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To develop and evaluate the proliposomes dosage form for Simvastatin

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The objective of the study was to develop and evaluate the proliposomes dosage form for Simvastatin. Proliposomes were prepared using D- Mannitol as a carrier, Leciva S70 (soya phosphatidylglycerol) as a phospholipids (SPG) and cholesterol as stabilizing agent by Film deposition on carrier method. Proliposomes drug delivery system is a novel drug delivery system used to increase the solubility of poorly water soluble drugs, efficacy and reduce the toxicity. Simvastatin is a hypolipidemic drug classified as a Bio-pharmaceutics Classification System (BCS) Class-II compound with a poor aqueous solubility (2.24 µg/ml) and an acceptable permeability through bio-membranes. The strategy of the study is to increasing oral bioavailability when using Proliposomes dosage form. The prepared Proliposomes were evaluated for different parameters. From the FTIR results and DSC results, it was confirmed that no interaction between the Simvastatin and excipients. Particle size analysis showed that the increase in the carrier ratio, there is increase in the particle size of Proliposomes, particle size were in the size range of 142.6-202.1 nm. SEM photographs conforms that the prepared formulations were spherical. XRD studies revealed that the Simvastatin in Proliposomes were amorphous in nature. So, that it helps to increase in the solubility of the Simvastatin in the range of 15.01±0.026 to 57.80±0.015µg/ml in pH 7.4 buffer. The drug release from the optimized formulation was extended upto 12 hr and the percentage release was 99.78±0.067%. Stability data confirmed that there was no significant change in drug content & physical appearance in the stability conditions. HPLC system was applied to study the concentration of Simvastatin in the plasma of the healthy Albino Wister rats after oral administration of Simvastatin proliposomes and pure simvastatin. The pharmacokinetic parameters were calculated by the Kinetica 5.0 software. The concentration–time curves of pure Simvastatin and Simvastatin proliposomes were much more different. The pharmacokinetic parameters of pure Simvastatin and Simvastatin proliposomes in Albino Wister rats were Tmax was 2±0.5 and 4±0.7 hr; C_{max} 10.4±2.921 and 21.18±12.321 µg/ml; AUC0-∞ 67.124±0.23 and 179.75±1.541µg/ml*hr respectively. The bioavailability of pure Simvastatin in proliposomes was more than the Simvastatin proliposomes. The optimized Simvastatin proliposomes did improve the oral bioavailability of Simvastatin in Albino Wister rats and offer a new approach to enhance the gastrointestinal absorption of poorly water soluble drugs.

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Nanoparticle formulations of decoquinate increase bioavailability and antimalarial efficacy against liver stage Plasmodium infections in mice

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Decoquinate (DQ) is highly effective at killing malaria parasites *in vitro*; however, it is extremely insoluble in water. In this study, solid dispersion method was used for DQ formulation which created a suitable physical form of DQ in aqueous phase for particle manipulation. The formulation particles were reduced to a mean size between 200 to 400 nm, which was stable in aqueous medium for at least three weeks. Pharmacokinetic (PK) studies showed that compared to DQ microparticle suspension, a nanoparticle formulation orally dosed to mice showed a 14.47-fold increase in area under the curve (AUC) of DQ plasma concentration and a 4.53-fold increase in AUC of DQ liver distribution. Three separate preparations at doses of decoquinate 0.5-5 mg/kg were examined in mice infected with *Plasmodium berghei*. Oral administration of nanoparticle decoquinate at a dose of 1.25 mg/kg effectively inhibited the liver-stage parasite growth and provided complete causal prophylactic protection. This efficacy is 15 fold greater than that observed for microparticle decoquinate, which requires minimal dose of 20 mg/kg for the same inhibitory effect. Further *in vitro* studies utilizing dose–response assays revealed that decoquinate nano formulation was substantially more potent than decoquinate microsuspension in killing both liver and blood stage malarial parasites, proving its potential for therapeutic development.

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