

عنوان مقاله:

Enhancing immunogenicity of novel multistage subunit vaccine of Mycobacterium tuberculosis using PLGA:DDA hybrid nanoparticles and MPLA : subcutaneous administration

محل انتشار:

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نویسندگان:

Farzad Khademi - *Department of Microbiology, School of Medicine, Ardabil University of Medical Sciences, Ardabil, Iran*

Arshid Yousefi - *Department of Medical Bacteriology and Virology, Qaem University Hospital, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran*

Mohammad Derakhshan - *Department of Medical Bacteriology and Virology, Qaem University Hospital, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran*

Adel Najafi - *Department of Medical Bacteriology and Virology, Qaem University Hospital, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran*

خلاصه مقاله:

Objective(s): A new strategy in recent studies is using effective tuberculosis (TB) subunit vaccines combined with appropriate carriers and adjuvants which have shown promising results in preclinical and clinical studies. The aim of the present study was to evaluate the PLGA:DDA hybrid nanoparticles (NPs) for subcutaneous delivery of a novel multistage subunit vaccine along with MPLA adjuvant against Mycobacterium tuberculosis (M. tuberculosis). Materials and Methods: PLGA and PLGA:DDA NPs containing HspX/EsxS fusion protein and MPLA were prepared by double emulsion method (w/o/w). After characterization, these NPs were subcutaneously administered to BALB/c mice aged 6-8 weeks old. Immunogenicity of formulations were assessed by measuring the level of IFN- γ , IL-4, IL-17 and TGF- β cytokines as well as IgG1, IgG2a and IgA antibodies using ELISA. Results: Both particles had spherical shape and smooth surface with 316.7 ± 12.7 nm in size, surface charge of -33 ± 1.7 mV, and encapsulation efficiency of $92.2 \pm 2\%$ for PLGA NPs and 249.7 ± 16.7 nm in size, surface charge of 39 ± 1.8 mV, and encapsulation efficiency of $35.7 \pm 1.4\%$ for PLGA:DDA NPs. The highest IFN- γ response and also IgG2a and IgG1 antibodies titers were observed in groups immunized with PLGA:DDA/HspX/EsxS/MPLA and PLGA:DDA/HspX/EsxS/MPLA as booster as well as PLGA:DDA/HspX/EsxS and PLGA:DDA/HspX/EsxS as booster. Conclusion: With regard to effective induction of IFN- γ and IgG2a immune responses, PLGA:DDA hybrid NP along with MPLA adjuvant have good potentials for improving the immunogenicity of HspX/EsxS multistage subunit vaccine as well as promoting BCG efficacy as a BCG prime-boost.

کلمات کلیدی:

Mycobacterium tuberculosis, Multistage subunit vaccine, PLGA:DDA nanoparticle, MPLA, Immunization

لینک ثابت مقاله در پایگاه سیویلیکا:

