Exploring tau protein conformation and aggregation on surfaces

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One of the neuronal hallmarks of Alzheimer's Disease is the neurofibrillary tangle composed of the hyperphosphorylated tau protein [1]. Tau's normal function is to stabilize the microtubules in neuronal cells. The mechanism of tau malfunction is complex, since six different isoforms of tau exist and all undergo a variety of biochemical transformations, such as hyperphosphorylation, glycosylation etc. *In vitro* studies of tau aggregation are typically performed by optical spectroscopy and microscopy to identify the protein conformations and aggregate morphologies, respectively. Since tau proteins do not spontaneously self-assemble, like amyloid peptides, the guest molecule is typically used to induce their aggregation *in vitro*. The existing techniques for studying the tau protein *in vitro* require large samples volumes and tau concentrations. Alternative methods for exploring tau biochemistry are of interest. We have used the range of electrochemical techniques to monitor tau protein conformation on surfaces, towards developing more sensitive methodologies for tau studies. Investigations into the effects of additives on tau conformation and aggregation will be presented and electrochemical data compared to the optical solution and electron microscopy results.

1) (a) I. Grundke-Iqbal, K. Iqbal, Y. C. Tung, M. Quinlan, H. M. Wisniewski, L. I. Binder, Proc. Natl. Acad. Sci. U. S. A. 1986, 83, 4913-4917. (b) V. M.-Y. Lee, B. J. Balin, L. Otvos Jr, J. Q. Trojanowski, Science 2002, 1912-1934.