

Successful delivery of docetaxel to rat brain using experimentally developed nanoliposome: A treatment strategy for brain tumor

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In the field of neuroscience research, the treatment of brain cancer remains a challenge due to poor permeation of conventional chemotherapeutic drugs across the blood–brain barrier (BBB). Docetaxel (DTX) is found to be very effective against glioma cell *in vitro*. However, *in vivo* passage of DTX through BBB is extremely difficult due to the physicochemical and pharmacological characteristics of the drug. No existing formulation is successful in this aspect. Docetaxel is known to be effective against various tumors, including brain glioma. Nanoliposomal formulation is a promising novel strategy for site-specific drug delivery, without affecting normal tissues. In this study, effort was made to send DTX through blood–brain barrier (BBB) to brain to treat diseases such as solid tumor of brain (glioma) by developing DTX-loaded nanoliposomes. Primarily drug-excipients interaction was evaluated by FTIR spectroscopy. The DTX-loaded nanoliposomes (L-DTX) were prepared by lipid layer hydration technique and characterized physicochemically. *In vitro* cell viability assay and cellular uptake in C6 glioma cells was investigated. Further, *in vivo* plasma and brain pharmacokinetic study by LC-MS analysis was performed. FTIR data show that the selected drug and excipients were chemically compatible. The vesicle size was less than 50nm with smooth surface. Drug released slowly from L-DTX *in vitro* in a sustained manner. The pharmacokinetic data shows more extended action of DTX from L-DTX in experimental rats than the free-drug and Taxotere. DTX from L-DTX enhanced 100% drug concentration in brain as compared with Taxoterein 4 h. Thus, nanoliposomes as vehicle may be an encouraging strategy to treat glioma with DTX.

Biography

Salman Mondal has completed his masters in pharmacy (clinical pharmacy and pharmacy practice) from Department of Pharmaceutical Technology, Jadavpur University, Kolkata, West Bengal, India. His project work on " Prospective observational study to asses patients profile with clostridium defficile colitis in ICU " and project has been done with collaboration of AMRI Hospital, Kolkata, West Bengal, India.

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