Polymers under Multiple Constraints

Polymer- & Soft-Matter-Seminar

Tuesday,
23rd July 2013

at: 5.15 pm

VSP1 1.26

Von-Seckendorff- -Platz 1,
06120 Halle

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"Amyloid Fibrils: Certain Molecular Level Structural Insights with Solid-State Nuclear Magnetic Resonance."

Aβ peptides are interesting models for investigating different aspects of amyloid aggregation. On the basis of amyloid cascade hypothesis, which has dominated amyloid disease research for the past two decades, the main therapeutic strategies have aimed either to prevent the aggregation of Aβ, or to remove toxic oligomeric and fibrillar species of Aβ. Since Aβ is ordinarily produced in the brain, and there is no proof that Aβ overproduction underlies sporadic AD, the pursuit of former strategy demands a thorough understanding of all the neurochemical factors that initiate Aβ deposition in brain. One such factor is the presence of metal ions, especially Zn^{2+}. Zn^{2+} plays important roles in normal physiology of brain and is also considered to be a major neurochemical factor associated with Aβ aggregation and AD. Observations like high Zn^{2+} concentrations in senile plaques found in the brains of Alzheimer's patients and evidences emphasising the role of Zn^{2+} in Aβ-induced toxicity have triggered interest in understanding the nature of Zn^{2+}-Aβ interaction. Of the two strategies mentioned earlier, the later generally involves usage of external agents/drugs which can make Aβ follow such aggregation pathways which yield non-pathological species of Aβ. In this regard, curcumin, a small phenolic compound and a common Asian spice, has been found to ameliorate the effects of Aβ induced neuro-degeneration in AD models. A structural understanding of how curcumin interacts with Aβ can provide a significant impetus to such efforts, and we are exploring this aspect with SSNMR spectroscopy. In this work, we have studied both the properties and the molecular structure of both $Aβ_{40}$ and $Aβ_{42}$ aggregates co-incubated with curcumin. We will present here key results from both of these studies.