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9th Annual SEA-PHAGES Symposium Abstract

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A Phage Tale: Isolation and Characterization of a novel G1 sub-cluster phage Octavious Rex

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Mycobacteriophage Octavious Rex was one of sixteen novel phages isolated by undergraduates at Mount Saint Mary College during the fall 2016 semester. Identified as a result of direct isolation, Octavious Rex was purified to homogeneity after three rounds of full plate plaque assays. Transmission Electron Microscopy (TEM) revealed that Octavious Rex was a member of the siphoviridae family. DNA isolated from the high titer lysates was submitted to the University of Pittsburgh for Illumina sequencing. Sequencing results determined the genome length of Octavious Rex to be 41880 base pairs with a GC content of 66.6%. This phage was classified as a G cluster bacteriophage. Furthermore, it was also determined to be a member of the small sub-cluster G1. As part of the spring 2017 semester, undergraduates successfully annotated the viral genome of Octavious Rex. Bioinformatic programs including DNA Master, Gene Mark, Phamerator and Starterator were used to achieve this goal. Where applicable, gene functions were assigned using HHpred and NCBI BLASTX programs. Previously identified G1 phages have been characterized as lysogens. Annotation of Octavious Rex revealed the presence of immunity repressor and integrase genes, previously found to be associated with lysogeny. Though identified as a lytic phage, we are currently investigating the potential lysogenic life cycle of Octavious Rex. Previous studies by the Turner lab have shown changes in thermotolerance of phages upon exposure to non-ideal temperatures. We are currently investigating if similar changes occur in Octavious Rex upon exposure to heat shock. These studies will advance the knowledge and understanding of G1 subcluster mycobacteriophages.