Laboratory title : CNRS UMR 5287 - Jean-René Cazalets

Supervisor

Name : Vincent DAVID

Thesis title :

Effects of drugs of abuse on different forms of memory and hippocampus-striatum interactions

Keywords : Addiction, Memory, Hippocampus, Striatum, Corticoids

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Abstract

The multiple memory systems hypothesis posits that different neural circuits function in parallel and may compete for information processing and storage. For example, conditioning depends on the striatum, whereas spatial memory is mediated by a circuit centred on the hippocampus. However, the nature of the task itself is not sufficient to select durably one system over the other. It is well established that stress is a potent modulator of interactions between memory systems. In contrast, despite their putative role in the instatement of addictive behaviors, we know very little about the effects of drugs of abuse on these interactions. We thus plan to investigate the long-term effects of frequently abused drugs (nicotine and alcohol) on the use of different learning strategies and the formation of spatial and procedural memory. We will study long-term effects of self-administered drugs of abuse on learning strategies, using behavioral tasks assessing the respective use of spatial and cued memory. Analysis of brain regional expression of transcription factors (ERK/CREB) will be completed with the implication of epigenetic regulations (H3/H4) and functional measure of synaptic plasticity through the analysis of learning-induced long-term potentiation/depression within the striatal, hippocampal and parahippocampal brain regions. Finally, the role of hippocampal and striatal dopamine and corticoid levels in this synaptic plasticity will be evaluated using subregional microdialysis in freely-moving animals.

Qualification required

Neuroscience background preferred. Experience in Immunohistochemistry or microdialysis will be appreciated but is not essential.