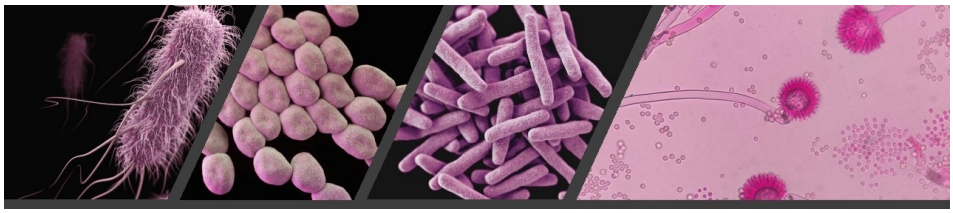

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Highly variable Receptor Binding Proteins in Tequatrovirus phages targeting Escherichia coli contribute to their host specificity

Thursday 11 September 2025 11:15 (15 minutes)

Bacteriophages, particularly those targeting E. coli, are known for their specificity. The narrow host ranges of four isolated Tevenvirinae phages targeting E. coli prompted us to investigate their Receptor Binding Proteins (RBP), which binds to bacterial receptors during adsorption. A better understanding of the factors determining the host range is crucial to select phages for treatments.

The serotypes of 53 strains isolated from bovine mastitis was determined and associated with the host range. To identify RBPs, the phage genomes were annotated and aligned with their 5 closest homologs in databases. Proteins with low nucleotide identities and located in the tail were further analyzed using phageDPO to detect depolymerase activity. Finally, the 3D structure of the selected proteins were predicted and the normalized RMSD scores were calculated.

The host range showed limited dependance on the serotype. In all phages, both long and short tail fibers were identified as RBPs and displayed depolymerase activity. Analyze of the 3D structure and the RMSD revealed a highly specific reversible attachment to the distal subunit of the long tail fiber, followed by a less specific irreversible attachment to the short tail fiber.

In conclusion, although phages from the same genus have the same located RBP's, mosaïcism drives their specificities. Further investigations should try to identify the bacterial receptors to predict the interaction between the RBP and its receptor.

Keywords

Bacteriophage, Escherichia coli, Host-specificity, Receptor-binding protein

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Professional Status of the submitter, who is also the speaker

PhD Student

Author: DIDERICH, Jacob (University of Liège)

Co-authors: Mr CORNET, Thomas (Dnalytics); Mr TOUSSAINT, Cédric (Dnalytics); Dr SAULMONT, Marc (Regional Animal Health and Identification Association (ARSIA)); Dr HELLEPUTTE, Thibault (Dnalytics); Prof. THIRY, Damien (University of Liège)

Presenter: DIDERICH, Jacob (University of Liège)

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