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The Corazón of Lafayette College: An Analysis of Genes 32, DNA methylase, and 35, Terminase

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Mycobacterial phage, Corazón, was isolated from soil on Lafayette College, Easton PA, campus using the direct method of isolation. This phage was named Corazón, which means 'heart' in Spanish, because students put their 'heart' into this project. Corazón, a Siphoviridae, is a Cluster S mycobacteriophage, one of only 11 members of this group. It has a genomic length of 64,931 base pairs and 63.4% GC content. We analyzed two genes – gene 32, a DNA methylase, and gene 35, a Terminase – to determine their evolutionary lineages and the role of each in the bacteriophage life cycle. The protein sequence of each gene was compared to its homologs in the NCBI Protein database by CLUSTAL OMEGA. Alignment results showed that the DNA methylase protein was only conserved in two regions, whereas the Terminase protein contained 12 conserved regions. There were fewer bacteriophage genomes with a DNA methylase compared to the number of bacteriophage genomes containing a Terminase gene. Why is Terminase more common in bacteriophages than DNA methylase? We hypothesize that the Terminase gene is more common due to its crucial biological function of recognizing newly replicated viral genomes and packaging the genome into the phage head whereas the function of DNA methylase is to protect against additional invading viruses, rather than benefiting the phage.