The Singapore Bioimaging Consortium (SBIC)
presents a seminar

on

"What can be inferred from an observed fMRI (BOLD) response in the Rat Hippocampus? A combined Functional MRI and Electrophysiological Study"

Speaker: Professor Frank Angenstein
German Center for Neurodegenerative Diseases (DZNE)
Magdeburg
Host : Dr Chuang Kai-Hsiang
Date : Friday, 6 March 2015
Time : 11.00am – 12.00pm
Venue : SBIC Seminar Room
11 Biopolis Way
Level 2, Helios Buiding, Singapore 138667
(Please enter Level 1 entrance)

Abstract

Functional magnetic resonance imaging (fMRI) is a widely used technique to search for brain regions involved in various forms of cognitive processes. However, the underlying neurovascular coupling processes are still elusive, thus an unambiguous interpretation of fMRI results that goes beyond the general conclusion of a locally modified neuronal activity remains difficult. A detailed study of neurovascular-coupling processes in a certain region requires on one side simultaneous measurements of neuronal activities and resultant hemodynamic parameters and on the other side an exact adjustment of the incoming activity. Such an experimental approach that simultaneously measures fMRI and neurophysiological responses in the dentate gyrus during electrical stimulation of the perforant pathway was previously developed by us and it turned out that this experimental approach is also a valuable tool to study the interaction of the hippocampal formation with its target regions, such as prefrontal cortex, nucleus accumbens. I will summarize current findings about the relation between neuronal activity and resultant BOLD response in the hippocampus and try to answer the question what information about neuronal activity can be inferred from a measured BOLD response.

About the Speaker

Prof Frank Angenstein got PhD in 1991 at the Institute for Pharmacology and Toxicology, Medical Academy Magdeburg, Germany about intracellular mechanisms controlling the glycoprotein synthesis in neurons. For his first postdoctoral position, he went to the Institute for Neurobiology and Brain Research in Magdeburg and

studied the role of various second messenger systems for mechanisms of synaptic plasticity in the hippocampus. In 1997, he moved to the Beckman Institute at the University of Illinois at Urbana-Champaign and worked in the laboratory of Prof WT Greenough about activity-dependent control of dendritic protein translation. This work was focused on transmitter-receptor mediated modifications of dendritic localized mRNA/mRNP complexes as well as the importance of these processes in the etiology of the fragile X syndrome. In July 2002, he returned to Magdeburg and started to use magnetic resonance imaging (MRI) to characterize small rodents, especially genetically modified mice. Especially, he developed an experimental approach to measure simultaneously fMRI signals and electrophysiological responses during electrical stimulation of a central fiber bundle. His current work is focused on the neurophysiological basis of fMRI and brain activation patterns induced by deep brain stimulations. Since January 2012, Prof Angenstein is the head of the DZNE-research group "functional Neuroimaging" in Magdeburg.

--- Admission is free and all are welcome ---