Docket #: S19-132

Functionalized Nanoparticles as Antibiotic Adjuvant

Researchers at Stanford have developed a new strategy for treating bacterial infections with functionalized nanoparticles. Drug-resistant infections are often difficult to treat because of the presence of persister cells, a subpopulation of bacterial cells that is highly tolerant of traditional antibiotics. Persister cells are dormant, making them less susceptible to many antibiotics, which are designed to kill growing cells. Administration of nanoparticles in combination with one or more antibiotics was found to be highly efficacious in eradicating persister cells and effective against both planktonic bacteria as well as biofilms for a broad range of bacterial species, including Gram-positive and Gram-negative bacteria. The formulations are useful for enhancing the effect of antibiotics as well as reducing the virulence of bacteria.

Stage of Development
Nanoparticles alone or combined with antibiotic were effective in dispersing pre-formed *Pseudomonas aeruginosa* biofilms, compared to antibiotic alone. Biofilm viability was reduced significantly with nanoparticles combined with antibiotic (> 50 %), compared to antibiotic alone (20%) after 24 hours incubation. This data highlights a way rescue the clinical efficacy of older antibiotics against resistant bacterial infections, especially *Pseudomonas aeruginosa* biofilm infections.

Applications

- Use of functionalized nanoparticles as adjuvants for antimicrobial agents

Advantages

- Can reduce/eradiate bacteria tolerant to other antimicrobial drugs

- Resensitizes bacteria to existing antibiotics

Patents

- Published Application: WO2021011398
- Published Application: 20230149561
- Published Application: 20220339293
- Issued: 11,998,615 (USA)

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