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A Spirited Search for the Elusive Tail Tube Protein Gene in Subcluster C1 Myoviridae Bacteriophages

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*Myoviridae* bacteriophages have rigid contractile tails with a sheath wrapped around a central tail tube that ends with a pointed tail tip, along with a tip-stabilizing base plate in some cases. The length of the phage tail is determined by the tape measure protein (TMP) which controls tail tube polymerization. Upon host recognition, the sheath contracts in a syringe-like manner to insert the tail tip into the host cell and inject the phage DNA into the cell’s cytoplasm. The Official SEA-PHAGES Function List (OFL) affirms that tail tube proteins are found in contractile tailed phages such as *Arthrobacter* phage RosiePosie of cluster AR. However, tail tube proteins have hitherto not been identified in subcluster C1 phages, though it can be assumed that they are needed for their contractile tail systems to work. These phages have several minor tail proteins which are expected to facilitate tail assembly by serving as scaffolds for the tail tube proteins. Moreover, there are many hypothetical proteins (HPs) in C1 phages. To determine whether these phages indeed have tail tube proteins or whether there is another specific functional assignment for other contractile tail system proteins that are not currently listed in the OFL, HPs and some currently called minor tail proteins around the TMP were analyzed. Comparisons were made across a representative sample of 11 subcluster C1 phages including the recently sequenced phage IkeLoa, using Phamerator, HHPred, and BLASTp searches in the NCBI and PhagesDB databases. Literature was also reviewed to better understand the known components of the phage contractile tail system. This study provides a framework for further understanding of the genes involved in the contractile tail system of the C1 phages.