

Dr Bruce Turnbull

W.B.Turnbull@leeds.ac.uk

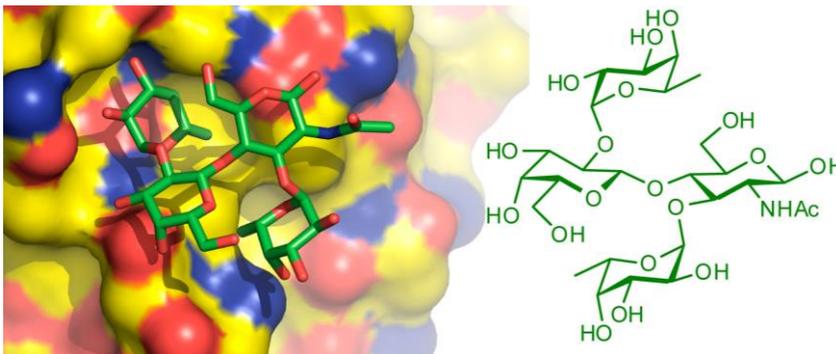
phone: 0113 343 7438

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Synthetic models for understanding cell surface protein-carbohydrate interactions

In this project we will use a combination of chemical and enzymatic synthesis and biophysical methods to understand medically important protein-carbohydrate interactions.

Many viruses, bacteria and their toxins interact with cell surface carbohydrates to mediate cellular adhesion and endocytosis. While the highest affinity ligands are often well characterised, much less is understood about the role of other weaker binding events that occur as the cell invader descends through the forest-like glycocalyx. In some cases, weak interactions with the external parts of the glycocalyx have been attributed to explaining the blood group-dependence of certain diseases. For example, we have proposed that weak interactions with blood group O (but not blood group B) carbohydrates facilitates cell entry of EI Tor cholera toxin B-subunit (CTB). In this project we will construct simplified models of the glycocalyx and use them to better understand how weak interactions between proteins and carbohydrates affects transport of proteins through the glycocalyx.



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We will prepare carbohydrate ligands using a combination of chemical and enzymatic synthesis.^{[1]-[2]} Part of the work will make use of the first automated oligosaccharide synthesiser in the UK as part of a collaboration with colleagues at the University of York. We will use these carbohydrates to make vesicle-linked glycopolymers and use them to study weak binding interactions using a range of biophysical methods including isothermal titration calorimetry.^{[1],[3]-[5]}

This multidisciplinary project will provide opportunities for the student to receive training in synthetic chemistry, protein chemistry and biophysical characterisation.

Please contact Dr. Bruce Turnbull (W.B.Turnbull@leeds.ac.uk) for further details about this opportunity.

References

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