Department of Biomedical Sciences
presents a seminar

CityU 香港城市大學 City University of Hong Kong
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"Early sensory experience shapes the initial circuits in auditory cortex"

Prof. Patrick O. Kanold
Dept. of Biology, University of Maryland, College Park

Date : 29 November 2017
Time: 11:00am to 12:30pm
Venue: Meeting Room 1B-G04, G/F, Block 1, To Yuen Building

Abstract

One of the hallmarks of the brain is its self-organization and the ability of its circuits to be sculpted by experience. This is especially evident in primary sensory areas before and during critical periods in development. The mechanisms and circuits underlying these processes are unknown. At different stages of an individual's life there are distinct circuits present in the cerebral cortex. While in adults, thalamic information is transmitted directly to cortical layer 4, the young cortex contains additional neuronal circuits, formed by subplate neurons (SPNs) which can relay thalamic information to layer 4 before the establishment of thalamocortical connections to layer 4. SPNs largely disappear during development and their role has been largely enigmatic. I will discuss the functional circuits SPNs are embedded in, how these circuits change over development, and the crucial role subplate circuits play during the development of thalamocortical connectivity. I will then present recent results showing that SPN circuits are the first cortical circuits to be activated by sensory stimuli. Together, our studies show how early sensory experience can activate and thereby sculpt early cortical circuits before thalamocortical circuits to layer 4 are established.

Research Insterests

Prof. Kanold studies the development and plasticity of the brain, in particular how periods of learning and plasticity are initiated and controlled. His work focuses on the development of the central auditory and visual system in particular on the role of early cortical circuits in brain wiring. He uses advanced neurophysiological, in vivo imaging, optogenetic, molecular and computational techniques. His work furthers our understanding of how prenatal and postnatal brain injury contribute to neurodevelopmental disorders such as cerebral palsy, epilepsy and schizophrenia.

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All are welcome!