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Simvastatin solid lipid nanoparticles for improving the oral bioavailability

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Statins are HMG-CoA reductase inhibitors which are commonly prescribed to reduce the LDL-cholesterol. Statins lower cholesterol level through reversible and competitive inhibition of HMG-CoA reductase. An enzyme involved in the biosysnthesis of cholesterol and other sterols. Among all statins (atorvastatin, pravastatin, fluvastatin, cerivastain, lovastatins and simvastatin) Simvastatin and lovastatin exhibit poor oral bioavailability (< 5%). All statins undergo extensive microsomal metabolism by CYP enzymes. CYP3A4 is the major metabolizing enzyme that metabolizes lactone form of Simvastatin and significantly lower intestinal uptake. The hydrophobic properties of simvastatin prevent complete dissolution of the drug in the intestinal fluid which also contributing for its lower bioavailability. Solid lipid nanoparticles are alternative carrier system to polymeric nanoparticles. Solid lipid nanoparticles are in submicron size range (1 – 1000 nm). SLN can be administered through oral, parentral, topical and pulmonary routes. Additional advantage of SLN include, lack of coalescences thus increase in physical stability. To overcome the hepatic first pass metabolism and to enhance the bioavailability, intestinal lymphatic transport of drugs can be exploited. In the present study attempt has been made to prepare solid lipid nanoparticles of simavastatin for improve the bioavailability. Solid lipid nanoparticles of simvastatin were prepared with triglycerides such as Trimyristin, Tripalmitin and Tristearin by hot homogenization followed by Ultrasonication method. The SLNs were characterized for size, zeta potential, entrapment efficiency, drug content and drug release. They were also evaluated by XRD, DSC for studying the interactions. Promising results of the study indicated the applicability of simvastatin solid lipid nano particles as potential tools for improvement of bioavailability of poorly soluble drugs.

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