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Mannose analogue decorated lipidic nanoparticles for targeted drug delivery to brain glioma

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Chemotherapy for brain glioma has been of limited value due to the inability of transport of drug across the blood-brain barrier (BBB) and poor penetration of drug into the tumor. For overcoming these hurdles, surface conjugated lipidic nanoparticles were developed with novel mannose derivative for targeting brain glioma. Lipidic nanoparticle were prepared by solvent emulsification and evaporation process and consequently characterized by various techniques like Differential scanning calorimetery (DSC), Dynamic light scattering (DLS). Drug loaded lipidic nanoparticles were surface modified with mannose derivative using carbodiimide coupling. Conjugation was confirmed using Infrared spectroscopy (IR). Drug encapsulation and *in vitro* release studies were carried out using HPLC. Conjugated lipidic nanoparticles were found to give sustain drug release as compared to drug solution. The targeting effects were evaluated on the glioma cell lines (U-87 MG). Cell toxicity assay were performed and results were encouraging with remarkable decrease in IC50 values as compared to drug encapsulated unconjugated lipidic nanoparticles and drug control and was further corroborated with cell uptake assay. Drug loaded mannose derivative-conjugated lipidic nanoparticles showed better IC50 and improved cell uptake. Hence, these conjugated lipidic nanopartiles are efficient delivery vehicle to target drugs to brain tumors.

Biography

Indu Singh has completed her MS from U.P Technical University, India. She was recipient of gold medal during her graduation as well as post graduation. Currently, she is a doctoral student in Department of Pharmaceutics, NIPER-Hyderabad, working under the mentorship and co-mentorship of Dr. Ramakrishna Sistla, Scientist E-II, CSIR-Indian Institute of Chemical Technology, Hyderabad, India and Dr. Wahid Khan, Assistant Professor, National Institute of Pharmaceutical Education & Research (NIPER), Hyderabad, India respectively. She has been working on bioconjugated nanoparticles for brain tumors and other brain diseases like Alzheimers, Parkinson disease etc.

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New trends in site-specific drug delivery

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A challenge for drug therapy research is to selectively target drugs to diseased organs and tissues. This would allow more efficient use of drugs by achieving higher concentrations in target organs and lowering concentration in remaining tissues, with a consequent reduction of side effects. Targeted drug delivery is appealing for application in a variety of diseases, such as cardiovascular diseases and diabetes; however, the area of main interest for the application of these methods is in oncology, where concentration of the drug in tumor cells is a crucial issue. Different strategies are being investigated in order to improve targeting of drugs to cancer cells. In passive targeting, increased delivery of the drug to target cells is achieved by taking advantage of the intrinsic properties of the tumor vasculature which permits an increase in the non-specific trapping of drugs, whereas active targeting is based on the use of tumor targeting bioactive compounds to drive drug accumulation. Genetically engineered nanocarriers are precisely controlled in size and structure and can provide specific control over sites for chemical attachment of drugs. This presentation will throw a beam of light on recent development of applications in drug and gene site-specific delivery.

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