

Development of Cationic Gelatin Nanoparticles as an Antigen-Carrier for Mucosal Immunization

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Abstract : Mucosal vaccine induces both mucosal (secretory IgA) and systemic immune responses and it is considered an ideal vaccination strategy for prevention of infectious diseases. One important point to be considered in mucosal vaccination is effective antigen delivery system which can manage effective delivery of antigen to antigen-presenting cells (APCs) of mucosal. In the present study, cationic gelatin nanoparticles were prepared as ideal carriers for more efficient antigen delivery. The average diameter of cationic gelatin nanoparticle was approximate 190 nm, and the zeta potential was about +45 mV, then ovalbumin (OVA) was physically absorbed onto cationic gelatin nanoparticle. The OVA absorption rate was near 95% the zeta potential was about +20 mV. We show that cationic gelatin nanoparticle effectively facilitated antigen uptake by mice bone marrow-derived dendritic cells (mBMDCs) and RAW264.7 cells and induced higher levels of pro-inflammatory cytokines. C57BL/6 mice twice immunized intranasally with OVA-absorbed cationic gelatin nanoparticle induced high levels of OVA-specific IgG in the serum and IgA in their in the nasal and lung wash fluid. These results indicate that nasal administration of cationic gelatin nanoparticles induced both mucosal and systemic immune responses and cationic gelatin nanoparticles might be a potential antigen delivery carrier for further clinical applications.

Keywords : antigen delivery, antigen-presenting cells, gelatin nanoparticle, mucosal vaccine

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