

Near and far: imaging the remote effects of ischemic stroke and cerebrovascular disease burden

Organizer:

Amy Brodtmann, MBBS FRACP PhD

Florey Institute of Neuroscience and Mental Health, Melbourne, Victoria, Australia

What happens to the human brain after stroke? Most researchers have focused on improving methods to image recovery, using post-stroke changes as a model of neural plasticity. But the reality is more complex. We are dealing with aging brains, meaning that some of our assumptions may not hold, including those regarding BOLD signal changes based on evidence from younger people. White matter hyperintensities and microinfarcts are not estimated or included in much of our modelling. Changes can occur in regions that have not been directly affected by the infarct; both within the affected hemisphere and more remotely, especially the hippocampi and thalami.

There is now evidence that the brain atrophies at an accelerated rate after brain infarction. Some of these changes are dynamic, especially cortical thickness and hippocampal change, but some appear progressive, associated with cognitive decline. Stroke is strongly associated with cognitive decline and dementia - one third of stroke patients have dementia 3-5 years after their event. Yet most researchers focus on recovery, assuming that the brain is stable over time.

Attendees will be provided an overview of the evidence of structural brain aging associated with brain ischemia and infarction as a background for the presentations, introducing the concept of vascular neurodegeneration. Brodtmann will present an overview of evolving concepts of vascular degeneration. Forkel will discuss the use of diffusion imaging to provide important information on white matter tracts in aphasia recovery. Veldsman will present a more direct method of examining atrophy within networks at correlations in the rate of cortical atrophy – termed here atrophic covariance – rather than just correlations in the morphometric measure itself. Egorova will discuss the use of seed-based connectivity versus frequency-specific approaches in stroke patients, using networks affected by depression as the model. Longitudinal imaging has the benefit of overcoming inter-individual differences in cortical morphology by using each individual as their own control.

Symposia Schedule:

8:00-8:10

Introduction to the imaging of vascular degeneration

Amy Brodtmann

8:10-8:30

White matter imaging in stroke populations

Stephanie Forkel, PhD, King's College London, London, United Kingdom

8:30-8:45

Network-driven atrophy after stroke: structural versus atrophic covariance

Michele Veldsman, PhD, University of Oxford, Oxford, United Kingdom

8:45-9:00

Resting state brain functioning following stroke: the case of post-stroke depression

Natalia Egorova, PhD, Florey Institute of Neuroscience and Mental Health, University of Melbourne, Melbourne, Australia

9:00-9:15

Questions and Answers