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Smart liposomes bearing combination of synergistic anticancer agents

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Ovarian cancer is one of the most fatal gynecologic cancers. In this debut study, dual approach using synergistically active combination of paclitaxel-topotecan (Pac-Top; 20:1, *w/w*) is investigated with utilization of characteristic features of tumor micro-environment and additionally over expressed folate receptors (FR- α) to achieve targeting to tumor site. Various liposomes namely: Liposomes, PEGylated liposomes and FR-targeted PEGylated liposomes with lipid compositions viz. DPPC: DMPG (85.5:9.5), DPPC: DMPG: mPEG₂₀₀₀-DSPE (85.5:9.5:5) and DPPC: DMPG: mPEG₂₀₀₀-DSPE: DSPE-PEG-folate (85.5:9.5:4.5:0.5), respectively were developed using thin film casting method. These were nanometric in size around 200 nm. *In vitro* drug release study showed initial burst release followed by sustained release for more than 72 hrs at physiological milieu (37 \pm 0.5°C, pH 7.4) while burst release (i.e. more than 90%) within 5 min at simulated tumor milieu (41 \pm 1°C, pH 4). SRB cytotoxicity assay in OVCAR-3 cell line revealed Pac-Top free (20:1, *w/w*) to be more toxic (GI₅₀ = 6.5 μ g/ml) than positive control (Adriamycin, GI₅₀ = 9.1 μ g/ml) and FR-targeted PEGylated liposomes GI₅₀ (14.7 μ g/ml). Moreover, fluorescence microscopy showed the highest cell uptake of FR-targeted PEGylated liposomes so called "Smart Liposomes" which has not only mediated effective targeting to FR- α but also triggered release of drugs upon hyperthermia.

Biography

Ankit Jain with a breakthrough out of his diligence, scored 99.34 percentile in GATE-2008, (in BPharm III year). He got valuable scholarships like JRF-UGC and SASS (New Delhi) in his study period. He is also a recipient of Young Jaina Award-2012. He owned number of best papers in national seminars and has more than 15 international publications including book chapters in reputed journals to his credit. Currently, he is pursuing PhD (CSIR-SRF) under kind supervision of Prof. Sanjay K. Jain (Professor in Pharmaceutics), Dept. of Pharm. Sciences, Dr. H.S. Gour Central University, Sagar (M.P.), India. His research areas of interest include novel cancer targeting strategies, liposomal research and fabrication of drug nanocarriers.

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