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Study on brain targeting Zidovudine loaded PLGA nanoparticles for AIDS therapy

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Abstract

HIV is a neurotropic virus that directly infects brain shortly after infection. HIV replicates in brain macrophages and microglia, causing neurotoxic and inflammatory responses. The antiretroviral agents in conventional drug delivery systems having problems like inability to cross blood brain barrier. In this current study Zidovudine loaded PLGA nanoparticles were prepared coated and further investigated for effective brain targeting. IR and DSC studies were performed to determine the interaction between excipients used and to find out form of drug in the formulation. Formulations were prepared by adopting 2^3 factorial designs to evaluate the effects of process and formulation variables. The prepared formulations were subjected for *in vitro* and *in vivo* evaluations. *In vitro* evaluations showed particle size below 100 nm, entrapment efficiency of formulations ranges from 28 – 57%, process yield of 60 – 76% was achieved and drug release for formulations were in the range of 50 – 85 %. The drug release from the formulations was found to follow Higuchi release pattern, n – value obtained after Korsemeyer plot were in the range of 0.56 to 0.78. *In vivo* evaluations performed in mice after intraperitoneal administration of Plain Zidovudine solution, uncoated and coated formulation. Formulation when coated with Tween 80 achieved higher concentration in brain than that of drug in solution and uncoated formulation. Stability studies indicated that there was no degradation of drug in the formulation after 90 days of preparation when stored in refrigerated condition.

Biography

C. Vijaya Raghavan obtained his B.Pharm and M.Pharm degrees from College of Pharmaceutical Sciences, Manipal and Ph.D. from The Tamil Nadu Dr. M.G.R. Medical University, Chennai. He is the Head Department of Pharmaceutics at PSG College of Pharmacy, His research interests are in the field of Nanotechnology, Buccal, Colon and Nasal drug delivery system; Bioavailability and Bioequivalence studies. He has published 32 research papers in International and National journals .He is the editor for the scientific journal **"International Journal of Pharma Research".** He has published two books, **A Practical Handbook of Physical Pharmaceutics in the year 1985** and **Experimental Biopharmaceutics and Pharmacokinetics in the years 2006** by New Century Book House (P) Ltd., Chennai