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Evaluation of the efficacy of LPD-nanoparticles containing rGP63 in the induction of CMI and protection against CL in murine model of leishmaniasis

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Background and Aims: The aim of this study was to evaluate the immunogenicity of liposome-protamine-DNA(LPD) nanoparticle encapsulated with recombinant major surface glycoprotein of Leishmania (rgp63) in immune response enhancement and protection in BALB/c mice against leishmaniasis.
Methods: liposomes were prepared by lipid film method. The lipid mixture consisting of DOTAP and cholesterol (1:1 molar ratio) was dissolved in chloroform: methanol. The solvent was removed by using rotary evaporator. The lipid film was hydrated and dispersed in rgp63 solution. The resulting liposomes sonicated in a bath-type sonicator at 50°C to form 100-200 nm liposomes. DOTAP-Cholesterol liposomes containing rgp63 were mixed with protamine sulfate (LP solution). While swirling the LP solution, the CpG Oligodeoxynucl-eotide (CpG ODN) solution is added. Female BALB/c mice were immunized subcutaneously with rgp63, rgp63 with CpG ODN or LPD nanoparticles encapsulated with rgp63, three times in 3 week intervals. At week 2 post infection serum levels of IgG, IgG1 and IgG2a antibodies and cytokine production by splenocytes were evaluated.
Results: Footpad swelling was considerably smaller in the mice inoculated with LPD. IgG2a isotype antibody (a marker of Th1 response) and IgG1 (a marker of Th2 response) were increased in the group inoculated with LPD. The both IL-4 and IgG1 was increased in the group inoculated with rgp63 that indicated the humoral response. In the other side, IFN-gamma and IgG2a were increased in the group of mice which received LPD nanoparticles.
Conclusions: The results of this study indicated that LPD nanoparticles containing rGP63 and CpG ODN could induce cell-mediated immunity (CMI) and protect the mice against challenge with L. major promastigotes

Keywords: LPD nanoparticle; rGP63; Leishmaniasis