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"This book is a highly recommended treatise for students, teachers, and researchers working in the many facets of biocatalysis as utilized by the pharmaceutical industry. The book spans the production of fine chemicals and active pharmaceutical ingredients in bacteria and yeast through to plant biofactories. There are interesting chapters on using microbial systems for the synthesis and degradation of pharmaceuticals and on the enzymes driving drug metabolic clearance in the human liver. The treatment of waste water using laccases or ligninolytic enzymes is also featured. The potential for biocatalysis to influence future gene therapy applications, e.g., CRISPR-Cas9 and CAR-T, is discussed in great detail. Each topic is covered in genuine depth, well referenced, and written by the experts in their respective fields."

Dr. Martin A. Hayes
Discovery Sciences, AstraZeneca, Gothenburg, Sweden

"The role of biocatalysis in the pharmaceutical industry has had an amazing evolution in the last forty years, moving from the pioneering enzymatic kinetic resolutions, up to in vivo cascade-reactions performed with metabolically engineered microorganisms. The selection of topics presented in this book clearly highlights the contribution of this last frontier of biocatalysis to the development of more efficient and sustainable pharmaceutical syntheses, as well as the key role of enzymes in the metabolic and environmental fate of pharmaceuticals."

Prof. Pier Paolo Giovannini
University of Ferrara, Italy

This volume deals with several different aspects of pharmaceuticals, which include not only various applications of drugs and their metabolism but also natural resources for active pharmaceutical ingredients as well as the removal of pharmaceutical pollution. It describes in detail the novel approaches for developing microbial fermentation processes to produce vitamin B6 using microorganisms, together with novel routes for vitamin B6 biosynthesis. The other topics discussed are new approaches for producing the successful anticancer drug Taxol from naturally occurring precursors, molecular farming through plant engineering as a cost-effective means to produce therapeutic and prophylactic proteins, and successful screening of potent microorganisms producing L-asparaginase for various chemotherapeutic applications. Furthermore, microbial biotransformations in the production and degradation of fluorinated pharmaceuticals are described. The other chapters inform the reader about the biotransformation of xenobiotics/drugs in living systems, the degradation of pharmaceuticals by white-rot fungi and their ligninolytic enzymes, and the removal of pharmaceutical pollution from municipal sewage using laccase. The concluding chapters deal with the mechanism of drug resistance in *Staphylococcus aureus*, genome editing and gene therapies, and epigenetic and metabolic alterations in cancer cells, including therapeutic approaches.



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