Characterizing Bacteriophage with Restriction Enzymes and Observing the Effects of Exposing Bacteriophage to Ultraviolet Irradiation

Dancharnjitt, Nichapa (School: Lincoln Park Academy)

The question asked was “how does ultraviolet irradiation and restriction enzymes characterize bacteriophage infecting Mycobacterium smegmatis?”. The purpose was to determine if an isolated bacteriophage can survive when exposed to ultraviolet irradiation. If bacteriophage specific for Mycobacterium smegmatis can survive exposure to ultraviolet irradiation then it can be used for phage therapy because it will be able to make new virions, which would inhibit the growth of Mycobacterium smegmatis. Bacteriophage was isolated from a soil sample. The bacteriophage was diluted by performing a serial dilution, aliquoted onto agar plates, and incubated at 37° C. A plaque purification was then conducted three times by a serial dilution and plaque assay. The most “webbed” plate was used to collect the phage lysate to perform another serial dilution to determine phage forming units per milliliter, which was 3.7 x 108 pfu/ml. Then the phage was characterized by using restriction enzymes and a qualitative gel assessment was performed. The phage lysate was also tested under the exposure of ultraviolet irradiation for different time increments. The data that was observed showed that the bacteriophage isolated was able to remain active and inhibit the growth of Mycobacterium smegmatis throughout the tested timed increments. Since the bacteriophage was active under the harsh conditions caused by the ultraviolet exposure, the bacteriophage capsid structure was strong enough to stay active and resist UV irradiation. Also, the restriction enzymes did not show fragmentation of the DNA, which concluded that the bacteriophage was unique.

Awards Won: