

Nose-to-brain delivery of artemether loaded nanostructured lipid carriers for management of cerebral malaria

Kunal Jain¹, Sumeet Sood¹, K. Gowthamarajan¹, K. Elango², B. Suresh³

¹Department of Pharmaceutics, J.S.S. College of Pharmacy, Constituent College of J.S.S. University, India

²Department of Pharmacology, J.S.S. College of Pharmacy, Constituent College of J.S.S. University, India

The purpose of the present investigation was to prepare artemether (ARM) loaded nanostructured lipid carriers (NLCs) to enhance the uptake of ARM to brain via intranasal delivery. NLCs were prepared using microemulsion technique and were characterized for particle size, size distribution, zeta potential, encapsulation efficiency, drug loading and *in vitro* drug release. The NLCs showed particle size of 14.2 to 30.5 nm with zeta potential of -32.5 ± 0.52 mV. The cytotoxicity of NLCs on *in vitro* vero cell lines and red blood cells were also assessed in order to evaluate the impact of surface modifications on toxicity of the different formulations. The CTC₅₀ value of NLCs was found to be >2000 mcg/ml and they showed no lysis of red blood cells. Hence, it can be concluded that NLCs were non toxic and safe. NLCs were subjected to differential scanning calorimetry (DSC) and x-ray diffraction (XRD) studies which revealed that drug was present in amorphous form in NLCs. Scanning electron microscopy studies confirmed that NLCs were spherical in shape and size was in agreement with results obtained from particle size analysis. The *ex vivo* release studies of the formulated NLCs were carried out using sheep nasal mucosa in comparison with drug suspension in simulated nasal fluid. The results revealed that release rate was biphasic and faster from drug suspension as compared to NLCs. It can be concluded that prepared NLCs having low particle size can be used to deliver artemether intranasally and would therefore be effective in improving the treatment of CM.

Biography

Kunal Jain is currently the Senior Research Fellow from Council of Scientific and Industrial Research (CSIR) at JSS College of Pharmacy, Udhagamandalam, India. He holds a B.Pharm from RGUHS, Bangalore and M.Pharm (Pharmaceutics) from JSS University, Mysore in the year 2007 and 2010 respectively. He is co-author of 2 patents, 2 publications and 1 book chapter. He is member of Indian Pharmaceutical Association, Mumbai, India and Controlled Release Society-Indian Chapter. He has presented 19 papers in national and international conferences. Recently, he has been selected as Wiley Science Advisor, John Wiley & Sons, Inc., USA.

kunaljain_15@yahoo.co.in