**Polymer-Polymer Scaffold: An Efficient Strategy to Cross Blood Brain Barrier and Modulate Pathological Amyloids**

Subrata Mondal, Sayan Roy Chowdhury, and Parameswar Krishnan Iyer\*

Department of Chemistry, Indian Institute of Technology Guwahati 781039, Assam, India.

Email id: [pki@iitg.ernet.in](mailto:pki@iitg.ernet.in)

Alzheimer's disease (AD) is pathologically highlighted by the aggregation of intracellular neuroﬁbrillary tangles shaped by tau proteins and extracellular feeble torment by amyloid β-proteins (Aβ) in the patient brain. Numerous studies have demonstrated that the aggregation of Aβ into amyloid ﬁbrils containing trademark cross-β-sheet structure in the mind of AD patients is firmly connected to the pathogenesis of AD and dissolvable Aβ oligomers and/or protoﬁbrils are the most poisonous species, in charge of neuron brokenness and death. Here, in this work, nontoxic, biocompatible water soluble polymeric conjugate have been used to modulate toxic amyloid aggregates in human CSF and as well as in preformed amyloid aggregates from commercial Aβ1-40. This modulation strategy leads to the formation of polymer-protein co-aggregates instead of toxic amyloid aggregates which is responsible for plaque formation and is related to disease progression. The intriguing prospect of amyloid fibrils using luminescent conjugate materials technique as a scaffold for polymer-protein hybrid materials is well delineated as this technique provides a direct link between spectral signal and protein conformation and can further be used to gain more information concerning the morphology of the protein deposits and facilitate a greater understanding of the conformational phenotype encoded in the native protein aggregates.

References

(1) Yankner, B. A.; Duffy, L. K.; Kirschner, D. A. *Science* **1990**, *250*, 279−282.

(2) Hardy, J.; Selkoe, D. J. *Science* **2002**, *297*, 353−356.

(3) Chowdhury, S. R.; Agarwal, M.; Meher, N.; Muthuraj, B.; Iyer, P. K. *ACS Appl. Mater. Interfaces*, 2016, 8 (21), 13309–13319.