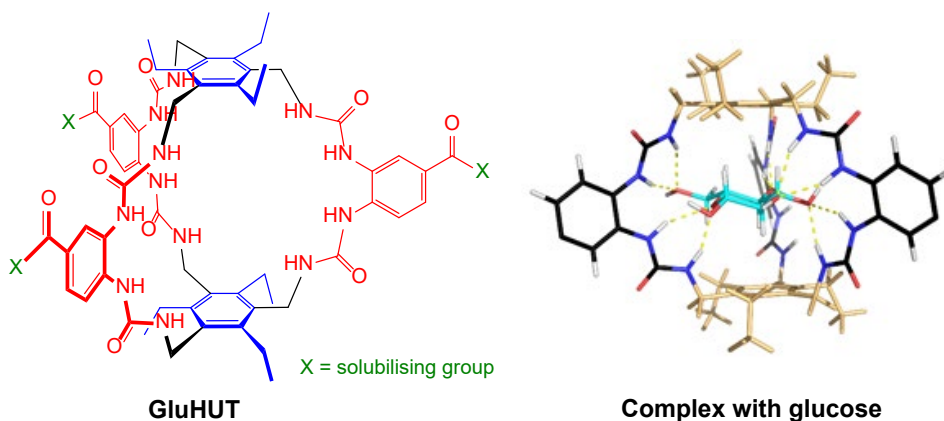


PhD Studentship in Supramolecular Chemistry – Synthetic Carbohydrate Receptors with Medical Applications

A PhD studentship funded through a UKRI Frontier Research Grant (selected as an ERC Advanced Grant) is available in the group of Prof. A. P. Davis.

Carbohydrates are central to biology, serving as fuels and building materials and also as carriers of information controlling biological processes. Synthetic receptors for carbohydrates thus have many potential applications in biological research and medicine. In just one example, receptors for glucose can serve as the basis for continuous glucose monitors and/or glucose sensitive insulin, benefitting the world's >500 million diabetics.

Designing selective carbohydrate receptors is notoriously difficult, but the Davis group recently made a remarkable breakthrough. As part of their programme on "Temple" carbohydrate receptors,¹ they discovered a variant "GluHUT" (Glucose-binding Hexaurea Temple) which binds glucose as tightly as all but the strongest natural receptors, and with almost perfect selectivity.² The IP for GluHUT was sold to the pharmaceutical company Novo Nordisk, and has been used in designs for glucose-responsive insulin.³



Potential projects aim (a) to exploit GluHUT's glucose binding properties in new ways which will further increase its value in medicine, and (b) to use the design as a starting point for receptors which bind other medically relevant carbohydrates (e.g. tumour biomarkers). The work will be supported by a collaboration with the group of Prof. A. J. Mulholland on state-of-art computational methodology for receptor design, including the use of virtual reality (VR) for building and manipulating candidate structures. For more details, please contact Prof. Davis at:

Anthony.Davis@bristol.ac.uk.

References:

1. Biomimetic carbohydrate recognition. A. P. Davis, *Chem. Soc. Rev.* **2020**, *49*, 2531-2545, DOI: [10.1039/c1039cs00391f](https://doi.org/10.1039/c1039cs00391f).
2. A biomimetic receptor for glucose. R. A. Tromans, T. S. Carter, L. Chabanne, M. P. Crump, H. Li, J. V. Matlock, M. G. Orchard, A. P. Davis, *Nature Chem.* **2019**, *11*, DOI: [10.1038/s41557-018-0155-z](https://doi.org/10.1038/s41557-018-0155-z).
3. Glucose-sensitive insulin with attenuation of hypoglycaemia. T. Hoeg-Jensen et al. *Research Square preprint* **2023**, DOI: <https://doi.org/10.21203/rs.21203.rs-2882397/v2882391>.

The successful candidate should hold or be predicted to achieve a First or Upper-second class degree in Chemistry or a related subject. A full studentship will cover tuition fees, a training support fee and a stipend at standard EPSRC rates for 4 years. The preferred start date is 16 September 2024.

To discuss this project in advance of making an application, please contact Professor Anthony P. Davis , University of Bristol. Anthony.Davis@bristol.ac.uk, <https://davis.chm.bris.ac.uk/>