



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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