Use of Polymer Coated Nanoparticles for Inactivation of MS2

Caswell, Samantha (School: Gwinnett School of Mathematics, Science, and Technology)

Off-target effects from viral vectors prevent their expansion in the medical field, resulting in the need for a method to prevent these negative impacts. To simulate an environment with a needed cell and unwanted virus, E. coli and its corresponding virus MS2 were utilized. The project measured the impacts of an altered nanoparticle to inhibit the spread of MS2 amongst a population of E. coli, providing an environment that allowed continued growth. The gold nanoparticles were coated in Polyethylenimine to cause the MS2 to denature via hydrophilic interactions while simultaneously being electrically attracted to the nanoparticle. The hypothesis was that the nanoparticles would inhibit the spread of MS2 through the population and allow further growth of E. coli. After the growth of E. coli was observed with and without the presence of MS2 as well as altered and non-altered nanoparticles, the conclusion can be drawn that the altered nanoparticles influenced the growth of E. coli and prevented effects of MS2 otherwise observed. A similar nanoparticle holds the possibility of being a fail-safe for other viral vectors that are used by being able to inactivate vectors that have interacted with healthy cells.

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