Dysfunctional synaptic and neuronal network encoding in tauopathy-associated dementia

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Alzheimer's Research UK

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United Kingdom

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Dysfunctional synaptic and neuronal network encoding in tauopathy-associated dementia

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The project/programme is most relevant to:

Alzheimer's disease & other dementias

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Tau | Tau-Mediated Pathogenesis (AD)

Research Abstract

The cognitive symptoms of dementias such as Alzheimer’s disease are thought to be due to the

malfunction of neuronal circuits in the brain. Although we know that dementia is related to the progressive accumulation of toxic deposits in the brain, it is becoming increasingly clear that communication between neurons is disrupted early in the disease. This neuronal communication is mediated by synapses, which seem to work incorrectly. We do not yet understand how the malfunctioning synapses affect the neuronal circuits, when that happens, or if it can be repaired to halt or reverse disease progression.

This proposal will combine state-of-the-art optical and electrical methods of measuring neuronal activity in a transgenic mouse model of tauopathy-associated dementia to study the relationship between synapse and neuronal network dysfunction from early through until late stages in the disease process. We will identify when and how synapse and circuit changes take place. We will relate these changes to electrical measures of brain activity that could be used to test brain function in humans. Finally, by rapidly removing the disease-causing agent, we will identify the time points in the disease at which treatments could most effectively halt its progress.

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