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Formulation, optimization and characterisation of Mebendazole solid lipid nanoparticles for glioblastoma multiforme treatment

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Glioblastoma multiforme (GBM), which is a highly aggressive tumor that invades early into surrounding brain tissue, making cure via surgical resection almost impossible. This study was aimed at developing mebendazole loaded solid lipid nanoparticles (Mbz-SLN) intended for improvement of treatment of GBM. Drug polymer compatibility studied by FTIR, DSC and X-RD studies revealed that drug and polymers are compatible. Modified solvent diffusion evaporation method was selected for preparation of solid lipid nanoparticle. The prepared SLN were evaluated for various characteristics like particle size, zeta potential, entrapment efficiency and drug loading. The in-vitro release study showed biphasic release pattern with initial burst effect followed by sustained release up to 49 hours. The optimized batch follows korsmeyer peppes model of drug release. With increase in lipid-drug ratio, particle size and entrapment efficiency were increased whereas the percent of drug released was decreased. The TEM images for optimized batch exhibited the spherical shape with smooth surface. The X-RD spectra confirmed that the drug inside the SLN has been changed from crystalline form to amorphous. *In-vitro* cytotoxicity study was performed on U373MG cell line by using sulforhodanmoine B (SRB) assay. The Mbz-SLN showed better activity as compared to pure drug (Mbz) due to enhanced permeation and retention (EPR) effect attributed to its smaller size. This study thus demonstrate that mebendazole loaded SLN are promising for the treatment of GBM.

Biography

Ajit Chandra Divedi, a Post graduate fellow, Indian Institute of Technology (Banaras Hindu University), India. His current area of research is Nano technology based drug delivery system. Before joining as Postgraduate fellow, he had completed Bachelor in Pharmacy from Department of Pharmaceutics, IIT (BHU) with distinction. He had worked with Indian Drug and Pharmaceutical Limited (IDPL), India in tablet and capsule manufacturing unit as production trainee. He has qualified GPAT-2013 with All India Rank 375. He received financial assistance, from MHRD, Government of India for his Post-graduation research work.

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