

## Abstract

Bacteriophages, simply known as phages, are viruses that infect and replicate within host cells. Microbacterium foliorum was used as the bacterial host during the Bio 1110 class last semester at Carthage College. Various samples of soil were collected all with the same goal to isolate and purify a single phage using a series of dilution assays. Some of these phages were able to produce enough DNA for analysis, including our phage, Blage, a member of the EA1 cluster. The dilution assays resulted in Blage forming hazy plaques-typically a characteristic of a temperate phage. Through DNA analysis, Blage was revealed to be lytic, and further investigation using Electron Microscopy revealed Blage to show siphoviridae morphology. The primary goal of the research this semester has been to analyze and annotate the genome of Blage. This research was done using the SEA PHAGES programs *Phamerator* and *PECAAN*, which compile data using multiple algorithms such as *HHPRED* and *NCBI Blast* to allow us to compare previously annotated phages and their genomes alongside Blage. Further research using additional bioinformatic tools and bench assays are being performed.

# Introduction

A bacteriophage is a virus that infects bacterial cells. The anatomy of a phage is relatively simple, with two major components. The capsid head, which contains genetic material, and the tail, which is used to penetrate the host cell and inject the phage genome (Poxleitner et al., 2018)





# Siphoviridae Morphology

Blage\_Draft (EA1)



# **Blage Lysogen Isolation**





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## **Results and Discussion**

• Blage is a lytic phage, meaning the plaques should be clear. However, Blage's plaques were hazy, displaying characteristics of a temperate phage.

- Blage has no integrase gene, the gene responsible for lysogeny.
- A patch test produced three possible lysogens.

• When the Blage lysate was plated on a lawn of *M. folio* (control) and a lawn of Blage lysogen, the plaques on the lysogen were significantly less visible than the control.

• The Blage lysogen appears to have immunity against cluster EA1 phages.

## **Future Research**

• Investigate phylogenetic differences of specific genes amongst different clusters

• Search for newly acquired genes

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### References

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