

P009 Chitosan-coating of liposomes to enhance cellular drug delivery

Laila Kudsiova, Prof. Jayne Lawrence

King's college London, UK

A drug delivery vehicle was formulated comprising distearoylphosphatidylcholine (DSPC) liposomes coated with the cationic chitosan known to increase permeability across epithelial cells, with a view to allowing the delivery vehicle (and any entrapped drug) access to the basolateral side of the epithelial membrane. Efficiency of chitosan coating was determined using a colourimetric assay after removal of any unadsorbed chitosan. Values in the range of 130 μ g of chitosan per mg of DSPC were typically obtained. In addition coated liposomes exhibited a positive zeta potential. Monitoring of size over a period of 49 days showed that coated liposomes were more stable than uncoated liposomes. The effect of the coated liposomes on cellular permeability of intestinal epithelial monolayers of intestinal-like Caco-2 cells and lung epithelial 16HBE14o-cells was studied by measuring the transepithelial-electrical resistance (TER) across the monolayers. Upon addition of coated liposomes a dose and time-dependent reduction in TER was observed in both cell lines, no such effect was seen when the uncoated liposomes were added. Paracellular permeability studies across 16HBE14o-cell monolayers showed 14, 5, 2.1 and 1.8-times increases in the transport rates of ¹⁴C-mannitol, 40kDa, 250kDa and 2MDa FITC-dextran respectively. Coated liposomes exhibited much less toxicity (thiazolyl blue (MTT) assay) than free-chitosan, toxicity was however dependent upon media pH, time of incubation and cell line. In conclusion chitosan-coating of liposomes possibly enhances the delivery of encapsulated drug to the basolateral membrane of epithelial cells as well as enhancing formulation stability.