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Selective binding affinity of cationic antimicrobial peptides for lipid membranes: roles of peptide charge and hydrophobicity[1] SATTAR TAHERI-ARAGHI, BAE-YEUN HA, Department of Physics and Astronomy, University of Waterloo, Ontario N2L 3G1, Canada — Antimicrobial peptides selectively disrupt microbial membranes through hydrophobic insertion into the outer layers, which are known to carry a large fraction of anionic lipids. When the peptides are cationic, as is often the case, the interplay between hydrophobic and electrostatic interactions determines the selective binding affinity (thus antimicrobial activity) of the peptides. Here we present a detailed theoretical picture of how the selective binding is influenced by such factors as the charge and hydrophobicity of the peptides and the elasticity of target membranes. This effort not only accounts for some of the general trends observed in experimental studies, but it also leads to a theoretical model for optimizing the selectivity and antimicrobial activity.

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