



SINAPSE PhD

Name of Primary Research Base:

University of St. Andrews

Name of Secondary Research Base:

Ninewells Hospital, Dundee

First Discipline:

Psychology

Second Discipline:

Diabetic Medicine/Medical
Physics

SINAPSE Centre Lead:

St Andrews

PROJECT

Title:

Cognitive function in patients newly diagnosed with Type 2 Diabetes Mellitus

SUPERVISORS

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Planned start date (year of intake):

2007-08

Summary (approximately 200 words):

Diabetes appears to increase the risk of developing both Mild Cognitive Impairment (MCI) and dementia, particularly Alzheimer's disease (AD) by as much as twofold¹. This may be attributable to molecular defects associated with the development of diabetes, particularly in respect of insulin action². Retrospective data suggest that the way diabetes affects cognition manifests in different ways at different ages³. This has implications for identifying patients with diabetes who are at risk of developing MCI or dementia. This studentship will address this issue by testing a prospective sample of patients newly diagnosed with Type 2 Diabetes Mellitus (T2DM) on a battery of cognitive tasks reflecting aspects of cognition previously identified as vulnerable, such as learning and memory³. fMRI will also be used to look for patterns of activation that differentiate healthy ageing from MCI and MCI from early AD, specifically increased hippocampal/medial temporal lobe activation relative to controls in MCI and reduced hippocampal/medial temporal lobe activation in early AD⁴. A cross-section of patients of all ages will be recruited from an education class at Ninewells Hospital, Dundee within one month of diagnosis. The patients will be followed for the first year after diagnosis and data collection will include factors such as glucose control that may influence cognitive performance⁵.

Key references (up to five):

1. Yaffe, K., Blackwell, T., Kanaya, A. M., Davidowitz, N., Barrett-Connor, E., and Krueger, K. (2004). Diabetes, impaired fasting glucose, and development of cognitive impairment in older women. *Neurology* 63, 658-663.
2. Cole, A. R., Astell, A. J., Green, C., & Sutherland, C. (In Press). Molecular connections between dementia and diabetes. *Neuroscience and Biobehavioral Review*
3. Ryan, C. M. and Geckle, M. (2000). Why is learning and memory dysfunction in Type 2 diabetes limited to older adults? *Diabetes Metab Res. Rev.* 16, 308-315.
4. Sperling, R. (2007). Functional MRI studies of associative encoding in normal aging, mild cognitive impairment and Alzheimer's disease. *Ann NY Acad Sci*, 1097 (Feb) 146-155.
5. Yaffe, K., Blackwell, T., Whitmer, R. A., Krueger, K., & Barrett Connor, E. (2006). Glycosylated hemoglobin level and development of mild cognitive impairment or dementia in older women. *J Nutr Health Aging*, 10(4) Jul-Aug, 293-5.