
Phage Therapy A Practical Approach

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Bacteriophages in Health and Disease

Bacteriophages to treat infections with multidrug resistant pathogens
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SWANSON STEPHANY

Biocommunication of Phages MDPI

In response to the emergence of pathogenic bacteria that cannot be treated with current antibiotics, many researchers are revisiting the use of bacteriophages, or phages, to fight multidrug-resistant bacteria. *Bacteriophages: Biology and Applications* provides unparalleled, comprehensive information on bacteriophages and their applications, such as phage therapy. It offers techniques, media, and methodology involved in isolating and working with therapeutic phages. Photographs, line drawings, and electron micrographs of phages are also included. With its broad approach, this book is a useful reference for microbiologists, hematologists, and infectious disease researchers.

Pharmaceutical Freedom
CABI

Biofilms in the Food

Environment examines biofilms produced by food-borne microorganisms, the risks associated with biofilms in the food chain, the beneficial applications of biofilms in the food environment, and approaches for biofilm removal to improve sanitation and safety in the food environment. Specifically, this book provides: an introduction into the emerging and exciting field of biofilm research in the food environment a summary of advanced knowledge in medical microbiology and engineering and its applicability to food biofilm research, and potential directions for biofilm intervention and industrial beneficial applications that may have direct impact on food safety and public health. *Biofilms in the Food Environment* is intended to serve as a comprehensive reference source for the food science community, including industry scientists, university researchers, and regulatory agencies. Not only are general concepts regarding biofilms in the

food environment covered, but also included are in-depth reviews on biofilm structures, the correlation between strain virulence and biofilm-forming abilities, cutting-edge technologies to investigate microbial compositions in ecosystems and cell-to-cell interactions, and updated findings on molecular attributes and mechanisms involved in biofilm development that might lead to targeted approaches for biofilm prevention and removal. The topics covered and approaches discussed are truly interdisciplinary in nature.

Bacterial Viruses Nova Science Publishers

This monograph emphasizes the many facets of bacterial evolution as impacted by bacterial interactions with phages, as well as, to a lesser degree, the evolutionary impact of phages on other organisms, including other phages. The book starts with a general overview of bacteriophages. Topics discussed in detail include but are not limited to mutagenesis, migration,

natural selection and genetic drift as the drivers of evolution as well as an extensive discussion from the author's unique perspective on phage ecology.

Environmental

Bacteriophages: From Biological Control

Applications to Directed Bacterial Evolution CRC Press

This book brings together world-famous acne researchers and specialists to compile a source of comprehensive, state-of-the-art information for management of acne. It examines acne as a chronic skin disease from pathogenesis to treatment. The book covers the clinical aspects of acne, topical treatments, light therapies, environmental factors and more alongside real patient photos from around the world. Treatments that chapters explore include photodynamic therapy and topical retinoids. In addition to genetic and hormonal causes of acne, chapters also include discussions on the connections between acne and diet, and acne and environmental factors. International contributors make this text unique in that it can

focus solely on acne but also include international factors. Throughout the text, authors present the most up-to-date knowledge of acne pathophysiology, clinical features, differential diagnosis, treatment, and more. Pathophysiology, in particular, includes information on bacteria, immunity, endocrinologic factors, various deteriorating factors and environmental factors. As for clinical features, adult acne, differences in clinical patterns by region and race, and acne fulminans are covered. Regarding treatment, the latest knowledge on existing treatments or treatment methods, new drugs, and core outcome measures are mentioned. Acne: Current Concepts and Management is written for the dermatologist community from resident to researcher to privately practicing clinician.

Keratitis BoD – Books on Demand

This volume details the experimental approaches suitable for isolating and characterizing bacteriophages to formulating bacteriophage medicinal products and clinical application. Chapters guide readers through regulatory

compliance and safety aspects of bacteriophage therapy. Written in the highly successful Methods in Molecular Biology series format, chapters include introductions to their respective topics, lists of the necessary materials and reagents, step-by-step, readily reproducible laboratory protocols, and tips on troubleshooting and avoiding known pitfalls. Authoritative and cutting-edge, *Bacteriophage Therapy: From Lab to Clinical Practice* aims to ensure successful results in the further study of this vital field.

A Research Review of Interventions to Increase the Persistence and Resilience of Coral Reefs Frontiers Media SA Bacteriophage is a live micro-organism, a natural enemy of bacteria. Canadian microbiologist Felix d'Herelle proposed that bacteriophage might be applied to the control of bacterial diseases, however in the West this idea was not explored with the same enthusiasm as in the former Soviet Union and was eventually discarded with the arrival of antibiotics. Phage therapy is successfully used for the treatment of a wide spectrum of bacterial infections. Such

experience has now become extremely important with the rapidly-increasing spread of antibiotic-resistant bacterial infections which are almost impossible to overcome these days. Phage therapy has been considered as an alternative to antibiotic-therapy and it is now attracting global interest. Most of the scientific works in phage therapy were published in Russian and are thus not easily available in the West. This fact inspired the authors to write a book based on the historical publications found in the library of the Eliava Institute.

Bacteriophages as Drivers of Evolution Springer Science & Business Media Examining the enormous potential of microbiome manipulation to improve health Associations between the composition of the intestinal microbiome and many human diseases, including inflammatory bowel disease, cardiovascular disease, metabolic disorders, and cancer, have been elegantly described in the past decade. Now, whole-genome sequencing, bioinformatics, and precision gene-editing techniques are being combined with centuries-

old therapies, such as fecal microbiota transplantation, to translate current research into new diagnostics and therapeutics to treat complex diseases. Bugs as Drugs provides a much-needed overview of microbes in therapies and will serve as an excellent resource for scientists and clinicians as they carry out research and clinical studies on investigating the roles the microbiota plays in health and disease. In Bugs as Drugs, editors Robert A. Britton and Patrice D. Cani have assembled a fascinating collection of reviews that chart the history, current efforts, and future prospects of using microorganisms to fight disease and improve health. Sections cover traditional uses of probiotics, next-generation microbial therapeutics, controlling infectious diseases, and indirect strategies for manipulating the host microbiome. Topics presented include: How well-established probiotics support and improve host health by improving the composition of the intestinal microbiota of the host and by modulating the host immune response. The use of gene editing and

recombinant DNA techniques to create tailored probiotics and to characterize next-generation beneficial microbes. For example, engineering that improves the anti-inflammatory profile of probiotics can reduce the number of colonic polyps formed, and lactobacilli can be transformed into targeted delivery systems carrying therapeutic proteins or bioengineered bacteriophage. The association of specific microbiota composition with colorectal cancer, liver diseases, osteoporosis, and inflammatory bowel disease. The gut microbiota has been proposed to serve as an organ involved in regulation of inflammation, immune function, and energy homeostasis. Fecal microbiota transplantation as a promising treatment for numerous diseases beyond *C. difficile* infection. Practical considerations for using fecal microbiota transplantation are provided, while it is acknowledged that more high-quality evidence is needed to ascertain the importance of strain specificity in positive treatment outcomes.

Because systems biology approaches and synthetic engineering of microbes are now high-throughput and cost-effective, a much wider range of therapeutic possibilities can be explored and vetted. If you are looking for online access to the latest clinical microbiology content, please visit www.wiley.com/learn/clinmicronow.

Fighting Multidrug Resistance with Herbal Extracts, Essential Oils and Their Components

Springer Nature

With a history that likely dates back to the dawn of human civilization more than 10,000 years ago, and a record that includes the domestication and selective breeding of plants and animals, the harnessing of fermentation process for bread, cheese, and brewage production, and the development of vaccines against infectious diseases, biotechnology has acquired a molecular focus during the 20th century, particularly following the resolution of DNA double helix in 1953, and the publication of DNA cloning protocol in 1973, and transformed our concepts and practices in disease diagnosis, treatment and

prevention, pharmaceutical and industrial manufacturing, animal and plant industry, and food processing.

While molecular biotechnology offers unlimited opportunities for improving human health and well-being, animal welfare, agricultural innovation and environmental conservation, a dearth of high quality books that have the clarity of laboratory manuals without distractive procedural details and the thoroughness of well-conversed textbooks appears to dampen the enthusiasm of aspiring students. In attempt to fill this glaring gap, Handbook of Molecular Biotechnology includes four sections, with the first three presenting in-depth coverage on DNA, RNA and protein technologies, and the fourth highlighting their utility in biotechnology. Recognizing the importance of logical reasoning and experimental verification over direct observation and simple description in biotechnological research and development, the Introduction provides pertinent discussions on key strategies (i.e., be first, be better, and be

different), effective thinking (lateral, parallel, causal, reverse, and random), and experimental execution, which have proven invaluable in helping advance research projects, evaluate and prepare research reports, and enhance other scientific endeavors. Key features Presents state-of-the-art reviews on DNA, RNA and protein technologies and their biotechnological applications Discusses key strategies, effective thinking, and experimental execution for scientific research and development Fills the gap left by detailed-ridden laboratory manuals and insight-lacking standard textbooks Includes expert contributions from international scientists at the forefront of molecular biotechnology research and development Written by international scientists at the forefront of molecular biotechnology research and development, chapters in this volume cover the histories, principles, and applications of individual techniques/technologies, and constitute stand-alone, yet interlinked lectures that strive to educate as well as to entertain. Besides

providing an informative textbook for tertiary students in molecular biotechnology and related fields, this volume serves as an indispensable roadmap for novice scientists in their efforts to acquire innovative skills and establish solid track records in molecular biotechnology, and offers a contemporary reference for scholars, educators, and policymakers wishing to keep in touch with recent developments in molecular biotechnology. *Bacteriophage Ecology* Humana Press

This Research Topic is dedicated to Prof. Elisabeth Kutter on the occasion of her 80th birthday. Dr. Kutter's career as a phage scientist has extended nearly 60 years. She has been a pioneer as a woman in science. She started to work with phage at the University of Rochester, New York working with Dr. Wiberg on radioisotopes making excellent progress in the field – progress which was even cited in Luria's 1969 Nobel Prize talk. Betty first encountered phage therapy during a visit to Georgia in 1990 which was part of a longer stay in the former Soviet Union under a US-USSR research exchange program. Dr.

Kutter was one of the first Americans to advocate for phage therapy in the post antibiotic era. Betty started hosting the Evergreen International Phage meetings in Olympia, Washington, from 1975 onward, which helped to develop a strong phage community with participation increasing over the years to 350 at the 23rd biannual last year. Betty continues to be an active member in the phage community, sharing her experience and working with all of us toward her ultimate goal of making phage therapy available worldwide thus reducing the burden caused by antibiotic resistant bacterial infections.

Phage Display Hachette UK

This book compiles the latest information in the field of antibacterial discovery, especially with regard to the looming threat of multi-drug resistance. The respective chapters highlight the discovery of new antibacterial and anti-infective compounds derived from microbes, plants, and other natural sources. The potential applications of nanotechnology to the fields of antibacterial discovery and drug

delivery are also discussed, and one section of the book is dedicated to the use of computational tools and metagenomics in antibiotic drug discovery. Techniques for efficient drug delivery are also covered. The book provides a comprehensive overview of the progress made in both antibacterial discovery and delivery, making it a valuable resource for academic researchers, as well as those working in the pharmaceutical industry.

Bacteriophage Therapy

Springer Nature

This is the first book to systemize all levels of communicative behavior of phages. Phages represent the most diverse inhabitants on this planet. Until today they are completely underestimated in their number, skills and competences and still remain the dark matter of biology. Phages have serious effects on global energy and nutrient cycles. Phages actively compete for host. They can distinguish between 'self' and 'non-self' (complement same, preclude others). They process and evaluate available information and then modify their behaviour accordingly.

These diverse competences show us that this capacity to evaluate information is possible owing to communication processes within phages (intra-organismic), between the same, related and different phage species (interorganismic), and between phages and non-phage organisms (transorganismic). This is crucial in coordinating infection strategies (lytic vs. lysogenic) and recombination in phage genomes. In 22 chapters, expert contributors review current research into the varying forms of phage biocommunication and Phagetherapy. *Biocommunication of Phages* aims to assess the current state of research, to orient further investigations on how phages communicate with each other to coordinate their behavioral patterns, and to inspire further investigation of the role of non-phage viruses (non-lytic, non-prokaryotic) in these highly dynamic interactional networks. *Hugo and Russell's Pharmaceutical Microbiology* John Wiley & Sons

Historically, the first observation of a transmissible lytic agent that is specifically active

against a bacterium (*Bacillus anthracis*) was by a Russian microbiologist Nikolay Gamaleya in 1898. At that time, however, it was too early to make a connection to another discovery made by Dmitri Ivanovsky in 1892 and Martinus Beijerinck in 1898 on a non-bacterial pathogen infecting tobacco plants. Thus the viral world was discovered in two of the three domains of life, and our current understanding is that viruses represent the most abundant biological entities on the planet. The potential of bacteriophages for infection treatment have been recognized after the discoveries by Frederick Twort and Felix d'Hérelle in 1915 and 1917. Subsequent phage therapy developments, however, have been overshadowed by the remarkable success of antibiotics in infection control and treatment, and phage therapy research and development persisted mostly in the former Soviet Union countries, Russia and Georgia, as well as in France and Poland. The dramatic rise of antibiotic resistance and especially of multi-drug resistance among

human and animal bacterial pathogens, however, challenged the position of antibiotics as a single most important pillar for infection control and treatment. Thus there is a renewed interest in phage therapy as a possible additive/alternative therapy, especially for the infections that resist routine antibiotic treatment. The basis for the revival of phage therapy is affected by a number of issues that need to be resolved before it can enter the arena, which is traditionally reserved for antibiotics. Probably the most important is the regulatory issue: How should phage therapy be regulated? Similarly to drugs? Then the co-evolving nature of phage-bacterial host relationship will be a major hurdle for the production of consistent phage formulae. Or should we resort to the phage products such as lysins and the corresponding engineered versions in order to have accurate and consistent delivery doses? We still have very limited knowledge about the pharmacodynamics of phage therapy. More data, obtained in animal models, are necessary to

evaluate the phage therapy efficiency compared, for example, to antibiotics. Another aspect is the safety of phage therapy. How do phages interact with the immune system and to what costs, or benefits? What are the risks, in the course of phage therapy, of transduction of undesirable properties such as virulence or antibiotic resistance genes? How frequent is the development of bacterial host resistance during phage therapy? Understanding these and many other aspects of phage therapy, basic and applied, is the main subject of this Topic.

Bacteriophages Academic Press

The only available reference to comprehensively discuss the common and unusual types of rickettsiosis in over twenty years, this book will offer the reader a full review on the bacteriology, transmission, and pathophysiology of these conditions. Written from experts in the field from Europe, USA, Africa, and Asia, specialists analyze specific patho

Biotherapy - History, Principles and Practice

CRC Press

Hugo & Russell's

Pharmaceutical Microbiology Discover the very latest developments in pharmaceutical microbiology in the 9th edition of this popular textbook Microbiology is one of the essential pharmaceutical sciences upon which the study and practice of pharmacy is built. It has a bearing on all aspects of the manufacture of medicines and sterile products, from their design and development to their delivery as quality products. Few interventions are more central to modern medicine than the treatment of infection, where antibiotics, vaccination and hygienic practices have essential roles to play. The COVID-19 pandemic, the appearance of new pathogens and the rise of antibiotic resistance have demonstrated most completely the need for pharmaceutical practitioners, researchers and industrial scientists to be fully conversant with this field. The 9th edition of Hugo and Russell's Pharmaceutical Microbiology has been updated to meet this need. Having long served as the sole comprehensive textbook covering this subject, it

has now been adapted to a critical new period in the advancement of medical and pharmaceutical research and development. Its experienced editors have incorporated contributions from subject experts and created a text which will serve the next generation of pharmacy students, pharmaceutical industry scientists and researchers. In this ninth edition of Hugo and Russell's Pharmaceutical Microbiology, readers will find: A mix of established and new authors bringing practical and research experience to their chapters Material covering the fundamentals of microbiology, microbial behavior and laboratory investigation Revised chapters incorporating new material on microbe-host interactions, antibiotic resistance, emerging pathogens, public health microbiology, healthcare-associated infection and pharmaceutical manufacture Emerging understandings from the COVID-19 pandemic on infection prevention and control and vaccine development Practitioners providing their insights on clinical practice and pharmaceutical

production An accompanying website incorporating teaching resources Hugo and Russell's *Pharmaceutical Microbiology*, 9th edition promises to remain the essential text for pharmacy and medical students, as well as researchers and industry professionals.

Mechanisms of Biofilm Development and Antibiofilm Strategies

Frontiers Media SA *Harnessing the Power of Viruses* explores the application of scientific knowledge about viruses and their lives to solve practical challenges and further advance molecular sciences, medicine and agriculture. The book contains virus-based tools and approaches in the fields of: i) DNA manipulations in vitro and in vivo; ii) Protein expression and characterization; and iii) Virus- Host interactions as a platform for therapy and biocontrol are discussed. It steers away from traditional views of viruses and technology, focusing instead on viral molecules and molecular processes that enable science to better understand life and offer means for addressing complex biological phenomena that

positively influence everyday life. The book is written at an intermediate level and is accessible to novices who are willing to acquire a basic level of understanding of key principles in molecular biology, but is also ideal for advanced readers interested in expanding their biological knowledge to include practical applications of molecular tools derived from viruses. - Explores virus-based tools and approaches in DNA manipulation, protein expression and characterization and virus-host interactions - Provides a dedicated focus on viral molecules and molecular processes that enable science to better understand life and address complex biological phenomena - Includes an overview of modern technologies in biology that were developed using viral components/elements and knowledge about viral processes

Bacteriophages

Cambridge University Press

Humans coexist with millions of harmless microorganisms, but emerging diseases, resistance to antibiotics, and the threat of bioterrorism are forcing

scientists to look for new ways to confront the microbes that do pose a danger. This report identifies innovative approaches to the development of antimicrobial drugs and vaccines based on a greater understanding of how the human immune system interacts with both good and bad microbes. The report concludes that the development of a single superdrug to fight all infectious agents is unrealistic.

A Literature Review of the Practical Application of Bacteriophage Research

John Wiley & Sons

Spellberg's book is a powerful and compelling journey into the antibiotic resistance problem . . . [written] in a personal, compelling, and easy-to-understand manner. It's a must read.--Michael Osterholm, M.D., author of "Living Terrors."

Treating Infectious Diseases in a Microbial World Oxford University Press

Alternative treatment modes for antibiotic-resistant bacterial pathogens have become a public health priority. Bacteriophages are bacterial viruses that

infect and lyse bacterial cells. Since bacteriophages are frequently bacterial host species-specific and can often also infect antibiotic-resistant bacterial cells, they could represent ideal antimicrobials for fighting the antibiotic resistance crisis. The medical use of bacteriophages has become known as phage therapy. It is widely used in Russia, where phage cocktails are sold in pharmacies as an over-the-counter drug. However, no phage product has been registered for medical purposes outside of the former Soviet Union. The current Special Issue of *Viruses* contains a collection of papers from opinion leaders in the field who explore hurdles to the introduction of phage therapy in western countries. The articles cover diverse topics ranging from patent to regulatory issues, the targeting of suitable bacterial infections, and the selection and characterization of safe and efficient phage cocktails. Phage resistance is discussed, and gaps in our knowledge of phage-bacterium interactions in the

mammalian body are revealed, while other articles explore the use of phages in food production and processing.

Gene Cloning and Manipulation Frontiers Media SA

Published in Cooperation with THE WORLD AQUACULTURE SOCIETY Aquaculture loses millions of dollars in revenue annually due to aquatic animal diseases. Disease outbreaks continue to threaten profitable and viable aquaculture operations throughout the world. As a result, aquaculture biosecurity programs that address aquatic animal pathogens and diseases have become an important focus for the aquaculture industry. *Aquaculture Biosecurity: Prevention, Control, and Eradication of Aquatic Animal Disease* provides valuable information that will increase success in combating infectious aquatic disease. Key representatives of international, regional, and national organizations presented their views on this important issue as part of a special session at the 2004 World Aquaculture Society Annual Conference. The chapters of this book cover a wealth of

experience from the varied perspectives of these experts on biosecurity, policies, and measures to take the offensive against the spread of diseases in aquatic animals. With contributions from renowned international experts, covering approaches to biosecurity policies and measures currently practiced, *Aquaculture Biosecurity: Prevention, Control, and Eradication of Aquatic Animal Disease* is a vital reference for all those concerned about protecting aquaculture from impacts of aquatic animal disease.

Rising Plague Springer Nature

This first major reference work dedicated to the manifold industrial and medical applications of bacteriophages provides both theoretical and practical insights into the emerging field of bacteriophage biotechnology. The book introduces to bacteriophage biology, ecology and history and reviews the latest technologies and tools in bacteriophage detection, strain optimization and nanotechnology. Usage of bacteriophages in food safety, agriculture, and different therapeutic

areas is discussed in detail. This book serves as essential guide for

researchers in applied microbiology, biotechnology and

medicine coming from both academia and industry.