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Design, characterization and *in vitro* and *in vivo* evaluation of chloroquine phosphate loaded nanostructured lipid carriers

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Chloroquine, a 4-Aminoquinoline derivative was once the mainstay of antimalarial therapy for about eight decades. But in the last few decades, the use of chloroquine in the treatment of malaria has declined due to the emergence of CQ-resistant strains of *Plasmodium* species. However, the use of resistant drugs can be reinstigated with the help of nano drug delivery systems as they have got site specific targeting, can reduce dose related toxicity and their ability to interact with the parasitized RBCs and parasite membrane. In the present research work, a modified double emulsion technique was employed to optimize chloroquine phosphate (CQ) loaded nanostructured lipid carriers (NLCs) with the help of response surface methodology. The optimized CQ loaded NLC showed a particle size of 66.50 ± 1.21 nm, PDI of 0.210 ± 0.016 , ZP of $+38.4 \pm 1.44$ and EE of 78.2 ± 1.2 % respectively. A good spherical surface morphology of the CQ-NLCs was observed with help of transmission electron microscopy. Differential scanning calorimetry and X-ray diffraction study demonstrated total solubilization of the drug within the lipid matrix, suggesting the increase in physical stability of the drug in the prepared NLCs. An enhanced antimalarial efficacy with a better suppression of parasitemia and with an increased efficacy of more than 23% was observed for the *in vitro* and *in vivo* antimalarial studies of CQ loaded NLCs in comparison to pure drug. The results clearly indicated that the use of nano lipids carriers can be very useful in overcoming the problems associated with the present antimalarial available.

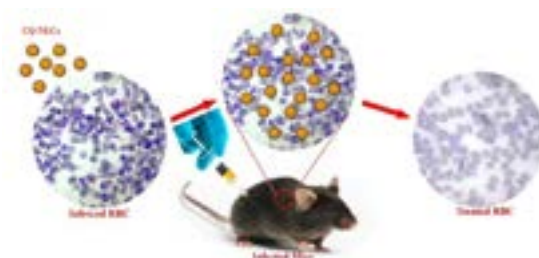


Figure 1: Effect CQ-NLCs on infected RBC.

Recent Publications:

1. Baruah U K, Gowthamarajan K, Vanka R, Karri V V, Selvaraj K and Jojo G M (2017) Malaria treatment using novel nano-based drug delivery systems. *Journal of Drug Targeting*. 25(7):567-581.
2. Selvaraj K, Gowthamarajan K, Karri V V, Baruah U K, Ravisankar V and Jojo G M (2017) Current treatment strategies and nanocarrier based approaches for the treatment and management of diabetic retinopathy. *Journal of Drug Targeting*. 25(5):386-405.

Biography

Uday Krishna Baruah is a Research Scholar from India pursuing his Doctorate degree in Pharmaceutical Science at JSS college of Pharmacy, Ooty under Jagadguru Sri Shivarathreeswara University, Mysuru, India. He completed his Masters of Pharmacy from the same college. He has been associated in the field of formulation and development of lipid based drug delivery systems for the last five years. His recent field of research interest is on the development of antimalarial loaded in to lipid based nano drug delivery systems for the better and improved treatment of malaria by overcoming the limitations associated with the present antimalarial drugs.

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