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TITLE

IMMUNE PROFILE OF CHIMERIC ELASTASE CONTAINING T- AND B-CELL EPITOPES (SMCETB) FROM SCHISTOSOMA MANSONI

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ABSTRACT

The hygiene hypothesis suggests that reduced exposure to infectious agents during early childhood impairs immune development, favoring a Th2-dominant profile and increasing allergy risks, particularly in high-income countries. Helminth infections, like allergies, induce Th2 responses with CD4+ T cells producing IL-4 and IL-5. However, helminths also promote IL-10 production and activate regulatory T cells (Tregs), helping to control inflammation. These parasite-induced mechanisms offer promising alternatives for treating allergies beyond corticosteroids, which are palliative and often cause side effects. Among the proteins secreted by Schistosoma mansoni, elastase (SmCE) plays a key role in immune evasion during cercarial invasion, inducing both Th1 and Treg responses, which may help rebalance Th2-dominant allergic responses. Dust mites, such as Blomia tropicalis, are significant aeroallergens in Brazil, highlighting the importance of allergen-specific immunotherapy, which can modulate immune responses and alter the progression of allergic diseases.This study aimed to evaluate the immunoregulatory potential of a chimeric elastase protein containing T- and B-cell epitopes (SmCETB) by promoting Th1 responses. SmCETB was expressed in Escherichia coli strains (Star and Rosetta) via IPTG induction, with samples collected at 4 and 24 hours. Protein extracts were solubilized in Tris-HCl buffer (pH 9.5) with and without 6M urea and purified by affinity chromatography on nickel columns (ÄKTA system). Protein identity and purity were confirmed by Western Blot using a 6-His tag, and endotoxins were removed with a commercial kit. Human Peripheral Blood Mononuclear Cells (PBMCs) were isolated from healthy and allergic donors using Ficoll-Hypaque separation. PBMCs were stimulated with SmCETB at 7.5 µg/mL for 48 and 72 hours, with unstimulated cells as controls. Polymyxin A was used to neutralize any residual endotoxins. After incubation, cell viability was assessed, and cytokines (IL-1β, IL-4, IL-5, IFN-γ, IL-10, IL-13, and TNF-α) were measured in the culture supernatant. SmCETB stimulation increased TNF-α production without altering baseline IL-10 levels, suggesting a Th1 response without suppressing Treg activity. These findings highlight the potential of SmCETB as an immunotherapeutic agent capable of promoting Th1-type responses while maintaining regulatory T cell levels. Further studies are needed to confirm these preliminary results and ensure the safety and efficacy of the protein preparation.

KEYWORDS

Cercariae; Allergies; Chimeric Protein; Immunomodulation

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