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Production of IL-4 by lung basophils

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Keywords

Allergen challenge, asthma, IL-4, lung basophils Allergen challenge, asthma, IL-4, lung basophils

Context

Th2 cytokines, in particular interleukin (IL)-4, IL-5 and IL-13, play an important role in the pathogenesis of asthma and other allergic diseases. The expression of these cytokines by inflammatory cells is upregulated in sites of allergic inflammation. It has long been thought that IL-4 is derived solely from T lymphocytes; however, more recent studies have demonstrated that basophils account for most of the IL-4 production in peripheral blood leucocytes. The authors of this study investigated whether, and under what conditions, basophils isolated from the lung following segmental allergen challenge secrete IL-4 *in vitro*.

Significant findings

The highest levels of IL-4 protein (after incubation under varying conditions) were detected in basophil-enriched fractions. IL-4 was not detected in any of the eosinophil preparations. Only a small amount of histamine was released by basophils under the same conditions. In contrast, high levels of histamine were obtained after stimulation with a bacterial peptide, suggesting that the cells were functional but desensitized to cross-linking stimuli as a result of their activation *in vivo*. As previously reported for basophils purified from blood, ionomycin enhanced the production of IL-4 by lung basophils, and addition of phorbol myristate acetate reduced this response. In contrast, a combination of both stimuli was necessary for optimal IL-4 production in mononuclear cell fractions. The secretion of IL-4 by BAL basophils was further confirmed by flow cytometry.

Comments

Several previous studies have shown that lymphocytes, eosinophils and mast cells express IL-4 as well as other cytokines in allergic lung inflammation. This is the first study to describe lung basophils as the main source of IL-4 during segmental allergen challenge of asthmatic humans. It thereby challenges the belief that lymphocytes are the predominant cells to produce IL-4 in allergic lesions. Basophil-derived IL-4 has already been shown to support IgE synthesis. This study further underlines the involvement of basophils in amplifying allergic inflammation. More studies are needed to clarify the interaction between Th2 cells and basophils in producing IL-4 and the resulting effects on the allergic immune response.

Methods

Segmental allergen challenge, BAL, ELISA, cell culture, flow cytometry

Additional information

References

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