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Preparation of nano albumin-flutamide (Nab-flu) conjugate and evaluation of its *in vitro* drug control release, anticancer activity and genotoxicity

S Karthick Raja Namasivayam* & AT George Robin

Department of Biotechnology, Sathyabama University, Chennai, Tamil Nadu, India

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Cancer is one of the most common noncommnicable diseases of mankind which causes considerable deaths worldwide. Though there have been consistant efforts on prevention and control, cancer still ranks second in global mortality, causing one out of every six deaths. Nanotechnology has radically changed the way cancer is diagnosed, imaged and treated. Researchers have designed novel nanodevices capable of detecting cancer at its earliest stages, pinpointing its location within the body and delivering drugs specifically to malignant cells. Albumin, with active tumor targeting capacity, is a versatile drug carrier in anticancer drug delivery system. In this study, preparation of BSA nanoparticles has been optimized with various parameters such as pH, ethanol to BSA ratio and crosslinking time in order to improve drug delivery. The optimal pH was found to be 8.0, the ethanol to albumin ratio was found to be 4:1 and cross linking time of 8 h which gives the higher yield of BSA nanoparticles. Nanodrug conjugate was prepared using the optimized conditions and the nanospheres formed were characterized using SEM which showed a particle size of nanosphere in the range of 160-230 nm. Fourier transform infrared spectroscopy (FTIR) analysis showed the possible functional groups of nano drug conjugate. The drug loading efficiency and entrapment efficiency were found to be 81 and 83%, respectively. The *in vitro* drug release profile was studied by continuous dialysis method. Cumulative release reached almost 81% after 24 h and showed an almost released ability of the nanoparticle formulation. Sustained and controlled release profile of flutamide facilitates application of nanoparticles for delivery of anticancer drugs. The Nab-Flu, Nab was found to have very low toxicity on Vero cell line and a higher toxicity in hep2 cell lines. Further, genotoxicity study revealed the Nab and Nab-Flu showed a zero genotoxicity.

Keywords: Flutamide, Hep 2 cell line, Nanoalbumin, Nano conjugate,