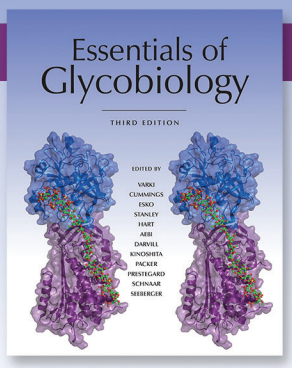
Essentials of Glycobiology

Third Edition



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Defined in the broadest sense, Glycobiology is the study of the structure, biosynthesis, biology, and evolution of saccharides (sugar chains or glycans) that are widely distributed in nature in all living life-forms. Glycobiology is now one of the more rapidly growing fields in the natural sciences, with broad relevance to many areas of basic research, biomedicine, and biotechnology. The field includes the chemistry of carbohydrates, the enzymology of glycan formation and degradation, the recognition of glycans by specific proteins, roles of glycans in complex biological systems, and their analysis or manipulation by various techniques. The third edition of this primary textbook in the field continues in the prior tradition, seeking to provide a basic overview of Glycobiology, directed toward the advanced undergraduate or the beginning graduate-level student of molecular and cellular biology and biomedicine. Although efforts have been made to avoid a major increase in overall length of the text, substantial changes and improvements include the following:

- Broader focus on all lineages of life-forms in nature
- Wider range of topics, ranging from biology and medicine to chemistry and materials science
- Expanded international editorial board representing a wider range of expertise
- Wider range of contributing authors with expertise in specific areas
- Greatly expanded monosaccharide symbol nomenclature for the representation of glycans
- Greater attention to informatics, and the relevance to exploration of the glycome

2017, 823 pages, illustrated (223 color and 62 B&W), glossary, index
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Advance Comments on the Third Edition of *Essentials of Glycobiology*

"The field of glycobiology has matured. The comments of Nobel Laureates on the previous editions reflect the long-held belief that central functional roles played by the diversity of glycan chains would be revealed by research in this field. Now, as the result of advances in analytical chemistry and much deeper understanding of genomes, cell and tissue organization, this field has arrived. The third edition of *Essentials of Glycobiology* stands as the authoritative treatise on the subject, covering all aspects of the field and written by the world leaders in current research."

—James E. Rothman, Nobel Laureate in Medicine, 2013

"Difficult to analyze and synthesize artificially, glycans are often simply ignored. To do so is to avert one's gaze from an important part of life. More than mere decoration, glycans magnify the diversity of the already diverse molecules to which they are attached, affect protein folding and stability, direct traffic within cells, serve as signposts of self vs. non-self, create barriers that protect us, and conversely, defend microbes, making some of them the pathogens they are. It is hard to imagine a world without complex sugars, but if such a world existed, it would be much diminished. The third edition of *Essentials of Glycobiology* may be life changing for scientists who have not yet engaged with glycobiology, and will certainly be a treasured resource for those who already have."

—Bruce Beutler, Nobel Laureate in Medicine, 2011

"The importance of glycans has long been recognized and great advances have been reported on the synthesis and chemical analysis of this class of natural compounds. In my field, structural biology, carbohydrate moieties in glycoproteins and in complex multi-component macromolecular systems have been and continue to be difficult to handle. I greatly welcome the effort made in this multi-author volume to present results obtained with methods of structural biology in the context of the wealth of currently available chemical and biological data. I recommend the 3rd edition of *Essentials of Glycobiology* as a highly useful reference on the current state of the field."

—Kurt Wüthrich, Nobel Laureate in Chemistry, 2002

"We think conventionally of the immune system as having evolved to deal with invading pathogens that express "foreign" proteins (and peptides), targeted via specific recognition units, particularly secreted antibodies and cell-bound T lymphocyte receptors. As the molecular revolution has unfolded, such science that relies on a reasonably direct correlation between genotype and phenotype has been relatively straightforward. Much more difficult to assess is the part played by glycosylation profiles in immune recognition and pathogen elimination. Perhaps even more intriguing is the issue of glycan abnormalities and recognition in cancer and many other disease processes. Now, in a third edition of *Essentials of Glycobiology* written by authoritative leaders in the field, we learn how this knowledge has been rapidly advancing, and see possibilities for real breakthroughs in understanding and therapy."

—Peter C. Doherty, Nobel Laureate in Medicine, 1996

www.cshlpress.org/glycobiology

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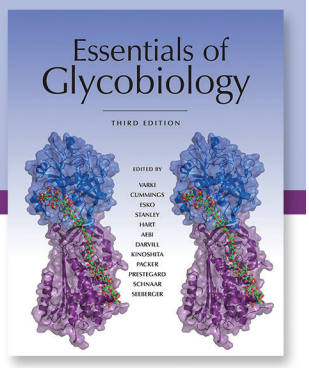

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