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# Protamine/carboxymethyl dextran based nano-adjuvant for co-delivery CpG oligonucleotides and EV71 inactivated vaccine against hand, foot and mouth disease

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Enterovirus 71 (EV71) is a major causative pathogen of Hand, Foot and Mouth Disease (HFMD) in young children. HFMD induced by EV71 can cause a high rate of neurologic complications and even death. Although there are three inactivated EV71 vaccines were approved in China, the adjuvants used with EV71 vaccines have many defects and need to be improved. In this study, we generated a novel protamine/carboxymethyl dextran based nano-adjuvant for CpG Oligonucleotides (ODNs) and EV71 inactivated vaccine co-delivery. The new nano-vaccine was administrated in mice to evaluate its immune activity. Results showed that it can induce high level EV71-specific neutralizing antibodies toward Th1-bias response. The specific antibodies from mice administered nano-vaccine showed stronger neutralization activity *in vitro* and *in vivo* than any other groups with nano-adjuvant or CpG ODNs alone. The CpG-1826, a B-type CPG ODNs were loaded in the nano-adjuvant and stimulated immune cells to secrete a great deal of both IFN-α and IFN-γ *in vivo*. This result demonstrated that nano-adjuvant endows CpG-1826 with A-type CpG ability to secreting type I IFN without losing its B-type activity to enhance immune response. Taken together, the novel nano-vaccine can be a potential candidate for medically necessary EV71 vaccines, and CpG ODNs loaded nano-adjuvant may be an excellent adjuvant used in other immunotherapeutic applications which demand type I and type II IFN induction.

## Biography

Hao Liang is a PhD student of Beijing University of Technology and majoring in Bioengineering from College of Life Science and Bioengineering. He has specialized in developing novel vaccines and immune therapy and has participated in a national natural science project, design and construction of beta-glucan/CpG ODN-based dual combined nano-adjuvant and studies on its immune effects of Enterovirus 71 vaccine (Grant No. 31770999).

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