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Design and development of liposomes for colon targeted drug delivery

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Purpose: Liposomes have shown potential to specific accumulation at inflammation site thus reduce toxicity; hence it can be used for effective treatment of IBD.

Methods: Liposomes prepared using thin film hydration method. Statistical design was used for optimization. Colitis was induced using acetic acid. Inverted sac method was used as *ex-vivo* model for IBD. MPO activity and histopathology comparative study was carried out. Liposomes were formulated in enteric coated capsules to deliver the liposome specifically in initial segment of colon.

Results: Particle size and entrapment efficiency were between 200-300 nm and 40-60% respectively. *In vivo* & *ex vivo* study indicates higher accumulation of liposomes in colonic region as compared to pure drug. Enteric coated capsules delivered the drug after 5 hr lag time.

Discussion: Low particle size is attributed to low lipid content and stabilization due to surfactant. At higher cholesterol level, vesicles cannot reshuffle into smaller vesicles due to rigidization. Study shows higher accumulation of liposomes due to its lipoidal nature as compared to pure drug due to membrane transfer mechanism of drug thus MPO significantly lowers as compared to standard group ($p<0.05$).

Conclusions: Higher accumulation of liposomal drug in inflammatory area and specific release of liposomes by enteric coated capsules provide better option for the treatment of colonic disease.

Comparative nephrotoxicity of khat and gentamicin in rats

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Khat use has been reported to produce significant acute and chronic toxic effects including oxidative damage of cellular macromolecules such as DNA, lipids and proteins contributing to the development of several pathologies, notably cancer, nephrotoxicity, hepatotoxicity and neurodegenerative diseases. Various studies have been carried out on the pharmacological actions of khat. However, the effect of khat induced changes in the kidney has not yet been worked out in details. The aim of this study was therefore to investigate if khat administration has a potential to cause significant nephrotoxicity in rats in comparison with gentamicin.

Forty healthy sprague dawely rats of both sexes, each weighing 170-210 g, were divided into five experimental groups of eight animals and khat was administered in different doses (100 mg/kg, 200 mg/kg and 400 mg/kg) orally for ten days. Gentamicin 100 mg/kg intraperitoneally was given for other groups and served as a positive control. Animals were killed by light ether anesthesia and blood and renal tissue were used to measure renal markers, including creatinine, blood urea nitrogen, antioxidant enzymes as well as markers for lipid peroxidation using established protocols. In addition, histopathological changes were evaluated using hematoxilin-eiosin staining technique.

Administration of khat at high dose (400 mg/kg) significantly caused marked renal dysfunction as evidenced by significantly increased serum creatinine, blood urea nitrogen and MDA level compared to control animals. Superoxide dismutase and catalase enzymatic activities were decreased significantly compared to control animals. Gentamicin treated rats exhibited marked renal injury compared to both control and khat treated groups. In conclusion, khat treatment at high dose induced renal damage that appears to be mild to moderate relative to gentamicin.