Mucosal and humoral immunities were acquired after priming mice with liposomal particle sandwiched by chitosan.

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The unique characteristics of chitosan [α-(1-4)-amino-2-deoxy-β-D-glucan, a deacetylated form of chitin] such as positive charge, biodegradability, biocompatibility, non-toxicity, and rigid linear molecular structure make this macromolecule ideal as drug carrier. The association between chitosan (Chi) and liposomes (REVs) permits the design of oral vehicle for vaccine delivery with great capacity of antigen loading. The REVs-Chi was further interfacial polymerized with polyvinyl alcohol (PVA) to enhance particle stability and/or change hydration properties. Empty REVs, REVs-Chi or REVs-Chi-PVA were designed to encapsulate Dtxd (Diphtheria toxoid). Mice were immunized orally or subcutaneously to study also the potential adjuvant effect of Chi or and PVA on the immune response. Light scattering, inversion phase, confocal, and electronic transmission microscopies, freeze-fractures and biological assays were done to well characterize the designed particles. The efficiency encapsulation capacities were dependent of particle complexicity being REVs-Chi-PVA/Dtxd > REVs-Chi/Dtxd > REVs/Dtxd (75.4, 69.2 and 58.8 %, respectively). Round particles of 383 nm, 524 nm and 256 particles of REVs-Chi-PVA/Dtxd, REVs-Chi/Dtxd and REVs/Dtxd, respectively were obtained. The response patterns and the immune maturity were measured by IgG_1 and IgG_{2a} titrations. REVs-Chi or REVs-Chi-PVA containing Dtxd elicited both antibodies production giving the animals higher immune response and selectivity. The REVs-Chi/Dtxd or REVs-Chi-PVA/Dtxd particles were able to enhance both salivar and vaginal IgA.

Keywords: Chitosan hydration, PVA hydration, interfacial polymerization, oral adjuvant, vaccine delivery.
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