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MEETING ABSTRACT Open Access

Bronchial hyperreactivity induced by tropomyosins from cockroach and shrimp: a mouse model to study in vivo cross-reactivity

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Background

In vivo cross-reactivity among tropomyosins, major pan-allergens among invertebrates, is not established. Our aim was to investigate the effects of purified tropomyosins from cockroach (recombinant Per a 7) and shrimp (natural Lit v 1) on airway inflammation and hyperresponsiveness in a mouse model of asthma.

Methods

Balb/c mice, 4 to 6 weeks-old, were sensitized twice with 50μg of rPer a 7 or nLit v 1 intraperitoneally with 1 mg alum, and challenged with 50μg of rPer a 7 or nLit v 1 intranasally for three days. A group was sensitized with rPer a 7 and challenged with nLit v 1 under same conditions. Controls received saline on same days. Twenty-four hours after the last challenge, mice were ventilated with FlexiVent®, and *in vivo* bronchial hyperresponsiveness was evaluated with increased doses of inhaled methacholine (6.25, 12.5, 25 and 50mg/ml). After ventilation, bronchoalveolar lavage fluid (BALF) was collected and cell counts were performed.

Results

Sensitization and challenge of mice with rPer a 7 or nLit v 1 resulted in increase in bronchial hyperresponsiveness, given by increase in total and tissue resistance and elastance. Total cells in BALF increased in rPer a 7 (1×10^5 vs 3×10^5, $p<0.01$) and nLit v 1 (1×10^5 vs 1×10^6, $p<0.001$) groups, as compared to controls. There was increase in macrophages for rPer a 7 (5×10^4 vs 1×10^5, $p<0.001$) and nLit v 1 (5×10^4 vs 3×10^5, $p<0.001$) and eosinophils for rPer a 7 (2×10^3 vs 1.4×10^5, $p<0.001$) and nLit v 1 (2×10^3 vs 9.1×10^5, $p<0.001$). Mice immunized with rPer a 7 and challenged with nLit v 1 showed no changes in bronchial hyperresponsiveness or eosinophils on BALF as compared to controls (2×10^3 vs 6×10^3). However, there was an increase in neutrophils in this group as compared to controls (5×10^4 vs 1×10^5, $p<0.01$).

Conclusions

Experimental asthma induced by purified tropomyosins from cockroach and shrimp mimicked the main characteristics of human asthma. Despite the high degree of sequence identity and IgE immunologic cross-reactivity, our data suggested that *in vivo* cross-reactivity of these tropomyosins is unlikely.

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