

The effect of Gold and Copper nanoparticles on negative bacillus bacteria causing urine infection (MDR)

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Abstract

Background & Aim: Irregular consumption of common antibiotics increases antibiotic resistance in the urine pathogens. The topic of this study was selected based on this great community problem and considering the fact that a large number of diseases are being treated using gold and copper nanoparticles yet not much is known of their effects on gram negative bacillus bacteria that cause urine infection.

Methods: The study included 140 cases of Multiple drug resistance (MDR) bacteria strains: E.coli, Klebsiellapneumoniae, Enterobacteraerogenes, Proteus vulgaris, Citrobacterfreundii, Acinetobacterhumanii and Pseudomonas aeruginosa (each genus of bacteria, 20 samples), all of which were MDR causing urinary tract infections. A variety of biochemical tests for identification of bacteria were used and laboratory methods (Agar well diffusion, Agar disk diffusion and Macrodilution method) were utilized to assess their sensitivity to copper and gold nanoparticles.

Results: Gold nanoparticles did not show any effect on these bacteria. According to agar disk diffusion and the Macrodilution method, copper nanoparticles (in 1000ppm dilution) showed the highest and lowest mean inhibition zone diameter in Acinetobacterhumanii and Entrobacteraerogenes 23 and 15mm, respectively. The MIC for all of the bacteria stood at 250µg/ml while Acinetobacterhumanii was 125µg/ml.

Discussion: Gold nanoparticles were not effective on these bacteria. Copper nanoparticles had a relatively strong effect on all of the bacteria causing urine infection and MDR.

Keywords: Urine infection, Negative bacillus bacteria, Multiple drug resistance, Copper and gold