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Sphingosomes: Potential Anti-Cancer Vectors for the Delivery of Doxorubicin

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Abstract : The purpose of the investigation was to evaluate the potential of sphingosomes as nanoscale drug delivery units for site-specific delivery of anti-cancer agents. Doxorubicin Hydrochloride (DOX) was selected as a model anti-cancer agent. Sphingosomes were prepared and loaded with DOX and optimized for size and drug loading. The formulations were characterized by Malvern zeta-seizer and Transmission Electron Microscopy (TEM) studies. Sphingosomal formulations were further evaluated for in-vitro drug release study under various pH profiles. The in-vitro drug release study showed an initial rapid release of the drug followed by a slow controlled release. In vivo studies of optimized formulations and free drug were performed on albino rats for comparison of drug plasma concentration. The in- vivo study revealed that the prepared system enabled DOX to have had enhanced circulation time, longer half-life and lower elimination rate kinetics as compared to free drug. Further, it can be interpreted that the formulation would selectively enter highly porous mass of tumor cells and at the same time spare normal tissues. To summarize, the use of sphingosomes as carriers of anti-cancer drugs may prove to be a fascinating approach that would selectively localize in the tumor mass, increasing the therapeutic margin of safety while reducing the side effects associated with anti-cancer agents.

Keywords : sphingosomes, anti-cancer, doxorubicin, formulation
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