POSTDOCTORAL FELLOWSHIP OPPORTUNITY

Hosted by the department of Physical Chemistry, funded for up to 5 years

Application of cutting edge, high-molecular weight solution and solid NMR techniques to studies into how molecular chaperones prevent protein aggregation

A growing number of human disorders including Alzheimer's disease (AD), Parkinson's disease (PD), type II diabetes and the prion diseases are associated with the deposition of proteinaceous 'amyloid' aggregates in human tissues.

The primary goal of this proposal is to elucidate the molecular mechanism by which a family of chaperones, the small heat shock proteins (sHSPs) inhibit aggregation. Studies of sHSPs have proven challenging, as they typically exist as heterogeneous ensembles of high molecular weight oligomers. A combination of cutting edge NMR, ion-mobility mass spectrometry (IM-MS) methods, and electron microscopy (EM) will be used to probe the interactions between the aggregating proteins and sHSPs. This novel 'hybrid' approach is uniquely suited to the studies of complex, high molecular weight biological molecules, and will give insight into the molecular mechanism by which sHSPs inhibit aggregation.

Due to the inter-disciplinary nature of the project, a range of expertise is welcomed. Applications with past training in protein purification and functional studies are encouraged to apply. Extensive training however is offered in all areas:

- Cutting edge high molecular weight methyl-TROSY solution NMR techniques, with an emphasis on slow (μs/ms) and fast (ps/ns) dynamics measurements to understand how these relate to biological function.
- Solid-state NMR techniques
- Ion-mobility mass spectrometry techniques
- NMR theory with practical experience in pulse sequence programming and data analysis
- Protein purification and expression
- Biophysical assays to determine protein aggregation rates
- Use of python and C++ programming languages to provide novel methods for structure determination of high molecular weight oligomers.

For more information, please contact: **Dr. Andrew Baldwin,** andrew.baldwin@chem.ox.ac.uk

To apply: https://www.recruit.ox.ac.uk/pls/hrisliverecruit/erq_jobspec_version_4.display_form