De Novo Approaches to Glycomics?

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Over the years the O'Doherty group has been working in two related areas of organic synthesis: carbohydrate synthesis and natural product synthesis. The unifying theme that connects our research in these two areas is our method of synthesis (asymmetric catalysis) and target selection (anti-cancer/anti-microbial agents). A recurring theme in the group's synthetic approaches to both types of targets is our reliance on asymmetric catalysis for the control of asymmetry. Fundamental to our approach is the development of highly efficient routes that transform, via catalysis, inexpensive achiral starting materials into enantiopure products, which are poised for the conversion into complex molecules with biologically relevant properties (i.e., enantioselective synthesis of a new “chiral pool” via asymmetric catalysis). Recently, we have found that these approaches have matured to the point where we have developed enantioselective routes to these complex molecules in sufficient quantities that are amenable for biomedical investigations. An example of these types of approaches is outlined below in our recent approach to Merremoside D (Scheme 1) and related oligosaccharide natural product with anticancer activity.

Scheme 1: De novo approach to the Merremoside D.

References