

## Editorial

Accompanying the rapid increase of knowledge on the extreme importance and vital roles of carbohydrates in living systems, carbohydrate chemistry has made its way from a quite underrated area of natural products research right into the focus of modern organic and bioorganic chemistry within a quarter of a century. Just by flicking through the graphical abstracts of major journals, large numbers of papers on carbohydrate chemistry can be found almost anywhere in the contemporary literature.

The complexity and polyfunctionality of carbohydrates as a testing ground for modern organic methodology, carbohydrates as building blocks, carbohydrate related mimetics of natural products as enzyme probes, diagnostics, and therapeutics, carbohydrates in material sciences, all these and many more exciting topics demonstrate this lasting boom in glycosciences. Not many other areas are as rich in complexity, subtle reactivity differences, unusual behaviour of compounds and, as a result, so full of challenges, surprises, and rewards. Consequently, it was a great pleasure to accept the proposal by the *Managing Editor* of the Austrian journal *Chemical Monthly*, Prof. *Heinz Falk*, to compile a representative survey of timely research contributed by international leaders in the field as well as by outstanding young talents. This collection is intended to give evidence for the statements made above as well as to provide informative and entertaining reading for the many who are interested in our field, from advanced students to seasoned researchers.

The topic span from an interesting and wide range of contributions in the section synthetic methodology to important subunits of biologically significant lipopolysaccharides, sugar, and nucleoside mimetics and their biological activities as well as applications of saccharides as scaffolds for compound libraries and the application of carbohydrates as chiral auxiliaries.

This special issue of *Chemical Monthly* features four invited reviews: *B. La Ferla* has surveyed applications of lipases and esterases in selective biocatalytic carbohydrate protection and deprotection reactions. *F. Nicotra* and his group have exploited carbohydrates as scaffolds for library generation. The liberation of carbonyl functions from C-nitro groups in sugars, an important step in the chain extension of sugars, has been treated by *L. Petruš* and coworkers. Last but not least, *T. M. Wrodnigg* has provided a review on important pyrrolidine-related iminoalditols, their natural sources, synthetic approaches, and glycosidase inhibitory activities.

In the article section, *K. Dax* and coworkers have elaborated a system to categorize reactions occurring during attempted nucleophilic displacement reactions at C-2 of pyranosides with diethylaminosulfur trifluoride. *A. Fairbanks*

and his group describe an interesting intramolecular aglycon delivery approach employing allyl protecting groups. *R. Madsen* and colleagues have taken advantage of a transition metal mediated fragmentation of 6-deoxyiodo glycopyranosides leading to key intermediates for RCM methodology and other approaches to natural products and analogues. *T. Lindhorst* and *M. Walter* observed differences in kinetics during a “reactivity tournament” of sugar derived isothiocyanates.

Carbohydrate photochemistry, exemplified by transformations of levoglucosan imides to nitrogen containing heterocycles, is reported by *J. Thiem* and coworkers. In the carbohydrate mimetics section, an account on nucleoside analogues and their biological activities was contributed by the *M. Jung* group. Thiosugars are the topics in both the contributions by *S. Witczak* and collaborators and *W. Schmid* and coworkers. *R.V. Stick* and *A. G. Watts* have chased and discussed common features in the mechanistic principles of retaining glycosyl hydrolases and retaining glycosyl transferases. Some new xyloside mimetics related to 1,5-dideoxy-1,5-iminoxylitol were probed as reversible inhibitors of  $\beta$ -xylosidases by *S. G. Withers* and collaborators.

Immunologically interesting sub-units of chlamydial lipopolysaccharides have been prepared by *P. Kosma* and coworkers. *H. Kunz* and colleagues took advantage of carbohydrates as chiral auxiliaries in their synthetic work on tetrahydroquinoline alkaloids. Application of modern NMR spectroscopy is demonstrated by *H. Kählig* and coauthors who employed diffusion difference NMR spectroscopy for the analysis of carbohydrate mixtures.

It is a special feeling to find so much appreciation for our ‘trade’ here in Austria; we, the guest editors, would like to thank *Heinz Falk* and *Hermann Kalchhauser* as well as the Springer publishing team for their kind support, patience, and help with this project. We hope that the readers will enjoy this collection of timely topics in carbohydrate chemistry.

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