A nebulized gelatin nanoparticle-based CpG formulation is effective in immunotherapy of allergic horses.

In the recent years, nanotechnology has boosted the development of potential drug delivery systems and material engineering on nanoscale basis in order to increase drug specificity and reduce side effects. A potential delivery system for immunostimulating agents such as cytosine-phosphate-guanine-oligodeoxynucleotides (CpG-ODN) needs to be developed to maximize the efficacy of immunotherapy against hypersensitivity. In this study, an aerosol formulation of biodegradable, biocompatible and nontoxic gelatin nanoparticle-bound CpG-ODN 2216 was used to treat equine recurrent airway obstruction in a clinical study. Bronchoalveolar lavage fluid was obtained from healthy and allergic horses to quantify Th1/Th2 cytokine levels before and after inhalation regimen. Full clinical examinations were performed to evaluate the therapeutic potential of this nebulized gelatin nanoparticle-based CpG formulation. Most remarkable was that regulatory anti-inflammatory and anti-allergic cytokine IL-10 expression was significantly triggered by five consecutive inhalations. Thorough assessment of clinical parameters following nanoparticle treatment indicated a partial remission of the allergic condition. Thus this study, for the first time, showed effectiveness of colloidal nanocarrier-mediated immunotherapy in food-producing animals with potential future
applicability to other species including humans.