The Use of Fmoc-L-phenylalanine, a SurA Inhibitor, to Prevent the Virulence of Antibiotic-Resistant Escherichia coli

Lutfiyya, Sabrene (School: Timberland High School)

Antibiotic resistance is a rising threat to public health. Until recent years, efforts to combat antibiotic resistance have focused on creating newer and stronger antibiotics, but pathogens continue to adapt and resist these treatments. Recent studies suggest that inhibiting outer membrane proteins of bacteria can attenuate the virulence, but not the viability, of resistant bacteria, resensitizing resistant bacteria to antibiotics without creating selective pressure for adaptation. No such chemical inhibitor currently exists for use in humans. This research investigates an inhibitor of SurA, Fmoc-L-phenylalanine, and its effect on bacterial viability and virulence through an ATP quantifying assay and swimming motility assay, as well as its ability to resensitize the bacteria to antibiotics through a wax moth survival assay. It was hypothesized that the presence of the inhibitor would have no effect on ATP production but would result in reduced swimming motility and increased wax moth survival. Results showed no significant correlation between inhibitor concentration and ATP production, motility, or wax moth survival, indicating no significant effect on bacterial viability, virulence, or antibiotic susceptibility. While this study did not identify the SurA inhibitor as an effective treatment for resistant E. coli, it does not rule out SurA as a potential target for attenuating antibiotic resistance. Future research should explore other SurA inhibitors, their effects on resistant bacteria, and other protein targets.

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