Side-Chain Amino Acid Based Cationic Antibacterial Polymer Induced Morphological Switching of Treated Bacterial Cell

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Synthetic polymer based antimicrobial materials destroy conventional antibiotic resistant microorganisms.[1,2] Although these antibacterial polymers duplicate the properties of antimicrobial peptides (AMPs), their effect on the bacterial cell morphology has not been studied exhaustively. To investigate the morphological switching of bacterial cell in the presence of antimicrobial polymer, herein we have synthesized side-chain amino acid based cationic polymers. These polymers exhibited efficient antibacterial activity against Gram-negative (E.coli) as well as Gram-positive (B.subtilis) bacteria. Drastic morphological switching from rod shape to spherical shape of E.coli cells was visualised by field emission scanning electron microscopy (FE-SEM) analysis during cell wall disruption through polymer treatment, whereas B.subtilis cell structure and size remain unchanged, but stacked to each other after polymer treatment. Using side-chain leucine pendant cationic polymer, the bacterial growth inhibitory property in Luria Broth media was established by the absence of exponential phase of bacterial growth curve of E.coli. KEYWORDS: Antimicrobial peptides (AMPs), Zone of inhibition, Gram-positive and Gram-negative bacteria, morphological switching.

References:

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