Chemotactic activity was high in 8/10 patients but not demonstrable in controls. When anti C5a antibody was added to patient BAL fluid a significant inhibition (p<0.05) of chemotactic activity occurred (Fig. 2).

Our results show that acute response in HP is associated with an influx of neutrophils into the lungs, whilst the subacute and chronic responses are associated with alveolar macrophages. To characterize the nature of neutrophil chemotactic factors we investigated the role of complement using anti C5a antibodies. Results showed that antibodies toward C5a are able to diminish, without abolishing, neutrophil chemotactic activity. These data agree with those of Yoshizawa et al. [3] in patients with acute hypersensitivity pneumonitis and indicate that in BAL fluid of patients with acute HP there are several neutrophil chemotactic factors. Release of LTB4 from macrophages or of high molecular weight neutrophil chemotactic factor from mastocytes are possible sources of chemotactic activity. Release of a neutrophil-specific chemotactic factor from stimulated alveolar macrophages is an alternative mechanism.

The results indicate the importance of local humoral immune response in development of HP. Presence of C3 in BAL suggests the existence of a mechanism which activates the complement cascade by the classic pathway, probably immune complexes. Moore et al. [4] reported that, after inhalation challenge with pigeon antigen, serum complements did not become depressed in symptomatic pigeon breeders. Wenzel et al. [5] found CIq in the cytoplasm of macrophages. Soda et al. [6] reported significant amounts of CIq and C3 in BAL from patients with HP. Our results show that both CIq and C3 are secreted or concentrated in the respiratory tract of HP patients. Some reports have indicated that alveolar macrophages produce C3 and epithelial cells C1.

We found a strong increase in IgG/albumin ratio levels and presence of specific precipitins suggesting local production. Immunocomplexes were detected in 75% of patients.

These findings support the hypothesis that immune complexes are involved in the pathogenesis of early phase human HP. Results of immunohistochemical studies on transbronchial biopsies have been reported previously [1, 7].

References


Functional activities of human alveolar macrophages

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Human alveolar macrophages (HAMs) from healthy subjects and patients with lung diseases are studied. In 1985, HAMs from control smokers were found to have an acid phosphatase (AP) activity 4-5 fold higher than smokers, whilst HAMs from sarcoid patients had a decreased AP activity. Preliminary data on phagocytosis and intracellular killing in various lung diseases are shown in table 1.

In the acquired immune deficiency syndrome (AIDS) the HAMs showed a severe impairment of antimicrobial function, accounting for frequent lung involvement. The killing percentage of lung tumours, although not significantly different, is lower than controls as is in AIDS patients, supporting data recently reported from other authors.

In our experimental system, mean phagocytosis and killing do not change significantly for a staphylococcus: HAM ratio range between 10:1 and 50:1. However, our preliminary results suggest a possible
Table 1. - Preliminary data on HAM phagocytosis and killing of Staphylococcus aureus ATCC 6538

<table>
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<th>Killing</th>
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<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>p</td>
</tr>
<tr>
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<td>NS</td>
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<tr>
<td>AIDS</td>
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*: p value, examined group vs controls (t-test); HAM: human alveolar macrophages; NS: nonsignificant; AIDS: acquired immune deficiency syndrome.

Fig. 1. - Oxygen consumption of human alveolar macrophages (HAMs): values before and after phagocytosis of latex beads in different groups.