

BOOK REVIEW

Waksman, G., Caparon, M., Hultgren, S., editors

Structural Biology of Bacterial Pathogenesis

AMS Press, American Society for Microbiology: Washington, DC, 2005. XI + 273 pages. Format 177 × 252 mm. Binding: Hardcover. Price: USD 115.95
ISBN 1-55581-301-1

The editors are affiliated with university institutions of molecular biology or microbiology at London and St. Louis, Missouri. The list of contributors comprises 26 specialists mostly in the field of biochemistry, molecular biology and microbiology, and microbial pathogenesis. It is declared in the introduction by the editors that recent years have seen rapid increase in structural information for proteins implicated in bacterial pathogenesis. From structures involved in adhesion and host recognition to those describing elements of bacterial secretions systems, this explosion in the field of structural microbiology has led to spectacular advances in our understanding of bacterial pathogenesis. The authors have focused on areas that represent elements of the basic paradigm of bacterial pathogenesis. Bacteria enter the host and use sophisticated sensory pathways to upregulate expression of virulence factors.

The volume is arranged in 12 chapters. Textual parts are supplemented with a comprehensive list of topical references in each chapter. The introductory chapter provides insights into regulations of bacterial transcription by anti- σ factors, namely regulation of *Bacillus* sporulation, regulation of the periplasmic stress response, and regulation of flagellar synthesis. Chapter 2 explains two components of signal transduction and chemotaxis while discussing signaling systems designed to detect environmental signals and elicit appropriate responses. Chapter 3 provides an overview of sugar recognition and bacterial attachment. To bind and make intimate contact with host cells presents trigger a cascade of signaling events. Nominally, bacterial pathogenesis depends on interaction of a protein on the bacterial surface (adhesin) with surface elements (receptors), frequently carbohydrates, on the surface of the target cells. Chapter 4 concentrates on host receptors of bacterial origin. Chapter 5 is devoted to the chaperone-usher pathway of pilus fiber biogenesis.

Chapter 6 explores structure and type IV pilins – ubiquitous organelles of Gram-negative bacteria, pathogens, symbionts, and

free living organisms alike. They are long, extremely narrow hair-filaments that are best known for their role in the initial attachment of microbes to host cells. Chapter 7 places emphasis upon structural basis of surface proteins and sortase enzymes that promote bacterial adhesion and host cell invasion. Chapter 8 provides a look at structural determinants of *Haemophilus influenzae* adherence to host epithelia: variation on type V secretion. Chapter 9 comprises type III secretion machinery and effectors: all most important Gram-negative bacterial pathogens are linked in that they utilize a highly specialized virulence related secretion system. Type IV secretion systems discussed in chapter 10 are multicomponent transport machineries mediating the intracellular transfer of specific substrates from bacterial donors to prokaryotic or eukaryotic target cells. Chapter 11 focuses on newly discovered injectosomes in Gram-positive bacteria. Concluding chapter 12 examines innate immunity in relation to the toll/interleukin-1 receptors that are crucial molecules in the recognition of pathogen-associated molecular patterns. The volume is illustrated by an inset of 52 full-page colour plates featuring modular architecture of structural domains, conserved domains of two-component pathways, ribbon representations of chemotaxis proteins, lectin-binding domains, fiber assembly by the chaperone-usher pathway, donor strain complementation, structure and function of an actin stapler, structural mimicry in bacterial virulence, and many more. Besides, there are figures situated in particular chapters.

Recent technological advances have led to an outpouring of knowledge in the field of structural biology, yielding an abundance of informational resources available to researchers in the study of bacterial pathogenesis. Structural Biology of Bacterial Pathogenesis represents first compilation of this kind, it offers a convenient review of current research that will engage instructors, students, and professionals in the fields of bacterial pathogenesis and infectious diseases.

Jindřich Jíra