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

Gepubliceerd: 24-03-2017 Laatst bijgewerkt: 15-05-2024

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

Ethische beoordeling	Positief advies
Status	Werving gestopt
Type aandoening	-
Onderzoekstype	Observationeel onderzoek, zonder invasieve metingen

Samenvatting

ID

NL-OMON24107

Bron
Nationaal Trial Register

Verkorte titel
MAAS BBB

Aandoening

Cognitive aging/ cognitieve veroudering

Blood-brain barrier leakage/ bloed-hersenbarrière lekkage

Ondersteuning

Primaire sponsor: Maastricht University
Overige ondersteuning: Nederlandse organisatie voor Wetenschappelijk Onderzoek (Research Talent Grant) and Maastricht University

Onderzoeksproduct en/of interventie

Uitkomstmaten

Primaire uitkomstmaten

• Episodic memory
• Hippocampal volume
• Blood-brain barrier leakage

Toelichting onderzoek

Achtergrond van het onderzoek

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.

Doel van het onderzoek

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

Onderzoeksopzet

Two sessions with one week between sessions

Onderzoeksproduct en/of interventie

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

Contactpersonen

Publiek

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Deelname eisen

Belangrijkste voorwaarden om deel te mogen nemen (Inclusiecriteria)

• Informed consent before participation

• Participation in 12-year follow-up of MAAS

• MMSE score ≥ 25

• DAD score > 90%

Belangrijkste redenen om niet deel te kunnen nemen (Exclusiecriteria)

• 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

Onderzoeksopzet

Opzet

Type:	Observationeel onderzoek, zonder invasieve metingen
Onderzoeksmodel:	Parallel
Toewijzing:	N.v.t. / één studie arm
Blindering:	Open / niet geblindeerd
Controle:	N.v.t. / onbekend

Deelname

Nederland

Status:	Werving gestopt
(Verwachte) startdatum:	18-04-2017
Aantal proefpersonen:	61
Type:	Werkelijke startdatum

Ethische beoordeling

Positief advies

Datum:	24-03-2017
Soort:	Eerste indiening

Registraties

Opgevolgd door onderstaande (mogelijk meer actuele) registratie

ID: 47086
Bron: ToetsingOnline
Titel:

Andere (mogelijk minder actuele) registraties in dit register

Geen registraties gevonden.

In overige registers

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

Resultaten