

Preface

There is no doubt that glycoside chemistry continues to be a dynamic and exciting field of organic chemistry. Within sugar chemistry, glycosides are of special interest not only because of the challenges represented by their synthesis and structural characterization, but also due to their important biochemical relevance, and hence their applications in a number of essential disciplines, such as pharmaceuticals, food, and biotechnology.

Important biomolecules such as DNA and RNA, or cofactors such as ATP and NAD are some of the natural glycosidic structures that play key roles at a biochemical level. Also, a considerable number and variety of natural and synthetic glycosides are being extensively used as antibiotics, antiviral, and antineoplastic agents.

There are also a significant number of chromophoric glycosides being used in molecular biology as substrates for detection of enzymatic activity of gene markers.

Solid-phase oligosaccharide synthesis despite the great progress recently reported by different groups continues to be a challenging task considering the diversity and complexity of glycosides, especially those present in cellular membranes. However, based on the satisfactory evolution of this approach, there is confidence that many complex molecules will be prepared just in the same way that solid-phase chemistry is currently used to prepare oligopeptides and oligonucleotides.

The aim of this book is to provide methods and strategies for the formation of glycosides, illustrated by the synthesis of important biologically active glycosides, and also to present an overview of the basic tools needed for the characterization of glycosides through NMR spectroscopy, X-ray diffraction, and mass spectrometry.

From the overwhelming number of excellent articles related to glycoside chemistry, it has not been an easy task to select those that are biologically important, and perhaps most importantly serve as didactic models for understanding more about the process of glycoside bond formation.

The book should also serve as a helpful guide to those professionals interested in sugar chemistry, especially regarding the design of synthetic routes, by evaluating suitable protecting and leaving groups, and the best reaction conditions needed for the preparation of glycosides.

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Preface for Second Edition

The second edition is designed to serve as a textbook on glycoside chemistry with the main goal to provide updated information about the methods considered classical or of primary significance as well as novel variations or new methods for achieving glycosylation processes. This applies to glycosyl donors, promoters or activators, and protecting groups that have been currently reported as more efficient or with significance for preparing active substances of glycosidic nature with important implications in pharmaceutical, food, environmental, and biotechnological related disciplines. The second edition provides updated information on chemical shifts, and coupling constant data for complete structure assignment of glucopyranoses and pyranosyl disaccharides, as well as the main fragmentation pattern observed in mass spectrometry. I hope this new edition will expand its usefulness to those professionals involved in glycoside chemistry and will provide support in design of suitable methodologies in a novel or more efficient way. Finally the author would be grateful for receiving any comment intended to improve the quality of the material included.

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