



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Programme of Study : Ph.D.

Thesis Title: **Development and Mechanistic Studies of Short, Cationic and Broad-Spectrum Antimicrobial Peptides**

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SHORT ABSTRACT

The rising threat of antimicrobial resistance and the failure of the conventional antibiotics to tackle the crisis has necessitated the need for alternatives to the conventional antibiotics existing in the markets. Peptide based antimicrobial agents or antimicrobial peptides (AMPs) may be thought of an alternative to the existing ineffective drugs, as many of these have shown excellent prospects with superior properties including lesser scope for the microbes to develop resistance against them. However, these peptides also have certain limitations like salt-sensitivity, protease degradability, high cytotoxicity, along with high cost of production, that are to be addressed to make them commercially available in the clinics. Chemical modifications of the naturally occurring AMPs or *de novo* design of AMPs can provide us with essential avenues to tackle their limitations and render them effective *in vivo*. Our thesis is an attempt to design AMPs to address their inherent drawbacks through incorporation of D-amino acids or unnatural amino acids in the sequences of previously reported peptides or naturally occurring peptides. We have also reported *de novo* design of short antimicrobial peptides showing excellent broad-spectrum antimicrobial activity as well desirable properties essential for them to be qualified as therapeutics.