

Indoleamine 2,3-dioxygenase ameliorates airway inflammation by decreasing the Th17 cell response in neutrophilic asthma model

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May 27, 2020

Abstract

Background: Currently, no effective treatment method is available for neutrophilic asthma. Th17 play an important role in the promotion of asthma inflammation. And IDO-dependent tryptophan metabolism has been shown to act as a molecular “switch” for the conversion of Th17 cells into Tregs under certain conditions. Objective: Therefore this study aimed to regulate IDO expression in vivo and in vitro in a neutrophilic asthma animal model and investigate whether IDO could reduce Th17 cells and the secretion of related factors to ameliorate airway hyperreactivity and inflammation in neutrophilic asthma. Methods: A neutrophilic asthma model was established using ovalbumin(OVA)and lipopolysaccharide. IDO expression in the model mice was regulated using an IDO inducer and an IDO inhibitor. Th17 cells and the secretion of related factors were examined, and changes in airway hyperreactivity and inflammation were observed. Plasmacytoid dendritic cells and naïve CD4+ T cells were cocultured in vitro. After OVA stimulation and IDO inhibitor treatment, changes in Th17 cells and the secretion of related factors were examined. Results: Airway hyperreactivity and inflammation were ameliorated in the neutrophilic asthma model mice in the IDO induction group. IDO reduced Th17 cells and inflammatory cytokine secretion (IL-17, IL-6, and TGF- β 1). Conclusion: IDO ameliorated airway hyperreactivity and inflammation in neutrophilic asthma. The mechanisms may be associated with the influence of the differentiation direction of CD4+ T (Th0) cells and inhibition of Th17 cell production. These results will provide new bases for potential therapeutic targets for the prevention and treatment of neutrophilic asthma using IDO.

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