

Self-Derived Peptides: Inhibition of Bacterial Growth Without Resistance

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The World Health Organization warns antibiotic-resistant pathogenic bacteria are a major global health issue. Some gram-negative bacteria such as *Escherichia coli* and *Acinetobacter baumannii* even have strains resistant to all available antibiotics. However, a truly innovative antibiotic has not occurred for 60 years. This investigation aims to explore the viability of self-derived peptides as the future of antibiotics. *E. coli* MG1655 strain was tested for cell growth inhibition at twelve concentrations of a designed peptide. Then, a drug resistance assay was conducted to detect resistance of the bacterium by comparing the change of minimum inhibition concentrations (MIC) of the peptide and the standard drug enrofloxacin. Lastly, a cytotoxicity assay was conducted to test the effects of peptide concentrations on the relative activity of mammalian cells. The *E. coli* growth curve confirmed the self-derived peptide inhibited *E. coli* cell growth at concentrations greater than 2 μM . Over eighteen days, the peptide MIC increased two-fold, compared to the 256-fold MIC increase of the standard antibiotic enrofloxacin. The peptide also showed low cytotoxicity in mammalian cells at concentrations less than 50.0 μM . In conclusion, with little resistance and low cytotoxicity, self-derived peptides have a promising future as a new class of antibiotics. It is estimated that in the year 2050 alone, 10 million deaths worldwide will be attributed to antibiotic resistance. With more comprehensive research and development, self-derived peptides could potentially combat multi-antibiotic resistant bacterial strains and save countless lives.