

Bacteriophage

Genetics and Molecular Biology



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Bacteriophages (viruses that infect bacteria) are fascinating organisms that have played and continue to play a key role in bacterial genetics and molecular biology. Phage can confer key phenotypes on their host, for example converting a non-pathogenic strain into a pathogen, and they play a key role in regulating bacterial populations in all sorts of environments. The phage-bacterium relationship varies enormously: from the simple predator-prey model to a complex, almost symbiotic relationship that promotes the survival and evolutionary success of both. While infection of bacteria used in the fermentation industry can be very problematic and result in financial losses, in other scenarios phage infection of bacteria can be exploited for industrial and/or medical applications. In fact interest in phage and phage gene products as potential therapeutic agents is increasing rapidly and is likely to have a profound impact on the pharmaceutical industry and biotechnology in general over the coming years. One potential application is the use of phage to combat the growing menace of antibiotic-resistant infections.

Written by eminent international researchers actively involved in the disparate areas of bacteriophage research this book focuses on the current rapid developments in this exciting field. The book opens with an excellent chapter that provides a broad overview of the topics and also highlights the multifaceted nature of bacteriophage research. This is followed by a series of reviews that focus on the current most cutting-edge topics including bioinformatics and genomics, phage in the environment, bacteriophage in medicine, transfer of phage DNA to the host, contribution to host phenotype and much more.

Essential reading for all phage researchers and of interest to molecular biologists and microbiologists working on bacteria in academia, biotechnology and pharmaceutical companies, and in the food and other industries

Chapter 1. The New Phage Biology: From Genomics to Applications. *Olivia McAuliffe, R. Paul Ross, and Gerald F. Fitzgerald*

Chapter 2. Bacteriophage Bioinformatics and Genomics. *Carlos A. Canchaya, Marco Ventura, and Douwe van Sinderen*

Chapter 3. Bacteriophage in the Environment. *Markus G. Weinbauer, Martin Agis, Osana Bonilla-Findji, Andrea Malits and Christian Winter*

Chapter 4. Bacteriophages and Food Fermentations. *Eric Emond and Sylvain Moineau*

Chapter 5. Bacteriophages in Medicine. *Andrzej Górski, Jan Borysowski, Ryszard Miedzybrodzki, and Beata Weber-Dabrowska*

Chapter 6. Phage Therapy: The Western Perspective. *Harald Brüssow*

Chapter 7. Bacteriophage Host Interaction in Lactic Acid Bacteria. *Christina Skovgaard Vegge, John Gerald Kenny, Lone Brøndsted, Stephen Mc Grath, and Douwe van Sinderen*

Chapter 8. Transfer of DNA From Phage to Host. *Lucienne Letellier, Laure Plançon, and Pascale Boulanger*

Chapter 9. Prophages and Their Contribution to Host Cell Phenotype. *W. Michael McShan and Joseph J. Ferretti*

Chapter 10. Prophage Induction of Phage λ . *John W. Little*

Chapter 11. Phage ϕ 29: Membrane-associated DNA Replication and Mechanism of Alternative Infection Strateg. *Wilfried J.J. Meijer, Daniel Muñoz-Espín, Virginia Castilla-Llorente and Margarita Salas*

Chapter 12. Release of Progeny Phages from Infected Cells. *Carlos São José, João Nascimento, Ricardo Parreira and Mário A. Santos*

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