

BACTERICIDAL ACTIVITY OF SILVER NANOPARTICLES IN DRUG-RESISTANT BACTERIA

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Background: Bacterial resistance to multiple drugs is a worldwide problem that afflicts public health. This is why nanomedicine approach has been used to combat the antibiotic resistance, among them is the synthesis of silver nanoparticles. Various studies have shown that silver nanoparticles are good bactericidal agents against Gram negative and Gram positive bacteria due to the adherence and penetration of the external bacterial membrane, preventing different vital functions and subsequently bacterial cell death. Methods: We searched the following databases: ScienceDirect, PubMed, Scopus, and EBSCOhost. The quality of the articles was assessed using the Retraction Watch Database, and the review was carried out in accordance with the PRISMA ScR 2020 guidelines. This review aims to answer the following question: In which type of drug-resistant bacteria (Gram positive or Gram negative) are silver nanoparticles more effective as bactericides? Results: Out of the initial 1420, 141 studies met the inclusion criteria and were included to form the basis of the analysis. The results of this systematic review showed that silver nanoparticles act primarily as bacteriostatic agents and subsequently as bactericides, both in Gram-positive and Gram-negative drug-resistant bacteria. In addition, the synthesis method using phytochemical reducers as well as physicochemical properties, such as size distribution, could be related to bacteriostatic/bactericidal activity. Conclusions: Silver nanoparticles are more effective as bactericide in Gram negative bacteria. More preclinical studies with controls are necessary to elucidate the benefits of using silver nanoparticles as bactericide agents in different drug-resistant bacteria infections.

Keywords: Nanomaterials, Silver nanoparticles, Bactericidal activity

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<https://sites.google.com/view/nanomedicine/home>

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