Investigating fornix integrity as a sensitive biomarker in individuals who show the earliest signs of Alzheimer’s disease

https://neurodegenerationresearch.eu/survey/investigating-fornix-integrity-as-a-sensitive-biomarker-in-individuals-who-show-the-earliest-signs-of-alzheimers-disease/

Name of Fellow

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Institution
Funder

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Contact information of fellow
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Canada

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Investigating fornix integrity as a sensitive biomarker in individuals who show the earliest signs of Alzheimer's disease

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Alzheimer's disease & other dementias

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Research Abstract
Alzheimer’s disease (AD) is the most common form of dementia characterized by memory loss and impairment in other thinking abilities. It affects over 25 million people worldwide and is expected to increase over time. Changes in the brain’s memory network begins a decade before AD symptoms emerge. Sensitive tools are needed to detect the earliest brain changes in individuals at risk for AD to enable immediate diagnosis and intervention. Brain imaging in individuals at risk for AD has focused on changes in the gray matter regions of the brain that support memory. However, abnormalities within the white matter tracts, which are bundles of nerve fibers that connect gray matter regions, are also affected by AD. Notably, these white matter changes may even precede gray matter changes. One white matter tract with particular promise for detecting early signs of AD is the fornix, the main outflow tract of the brain’s memory centre. Fornix abnormalities predict conversion from normal aging to mild cognitive impairment (MCI; a transitional state between normal aging and AD) and from MCI to AD. Because the fornix has been difficult to image with traditional brain imaging techniques, we still do not understand whether the fornix is altered before AD symptoms emerge. This study’s main goal is to identify very early signs of AD by measuring fornix abnormalities. We will use a custom-built Connectome scanner to provide very high quality imaging data (7.5x that of a clinical scanner) to improve detection of early white matter changes. We will examine fornix abnormalities in (1) healthy adults and in individuals with: (2) subjective memory concerns; (3) MCI, and (4) AD. We predict that fornix abnormalities will increase across these groups from healthy aging to AD. Overall, using a very sensitive imaging tool, we aim to identify a brain marker in the fornix in individuals who show the earliest signs of AD, thereby aiding in immediate diagnosis and intervention.

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