

The human brain connectome applied to stroke rehabilitation research

Much of functional rehabilitation after cerebrovascular brain damage depends on the integrity of the remaining brain tissue. Cortical regions are commonly injured after a stroke, but an even greater degree of damage occurs in white matter, where secondary fiber loss occurs due to loss of projections or reduced functional demands. For this reason, the integrity of white matter networks can be variable across stroke survivors and this difference in the “structural brain framework” may explain different responses to rehabilitation.

The human brain connectome is an advanced structural neuroimaging method that enables charting the totality of the middle- to long- range brain white matter connections among gray matter regions. It permits the direct assessment of white matter loss after stroke and the impact of the remaining networks on the restoration of function. This lecture was designed to provide a practical overview on the utility of the human brain connectome for aphasia research and the methodological steps used to measure the brain connectome, with special emphasis on how to accurately assess it in stroke survivors.