Multi-modal retinal biomarkers for vascular dementia: developing enabling image analysis tools

https://neurodegenerationresearch.eu/survey/multi-modal-retinal-biomarkers-for-vascular-dementia-developing-enabling-image-analysis-tools/

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United Kingdom

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Multi-modal retinal biomarkers for vascular dementia: developing enabling image analysis tools

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Alzheimer's disease & other dementias

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Neurodegenerative disease in general

Research Abstract

Dementia is a devastating disease. It has catastrophic implications for affected individuals, their family, wider society, and heavy, increasing costs for the NHS. Detecting subjects at increased risk of developing dementia in the future, and detecting adverse risk at the earliest stages of dementia, may present opportunities to preserve brain function and delay disease progression.

There is increasing recognition that degeneration of brain blood vessels plays a role in the development of dementia. It is therefore important to identify patients likely to present such degeneration as early as possible, as they may require special treatment and the disease progress can be delayed.

There is also strong clinical evidence that the brain blood vessels are related to those in the retina, the part of the eye responsible for the first stage of human vision. The retina is checked routinely by high-street opticians, hence retinal images (fundus photography and optical coherence tomography, now both available on a single device) could provide an inexpensive, non-invasive procedure capable of capturing early signs of dementia or those at high risk of developing dementia. It would exploit widely available existing examinations and be deployable immediately. Hence the potential impact of a retinal test for dementia signs would be huge.

The central question is whether the retina can provide (a) reliable biomarkers (signs) for future risk of dementia, and (b) sensitive biomarkers of disease progression of either cognitive decline or brain vessels degeneration. Our purpose is to develop enabling technologies based on image analysis to identify such biomarkers, using easily accessible retinal features (supporting an uninvasive, inexpensive, easily accessible and high-specificity test), and joint brain-retina features (a larger-scope investigation motivated by the affinity of small vessels of brain and retina).

We shall validate the technologies in a pilot study in collaboration with the specialist units at the University Hospitals of Dundee and Edinburgh, including ophthalmology, brain imaging, and cognitive ageing and cognitive epidemiology. Our research is supported by the Alzheimer’s Society.

Lay Summary
Further information available at:

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Investments > €500k

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Alzheimer's disease & other dementias

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