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DNA vaccine encoding Hantavirus Gn, targeted to the MHC class II compartment by LAMP, significantly elicits specific immune responses and induces immune protection against Hantavirus challenge in vivo

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Abstract

Lysosome-associated membrane protein (LAMP) can target and bind the endosome/lysosome, one of the most important components of the MHC class II-processing compartment (MIIC) in the exogenous antigen-processing pathway. LAMP targeting could greatly enhance the immune response against a number of antigens and DNA plasmids encoding endogenous antigen could take advantage of LAMP and be carried directly into MIIC. Hantavirus glycoprotein N-terminal, named Gn, could induce neutralizing antibody production with a low serum titer as natural infection. To analyze the influence of LAMP on Hantaan virus (HTNV) Gn vaccine potency and develop a novel effective vaccine against HTNV, we constructed three eukaryotic vectors as naked DNA vaccine named pVAX-Gn, pVAX-LAMP and pVAX-LAMP/Gn, respectively. Balb/c mice were immunized with those plasmids, the specific humoral and cellular responses elicited against HTNV Gn were measured by ELISA, cytotoxicity assays, cytokine release (IFN-γ and IL-4) and ELISPOT assay. To measure the protective efficacy, virus challenging in vivo and neutralizing antibody valence were conducted by viral load detection (qRT-PCR and sandwich ELISA) and the cell microculture neutralization test. We found that HTNV Gn showed a strong immunogenicity to elicit both humoral and cellular responses with LAMP as a chimera. Results of protection assay in vivo indicated that the immune response established was HTNV specific and protective. These findings not only demonstrate that the LAMP as a trafficking molecule can introduce Gn to MHCII presenting pathway and significantly enhance HTNV specific immune response, but also suggest that the pVAX-LAMP/Gn as a DNA vaccine has potential application on clinic for HTNV infection immunoprophylaxis.

Biography

Dongbo Jiang is reading bachelor in the Forth Military Medical University, majoring in clinical medicine. He performs well and college ranking is on the top. He is about to become a member of national immunology society. He has 3 second author publications in academic journal or conference proceedings and his new work is yet to be published.