P265 THE POTENTIAL OF CHITOSAN AS MUCOADHESIVE DRUG CARRIER: STUDIES ON ITS INTERACTION WITH PIG GASTRIC MUCIN ON A MOLECULAR LEVEL

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Various chitosans have shown potential as mucoadhesives in gastrointestinal drug delivery systems by measuring detachment forces of swollen polymer from mucosal tissue. In our investigations we attempt to elucidate the interaction between pig gastric mucin (as the major component of mucus apart from water) and two chitosans on a molecular level. Turbidity measurements of mucin-chitosan mixtures in solution as well as co-sedimentation experiments using analytical ultracentrifugation show a pronounced precipitation effect. Sedimentation coefficients for mixtures of both components are of an order of 10^2-10^4 higher than s-values for the single components. Classical light scattering suggests a spherical complex with an average diameter of 300nm. These findings were confirmed by transmission electron microscopy and scanning tunnelling microscopy. Colloidal gold was used to localise chitosan within the complex using a chitosan-gold probe as well as a chitosan-[wheat-germ-agglutinin]-gold probe. The micrographs show that colloidal gold and hence chitosan tend to concentrate within the centre of a globular structure which is heavily covered by mucin. The complex formation does not occur when sialic acid free mucin is employed. Complexation can be reduced by an increase in ionic strenth and the presence of 6M guanidine. These results suggest that a combination of ionic and hydrophobic interactions are responsible for the precipitate formation.