**Monday, March 29, 2010 at 11 a.m.**

**IGBMC Auditorium**

**Special Seminar**

## Reward-controlled learning: dopamine signaling from the membrane to the nucleus

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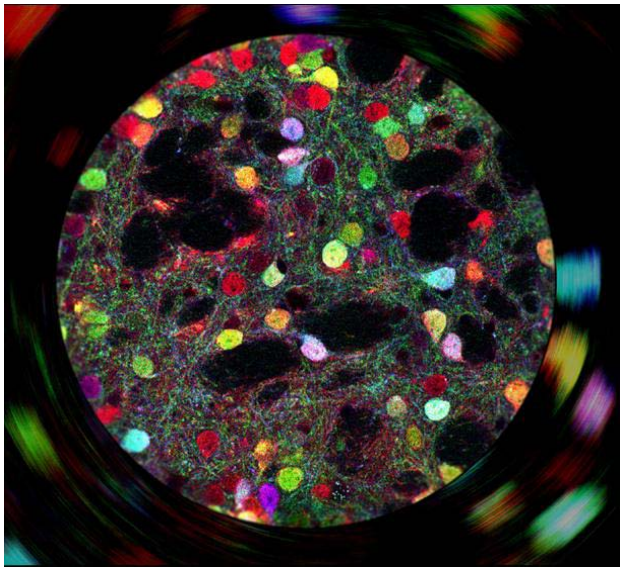
The striatum is a brain region proposed to play a central role in action selection, controlling movements and behavior orientation. Striatal function and plasticity are regulated by dopamine, whose release codes for “reward prediction errors”. Dopamine modulates the effects of the major glutamate input to the striatum, coming from the cerebral cortex. While Parkinson disease is due to the disappearance of dopamine neurons, addictive drugs increase extracellular dopamine and, thus, hijack the normal reward-driven learning mechanisms. We study the signaling pathways by which dopamine and glutamate exert long-lasting effects on striatal neurons by controlling their nuclear functions. These mechanisms include cAMP-dependent kinase and extracellular signal-regulated kinase (ERK), and regulation of protein phosphatases in the cytoplasm and in the nucleus, by DARPP-32 (dopamine and cAMP-regulated phosphoportein Mr~32 000), a protein phosphatase-1 inhibitor.



*Triple labeling of striatal medium-sized spiny neurons with DARPP-32 (red immunofluorescence) and cocaine-induced p-ERK (blue immunofluorescence) in BAC-EGFP transgenic mice in which $D_1$-receptor-expressing cells are green. Neurons display a different color code depending on the presence and intensity of the three markers.*

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