Free Papers B

[O23] IN VITRO EVALUATION OF LYTIC BACTERIOPHAGE ACTIVITY AGAINST METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS (MRSA) BIOFILM

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Aim: To evaluate antimicrobial activity of Sb-1 and Pyo-bacteriophage in preventing and eradicating MRSA biofilm in vitro using isothermal microcalorimetry.

Method: Two S. aureus specific bacteriophages, Sb-1 and Pyo-bacteriophage cocktail, were tested against S. aureus MRSA (ATCC 43300). MRSA biofilm was formed on porous glass beads and incubated for 24 h at 37° C in BHI, washed 3 times and exposed to different concentrations of bacteriophages. For biofilm prevention, MRSA ($5x10^6$ CFUs/ml) was incubated with different phage titers. Glass beads were placed in the calorimeter and heat flow (µW) and total heat (J) were measured in real-time for 48h (eradication) or 24h (prevention).

Results: Both tested bacteriophages rapidly inhibited the heat production of MRSA biofilm in a concentration-dependent manner during the first 24h, as shown for Sb-1 in Figure 1 A. After 48h-exposition all the titers of bacteriophages show a strong reduction of biofilm viability (Figure 1B). MRSA biofilm was eradicate only by co-incubation with the highest Sb-1 phage titer (10^7 PFUs/ml) (Figure 1A-B). In prevention experiments, significant reduction of MRSA heat production was already achieved at a lower titer (10^2 PFUs/ml) of both Sb-1 and Pyo-bacteriophage and in the presence of 10^4 PFUs/ml the heat production was completely abolished.

Conclusions: Sb-1 and Pyo-bacteriophage are promising phages for treatment MRSA biofilms, as well as for preventing device colonization and controlling biofilms on surface. Their potential activity combined with antibiotics should be further investigated.

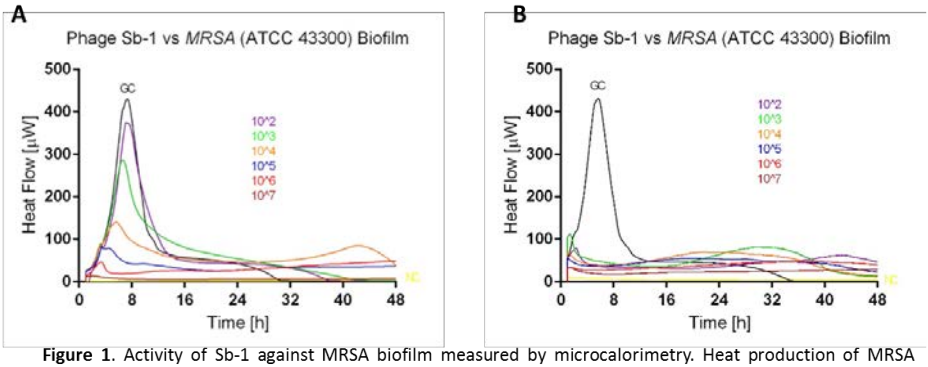

Figure 1. Activity of Sb-1 against MRSA biofilm measured by microcalorimetry. Heat production of MRSA biofilm co-incubated (A) and after 24h exposition (B) to different Sb-1 titers.