

Investigation of MexA-B efflux pump genes expression in ciprofloxacin resistant *Pseudomonas aeruginosa* bacterium influenced by silver nanoparticle functionalized by thiosemicarbazone

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Abstract Introduction : *Pseudomonas aeruginosa* is a gram negative bacterium and an important hospital pathogen. One of the main problems in the treatment of infections for this bacterium, is the multi-drug resistance. Today, metal nanoparticles are a good alternative to antibiotics. The purpose of this study was investigation of MexA-B efflux pump genes expression in ciprofloxacin resistant *Pseudomonas aeruginosa* bacterium influenced by silver nanoparticle functionalized by thiosemicarbazone. **Method:** In this study examined 70 strains of *Pseudomonas aeruginosa* isolated patients admitted to hospitals. Silver nanoparticles were synthesized by chemical reactants and optimal conditions, and were functionalized with thiosemicarbazone. The effect of silver nanoparticle functionalized by thiosemicarbazone was investigated by MIC and Sub-MIC methods on *Pseudomonas aeruginosa* isolates and the gene expression of MexA, MexB in the ciprofloxacin resistant isolated influenced by silver nanoparticle functionalized by thiosemicarbazone investigated with Real Time PCR method. **Results:** The microbial results indicated that silver nanoparticle functionalized by thiosemicarbazone has synergistic effects with ciprofloxacin and results bacterial death in lower concentrations compared to the isolates influenced by nanoparticles, as well as the isolates influenced by ciprofloxacin, which result of Real Time PCR method confirmed it. because the reduction in gene expression of MexA, MexB was evident in the isolated influenced by silver nanoparticle functionalized by thiosemicarbazone and ciprofloxacin. **Conclusion:** *Pseudomonas aeruginosa* isolates exhibit a significant reduction in the gene expression of

MexA, MexB when this isolates influenced by silver nanoparticle functionalized by thiosemicarbazone and ciprofloxacin compared to isolates influenced with ciprofloxacin, therefore the use of silver nanoparticle functionalized by thiosemicarbazone with ciprofloxacin can reduce the antibiotic resistance of this bacterium. Keywords: Silver Nanoparticles, Thiosemicarbazone, Pseudomonas aeruginosa, Real Time PCR.

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