Design and construct of Helicobacter Pylori vaccine using DNA vaccine technology and Chitosan nano-vector

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Abstract

Introduction & Aim: Successful gene therapy and DNA vaccine systems are mostly dependent on a safe and efficient delivery vector, to transfer genetic material from cell membrane and further transcription and translation processes. Some investigation have been discussed the potency of chitosan nano-vector as a biodegradable and safe delivery system for drugs and nucleic acid transport in vitro and in vivo. According to the importance of Helicobacter Pylori in gastrointestinal carcinoma, it seems necessary to develop efficient the prophylactic or therapeutic vaccine against it to eradicate the infection. In present study, we focused to load an H. pylori DNA vaccine on the positively charged chitosan nano-polymer.

Methods: H. pylori DNA vaccine and chitosan Nano-complex was prepared based on complex coacervation method and was assessed by Zeta-Sizer and Electron Microscopy. To evaluate the efficiency of encapsulation of nucleic acid, treatment with DNase and Electrophoresis was done. In-vitro transfection efficiency was done to evaluate DNA vaccine carrier capability.

Results: Treatment of nano-complex with DNase was shown high encapsulation. The results showed that the average size of chitosan nanoparticles were homogenous and below than 100 nm. Transfection results was shown prepared chitosan could efficiently transport the desired DNA into macrophage cell line.

Conclusion: Applying the chitosan nano-vector as a delivery system for H. pylori genetic vaccine can be useful for efficient vaccine trials.

Key words: Helicobacter Pylori, DNA vaccine, chitosan nano-vector