Tiny Titans: Induced Sporulation of Bacillus anthracis

Ward, Jeremy

The purpose of this project is to determine if silver nanoparticles can induce sporulation in Bacillus anthracis. Sporulation in this project would be caused by the silver nanoparticles' toxicity. When sporulating bacteria are introduced to harsh environment, Bacillus anthracis begin to make spores that will transfer back to its original bacterial state when introduced into suitable environment. The hypothesis for this project is if silver nanoparticles are introduced to Bacillus anthracis it will induced sporulation and the effects of silver nanoparticles will be able to be documented by using a Ziess Merlin SEM FEG. Take an aliquot of bacteria from a master culture and put a known amount in some test tubes. Put an increasing amount of silver nanoparticles in the test tubes. The concentrations of nanosilver 0µg/mL, 10µg/mL, 40µg/mL, 70µg/mL, and 100µg/ml. The cells will then grow overnight. Heat the cells to 65 degrees Celsius to kill the bacteria. Pellet the dead bacteria and spores in a centrifuge and get rid of the fluid which contains nanosilver. Germinate the spores on the plates and use this to estimate the original viable spore count for each dilution of nanosilver in each of the tubes that were cultured. Take some of the resuspension and use it to conduct electron microscopy. The results show that silver nanoparticles do induce sporulation in Bacillus anthracis. The concentrations that were least effective were 0µg/mL and 10µg/mL. The most effective concentrations were 40µg/mL and 70µg/mL. The 100µg/mL solution was to hostile that Bacillus anthracis would die off before it could sporulate. The student's hypothesis was proven correct through this experiment.

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