Advances in Experimental Medicine and Biology

Volume 1148

More information about this series at http://www.springer.com/series/5584

Nikolaos Labrou
Editor

Therapeutic Enzymes: Function and Clinical Implications

Springer

Editor
Nikolaos Labrou
Department of Biotechnology
Agricultural University of Athens
Athens, Greece

ISSN 0065-2598 ISSN 2214-8019 (electronic)
Advances in Experimental Medicine and Biology
ISBN 978-981-13-7708-2 ISBN 978-981-13-7709-9 (eBook)
https://doi.org/10.1007/978-981-13-7709-9

This Springer imprint is published by the registered company Springer Nature Singapore Pte Ltd.
The registered company address is: 152 Beach Road, #21-01/04 Gateway East, Singapore 189721, Singapore

Preface

Nowadays, the application of enzymes as pharmaceuticals is a growing field. Enzymes as pharmaceuticals have two fascinating features that distinguish them from all other types of drugs. First, enzymes bind their substrate with high affinity and specificity. Second, enzymes can convert their substrate to the desired products. These two features make enzymes valuable therapeutic tools, as, unlike common medicinal products which can temporarily solve the particular health problems, they address the underlying cause of health problem and the patient can achieve permanent relief. All these attributes make the enzymes potent drugs offering a platform and promising subcategory of modern biopharmaceuticals for the treatment of several severe diseases. Research and drug development efforts and the advancements in biotechnology over the past 20 years have greatly assisted the introduction of efficient and safe enzyme-based therapies for a range of both rare and common disorders. The introduction and regulatory approval of 20 different recombinant enzymes has enabled effective enzyme replacement therapy.

This volume aims to overview selected therapeutic enzymes, focusing in particular on more recently approved enzymes produced by recombinant DNA technology. It is impossible for a single book volume to cover all of the different aspects of this research area in which scientists have made significant progress. Thus, I have selected key examples covering a wide range of diverge scientific disciplines and state-of-the-art approaches, in order to provide the reader with a representative sample of the current status of the area. This volume highlights and provides an overview and recent progress on the three aspects of recombinant therapeutic enzymes and their clinical and pharmaceutical technology: (i) overview of the production process and biochemical characterization of therapeutic enzymes, (ii) focuses upon the engineering strategies and delivery methods of therapeutic enzymes, and (iii) clinical applications of selected therapeutic enzymes, including aspects on their mechanisms of action and information on safety and immunogenicity issues and various adverse events of the enzymes used for therapy.

This book is aimed at academics, researchers, and students undertaking advanced undergraduate/postgraduate programs in the biopharmaceutical/biotechnology area who wish to gain a comprehensive understanding of enzyme-based therapeutic molecules.

I sincerely hope that the readers will enjoy the information provided in this book and find its contents interesting and scientifically stimulating. I also hope that I have established a successful compilation of chapters within the

exciting area of therapeutic enzymes. I wish to extend my sincere gratitude to all contributing authors for their enthusiasm and for the time they spent preparing the chapters for this book. Thanks also to those at Springer who have helped put this together so that it ultimately provides an invaluable resource to all those working in the field of therapeutic enzymes. I would especially like to thank my family for their understanding and patience during the editing and organization of the book chapters.

Athens, Greece Nikolaos Labrou

Contents