Abstracts

Speaker 1: Ingo Willuhn, Netherlands
Title: Establishment and escalation of cocaine use is determined by distinct patterns of striatal dopamine signaling

Abstract
The basal ganglia provide brain structure for the selection of motivated actions. Dopamine neurotransmission in the striatum, the main input nucleus of the basal ganglia, is central to regulating motivated actions. Limbic parts of the striatum are thought to be involved in the acquisition of motivated behavior and sensorimotor parts in the automation of these actions. Recent findings show that contrary to the assumption of a uniform dopamine signal throughout the brain, dopamine release is region-specific. In this talk, I will present studies that utilized electrochemical detection of real-time dopamine release in rats self-administering cocaine in order to further explore the role of region-specific striatal dopamine signaling in substance use. My results demonstrate that phasic dopamine release in the sensorimotor striatum emerges progressively during drug taking over the course of weeks. This emergent dopamine signaling is dependent on antecedent activity in the limbic striatum. Thus, the current findings identify a striatal hierarchy that is instantiated during the expression of established responses to obtain cocaine. Furthermore, I show that a sub-population of rats increased their drug intake progressively. A development that can be attributed to a loss of dopamine signaling in the limbic striatum, but not to changes in the sensorimotor striatum. Thus, this suggests that drug consumption escalates in order to compensate for diminished limbic signaling and to maintain a preferred level of dopamine neurotransmission. These findings will be discussed in light of the putative role of different striatal domains in behavioral flexibility and their potential therapeutic relevance.

Speaker 2: Yolanda Peña-Oliver, UK
Title: Preventing the expression of a drug seeking habit triggers aberrant cocaine seeking behavior at relapse

Yolanda Peña-Oliver, Mickael Puaud, Chiara Giuliano, David Belin and Barry J Everitt