University of Brighton

UNIVERSITY OF BRIGHTON- SCHOOL OF PHARMACY AND BIOMOLECULAR SCIENCES

Fabricating of Pluronic F108 Surface-Modified Liposomes; Encapsulation and in Vitro Evaluation of a Drug Delivery Platform for the Cytotoxic Doxorubicin

MSc. Industrial pharmaceutical sciences

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ABSTRACT:

Currently, nano medicines, such as liposomes demonstrate their applicability as successful drug delivery systems, such as specifically targeting subcellular structures and extending the drugs' half-life. The compatibility of a mixture of a drug moiety and Pluronic F108 was studied here. The surface tension behaviour of the mixture was investigated and compared to the surface tension behaviour of each one individually. In this work conducted here, mixing of an amphiphilic drug moiety (Doxorubicin; DXR) with the amphiphilic copolymer (Pluronic F108) is recorded to cause molecular incompatibility at the air / water interface. The research represents a method for fabricating a platform for loading of drug moieties on a liposomes coating polymer. At the same time, this polymer is still able to do the job as stabilizer of liposomes. This study consists of examining of the surface tension compatibility to investigate the interaction at the monolayer interface, coating the liposomes with an adsorbed layer of the polymer onto a model of DPPC liposomes (Dipalmitoylphosphatidylcholine), then studying of the changes in the hydrodynamic diameter and zeta potential of the fabricated particles. The stability of the platform, along a two-week period, also was evaluated. This work is based on the change in the particle size which was found to be (64.9%) and (59%) growth in size for polymer micelles and polymer-coated liposomes, respectively, with incorporation of the highest DXR concentration in this work. This enlargement in size was guided and supported by surface tension study. The zeta potential was performed to allocate the exact place of the entrapped DXR on the platform. The aim behind this work is to craft a drug delivery platform with further development and in vivo studies; it might offer a promising alternative to the currently approved liposomal

systems. Doxorubicin and the polymer (Pluronic F108) here were just to prove the concept of interaction and possibility of loading.