Professor Graham Collingridge (winner of the 2016 Brain Prize)

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Synaptic plasticity, memory, and molecules

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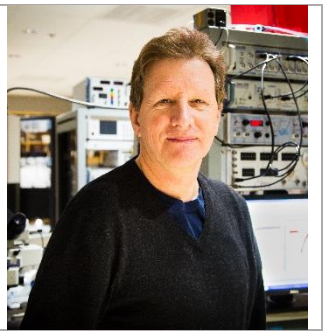

Abstract

Long-term potentiation (LTP) is firmly established as the most important model system for understanding the synaptic basis of learning and memory. In this talk I will describe the discovery of LTP, the role of NMDA receptors in its induction and the link between LTP and learning & memory. In the ensuing 30 years it has become apparent that the molecular machinery that enables synaptic plasticity (both LTP and its counterpart long-term depression; LTD) is highly complex - comprising hundreds of different proteins and a multitude of interacting signaling pathways. In the next part of my talk, I will summaries the status of the field and present recent work addressing some outstanding issues. It is also becoming clear that errors in the molecular processes of synaptic plasticity contribute towards a large variety of brain disorders, such as schizophrenia, Alzheimer's disease, depression, autism and chronic pain. In the last part of my talk, I will describe recent work on synaptic plasticity that is shedding light on the aetiology of some of these major brain disorders.