

Enhancement of taxane bioavailability cum anticancer potential using engineered lipohybrid system

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Fabricated lipohybrid (FLH) systems have been developed with the purpose of improving bioavailability of paclitaxel combining concepts of thermoresponsive delivery and P-gp inhibition.

FLH systems were composed of DPPC (thermosensitive lipid), Brij78 and pluronic F68 (PF68, P-gp inhibitor) for thermosensitive delivery of paclitaxel (PTX) with sizes below 150 nm. The use of 2% (v/v) Tween 80 (P-gp inhibitor) in the hydration media was able to increase the solubility of drug (leading to increase in entrapment efficiency from 81 to 92 %). The transition temperature of the FLH systems were ~41 °C leading to enhanced bioavailability upon hyperthermia. *In vitro* drug release at 40±1°C was abrupt burst release (i.e., 100% within 5 min) whereas insignificant release at 37±0.5 °C. Cytotoxicity in PTX-resistant human lung cancer cell line (A549/T cells) brought favorable results that DPPC/Brij78/PF68 FLH system being hydrated with Tween 80 was highly toxic in MTT assay, and it showed 3.5 fold enhancement of cytotoxicity as compared to DPPC/Brij78 FLH system. This was accounted to enhanced bioavailability of paclitaxel due to both high entrapment and least efflux (P-gp inhibition) from cancer cells.

Such FLH systems, possessing heralding features of thermo-sensitivity, high entrapment efficiency, that could not only enhance bioavailability but also anticancer potential, could serve as better alternative for the passive targeting of PTX-resistant human lung cancer.

Biography

With a breakthrough out of his diligence, he scored 99.34 percentile in GATE-2008, (in B. Pharm. III year) making history in the Department of Pharmaceutical Sciences, Dr. Harisingh Gour Vishwavidyalaya, Sagar (M.P.), India. He got valuable scholarships like JRF-UGC (M. Pharm.) and Shri Acharya Shanti Sagar Scholarship (SASS, New Delhi) in his study period. He owned number of international publications in reputed journals. Currently, he is pursuing Ph.D. (Central Research Fellow) under kind supervision of Prof. Sanjay K. Jain (Professor in Pharmaceutics), Department of Pharmaceutical Sciences, Dr. Harisingh Gour Vishwavidyalaya, Sagar (M.P.), India.

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