

Therapeutic Effects of Guar Gum Nanoparticles in Oxazolone-Induced Atopic Dermatitis

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Abstract : Atopic dermatitis (AD) is a chronic disease of the skin, involving itchy, reddish, and scaly lesions. It mainly affects children and has a high prevalence in developing countries. The AD may occur due to environmental or genetic factors. There is no permanent cure for the AD. Currently, all therapeutic strategies involve methods to simply alleviate the symptoms, and include lotions and corticosteroids, which have adverse effects. Use of phytochemicals and natural products has not yet been exploited fully. The particle used in this study is derived from *Cyamopsis tetragonoloba*, an edible polysaccharide with a galactomannan component. The mannose component mainly increases its specificity towards cellular uptake by mannose receptors, highly expressed by the macrophage. The aim of this study was to determine the therapeutic effect of guar gum nanoparticles (GN) in vitro and in vivo in the AD. To assess the wound healing capacity of the guar gum nanoparticle (GN), we first treated adherent NIH3T3 cells, with a scratch injury, with GN. GN successfully healed the wound caused by the scratch. In the in vivo experiment, Balb/c mice ear were topically treated with oxazolone (oxa) to induce AD and then were topically treated with GN. The ear thickness was increased significantly till day 28 on the treatment of Oxa. The GN application showed a significant decrease in the thickness as assessed on day 28. The total cell count of skin cells showed fold increase when treated with oxa, was again decreased on topical application of GN on the affected skin. The eosinophil count, as assessed by Giemsa staining was also increased when treated with oxa, GN application led to a significant decrease. The IgE level was assessed in the serum samples which showed that GN helped in restoring the alleviated IgE level. The T helper cells and the macrophage population showed increased percentage when treated with oxa, the GN application. This was examined by flow cytometry. The H&E staining of the ear tissue showed epidermal thickness in the oxa treated mice, GN application showed reduced cellular infiltration followed by epidermal thickness. Thus our assays showed that GN was successful in alleviating the disease caused by Oxa when administered topically.

Keywords : allergen, inflammation, nanodrug, wound

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