CONSIDER FOR TALK

7th Annual SEA-PHAGES Symposium Abstract

Hampden-Sydney College

Hampden-Sydney VA

Corresponding Faculty Member: Mike Wolyniak (mwolyniak@hsc.edu)



Joshua T Dimmick



J. Taylor Meinhardt

Archie14, a Bacillus thuringiensis bacteriophage with evidence of passage through multiple bacterial hosts

Joshua T Dimmick, J. Taylor Meinhardt, Stephen L Woodall, Michael J Wolyniak

As part of the SEA-PHAGES curriculum at Hampden-Sydney College, a men's liberal arts college in central Virginia, the Molecular and Cellular Biology class isolated and characterized bacteriophages from the local environment using *Bacillus thuringiensis* as a host. Direct plating of one environmental sample yielded Archie14, a bacteriophage that appeared to show an especially strong lytic capacity. Archie14 shows strong homology to subcluster C1 *Bacillus* bacteriophages and is 162,099 basepairs long with 298 ORFs. Of particular interest in the genome of Archie14 is the presence of several bacterial ORFs that would seemingly be dispensable for viral replication. Several *Bacillus* ORFS, including dihydrofolate reductase, adenylate kinase, and thymidylate synthase, are found clustered together in Archie14, suggesting acquisition from *Bacillus* at some point during the evolutionary history of the phage but leaving in question if the acquisition benefits the ability of the virus to be replicated or is merely coincidental. Intriguingly, we also detected a sigF-like RNA polymerase sigma factor of greater similarity to *Clostridium* bacterial species than *Bacillus*. In considering the evolution of Archie14, this suggests that the virus may have passed through *Clostridium* hosts on its way to adaptation to its current status as a *Bacillus* bacteriophage. Current work is exploring the host range of Archie14 to follow up on which bacterial hosts can support its propagation.