

Press release

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Basic information

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Department of: Clinical Medicine

Main supervisor: Associate Professor Simon Fristed Eskildsen

Title of dissertation: "Magnetic Resonance Imaging of Cortical Microcirculation, Brain Oxygenation and Neurodegeneration in Early and Advanced Alzheimer's Disease"

Date for defence: 15.11.2018 at (time of day): 14 Place: Palle Juul-Jensen auditoriet, Aarhus Universitetshospital, Bygning 10G, Nørrebrogade 44, 8000 Aarhus C.

Press release (Danish)

Undersøgelse af mikrocirkulation, iltning, proteinaflejring samt tab af hjernevæv i hjernebarken hos patienter med tidlig og fremskreden Alzheimers sygdom

Et nyt ph.d.-projekt fra Aarhus Universitet, Health benytter hjerneskaninger til at undersøge fordelingen af blod i hjernens mindste blodkar i relation til iltning, tilstedeværelse af skadelige proteinaflejringer samt svind af hjernebarken hos patienter med tidlig og fremskreden Alzheimers sygdom. Projektet er gennemført af Rune Bæksager Nielsen, der forsvare det d. 15/11 2018.

Alzheimer's sygdom er kendetegnet ved demens, svind af hjernen og ved ophobning af de skadelige proteiner amyloid- β og tau i hjernen. Desuden deler Alzheimers sygdom risikofaktorer med hjertekarsygdom og forskning peger på, at både struktur og funktion af hjernens mindste blodkar beskadiges tidligt i sygdomsforløbet. Dette ph.d.-projekt har med nyligt udviklede MR skanningsteknikker fundet, at hjernens blodgennemstrømningen er reduceret, samt at blodet fordeles uhensigtsmæssigt i småkarrene i hjernebarken hos patienter med Alzheimers sygdom. Den uhensigtsmæssige fordeling af blod var associeret med graden af patienternes kognitive symptomer og med udtynding af hjernebarken og synes at forringe hjernens ilttilbud. Resultaterne indikerer at reduceret ilttilbud som følge af forandringer i hjernens karsystem kan vise sig at representere en hidtil overset årsag til celledød og til ophobning af skadelige proteiner i hjernen hos patienter med Alzheimers sygdom. Således bør fremtidig forskning klarlægge årsagen til de fundne forandringer i hjernens blodkarsystem med henblik på udvikling af nye behandlingsstrategier.

Forsvaret af ph.d.-projektet er offentligt og finder sted den 15/11 2018 kl. 14:00 i Palle Juul-Hensen auditoriet, Aarhus Universitetshospital, Bygning 10G, Nørrebrogade 44, 8000 Aarhus C. Projektets danske titel er "Magnetisk resonans billedannelse af den kortikale mikrocirkulation, oxygenering og neurodegeneration i tidlig og fremskreden Alzheimers sygdom".

Yderligere oplysninger: Ph.d.-studerende Rune Bæksager Nielsen,
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Bedømmelsesudvalg:

Professor Jens Randel Nyengaard, Core Center for Molecular Morphology, Section for Stereology and Microscopy, Department of Clinical Medicine, Aarhus University Hospital, Denmark.

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Associate Professor Tim Bjørn Dyrby, Image Analysis and Computer Graphics section, Department of Applied Mathematics and Computer Science, Technical University of Denmark, Denmark.

Press release (English)

Magnetic Resonance Imaging of Cortical Microcirculation, Brain Oxygenation and Neurodegeneration in Early and Advanced Alzheimer's Disease

A new PhD-project from Aarhus University, Health uses brain imaging to investigate the distribution of blood among the smallest of blood vessels in the brain, in relation to tissue oxygenation, harmful protein deposition and atrophy of the cerebral cortex in patients with early and advanced Alzheimer's disease. The project was carried out by Rune Bæksager Nielsen, who is defending his dissertation on November 15th 2018 at 14:00 pm.

Alzheimer's disease is characterized by dementia, brain atrophy and by accumulation of the harmful proteins amyloid- β and tau in the brain. In addition, Alzheimer's disease shares risk factors with cardiovascular disease, and research suggests that both the structure and function of the brain's smallest blood vessel are impaired at early disease stages. Using novel MRI techniques, this PhD project found that the cerebral blood flow is reduced and further that the normal distribution of blood among the smallest blood vessels within the cerebral cortex of patients with Alzheimer's disease is disturbed. The disturbed blood distribution was associated with the degree of cognitive symptoms, with thinning of the cerebral cortex and appeared to reduce oxygenation of brain tissue. The results indicate that reduced oxygen supply resulting from an impairment of the brain's vascular system may represent a previously overlooked cause of brain damage and possibly a path to the characteristic accumulation of harmful proteins in the brains of patients with Alzheimer's disease. Thus, future research should clarify the cause of the discovered changes in the brain's vascular system with the goal of developing efficient treatment strategies.

The defence is public and takes place on November 15 2018 at 14:00 pm in the Palle Juul-Hensen auditorium, Aarhus Universitetshospital, Bygning 10G, Nørrebrogade 44, 8000 Aarhus C. The title of the project is "Magnetic Resonance Imaging of Cortical Microcirculation, Brain Oxygenation and Neurodegeneration in Early and Advanced Alzheimer's Disease". For more information, please contact PhD student Rune Bæksager Nielsen, email: rbaeksager@cfm.au.dk, Phone +45 5133 3440.

Assessment committee:

Professor Jens Randel Nyengaard, Core Center for Molecular Morphology, Section for Stereology and Microscopy, Department of Clinical Medicine, Aarhus University Hospital, Denmark.

Professor Oskar Hansson, Department of Clinical Sciences of Malmö and Lund, Lund University, Lund, Memory Clinic, Skåne University Hospital, Malmö, Sweden.

Associate Professor Tim Bjørn Dyrby, Image Analysis and Computer Graphics section, Department of Applied Mathematics and Computer Science, Technical University of Denmark, Denmark.

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