

Conferencia: Synthetic Lectins – Biomimetic Receptors for Carbohydrates

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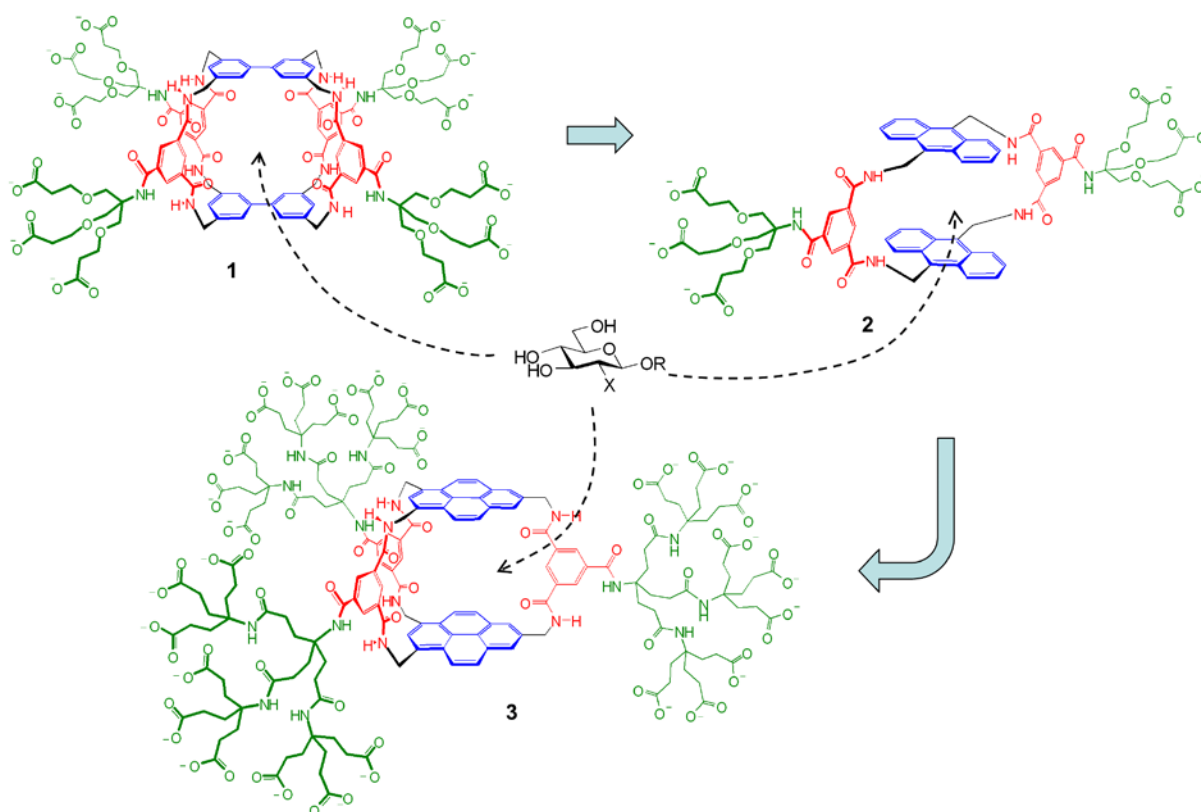
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Synthetic Lectins - Biomimetic Receptors for Carbohydrates

Carbohydrate recognition presents an interesting problem to supramolecular chemists. On the one hand it is challenging, owing to the hydrophilic and hydromimetic nature of carbohydrates. Indeed, even natural lectins tend to show low affinities by normal biological standards. On the other hand, it provides an opportunity to interface directly with biology. Lectins are widely used as tools in glycobiology, but do not always possess the ideal recognition and/or physical properties. “Synthetic lectins” could serve as complementary agents if sufficiently active and selective. We have been developing receptors for the “all-equatorial” family of carbohydrates (glucose, GlcNAc etc.), employing designs which incorporate parallel aromatic surfaces (complementary to axial CH units) joined by polar spacers. As illustrated below, the systems have evolved from biphenyl-based structures (e.g. **1**) through monocyclic bis-anthracenes (e.g. **2**) to cages built from condensed aromatics (e.g. **3**). This diversity of structures has lead to useful variations in selectivity, while affinities continue to improve. Some of this new work has led to systems with affinities $> 10^4 \text{ M}^{-1}$ towards saccharides in water, providing a serious challenge to common natural lectins.



Tony Davis gained a B.A. in Chemistry from Oxford University in 1977, then stayed on for a D.Phil. under Dr. G. H. Whitham and two years' postdoctoral work with Prof. J. E. Baldwin. In 1981 he moved to the ETH Zürich as a Royal Society European Exchange Fellow working with Prof. A. Eschenmoser, then in 1982 was appointed as a Lecturer in Organic Chemistry at Trinity College, Dublin. In September 2000 he moved to the University of Bristol, where he is Professor of Supramolecular Chemistry in the School of Chemistry.