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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 8 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 reinstated 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 $78.2 \pm 1.2\%$ 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 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 antimalarials available.

Recent Publications

1. Baruah U K, Gowthamarajan K, Vanka R, Karri V V, Selvaraj K, 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, 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.

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