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# Bacterial Pathogenesis

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## Bacterial Pathogenesis

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*Front cover artwork:* Image of HeLa cells infected by *Listeria monocytogenes*. Some bacteria form actin comet tails and move in the cytoplasm of the cells. Bacteria are stained with *Listeria*-specific antibody (in red); cellular actin is stained with DAPI (in blue). Image courtesy of Edith Gouin and Pascale Cossart, Pasteur Institute, Paris.

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## Preface

SINCE THE EARLY 1980s, the study of bacterial pathogens and bacterial pathogenesis has received a lot of attention, and progress has been spectacular, as illustrated in this volume. The combination of various approaches, including classical genetics, molecular biology, and cell biology, over the last 20 years has led to the emergence of cellular microbiology. Genomics pushed the field even further, providing a broader view of the multitude of strategies bacteria use during a productive infection. Transcriptomics subsequently invaded the microbial world and highlighted the numerous unsuspected regulatory mechanisms that allow bacteria to optimally adapt to their hosts during infection. Finally, transgenesis and sophisticated ex vivo and in vivo models have helped to place the numerous studies of cultured cells into an in vivo context. Hence we have the necessary tools to go one step further and understand infection in the context of all the other microbes, including commensals, symbionts, and other pathogens, that are present during an infection. This opens exciting new opportunities for discovery. This book thus sets the stage for the next generation of bacterial pathogenesisists!

We did not intend to cover the whole field of bacterial pathogenesis. We believe it is important to build on what we know about some well-studied pathogens, so the book begins with chapters dedicated to several important pathogens and their key features, such as the intracellular life cycles of *Chlamydia* and *Francisella*, cellular invasion by *Listeria* and *Shigella*, the pathogenesis of meningococci, and the persistence of *Helicobacter pylori* and *Salmonella*. The second part of the book transitions to chapters describing either well-established concepts or new mechanisms emerging from the study of various pathogens, including RNA-mediated regulation of virulence, the role of quorum sensing in virulence, and epigenetics and bacterial infections. Finally, such a book could not exist without chapters dedicated to vaccinology and new therapeutic approaches. In this respect, the chapter on probiotics is particularly timely.

We thank the many colleagues who agreed to write for us. We are convinced that gathering in one volume a series of chapters written by experts in their respective fields will be of great help for teaching and preparation of reviews, grant proposals, and reports. This type of book also provides an important forum for authors to express their vision, and, in this respect, we believe that this volume is a gold mine. The field is moving fast, yet there is so much we need to learn before we really understand in detail how the microbiota influence infection and how each bacterium in a population plays a role in infection. We hope that this book will be read for many years by researchers in various fields.

We thank Barbara Acosta and Richard Sever for continued support and patience during what at some stages seemed an endless project.

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STANLEY MALOY