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Poster #26: The Z-Project: Expanding the Bacteriophage Toolbox

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The Z-project of the DFG Priority Programme SPP 2330 provides standardized methodologies and infrastructure for bacteriophage research, including isolation, characterization, host-range determination, and infection kinetics. Collaborative projects with SPP partners aim to expand phage diversity by isolating novel bacteriophages from diverse bacterial hosts. These efforts resulted in the isolation of eleven phages infecting rare actinomycetes, including three Lentzea phages (two new genera) and a temperate Actinomadura phage, vB_AmeS_Stercus, whose endolysin shows potential against pathogenic Actinomadura madurae and Actinomadura latina. Five phages infecting Kitasatospora and two infecting Salinispora are currently being characterized. Additionally, 44 phages were isolated from Citrobacter and Enterobacter strains, including five infecting strains from both genera. Citrobacter freundii phage Cfr-14, a lytic myovirus of the Pseudotevenvirus genus, exhibits cross-infectivity with Enterobacter cloacae complex strains and demonstrates high infection efficiency. Infection kinetics revealed strain-dependent lysis and rapid, incomplete adsorption, suggesting limited receptor availability or receptor saturation. Ongoing studies aim to identify the phage receptor and further define its host range within Enterobacterales. Furthermore, we are actively looking for phages targeting clinically relevant oral pathogens. Three Fusobacterium nucleatum strains (DSM 15643, DSM 20482, DSM 19679) and several Streptococcus spp have been selected for phage isolation. Preliminary LPS analysis of F. nucleatum revealed distinct O-antigen structures, and potential phage particles were detected by dynamic light scattering (ZetaSizer) in enrichment approaches using DSM 19679, indicating promising leads. Collectively, these efforts expand available bacteriophage diversity, provide new models for phage–host interaction studies, and strengthen SPP 2330 bioresources, including the phage-dedicated database PhageDive.

Reference #1

Reference #2

Reference #3

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