



The Singapore Bioimaging Consortium (SBIC)
presents a seminar

on

**"Functional Magnetic Resonance Imaging (fMRI) in mice :
Towards the Analysis of Networks"**

Speaker: Markus Rudin
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Functional Pharmacology University of Zürich and ETH Zürich
Institute for Biomedical Engineering UZH/ETH &
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Date : Wednesday, 10 December 2014
Time : 4.00pm – 5.00pm
Venue : Aspiration Theatre, Level 2M
30 Biopolis Street
Level 2M, Matrix Building
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Abstract

Functional magnetic resonance imaging (fMRI) in rodents is attractive in many regards. 1. Mechanistic information on the link of the hemodynamic response to the underlying neural activity can be obtained by combining fMRI with established invasive readouts of neuronal function. 2. Use of genetically engineered mouse lines allows assessing the impact of specific molecular entities involved in signal processing. 3. The relatively simple (cortical) morphology enables detailed analyses of the functional topology and its rearrangements following focal CNS injury. 4. Modern fMRI techniques allow for full three-dimensional coverage of the brain essential for the elucidation of large scale networks involved in specific task, pharmacological activation or during rest. Challenges in rodent fMRI are linked to the small dimensions and correspondingly the high demands on spatial resolution, to the animal physiology, which should be stable enough to allow for detection of percent changes in signal intensity, and to potential interference by anesthesia. Yet, technical solutions are available and rodent (mouse) fMRI is becoming a commodity. Different aspects of rodent fMRI will be addressed: 1) Mechanistic information on the neurovascular coupling obtained by combined fMRI/fiber-optics measurement of the bulk Ca signal using a fluorescent ligand illustrating a potential role of glia in determining the vascular signal has been implicated, 2) the influence of anesthesia on stimulus-evoked and resting state fMRI signals in mice, 3) the effect of cerebral amyloidosis on resting-state fMRI patterns in APP overexpressing mice, and 4) alterations in serotonergic signaling in a mouse model of early life stress.

About the Speaker

Prof Markus Rudin received his Diploma in Chemistry at ETHZ in 1976 and his PhD at the Laboratory for Physical Chemistry in 1981 followed by a post-doctorate. In 1983, he moved to Biomedical Imaging, joining Sandoz AG to establish a Biomedical Imaging group. Within Sandoz AG, later Novartis AG, he became Head of the Biophysics Group, of the In-vivo Models Unit and finally the Analytical and Imaging Science Unit within Discovery Technologies. In this function, he also was Deputy Head of Discovery Technology Area. In 1997, he became Assistant Professor (PD) for Biophysics at the University of Basel. Since 2005, he is in his current position as full Professor for Molecular Imaging and Functional Pharmacology at the Institute for Biomedical Engineering (University and ETH Zürich) and at the Institute of Pharmacology and Toxicology (University of Zürich). From March 2005 to March 2013, he was member of the Research Council of the Swiss National Science Foundation.

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