



## Book review

**Advances in Macromolecular Carbohydrate Research**, Edited by Robert J. Sturgeon, Vol. 2, 2003, 247 pp. ISBN 0444-51430-9. Elsevier Science B.V. EURO 285, USD 285

Carbohydrates are attracting increasing interest, as evidenced, among others, by the growth in the number of books on the chemistry and biology of these and related substances, the study of many of which falls in the area that has become known as glycobiology. The five reviews comprising the present volume are written at a level suitable for graduate students and researchers working in this area.

One of the first two reviews, written by W. Tanner, M. Gentzsch and S. Strahl, deals with the chemical structure, molecular organization and biosynthesis of the yeast cell wall, with focus on the wall glucans and the proteins to which they are attached via  $\gamma$ -ethanolamine-Man<sub>3</sub>-, a fragment of the widely occurring GPI (glycosylphosphatidylinositol) anchor. The other review by H. de Nobel and F.M. Klis, is devoted to protein-*O*-mannosylation, a reaction originally observed in fungal proteins and most extensively studied in *Saccharomyces cerevisiae*. The authors describe the structure and biosynthesis of the *O*-mannosylsaccharides, and discuss their possible roles. Several features of the same reaction in higher eukaryotes, where it is now known to occur as well, are also summarized.

The ABO and related blood group determinants are the subjects of the third review of this book, whose authors are Anne Imberty *et al.* Among the topics covered are the structure and localization of these oligosaccharide determinants, and their biosynthesis, with special emphasis on the cloned fucosyltransferase genes involved. This is followed by a description of the three-dimensional structures and conformational behavior of the oligosaccharides, and their interaction with lectins and antibodies, including the structure of the respective protein-carbohydrate complexes.

Biotechnological developments in the use of chitin and chitosan (deacetylated chitin) are reviewed by S. Hirano in the fourth part of the book. Current and potential applications of these two polysaccharides and of the derivatives obtained from them by chemical substitution of their hydroxyl and amino

groups are surveyed. Information is also presented on the products obtained from the chemically substituted polysaccharides in the form of beads, fibers, hydrocolloids hydrogels and microspheres, and their biomedical and biotechnological uses

The fifth and last review by S.A. Nepogodiev and J. Fraser Stoddart, deals with carbohydrate dendrimers, compounds with highly branched structures emanating from a central core. Some of these glycodendrimers are amongst the synthetic carbohydrates of highest molecular weight known, with perfect homogeneities and beautiful symmetries. They contain numerous non-reducing monosaccharide residues; examples are presented of a glycopeptidodendrimer presenting 48  $\alpha$ -D-mannopyranoside residues, and of another dendrimer with 64 lactose residues. Such tailor-made macromolecules are uniquely suited for the study of the specificity of lectins and other carbohydrate-binding proteins. Furthermore, they may be of particular use for the anti-adhesion therapy of microbial diseases, as already demonstrated by one such dendrimer, named STARFISH, that proved to neutralize most effectively the action of Shiga-like toxins both *in vitro* and *in vivo* [G.L. Mulvey *et al.* (2003) *J Infect Dis.* **187**, 640–9].

The reviews are generally well written and heavily referenced, with the exception of the last one, the subject of which is comparatively new, that has only 65 references. The literature survey is quite extensive up to the end of the 1990s, with only a sprinkle of articles from the present century. It is unfortunate, however, that the exorbitant price of the book, at *two hundred eighty five* US dollars or Euro (1.15 cents per printed page!), two and a half times that of the first volume in the series, may make it out of reach for interested readers. They may instead consult reviews on the same topics published in less expensive and more readily accessible books or journals.

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