Tata Institute of Fundamental Research
Survey No. 36/P, Gopanpally Village, Serilingampally, Ranga Reddy Dist., Hyderabad – 500 046

Seminar

Extending CEST NMR experiments to study protein conformational dynamics occurring over the ~10^{-4} to ~10^{0} seconds timescale

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Protein conformational dynamics play a crucial role in their function, folding/misfolding aggregation. However, studying conformational dynamics and thus understanding the mechanism of processes like folding etc. remains a challenge as they involve sparsely populated states. Further, these minor states are short lived making them hard to detect. NMR spectroscopy has emerged as a particularly powerful tool to detect and study such minor states of biomolecules at the atomic level. Chemical Exchange Saturation Transfer (CEST) NMR experiments developed over the past decade are now routinely employed to detect minor states populated to<1%, with lifetimes varying from ~10^{-2} to ~10^{-1} seconds. In this talk, I will discuss our efforts towards extending the range of applicability of CEST NMR experiments to study conformational dynamics over timescales from ~10^{-4} to 10^{0} seconds and apply them to study conformational dynamics of the FF domain (~10 s^{-1}), L99A T4 lysozyme (~100, ~3000 s^{-1}) and the folding of peripheral subunit binding domain (~10000 s^{-1}). In the case of L99A T4L, detailed insights into the free energy surface were obtained using urea *m*-values derived from CEST experiments. Using lessons learnt from the above studies I will also describe how CEST can be used to study exchange between 'visible' protein states, emerging as a powerful alternative to the ZZ-exchange experiment.

Tuesday, Jun 10th 2025

16:00 Hrs (Tea / Coffee 15:45 Hrs)

Auditorium, TIFRH