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Bactericidal Effects of Charged Silver Nanoparticles in Methicillin-resistant *Staphylococcus aureus*[1] DULCE ROMERO-URBINA, J. JESUS VELAZQUEZ-SALAZAR, HUMBERTO H. LARA, JOSEFINA ARELLANO-JIMENEZ, EDUARDO LARIOS, The University of Texas at San Antonio, TONY T. YUAN, YOON HWANG, MAURIS N. DESILVA, Naval Medical Research Unit, JBSA Fort Sam Houston, MIGUEL JOSE-YACAMAN, The University of Texas at San Antonio — The increased number of infections due to antibiotic-resistant bacteria is a major concern to society. The objective of this work is to determine the effect of positively charged AgNPs on methicillin-sensitive *Staphylococcus aureus* (MSSA) and methicillin-resistant *Staphylococcus aureus*(MRSA) cell wall using advanced electron microscopy techniques. Positively charged AgNPs suspensions were synthesized via a microwave heating technique. The suspensions were then characterized by Dynamic Light Scattering (DLS) and Transmission Electron Microscopy (TEM) showing AgNPs size range from 5 to 30 nm. MSSA and MRSA were treated with positively charged AgNPs concentrations ranging from 0.06 mM to 31 mM. The MIC_{50} studies showed that viability of MSSA and MRSA could be reduced by 50% at a positively charged AgNPs concentration of 0.12 mM supported by Scanning-TEM (STEM) images demonstrating bacteria cell wall disruption leading to lysis after treatment with AgNPs. The results provide insights into one mechanism in which positively charged AgNPs are able to reduce the viability of MSSA and MRSA.

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