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“Microstructural MRI using diffusion in pre-clinical models of TBI and AD”

Abstract:

The non-invasive detection of subtle brain changes in neurologic disorders and after brain injury is a major goal of imaging science. In particular, quantitative MRI techniques combined with pre-clinical models is a promising approach toward this goal because changes at the cellular level can be probed by methods that are sensitive to physical and chemical changes in the tissue environment. In this presentation, I will describe the primary avenues of research undertaken by my lab in an effort to develop and understand translationally relevant imaging markers – especially by advanced diffusion MRI methods – of brain changes after experimental traumatic brain injury (TBI) and as a result of Alzheimer’s disease (AD) in humans. This includes the study of human-similar ferret models of TBI that recapitulate key pathologic processes and of TBI in humans and translational studies in post-mortem human tissue to discover new imaging markers of AD pathology. A commonality across all levels of investigation is the impact that advanced diffusion MRI methods can have for advancing the tools and understanding of brain disorders and for bridging pre-clinical and clinical findings. Already, the use of these pre-clinical MRI approaches has advanced the tools and knowledge of TBI and AD research and I hope to convey how consequential such approaches may be for the future of translational neurologic disorders research.