

Isolation of New Bacteriophage from Agricultural Sources

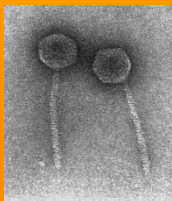
Heather Beck and Ray A. Larsen

Department of Biological Sciences, Bowling Green State University, Bowling Green, OH 43402

hbeck@bgnnet.bgsu.edu

Abstract

The purpose of this project was to isolate bacteriophage from coliform bacteria in the environment. Fecal samples were collected from a variety of farm animals and evaluated for the presence of bacteriophage. For the present study, a set of phage isolated from horses are considered. These phage were plated on a variety of *Escherichia coli* strains to identify components of host specificity. One phage that could not grow on laboratory strains of *E. coli* was maintained on the original horse-borne coliform from which it was isolated. Analysis of 16S rRNA sequences indicated this host was also an *E. coli* strain. This set of phage could be divided into four different classes based on plaque morphology, apparent use of FhuA protein as a receptor, and dependence upon the TonB energy transduction system.



Introduction

A virus that infects bacteria is known as a bacteriophage. Any place that bacteria occur is likely to be phage as well, often at 10 times the amount of phage as bacteria.

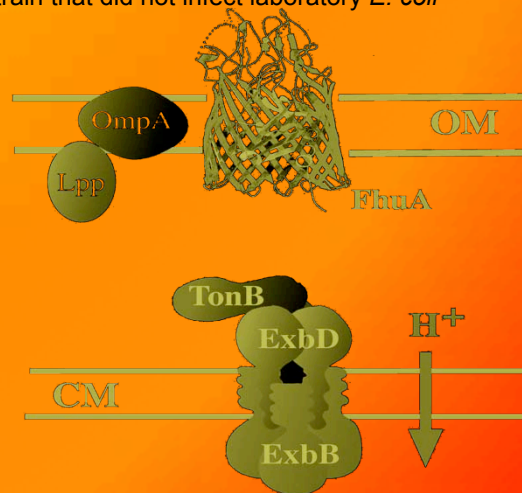
While some have been subject to rigorous study, most phage remain unexamined. Phage are of interest in this study because they are thought to be a cause of genetic transfer between bacteria. New phage were isolated from coliform bacteria so they could be tested against known phage from laboratory strains of coliform bacteria for genetic transfer in future studies.

Results

Twelve different phage were independently isolated using six natural coliform isolates from horses.

Four different classes of phage were isolated:

- TonB and FhuA dependent strains
- TonB independent strains
- TonB dependent and FhuA independent strains
- Strain that did not infect laboratory *E. coli*



	HR6B	HR1C	HR4C	HR1E	HR7C	HL4A	HL5B	HR2B	WP8A	HL3A	CH1D	H4
AB1515	+	+	+	-	+	+	+	+	+	+	-	-
A592	+	+	+	-	+	+	+	+	+	+	-	-
W3110	+	+	+	+	+	+	+	+	+	+	-	+
MH2	-	-	-	-	-	-	-	-	-	-	+	-
MH3	-	-	-	+	-	-	-	-	-	-	-	-
KP1344	+	-	-	-	+	-	+	+	-	-	-	-

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MH2 and MH3 are two strains of bacteria that were present in the horse samples that were found to be hosts for certain phage. Analysis of 16S rRNA sequences indicated that MH2 was an *E. coli* strain and MH3 was an uncultured *Shigella* strain.

	NK370 (λ)	Φ80	H4
W3350 (Φ80 Lysogen)	+	+	+
K12 (λ lysogen)	-	+	+
W3110	+	+	+
RA1038	+	+	+
KP1344	+	-	-

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H4 phage plaques on laboratory *E. coli* strain, W3110

Discussion

We have isolated a distinct set of phage that differentially interact with the TonB system, similar to more well-studied phage. Characterization of these phage will provide insights to the function of the TonB system and the means by which a variety of bacteriophage pirate this system to exploit coliform bacteria. Further, comparisons will identify regions shared and unique amongst these phage, providing markers to track gene flow amongst phage and their hosts.

Acknowledgements

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