The Singapore Bioimaging Consortium (SBIC) jointly presents a seminar on

"Detecting Blood–Brain Barrier Disruption Within Minimal Hemorrhage Following Transcranial Focused Ultrasound: A Correlation Study With Contrast-Enhanced MRI”

Speaker: Dr Jun-Cheng Weng
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School of Medical Imaging and Radiological Sciences
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Date: Tuesday, 26 July 2011
Time: 2.00pm – 3.00pm
Venue: SBIC Seminar Room, 11 Biopolis Way
Level 2 Helios Building, Singapore 138667
(Please use level 1 entrance)

Abstract

Focused ultrasound combined with an intravascular ultrasound contrast agent can induce transient disruption of the blood-brain barrier, and the blood-brain barrier disruption can be detected by contrast-enhanced MRI. There is, however, no study investigating the ability of various MR methods to detect focused ultrasound-induced blood-brain barrier disruption within minimal hemorrhage. Sonication was applied to rat brains with four different doses of ultrasound contrast agent (0, 10, 30, or 50 µL/kg), and contrast-enhanced T1-weighted spin echo, gradient echo images, and R1 mapping along with T2*-weighted and susceptibility-weighted images were acquired. Volume-of-interest-based and threshold-based analyses were performed to quantify the contrast enhancement, which was then correlated with the ultrasound contrast agent dose and with the amount of Evans blue extravasation. Both T2*-weighted and susceptibility-weighted images did not detect histology-proved intracranial hemorrhage at 10 µL/kg, but MRI failed to detect mild intracranial hemorrhage at 30 µL/kg. All tested sequences showed detectable contrast enhancement increasing with ultrasound contrast agent dose. In correlating with Evans blue extravasation, the gradient echo sequence was slightly better than the spin echo sequence and was comparable to R1 mapping. In conclusion, both gradient echo and spin echo sequences were all reliable in indicating the degree of focused ultrasound-induced blood-brain barrier disruption within minimal hemorrhage.
About the Speaker

Dr. Jun-Cheng Weng was born in Taiwan in 1978. He received his MS and PhD degrees in Biomedical Engineering and Electrical Engineering both from National Taiwan University in 2002 and 2008, respectively. He studied structure function relationships of rat’s cortex, including whisker barrel and hippocampus, using diffusion and manganese-enhanced MR techniques. During 2006-2007, he spent a year as an exchange PhD student in Alan Koretsky’s lab at the National Institute of Health. He further acquired elaborate techniques in animal functional experiments on high field MR system. After one-year’s service in machinery infantry as a reserve officer, Dr. Weng worked at Center for Optoelectronic Biomedicine, National Taiwan University College of Medicine, and focusing his study on opening blood-brain barrier with focused ultrasound. Dr. Weng joined the faculty of Medical Imaging and Radiological Sciences at Chung Shan Medical University as an assistant professor in 2009. His research interests are to develop noninvasive MRI methods for early detection of neural plasticity and connectivity change, and for evaluation of treatment in neurodegenerative diseases. Currently, he teaches several courses in Magnetic Resonance Imaging, Medical Imaging System, and Medical Imaging Processing.

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