Small Intestinal Eosinophils Regulate T_H17 cells by Producing IL-1 Receptor Antagonist

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Eosinophils play pro-inflammatory roles in helminth infections and allergic diseases. Under steady-state conditions, eosinophils are abundantly found in the small intestinal lamina propria, but their physiological function is largely unexplored. In this study, we found that small intestinal eosinophils down-regulate T_H17 cells. T_H17 cells in the small intestine were markedly increased in eosinophil-deficient mice, and an inverse correlation was observed between the number of eosinophils and T_H17 cells in the small intestine of wild-type mice. In addition, small intestinal eosinophils suppressed the *in vitro* differentiation of T_H17 cells as well as the IL-17 production by small intestinal $CD4^+$ T cells. Unlike other small intestinal immune cells or circulating eosinophils, small intestinal eosinophils have a unique ability to constitutively secret high levels of IL-1 receptor antagonist (IL-1Ra), a natural inhibitor of IL-1β. Moreover, small intestinal eosinophils isolated from IL-1Ra−deficient mice failed to suppress T_H17 cells. Collectively, our results demonstrate that small intestinal eosinophils play a pivotal role in the maintenance of intestinal homeostasis by regulating T_H17 cells via production of IL-1Ra.