ACNP Bulletin
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2021 *Neuropsychopharmacology Reviews*

Panel Session

Prefrontal Cortex

Co-Chairs: Suzanne N. Haber, Ph.D., and Trevor W. Robbins, C.B.E., FRS, Ph.D.

The ACNP panel session for *Neuropsychopharmacology Reviews* will be held on Monday, December 6th at 8:30 AM Atlantic Standard Time.

The prefrontal cortex (PFC) is arguably one of the last great frontiers for understanding how cognitive and emotional processes intersect and drive behaviors. Virtually all mental health disorders implicate some form of dysfunction of neural circuitry that includes the prefrontal cortex. Our ability to devise new treatments, whether pharmacological, neuromodulatory, or psychological, depends on enhancing understanding of the functionality of prefrontal circuits, especially across species. Investigating prefrontal cortical function across species provides special challenges because of the difficulty of establishing clear neuroanatomical homologies between primates and other mammals. Another problem is the sheer heterogeneity of the primate prefrontal

cortex as well as associated regions such as the cingulate cortex, and how these regions interact to provide executive or cognitive control over neural networks to which they contribute. Finally, we need to provide more a sophisticated theoretical account of the cognitive and behavioral functions of these networks, both at the psychological and computational levels.

The 2022 special issue of *Neuropsychopharmacology Reviews* highlights new ideas in understanding the key structural and functional features of the PFC that are particularly relevant to the mechanisms that underlie normal and abnormal behaviors. It draws from cross-species comparisons, electrophysiological and psychopharmacological studies, circuit, and network analyses, computational modeling, neuroimaging and therapeutic approaches. Contributions are divided into four sections. The first section, 'The Fundamentals' covers general principles of structure and function. Next, 'Structure and Function' considers in more detail interactions between PFC components and key subcortical structures. Third, 'Clinical-Translational Perspectives' discusses PFC dysregulation in several major neuropsychiatric disorders. Finally, 'Modulation and Treatment' addresses current therapeutic approaches to psychiatric disorders that target the PPC.

The NPPR panel for this year's meeting features speakers representing these sections and includes cross species approaches, computational analyses, consideration of cortico-cortical and cortico-subcortical circuits, as well as therapeutic advances. John O'Doherty will review how fronto-striatal circuitry mediates reinforcement learning from a computational perspective with a focus on how the brain allocates or arbitrates control over distinct reinforcement learning sub-systems. Matthew Rushworth will describe functional interactions between the primate ventrolateral prefrontal cortex and the anterior cingulate that are important for information seeking and credit assignment- crucial operations for effective and flexible decision-making. Angela Roberts will address the problems of modelling depression in experimental animals, specifically using the New World marmoset to map functions relevant to depressive symptoms in homologous prefrontal circuitry. Finally, Sarah Lisanby will survey the prospects for non-invasive, neuromodulatory interventions, such as repetitive transcranial magnetic stimulation and transcranial direct current stimulation, in combination with personalized neuronavigation and neurophysiological read-outs, to relieve symptoms of several neuropsychiatric disorders.