Microdetect
– Diagnosis of Dementia, Autism and Other Conditions

A new level of precision in brain measurements identifies patterns in the microstructure of the human brain which can be used to classify a range of cognitive and neurological diseases.

In England alone there are more than 670,000 people with dementia. 350,000 remain undiagnosed and without access to support. Over the next 30 years, the cost of dementia in England is set to rise by £19 billion. In order to minimise cost and improve care for an ageing population, improvements in diagnosis need to be made.

Autism is a developmental condition with brain effects that are too subtle to detect with conventional brain imaging methods. 1% of the human population have autism but many are undiagnosed. The cost of autism in the UK is estimated at £32 billion per year and improved diagnosis is crucial to enable intervention and support in early life.

Diagnosing Dementia

Diagnosis of Alzheimer's disease and other dementias can only be confirmed by post-mortem examination. 'Probable diagnosis' in life depends on clinicians' judgement and current brain imaging tests rely on imaging agents which are expensive and radioactive.
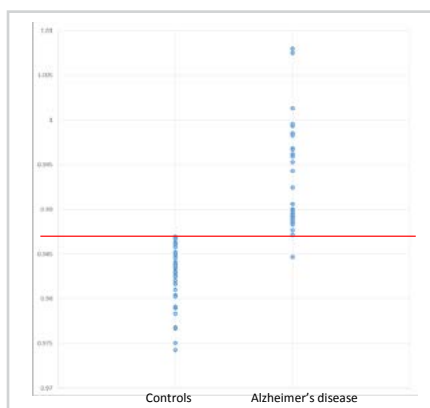
Diagnosing Autism

Current methods depend on clinicians' judgement and family interviews. No brain imaging or other biological test currently exists.

Oxford Invention

Unique new diffusion MRI measurements which are low cost, non-invasive and do not rely on ionising radiation have been developed by scientists at the University of Oxford. The technology establishes signature patterns in the microstructure of the human brain which can provide differential diagnosis between dementias such as Alzheimer's disease (AD) and cerebrovascular dementia (CVD) in late life, or detection of developmental conditions such as autism in early life. It is expected this technology could have positive implications for the clinical management of patients with cognitive diseases.

The Oxford invention has been developed through studies of post-mortem histology of the brain and with diffusion tensor imaging (DTI) MRI scans.

A patent application protecting a broad range of microstructural signature patterns of disease in the human brain has been filed. Further development work is ongoing.

99% classification accuracy (80/81 subjects) using just one of the new measures (Two different study datasets using conventional MRI scanners in UK and Italy have been combined)

Professor Steven Chance
Associate Professor in Clinical Neurosciences
steven.chance@ndcn.ox.ac.uk