

## Clindamycin phosphate absorption from nano-liposomes through third-degree burn scar

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**Background and Aims:** Burns are of the most common and devastating forms of trauma. After thermal injuries, a new barrier (scar) is formed that restricts permeation of drugs. Drug delivery in burn is not studied well and requires further attention and investigation. The aim of the present study was to investigate absorption of clindamycin phosphate (CP), as a hydrophilic drug model, through third-degree burn eschar using nano-liposomes. To the best of our knowledge, there is not data available in the literature in this regard.

**Methods:** Third-degree burn eschar samples, separated at the time of surgical debridement (7-14 days post burn) from burned patient, were obtained from Motahari Burn Center (Tehran, Iran). The cause of burning in all patients was flame. Large pieces of eschar were stored at -20°C until use. Before each experiment, eschar samples were thawed at ambient temperature. Home-made diffusion cells with effective surface area of 1.8 cm<sup>2</sup> were used for permeation studies. CP liposomal formulation was prepared by thin-film hydration and its size, CP content and encapsulation efficiency (EE) were determined.

**Results:** Size of the prepared liposomes was about 130 nm and encapsulation efficiency of the liposomal system was calculated to be about 30%. Permeation flux of CP from liposomes was found to be  $0.17 \pm 0.01$  mg/cm<sup>2</sup>/hr that was by about 2 times less than that from a CP solution with the same concentration ( $P < 0.05$ ). These data revealed that liposomes showed a tendency to decrease permeation of CP and increase its duration of action. This could be due to deposition of liposomes in the eschar and subsequently release of the cargo in a sustained manner.

**Conclusions:** Liposomal formulations can be applied as a drug reservoir (depot) and sustained release system in burn eschar.

**Keywords:** Burn eschar; Permeation; Liposome; Clindamycin phosphate; Reservoir