Neuroimaging in Neurogeneration, Neurotrauma and Neurorestoration

Meng Law, MBBS, FRACR

Insights into the pathophysiology, possible etiology and ultimately the therapeutic options for debilitating neurological diseases such as epilepsy, traumatic brain injury, stroke, multiple sclerosis, Parkinsons disease and Alzheimhers disease may be provided by neuroimaging. Understanding the underlying molecular, genetic, functional and immunological basis for disease can allow us to look towards concepts such as diapeutics (diagnosis and therapeutics) or theranostics (therapy and diagnostics) in one single approach towards making a diagnosis and then therapy.

There are many advanced neuroimaging tools now such as PET imaging, functional MRI, diffusion tensor MRI, perfusion/permeability MRI, MR spectroscopy which allows us to investigate these underlying mechanisms. This combined with a modeling, machine learning approach to incorporate “big data” to give us an all encompassing understanding of what provides the most accurate diagnosis for individual patients and ultimately the most optimal therapy.