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Role of immune modulator KMK as a vaccine adjuvant

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Immuno modulators exert their effects by boosting host immune responses rather than targeting pathogens directly. Khamira Marwarid khas (KMK) is a compound herbo-mineral preparation consisting of pearl extract and 7 plant extracts, widely prescribed by Unani physicians for various ailments owing to the claimed restorative and recuperating power. Though it is a known Unani formulation, no attempts have been made to validate its mechanism of action. In this regard, we attempted to elucidate its role in modulation of the immune response keeping in mind the need to develop new types of adjuvants to ensure an appropriate immune response effectiveness and appropriate skewing of the immune response to antigen of many vaccines currently in use. KMK was administered to mice orally at a dose level of 2 g/kg body weight for 15 days, following which hematology and immune function including the lymphoid organ weight and cellularity of lymphoid organs were analyzed. Humoral and cell mediated immune responses were evaluated by assessing the IgG levels and titres, IgG subtypes, comparative levels of IgG and IgE, delayed type of hypersensitivity, lymphocyte proliferation using ³H-thymidine incorporation assay and cytokine analysis. Innate immune responses were analyzed using production of NO by macrophages and phagocytosis. KMK treated mice showed a significant increase ($p < 0.05$) in the cellularity of the bone marrow. Ovalbumin-specific serum IgG level ($p < 0.05$) and levels of IgG2a and IgG2b increased significantly. KMK enhanced significantly ($p < 0.05$) lymphocyte proliferation and delayed type of hypersensitivity response. An upregulation in the production of Th-1 cytokine (IFN- γ) by Conavalin A (Con A) stimulated splenocytes was observed. Oral administration of KMK, by itself did not induce the production of NO by macrophages, and suppressed the production of NO in response to LPS. Increased phagocytic rate and phagocytic index was observed. The Th1-stimulatory effects of KMK observed in this study imply the plausibility of its therapeutic efficacy and its potential as immunopotentiating adjuvant may be explored.