**Understanding the Efficacy of Hydroxyquinoline-derived “turn-on” Fluorescence Probe for the Detection of Amyloid beta**

Priyam Ghosh,1 Parameswar K. Iyer\*1,2,3

1Department of Chemistry, Indian Institute of Technology Guwahati, Assam, India 781039

2Center for Nanotechnology, Indian Institute of Technology Guwahati, Assam, India 781039

3Jyoti and Bhupen Mehta School of Health Science and Technology, Indian Institute of Technology Guwahati, Assam, India 781039

**Email: pki@iitg.ac.in**

**Abstract:** Amyloid beta(Aβ) protein aggregation inside the neocortex is the primary aetiology of Alzheimer's disease (AD). Recent findings point to aberrant interactions with metal ions in the neocortex, including Zn, Cu, and Fe, as the cause of Aβ precipitation and toxicity in AD. Drug design, protein-ligand interaction, optoelectronic material design, macromolecule construction, and many other fields rely heavily on non-covalent interactions such as hydrogen bonding, π-π stacking, π-alkyl, π-anion, π-cation, π-lone pair, etc. One of the most challenging tasks facing the scientific community is the design of drug molecules for Alzheimer's Disease (AD). Here, we used a molecular docking study to investigate the interaction of some newly synthesized molecules with the model of amyloid fibrils to comprehend the molecular binding nature and inhibitory attributes. The best effective molecule was further tested using the ThT assay, and it was found that the molecule is highly responsive to Aβ and efficiently blocks the fibrillation pathway. Furthermore, physicochemical studies have been performed to understand the molecule's efficacy toward AD.

**KEYWORDS:** **Amyloid beta • Nano Dot • Disaggregation • Copper Chelation • Neurotoxicity • Alzheimer’s Disease**