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Poster #108: Identification of a non-WTA bacteriophage receptor in Staphylococcus aureus

Phages are major vehicles for horizontal gene transfer in the human pathogen *Staphylococcus aureus* and promising agents for the treatment of antibiotic resistant infections. All currently known *Staphylococcus* phages use wall teichoic acid (WTA), a bacterial cell wall glycopolymer, as their receptor, such that loss of WTA can lead to phage escape. We found that *Silviavirus* Remus can bind and infect *S. aureus* even in the absence of WTA, albeit with decreased efficiency, indicating that the phage uses an additional receptor. Analysis on phage resistant mutants of *S. aureus* revealed disruptions of the cell-wall bound peptidoglycan transglycosylase IsaA. Clean deletion of IsaA in a WTA-negative background confirmed the extracellular enzyme as the additional *S. aureus Silviavirus* receptor, which was further confirmed via detection of direct binding between phage Remus and IsaA. These findings illuminate the molecular specificities of *S. aureus*-phage interactions with important implications for future phage therapies.

Reference #1

Reference #2

Reference #3

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