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2024 SEA Faculty Meeting Abstract

Colorado State University-Pueblo

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Lysogen Generation and Verification Through a PCR-Based Analysis of 3FH Phage in Arthrobacter globiformis

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A bacteriophage can be described as a virus that infects bacteria. Phage follow two different life cycles known as the lytic and lysogenic life cycle. The lytic cycle involves the injection of DNA into the bacterial host in order to utilize its machinery to assemble more phage, this causes the cell to burst and ultimately bacterial death. While the lysogenic cycle also involves the injection of phage DNA, here it becomes integrated into the host DNA or remains as an extrachromosomal episome and does not cause cell death. This project aims to investigate whether phages from the clade FH, who infect the bacteria Arthrobacter globiformis B2880 are able to carry out the lysogenic cycle. Genomic analysis has revealed the presence of parB genes indicative of an extrachromosomal episome. This is relevant because the FH clade is closely related to clades with only lytic phage. In addition, we aim to determine if the lysogenic cycle can provide immunity for bacteria to potentially evade infection in FH phage. Two phages from the FH clade known as Prairie and Klevey have been determined to form lysogens through evidence of PCR. Also, a new lysogen of A. globiformis has been generated with the phage Lilmac1015. Lilmac1015 is still currently being studied. Lysogens of all these phage have proven to be unstable but we have successfully cultured a Lilmac1015 lysogen in broth culture by eliminating calcium and dextrose. Future studies aim to determine if these metabolites are necessary for phage infection and if not, immunological studies can be conducted.