NYU-ECNU Institute of Mathematical Sciences at NYU Shanghai

WEEKLY SEMINAR

Topic: **Cortical Contributions to Orienting Decisions in the Rat: Surprising Homology with Primate Saccade Networks**

Speaker: **Prof. Jeffrey Erlich**

Time: 14:30-16:30, 12 December 2013

Venue: Room 157, Geography Building, 3663 Zhongshan Road North, Shanghai (华东师范大学中山北路校区，地理楼 157 室)

ABSTRACT OF THE TALK

The cortical contributions to saccadic decisions have been studied extensively in humans and non-human primates. This work has identified two cortical regions as major contributors to decisions about where to look: the frontal eye field (FEF) and the lateral intraparietal cortex (LIP) in the posterior parietal cortex (PPC). A small group of rodent researchers have been arguing for decades that the rat medial agranular cortex is a functional homologue of the FEF and that rodent PPC may be a functional homologue of LIP. However, differences in behavioral tasks and experimental techniques used across species have prevented directly testing this homology. We have trained rats on several tasks that were modeled directly on existing primate tasks. E.g. we trained rats on a memory-guided orienting task that was modeled after the classic FEF dependent memory-guided saccade task. We have trained rats on accumulation of evidence tasks that are modeled after the random dot motion task used to examine the role of LIP in decision-making. Here we present behavioral, electrophysiological, and pharmacological evidence from rats performing these two tasks which strongly support the idea that the rat AgM is homologous to primate FEF and rat PPC is homologous to primate LIP. This suggests that FEF and LIP are evolutionary conserved structures for the control of orienting and that saccadic control is a specialization of this conserved system. Moreover, we present novel evidence that distinguishes the contribution of frontal and parietal cortex in orienting decisions.

BIOGRAPHY

Jeffrey C. Erlich received his PhD. from New York University in 2009. After working for Nevo Technologies, he decided to pursue a career in neuroscience and is currently working at Princeton University as the Associate Research Scholar. His current research projects are investigating how chaotic neural activity, driven by internal dynamics and external sensory input, is resolved into coherent behavior.