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Book review

Carbohydrates in drug design

Z.J. Witczak, K.A. Nieforth (Eds.)
Marcel Dekker, New York, 712 pp., (illustrated), ISBN: 0-8247-9982-8 $175.00

It is clear today that carbohydrates are not only energy sources, structural components and protective agents, but play diverse and crucial roles in a wide variety of biological systems. In this book, through 16 chapters, internationally recognised scientists introduce some exciting developments in the field of carbohydrates. Recently carbohydrates have become one of the fastest developing fields within synthetic medicinal chemistry, mainly because the isolation and study of glycoproteins and oligosaccharides have greatly contributed to increasing our knowledge of the critical biological roles of these compounds. Development of synthetic techniques have also increased in the carbohydrate field creating the possibility of synthesising novel carbohydrate based lead compounds. The book discusses carbohydrates as new and old targets for future drug design including antiviral, antidiabetic and antitumour agents. The sialyl Lewis oligosaccharides and glycomimetics are discussed in numerous chapters of this book. Mark von Itzstein talks about sialic acid analogues as potential antimicrobial agents, which is especially exciting since an antiviral sialic acid analogue is the product of a systematic, enzyme crystal structure based drug design. One of the most famous and productive carbohydrate chemists, Hasegawa, describes the design and synthesis of cell adhesion carbohydrate ligands and inhibitors. Heparin and other polyanionic substances act as herpes simplex virus and HIV-1 virus inhibitor and so show potential as antiviral drugs. Furthermore, the book discusses similar polyanionic carbohydrates with anticoagulant and antithrombotic properties. The important antibiotics, aminocyclitols and related compounds are also discussed. Azasugars as potential anti-HIV drugs have attracted considerable attention. Great attention is paid to sugar modified pyrimidine nucleoside analogues and carbohydrate templates for the synthesis of 3′-heteronucleosides. Doxorubicin analogues, sugar modified anthracyclines are also discussed. Aiming at greater antibacterial activity and improved pharmacokinetics, lincomycin was chemically modified and the novel analogues evaluated. Finally the book discusses the chemistry and antitumour activity of fungal (1–3)-β-D-glucosans. From the first to the last page, the book is an addictive read and invaluable to both academic and industrial researchers, as well as educators, describing enzymatic as well as chemical synthetic methods.

I. Toth.
School of Pharmacy,
University of London.

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