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The use of multi-modal imaging to discover sensitive Neuroimaging biomarkers in Huntington's disease

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considerable effort has been underway Aover the last decade to establish sensitive biomarkers of disease onset and progression in Huntington's disease (HD). In particular, neuroimaging measures have been an important area for biomarker development. For example, large-scale multi-site studies (e.g., TRACK-HD, PREDICT-HD) have used structural (MRI) and microstructural (DTI) imaging methods (along with clinical/cognitive/behavioural measures) to document sensitivity of various measures in tracking progressive changes. The Melbourne based IMAGE-HD study is a biomarker development study that adopted a multi-modal approach with consideration of MRI, DTI, functional MRI (fMRI) and susceptibility weighted imaging (SWI). Importantly, across all these studies, including other smaller scale studies, volumetric changes have been shown throughout the course of disease and are observed many years prior to clinical onset. It is now well recognised that caudate volume in particular is the most sensitive marker of disease progression, with white matter changes are also seen very early on. Although there is evidence to suggest that functional deficits in multiple cortical

and subcortical regions extend well beyond the volumetric abnormalities, we are still some way from understanding whether functional changes reflect pathology or compensation, or in determining the utility of functional markers for clinical trials. This presentation will present multimodal data from the IMAGE-HD study, as well as from other large multi-site studies, to showcase sensitive markers of disease progression in HD and will comment on the preparedness of imaging markers for therapeutic trials.

Speaker Biography

Nellie Georgiou-Karistianis completed her PhD in 1997 at Monash University, Australia. She is Professor of Psychology and currently heads an independent research group at the Monash Institute of Cognitive and Clinical Neurosciences. She leads efforts through IMAGE-HD and IMAGE-FRDA to uncover sensitive imaging and cognitive biomarkers of disease progression in rare disorders, such as Huntington's disease (HD) and Friedreich ataxia (FRDA). She also holds the position of Associate Dean (Graduate Research) in the Faculty of Medicine, Nursing and Health Sciences, Monash University, Australia, with a leadership focus on excellence and quality in graduate research training. She has over 190 peer-reviewed scientific publications, with a career total of over \$AU\$12m in research funding. She is a member of the editorial board for the Journal of Huntington's Disease and serves on a number of international working groups/steering committees, including the Huntington's Disease Regulatory Science Consortium (HD-RSC), Critical Path Institute, Arizona. .

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