Early-Stage Aggregates in Alzheimer's Disease

The neurodegenerative symptoms of Alzheimer's Disease have long been connected to aggregations of fibrilized beta amyloid (Aβ) peptide on the brains of patients. The polymerization of Aβ peptide leads to a characteristic β-sheet structure, which has been found to be the composition of the plaques. Increasing evidence shows that in a course of fibril formation, early-stage aggregates exist and that the neurotoxicity of the early-stage aggregates may be responsible for neural cell death in AD. In this study, we examined a shorter fragment of 14 residues Aβ(22-35) for the most-abundant 40-residue Aβ peptide, Aβ(1-40) in order to study its conformational change and how it compares to that of the 40 residue Aβ peptide. Very little information has been obtained about this fragment and its effects on neurotoxicity. In our study, we found that formation of only transient intermediates having β-sheet structure (β-sheet intermediates) was detected by fluorescence spectroscopy using a Thioflavin T (ThT) dye. ThT is a marker that exhibits light absorbance as it binds to β-sheet and can elucidate the Aβ polymerization process and dictate when the intermediate structure begins to form. Data gathered will not only verify that the Aβ(22-35) region polymerizes into β-sheets just as the entire Aβ(1-40) region does, but it will also demonstrate the time intervals in which intermediate structures may be captured for analysis.