Neurovascular targets and challenges in translational stroke research

Over the past decade, numerous advances in neuroimaging have allowed us to probe the pathophysiology of brain injury after stroke. MRI tools centered on diffusion-perfusion mismatch may help identify patients with salvageable penumbra. PET imaging may help us characterize the ensuing dysregulations in cerebral blood flow and metabolism. However, in spite of these powerful in vivo techniques for "looking at stroke", we still lack clinically effective neuroprotective therapies. In this presentation, we will attempt to discuss the translational challenges involved in bridging promising experimental leads into clinically meaningful applications. Specifically, we try to address the following 3 questions: Is it possible that beyond saving neurons (i.e. neuroprotection per se), we need to consider restoring cell-cell interactions between multiple brain cell types (i.e. the neurovascular unit)? Is it possible that many of the neurovascular mechanisms and targets underlying stroke are biphasic in nature (i.e. deleterious in the acute stage but beneficial during recovery)? Finally, in addition to cell and animal models, is it possible to develop "human models" that may help us link experimental platforms to the stroke patient?