



Centre for Cognitive and Neural Systems Profile of Principal Investigator

Professor Richard Morris, FRSE, FRS, CBE

Biographical Profile

BA in Natural Sciences at Univ. Cambridge and D.Phil. at Sussex Univ. Lecturer at Univ. St Andrews in 1977 before moving to Edinburgh in 1986. Presently Director of the Centre for Cognitive and Neural Systems (CCNS), and Hon. Visiting Professor at Centre for Brain Development and Repair, Bangalore, and Caro Almela Honorary Chair of Neurobiology in Alicante, Spain. Various Scientific Advisory Boards (including reviewing editors of *Science*), as President of both the British Neurosci. Ass. (1994-96), Federation of European Neurosci. Societies (2006-8) and, by secondment, as Head of Neuroscience and Mental Health at the Wellcome Trust (2007-2009). Fellow of the Royal Society (1997) and appointed Commander of the British Empire (CBE, 2007). Ipsen Prize in Neuronal Plasticity 2013.

Teaching Focus, Research and Research Team

I enjoy **teaching** and have responsibility in the Hons.Neuroscience and M.Sc/Ph.D Neuroscience courses, with a focus on the neurobiology of cognition. Teaching Ph.D students the rigours of research is also important.

My **research group** focuses on the **neurobiology of memory**. This research includes studies of the role of activity-dependent synaptic plasticity in memory, and hippocampal-neocortical interactions with a theoretical framework laid out in Morris (2006), Wang and Morris (2010) and Redondo and Morris (2011). Our four project teams are:

- *Animal models of episodic-like and semantic-like memory* (Day et al, 2003; Tse, Langston et al, 2007).
- *The synaptic-tagging and capture (STC) hypothesis of protein synthesis-dependent long-term potentiation (LTP) and its implications for cellular consolidation of memory* (Frey and Morris, 1997).
- *Systems memory consolidation and hippocampal/neocortical interactions* (Wang and Morris, 2010).
- *Animal models of neurodegeneration to test new therapeutics in relation to cognition* (Daumas et al, 2008)

Research impact includes development of the watermaze (1982), discovery of the role of NMDA receptors in spatial memory (1986), the STC hypothesis of LTP consolidation (1997) and new work on mental schemas (2007, 2011). The group includes 2 senior support staff, 5 postdocs, and 1 Ph.D student. Collaboration with H Bito (Tokyo), E Moser & M Witter (Trondheim), G Fernandez (Donders), S Canals (Alicante), Y Dudai (Weizmann), R Redondo (Roche).

Grant Funding

MRC Programme Grant (£2,548,036) "*Hippocampal, Subcortical and Cortical Interactions in Memory and Plasticity*". Jointly with Prof. Bruno Frenguelli (Univ. Warwick). 2006-2010
ERC Grant (Euro 3,400,000) NEUROSCHEMA. Jointly with Prof Dr Guillen Fernandez (Donders, Nijmegen). 2011-2016.
EU ITC-FET Grant (£612,164) GRIDMAP. Jointly with Drs Edvard Moser, Alessandro Treves and Jorg Conradt. 2013-2016.
DART NeuroScience (£370,094) Memory enhancement. 2013-2017.

Selected Publications

Morris RGM, Garrud P, Rawlins JNP and O'Keefe J (1982) Place navigation impaired in rats with hippocampal lesions. *Nature*, 297: 681-683 (>4950 citations).

Morris RGM, Anderson E, Baudry M and Lynch GS (1986) Selective impairment of learning and blockade of long-term potentiation *in vivo* by AP5, an NMDA antagonist. *Nature*, 319: 774-776 (>2900 citations).

Frey JU and Morris RGM (1997) Synaptic tagging and long-term potentiation. *Nature*, 385: 533-536 (>1085 citations).

Morris, RGM (2006) Elements of a neurobiological theory of hippocampal function: the role of synaptic plasticity, synaptic tagging and schemas. The EJN Award Lecture. *European Journal of Neuroscience*, 23: 2829-2846.

Tse D, Langston RF et al (2007) Schemas and memory consolidation. *Science*, 316: 76-82 (+Perspective).

Redondo RL and Morris RGM (2011) Making memories last: the synaptic tagging and capture hypothesis. *Nature Reviews Neuroscience*, 12:17-30.

Tse D, Takeuchi T, et al. (2011) Schema-Dependent Gene Activation and Memory Encoding in Neocortex. *Science*, 333: 891-895.

Dudai Y and Morris RGM (2013) Memorable Trends. *Neuron*, 80: 742-750.

Van Kesteren, MTR et al (2013) Building on prior knowledge: Schema-dependent encoding processes relate to academic performance. *J Cognitive Neuroscience*, 26: 2250-2261.

Squire LR, Genzel, L, Wixted JT and Morris RGM (2016) Memory Consolidation. In *Learning and Memory* (Eds. Kandel, E, Dudai, Y and Mayford M). *Cold Spring Harbor Lab Press*.