Biofilm Dormant cells S. lugdunensis

Characterisation of two novel bacteriophages specific against *Staphylococcus lugdunensis* biofilms

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Staphylococcus lugdunensis is a coagulase negative staphylococci (CoNS) and an emergent pathogenic biofilm-forming agent, responsible for causing a severe form of native valve endocarditis and infections of prosthetic heart valves, intravascular catheters, prosthetic joints, and ventriculoperitoneal shunts, among other hospital-acquired infections.

Biofilm formation is a virulence factor of *S. lugdunensis*. Inside biofilms, dormant cells can survive antibiotic therapy, due to their low metabolic activity. The survival of these bacterial cells to antibiotic treatments, results in biofilm relapse and consequent infectious illness recalcitrance.

Bacteriophages (phages) are an antimicrobial potential that can be used as alternative or in a complement of traditional methods. However, to data, there are no reports of *S. lugdunensis* phages.

The main goal of this study was the isolation and characterization of new *S. lugdunensis* phages and the evaluation of their activity against biofilms and dormant cells to select promising candidates for therapy.

The two isolated *S. lugdunensis* phages (Lud1 and Lud2) exhibited good antimicrobial properties against *S. lugdunensis* I439 and U867 biofilms. Phage Lud2 showed the rare ability to infect dormant bacteria. In addition, both phages characterization demonstrated that both exhibited a broad lytic spectrum, high stability at different pH and temperature conditions and potential safety, as genome analysis did not identify any virulence-associated nor antibiotic resistance genes.

As far as we know, these are the first well-characterized *S. lugdunensis* phages. Overall, both phages demonstrated that they can be promising agents to combat infections caused by this important novel pathogen.