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Genetic immunization by jet injection of targeted pDNA-coated nanoparticles.

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Abstract

Genetic immunization strategies have largely focused on the use of "naked" plasmid DNA or the gene gun. However, there remains a clear need to further improve the efficiency and/or cost of potential DNA vaccines. The theoretical basis of our research is to rationally design genetic immunization methodologies for nanoparticle-based delivery systems of plasmid DNA, perhaps in combination with already commercially available needle-free devices, such as the Biojector 2000. These methodologies may both reduce the dose of pDNA required and enhance the breadth and depth of protective immune responses (i.e., humoral and cellular). The purpose of this article is to provide detailed experimental methods to (1) engineer and characterize pDNA-coated cationic nanoparticles (<100nm) directly from oil-in-water microemulsion precursors and (2) enhance both the breadth and depth of immune responses after immunization of mice with pDNA-coated nanoparticles by different routes of administration, including intradermal, using a needle-free jet injection device.

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