CONSIDER FOR TALK

7th Annual SEA-PHAGES Symposium Abstract

University of North Texas

Denton TX

Corresponding Faculty Member: Lee Hughes (lhughes@unt.edu)



Mark Mehany

Isolation and Annotation of a group of similar Streptomyces phages: Excalibur, Danzina, Hydra, Izzy and Lannister.

Mark Mehany, Tunazzina Ahmed, Danial Ali, Guadalupe Alvarez, Gretchen Clark, Elizabeth Cox, Isabel Delwel, Cynthia Garcia, Frederic Johnson, Connor Kennedy, Aaron Lara, Jessi Narvaez, Naomi Niyah, Brian Okundaye, Sekinat Quadri, Jazmine Rosado, Owen Saenz, Brandt Smith, Orooj Syed, Dat Tran, Katelyn Williamson, Jennifer Zinanti, Swapan Bhuiyan, Sonya R Layton, Robert C Benjamin, Lee E Hughes

*Streptomyces* are genus of filamentous bacteria. They are complex, gram-positive aerobic bacteria that exhibit a complex form. Certain *Streptomyces* are used in antifungals, antivirals, immunosuppressants, and especially antibiotics. In this research, we have used *Streptomyces venezuelae* and *Streptomyces griseus* as hosts bacteria for our isolated phages. *Streptomyces griseus* is commonly found in soil and resembles a fungi in shape. It is a well-known producer of antibiotic. *Streptomyces venezuelae* can be found in the soil and above ground as aerial hyphae. The first antibiotic to be manufactured on a mass scale was derived from *Streptomyces venezuelae*. The large group of similar phages we studied during the annotations portions of the semester include: Excalibur, Hydra, Lannister, Danzina, and Izzy. There are many similarities between these genomes along with a few differences.
Lannister, Izzy, Excalibur, Hydra and Danzina were isolated from enriched soil samples. These phages tend to have typical synteny of structural bacteriophage genes. All these phages contain a 3’ sticky overhang that is 11 base pairs long. Specifically, Hydra, Excalibur, and Izzy have the same 3’ sticky overhang consisting of CGGGCAGTGAT while Danzina and Lannister have a CGGCCAGTGAT 3’ sticky overhang. All the phages are roughly 50,000 base pairs long, and the genomes contain around 65% of G and C’s. Hydra and Excalibur have the most similar genomes based on the Phamerator maps, while Izzy, Lannister and Danzina exhibit more variation.
The phage Lannister was collected in Texas. Its genome is around 50,165 base pairs long, consists of 65.7% G and C’s and potentially codes for at least 73 genes. The phage Izzy was collected in Texas. The GC content of this genome is around 65.9% and is 50,113 base pairs long. The phage Excalibur was collected in Texas. The genome is 49,949 base pairs long and contains 66.2% GC content. The phage Hydra was collected in Texas. It is 50,727 base pairs long and has GC content of 66.2%. The phage Danzina was collected in Texas. It is 50,773 base pairs long with a 65.7% content of GC. All of the phages contain a gene in the middle of the DNA that is responsible for tape measure and a gene towards the end of the DNA that has a function of DNA Polymerase II. Many of the reads and BLASTS of these phages relate to Zemlya, Sujidade, and Lika. It is also worthy to note that Danzina has an immunity repressor gene that could possibly indicate that this is a temperate phage. Because the phages Lannister, Izzy, Excalibur, Hydra and Danzina are in a closely related group, they are similar and exhibit comparable functions, shapes and characteristics. In this research, the phages Excalibur, Danzina, Hydra, Izzy and Lannister were isolated from *Streptomyces venezuelae* or *Streptomyces griseus* bacteria, sequenced, annotated, and finally compared to further expand the research of bacteriophages in *Streptomyces*.