

Preface

Synthesis and biological investigations of β -lactams have been very intensely studied for more than 7 decades because of their powerful clinical activity, as well as their potential use as intermediates for the synthesis of diverse heterocyclic compounds with controlled stereochemistry. Significant research has been performed by scientists in this area, and it is a good time to summarize useful research on β -lactams. As a result of these studies, many authors have published their research in various journals and books. A number of studies have resulted in patents. Earlier, the editor of this book has edited two books on beta β -lactams that were written by eminent authors in this field and published by Springer. In the current book, the editor also has selected leaders in this field to write book chapters on various aspects of β -lactam science.

Bhalla and his group have described synthesis of diverse β -lactams and identified the role of appended hetero groups on the activity in Chapter “[Synthesis of Diverse \$\beta\$ -Lactams: Role of Appended Hetero Moiety on Its Activity](#)”. Bari et al. have demonstrated the use of transition metal reagents in the synthesis of β -lactams through selective approaches in Chapter “[Role of Transition Metal Reagents in \$\beta\$ -Lactam Synthesis: New Paradigms](#)”. Zambron et al. have used 4-vinyloxyazetidin-2-one as the starting materials for the racemic and asymmetric synthesis of diverse β -lactams in Chapter “[4-Vinyloxyazetidin-2-one, a Novel Substrate for \$\beta\$ -Lactam Synthesis](#)”. Tidwell has described synthesis of β -lactams derived from ketene–imine cycloaddition reactions by thermal and photochemical methods in Chapter “ [\$\beta\$ -Lactams from Ketene–Imine Cycloadditions: An Update](#)”. Mata et al. have studied approaches toward the generation of molecular diversity based on β -lactam structures in Chapter “[Recent Approaches Toward the Generation of Molecular Diversity Based on \$\beta\$ -Lactam Structures](#)”. In Chapter “[Synthesis of Five-Membered Heterocycles Through \$\beta\$ -Lactam Ring-Expansion Reaction](#)”, Alcaide, Almendros, and Aragoneillo have investigated the synthesis of 5-membered heterocycles through β -lactam ring expansion methods. Martin-Torres and Gonzalez-Muniz have studied synthesis of β -lactams through the formation of a single bond, either C–C or N–C, in Chapter “ [\$\beta\$ -Lactams Through Single Bond Ring Closing: Methods, Transformations and Bioactivity](#)”. Parvatkar, Parameswaran, and Banik have covered solid-phase synthesis of β -lactams in Chapter

“Solid Phase Synthesis of β -Lactams: Results and Scope”. Basu and Banik have described clinically active β -lactam drugs and their mechanisms of action in Chapter “Beta-Lactams as Clinically Active Medicines”. Urbanczyk-Lipkowska et al. have studied nanoformulations of penicillin and other antibiotics in Chapter “Nanochemistry in Drug Design”. In Chapter “Asymmetric Synthesis of β -Lactams via the Ketene-Imine Cycloaddition”, Oiarbide and Palomo have described asymmetric synthesis of β -lactams through ketene-imine reactions. Basak and his group have used β -lactams as molecular scaffolds and building blocks for various other compounds of interests in Chapter “The Never-Ending Story of β -Lactams: Use as Molecular Scaffolds and Building Blocks”.

It can be seen the topics are extremely diverse and subjects of current investigations. Each chapter is focussed to give readers a good chance to acquire knowledge and concepts. Therefore, the book will serve as a useful resource for scientists working in the diverse fields of β -lactam research. I sincerely thank all the authors for their time in preparation for their chapters.

Thank you. Sincerely,

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