A Method for Water Purification Using Bacteriophage

Santarpia, George (School: Albuquerque Institute for Math and Science)

Bacteria cause numerous issues when they infect water sources, including bacterial disease, which affects billions of people annually, aquarium and aquaculture issues, and environmental issues. Existing water treatment methods are inadequate, especially in the developing world. Bacteriophage are a potential solution. However, direct application of bacteriophage, which are bacteria-infecting viruses, would require an impractically large amount of phage. To combat this, I made a propagation device to produce phage while in the infected body of water, so the initial amount of phage can be small, while still producing as much phage as necessary. This device could also be used to produce phage cheaply and effectively on a large scale, which also helps alleviate the issue of insufficient bacteriophage. The objective of this project was to test the effectiveness of this device in water purification and phage production. In this experiment, two, relatively equal, populations of E. coli a? were grown and in one, the device was used, while the other was left as a control, neither with aeration. Then, the experiment was repeated two times, except with a slightly different device that was used for a longer time and with different kinds of aeration. The results indicate that the device effectively produced phage when the bacteria were active and significantly lowered the bacterial population the second time, probably because it was used longer. These promising results suggest that this device could be used in both the elimination of bacteria from a body of water and the large-scale production of phage.

Awards Won: