DO NOT CONSIDER FOR TALK

2025 SEA Symposium Abstract

LeTourneau University

Longview TX

Corresponding Faculty Member: Fred Baliraine (fredbaliraine@letu.edu)



Sophia Merjil

From a Turmeric Garden to Genome Characterization: The Story of Phage Therapy Candidate Mycobacterium phage Jezreel

Sophia Merjil, Barnabas Y Baliraine, Natalie E Sullivan, Thomas T Lackman, Reagan L Chastain, Josh D McLoud, Frederick N Baliraine

Isolation of naturally occurring bacteria-infecting viruses (bacteriophages) is important to treat infections that won’t respond to antibiotics or in cases where patients are allergic to antibiotics. Mycobacterium phage Jezreel was isolated from a soil sample collected on August 26, 2024, from a turmeric garden near a pond in Longview, Texas (32.52199° N, 94.6983° W). Using the enriched method, the soil sample was mixed with Middlebrook 7H9 broth and *Mycobacterium smegmatis* mc2 155 and incubated at 37°C for 4 days with shaking at 210 rpm, then centrifuged and 0.22 µm-filtered. Phage presence was confirmed using a spot test. Phage purification was done through 3 rounds of 10-fold serial dilutions and plating. Phage Jezreel’s plaques were clear and tiny (average diameter 0.89 mm; range 0.5-1.1 mm; n=15). The lysate titer was 1.10 x1011 PFU/mL. The lysate was used for DNA extraction, TEM imaging preparation, and archiving. Jezreel displayed a Myoviridae morphotype. Genome sequencing was done using Illumina MiSeq sequencing with ~3804 shotgun coverage. Annotation was done using various software and databases, including DNA Master, PhagesDB, HHPred, Phamerator, Starterator, GeneMark, DeepTMHMM, and ARAGORN. Sequence data showed Jezreel subcluster C1. Its genome size was 155,660 bp with a circularly permuted end and 64.7% G+C content. Preliminary data predicts 229 putative protein-coding genes and 33 tRNAs and no evidence of the integrase, immunity repressor, and excise genes that are associated with the lysogenic life cycle. Given that it is a lytic phage, Jezreel has great potential for being used in phage therapy.