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Discovery and analysis of Subcluter DE3 phage RoadKill from a wastewater treatment facility

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Bacteriophages are useful tools in a variety of biomedical and molecular research studies, including efforts to combat antibiotic resistance and understand both DNA recombination and protein function. A novel bacteriophage able to infect Gordonia terrae was isolated from a wastewater treatment facility in Farmington, Maine and named Roadkill. Roadkill is a siphoviridae phage that produced clear, round plaques and is member of Subcluster DE3. RoadKill’s genome is circularly permuted and consists of 55,939 bp and 84 genes. Similar to other Cluster DE phages, the RoadKill genome does not contain any well-established genes associated with lysogeny, and may only exhibit lytic growth. RoadKill is highly similar to other DE3 phages (96-97% identity) but also exhibits some novel recombination, including after the terminase gene and between genes 65 and 68. These four genes were possibly inserted into a protein coding sequence with high similarity to orpham gene 69 in phage Dexdert. The central region of this protein in Dexdert (residues 104-141) exhibits similarity to the end of orpham gp69 in RoadKill. In addition, the same residue (104) and terminal end of the protein is associated with high similarity to orpham gp73 in phage GTE6. Overall, this genomic location in the DE3 phage genes may be associated with high rates of insertion and may require further investigation.