

Fundamentals of Basic and Applied Phage Biology

Monday May 12, 2025

Course Introduction

11:30-12:00 **Course Introduction**
Vasili Hauryliuk, Lund University, Sweden

12:00-12:45 **Lunch**

Lectures

Chairperson: **Vasili Hauryliuk, Lund University, Sweden**

13:00-13:45 **Bacteriophages - from the fundamentals of molecular biology to the BASEL collection**
Alexander Harms, Department of Health Sciences and Technology, ETH Zürich, Switzerland

13:45-14:00 **Questions and discussion**

Lab work: Enviromental phage Isolation

14:00-15:00 **Collection of environmental samples across the town**

15:00-15:30 **Preparation of the top agar and SM buffer and isolation of phages infecting *E. coli* K-12 O16(+) strain from the environmental samples (up to phage precipitation)**

15:30-15:45 **Coffee break**

15:45-17:00 **Preparation of the top agar and SM buffer and isolation of phages infecting *E. coli* K-12 O16(+) strain from the environmental samples (plating)**

Lectures

Chairperson: **Vasili Hauryliuk, Lund University, Sweden**

17:00-17:45 **Oh no. My gut microbiome got a virus infection. The role of the gut virome in health and disease – and how to study it**
Dennis Sandris Nielsen, University of Copenhagen

17:45-18:00 **Questions and discussion**

18:30 **Dinner**

Tuesday May 13, 2025

Lab work: Phage Isolation continues and Immunity Escaper isolation starts

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| 9:00-9:30 | Picking plaques from the environmental isolation plates and re-streaking (phage purification step Nr 1) |
| 9:30-11:00 | Isolation of immunity escape mutants: phage infections of resistant strains to generate escape plaques |

Lectures

Chairperson: Marcus Johansson, Lund University, Sweden

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| 11:00-11:45 | Phage-bacteria evolution experiments - a powerful tool to watch evolution in action Carolin Wendling, LMU Munich, Germany Questions and discussion |
| 11:45-12:00 | Lunch |
| 12:00-13:00 | Presentations by participating students (1-slide elevator pitch) |
| 13:00-14:00 | Resistance to phages and antibiotics: Challenges and possibilities Hanne Ingmer, University of Copenhagen, Denmark |
| 14:00-14:45 | Questions and discussion |
| 14:45-15:00 | |
| 15:00-15:15 | Break |
| 15:15-16:00 | Life After Infection: The Story of <i>Bacillus subtilis</i> Lysogens Anna Dragoš, University of Ljubljana, Slovenia |
| 16:00-16:15 | Questions and discussion |
| 16:15-17:00 | Bacteriophage isolation and engineering for clinical applications Antonia Sagona, University of Warwick, the UK |
| 17:00-17:15 | Questions and discussion |
| 18.30 | Dinner |

Wednesday May 14, 2025

Lab work: Single-plaque purification of environmental phages and escape mutants

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| 9:00-9:30 | Restreaking individual plaques of environmental isolates (purification step Nr 2) |
| 9:30-10:00 | Restreaking individual plaques of escape mutants (purification step Nr 1) |

Lectures

Chairperson: Ilya Terenin, Lund University, Sweden

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| 10:00-10:45 | Fighting <i>Pseudomonas</i> phages Stan J.J. Brouns, Delft University of Technology, Netherlands |
| 10:45-11:00 | Questions and discussion |
| 11:00-11:45 | Phage vs host interactions Rob Lavigne, University of Leuven, Belgium |
| 11:45-12:00 | Questions and discussion |
| 12:00-12:45 | Lunch |
| 13:00-13:45 | Belgian clinical phage application Rob Lavigne, University of Leuven, Belgium |
| 13:45-14:00 | Questions and discussion |
| 14:00-14:45 | Bacteriophages and plant-associated microbes Lars Hestbjerg Hansen, University of Copenhagen, Denmark |
| 14:45-15:00 | Questions and discussion |
| 15:00-15:15 | Break |
| 15:15-16:00 | The biology of CRISPR-Cas: adaptive immunity in prokaryotes Rafael Pinilla Redondo, University of Copenhagen, Denmark |
| 16:00-16:15 | Questions and discussion |
| 16:15-17:00 | Xenogeneic regulation of the bacterial transcription machinery Sivaramesh Wigneshweraraj, Imperial College London, the UK |
| 17:00-17:25 | Questions and discussion |
| 18.30 | Dinner |

Thursday May 15, 2025

Lab work: Preparation of phage working stock, Determination of phage titre, Confluence plates

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| 9:00-9:30 | Streaking the phage escape mutants into single plaques (purification step Nr 2) |
| 9:30-11:00 | Preparation of the phage lysate (working stock) from environmentally isolated phages, determination of phage titer for environmentally isolated phages |

Lectures

Chairperson: Karin Ernits, Lund University, Sweden

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| 12:00-12:45 | Lunch |
| 13:00-13:45 | Phage Therapy in Belgium Jean-Paul Pirnay, Laboratory for Molecular and Cellular Technology, Queen Astrid Military Hospital, Brussels, Belgium |
| 13:45-14:00 | Questions and discussion |
| 14:00-14:45 | Insane in the membrane, safe in the cell: the examples of Kiwa and Tmn Franklin Nobrega, University of Southampton |
| 14:45-15:00 | Questions and discussion |
| 15:00-15:15 | Break |
| 15:15-16:00 | A dive into the Argonaute world – Immunity through a wide variety of mechanisms Daan Swarts, Wageningen University, the Netherlands |
| 16:00-16:15 | Questions and discussion |
| 16:15-17:00 | Bioinformatic tools for visualising and comparing phage genomes Gemma Atkinson, Lund University, Sweden |
| 17:00-17:15 | Questions and discussion |
| 17:15-17:45 | Labs: looking at the plates |
| 18.30 | Dinner |

Friday May 16, 2023

Lab work: Preparation of phage escape mutant stocks, analysis of the results

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| 9:00-11:00 | Making the working stock of the escaper mutants, cleaning up the lab |
| 11:00-12:00 | Discussion and data analysis of both the actual data and theoretical aspects of the course (oral examination) Vasili Hauryliuk, Lund University, Sweden |
| 12:00-13:00 | Lunch |
| 13:00-13:45 | Course evaluation |
| 13.45 | Departure |