Staphylococcus
Molecular Genetics

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The staphylococci are important pathogenic bacteria responsible for a variety of diseases in humans and other animals. They are the most common cause of hospital acquired infection and antibiotic resistant strains (MRSA) have become endemic in hospitals in most countries causing major public health issues. In addition, the incidence of new strains that cause severe community-acquired infections in healthy people is increasing and MRSA strains are emerging in agricultural and domestic animals. In the race to understand staphylococcal pathogenesis the focus has been on genetics, as a bacterium can only do what its genes allow. The publication of the first staphylococcal whole genome sequence in 2001 paved the way for a greater understanding of the molecular basis of its virulence, evolution, epidemiology and drug resistance. Since then the available genomic data has mushroomed and this, coupled with the major advances in genetic know-how and the availability of better genetic tools, has allowed significant advances to be made.

This volume, the first to focus on staphylococcal genetics, brings together the expertise and enthusiasm of an international panel of leading staphylococcal researchers to provide a state-of-the art overview of the field. Topics include the sequencing projects, including spin-off microarray and systems biology tools, epidemiology, evolution, manipulation of the genome, diagnostics, gene expression due to global regulators and environmental triggers, cell-wall synthesis, coagulase-negative species, and animal pathogens. It is designed for two major audiences. Firstly, to introduce the subject to new researchers, including those unfamiliar with genetics. Secondly, for established researchers, for whom it will serve as an invaluable reference and summary of a large field, as well as presenting the latest advances and future trends written by those who are developing them.

Essential reading for anyone involved in *Staphylococcus* research.

Chapter 1. Whole Genomes: Sequence, Microarray and Systems Biology. *Matthew T. G. Holden and Jodi A. Lindsay*
Chapter 2. The Population Structure of *Staphylococcus aureus*. *Mark C. Enright*
Chapter 3. *S. aureus* Evolution: Lineages and Mobile Genetic Elements (MGE). *Jodi A. Lindsay*
Chapter 5. Genetic Manipulation of *Staphylococcus aureus*. *Peter J. McNamara*
Chapter 6. Global Regulators of *Staphylococcus aureus* Virulence Genes. *Bénédicte Fournier*
Chapter 7. The Response of *S. aureus* to Environmental Stimuli. *Malcolm J. Horsburgh*
Chapter 8. Mechanisms of β-Lactam and Glycopeptide Resistance in *Staphylococcus aureus*. *Mariana G. Pinho*
Chapter 9. *Staphylococcus epidermidis* and other Coagulase-Negative Staphylococci. *Shu Yeong Queck and Michael Otto*
Chapter 10. Staphylococci of Animals. *J. Ross Fitzgerald and José R. Penades*

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