

Title: "Regulation of neural stem cell proliferation by astrocytes in the context of anxiety and depression"

Adult hippocampal neurogenesis results in the continuous generation of neurons, that participate to mechanisms of memory and mood disorders (depression). Our aim is to decipher the regulation mechanisms of adult neurogenesis by the cellular environment of neural stem cells and to use these mechanisms for the treatment of depression or memory impairment. Astrocytes are known to produce a number of molecules that affect brain function. In recent years, we found that astrocytes release a small molecule, D-serine, that regulate the survival, maturation and synaptic integration of new neurons in the hippocampus (Sultan et al. Neuron 2015). This novel mechanism may contribute to the pro-cognitive effects of D-serine.

In the current project, we propose to examine the role of astrocytes in the regulation of hippocampal neural stem cell proliferation. We will use conditional transgenic mice model and viral approaches to manipulate astrocytes and stem cells; confocal microscopy, cell culture, gene expression and biochemical analysis to identify regulation pathways and behavioral approaches to examine the role of these mechanisms in mouse models of depression and cognitive impairment.