MRI of Brain Damage and Plasticity in Experimental Models of Traumatic Brain Injury and Epilepsy

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The Institute for Engineering in Medicine (IEM) is pleased to announce the IEM Seminar by Dr. Olli Gröhn, “MRI of brain damage and plasticity in experimental models of traumatic brain injury and epilepsy.”

The brain has remarkable ability to recover after brain insult. However, brain plasticity launched by injury is not always beneficial and it may trigger long lasting pathological processes such as epileptogenesis. The aim of this work is to identify MRI biomarkers for different aspects of damage and recovery processes after brain injuries caused by traumatic brain injury (TBI) or status epilepticus in rat experimental models. To achieve this goal we have used multimodal MRI approach including resting state functional MRI (rsfMRI), diffusion tensor imaging (DTI), manganese enhanced MRI (MEMRI), phase and magnetization transfer imaging with no echo time SWIFT technique, and rotating frame relaxation contrasts including T1rho and relaxation along a fictitious field (RAFF). MRI results correlate with behavioral testing and EEG, and a part of our work aims to increase basic understanding of the origin of pathological changes in MRI contrast using histology and electron microscopy. Our results show that we can detect both structural and functional plasticity launched by initial damage using MRI and indicate that MRI may help in future to individualize treatment of patients after brain insults.

Dr. Gröhn completed his MSc in biotechnology in 1996 and PhD in biomedical NMR in 2000, in University of Kuopio, Finland. He did his post-doc in Center for Magnetic Resonance Research at University of Minnesota in 2001-2002 after which he returned to Finland and established his own research group in A.I.Virtanen Institute, University of Eastern Finland. He was nominated as Research Director 2006 and has been serving as Professor in biomedical NMR since 2009. He is also Vice Director of the A.I.Virtanen Institute and director of the Biomedical Imaging Unit that serves as a National core facility for experimental MRI in Finland. His major research interest is to develop and apply novel MRI methodology for detection of damage and plasticity in brain after brain injuries.

For additional information on Dr. Gröhn’s presentation, please contact: scot0353@umn.edu

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