique opportunity of having a sample with cognitive pre-measurements already conducted from 1993 to 2005. We will use this information to investigate the association between BBB leakage and cognitive decline over the past 23 years and the association between BBB leakage and radiologically visible brain tissue abnormalities.

Study objective

Blood-brain barrier leakage is associated with cognitive decline and brain abnormalities during aging.

Study design

Two sessions with one week between sessions

Intervention

Participants will be subjected to blood sampling, neuropsychological assessment (approximately 60 minutes with five cognitive tests) and MRI scanning (approximately 60 minutes).

Contacts

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Eligibility criteria

Inclusion criteria

- Informed consent before participation
- Participation in 12-year follow-up of MAAS
- MMSE score ≥ 25
- DAD score > 90%

Exclusion criteria

• Contraindications for scanning (e.g. brain surgery; cardiac pacemaker; metal implants; claustrophobia; large body tattoos)

- Contraindications for the gadolinium-containing contrast agent (renal failure) as determined by the eGFR < 30 mL/min

• Diagnosis of dementia, prodromal dementia or MCI (in case of doubt, prof. dr. Frans R.J. Verhey will determine whether the participant may be included)

• Diagnosis of other psychiatric or neurological disorders (major depression (< 12 months); history of schizophrenia; bipolar disorder; psychotic disorder NOS or treatment for a psychotic disorder (< 12 months); cognitive impairment due to alcohol abuse; epilepsy; Parkinson's Disease; Multiple Sclerosis; brain surgery; brain trauma; past electroshock therapy; kidney dialysis; Menière's Disease; brain infections)

• Structural brain abnormalities, as is thus far known from the medical history or will later become evident on the scan.

• Cognitive impairment due to alcohol/drug abuse or abuse of other substances

Study design

Design

Study type:

Observational non invasive

Intervention model:	Parallel
Allocation:	Non controlled trial
Masking:	Open (masking not used)
Control:	N/A , unknown

Recruitment

NL	
Recruitment status:	Recruitment stopped
Start date (anticipated):	18-04-2017
Enrollment:	61
Туре:	Actual

Ethics review

Positive opinion	
Date:	24-03-2017
Application type:	First submission

Study registrations

Followed up by the following (possibly more current) registration

ID: 47086 Bron: ToetsingOnline Titel:

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

No registrations found.

In other registers

Register	ID
NTR-new	NL6358
NTR-old	NTR6542
ССМО	NL54944.068.16
OMON	NL-OMON47086

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Study results