Effectors and Pathogenesis of Allergic Diseases

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Mast Cell and Basophil Number in the Airway Correlate with the Bronchial Responsiveness of Asthmatics

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Key Words

Mast cell
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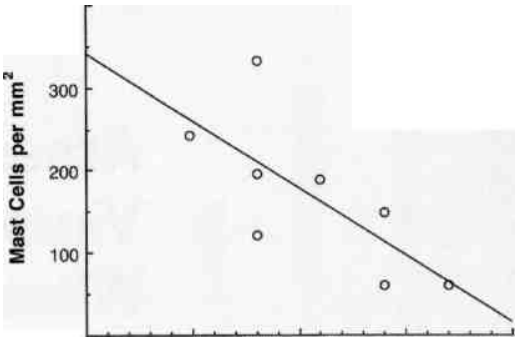
Bronchial asthma has now been recognized as a chronic inflammatory disease involving mast cells, eosinophils, lymphocytes, and macrophages [1-3]. Chronic inflammation of the airways results in the characteristic airway hyper-responsiveness of asthma. We have reported the presence of basophils by immunohistochemistry in the airways of postmortem cases of asthma [4]. We investigate here the role of basophils in the pathogenesis of asthma. Eight asthmatics and six control subjects were enrolled. Airway responsiveness to acetylcholine (PC20-ACh) was measured and trans-bronchial biopsy specimens were taken on the same day. Mast cells and basophils were identified by immunohistochemistry and counted. In the patients with mild asthma, many mast cells were present in the airway submucosa, beneath the epithelium, around the submucosal glands and in the airway muscle bundles; however, few mast cells were observed in the submucosal lesions of control subjects. There was a significant increase in the number of mast cells in the asthmatic airways compared to the control airways: 168 ± 32.6 and22.3 ± 6.1/mm2, respectively ($p < 0.05$). Many basophils were also observed in the airway submucosa of the asthmatic subjects. The number of basophils of asthmatics was 52.2 ± 12.5/mm2. No basophils were found in the air-
ways of the control subjects. There was a significant correlation between mast cell numbers and basophil numbers (fig. 1) and a significant correlation between mast cell numbers and logPC20-ACh (fig. 2). Basophil numbers also correlated significantly with logPC20-ACh ($p < 0.05$). Since basophils are only located in circulating blood under normal conditions, the presence of basophils in the airways of asthmatics indicates that basophils might be recruited from the circulation into inflammatory tissue sites.

These data suggest that mast cells and basophils might play an important role in asthmatic inflammation.

120
r=-0.72



80
E E i-α > α
.c
S 40
(0
CD
r = 0.88
100 200 300
400
400
0 2.0
2.5 3.0 3.5 4.0
Log PC∑o· ACh
Mast Cells per mm
Fig. 1. Correlation between mast cells and basophils in the airways of asthmatics.
Fig. 2. Correlation between PC2o ACh and mast cell numbers in the airways of asthmatics.

References

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