013 BRAIN NETWORKS IN HUMAN EPILEPSY

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Mark Richardson is a neurologist specialising in epilepsy. He is Paul Getty III Professor of Epilepsy and Head of the Department of Clinical Neuroscience at King's College London. Professor Richardson studied medicine at Oxford and trained in neurology in London. He began his research career as a PhD student at the Institute of Neurology, joining the faculty there in 2000 as an MRC Clinician Scientist Fellow. He moved to King's in 2005. Professor Richardson's clinical practice spans all aspects of epilepsy, from first presentation to complex treatment-resistant epilepsy. His lab studies people with epilepsy using neuroimaging and neurophysiological techniques. Current work aims to understand the brain networks underlying epilepsy, how seizures might arise in these networks, how these network abnormalities affect cognition, and whether interventions targeting specific components of the network can improve epilepsy. He collaborates with mathematicians and engineers in developing computational models to explain phenomena associated with epilepsy.

This contribution aims to introduce the concept of epilepsy as a network disorder. I will provide an overview of how neuroimaging and EEG might contribute to describing brain network structure, and describe how dynamic models may be introduced into network structures to reveal how seizures emerge. I will provide examples of how conventional MRI may be used to reveal network abnormalities. Lastly, I will show an example of how data from human subjects may be used to derive network structures, and combined with dynamic modelling, to cast light on how seizure susceptibility varies between individuals.