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8th Annual SEA-PHAGES Symposium Abstract

Doane University

Crete NE

Corresponding Faculty Member: Erin Doyle (erin.doyle@doane.edu)



Nadezdha Hughes



Connor Long

Isolation and genome annotation of mycobacteriophage Jabith, a cluster A11 phage which increases biofilm growth of Mycobacterium smegmatis

Nadezdha Hughes, Connor Long, AJ Allen, Kaycee Bartels, Jared Bithell, Dalton Fellows, Jared Foote, Barbara J Clement, Erin L Doyle

Biofilms are communities of bacteria and other microorganisms that stick to a surface and to each other by means of a self-produced extracellular matrix composed of proteins, polysaccharides, and extracellular DNA. Because biofilms can form on medical devices and implants and they are often antibiotic resistant, they represent a significant problem in the medical field. Therefore, students at Doane College attempted to isolate mycobacteriophage and test their ability to lyse *Mycobacterium smegmatis* when grown in a biofilm. Twenty-two mycobacteriophage were isolated from soil samples taken on Doane’s campus in August 2015 using *M. smegmatis* as a host. The phage were tested for their effects on *M. smegmatis* biofilms grown in 96-well plates using a crystal violet assay. Overall, two phage significantly reduced biofilm growth (p< 0.05), and six actually increased biofilm growth (p <0.05). An additional 5 phages were isolated from soil samples taken in January 2016 and tested in the same assay. Of these, two significantly reduced biofilm growth (p<0,05); the other phage had inconclusive results due to low titers.   
  
Mycobacteriophage Jabith was chosen for genome sequencing and annotation because of its unexpected effect of increasing biofilm growth. Plaque morphology and TEM imaging confirmed that Jabith is a temperate siphoviridae. Sequence analysis placed it in cluster A11, where it most closely matches the annotated genome sequence of mycobacteriophage Mulciber. Jabith’s genome is 52.7kb in size, with ninety protein coding genes. In future work, we hope to annotate and compare genome sequences of other phage tested on biofilms to identify genetic elements that may be important for the ability to lyse *Mycobacterium smegmatis* growing in a biofilm.