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Annotation Announcements: Investigation into Pham 187115 Proteins Leads to Request for Updated Function Call

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This year students at Drexel University discovered 37 novel bacteriophages using Microbacterium foliorum NRRL B-24224 as a host. These phages were isolated and purified from soil samples collected near Drexel’s Philadelphia campus but also included samples from Philadelphia suburbs in Pennsylvania and New Jersey. Six of these novel Microbacterium phages were sequenced by the Pittsburgh Bacteriophage Institute: one from the EA4 subcluster (RenegadeRaider), two from the GA cluster (Phingu and PhillyJawn), and one from the EB cluster (PhigPhack), one from the EC cluster (PhedwardCullen), and one from the EF cluster (Artiphact). All six produced lytic plaques but the GA cluster life cycle is unknown. All exhibit siphoviridae morphology determined by TEM. Bioinformatics analysis of these six genomes revealed high similarity to previously characterized phages in their respective clusters, with no distinguishing features identified to-date. However, during annotation students noted some of the gene products in PhillyJawn and Phingu, both members of the GA cluster, required more in-depth analysis to assign a function. To date, the GA cluster includes 17 phages, 8 of which are still drafts. Upon initial annotation, PhillyJawn\_9 and Phingu\_11 (both Pham 187115) were called as Hypothetical Proteins, following synteny with other members of the GA cluster. Other GA members call these genes MuF-like minor capsid protein, which has since been removed from the official function list. Further investigation into the potential protein function of the genes utilized information from the official forums at seaphages.org, including pertinent HHPred hits, and similarity to the homologous gene 5 in the DZ cluster phage Morgana (host Gordonia rubripertincta NRRL B-16540). In Morgana this gene was assigned as a capsid maturation protease and is situated between the portal protein and scaffolding protein. Upon collection of similar data compared to Morgana\_5, genes PhillyJawn\_9 and Phingu \_11 were also assigned as capsid maturation protease. This research calls for extra attention while annotating the functions of genes in Pham 187115, particularly in Clusters GA and DZ.