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2023 SEA Symposium Abstract

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Not Like Other Phage - Budski - a Diverse and Puzzling Gordonia Bacteriophage

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Bacteriophages (phages) are viruses that infect and replicate within a bacterial cell. Phages can kill a bacterial cell through cell lysis and therefore have potential as a treatment for antibiotic resistant bacterial infections. With approximately 2.8 million antibiotic-resistant infections a year in the US according to the CDC (1), finding new ways to eradicate these infections is of ultimate importance. Studying the diversity of phages and how they interact with their bacterial hosts will lead to a greater understanding of how they can be used for medical interventions such as Phage Therapy. Phages have also been used to treat environmental problems. The bacterium Gordonia terrae is known to cause issues with foaming in wastewater treatment plants, which has been remedied using Gordonia-specific phage treatments. The novel bacteriophage, Budski, was isolated from a soil sample in Hampden, Maine, USA, using enriched isolation and the bacterial host Gordonia terrae 3612. Electron micrographs of the Budski virion shows an icosahedral head and a long flexible, non-contractile tail typical of the Siphoviridae family morphology. DNA sequencing of the phage genome revealed that Budski belongs to cluster DN. Its genome is 56,559 bp long with a 63% GC content. It encodes 106 protein-coding genes including 10 orphams and a WhiB transcriptional regulator. The genome region between the lysis cassette and immunity repressor encodes multiple membrane proteins which potentially could impact bacterial fitness. Functions were predicted for only half of the genes which hold the potential for new gene functions that could be useful in medical and biotechnology applications.