WAYNE STATE UNIVERSITY

The WSU Program for Traumatic Brain Injury Research

presents a Special Topic Seminar

Sheng-Kwei "Victor" Song, PhD

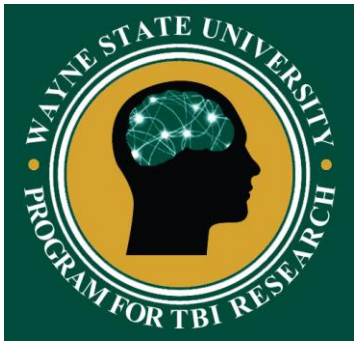
Associate Professor of Radiology,
Washington University School of Medicine, St. Louis, MO 63110

"Noninvasive assessment of CNS white matter pathology and function"

Abstract: The directional diffusivities derived from diffusion tensor imaging (DTI) have previously been proposed and demonstrated to reflect axon and myelin injury in mouse models of white matter injury.[1-3] Unfortunately, the current DTI model does not address effects of vasogenic edema or increased cellularity associated with CNS inflammation, an important pathological component of disorders such as multiple sclerosis and spinal cord injury. Vasogenic edema has long been recognized to result in an increased apparent diffusion coefficient (ADC), and the underestimation of white-matter tract diffusion anisotropy.[4-6] We expect that restricted diffusion resulting from increased cellularity would lead to a decreased ADC and an underestimation of diffusion anisotropy in the white matter.[7] Thus, in addition to crossing fiber complications,[8] we contend that DTI of CNS white matter pathology is also significantly confounded by a spectrum of isotropic diffusion tensor components resulting from inflammation,[9] chronic tissue loss,[10] and the partial volume effect from cerebrospinal fluid (CSF) or gray matter contamination.[11] A new approach, diffusion basis spectrum imaging (DBSI),[12] was proposed to accurately reflect the complexity of CNS white matter injury allowing quantification of axonal injury, demyelination, and inflammation during disease progression.

LeBihan, et al. investigated diffusion weighting as a possible alternative to BOLD contrast for monitoring neuronal activity in gray matter of the human visual cortex.[13] Their report was met with some skepticism and subsequently it was shown by other investigators that a similar increase in MRI signal intensity could be elicited by hypercapnia-induced brain blood flow enhancement without application of a visual stimulus.[14] In our preliminary investigations we have demonstrated that diffusion fMRI response of mouse optic nerve is readily detected and is free from confounding vascular effects.[15] The application of diffusion fMRI to assess functional integrity of the optic nerve in EAE mice will be demonstrated.

Date: Thursday June 27, 2013
Time: 12:00pm – 1:00 pm
Location: Margherio's Family Conference Center
320 E. Canfield, Detroit, MI 48201



For further information contact: Charbel Habib at 313-966-7433 Email: chabib@med.wayne.edu