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Development of a new adjuvant for flu vaccine

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Although vaccine adjuvants have been used for almost a century, alum is only adjuvant licensed by the US FDA for human vaccine use. Many adjuvants studied to date have generated inflammatory properties and lack specificity in terms of targeting immune compartments and cell populations. It has been reported that toll-like receptors bind different determinants to trigger unique inflammatory cascade events that has yielded TLR agonist with adjuvant potential. Specific examples of TLR4 stimulation include bacterial derived adjuvant such as monophosphory lipid A (MPLA). Because TLR signaling may not be critical for Th2 immune response, TLR agonists show particular promise as adjuvants of cytotoxic T cell activity. Currently, we reported that the innate immune responses induced by the treatment of 1-PGA in macrophages and DCs were mediated by TLR4 using MyD88 knock-out and TLR4 deficient mice. We also found that 1-PGA nanoparticles strongly induced cytokine production, up-regulation of costimulatory molecules, and the enhancement of T cell stimulatory capacity in DCs. 1-PGA chitosan NPs are excellent vaccine carriers capable of delivering antigenic proteins to antigen-presenting cells and eliciting potent immune responses based on angiten specific cytotoxic T lymphocytes. Ag-mixed with 1-PGA nanoparticles are capable of inducing strong cellular and humoral immune responses. We also investigated the adjuvant effect of 11PGA nanoparticles using influenza split vaccine. These finding indicates that 1-PGA nanoparticle may be a candidate of the future vaccine adjuvant.