7th World Conference on

Targeting Phage Therapy

June 20-21, 2024 - Malta

Agenda

PHAGE THERAPY 2024

INTERNATIONAL SOCIETY OF MICROBIOTA

www.phagetherapy-site.com

7th World Conference on

Targeting Phage Therapy

PHAGE THERAPY 2024

June 20-21, 2024
Corinthia Palace, Malta

Short Oral Submissions

June 7, 2024

Poster Submissions

June 12, 2024

Keynote speech

Clinical Trials in Phage Therapeutics: Looking Under the Hood

Robert T. Schooley
University of California, San Diego, USA

Introducion to Phage Therapy 2024
Marvin Edeas,
Chairman of Targeting Phage Therapy's Scientific Board, INSERM - Institut Cochin, Université Paris Cité, France

Regulatory restrictions vs. Human Rights, the Hippocratic oath and the Freedom of therapy: The legal aspect of phage therapy
Barbara Brenner,
Kanzlei BRENNER, Germany

Mycobacteriophages and Their Therapeutic Potential
Graham F. Hatfull,
University of Pittsburgh, USA

Phage therapy: Targeting Intestinal Bacterial Microbiota for the Treatment of Liver Disease
Jumpei Fujiki,
University of California San Diego, USA
Rakuno Gakuen University, Japan

Addressing Phage Resistance to Enhance the Robustness of Phage Therapy for Pseudomonas aeruginosa Infections in People with Cystic Fibrosis
Federica Briani,
University of Milan, Italy

The Phageome in Normal and Inflamed Human Skin
Wolfgang Weninger,
Medical University of Vienna, Austria

Phage Satellites, a Diversity of Extradimensional Symbionts and Pathways to Phage Therapy
Rodrigo Ibarra Chávez,
University of Copenhagen, Denmark

Improving Phages Through Experimental Evolution
Frederic Bertels,
Max Planck Institute for Evolutionary Biology, Germany

Cell-Free Production of Personalized Therapeutic Phages Targeting Multidrug-Resistant Bacteria
Kilian Vogele,
Invitris, Germany

Phage Therapy: A Glimpse into Clinical Studies Involving Over 150 Cases
Nannan Wu,
Shanghai Public Health Clinical Center, Fudan University, China

Making Antibiotics Great Again: Phage resistance in vivo correlates to resensitivity to antibiotics in pan-resistant *Pseudomonas aeruginosa*
Sabrina Green,
KU Leuven, Belgium

Magistral Phage Preparations: Is This the Model for Everyone?
Jean-Paul Pirnay
Queen Astrid Military Hospital, Belgium

Leveraging Evolutionary Trade-Offs in Development of Phage Therapy
Paul Turner,
Yale University, USA

Genetic Engineering of Phages to Target Intracellular Bloodstream E.coli Infections
Antonia P. Sagona,
University of Warwick, United Kingdom

Towards Efficient Phage Therapies: Investigation of Phage / Bacteria Equilibrium with Metagenome of Dark Matter in Natural Samples
Domenico Frezza,
University of Roma Tor Vergata, Italy

Adaptive Phage Therapy in The Intensive Care Unit: From Science to Patients
Ekaterina Chernevskaya,
Federal Research and Clinical Center of Intensive Care Medicine and Rehabilitology, Russia

Quality control of phage Active Pharmaceutical Ingredients (APIs) in Belgium
Pieter-Jan Ceyssens,
Sciensano, Belgium

Modern Concepts of Phage Therapy: An Immunologist's Vision
Besarion Lasareishvili,
Eliava Institute of Bacteriophage, Microbiology and Virology, Georgia

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7th World Conference on Targeting Phage Therapy

Day 1 - June 20, 2024

8h00 **Welcoming of attendees & Badge Distribution**

9h00 **Introduction to Targeting Phage Therapy 2024**
Marvin Edeas, *INSERM – Institut Cochin, Université de Paris, France*

9h15 **Keynote Speech**

Clinical Trials in Phage Therapeutics: Looking Under the Hood
Robert T. Schooley, *University of California, San Diego, USA*

- *Clinical trials of phage therapeutics are accelerating.*
- *Rigorous translational research tools must be integrated into study design.*
- *Trials should go beyond simple clinical endpoints.*
- *The aim is to contribute directly to understanding fundamental principles of phage therapy.*
- *Systematic elucidation of these principles will hasten phage therapy's advancement into clinical medicine.*
- *Provides a framework for objectively evaluating new phage-based therapeutic approaches transitioning from bench to bedside.*

Session 1 – Phages, Hosts & Microbiome: On the Way to Medical Revolution

Chairs: Marvin Edeas & Graham Hatfull

9h40 **The Phageome in Normal and Inflamed Human Skin**
Wolfgang Weninger, *Medical University of Vienna, Austria*

- *Overview of Atopic Dermatitis (AD) as an inflammatory skin disease with dysbiosis of the skin microbiota.*
- *Utilization of machine learning algorithms to define viruses, including bacteriophages, in patient samples.*
- *Identification of unique phages under homeostatic and inflammatory conditions.*
- *Current efforts focused on characterizing phages isolated from patients for their potential to modify the skin microbiome.*

10h05 **Phage therapy: Targeting intestinal bacterial microbiota for the treatment of Liver disease**
Jumpei Fujiki, *University of California San Diego, USA / Rakuno Gakuen University, Japan*

- *Phages have precise editing capabilities on the gut microbiota.*
- *Cytolytic E. faecalis plays a role in alcohol-associated liver diseases, contributing to disease progression. Targeting this pathogen offers a potential treatment avenue for liver disease.*
- *Analysis conducted on phage-resistant variants of cytolytic E. faecalis.*
- *Evolution of Enterococcus phages also examined in the study.*

10h30 – Panel Discussion

10h40 **Coffee Break, Networking, Poster & Exhibition Sessions**

11h15 **Towards efficient phage therapies: investigation of phage / bacteria equilibrium with metagenome of dark matter in natural samples**
Domenico Frezza, *University of Roma Tor Vergata, Italy*

- *Sampling of phage and bacteria in wild environment helps to know their equilibrium and mechanisms for changes of equilibrium.*
- *Deepening the knowledge on phage dark matter gives a larger repertoire of phage.*
- *New generation sequencing gave a great opportunity to discover new phage genomes and species.*
- *"AI" programs are developing the possibility to find the bacterial target of new phage discovered assembling new phage genomes from dark matter.*

Session 2 - Phage Therapy: Emerging Trends and Innovative Approaches

Chairs: Antonia Sagona & Frederic Bertels

11h45 **Mycobacteriophages and Their Therapeutic Potential**
Graham F. Hatfull, *University of Pittsburgh, USA*

- *Genetic diversity of Mycobacteriophages.*
- *Therapeutic usage of phages for treating NTM infections.*
- *Limitations to broader use of phages for treating NTM infections.*

12h10 **Leveraging Evolutionary Trade-Offs in Development of Phage Therapy**
Paul Turner, *Yale University, USA*

- *Explore concerns regarding evolved phage resistance and its implications in clinical settings.*
- *Discover how precise phage selection pressure can positively influence outcomes amidst resistance challenges.*
- *Show results from both laboratory experiments and in vivo studies.*
- *Emphasize the significance of understanding the interactions between phage therapy and human immunology for improved clinical efficacy.*

12h35 – Panel Discussion

12h45 **Lunch Break, Networking, Poster & Exhibition Sessions**

Chairs: Paul Turner & Domenico Frezza

14h00 **Improving Phages Through Experimental Evolution**
Frederic Bertels, *Max Planck Institute for Evolutionary Biology, Germany*

- *Overview of lab projects focusing on experimental evolution approaches to study phages.*
- *Experimental evolution enables:*
  - *Modification of host ranges of phages.*
  - *Examination of how antibiotics impact resistance evolution.*
  - *Alteration of phage life history traits.*
- *Experimental evolution serves as the primary tool for developing PhiX174, a model phage, into a therapeutic agent.*

14h25 **Addressing Phage Resistance to Enhance the Robustness of Phage Therapy for *Pseudomonas aeruginosa* Infections in People with Cystic Fibrosis**
Federica Briani, *University of Milan, Italy*

- *P. aeruginosa clinical strains isolated from people with Cystic fibrosis are highly heterogenous and very frequently multi-resistant to phages. Resistance to phages is also developed in susceptible strains.*
- *Natural Pseudomonas phages tend to use a relatively small repertoire of receptors among which pili and LPS, which are typically modified/lost by clinical strains.*
- *Approaches to address this challenge that we are exploring in the lab will be presented.*

14h50 **Genetic Engineering of Phages to Target Intracellular Bloodstream *E.coli* Infections**
Antonia P. Sagona, *University of Warwick, United Kingdom*

- *Discuss methodology developed in the lab for genetically modifying E.coli bacteriophages.*
- *Focus on increasing tropism towards human cells and enhancing ability to target intracellular bacteria.*
- *Present unpublished data on novel phages isolated and characterized, targeting clinical bloodstream E.coli from UCWH hospital patients' samples.*
- *Aim to genetically modify these novel phages to invade human cells more efficiently and clear intracellular bloodstream infections. Objective includes identifying optimal cellular conditions for phage therapy.*
- *Highlight example of proof of concept in vitro work, demonstrating applied phage therapy targeting clinical samples from patients.*

15h15 – Panel Discussion

15h30 **Coffee Break, Networking, Poster & Exhibition Sessions**

Chair: Besarion Lasareishvili

16h10 **Cell-Free Production of Personalized Therapeutic Phages Targeting Multidrug-Resistant Bacteria**
Kilian Vogele, *Invitris, Germany*

- *Alternatives of cell-free production of phages.*
- *Engineering of Phage for improving them (host-range, biofilm degradation...).*

16h35 **Phage Satellites, a Diversity of Extradimensional Symbionts and Pathways to Phage Therapy**
Rodrigo Ibarra Chavez, *University of Copenhagen, Denmark*

17h00 – Panel Discussion

17h10 – Short Oral Presentations & Innovations

Phage Resistance Characterization of a Phage Cocktail Targeting Pseudomonas Aeruginosa Associated to Lung Infections
Clara Leandro, Technophage, Investigação E Desenvolvimento Em Biotecnologia S.a., Portugal

Bacteriophage Genome Annotation: Comparing Automatic and Manual Approaches
Antoine Culot, Rime Bioinformatics, France

Nanobiotechnological Engineering of the M13 Bacteriophage for Targeted Photodynamic Cancer Therapy
Alena Kaltenbrunner, University of Bologna, Italy

High-Throughput Time-resolved Measurement of Phage Infection Cycles in Individual Cells
Somenath Bakshi, University of Cambridge, United Kingdom

Bacteriophage Host Ranges: A Key to the Two Therapy Strategies
Ivan M. Pchelin, Institute of Experimental Medicine, Russia

The Burden of Resistance: A Comprehensive Analysis of *V. Harveyi* Mutants Resistant to Phages
Stavros Droubogiannis, Hellenic Centre for Marine Research, Greece

Bacteriophage-based Cleaning Approaches to Eradicate *Salmonella Infantis* in Broiler Farms
Sandra Sevilla, Centro de Calidad Avícola y Alimentación Animal de la Comunidad Valenciana, Spain

18h10 – **End of Conference Day 1**

20h00 – **Speakers' Dinner (reserved for ticket holders)**

PHAGE THERAPY 2024

7th World Conference on Targeting Phage Therapy

Day 2 - June 21, 2024

8h20 Welcoming of attendees & Badge Distribution

Session 3 - Phages Therapy 2024: From Bench to Bedside

Chairs: Anna Pistocchi & Jean-Paul Pirnay

8h30 **Modern Concepts of Phage Therapy: An Immunologist's Vision**
Besarion Lasareishvili, *Eliava Institute of Bacteriophage, Microbiology and Virology, Georgia*

- *Discuss the effects of phage therapy on both innate and adaptive immune responses, including inflammatory responses and antibody production.*
- *Address current contradictions and prospects, highlighting variable immune responses, the potential for personalized therapy, and advances in genetic engineering.*
- *Emphasize the research needed to optimize phage therapy, focusing on immune response studies, pharmacokinetics, and formulation optimization.*

9h00 **Adaptive Phage Therapy in The Intensive Care Unit: From Science to Patients**
Ekaterina Chernevskaya, *Federal Research and Clinical Center of Intensive Care Medicine and Rehabilitology, Russia*

- *Adaptive phage therapy selects bacteriophages for the entire spectrum of bacteria in the ICU.*
- *Continuous clinical and microbiological monitoring ensures efficacy.*
- *Results indicate potential for reducing antibiotic usage and preserving efficacy.*
- *Adaptive phage therapy protocol demonstrates promise in ICU settings.*

9h25 **Phage Therapy: A Glimpse into Clinical Studies Involving Over 150 Cases**
Nannan Wu, *Shanghai Public Health Clinical Center, Fudan University, China*

- *Brief overview of the history and current status of phage therapy in China.*
- *Statistical analysis of the preliminary data from their team's 150 personalized phage therapy cases.*
- *Discussion of specific observations and insights gained from case studies.*
- *Exploration of future opportunities and challenges for the advancement of phage therapy in China.*

9h50 **Making Antibiotics Great Again: Phage resistance *in vivo* correlates to resensitivity to antibiotics in pan-resistant *Pseudomonas aeruginosa***
Sabrina Green, *KU Leuven, Belgium*

- *Overview of phage and antibiotic synergy in general.*
- *Detailed examination of data specific to the recent 100 patient case.*

10h15 – Panel Discussion

10h30 **Coffee Break, Networking, Poster & Exhibition Sessions**

11h15 – Short Oral Presentations & Innovations

Production of Phage Products for Various Applications
Frenk Smrekar, JAFRAL's CEO, Slovenia

Efficacy of Mycobacteriophage D29 Against Intracellular *Mycobacterium Smegmatis*
Daria Smalchuk, Germans Trias i Pujol Research Institute, Spain

Neutralizing Antibodies After Nebulized Phage Therapy in Cystic Fibrosis Patients
Marco Pardo-Freire, University of Valencia, Spain

Successful Phage Treatment in a Cystic Fibrosis Patient with Acute Rejection Following Two Bilateral Lung Transplants
Mireia Bernabeu-Gimeno, Universitat De València, Spain

Bridging to Lung Transplantation: Personalized Phage Therapy for a Cystic Fibrosis Patient Infected with *Burkholderia Multivorans*
Evgenii Rubalskii, Hannover Medical School, Germany

Bacteriophages as Commercial Tools for the Treatment of Civilization Skin Disorders Like Acne or Eczema
Vendula Ficelová, Aumed, Czech Republic

Determining the main causes of phage resistance in clinical strains of *Pseudomonas aeruginosa*
Cindy Fevre, Phaxiam Therapeutics, France

Hydrogel Beads for Targeted/Controlled Phage Delivery in the Gastrointestinal Tract
Farzaneh Moghtader, TiPHAGE San.Tic, Turkey

12h35 **Lunch Break, Poster & Exhibition Sessions**

Session 4 - Ethical Considerations and Regulatory Landscape of Phage Therapy: Challenges, Advocacy and Task Forces

Chair: Barbara Brenner & Mariagrazia Di Luca

14h00 **Regulatory restrictions vs. Human Rights, the Hippocratic oath and the Freedom of therapy– The legal aspect of phage therapy**
Barbara Brenner, *Kanzlei BRENNER, Germany*

- *Anecdotal evidence vs. RCTs (is it ethical to perform RCTs if enough evidence can be drawn from microbio science + case reports?).*
- *Regulatory issues on magistral preparations (non-GMP, adaptive GMP or Brussels monograph).*
- *Human right to quick and affordable access to phage drugs: is safety really an issue with phage preps (risk assessment)?*
- *Art. 37 of the Helsinki Protocol of WMA & the Hippocratic oath vs. Regulators: Are regulators entitled to forbid non-GMP phages be produced and taken to cure emergencies given the fact that GMP-phages still aren't available (or - in future - cannot be afforded)? Or does the "all you can grab"-guideline prevail?*
- *Fighting back the AMR-tsunami: which strategy have the countries got (if at all!)? Will industrial phages help us out? One Health approach, animal farming, restriction of chemical antibiotics to emergencies, promote phages as basic interventions and go in with chemical antibiotics only if phages won't work (model: Georgia).*

14h25 **Quality control of phage Active Pharmaceutical Ingredients (APIs) in Belgium**
Pieter-Jan Ceyssens*, Sciensano, Belgium*

Focus on genetic variability and the reoccuring problem of prophage contamination, especially when using clinical strains in phage production.

14h50 **Magistral Phage Preparations: Is This the Model for Everyone?**
Jean-Paul Pirnay, *Queen Astrid Military Hospital, Belgium*

15h15 – Panel Discussion

15h30 – **Concluding Remarks by Dr. Jean-Paul Pirnay**

15h50 – **Awards Distribution**

16h00 – **Networking Accompanied by Drinks and Appetizers**

Selected Posters for Presentation

1. **Development of Phage-based Tool with the Potential to Treat Antibiotic-Resistant *Gonorrhea***
   Magdalena Pelka, University of Warsaw, Poland

2. **Phage-antibiotic Combination Therapy Against Recurrent Pseudomonas Septicaemia in a Patient with an Arterial Stent**
   Saija Kiljunen, University of Helsinki, Finland

3. **Elucidating Key Steps of Pseudomonas Aeruginosa Infection by DEV Lytic Phage for Phage Therapy.**
   Jimena Nieto Noblecia , Università Degli Studi Di Milano, Italy

4. **Phage- Encoded Proteins with Antimicrobial Activity Against *Klebsiella Pneumoniae***
   Monika Adamczyk-Popławska, University of Warsaw, Poland

5. **Flow Cytometry as a Tool for Monitoring the Course of a Staphylococcal Phage Abortive Infection at the Single Cell Level**
   Lucie Kuntová, Masaryk University, Czech Republic

6. **Genomic and Structural Characterization of Novel Macrococcus Siphovirus That Will Likely Represent a New Subfamily Within *Caudoviricetes***
   Ivana Maslanova, Masaryk University, Czech Republic

7. **Polymicrobial Interactions in Urinary Tract Infections and Their Impact on Phage Therapy**
   Stéphane Pont, Swiss Federal Institute of Technology Lausanne (EPFL), Switzerland

8. **Antibacterial Activity of Holin Proteins**
   Hande Hancer, Yildız Technical University, Turkey

9. **Strategy for Purification of the Staphylococcus Aureus Bacteriophages**
   Rostislav Halouzka, MB Pharma, Czech Republic

10. **Synergistic Action of RCHAPK With Antibiotics Against MRSA and Its Application in an *in vivo* Murine Wound Model**
    Semra Tasdurmazli, Yildız Technical University, Turkey

11. **Characterization and Therapeutic Potential of a Newly Isolated Pseudomonas Aeruginosa Phage from Wastewater**
    Tinatini Tchatchiashvili, Jena University Hospital, Germany

12. **Expanding Host Range from Unrelated Phages Using Appelmans Protocol: Interactions and Underlying Genetic Mechanisms**
    Dongeun Yong, Microbiotix Co., Ltd, South Korea

13. **Characterization TP-84 Bacteriophage Endolysin and Its Potential Application in Biotechnology**
    Piotr Skowron, University of Gdansk, Poland

14. ***Ex Vivo* Pig Lung as a New Cystic Fibrosis Model for the Study of the Phage Therapy Against *Pseudomonas Aeruginosa* Biofilm Infection**
    Marco Cafora, University of Milan, Italy

15. **Characterization of Kagunavirus-Resistant *Escherichia Coli* Resistant Mutants**
    Sheetal Patpatia, University of Helsinki, Finland