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Rajnibhai V. Patel
PharmInnova Award
Best M. Pharm Thesis

WINNER

Winner

Mr. Anand S. Gupta

Research Guide

Dr. Sanjay J Kshirsagar

Subject:
Quality Assurance

Thesis Title :
Design & Development of Liposomes for colon targeted drug delivery

College:
AISSMS College of Pharmacy, Pune

Colon targeted delivery of Budesonide for treatment of inflammatory disorders of colon

Outcome of Research

Drugs used orally in treating colonic diseases may release early in the gut leading to side effects. Hence, it is important to release the drug at the inflammatory site of colon using specific drug delivery. To address this issue, an anti-inflammatory drug- (budesonide) loaded liposomes was formulated in enteric coated capsules and evaluated by ex-vivo method, after inducing inflammation of colon in animal models by acetic acid. The results demonstrated higher drug deposition in colonic inflammatory area with drug release lag time of 5 hours. This will produce a better effect of the drug on the affected site with reduced side-effects. Such a system may also be helpful in delivering cytotoxic drugs to the colon for the treatment of colonic cancer.

Thesis Title:
Design and development of liposomes for colon targeted drug delivery

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ABSTRACT

Background: Local delivery to bowel tissue through oral administration is a challenging but a desirable goal to treat diseases like IBD. CSDDS should be capable of protecting the drug en route colon.

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.

Abbreviations: IBD, CSDDS, EE, MPO