protective immunization by parenteral, mucosal, and gene-gun inoculations. Proc. Natl. Acad. Sci. USA 90:11478.

28. Robinson, H L, Hunt L A, and Webster R G. 1993. Protection against a lethal influenza virus challenge by immunization with a haemagglutinin-expressing plasmid DNA. Vaccine 11:957.
29. Pardoll, D M, and Beckerleg A M. 1995. Exposing the immunology of naked DNA vaccines. Immunity 3:165.
30. Hsu, C H, Chua K Y, Tao M H, Lai Y L, Wu H D, Huang S K, and Hsieh K H. 1996. Immunoprophylaxis of allergen-induced immunoglobulin E synthesis and airway hyperresponsiveness in vivo by gene vaccines. Nature Med. 2:540.
31. Hsu, C H, Chua K Y, Tao M H, Huang S K, and Hsieh K H. 1996. Inhibition of an in vivo allergen-specific IgE response in mice by direct gene transfer. Int. Immunol. 8:1405.
32. Raz, E, Tighe H, Sato Y, Corr M, Dudler J A, Roman M, Swain S L, Spiegelberg H L, and Carson D A. 1996. Preferential induction of a Th1 immune response and inhibition of specific IgE antibody formation by plasmid DNA immunization. Proc. Natl. Acad. Sci. USA 93:5141.
33. Burks, A W, Williams L W, Helm R M, Connaughton C, Cockrell G, and O'Brien T. 1991. Identification of a major peanut allergen, Ara h I, in patients with atopic dermatitis and positive peanut challenges. J. Allergy Clin. Immunol. 88:172.
34. Burks, A W, Williams L W, Connaughton C, Cockrell G, O'Brien T, and Helm R M. 1995. Epitope specificity of the major peanut allergen, Ara hII. J. Allergy and Clin. Immunol. 95:607.
35. Wang, B, Ugen K E, Srikantan V, Agadjanyan M G, Dang K, Refaeli Y, Saito A I, Boyer J, Williams W V, and Weiner D B. 1993. Gene inoculation generates immune responses against human immunodeficiency virus type I. Proc. Natl. Acad. Sci. USA 90:4156.
36. T. Friedmann, Human gene therapy—an immature genie, but certainly out of the bottle, Nature Medicine, 2(1996) 144.
37. R. G. Crystal, The gene as the drug, Nature Medicine, 1(1995) 15.
38. R G. Crystal, Transfer of genes to humans: Early lessons and obstacles to success, Science, 270(1995) 404.
39. Z. Q. Xiang, Y. Yang, J. M. Wilson and H. C. Ertl, A replication-defective human adenovirus recombinant serves as a highly efficacious vaccine carrier, Virology, 219(1996) 220.
40. M. R. Knowles, et al., A controlled study of adenoviral-vector-mediated gene transfer in the nasal epithelial of patients with cystic fibrosis, N. Eng. J. Med., 333(1995) 823.
41. E. W. Alton and D. M. Geddes, Gene therapy for cystic fibrosis: a clinical perspective, Gene Therapy, 2(1995) 88.
42. N. J. Caplen, et al., Liposome-mediated CFTR gene transfer to the nasal epithelium of patients with cystic fibrosis, Nature Medicine, 1(1995) 39.
43. M. Cotten and E. Wagner, Non-viral approaches to gene therapy, Current opinion in biotechnology, (1993) 705–710.
44. A. Singhal and L. Huang, Gene transfer in mammalian cells using liposomes as carriers, in Gene Therapeutics: Methods and Applications of Direct Gene Transfer, J. A. Wolff, Editor. 1994, Birkhauser: Boston.
45. J. P. Schonfield and C. T. Caskey, Non-viral approaches to gene therapy, Brit. Med. J., 51(1995) 56.
46. D. Law, et al., Cancer gene therapy using plasmid DNA: Pharmacokinetic study of DNA following injection in mice, Human Gene Therapy, 6(1995) 553.
47. V. Truong, J. R. Williams, J. Hildreth and K. W. Leong, Targeted delivery of immunomicrospheres in vivo, Drug Delivery, 2(1995) 166.
48. P. Golumbek, R. Azhari, E. Jaff, H. Levitsky, A. Lazenby, K. Leong and D. Pardoll, Controlled release, biodegradable cytokine depots: A new approach in cancer vaccine design, Cancer Res., 53(1993) 5841.
49. K. Brown, W. Shao, J. Bathon and K. Leong, Controlled drug delivery to the joints by enzymatically degradable microspheres, MRS Symposium Series, 331(1994) 290.
50. P. I. Rose, Gelatin. Concise Encyclopedia of Polymer Science and Engineering, ed. J. I. Kroschwitz. 1990, New York: Wiley. 430.

What is claimed is:

**1**. A method of eliciting an immune response in a mammal against an antigen, comprising:

orally administering an immunogenic formulation comprising a solid nanoparticle of less than 5 $\mu$m comprising a coacervate of a polymeric polycation and a polyanion, wherein the polymeric polycation is selected from the group consisting of gelatin and chitosan, and wherein the polyanion consists of nucleic acids encoding an antigen, whereby the antigen is expressed and elicits an immune response in the mammal.

**2**. The method of claim **1**, wherein the nucleic acids comprise an expression vector which comprises a promoter operably linked to an oligonucleotide encoding the antigen.

**3**. The method of claim **1**, wherein the antigen is an allergen.

**4**. The method of claim **1**, wherein the antigen is a food allergen.

**5**. The method of claim **1**, wherein the immunogenic formulation is formulated in a food.

**6**. The method of claim **1**, wherein the immunogenic formulation is formulated in a beverage.

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