

## Indium Phosphide Quantum Dot-Mediated Photodynamic Therapy for Antimicrobial-Resistant Bacteria Inactivation

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Antibiotic-resistant bacterial cell infection is a serious problem in many countries. Reactive oxygen species (ROS), which is toxic to bacterial cells, is one of reactive species responsible for the photoactivity of semiconductor nanoparticles. In this study, we have prepared highly efficient antimicrobial colloidal semiconductor quantum dots (QDs). The bandgap energy of indium phosphide quantum dots (InP QDs) was tuned by quantum confinement effect. The InP QDs were treated to gram positive (drug-resistant *Bacillus cereus* and *Staphylococcus aureus*) and gram negative (drug-resistant *Escherichia coli*) bacteria and the bacterial viability was analyzed to confirm the QD-induced bacterial cell death. The InP QDs efficiently attacked and growth-inhibited the bacterial cell, but had less effect on the mammalian cells (COS-7 and fibroblast). The InP QDs could be used for clinical phototherapy to care the bacterial infections.