Biophysical Evaluation of Phosphatidylglicerol and Cardiolipin Systems to Predict Peptide Antimicrobial Activity

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Staphylococcus aureus is considered one of the most dangerous bacteria for humans due to its ability to penetrate the epithelial barriers producing sepsis, osteomyelitis, pulmonary, skin and soft tissue infections [1]. It is also the most common cause of postoperative wound infections. The World Health Organization (WHO) report of 2014 emphasizes that over the past decade, was significant the number of cases of methicillin-resistant *Staphylococcus aureus* (MRSA) patients in hospitals and some to vancomycin are now recognized [2]. Antimicrobial peptides (AMPs) are essential components of the innate immunity of several organisms, they have been isolated from animals, plants, fungi, and bacteria. AMPs are considered promising alternatives to conventional antibiotics [3]. Based on the need to evaluate new potential therapeutic agents to combat the antimicrobial resistance, we evaluate four different systems built of phosphatydilglycerol and cardiolipin, the principal lipids present in the *S. aureus* membrane. Lipid membrane composition in different stages of bacterial growth affect the activity of the peptides. Calcein leakage experiments were performed to evaluate the disruption of Daptomycin, LL37 and DM2 peptides on the lipid bilayers. These results were compared with antimicrobial activity obtained by flow citometry experiments. We observed that increasing concentrations of cardiolipin reduced significantly the disrupting mechanism associated with the three membrane active peptides.

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References

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