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The ILL Deuteration Laboratory (ILL D-Lab)

Tuesday 21 March 2023 16:00 (2 hours)

The ILL Deuteration Laboratory is a platform dedicated to isotope labelling of biological molecules. More specifically, the D-Lab team members are experts in the deuteration of biomolecules for neutron applications, such as neutron scattering, protein crystallography, dynamics and reflectometry. The D-Lab is part of the ILL Life Sciences Group within the Partnership for Structural Biology (PSB) located in Grenoble, France. It is run as a user platform available to all neutron users. Access to the platform is by a rapid electronic peer-review system, available at any time.

In neutron experiments in biology, the replacement of the common hydrogen isotope protium (1H) by its stable isotope deuterium (2H) is of crucial importance for biomolecules [a]. Depending on the neutron experiment, various levels of deuteration of these molecules are necessary [b]. Microorganisms such as bacteria and yeasts have been successfully adapted to growth in deuterated minimal media. Large-scale protein deuteration by recombinant expression in high-cell density cultures was initially developed in the ILL D-Lab. The production of various labelled biomolecules required for the study of proteins, protein-nucleic acid complexes, protein-lipid complexes, glycoproteins, membrane proteins and stealth lipid nanodiscs will be presented. The in vivo deuteration of small biomolecules of major functional importance will also be highlighted, as well as recent advances and method developments for the deuteration of biomolecules *in vivo* and *in vitro*.

For further information, you can consult the webpage on the ILL website (https://www.ill.eu/users/support-labs-infrastructure/deuteration-laboratory) dedicated to the platform. The ILL D-Lab team can be contacted at any time (dlab-proposals@ill.fr) and is fully available to assist neutron users in biology with their sample preparation.

REFERENCES:

a. Haertlein M., Moulin M., Devos J.M., Laux V., Dunne O., Forsyth V.T. Biomolecular Deuteration for Neutron Structural Biology and Dynamics Methods Enzymol., 566, 113-157 (2016).

b. Dunne O., Weidenhaupt M., Callow P., Martel A., Moulin M., Perkins S. J., Haertlein M., Forsyth V.T. Matchout deuterium labelling of proteins for small-angle neutron scattering studies using prokaryotic and eukaryotic expression systems and high cell-density cultures Eur. Biophys. J., 46, 425–432 (2017).

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