There is a growing literature supporting alterations in the functional interactions between multiple brain regions in addiction. Results from many studies pointed beyond the mesolimbic system showing important associations between reward regions and areas of the brain regulating memory, emotion, habit formation, and cognitive function. These areas include prefrontal cortical sub-regions, hippocampal and parahippocampal areas, anterior thalamic nuclei along with dorsal striatum. Our laboratory has applied a variety of experimental paradigms using functional MRI in rats to investigate putative neural circuits of drug and natural reward. Key to the strategy for examining brain function has been the use of techniques to image the non anesthetized rats. The initial work examined the direct pharmacodynamic actions of cocaine in the male and female rat brain. These studies provided an initial insight into the use of pharmacological MRI in awake rats and the regions directly activated by cocaine. In follow up experiments discussed at the conference, we explore interactions between sex and response to cocaine, epigenetic modulation of cocaine-induced neuro-adaptations. More recently we have used other methods to examine neuronal activity changes more directly with manganese enhanced MRI (MEMRI) and resting state functional connectivity analysis. The latter methods, along with the traditional fMRI techniques are gradually piecing together important properties of drug-induced changes in functionality in the in vivo rodent brain that can be used to guide the development of treatments.

Biography

Marcelo Febo is Assistant Professor of Psychiatry and Program Director of Translational Research Imaging at the University of Florida McKnight Brain Institute. His research laboratory uses MRI in mouse and rat models of neuropsychiatric and neurological disease. Magnetic resonance imaging studies are carried out at high fields to examine both functional and structural changes with chronic drug exposure. His main interests in the field of addiction research include the neural and behavioral consequences of chronic drug exposure on maternal-offspring interactions and social neural circuits. He also investigates the neural actions of the neuropeptides oxytocin and vasopressin in modulating social behavior and fear.

febo@ufl.edu