Carbon Nanotube based electrodes for the electrochemical detection of interactions between *scyllo*-Inositol and Amyloid-β

Vinci Hung, Kagan Kerman [a,b]

[a] Department of Chemistry - University of Toronto
80 St. George Street, Toronto, Ontario M5S 3H6

[b] Physical & Environmental Science - University of Toronto Scarborough
1265 Military Trail, Toronto, Ontario M1C 1A4

Alzheimer's disease (AD) is a prominent neurodegenerative illness that affects the elderly population around the world. A biochemical hallmark of AD is the presence of amyloid-β (Aβ) plaque that has been documented to cause neuronal death. Factors that increase the neurotoxicity of Aβ include the presence of metal ions and production of reactive oxygen species. [1]

In an effort to circumvent the damage caused by Aβ plaques, novel investigations into therapeutic agents able to modulate its formation are underway. *scyllo*-Inositol (SC), a natural plant sugar alcohol, has been shown to interact directly with Aβ to block fibril formation. [2] The modulatory effect of SC was monitored by a rapid and label-free electrochemical method. In this study, the oxidation signal of a lone tyrosine (Tyr-10) residue in the Aβ was recorded over time. A decrease in the aggregation rate of Aβ was observed in the presence of SC, similar to the trend observed for other known aggregation modulators.

Shown in Figure 1, Tyr-10's oxidation signal was observed at ca. 0.75 V (vs. Ag/AgCl) on a carbon paste-CNT electrode. The use of CNTs in this study allowed an enhanced detection of tyrosine's oxidation signal as compared to a bare electrode. [3] Progression of Aβ aggregation in the presence of SC allowed for the formation of a globular amorphous aggregate, which shifted the oxidation signal of Tyr-10 to a higher potential. In the presence of iron, copper and zinc, SC was able to slow fibril formation *in vitro.* These electrochemical results reflect on the neuroprotective ability of SC, and confirm the potential use of electrochemistry for the screening of other therapeutic compounds.

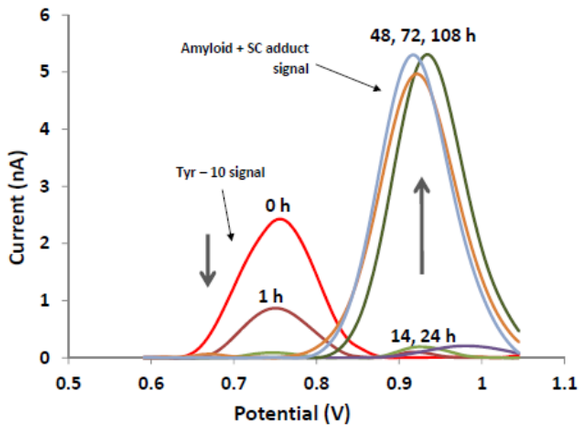

Figure 1. Differential pulse voltammograms for the oxidation signal of the lone tyrosine (Tyr-10) residue found within Amyloid-β 1-40 peptides (Aβ-40) in the presence of *scyllo*-inositol (SC) in PBS (pH 7.4).

1. A.I. Bush, *Trends Neurosci.*, **26**, 207 (2003)
2. Y. Sun, G. Zhang, C.A. Hawkes, J.E. Shaw, J. McLaurin, M. Nitz, *Bioorgan. Med. Chem.*, **16**, 7177 (2008)
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