CONSIDER FOR TALK

10th Annual SEA Symposium Abstract

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Phalling off of Clifton

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The SEA-PHAGES program is a full-year course that focuses on characterizing different phages and annotating their genomes to identify unique genes and their functions. The bacteriophage Clifton was isolated from a soil sample from Clifton, New Jersey, and infected the bacterium *Mycobacterium smegmatis*. Through serial dilutions, Clifton was isolated and found to form clear plaques. Clifton was found to be a siphoviridae and F1 cluster phage through electron microscopy and genomic sequencing. Afterwards, Clifton was annotated using bioinformatics tools, such as DNA Master, Phamerator, GeneMark, etc., to determine the location and function of each gene by comparing Clifton’s genes to the genes of previously annotated phages. GP79 in Clifton was interesting because it had substantial coding potential and filled a large gap, but it was an orpham. Therefore, there is not a lot of information about this gene and needs to be studied more to find its function. Similarly, we inserted a gene not called by Glimmer or Genemark, that aligns 100% with a current orpham in Pippy, GP47. Integrase and immunity repressor genes were indicative that Clifton was a temperate phage, despite its clear plaque morphology. Integrase allows Clifton to recognize specific sites in the host’s genome to insert viral DNA and the immunity repressor allows Clifton to stay in the lysogenic cycle. The integrase and immunity repressor genes can also provide information about how phages remain undetected in their hosts and how these functions could be repressed. This information may be applicable for treating dormant viruses such as HIV or Herpes. Another interesting gene was WhiB family transcription factor because it allows Clifton to alter its host’s cell wall to prevent other bacteriophages from infecting that same host. This can be useful in affecting the pathogenesis of bacteria, as seen in other bacteria such as *Corynebacterium diphtheriae* or *Vibrio cholera*. Studying Clifton’s genome may be useful in medicine because it can provide information and preventative treatments for human pathogens.