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Nanostructured lipid carriers for intranasal delivery for improved brain targeting in Alzheimer's disease

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Curcumin is a polyphenol derived from the dietary spice turmeric has shown to slow down the progression of Alzheimer's disease by reducing β-amyloid and its neuroprotective effects. However, its therapeutic efficacy is limited by short half-life and poor oral bioavailability. The objective of the present work is to design curcumin loaded nanostructured lipid carriers (NLCs) for intranasal delivery for direct delivery to brain. The NLCs were prepared using microemulsion technique using lipids and oil selected based on partition coefficient and saturation solubility studies. The NLCs showed particle size of 4.35-38.9 nm. It was found that each of formulation variables had a significant effect on the particle size. The NLCs were evaluated for cytotoxicity studies using Vero cell lines using MTT assay. The CTC_{50} value was found to be 950mcg/ml. Hence, the formulated NLCs were non-toxic. The NLCs were further characterized for drug loading and entrapment efficiency. NLCs were subjected to differential scanning calorimetry and x-ray diffraction studies which revealed that drug was present in amorphous form in NLCs. The *ex vivo* release studies of the NLCs were carried out using sheep nasal mucosa in comparison with drug suspension. The results revealed that release rate was faster from drug suspension as compared to NLCs. This affect may be attributed to the barrier properties of mucosa and lipid matrix that delayed the release of curcumin from NLCs. It can be concluded that NLCs were prepared successfully having low particle size and can be used to deliver curcumin for management of Alzheimer's disease.

Biography

Sumeet Sood is working as a INSPIRE fellow under Department of Science and Technology, Government of India since July 2010. He is working in the area of lipid based nanoparticulate delivery systems for targeting to brain. He has received Masters in Pharmacy in Pharmaceutics (Gold Medalist) from J.S.S. University, Mysore, India in June 2010. He has co-authored 2 patents, 6 publications and 1 book chapter. He has presented 20 papers in national and international conferences.

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