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Poster #41: pDolos: A plasmid-based phage satellite of the Shewanella inovirus Dolos

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Phages are parasites that depend on their bacterial hosts for replication. Interestingly, these parasites can be hijacked by mobile genetic elements known as phage satellites. Phage satellites require the presence of a helper phage for lateral gene transfer.
Here, we present a Shewanella oneidensis MR-1 plasmid, named pDolos, which functions as a phage satellite for the inovirus Dolos. pDolos has a severe effect on its helper phage: The presence of pDolos decreases the number of Dolos plaque forming units by a factor of approximately 10, and furthermore, the number of phage satellite particles exceeds the number of phage particles by a factor of 250. qPCR analysis revealed that the reproduction rate of both Dolos and pDolos change during an infection. The reproduction of Dolos starts high but decreases over time, while pDolos reproduction peaks at later stages of the infection.
To determine the effect of the phage and its phage satellite on the host, we performed a proteomic analysis. Furthermore, pDolos appears to reduce the abundance of the replication protein from its helper phage at later stages of the infection, indicating a late takeover by the satellite. Further studies on the interactions between Dolos, pDolos and their host MR-1 suggest suppressed induction of the Prophage LambdaSo by phage Dolos. In addition, the presence of pDolos reduces the number of structural proteins from the Shewanella prophage MuSo1. Thus, S. oneidensis, Dolos and pDolos form an intricate ménage-à-trois balanced between mutual benefits and drawbacks.

Reference #1

Reference #2

Reference #3

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