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Poster #48: Quantitative and Biophysical Analysis of Phage-Induced Outer Membrane Vesicles in Salmonella

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Bacterial outer membrane vesicles (OMVs) influence phage-host interactions by acting as decoys that adsorb bacteriophages and reduce the number of infectious particles. This study investigates the molecular and biophysical mechanisms underlying OMV formation in *Salmonella enterica* serovar Typhimurium during bacteriophage infection.

The podovirus P22 is used as a model phage to examine the vesicular response of S. Typhimurium under controlled infection conditions. OMVs and phage particles are characterized using laser-scattering techniques and confocal fluorescence microscopy. Differential fluorescent labelling is applied to distinguish bacterial vesicles from phage particles, quantify particle populations, and assess changes in vesicle abundance, size distribution, and spatial association during infection. *In vitro* phage-OMV interactions are compared with observations obtained from growing bacterial cultures exposed to P22.

Fluorescent labelling enables discrimination between OMV and phage populations and provides a basis for quantitative analysis of their interactions. Ongoing measurements will determine whether phage exposure alters OMV production and identify particle profiles associated with phage binding to the bacterial outer membrane. Integration of *in vitro* and *in vivo* data will reveal whether changes in vesicle formation correlate with phage challenge and reduced infective phage abundance.

OMVs are hypothesized to function as an inducible decoy mechanism that modulates phage populations and protects Salmonella cells during infection. This work will clarify the contribution of OMVs to phage infection in Gram-negative bacteria and improve understanding of phage-host dynamics. The findings may also inform bacteriophage therapy by identifying OMVs as factors that influence phage availability, treatment efficacy, and microbiome-level interactions.

Reference #1

Stephan, M. S., Broeker, N. K., Saragliadis, A., Roos, N., Linke, D., \textbackslash{}\& Barbirz, S. (2020

Reference #2

Reference #3

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