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Solid Lipid Nanoparticulate Delivery of Raloxifene Hydrochloride as an Effective Pharmaceutical Drug Carrier in Breast Cancer Managment

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Raloxifene hydrochloride is a selective estrogen receptor modulator (SERM) and is useful in treatment of breast cancer. It exhibits low oral bioavailability (less than 2%) and high inter-patient variability in humans due to its poor solubility across GIT and extensive intestinal glucuronidation. In order to achieve the broader objective extensive preformulation studies were carried out to establish physicochemical properties of Raloxifene Hcl including Particle Size, Zeta potential, SEM & TEM and interaction that could further aid in selection of appropriate excipients and manufacturing conditions. Lipid based nanoparticles were developed for delivery of Raloxifene and Optimized formulations were subjected to investigate the effect of Raloxifene (Rlx) loaded solid lipid nanoparticles (SLNs) on MCF7 breast cancer cells . Rlx-SLNs were produced by the hot homogenization method. The characterization studies of SLNs demonstrated good physical stability with small particle size. The related apoptosis-associated target-genes in both MCF7 and MCF7-Rlx resistant cells without damaging the MCF10 control cells ($p < 0.05$). We demonstrated a molecular mechanism of the induction of apoptosis by Rlx-SLNs in MCF7 and thus Rlx-SLNs were more effective. The present study suggests that the use SLNs may be a potential therapeutic strategy to overcome resistance of raloxifene in breast cancer.

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