Neutrons for structural glycobiology in host-pathogen interactions

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Glycans are essential component of cell surfaces as part of glycoproteins and glycosphingolipids, where their complex topology builds the "glycocode" deciphered by different receptors. Among them, lectins expressed by pathogenic microbes have the ability to specifically recognize complex carbohydrates present on the host tissue. Fucose, a monosaccharide present on histo-blood group oligosaccharides of ABH(O), is the target for the lectins of several pathogenic bacteria and viruses.

Neutrons crystallography has been used to decipher the role of hydrogen atoms in the interaction between bacterial receptors and host glycans. Perdeuterated fucose was produced using a synthetic glycobiology approach and co-crystallized with two fucose-specific bacterial lectins, PLL from insect pathogen *Photorhabdus luminescens*, and LecB from human pathogen *Pseudomonas aeruginosa*. Diffraction data collected using the LADI-III instrument at ILL has yielded the first structures of perdeuteurated protein/carbohydrate complexes, with new finding in the fine mechanisms of recognition.