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

References
1. Berman RM, Cappiello A, Anand A, Oren DA, Heninger GR, Charney DS, Krystal JH. Antidepressant effects of ketamine in depressed patients. Biol Psychiatry. 2000 Feb 15;47(4):351–4. PubMed PMID: 10686270.
2. Duman RS, Aghajanian GK, Sanacora G, Krystal JH. Synaptic plasticity and depression: new insights from stress and rapid-acting antidepressants. Nat Med. 2016 Mar 3;22(3):238–49. doi: 10.1038/nm.4050. PubMed PMID: 26937618.
3. Krystal JH, Sanacora G, Duman RS. Rapid-acting glutamatergic antidepressants: the path to ketamine and beyond. Biol Psychiatry. 2013 Jun 15;73(12):1133–41. doi: 10.1016/j.biopsych.2013.03.026. Review. PubMed PMID: 23726151; PubMed Central PMCID: PMC3671489.

S13: The shifting brain circuitry underlying addiction
Chair: Ingo Willuhn, Netherlands
Co-Chair: Sung-Gon Kim, Republic of Korea

Speaker 3: Helen Mayberg, USA
Title: Targeted Modulation of Depression Circuits using Deep Brain Stimulation

Abstract
Deep Brain Stimulation (DBS) is an emerging treatment strategy for patients with intractable depression with imaging playing a crucial role in the development, testing and refinement of the procedure. Multimodal modeling of structural and functional connections combined with real-time behavioral and electrophysiological metrics is now used to more precisely identify the optimal target location as well as track long-term stimulation effect. Together these studies offer a unique perspective on critical pathways and mechanisms mediating antidepressant effects of DBS, and on the pathophysiology of treatment resistant depression more generally.

Speaker 4: John Krystal, USA
Title: Ketamine and the pursuit of rapid-acting antidepressants for the treatment of depression and PTSD symptoms.

John H. Krystal, M.D., Gerard Sanacora, M.D., Ph.D., Chadi Abdallah, M.D., Ronald Duman, Ph.D., Departments of Psychiatry and Neuroscience, Yale University School of Medicine, New Haven, CT USA

Abstract
The limitations of standard antidepressant treatments are well known, they work for too few patients and their beneficial effects emerge too slowly. APPROACH: The purpose of this presentation is to briefly describe the context leading to the discovery of the antidepressant effects of ketamine in humans, to characterize our current understanding of the profile of ketamine’s antidepressant effects in humans, to characterize our current understanding of the profile of ketamine’s antidepressant effects in humans, to characterize our current understanding of the profile of ketamine’s antidepressant effects in humans, to characterize our current understanding of the profile of ketamine’s antidepressant effects in humans, to characterize our current understanding of the profile of ketamine’s antidepressant effects in humans, to characterize our current understanding of the profile of ketamine’s antidepressant effects in humans, to characterize our current understanding of the profile of ketamine’s antidepressant effects in humans, to characterize our current understanding of the profile of ketamine’s antidepressant effects in humans. These findings combined with real-time behavioral and electrophysiological metrics is now used to more precisely identify the optimal target location as well as track long-term stimulation effect. Together these studies offer a unique perspective on critical pathways and mechanisms mediating antidepressant effects of DBS, and on the pathophysiology of treatment resistant depression more generally.

References
Aupperle RL, Stillman AN, Simmons AN, Flagan T, Allard CB, Thorp SR, Norman SB, Paulus MP, Stein MB. Intimate partner violence PTSD and neural correlates of inhibition. J Trauma Stress 2016; 29:33–40. PMID: 26748991
Howlett JR, Stein MB. Prevention of trauma and stressor-related disorders: A review. Neuropsychopharmacology 2016; 41:357–369. PMID: 26315508
Stein MB, Chen C-Y, Ursano RJ, et al. Genomewide association studies of Posttraumatic Stress Disorder in two cohorts of US Army soldiers. JAMA Psychiatry (in press)
Stein MB, Kessler RC, Heeringa SG, et al. Prospective longitudinal evaluation of the effect of deployment-acquired traumatic brain injury on posttraumatic stress and related disorders: results from the Army Study to Assess Risk and Resilience in Servicemembers (Army STARSS). Am J Psychiatry 2015; 172:1101–1111. PMID: 26337036

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