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2022 SEA Symposium Abstract

Northern State University

Aberdeen SD

Corresponding Faculty Member: Jon Mitchell (jon.mitchell@northern.edu)

Bacteriophage Isolation against Actinomycete Gordonia rubripertincta and Bioinformatic Characterization of the Bacteriophages MossRose and Eliott.

Megan L Fastenau, Jessica E Stockert, Jon C Mitchell

Bacteriophages are a type of virus that use bacterial cells as their host. The number of antibiotic-resistant bacterial strains is ever increasing and the choices for effective treatments using traditional chemical antibiotic compounds limited. Since bacteriophages infect only prokaryotic cells (bacteria) and not eukaryotic cells, studies into whether using bacteriophages as a tool towards treating these infections may be extremely promising. Equally as important as identifying viruses that infect and lyse bacterial cells is an understanding of the mechanisms associated with host/virus interactions. The purpose of our project was to isolate and purify novel bacteriophages and then annotate its genome. We attempted to isolate phages from a variety of environmental samples focusing on the Actinobacterial host, Gordonia rubripertincta NRRL B-16540. We used both direct and enriched protocols to isolate bacteriophage. Serial dilutions, ‘pick-n-jiggle/pick-a-plaque’, and spot-plating techniques were employed resulting in pure viral colonies from which genomic DNA could be isolated. Genomic DNA was mailed to the Pittsburgh Bacteriophage Institute (University of Pittsburgh, PA) for Illumina sequencing. Completed bioinformatic analysis will be completed later this spring, 2022; however, preliminary annotation of both viruses have been performed using several programs including PECAAN, DNA Master, Phamerator, Starterator, NCBI BLAST, and HHPred. Initial phylogenetic analysis positions virus MossRose (~61,000 bp) within the DR cluster and Eliott (~46,000 bp) within the CT cluster of Actinomycete bacteriophages. Studies surrounding host-virus range specificity and viral titers have also been initiated amongst several Gordonia species (G. terrae, G. rubripertincta, G. westfalica , G. lacuna) as well as Actinomycete, biofilm-producing, pathogenic, Nocardia asteroides. It is anticipated that our findings will help contribute toward the further understanding of bacteriophages and their host specificities.