Hamilton Institute

Synaptic Plasticity as a Therapeutic Target

Dr. Keith J. Murphy
Conway Institute, UCD

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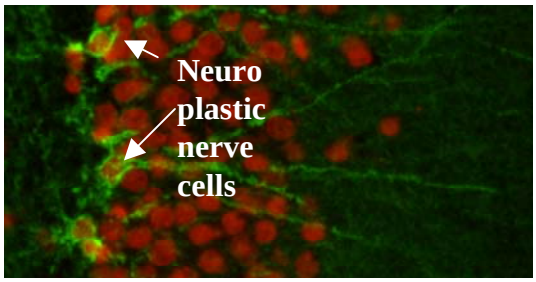
Abstract

Most medications available to treat mental illness exert their effect only after prolonged administration. Therefore, altering neurotransmission *per se* may not be responsible for the clinical actions of these drugs, but rather, some gradually developing adaptations to this enhanced neurotransmission would appear to mediate drug action. Such adaptation in neuronal circuits, whereby synaptic strength is increased or weakened, i.e. 'activity-dependent synaptic plasticity', is therefore becoming an increasingly important issue in novel drug development

A major goal of our research is focussed on exploitation of a largely untapped resource of drug targets – molecular and cellular events of activity-dependent synaptic plasticity. To this end we have conducted DNA microarray studies to begin a comprehensive characterisation of transcriptional events associated with synaptic plasticity. Our studies have identified over 350 genes that are regulated at the level of mRNA during the first 24 hours following a learning task.

By way of example, we have shown that expression of the low-density lipoprotein receptor-related protein, a protein implicated in Alzheimer's disease, is up-regulated in the early phase of memory consolidation and, moreover, plays a vital role in memory-associated synaptic plasticity. Numerous potential novel drug targets will be chosen from the pool of proteins identified to play a role in synaptic plasticity.



Venue: Seminar Room, Hamilton Institute, Rye Hall, NUI Maynooth

Time: **3.00 - 4.00pm** (followed by tea/coffee)

Travel directions are available at www.hamilton.ie

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