Abstract

Introduction

Fluoxetine is a selective serotonin reuptake inhibitor (SSRI) which enhances cognitive performance and has a large volume of distribution. these indicates a high percentage of the drug accumulating in body tissues and for this reason they cause unwanted side effects.

Chitosan has gained considerable interest as a polymer for preparing nanoparticles because of its biodegradable, biocompatible, non-toxic and mucoadhesive properties. Chitosan has been reported to increase the uptake of macromolecules through opening of tight junctions of epithelial cells and has also been formulated as nanoparticles designed to improve the delivery of therapeutically active molecules across mucosal surfaces.

The purpose of this study is to investigate the effects of polyethylene glycol on chitosan nanoparticles containing fluoxetine in terms of the amount of drug loaded, size, charge and drug release pattern. In this study, chitosan and chitosan/polyethylene glycol nanoparticles were prepared to encapsulate Fluoxetine by ionic gelation method.

Materials and Methods

chitosan and chitosan/polyethylene glycol nanoparticles were prepared by ionic gelation method with Sodium tripolyphosphate / Chitosan / Polyethylene glycol ratio of 1: 5: 20. The nanoparticles were characterized by Dynamic Scattering Light (DLS), Zeta Potential (ZP), Scanning Electron Microscopy (SEM). Fluoxetine release testing was performed at a PBS media.

Results

The size of chitosan nanoparticles was observed to be 208.7 nm with PI 0.284 and the size of chitosan/polyethylene glycol nanoparticles was observed to be 240. 2 nm with PI 0. 243. Encapsulation efficiency was measured by reverse-phase HPLC at about 53%. The release pattern of the drug is slow release and the nanoparticles released 76% of the fluoxetine within 4 hours.

Discussion and Conclusions

Chitosan and Chitosan/Polyethylene glycol nanoparticles were successfully prepared to encapsulate Fluoxetine.They differ a little in size and zeta potential and drug release improved. Studies have clearly demonstrated the potential of nanoparticle in extending the circulation half-life of fluoxetine and in reducing systemic toxicity. More studies can be carried out to further investigate the in vivo PK and PD characteristics.

Key words: Fluoxetine, Blood-Brain-Barrier, Nanoparticle, Chitosan, Polyethylene glycol, Multiple sclerosis