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MRI in frontotemporal dementia: state of the art, promises and challenges

Magnetic resonance imaging (MRI) is playing an increasingly important role in the study of neurodegenerative diseases including frontotemporal lobar degeneration (FTLD), delineating the structural and functional alterations associated with these conditions. MRI techniques are of special interest for their potential to characterize the signature of each clinical presentation within such complex spectrum of disorders, aiding both the diagnostic process and the monitoring of disease progression. A whole set of multimodal MRI techniques allow us to investigate the different features of neurodegeneration, including volume loss of specific brain regions, macroscopic and microstructural damage of white matter tracts, disruption of functional networks constituted by highly interconnected neuronal populations. Among the most up-to-date neuroimaging approaches, graph-based network analysis applied to MRI represents a key methodology to assess brain connectivity. Although a growing body of knowledge about structural and functional connectivity in FTLD has been gathered, we still have a poor understanding of their exact relationship and evolution over time. Moreover, the influence of genetic background on the vulnerability of brain networks to different pathological processes is yet to be clarified. These aspects will become crucial when disease-modifying (personalized) therapies will be established.

