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Enhanced Immunogenicity of MPG/HIV-1 MPER-V3 nanoparticles using prime-boost strategy in BALB/c mice

Kimia Kardani

Department of Hepatitis and AIDS, Pasteur Institute of Iran, Iran

Abstract

Due to the global pandemic of human immunodeficiency virus type 1 (HIV-1), expanding research and accelerating HIV-1 vaccine development is a serious importance. To trigger potent and strong humoral and cellular immune responses, efficient and powerful HIV-1 preventive vaccine is needed. It has shown that MPER of gp41 and V3 Loop of gp120 are highly conserved regions and they are great targets of bNAbs. Thus, in order to induce potent immunogenicity, we have used the fusion construct of MPER-V3 along with a DNA delivery system (MPG cell penetrating peptide) and a peptide adjuvant (Montanide 720) in mice. The in vivo analysis was performed in BALB/c mice as three vaccination strategies including DNA/DNA, peptide/peptide, and DNA/ peptide (prime/boost). Our data showed that the MPG/MPER-V3 complexes were formed as stable non-covalent nanoparticles at the N/P ratio of 10:1 with a size of 110-130 nm. The results indicated that MPG and Montanide improved IgG1, IgG2a and IFN-gamma immune responses in mice. These responses were remarkably higher in heterologous prime/boost and then peptide immunization strategies than DNA immunization. Generally, our study demonstrated that delivery of MPER-V3 fusion as DNA/Peptide could be an efficient approach to trigger immune responses as a potent and strong vaccine candidate for HIV-1 infection..

Biography:

Kimia Kardani is 27 years old and she is PhD candidate in Pharmaceutical Biotechnology at Shahid Beheshti University of Medical Sciences, Tehran, Iran. She has published five papers in reputed journals and also she is one of the contributors of HPV Infections: Diagnosis, Prevention and Treatment book which has published by Bentham Science Publishers.

Speaker Publications:

1. "Anti-viral therapy for the sexually transmitted viruses: recent updates on vaccine development"; Expert Review of Clinical Pharmacology; 2020.
2. "An overview of in silico vaccine design against different pathogens and cancer"; 2020; Expert Review of Vaccines.
3. "B1 protein: a novel cell penetrating protein for in vitro and in vivo delivery of HIV-1 multi-epitope DNA constructs"; Biotechnology Letters, 2020: Vol 42 (6).
4. "Comparative analysis of two HIV-1 multiepitope polypeptides for stimulation of immune responses in BALB/c mice"; 2020; Molecular Immunology; Vol 119:106-122.
5. "Comparison of HIV-1 Vif and Vpu accessory proteins for delivery of polyepitope constructs harboring Nef, Gp160 and P24 using various cell penetrating peptides"; PLoS ONE; 2019, Vol 4(10).

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