A Novel Alternative to Antibiotics: Gold Nanoparticles

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This project in its present form tests the effects of different sizes of gold nanoparticles on the inhibition of bacterial growth. Scientists have conducted no research involving gold nanoparticles alone as an antimicrobial. The purpose was to prove gold nanoparticles as an antimicrobial. The independent variable was different sizes of gold nanoparticles (small and large), and a control of plain gauzes. The zone of inhibition was the dependent variable (millimeters). It was hypothesized that smaller sized gold nanoparticles would demonstrate the highest zone of inhibition. E.coli bacteria were exposed to gauzes containing the three levels of IV. The bacteria were grown in an incubator for 24 hours, the zone of inhibition was measured. The small gold nanoparticles (size of 7 nm), on average created a 4.9 mm larger zone of inhibition than the large gold nanoparticles (size of 28 nm) and a 33.0 mm larger zone of inhibition than the control. In an addition to this experiment, another experiment was conducted to test the effects of different of concentrations of gold nanoparticles on the inhibition of bacterial growth. The purpose was to determine the Minimum Inhibitory Concentration (MIC) of gold nanoparticles in order to find the safest concentration of gold nanoparticles which can be used in the gauzes modeled in the previous experiment. The concentrations used were 750 M, 75 M, 7.5 M, and 0.75 M. In this experiment the size remained as a constant of 7 nm as this was the best size that worked against the bacteria. The dependent variable remains the same as the previous experiment. It was hypothesized that 0.75 M would be the MIC. This project as a whole could lead to further studies that test gold nanoparticles as a functional antimicrobial against other bacteria.

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