026-LIPS

Biophysical Characterization of Aurein: Insights into Its Mechanism of Action and Potential for Overcoming Drug Resistance

Abstract

The increasing resistance of bacteria to conventional drugs has highlighted the need for more advanced therapeutic strategies. One solution, discovered in 1939, involves the use of antimicrobial peptides (AMPs), which offer similar efficacy to traditional drugs but with a lower potential for resistance. However, a major challenge in their clinical application is preventing undesired interactions that could compromise their effectiveness. This research focuses on the AMP aurein, which is secreted by the Australian southern bell frog (*Litoria* genus). Aurein has demonstrated activity against a wide range of pathogens, including fungi, bacteria, viruses, and even cancer cells, by exploiting differences in membrane composition between bacterial and host cells. While the antimicrobial properties of aurein are well-documented, the precise mechanisms of its action remain unclear.

The primary goal of this study was to investigate the structural and functional characteristics of aurein through various biophysical techniques. A curve-fitting analysis was employed to quantitatively assess the contributions of secondary structures, such as helices, sheets, turns, and random coils, to the peptide's overall conformation. Infrared and fluorescence spectroscopy revealed strong interactions between aurein and two lipid raft systems, suggesting that aurein's activity is influenced by its binding to lipid membranes. Fourier Transform Infrared (FTIR) spectroscopy further demonstrated that aurein undergoes conformational changes upon interaction with model membranes, offering valuable insights into its mechanism of action.

Overall, this research enhances an understanding of aurein as a promising alternative to traditional drugs. By employing FTIR and fluorescence spectroscopy in combination, this study adds to the growing body of knowledge on insights into its mechanism of action and potential for overcoming drug resistance. Ultimately these findings offer insights that could transform the future of medicine and improve global health.