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Efficacy studies of a *S. epidermidis* bacteriophage against stationary and biofilm cells

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Staphylococcus epidermidis has recently become known as a common cause of nosocomial infections, predominantly in patients with indwelling medical devices. 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. A biofilm is a three-dimensional microbial structure consisting of a multicellular community composed of cells embedded in a matrix composed, at least partially, of material synthesized by the sessile cells in the community. When *S. epidermidis* cells are in a biofilm they are more resistant to antibiotics and to the immune system. The importance of biofilms in the pathogenesis of the *S. epidermidis* infections is becoming more understandable, consequently several studies are needed, in order to develop effective methods for biofilm control. The use of (bacterio)phages to eradicate biofilms has been considered a potentially valuable approach. 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. Our aim is to search for virulent phages with broad host range for *S. epidermidis* biofilm therapy. Using wastewater treatment plants raw effluents we were able to isolate 5 phages. Their activity against 40 clinical *S. epidermidis* isolates with different genetic profiles was screened and was found to be different ranging from 46% to 95% of positive results. Further morphologic and genetic characterization of these isolated phages is now being performed. Preliminary results show that, one of the phages (phiIBB-Se1), using a MOI of 1 is able to cause a 6 Log CFU/ml reduction of the cell titre in <2h for some of the clinical strains at exponential phase and in <4h for stationary phase cells. This phage has also the capacity of reducing by up to 2 Log CFU/ml 24h biofilm cells. These are promising results, since phage phiIBB-Se1 presents a broad host range and ability to control *S. epidermidis* under different metabolic states. Ongoing studies are being performed with 4 other phages, with the purpose of developing a phage cocktail to be used against *S. epidermidis* biofilm infections.

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