

# Seminar

CENTER FOR  
ADAPTIVE NEURAL SYSTEMS

IRA A. FULTON SCHOOL OF ENGINEERING

## "The spatial and temporal dynamics of the cAMP-specific phosphodiesterase PDE4B isoforms during late-LTP"

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**Abstract:** Molecular events associated with mnemonic processes and neuronal plasticity are postulated to result in functional changes in synaptic structure. One possible site is the post-synaptic density, where activity-dependent changes modulate signal transduction cascades. In this presentation data will be presented detailing spatial-temporal changes for phosphodiesterase 4B (PDE4B) proteins and their substrate cAMP within three neuronal fractions during early and late long-term potentiation (LTP). The cAMP-dependent protein kinase A cascade – which can be regulated by distinct PDE4B activity – is required for mnemonic processes as well as mechanisms of neuronal plasticity, such as those during the maintenance or late-LTP. Fluorescence in situ hybridization studies (FISH) identified no translocation of PDE4B3 from the soma after late-LTP induction indicating a subtle, local control of PDE4B activity. Protein changes were detected within the PSD-enriched fraction. From these results, we conclude that either the changes in PDE4B are due to modulation of pre-existing mRNA, or that the protein is specifically translocated to activated synaptic structures. Furthermore, we report late changes in cAMP levels in the somato-dendritic fraction and discuss this result with the increased PDE4B1/3 doublet in the PSD-enriched fraction.

**Biography:** Current: KUL-Scientific Council Visiting Research Fellow, Laboratory of Biological Psychology KUL, Belgium.

2005-2006: Postdoctoral Research Fellow: Division of Neurosciences and Pathology, Dundee University, Ninewells Hospital, Ninewells Dundee.

2003-2005: Senior Research Scientist. Department Neurophysiology, Leibniz Institute for Neurobiology Magdeburg, Germany. 2002-2003: Principal scientist, Thomas H Christopher Parkinson's Laboratories, Sun Health Research Institute, Sun City, Arizona, USA 1997-2002: Postdoctoral-Scientist. Department Neurophysiology, Leibniz Institute for Neurobiology, Magdeburg, Germany. 1995-1997: Scientist/ Assistant Manager, Kicho Laboratories, Speke Industrial park, Speke, Liverpool, UK.

PhD: Search for a RAS-like homologue from the dimorphic-imperfect pathogenic fungus *C.albicans*. UMIST, Department of Biochemistry and Applied Molecular Biology (1991-1995).

MSc: Nerve growth under the influence of a variety of Pharmacological Treatments and an applied Electric Field. Aberdeen University, Department of Physiology (1989-1990). BSc. Hons. Biochemistry University of Liverpool, Department of Biochemistry (1986-89).

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Date: Nov. 9, 2007  
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**Map:** <http://www.asu.edu/tour/main/istb1.html>

*"designing adaptive engineered systems to promote adaptation in neural systems"*

