Abstract Title: Nanoparticle based delivery of carboplatin for treatment of retinoblastoma

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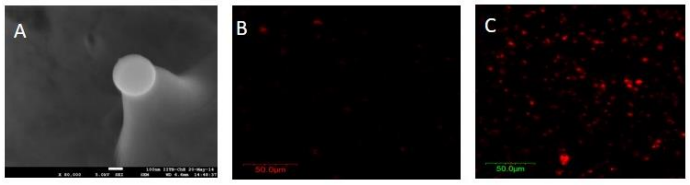
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Abstract (not more than 300 words)

Retinoblastoma is an intraocular tumour which mainly affects children below five years of age. Treatment of retinoblastoma is generally based on intravenous administration. Intravenous administration is limited by minimal amount of drug crossing blood retinal barrier and hence very less amount of drug actually reaches the retina. The need to maintain required dose in retina requires high doses of drug which leads to toxicity. Nanomedicine has led to the development of trigger-responsive nanoparticles that can allow sustained delivery of drug through a suitably designed depot nanoparticles. These technologies have been applied in the present study for the development of nanoparticles for the treatment of retinoblastoma. The nanoparticles developed have been encapsulated with carboplatin, one of the major chemotherapeutic drug for the treatment of retinoblastoma. Encapsulation of carboplatin was found to reduce toxicity while ensuring sustained and controlled release of the drug once it has reached desired site. The present study consists of preparation of nanoparticle, their physico-chemical characterization in terms of size, hydrodynamic diameter, zeta potential, drug entrapment of carboplatin. Cumulative release in simulated condition *in vitro* showed sustained release of the drug. The nanoparticles were also tested for their biocompatibility using fibroblast cells line (L929).Nanoparticles loaded with carboplatin did not show reduction in cell viability after an incubation of 24h. Cytotoxicity evaluation and cellular uptake study in Retinoblastoma cell line (Y79) proved higher cytotoxicity and higher cellular uptake as compared to free drug. Ex-vivo penetration study showed a higher penetration of nanoparticles (loaded with Rhodamine-6G) when applied on eye as compared to free dye. Thus the formulation showed potential for less toxic and more effective treatment of retinoblastoma.

Keywords— Retinoblastoma, Carboplatin, Ocular drug delivery, Cytotoxicity.



Free rhodamine dye after 3h of incubation.

Nanoparticle loaded with rhodamine after 3h of incubation.

Figure 1:

(A) Cryo-FEG-SEM image of nanoparticle. (B,C)Confocal images of retinal smear after application of formulation on eye.

Professional Biography (100-150 words)

Ritika is a Dual Degree student (M.Tech.-Ph.D) in Biomedical Engineering at the Department of Biosciences and Bioengineering, Indian Institute of Technology Bombay. She is a biotechnologist by training and has experience in areas of nanotechnology and drug delivery. Her research interests include stimulus responsive drug delivery using smart nanoparticles and the use of such nanoparticles in the development of point-of-care devices for the detection and monitoring of various diseases.



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Any Comments: