Dear Faculty, IGERT Fellows, IGERT Associates and Students,

You are cordially invited to attend a Seminar presented by Dr. Andre Obenaus. Please plan to attend.

# Andre Obenaus Ph.D.

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Date: Friday, May 25, 2012
Location: WCH Room 205/206
Time: 11:10am

## Neuroimaging of repeated mild TBI

**Abstract:**

Traumatic brain injury (TBI) is an important medical problem, but in the past mild TBI (mTBI) has been considered physiologically unimportant. Recent evidence, mostly from neuro-psychological testing and from non-invasive imaging has revealed that mTBI results in long lasting changes within the circuitry of the brain. Studies in active military personnel and sports players have demonstrated that repetitive mTBI (rmTBI) results in exacerbation of tissue damage and psychosocial outcomes. While clinical studies have documented the effects mTBI, few studies have investigated the physiological effects of rmTBI.

We investigated the effects of rmTBI in a rodent model where two repeated mild injuries were induced either at the same location or in opposite locations of the brain. We also studied the changes within the brain where the first mild impact was then followed by a second mTBI at intervals of 1, 3, 7 days apart to determine if there was a period of enhanced vulnerability to a subsequent TBI event. Non-invasive magnetic resonance imaging (MRI), neurobehavioral and immunohistochemical techniques were used to demonstrate structural and functional changes within the brain. rmTBI resulted in exacerbation of tissue injury when induced 1 or 3 days apart but not 7 days apart. TBI lesion volumes were increased with elevated levels

of extravascular blood and local neuroinflammation was evident after rmTBI. The tissue injury signatures were significantly different if the rmTBI occurred at the same site or if it was delivered to the opposite hemisphere. While numerous therapeutic strategies have been suggested, we tested whether hyperbaric oxygen therapy (HBOT), either as a pretreatment or post-injury treatment modality, would be effective in modifying tissue injury. HBOT significantly decreased tissue injury after rmTBI.
Our novel findings suggest that brain tissue remains vulnerable to a second injury for up to 3 days after an initial TBI event. Thus, models of repetitive mTBI may serve as sensitive platforms for investigation into injury-induced neuro-structural deficits, and provide the basis for evaluation of experimental therapeutics.

**Bio:**
Dr. Obenaus serves as the Director of the Non-Invasive Imaging Laboratory in the Radiation Biology Program at Loma Linda University. His laboratory is well known for its state-of-the-art equipment. His expertise is in the area of neuroimaging of disease, and the Noninvasive Imaging Laboratory has experience with a broad range of topics and models of disease including Alzhiemers and neurorepair using stem cells. He has been involved in teaching Biomedical Imaging and Radiation Biology, and he has supervised a number of undergraduate and graduate students. He earned a B.Sc. in Biophysics from Loma Linda University, Riverside, CA in 1984. He earned a Ph.D. in Neurophysiology from University of British Columbia, Vancouver in 1989. Currently he is Adjunct Professor from Department of Biology & Neuroscience, University of California, Riverside and Biophysics and Bioengineering, Loma Linda University. He is also Associate Professor from Department of Pediatrics, Loma Linda University.