
Book Review

***Essentials of Glycobiology*, Edited by A. Varki, R. Cummings, J. Esko, H. Freeze, G. Hart, and J. Marth; Cold Spring Harbor Laboratory Press, Cold Spring Harbor, New York, 1999, 653 pp.; ISBN 0-87969-559-5 (cloth, \$175), ISBN 0-87969-560-9 (printed hard cover, \$95).**

Although identified in the 19th century, carbohydrates and related macromolecules remained largely under explored for several decades. Unlike proteins and nucleic acids, this third frontier of biological science failed to attract the necessary work force for various reasons. Barring occasional discoveries by solitary giants, no tangible advancements in this area were recorded for a long period of time. In the middle of the 20th century, carbohydrate research started gaining substantial momentum and consequently the past two decades have witnessed a radical change in the whole scenario. Participation of an increasing number of people, resolute approach, and the introduction of new technologies have added new dimensions and meanings to this once poorly understood branch of science. In the late 1980s the term ‘Glycobiology’ was coined to describe the area of carbohydrate and allied research, and now in the concluding year of the century *Essentials of Glycobiology*, the first complete textbook of the subject, has been published.

The present book contains 41 chapters divided into five major sections, namely (1) General Principles, (2) Biosynthesis, Metabolism, and Function, (3) Proteins that Recognize Glycans, (4) Glycans in Genetic Disorders and Disease, and (5) Methods and Applications. These properly ordered chapters address a wide range of topics in a systematic style. Each chapter begins with a list of sub-

headings along with respective page numbers, followed by a brief overview of the topics to be discussed. The heading of each sub-chapter clearly indicates the references cited in the respective text. The first section (chapters 1–5) presents general aspects of glycans, such as historical background, nomenclature, diversity, biological roles, etc. The second section (chapters 6–21) describes the biosynthesis, metabolism, and functions of saccharides in some detail. This section covers different aspects of glycans, glycoproteins, glycolipids, proteoglycans, glycosaminoglycans, and glycosyltransferases. The inclusion of the last three chapters (19–21) in this section does not seem very appropriate. While the other chapters (6–18) deal with topics from general sources, the remaining three are distinguished by particular phylogenetic themes. These three chapters might comprise a separate section in a future edition. The idea of incorporating a chapter (19) (Glycosylation of ‘Model’ Organisms) is timely and relevant.

The third section (chapters 22–30) is devoted to one of the major areas of glycobiology, namely, carbohydrate-binding proteins (lectins). This section presents a comprehensive account of the widely diversified field of lectins, barring a few exceptions. Viral hemagglutinins and such intracellular lectins as calreticulin and calnexin appear to be underrepresented. Considering the magnitude of the available information, plant lectins did not get their fair share of space in chapter 30 (Plant Lectins); however, the chapter remains informative despite space constraints and the omission of the monocot mannose-binding lectin superfamily. The section named ‘Glycans in Genetic Disorders and Disease’ contains seven chapters (31–37) that focus on glycobiology in human health. Each chapter

highlights the distinct functions and status of glycans in a wide range of conditions, such as organogenesis, signal transduction, parasitic infections, cancer, genetic and acquired disorders, and other diseases. The final section of the book (chapters 38–41) includes brief, yet informative, descriptions of analytical, synthetic, and therapeutic aspects of glycans. The editors might consider the inclusion of additional description of synthetic glycan analogues and glycomimetics in the next edition.

As mentioned in the preface of the book, the contents originated from the 1998 UCSD Spring Quarter Graduate Course in Glycobiology. The metamorphosis of teaching handouts into a dependable textbook is indeed convincing. A number of people beyond the limit of the classroom and glycobiology community would find this book accessible and interesting. It is suitable for both personal collection and library purchase. *Essentials of Glycobiology* is a multi-authored book edited by six well-known glycobiologists. They have maintained an overall harmony and consistency of the book in dealing with highly diversified subjects. Yet the book covers specialized areas without compromising on clarity and coherence, demonstrating a balance of econ-

omy in the presentation of figures and tables. As a result, the general reader can also enjoy some of the intricate and specialized aspects of glycobiology. On the negative side, a few subchapters remain too concise because of space constraints. In a future edition, a little elaboration and addition of certain topics, expansion of the glossary and inclusion of more color figures could be considered within a permissible frame of production cost. The contributors are quite successful in selecting the representative work from a diverse and extensive information base. The production quality is excellent, as expected from a renowned publishing house. This elegant and informative book should be a valued possession for anyone who is interested in this rapidly expanding branch of science.

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