

Female mice are more susceptible to the development of asthma than males

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Background: In humans the prevalence of asthma is higher among females than among males after puberty. The reason for this phenomenon is not clear, but it is probably caused by a difference in immune regulation due to dissimilar levels of sex hormones.

Objective: We tested the hypothesis that female mice are more susceptible to the development of asthma than male mice and studied allergic immune responses in the lung.

Methods: We compared allergic airway inflammation, i.e. serum IgE, the number of eosinophils, T-cell subsets, B cells and cytokines in lungs of male and female BALB/c mice sensitized to ovalbumin (OVA) twice and subsequently challenged with OVA (OVA-mice) or phosphate buffered saline (PBS-mice) aerosols on days 24, 25, 26, 30, and 31.

Results: Female OVA-mice had significantly higher numbers of eosinophils, CD4+ T cells, B cells, and levels of IL-4, IL-13, IFN γ , total and OVA-specific IgE than male OVA-mice. In contrast, female PBS-mice had significantly lower percentages of regulatory CD4+/CD25+ T cells than males (females 4.2 \pm 0.2% vs. males 5.3 \pm 0.1% of CD4+ T cells, $p < 0.05$).

Conclusion: Female mice develop a more pronounced type of allergic airway inflammation than male mice after OVA-challenge. The reduced percentage of CD4+/CD25+ T cells in the lungs of female PBS-mice may indicate that the level of these cells in the lung during the sensitization phase is important for the development and/or progression of an allergic immune response after multiple OVA-challenges.