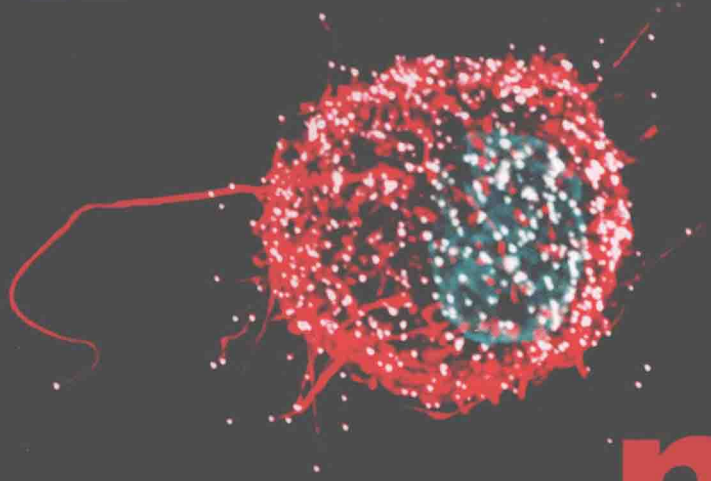

medical biotechnology

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To our spouses, Marcia Glick, Regina Delovitch, and Patrick Patten,
for their omnipresent love and tolerance, support, wisdom, and humor

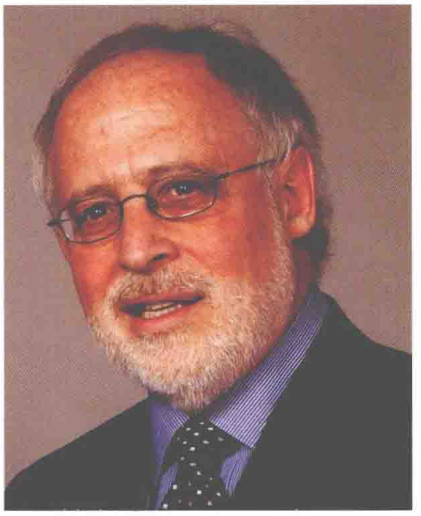
Preface

From the very beginning of the biotechnology revolution in the early 1970s, many scientists understood that this new technology would radically change the way that we think about health care. They understood early on, well before any products were commercialized, that medical science was about to undergo a major paradigm shift in which all of our previous assumptions and approaches would change dramatically. Forty years later, biotechnology has delivered on much of its early promise. Hundreds of new therapeutic agents, diagnostic tests, and vaccines have been developed and are currently available in the marketplace. Moreover, it is clear that we are presently just at the tip of a very large iceberg, with many more products in the pipeline. It is likely that, in the next 10 to 15 years, biotechnology will deliver not only new products to diagnose, prevent, and treat human disease but also entirely new approaches to treating a wide range of hitherto difficult-to-treat or untreatable diseases.

We have written *Medical Biotechnology* with the premise that it might serve as a textbook for a wide range of courses intended for premedical and medical students, dental students, pharmacists, optometrists, nurses, nutritionists, genetic counselors, hospital administrators, and other individuals who are stakeholders in the understanding and advancement of biotechnology and its impact on the practice of modern medicine. The book is intended to be as jargon-free and as easy to read as possible. In some respects, our goal is to demystify the discipline of medical biotechnology. This is not a medical textbook per se. However, a discussion of some salient features of selected diseases is presented to illustrate the applications of many biotechniques and biochemical mechanisms. Thus, this book may be considered a biomedical road map that provides a fundamental understanding of many approaches being pursued by scientists to diagnose, prevent, and treat a wide range of ailments. Indeed, this presents a large challenge, and the future is difficult to predict. Nevertheless, we hope that this volume will provide a useful introduction to medical biotechnology for a wide range of individuals.

About the Authors

Bernard R. Glick is a professor of biology at the University of Waterloo in Waterloo, Ontario, Canada, where he received his PhD in biochemistry in 1974. His current research is focused on the biochemical and genetic mechanisms used by plant growth-promoting bacteria to facilitate plant growth. In addition to his nearly 300 research publications, Dr. Glick is a coauthor of the textbook *Molecular Biotechnology: Principles and Applications of Recombinant DNA*, published by ASM Press. According to Google Scholar, his work has been cited more than 15,000 times. In addition to having served two terms as chair of the Department of Biology at Waterloo, Dr. Glick has taught 10 courses in five countries on various aspects of biotechnology.



Terry L. Delovitch obtained his BSc in chemistry (1966) and PhD in chemistry/immunology (1971) at McGill University. He received postdoctoral training at the Massachusetts Institute of Technology and Stanford University and then joined the faculty of the University of Toronto. In 1994, he was appointed senior scientist and director of the Autoimmune Disease Group on Type 1 Diabetes at the Robarts Research Institute, Western University, London, Ontario, Canada. After a 45-year research career, he retired from Western in 2011. He has received several academic awards and published about 200 research papers, review articles, and book chapters. He is the former chief scientific advisor to the Juvenile Diabetes Research Foundation Canada and past president of the International Immunology of Diabetes Society, and he is a consultant or advisor for several biotechnology and pharmaceutical companies, granting agencies, and journal editorial boards and a national allergy, asthma, and immunology research network. He and his wife, Regina, live in Toronto.

Cheryl L. Patten is an associate professor of microbiology and associate chair of the Department of Biology at the University of New Brunswick (UNB) in Fredericton, New Brunswick, Canada. Dr. Patten received her PhD from the University of Waterloo in 2001 and did postdoctoral work at McMaster University before joining the UNB faculty in 2004. Her research aims to understand how bacteria respond to the host environment at the biochemical and genetic levels. In particular, she is interested in secreted bacterial metabolites that may impact host health. As well as teaching introductory and advanced courses in microbiology, she enjoys introducing first-year science students to the wonders of biochemistry and molecular biology. She is a coauthor of another ASM Press textbook, *Molecular Biotechnology: Principles and Applications of Recombinant DNA*.

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