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DNA vaccination via electroporation based drug delivery

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DNA vaccination involves the direct introduction of a plasmid containing the DNA sequence encoding the antigen against which an immune response is sought, and relies on the in-situ production of the target antigen. This approach offers a potential advantage over classical protein based vaccination including expression of antigenic epitopes which more closely resemble native viral epitopes and could therefore be more effective, the stimulation of both B- and T-cell responses, improved vaccine stability, and the absence of any infectious agent and the relative ease of large-scale manufacture. Electroporation has a great impact in vaccine immunogenicity and efficacy by increasing antigen delivery up to 1000-folds over naked DNA delivery alone. This increased delivery has resulted in an improved *in vivo* immune response magnitude as well as response rates relative to DNA delivery by direct injection alone. It involves gene electro transfer in DNA vaccination, introduced by Nomura et al. in 1996, which aims to address two major factors that are thought to limit clinical success of human DNA vaccines low transfection efficiency and insufficient recruitment of antigen-presenting cells to the injection site. Gene electro-transfer has been shown to enhance DNA vaccine efficacy up to three orders of magnitude and to achieve responses comparable to those achieved with protein vaccines.

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