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# Poster #83: Multicellular defense in Streptomyces: a collective shield against phage predation

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Bacteriophages predation exerts strong selective pressure on bacteria, driving the evolution of diverse antiphage defense systems. While most characterized defense systems act intracellularly post-infection1, its critical to explore defense strategies that function prior to infection considering, that phage-host interactions occur within complex natural environments. Such pre-infection mechanisms may elucidate how bacterial populations collectively respond to phage predation at the community level.

*Streptomyces* characterized by a complex developmental lifestyle2, and prolific production of specialized metabolites and proteins some of which possess antiphage properties3, provide a compelling model. We hypothesize that these multicellular bacteria evolved strategies to inactivate free phages either pre-infection or after bursts of infections. Our findings demonstrate, that a burst of phage infection in a *Streptomyces* culture was frequently followed by regrowth of phage-resistant mycelium coinciding with a significant drop in the titer of infectious phage particles. This regrowth was accompanied by a decrease in the pH of the culture supernatant and elevated levels of organic acids. Furthermore, screening of spent media revealed the presence of secreted bioactive compounds inactivating extracellular phage particles, with a notable proteolytic activity that degrades phage particles.

Notably, the antiphage potential of this repertoire has only been recently recognized; with phage infection also identified as an elicitor of specialized metabolism. Taken together, these findings highlight the multifaceted defense strategies employed by *Streptomyces* to protect the community.

## Reference #1

1. Georjon, H., \textbackslash{}\& Bernheim, A. (2023). The highly diverse antiphage defence systems of ba

## Reference #2

2. Luthe, T., Kever, L., Hänsch, S., Hardy, A., Tschowri, N., Weidtkamp-Peters, S., \textbackslash{}\& Fru

## Reference #3

3. Hardy, A., Kever, L., \textbackslash{}\& Frunzke, J. (2023). Antiphage small molecules produced by bact

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