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Neuroimaging processing methods for ageing, neurodegenerative and cerebrovascular diseases

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Cognitive decline with age is a growing concern as the proportion of older people in the population continues to rise. Neurodegenerative and cerebrovascular diseases associated with age benefit enormously from results obtained from processing and analysing magnetic resonance images, which have acquired a pivotal importance in the diagnosis, treatment and prognosis of a myriad of neurological conditions. This talk presents and discusses some examples of the contribution of neuroimaging processing techniques to the understanding of ageing processes, small vessel disease and (some) neurodegenerative diseases. Specifically, it presents advances in neuroimaging biomarkers discovery, steered from automatic methods that have been developed to assess brain features considered non-pathological for years, namely enlarged perivascular spaces, subtle white matter hyperintense regions, brain mineral deposition and inflammation in nasal sinuses. Evidence from the application of these methods in the Lothian Birth Cohort 1936 Study and Mild Stroke Studies conducted at the University of Edinburgh, and in the longitudinal multicentre Future MS study carried out in six different sites across Scotland will be presented to illustrate their impact.

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