

TITLE

Antibiotic-assembled gold nanoparticles: New trend for the development of anti-ESBL *Escherichia coli*

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National Urinary tract infections (UTI) are most common form of bacterial infections, affecting people throughout their lifespan. The pathogenesis of complicated and uncomplicated UTI is complex and influenced by many host biological behavioral factors and properties of the infecting uropathogens. Leading etiological agents of UTI's include *Escherichia coli*, *Pseudomonas aeruginosa*. Despite the existence of potent antibiotics, resistant or multi-resistant strains are continuously appearing, imposing the need for a permanent search and development of new drugs.

Recently gold nanoparticles (NPs) have attracted significant interest as a novel platform for various applications such as nanobiotechnology and biomedicine.

The purpose of the present study is to evaluate the antimicrobial activity, (using Kirby Bauer Method), of gold nanoparticles, (prepared by the reaction of trisodium citrate with hydrogen tetrachloroaurat), and antibiotics-assembled gold nanoparticles against ESBL *Escherichia coli*.

Although ESBL *E.coli* showed resistance to pure gold NPs, however an enhanced activity of ofloxacin (OFX) Ceftriaxone (CTR), Tazocin (TZP), and Cefotaxime (CTX) against the isolated pathogens, from fifty urine samples taken from patients with urinary tract infection, was observed once it was assembled with gold NPs. Therefore, gold nanoparticle can restore the activity of some of third generation β -lactam antibiotics against the ESBL *E.coli*.

The above results together with our previous results in a study with silver nanoparticles are discussed in terms of mechanisms related to

- 1) Huge surface area per unit volume of nanoparticles
- 2) Selective assembly of nanoparticles to ligands such as silver to nitrogen and gold to sulfur

The selective effect of silver nanoparticles conjugation to antibiotics give good tidings of new horizon will for sure expands in the drug design process through the use of nanomaterials.

Biography

Professor Ahmad Kabbani has completed his PhD at the age of 30 years from the University of California-Davis; he was under NIH scholar exchange program at UC-Davis, at present professor of chemistry at the Lebanese American University-Beirut. He acts as the chairperson of Natural Science Department. He is affiliated with Rice University in USA. He has published more than 15 papers in highly reputable journals, in addition he is the founder of the international conference of Research Trends in Science and Technology (RTST) and other international conference. At present his work emphasizes the antibacterial activity of metal nanoparticle conjugated to antibiotics. Also we are working on graphite oxide derivatives and trying to use them for drug and environmental goals.