protein/weight microspheres), whereas acidic proteins such as ovalbumin, bovine serum albumin and human growth hormone were incorporated less than 1%. As the pH of the incorporation medium decreases, incorporation capacity was also decreased. Ionic strength and temperature of the incorporation media were also determined as critical factors of the incorporation capacity. These results suggest that the incorporation is mainly caused by ionic interaction between free carboxyl group of the polymer and positive charges of the basic proteins. Conclusively, this non-invasive method of encapsulation of protein into biodegradable PLGA polymeric matrix can be successfully applied to basic proteins with high drug loading.

[PE1-26] [04/21/2000 (Fri) 10:30 - 11:30 / [1st Fl, Bldg 3]]

THE INTESTINAL ABSORPTION OF HEPARIN DISACCHARIDE USING SEVERAL ABSORPTION ENHANCERS IN CACO-2 MONOLAYERS

ChoSY[1], Li H[2], Shim CK[2] and Kim YS[1]*

[1]Natural Products Research Institute, Seoul National University, Seoul 110-460 [2] College of Pharmacy, Seoul National University, Seoul 151-742

The effect of several absorption enhancers was studied using the Caco-2 cell monolayers on the intestinal absorption of heparin disaccharide, a repeating unit of heparin of which the structure is highly charged and heterogeneous. The absorption enhancing activity of a series of compounds was determined by the changes in transepithelial resistance(TEER) and the transport amount of heparin disaccharide across the Caco-2 cell monolayer by HPLC using SAX column. Among the absorption enhancers, dipotassium glycyrrhizinate, 18β- glycyrrhetinic acid, caprate and taurine decreased TEER and increased the permeability of heparin disaccharide in a dose- and time-dependent manner without severe cytotoxicity. Dibutyryl adenosine 3',5'-cyclic monophosphate, which is an endogeneous cAMP analogue, decreased TEER and increased the transport of heparin disaccharide by almost 10% for control without any toxicity. The combination of sodium deoxycholate and dipotassium glycyrrhizinate or 18β- glycyrrhetinic acid or taurine made the absorption more effective than they were used alone. Our results indicate that these absorption enhancers can widen the tight junction, which is a paracellular absorption route of the hydrophilic compounds, such as heparin, chondroitin sulfate and protein drugs. The oral administration of heparin as well as heparin oligosaccharides may be possible using the selective enhancers together.

[PE1-27] [04/21/2000 (Fri) 10:30 - 11:30 / [1st Fl, Bldg 3]]

Preparation and evaluation of microspheres containing GFP for oral vaccine delivery system

Jiang Ge°, Park JP, Kwak SH, Hwang SJ and Maeng PJ[1]

College of Pharmaccy, College of Natural Science[1], Chungam National University

In order to design the oral vaccine delivery system, we prepared the alginate microspheres containing GFP (Green Fluorescent Protein) as a model drug by spraying method.
To optimize the preperation conditions of microspheres, we investigated the effects of various parameters including nozzle pressure, nozzle pening angle, and concentrations of sodium alginate and calcium chloride . The prepared microspheres were evaluated by measuring their size and loading efficiency, and morphology.
The particle size of microspheres was affected by the concentration of sodium alginate and calcium chloride, and nozzle opening angle, and nozzle diameter. As the concentration of sodium alginate increased, GFP loading efficiency and particles size of microsphere also increased. But more than 1.5%(w/v) sodium alginate solution too viscous, So it was difficult to spary the solution, and particles shape was not spherical.The pressure over 2kgf/cm2 didn't affect the size of particles.
As a result,the spraying method enabled us to prepare microspheres for oral vaccine delivery