

The National Deuteration Facility, and support of neutron scattering for structural biology

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The National Deuteration Facility (NDF) at the Australian Nuclear Science and Technology Organisation (ANSTO) provides deuteration for a diversity of molecules and applications, including the deuteration of proteins for solvent contrast variation of multi-subunit biological assemblies.

Many of the macromolecular functions of life and disease involve dynamic protein interactions. Observing, and mapping, large scale domain movements is a strength of method of solution scattering. Small angle x-ray scattering can quickly provide macromolecular envelope information. Extending on this is the method of small angle neutron scattering (SANS) using solvent contrast variation, and subunit-specific labelling by deuteration, which enables identification and mapping of relative dispositions of the subunits within the macromolecular envelope.

Recent illustrative examples of structural characterisations using deuteration and SANS include: [1] the trimeric *Proteus mirabilis* ScsC protein bound to ScsB; [2] the BAMLET complex of alpha-lactalbumin and oleic acid; and [3] multiple complexes of syntaxin and munc18.

[1] Disulfide isomerase activity of the dynamic, trimeric *Proteus mirabilis* ScsC protein is primed by the tandem immunoglobulin-fold domain of ScsB.

Furlong, E. J., Choudhury, H. G., Kurth, F., Duff, A. P., Whitten, A. E. & Martin, J. L.

Journal of Biological Chemistry, 293, 5793-5805. (2018) <http://dx.doi.org/10.1074/jbc.RA118.001860>

[2] Neutron scattering shows a droplet of oleic acid at the center of the BAMLET complex.

Rath, E. M., Duff, A. P., Gilbert, E. P., Doherty, G., Knott, R. B. & Church, W. B.

Proteins, 85, 1371-1378. (2017) <http://dx.doi.org/10.1002/prot.25298>

[3] Studying Munc18:syntaxin interactions using small-angle scattering.

Whitten, A. E., Jarrott, R. J., Hu, S. H., Duff, A. P., King, G. J., Martin, J. L. & Christie, M. P.

Methods in Molecular Biology, 1860, 115-144. (2019). http://dx.doi.org/10.1007/978-1-4939-8760-3_7

Speakers Gender

Male

Travel Funding

No

Level of Expertise

Expert

Do you wish to take part in the poster slam

No

Primary author(s): DUFF, Anthony (ANSTO); Ms CAGNES, Marina (ANSTO); DARWISH, Tamim (ANSTO); DAVY-DOVA, Natalia (ANSTO); HOLDEN, Peter (ANSTO); Dr KRAUSE-HEUER, Anwen (ANSTO); MURPHY, Rhys (ANSTO); REKAS, Agata (ANSTO); RUSSELL, Rob (ANSTO); WILDE, Karyn (ANSTO); YEPURI, Nageshwar (ANSTO)

Presenter(s): DUFF, Anthony (ANSTO)

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