EASTERN MICHIGAN UNIVERSITY

Chemistry Department

M. S. Thesis Seminar

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Tuesday, Dec. 16th, 1:00 pm, Sci Complex Rm 545

Antimicrobial, Membrane Permeability, and Hemolytic Activity of Linear Derivatives of Cysteine-Deleted Tachyplesin I

Antimicrobial peptides are promising alternatives to traditional antibiotics that are susceptible to bacterial resistance. Cysteine-deleted tachyplesin (CDT) is an antimicrobial peptide derivative of Tachyplesin I. CDT has proven to have adequate activity by maintaining the peptide's hydrophobic-hydrophilic balance and structural conformation. However, understanding the amino acid sequence-dependent activity of the peptide helps in finding an effective peptide derivative. We investigated the role of various amino acid substitutions and deletions on linear CDT, which include replacement of arginine with lysine, systemic deletion of C-terminus arginines, and replacement of hydrophobic residues with aromatic amino acids. Membrane disruption ability, antimicrobial activity and hemolytic assays were used to evaluate the activity of peptide derivatives. Lysine-replaced CDT showed decreased membrane perturbation, but retained its antimicrobial activity. Deletion of the first and second arginines from the C-terminus was well tolerated, but deletion of all three arginines led to decreased activity, especially against gram-negative bacteria. Replacing hydrophobic residues with aromatic phenylalanine resulted in slightly increased activity against gram-positive bacteria and caused more model membrane disruption. These studies have helped us determine that C-terminal positive charge and hydrophobicity was critical for the peptide to maintain its activity.