Lipid-based Nanoformulations of Antimicrobial Peptides to Treat Bacterial Infectious Diseases

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The rapid increase in drug-resistant infections presents an acute problem that continues to challenge the healthcare sector, generating interest in novel antimicrobial strategies. Antimicrobial peptides (AMPs) have a high potential as new therapeutics against infectious diseases as they are less prone to induce resistance due to their fast and non-specific mechanism of action. The new peptides included in the study are well-defined AMPs, established to have an antimicrobial effect and an acceptable safety profile. The aim of this work is to explore the potential of lipid nanocapsules (LNCs)[1] for AMP delivery, and especially its ability to protect the peptide against degradation while at the same time maintain proper drug activity. The LNCs are described as an oily core composed of medium chain triglycerides, and surrounded by a surfactant shell made of lecithin and PEGylated surfactants. Their lipidic cores are not favorable as they stand to encapsulate hydrophilic molecules. To promote the peptide loading, the incorporation of the cationic peptides in the shell of the LNCs was envisaged. The incubation performed at different conditions shows a good association of the peptides to the surface of the LNCs. The minimal inhibitory concentrations (MIC) of the LNC-AMPs were determined for the sensitive strains. The results show a preservation of the antibacterial activity of the native peptide and in some cases a decrease of the MIC.

References

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