DOXORUBICIN ENCAPSULATION IN ARSONOLIPOSOMES BY ACTIVE LOADING

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ABSTRACT

Arsonoliposomes, are liposomes that incorporate arsonolipids in their membranes and have been studied previously, in terms of their stability and antitumor activity [1, 2]. They demonstrate significant toxicity towards cancer cells while being less toxic towards normal cells. Doxorubicin (DOX), is an anti-cancer drug which is currently used in the clinic in the form of liposomes.

In this study, we sought to investigate the possibility to encapsulate DOX into arsonoliposomes and arsonoliposomes that are modified with a curcumin derivative (TREG), in order to study at a latter step, if the DOX-arsonoliposome combined system demonstrates additive or even synergist anticancer activity. PEGylated arsonoliposomes and TREG-arsonoliposomes composed of DSPC/Chol/PEG-2000-DSPE/Arsonolipid/TREG (in some cases) were prepared and the loading of DOX was attempted by applying the active loading method protocol. A drug/lipid ratio (D/L) of 1/7 (w/w) was always used, while the effect of using different temperatures (40° C and 60° C) and different time periods of incubation (15, 30, 60 and 90 min), on the DOX encapsulation in arsonoliposomes and TREG-arsonoliposomes, was tested. In all cases, liposomes were purified after the loading process and the % DOX entrapment efficiency was calculated based on initial/final D/L ratio.

Results show that, the active-loading protocol succeeds to encapsulate high percents of DOX into arsonoliposomes (up to 99%) and TREG-arsonoliposomes (up to 89%); Maximum loading was demonstrated when the incubation was carried out at 40° C, for arsonoliposomes and 60° C for TREG-arsonoliposomes. Considering the duration of incubation, in both cases DOX encapsulation was highest after 90 min. DOX-loaded arsonoliposomes and TREG-arsonoliposomes are currently tested for their anticancer activity towards different types of cancer cells, in vitro, and the first results are interesting.

REFERENCES

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