Design, development and *in vitro* validation of synthetic peptides as therapeutic agents against pathogenic bacteria

Mayank Maan[1], Avneet Saini[1]

[1]Department of Biophysics, Panjab University, Sector 25, Chandigarh, India

Synthetic cationic peptides have been screened and optimized to counter the problems associated with natural peptides while maintaining their superior antibacterial action and minimising the accompanying limitations. Studies on machine learning and algorithms that can predict or identify potential sequences based on the physicochemical and structural properties and the quantitative structure-activity relationship of Antimicrobial Peptides and targets already present in databases have advanced the development of synthetic/artificial peptides. AMPs, which have demonstrated to have higher antibacterial activity against pathogenic bacterial strains than commercially available antibiotics, are a class of medicines with considerable promise for therapeutic application. Natural AMPs are toxic to host cells, rapidly degraded by proteases, unstable due to pH changes, lose their action when exposed to serum and high salt concentrations, have a low oral bioavailability, and are expensive to produce. Hence, a number of methods have been utilized to produce peptides with better half-lives, including adding or replacing natural amino acids with synthetic ones, cyclizing peptides, and using D-amino acids in the peptide sequence. This current work is a pilot study which involves the design, development, and validation of synthetic peptide analogues with improved potency and bioavailability.