



Book review

Carbohydrates: the sweet molecules of life, By Robert V. Stick, Academic Press, New York, 2001. ISBN 0-12-670960-2; 256 pp.; hardback, £ 43.95, \$ 64.95

Carbohydrates is intended as an introduction to the field for organic chemists at the advanced undergraduate and postgraduate level. In chapters 1–5, the initial treatment is historical, with an emphasis on the contributions of Emil Fischer and other pioneers that led to the establishment of the relative configurations in glucose. Ring structures, conformations and anomeric effects are then discussed to give the necessary structural foundation.

There follows a chapter on synthesis and protecting groups and one on the reactions of monosaccharides. The heart of the book, and clearly the main interest of the author, lies in glycoside and oligosaccharide synthesis (chapters 8 and 9). The development in this area is clearly laid out, from the early days of Fischer and Koenigs and Knorr, with an extensive and up to date bibliography. The various methods are discussed critically, with an emphasis on reactivity, regioselectivity and the control of anomeric configuration. Recent work on oligosaccharide synthesis on polymer supports is covered. The later chapters (10–12) introduce some of the more complex naturally occurring carbohydrates, glycoconjugates and glycobiology, and the subject of carbohydrate vaccines.

NMR is mentioned on several occasions, but only in passing, and there is no NMR entry in the index. From a historical point of view, Lemieux was a pioneer in the introduction of NMR to organic chemistry. A short chapter on its use would have been valuable, dealing in particular with the characteristic chemical shifts of anomeric protons and carbons, the Karplus equation, the differentiation of α and β anomers and the determination of polysaccharide structures with regular repeating units.

I am a little unhappy about chapter 4 in which it is implied that two of Fischer's research students (one female—in 1891!) discovered the two crystalline anomers of glucose and the phenomenon of mutarotation. The discovery was made by Charles Tanret [*C.R. Hebd. Seances Acad. Sci.* **1895**, 120, 1060–1062] and it is believed that in 1891 Fischer himself was sceptical about ring structures for free monosaccharides. The author later refers to this sequence as 'a pantomime' but this is one way in which mistakes can creep into textbooks! I am confused by the reference to α -amylase and β -amylase on page 201 where the distinction is between an *exo*- and *endo*-glucosidase and has nothing to do with configuration or the detailed mechanism of glycoside cleavage.

The book is remarkably free from trivial errors, particularly in the references. There are many excellent structural formulae throughout the book. I noted only an unusual phenylhydrazide on page 6, some L-ido configurations on pages 93 and 101, some L-galacto configurations on pages 173 and 225, and a missing reference 14 on page 95.

I enjoyed reading this book. We are introduced to the major players in the field and there is a real sense of the author's own enthusiasm for his subject. The complex nomenclature of carbohydrate chemistry is acquired systematically and painlessly. The Appendix is more than simply a list of references; it gives a very good introduction to the literature of carbohydrate chemistry for the serious practitioner. Every chemistry library should certainly have a copy of the book. For the advanced undergraduate or research student, it is a pity that the book is not available in soft covers.

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