

International Conference & Exhibition on Vaccines & Vaccination

22-24 Nov 2011 Philadelphia Airport Marriott, USA

Novel mucoadhesive nano-colloidal carriers as potential oral vaccine delivery system

Anshuman Shukla

University Institute of Pharmaceutical Sciences,
UGC-Centre of Advanced Studies, Panjab
University, India

Objective: The currently marketed parenteral vaccines fail to induce mucosal antibody response. Thus, oral immunization can be an effective alternative. However, the disadvantage of denaturation, degradation and lower uptake of the antigens in gut environment consequently requires larger doses and more frequent dosing. Further, this can induce systemic non-responsiveness. Therefore, the objective of the present study was to overcome these problems using novel mucoadhesive nano-colloidal carriers (NMNC) and Diphtheria Toxoid (DTx) as the model antigen, which could provide both protection to the antigen and subsequently cause systemic as well as mucosal immunity.

Methods: In the present study, the NMNC were prepared and characterized *in-vitro* for their shape, size, percent entrapment, surface charge and stability. The confocal laser scanning microscopy was carried out to confirm the uptake their by gut associated lymphoid tissues. The *in-vivo* part of the study comprised estimation of anti-DTx-IgG response in serum and anti-DTx- sIgA in various body secretions using ELISA following oral immunization.

Results: The results showed that the developed NMNC, with entrapment efficiency of around 24% to 26%, were highly stable in simulated fluids. The *in-vivo* uptake studies revealed that the NMNC with fluorescent marker were efficiently taken up by the Peyer's patches. The two times higher DTx dose-loaded formulation produced comparable anti-DTx-IgG levels in serum to those observed in the case of intramuscular (IM) administration of alum-adsorbed-DTx. Also, the formulations elicited measurable sIgA in mucosal secretions and as expected, such responses were not observed in IM-administered alum-adsorbed-DTx.

Conclusion: The developed novel mucoadhesive DTx-loaded nano-colloidal carriers produced comprehensive responses upon oral administration without the induction of tolerance. However, the realistic effectiveness could only be realized after elaborative studies elucidating the mechanisms of better immune responses, by clinical and preclinical trials with large populations.

Biography

He is a UGC-Doctoral Research Meritorious Fellow, working in the area of Novel Vaccine Delivery Systems, at University Institute of Pharmaceutical Sciences, Panjab University, India. Recently, he has been awarded with prestigious Bill and Melinda Gates Global Health Travel Award. Earlier, he was awarded with "Young Scientist Award 2009" by M.P. Council of Science and Technology, India. He has presented his research work through podium presentations in International conferences held in Italy (2010), Portugal (2010) and as poster in Canada (2011). He has 7 international research publications in high impact peer-reviewed journals.