

Carbohydrates Synthesis Mechanisms And Stereoelectronic Effects

A thorough introduction is provided to the variety and complexity of the roles that glycoconjugates play in the cells of the nervous system. Basic information as well as the latest developments in neural glycobiology are discussed. Topics covered range from the structure and metabolism of the saccharide chains and current approaches used in their study, to changes glycoconjugates undergo during development and aging of the nervous system and the roles they have in neurological disease. The breadth and depth of topics covered make it an essential reference for those new to the field as well more seasoned investigators.

Annotation Summarizes the literature on carbohydrate chemistry published in 1987, and also indicates the range of compounds reported and studied. The most extensive chapters cover glycosides and nucleosides, but there has been a surge of interest in C-glycosides and in inositol phosphates. Altogether, some 1500 references are cited. The typescript and other production values won't win any awards. No subject index. Distributed by CRC Press. Annotation(c) 2003 Book News, Inc., Portland, OR (booknews.com).

Carbohydrates offer a ready source of enantiomerically pure starting materials. They have been used for the imaginative synthesis of a wide range of compounds, and have been found to be effective chiral auxiliaries which enable the introduction of a range of functionalities in a highly enantioselective manner. In a subject dominated by volumes at research and professional level, this book provides a broad understanding of the use of carbohydrates in organic synthesis, at postgraduate student level. Emphasis is placed on retrosynthetic analysis, with discussion of why a particular synthetic route has been chosen, and mechanistic explanations are provided for key and novel reactions. Wherever possible, the authors highlight points of general significance to organic synthesis. Selected experimental conditions and reaction details are incorporated to ensure that information can be utilised in research. The book is extensively referenced and so provides a convenient point of entry to the primary literature.

The book deals with polar effects in carbohydrates and how these effects control the stereochemistry of carbohydrate reactions. This is important for understanding the mechanisms of certain carbohydrate reactions, including enzymatic reactions such as glycosidases, a very important group of enzymes in living matter. It is also very useful for synthetic carbohydrate chemists who would like to synthesize stereoselectively certain classes of carbohydrates. This book will be a very important source of information for practicing synthetic carbohydrate chemists. The book will also be helpful for organic chemists, or for those studying glycobiology.

Guanidines, amidines and phosphazenes have been attracting attention in organic synthesis due to their potential functionality resulting from their extremely

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strong basicity. They are also promising catalysts because of their potential for easy molecular modification, possible recyclability, and reduced or zero toxicity. Importantly, these molecules can be derived as natural products – valuable as scientists move towards “sustainable chemistry”, where reagents and catalysts are derived from biomaterial sources. Superbases for Organic Synthesis is an essential guide to these important molecules for preparative organic synthesis. Topics covered include the following aspects: an introduction to organosuperbases physicochemical properties of organic superbases amidines and guanidines in organic synthesis phosphazene: preparation, reaction and catalytic role polymer-supported organosuperbases application of organosuperbases to total synthesis related organocatalysts: proton sponges and urea derivatives amidines and guanidines in natural products and medicines Superbases for Organic Synthesis is a comprehensive, authoritative and up-to-date guide to these important reagents for organic chemists, drug discovery researchers and those interested in the chemistry of natural products. Since its inception in 1945, this serial has provided critical and informative articles written by research specialists that integrate industrial, analytical, and technological aspects of biochemistry, organic chemistry, and instrumentation methodology in the study of carbohydrates. The articles provide a definitive interpretation of the current status and future trends in carbohydrate chemistry and biochemistry. Features contributions from leading authorities and industry experts Informs and updates on all the latest developments in the field This book provides a comprehensive review of the structural, conformational, and chemical manifestations of the anomeric effect. In order to present a cogent discussion of this most fundamental and relevant phenomenon, three chapters examine our present understanding of the origin of this conformational effect, based upon a wealth of theoretical and physical data. Equally important, however, are three additional chapters that deal with the general consequences of the stereoelectronic interactions that are associated with the basis of the anomeric effect. The remainder of the book is devoted to new areas of development in the topic-such as differentiation of the endo and exo anomeric interactions, specific analysis of the enthalpic component of anomeric effects, critical evaluation of the kinetics and reverse anomeric effects, discovery of a new substantial effect in second- and lower-row anomeric segments, and others. Since carbohydrate oligomers are still a challenge in synthetic chemistry, this book on recent developments fulfils a great need. Covering the chemistry necessary to synthesize exact copies of these structures, top authors from all around the world comprehensively deal with synthesis from anomeric halides, from miscellaneous glycosyl donors, and by indirect and special methods, as well as 1-oxygen-and 1-sulfur-substituted derivatives. They demonstrate the best approach for the stereoselective formation of the intermonomeric bond, making this essential reading for every biochemist working in biosynthesis, the exploration of biopathways and vaccines.

[Superbases for Organic Synthesis](#)

[Homogeneous Catalysis with Renewables](#)

[Carbohydrate Chemistry: Chemical and Biological Approaches Volume 44](#)

[Applied Biocatalysis](#)

[Reactions, Stereochemistry and Synthesis](#)

[Carbohydrates](#)

[Modern Methods in Carbohydrate Synthesis](#)

[Synthesis, Mechanisms, and Stereoelectronic Effects](#)

[Stereoelectronic Effects](#)

[Organic Reaction Mechanisms](#)

This volume is devoted to compounds in which the spiro centre is part of a pyranoid or furanoid or an iminosugar ring. The chapters contributed deal with methodological peculiarities of syntheses of natural and artificial sugar derived spirocycles as well as their biological applications and other utilities including marketed drugs.

Carbohydrates are ubiquitous molecules in nature and participate in a vast number of biological interactions. Especially their conjugates with practically all kinds of primary and secondary metabolic small molecules (and also biomacromolecules) representing valuable tools for glycobiology research and also lead compounds for drug discovery. While monosaccharides per se appear as heterocycles, their natural conjugates frequently exhibit spiro(hetero)cyclic derivatives, in many cases of high therapeutical relevance. As a consequence, the field of carbohydrate-spiro-heterocycles attracts intense interest from both chemical and biomedical aspects therefore this volume will be of interest for synthetic and medicinal chemists and (glyco)biologists, as well as researchers involved in various biomedical fields. All essential areas of basic synthetic carbohydrate chemistry are covered and appropriately described. In addition, this book explains the basic reaction mechanisms while taking into account modern concepts such as stereoelectronic principles.

Since its inception in 1945, this serial has provided critical and integrating articles written by research specialists that bring together industrial, analytical and technological aspects of biochemistry, organic chemistry and instrumentation methodology in the study of carbohydrates. The articles provide a definitive interpretation of the current status and future trends in carbohydrate chemistry and biochemistry. Features contributions from leading authorities and industry experts Informs and updates on all the latest developments in the field

This textbook introduces the industrial production and processing of natural resources. It is divided into six major topics (fats and oils, carbohydrates, lignin, terpenoids, other natural products, biorefinery), which are divided into a total of 20 chapters. Each chapter is self-contained and therefore a compact learning unit, which can be worked on by students in self-study or presented by lecturers. Clear illustrations, flow diagrams, apparatus drawings and photos facilitate the understanding of the subject matter. All chapters end with a succinct summary, the "Take Home Messages". Each chapter is supplemented by ten short test questions, which can be solved quickly after working through the chapter; the answers are at the end of the book. All chapters contain bibliographical references that focus on essential textbooks and reference works. As a prior knowledge, only basic knowledge of chemistry is required.

The Handbook of Glycomics provides the first comprehensive overview of the

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emerging field of glycomics, defined as the study of all complex carbohydrates in an organism or cell ("the glycome"). Beginning with analytic approaches and bioinformatics, this work provides a detailed discussion of relevant databases, data integration, and analysis. It then moves on to a discussion of specific model organism and pathogen glycomes followed by therapeutic approaches to human disorders of glycosylation. Structure and function of glycomes are included along with state-of-the-art technologies and systems approaches to the analysis of glycans. Synthesizes contributions from experts in biology, chemistry, bioinformatics, biotechnology, and medicine Highlights chapters devoted to chemical synthesis, cancer glycomics and immune cell glycomics Includes discussions of proteomics, mass spectrometry, NMR, array technology, and transcriptomics analytic approaches

Kurti and Czako have produced an indispensable tool for specialists and non-specialists in organic chemistry. This innovative reference work includes 250 organic reactions and their strategic use in the synthesis of complex natural and unnatural products. Reactions are thoroughly discussed in a convenient, two-page layout--using full color. Its comprehensive coverage, superb organization, quality of presentation, and wealth of references, make this a necessity for every organic chemist. * The first reference work on named reactions to present colored schemes for easier understanding * 250 frequently used named reactions are presented in a convenient two-page layout with numerous examples * An opening list of abbreviations includes both structures and chemical names * Contains more than 10,000 references grouped by seminal papers, reviews, modifications, and theoretical works * Appendices list reactions in order of discovery, group by contemporary usage, and provide additional study tools * Extensive index quickly locates information using words found in text and drawings

Detailing commonly used methods and procedures, this reference discusses the reactions and derivative forms of carbohydrates. Preparative Carbohydrate Chemistry covers the formation, cleavage, and reactions of derivatives and illustrates bond-forming reactions of SN2 types, free radicals, chain extensions, and branching. The contents include: sugar

Modern Methods in Carbohydrate Synthesis presents in one volume a sequence of chapters leading from classical methods through to today's newest state-of-the-art technology for oligosaccharide synthesis. It places particular emphasis on the most recent breakthroughs in the field, including emerging technologies for both oligosaccharide and glycoconjugate synthesis. Chapters describing the synthesis of increasingly important glycosidic linkage analogs, as well as the oligosaccharides containing derivatives and analogs of natural sugars are included. While chemical-synthetic methods constitute the major part of the book, completing the volume is a section on the rapidly expanding and important field of enzymatic synthesis, also covering combined chemical and enzymatic synthesis. Chapters are written by leading experts in the field. Wherever possible, methods of synthesis are provided in sufficient detail to allow the reader to implement the techniques described. More than 1700 references are provided in the 21 chapters comprising the book. This volume should provide a wealth of information to a large number of synthetic organic chemists, medicinal chemists, protein chemists, biochemists, glycobiologists and cell biologists, including students in these fields.

[Glycobiology of the Nervous System](#)

[Part B: Reaction and Synthesis](#)

[Strategic Applications of Named Reactions in Organic Synthesis](#)

[Polymer Synthesis: Theory and Practice](#)

[Glycoscience: Chemistry and Chemical Biology I – III](#)

[The British National Bibliography](#)

[Synthetic Methods and Catalysts](#)

[Modern Methods of Organic Synthesis South Asia Edition](#)

[An Introduction](#)

[The Anomeric Effect and Related Stereoelectronic Effects at Oxygen](#)

This text will give the reader a firm understanding of all aspects of carbohydrate conformation by describing and explaining the importance of interactions between carbohydrates and interactions of carbohydrates with proteins, nucleic acids or any other macromolecule., The authors have gathered a wealth of information on carbohydrate structures, different methods of conformational analysis, the role of carbohydrates as recognition molecules in biological systems and their industrial applications., Whether you are a student, teacher or a basic researcher, this text book is a 'one-stop' source of current information on carbohydrate conformation and the potential use of conformational properties in industry and also of their crucial role in important biological events such as cell-cell interaction, cell adhesion, cellular signaling mechanism.

This book describes the essential steps in the development of biocatalytic processes from concept to completion. It is a carefully integrated text which combines the fundamentals of biocatalysis with technological experience and in-depth commercial case studies. The book starts with an introductory look at the characteristics and present applications of biocatalysts, followed by more detailed overviews of these areas.

Organic Reaction Mechanisms shows readers how to interpret the experimental data obtained from an organic reaction, and specifically how an organic reaction mechanism can be considered or rejected based on the analysis of the experimental evidence. Whilst examining a series of selected examples of mechanisms, the text focuses on real cases and discusses them in detail. The examples are arranged to elucidate key aspects of organic reaction mechanisms. The authors employ all the types of information that the authors of the original work considered useful and necessary, including spectroscopic data, kinetic and thermodynamic data, isotopic labelling and organic reactivity. The book makes an excellent primer for advanced undergraduates in chemistry who are preparing for exams and is also useful for graduate students and instructors.

This volume gives a detailed account into how renewables can be transformed into value-added products via homogeneous catalysis, especially via transition metal homogeneous catalysis. The most important catalytic reactions of oleochemicals, isoprenoids, carbohydrates, lignin, proteins and carbon dioxide are described. Special emphasis is placed on carbon-carbon linkage reactions (hydroformylations, dimerisations, telomerisations, metathesis, polymerisations etc.), hydrogenations, oxidations and other important homogeneous reactions (such as isomerisations, hydrosilylations etc.). Also, tandem reactions including isomerising hydroformylations are presented. Wherever possible, the authors have included mechanistic, kinetic, and technical aspects. The reader is therefore given a total overview of the status quo of homogeneous catalysis directed to the most important renewables.

Glycostructures play a highly diverse and crucial role in a myriad of organisms and systems in biology, physiology, medicine, and bioengineering and technology. Only in recent years have the tools been developed to partly understand the highly complex functions and chemistry behind them. In this set the editors present up-to-date information on glycostructures, their chemistry and chemical biology, in the form of a comprehensive survey. The text is accompanied by over 2000 figures, chemical structures and reaction schemes and more than 9000 references. The accompanying CD-ROM enables, besides text searches, searches for structures, schemes, and other information.

The molecular world is defined by interactions between electronic orbitals described at increased levels of theoretical sophistication. This book translates these theoretical ideas into the language of practicing organic chemists by illustrating how stabilizing electronic orbital interactions can be maximized by favorable orbital interlap at a particular geometry. This dependence gives rise to the concept of stereoelectronic effects, the ubiquitous forces that define interactions between different molecules and between different parts of a single molecule. This book offers practical guidelines for the control of chemical structure and reactivity. It provides a critical analysis of stereoelectronic effects, including theoretical and experimental approaches to their detection and quantification. It showcases the variety of organic reactivity patterns and explains individual idiosyncrasies and chameleonic behavior of functional groups. The first English edition of this book was published in 1971 with the late Prof. Dr. Werner Kern as coauthor. In 1997, for the preparation of the third edition, Prof. Dr. Helmut Ritter joined the team of authors and in 2001 Prof. Dr. Brigitte Voit and Prof. Dr. Matthias Rehahn complemented this team. The change in authors has not altered the basic concept of this 4th edition: again we were not aimed at compiling a comprehensive collection of recipes. In stead, we attempted to reach a broader description of the general methods and techniques for the synthesis, modification, and characterization of macromolecules, supplemented by 105 selected and detailed experiments and by sufficient theoretical treatment so that no additional textbook be needed in order to understand the experiments. In addition to the preparative aspects we have also tried to give the reader an impression of the relation of chemical structure and morphology of polymers to their properties, as well as of areas of their application. "Physical Chemistry in Depth" is not a stand-alone text, but complements the text of any standard textbook on "Physical Chemistry" into depth having in mind to provide profound understanding of some of the topics presented in these textbooks. Standard textbooks in Physical Chemistry start with thermodynamics, deal with kinetics, structure of matter, etc. The "Physical Chemistry in Depth" follows this adjustment, but adds chapters that are treated traditionally in ordinary textbooks inadequately, e.g., general scaling laws, the graphlike structure of matter, and cross connections between the individual disciplines of Physical Chemistry. Admittedly, the text is loaded with some mathematics, which is a prerequisite to thoroughly understand the topics presented here. However, the mathematics needed is explained at a really low level so that no additional mathematical textbook is needed.

[*Carbohydrate-spiro-heterocycles*](#)

[*Advanced Organic Chemistry*](#)

[*Reactions, Mechanisms, and Structure*](#)

[*The Organic Chemistry of Sugars*](#)

[*Glycobiology and Human Diseases*](#)

[*Advances in Carbohydrate Chemistry and Biochemistry*](#)

[*Advances in Stereoselectivity and Therapeutic Relevance*](#)

[*Chemistry of Renewables*](#)

[*Organic Mechanisms*](#)

[*Selective Glycosylations*](#)

Discusses contemporary experimental and computational studies on the anomeric effect and related stereoelectronic effects and presents conflicting data and theories in this highly controversial area. Explores applications in carbohydrate chemistry, including enzymology, as well as organometallic chemistry and the chemistry of phosphates and sulfates. Includes examination of molecular modeling methods in compounds influenced by stereoelectronic effects.

The aim of this book is to provide experimental protocols covering many aspects of glycobiology, glycotecology, and chemistry: biochemistry, molecular and cellular biology, genetics, physiology, and medicine. The protocols are all self-contained descriptions of the equipment and reagents needed, followed by details of the experimental procedure. In the post-genomic era, glycobiology is coming of age because more than half of proteins are glycosylated and the importance of sugar chains in various fields of life science research cannot be disregarded. Many scientists had not entered this area because glycobiology and glycoscience used to be considered difficult fields. This book, therefore, is presented much like a cookbook which can help scientists in fields other than glycobiology and glycoscience carry out research more easily.

Carbohydrate Chemistry provides review coverage of all publications relevant to the chemistry of monosaccharides and oligosaccharides in a given year. The amount of research in this field appearing in the organic chemical literature is increasing because of the enhanced importance of the subject, especially in areas of medicinal chemistry and biology. In no part of the field is this more apparent than in the synthesis of oligosaccharides required by scientists working in glycobiology. Glycomedicinal chemistry and its reliance on carbohydrate synthesis is now very well established, for example, by the preparation of specific carbohydrate-based antigens, especially cancer-specific oligosaccharides and glycoconjugates. Coverage of topics such as nucleosides, amino-sugars, alditols and cyclitols also covers much research of relevance to biological and medicinal chemistry. Each volume of the series brings together references to all published work in given areas of the subject and serves as a comprehensive database for the active research chemist. Specialist Periodical Reports provide systematic and detailed review coverage in major areas of chemical research. Compiled by teams of leading

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authorities in the relevant subject areas, the series creates a unique service for the active research chemist, with regular, in-depth accounts of progress in particular fields of chemistry. Subject coverage within different volumes of a given title is similar and publication is on an annual or biennial basis.

The two-part, fifth edition of *Advanced Organic Chemistry* has been substantially revised and reorganized for greater clarity. The material has been updated to reflect advances in the field since the previous edition, especially in computational chemistry. Part B describes the most general and useful synthetic reactions, organized on the basis of reaction type. It can stand-alone; together, with Part A: *Structure and Mechanisms*, the two volumes provide a comprehensive foundation for the study in organic chemistry. Companion websites provide digital models for students and exercise solutions for instructors.

A unique overview of the most important protecting group strategies in carbohydrate chemistry *Protecting Groups: Strategies and Applications in Carbohydrate Chemistry* provides a detailed account of key strategies and methodologies for the protection of carbohydrates. Divided into two parts, the first focuses on groups that are used best to protect a specific position on a carbohydrate. In the second part, specific carbohydrate residues or compounds are discussed in the context of a specific protecting group strategy used to reach the desired regioisomer. This important book: -Features chapters on protecting groups at the primary and secondary positions of carbohydrates -Describes protecting group strategies towards sialic acid derivatives, glycofuranoses, sulfated glycosaminoglycans, and cyclodextrins -Provides information on automated glycan assembly -Includes a chapter on the industrial scale synthesis of heparin analogs Written by a team of leaders in the field, *Protecting Groups: Strategies and Applications in Carbohydrate Chemistry* is an indispensable guide for academics and industrial researchers interested in carbohydrate and natural product synthesis, pharmaceutical chemistry, and biochemistry.

Textbook on modern methods of organic synthesis.

This book discusses glycobiology and various forms of human diseases. Topics covered include immunoglobulins, inflammation and glycosylation, the role and therapeutic significance of natural anti-glycan antibodies in malignancies and in normal and aberrant pregnancy, identifying urinary glycans as a possible method for the diagnosis of lysosomal storage diseases, glycobiology of human milk (biological roles and diseases) and pectins as biological modulators of human physiological reactions. The book includes analysis of comprehensive data and some productive conclusions and perspectives. Intrigued as much by its complex nature as by its outsider status in traditional organic chemistry, the editors of *The Organic Chemistry of Sugars* compile a groundbreaking resource in carbohydrate chemistry that illustrates the ease at which sugars can be manipulated in a variety of organic reactions. Each chapter contains numerous examples demonst

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[Handbook of Glycomics](#)

[A Bridge Between Structure and Reactivity](#)

[Handbook of Chemical Glycosylation](#)

[Electrostatic and Stereoelectronic Effects in Carbohydrate Chemistry](#)

[Tools for Stereoselective Synthesis](#)

[March's Advanced Organic Chemistry](#)

[Carbohydrate Chemistry](#)

[40 Solved Cases](#)

[Guanidines, Amidines, Phosphazenes and Related Organocatalysts](#)

[Organic Synthesis with Carbohydrates](#)

Closing a gap in the literature, this comprehensive book presents the utility of carbohydrate derivatives as chiral auxiliaries, reagents, complex ligands and organocatalysts, together with details of their preparation, as well as their successful application in stereoselective synthesis. Divided into four parts: * Carbohydrate Auxiliaries * Carbohydrate Reagents * Carbohydrate Ligands * Carbohydrate Organocatalysts It is an indispensable source for every organic chemist. This invaluable volume contains analysed, evaluated and distilled information on the latest in carbohydrate research. The discovery and synthesis of novel carbohydrates and mimetics with diverse applications continues to be a major challenge for carbohydrate chemists. The understanding of the structure and function of carbohydrates and glycoconjugates remains vital in medicine and molecular biology. Covering both chemical and biological science related to the particular volume topic, this series demonstrates the interdisciplinary nature of modern carbohydrate research, and benefits any researcher who wishes to learn about the latest developments in the carbohydrate field. A comprehensive summary of novel approaches to the stereoselective construction of glycosidic linkages, covering modern glycosylation methods and their use and application in natural product synthesis and drug discovery. Clearly divided into five sections, the first describes recent advances in classical methodologies in carbohydrate chemistry, while the second goes on to deal with newer chemistries developed to control selectivity in glycosylation reactions. Section three is devoted to selective glycosylation reactions that rely on the use of catalytic promoters. Section four describes modern approaches for controlling regioselectivity in carbohydrate synthesis. The final section focuses on new developments in the construction of "unusual" sugars and is rounded off by a presentation of modern procedures for the construction of glycosylated natural products. By providing the latest advances in glycosylation as well as information on mechanistic aspects of the reaction, this is an invaluable reference for both specialists and beginners in this booming interdisciplinary

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field that includes carbohydrate chemistry, organic synthesis, catalysis, and biochemistry.

In this book, Professor Anatoly Buchachenko gives a brief and informative description of the most striking achievements and discoveries made in the major natural sciences at the turn of the century - in the late twentieth and early twenty-first centuries. The author has a rare ability to describe scientific discoveries so that these achievements and their significance are understandable not only by professionals and scientists of all specialities, but for any reader interested in modern science, its role in the existence of mankind, and its impact on human society. Originally published in Russian, Professor Buchachenko's book describes the interaction of natural sciences with social ones—philosophy and history—as well as the part played by the human factor in the development of science, especially the role of the great scientists.

“Much of life can be understood in rational terms if expressed in the language of chemistry. It is an international language, a language without dialects, a language for all time, a language that explains where we came from, what we are, and where the physical world will allow us to go. Chemical Language has great esthetic beauty and links the physical sciences to the biological sciences. ” from *The Two Cultures: Chemistry and Biology* by Arthur Kornberg (Nobel Prize in Physiology and Medicine, 1959) Over the past two centuries, chemistry has evolved from a relatively pure disciplinary pursuit to a position of central importance in the physical and life sciences. More generally, it has provided the language and methodology that has unified, integrated and, indeed, molecularized the sciences, shaping our understanding of the molecular world and in so doing the direction, development and destiny of scientific research. The “language of chemistry” referred to by my former Stanford colleague is made up of atoms and bonds and their interactions. It is a system of knowledge that allows us to understand structure and events at a molecular level and increasingly to use that understanding to create new knowledge and beneficial change. The words on this page, for example, are detected by the eye in a series of events, now generally understood at the molecular level.

[Protecting Groups: Strategies and Applications in Carbohydrate Chemistry](#)

[The Beauty and Fascination of Science](#)

[The Anomeric Effect and Associated Stereoelectronic Effects](#)

[Fundamentals, Methods, Experiments](#)

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