more effective therapy against *Aspergillus* infection than amphotericin B alone. An animal model is warranted to further elucidate the potential utility of this combination therapy. Furthermore, the role of protein synthesis inhibition against *Aspergillus* should be explored, since it might provide a new avenue to the future design of antifungal therapy.

References


Increased Adherence of *Candida albicans* to Buccal Epithelial Cells from Patients with AIDS

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The adherence of six clinical *Candida albicans* isolates to buccal epithelial cells obtained from AIDS patients, solid organ transplant recipients and healthy individuals was compared. It was shown that *Candida albicans* bound in significantly greater numbers to epithelial cells obtained from AIDS patients than to those from healthy individuals or transplant patients, and that the adherence capacity varied among the strains tested.

Oropharyngeal candidiasis is one of the most frequent opportunistic infections in HIV-infected patients. Ninety percent of these patients develop candidiasis during the last stages of HIV infection, and recurrent oral infections with *Candida albicans* are common (1).

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Table 1: Adherence of Candida albicans isolates to buccal epithelial cells obtained from healthy individuals, AIDS patients and transplant recipients.

<table>
<thead>
<tr>
<th>Strain no.</th>
<th>Healthy individuals (n = 17)</th>
<th>AIDS patients (n = 12)</th>
<th>Transplant recipients (n = 8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5.5 (2.7)</td>
<td>14.3* (5.2)</td>
<td>7.0 (5.4)</td>
</tr>
<tr>
<td>2</td>
<td>2.7 (1.4)</td>
<td>8.5* (2.5)</td>
<td>4.0 (3.2)</td>
</tr>
<tr>
<td>3</td>
<td>3.5 (2.6)</td>
<td>10.0* (3.2)</td>
<td>6.6 (2.9)</td>
</tr>
<tr>
<td>4</td>
<td>3.5 (2.9)</td>
<td>9.3* (3.7)</td>
<td>4.4 (3.4)</td>
</tr>
<tr>
<td>5</td>
<td>3.5 (2.4)</td>
<td>11.4* (4.4)</td>
<td>4.9 (3.2)</td>
</tr>
<tr>
<td>6</td>
<td>2.9 (1.8)</td>
<td>9.5* (3.2)</td>
<td>4.5 (3.6)</td>
</tr>
</tbody>
</table>

* Significantly higher rate of binding to cells from AIDS patients compared to cells from healthy individuals or transplant recipients (Mann Whitney; < 0.05).

Adherence to epithelial cells is widely recognised as being the essential step in the process of candidal colonization and subsequent infection (2). However, despite the extensive data now available on candidal adhesion to epithelial cells, relatively little is known about the binding of Candida albicans to buccal epithelial cells (BECs) of immunocompromised patients who are at risk of developing oral candidiasis.

In order to characterize the role of adherence in recurrent oral infections in AIDS patients, adhesion of Candida albicans to BECs obtained from AIDS patients and healthy adults was compared. Since oral candidiasis is also common in other patients with impaired cell-mediated immunity, we included a group of solid organ transplant recipients for comparison. Data on the adherence capacity were analysed with reference to the immune status of the patients and to antimycotic therapy.

**Materials and Methods.** Because women's hormonal status may influence the adherence of Candida albicans to BECs (3), only males were included in the study. Subjects comprised AIDS patients, transplant recipients and control persons. The 12 AIDS patients (10 at stage C3, 1 at stage B2 and 1 at stage B3) were aged between 27 and 60 years and had CD4+ cell counts of < 60/μl, except for one patient with a CD4+ cell count of 260/μl. The eight kidney or liver transplant recipients were between 34 and 60 years old. Six had CD4+ counts of ≥ 350 cells/μl, while two had CD4+ counts of 80 and 180 cells/μl, respectively. All patients were receiving fluconazole at the time of sample collection. In addition, some of the AIDS patients were being treated with broad-spectrum antibacterial agents, and the transplant patients were receiving immunosuppressive agents such as cyclosporine, prednisolone or azathioprine. The 17 healthy control subjects ranged in age from 20 to 65 years and had not taken antibiotics or immunosuppressive agents in at least the three months prior to entering the study.

Six genotypically distinct clinical isolates of Candida albicans were tested for binding to BECs. Strains no. 1–4 were isolated from AIDS patients with oral candidiasis; strain no. 5 was isolated from the throat culture of a leukemic patient and strain no. 6 from the tracheal secretion of an intensive care unit patient. The isolates were stored at −20°C in NaCl supplemented with horse serum and were subcultured on Sabouraud agar plates at 30°C before use in the adherence assay. Yeast cells were suspended in 0.9% sodium chloride, counted in a Neubauer chamber and adjusted to a density of 10^8 cells/ml by appropriate dilution.

BECs were collected by gently rubbing the cheek mucosa of patients and controls with sterile swabs and then swirling the swabs in 6 ml of medium 199 (Sigma, Germany). Cell counts were adjusted to 5 x 10^5/ml. BECs from all patients were screened microscopically for any attached yeasts before use in the adherence assay. If adherent yeasts were present, the cell suspension was discarded. To minimize possible variations, cells were collected from all individuals at a specific time of day and tested within 60 min of collection.

The assay was performed as previously described (4). Briefly, 5 x 10^5 BECs were incubated with 100 μl of the yeast suspension at 37°C under rotation. After 45 min, cold phosphate buffered saline (PBS) was added and the cells were centrifuged at 300 x g for 5 min. The supernatant, which contained unattached yeast cells, was discarded and the sediment resuspended in a minimal volume of PBS. One drop of formalin was added and