

Salmonella

From Genome to Function

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Salmonellae are important pathogens, responsible for an estimated one million deaths and 100 million human infections annually. Their genomes are mosaic puzzles - results of lateral transfer events that occur within a stable genetic background. Extraordinary diversity of host ranges and pathogenicity traits between different strains are the consequence of both specific genome insertions/deletions and minute changes in genome composition. Genomic information decoded from a multitude of different *Salmonella* strains and new dramatic insights into pathogenic processes emphasize the fact that *Salmonella* research is currently at a very exciting juncture. In addition to their fascinating resilience in both the environment and eukaryotic hosts, *Salmonella* prefers tumours over any other location within the human host (by a factor of 1000 or more). This ability could propel *Salmonella* into future use as a therapeutic delivery agent to control and/or cure cancers.

In this book, internationally acclaimed experts review cutting-edge topics in *Salmonella* genomics and molecular biology, providing a timely snapshot of the current state of research. Topics include latest approaches to sub-species level classification and phage typing of *Salmonella*, comparative genomics, the search for genetic determinants for survival of the bacterium in different environments and the evolution of niche specialization by *Salmonella*. The book also explores the latest genomic information and molecular characterizations of sRNAs and complements of fimbriae, flagella and secreted virulence factors. Moreover, *S. Typhi* pathogenesis, interactions of the host with intracellular *Salmonella* and the host's anti-*Salmonella* immune response are reviewed. The current knowledge on *Salmonella* biofilm formation and a progress report on using *Salmonella* as an anti-tumour tool conclude this compendium. Essential reading for all researchers working with *Salmonella* and related organisms, and recommended reading for other scientists working on bacterial genomics, molecular biology and bacterial molecular and cellular pathogenesis.

Chapter 1. New approaches in sub-species level *Salmonella* classification. *Burkhard Malorny, Elisabeth Hauser and Ralf Dieckmann*

Chapter 2. Typing phages and prophages of *Salmonella*. *Wolfgang Rabsch, Sandra Truepschuch, Daniel Windhorst and Roman G. Gerlach*

Chapter 3. Comparison of *Salmonella* genomes. *Ye Feng, Wei-Qiao Liu, Kenneth E. Sanderson, and Shu-Lin Liu*

Chapter 4. High-throughput screening to determine the genetic requirements for *Salmonella* survival under different growth conditions. *Mollie Megan Reynolds, Rocio Canals, Michael McClelland and Helene Andrews-Polymeris*

Chapter 5. Evolutionary trends associated with niche specialization as modeled by whole genome analysis of egg-contaminating *Salmonella enterica* serovar Enteritidis. *Jean Guard, Devendra Shah, Cesar A. Morales and Doug Call*

Chapter 6. Genomics and Pathogenesis of *Salmonella enterica* serovars Typhi and Paratyphi A. *Kathryn E Holt, Tim T Perkins, Gordon Dougan and Robert A Kingsley*

Chapter 7. The small RNAs of *Salmonella*. *Sridhar Javayel, Kai Papenfort and Jörg Vogel*

Chapter 8. Fimbrial signature arrangements in *Salmonella*. *Sean-Paul Nuccio, Nicholas R. Thomson, Maria C. Fookes and Andreas J. Bäuml*

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Chapter 12. Anti-*Salmonella* immunity: Highlighting new research in vaccines, mucosal immunology and systemic disease. *Jennifer L. Bishop, Ellen T. Arena, Kenneth W. Harder and B. Brett Finlay*

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