



MOLECULAR GENETICS OF  
**MYCOBACTERIA**  
2<sup>ND</sup> EDITION

EDITED BY  
GRAHAM F. HATFULL AND WILLIAM R. JACOBS, JR.

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# Preface

Fourteen years have passed since the first edition of *Molecular Genetics of Mycobacteria* was published in 2000, and the mycobacterial field has exploded in the intervening time. In 2000 the *Mycobacterium tuberculosis* genome sequence had recently been reported, and there was considerable optimism for the advances in tuberculosis genetics that this would stimulate. This Second Edition of *Molecular Genetics of Mycobacteria* offers insights into how these promises have been realized, as well as the substantial impact of the numerous new molecular tools developed over the past dozen years. The field of mycobacterial genetics has thus expanded dramatically, with investigations into new areas of mycobacterial growth, replication, metabolism, physiology, drug susceptibility, and virulence.

The size and scope of *Molecular Genetics of Mycobacteria*, Second Edition, reflect this rapidly expanding field. This new edition contains double the number of chapters in the first edition and includes many topics not discussed there. The book is divided into eight main sections that focus on genomics and genetic exchange, gene expression, the proteome, metabolism, drug resistance, cell wall biosynthesis, macromolecular biosynthesis, and growth and persistence. Each contains several chapters written by leading experts in the field and includes a genetic perspective on the various topics discussed. The field is growing so rapidly that there are undoubtedly some specific topics and areas—especially those developed over the past year—that we have not been able to include and will have to await another edition.

Although *M. tuberculosis* is now fully tractable to genetic manipulation, tuberculosis the disease advances with little abatement of its impact on human health. Better clinical management across the world has led to steadying of the numbers of new cases reported each year, tuberculosis mortality, and the total number of infected people. Nonetheless, most of the problems in tuberculosis control that existed in 2000 are still with us today. The only available vaccine is BCG, with its

dubious efficacy against adult pulmonary tuberculosis; drug resistance continues to grow; antituberculosis drug regimens have barely changed; and diagnosis is either slow or costly. The good news is that the advances in mycobacterial genetics are beginning to be reflected in exciting recent developments. New diagnostic approaches can determine rifampin resistance within a few hours, promising new drugs are progressing through the pipeline and into the clinic, and a range of newly developed vaccines are being evaluated. The fruits of 30 years of intensive genetic investigations are finally beginning to emerge. But there remains much to learn about the mycobacteria and their curious but deadly habits and habitats. We anticipate that molecular genetic approaches will blunt the defenses of humanity's deadliest microbial enemies over the next dozen years. It is our hope that this book inspires both newcomers to the field and veterans in tuberculosis research alike to think about tuberculosis problems with fresh perspectives and understanding.

We would like to thank Ellie Tupper of ASM Press for her tireless efforts; Greg Payne, ASM Press, for his continual encouragement and advice; and our exceptionally gifted and dedicated authors who contributed so splendidly to this book.

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WILLIAM R. JACOBS, JR.



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