Research in Pharmaceutical Sciences, 2012;7(5)
School of Pharmacy and Pharmaceutical Sciences
Isfahan University of Medical Sciences

# The effect of cationic nanoliposomes containing rifampin on eradication of *Staphylococcus epidermidis* biofilm

**N. Moghadas sharif[1,*], B. Fazly Bazzaz[2], B. Malaekeh-Nikouei[3]**

[1]*School of Pharmacy, Mashhad University of Medical Sciences, Mashhad, Iran*
[2]*Biotechnology Research Center &School of Pharmacy, Mashhad University of Medical Sciences, Mashhad, Iran*
[3]*Nanotechnoloy Research Center &School of Pharmacy, Mashhad University of Medical Sciences, Mashhad, Iran*

**Background and Aims:** Biofilm formation is often considered as the most important reason why antibacterial treatment is not effective and antimicrobial agent fails. This presents a serious challenge in the field of antimicrobial therapy. The aim of the present study was therefore to examine the ability of liposomes to remove Staphylococcus epidermidis biofilm, which usually associated on the implant surfaces.
**Methods:** Liposomal rifampin formulations are prepared by phase evaporation method by an average size of 100 nm. Surface properties and zeta potential were evaluated by DLS method. To estimate the encapsulation rate, HPLC technique was used. The ability of liposomes for eradication of bacterial biofilm was evaluated by validated microtiterplate method.
**Results:** The zeta potential and size of cationic liposomes was 35.60 mVand 140nm, respectively. Encapsulation rate of rifampin was about 60 %. According to statistical analysis, the optical density values shown the significant differences between rifampin cationic liposomes and free rifampin (P-value<0.05). These results could reflect the efficacy of this formulation in eradication of bacterial biofilm. Moreover, bare cationic liposomes were being more effective than rifampin loaded liposomes. With these considerations in mind unknown interaction between liposomes and loaded antimicrobial agent may be occurred.
**Conclusions:** The anti biofilm activity of liposomes showed that liposomes were effective against bacterial biofilm and perhaps we could apply these drug delivery systems as a proper approach to reduce the bacterial biofilm risk.

**Keywords:** Bacterial biofilm; Liposome; *Staphylococcus epidermidis*