203 Efficacy studies of phage phiIBB-Sep1 against *S. epidermidis* cells under different metabolic states

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Staphylococcus epidermidis has become one of the most predominant causes of nosocomial infections. Although, *S. epidermidis* infections only rarely develop into life-threatening diseases, they are very frequent and difficult to treat due to the ability of this bacterium to adhere to the surfaces of indwelling medical devices and form biofilms. When *S. epidermidis* cells are in a biofilm they are more resistant to antibiotics and to the immune system. The understanding of the importance of biofilm formation on *S. epidermidis* pathogenesis can lead to the development of effective strategies for biofilm control. Bacteriophages (phages) are virus that infect bacteria and are the most abundant organisms on Earth. They are generally very efficient antibacterial agents and possess many advantages over antibiotics. The use of phages to eradicate biofilms can be seen as a potentially valuable approach. Our aim is to search for virulent phages with broad host range for *S. epidermidis* biofilm therapy. Using raw effluents from a wastewater treatment plant we were able to isolate 5 phages. Phage phiIBB-Sep1 was further selected for efficacy studies due to its high lytic activity against 40 clinical *S. epidermidis* isolates with different genetic backgrounds. Morphologic and genetic characterization is in progress. Efficacy studies using a MOI of 1 show that phiIBB-Sep1 causes a 6 Log CFU/ml reduction of the cell titre in < 2h and < 4h for some of the clinical strains at exponential and stationary phase, respectively. In 24h biofilms, the phage is

able to reduce 1 Log CFU/ml, being even more efficient when the biofilm is previously disrupted. To better understand the difference of these efficiencies flow cytometry assays were performed, essentially for being a more sensitive technique, allowing viable but not cultivable (VBNC) cell counts. Besides the cell counts being confirmed with SYBR Green/Propidium iodide (Live/Dead) staining, it was observed that this phage kill cells under different metabolic states from the biofilm. These are promising results, since the broad host range phage phiIBB-Se1 presents ability to control *S. epidermidis* under different metabolic states, suggesting that biofilm matrix is the only obstacle to achieve a better efficiency.
Keywords: *S. epidermidis* biofilms, antimicrobial resistance, phage therapy.