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Ganciclovir-loaded solid lipid nanoparticles prepared with TPGS as stabilizer: Formulation, characterization and *in vitro* drug release

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Ganciclovir (GAN) is an antiviral drug effective against cytomegalovirus infections that occur frequently in immuno-compromised people. This drug presents a very important drawback of poor oral bioavailability (5-6%) leading to administration of high daily doses (3g/day). To overcome this drawback, solid lipid nanoparticles (SLNs) were developed as potential bioavailability enhancer to improve oral bioavailability of ganciclovir (GAN). The SLNs were prepared by a double emulsion-solvent evaporation method, using glyceryl monostearate as the solid lipid and Vitamin E TPGS as the stabilizer. The SLNs were characterized for shape, size, zeta potential, and percentage drug entrapment and drug release were studied. The effects of varying lipid and stabilizer concentrations on the properties of the formulations such as particle size and entrapment efficiency were investigated. Optimized SLNs had particle size of 151.95±0.41 nm and encapsulation efficiency of 37.86±0.72 %. Morphological analysis using scanning electron microscopy confirmed the nanometer size and suggested a spherical and smooth surface of the nanoparticles. The SLN formulations exhibited biphasic release characteristics with initial burst followed by sustained release up to 8 hours. The release pattern was best described by the Baker-Lonsdale model (R2=0.9786), which describes the release of drugs from spherical matrices by diffusion mechanism. The Fickian diffusion as the mechanism of drug release was further confirmed by fitting the data into Korsemeyer Peppas model (n=0.323). The *in vitro* results make these SLNs a suitable system to be developed for the oral GAN delivery.

Biography

Garima Balwani is a research scholar at Department of Pharmacy, BITS Pilani, India, one of the country's most reputed technical universities. She is currently designated as a Senior Research Fellow under the DST-INSPIRE scheme of Government of India. She is a gold medalist at postgraduate level, with highest CGPA at Department of Pharmacy, BITS Pilani. She is currently working on a research project titled "Design and Evaluation of Novel Drug Delivery Systems for Selected Antiviral Drug" involving extensive laboratory work. She also undertakes practical sessions of Pharmaceutics for both undergraduate and post-graduate students of Pharmacy programme.

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