NOTES

ANTIGENIC RELATIONSHIP BETWEEN HAFNIA AND SHIGELLA FLEXNERI

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The antigenic relationships among members of the different groups of Enterobacteriaceae have been widely studied. The most extensive and systematic research was carried out by Kampelmacher (Antonie van Leeuwenhoek, J. Microbiol. Serol. 25:289. 1959). Studies on cross-reactions between members of the genera Hafnia and Shigella, however, have not been published.

From the feces of a young boy, presenting a dysenteric syndrome, a strain was isolated which by preliminary examination was typed as Shigella flexneri serotype 4a. Indeed, after 24 hr incubation the Kligler agar showed fermentation of glucose, no fermentation of lactose, no formation of H2S, no production of gas was observed, urea was not decomposed, and the reaction for indole was negative. The strain was agglutinated strongly by a specific antiserum vs. S. flexneri 4a.

Further study, however, proved it to behave biochemically as a typical Hafnia strain (Kauffmann, Enterobacteriaceae. 2nd ed. Copenhagen, 1954): rapid fermentation (with production of gas) of glucose, mannitol, rhamnose, arabinose, xylose, maltose, fructose, galactose, mannose, and glyceral. Delayed fermentation of lactose, sucrose, salicin, cellobiose, and inulin. No fermentation of dulcitol, adonitol, inositol, raffinose, sorbitol, dextrin, and starch. No production of indole, no liquefaction of gelatin, no decomposition of urea, and delayed formation of H2S. Nitrates were reduced, the Voges-Proskauer reaction was positive, and the methyl red reaction was negative. The culture grew in KCN medium, gave a positive reaction in p-tartrate after 1 day, and in sodium-citrate after 2 days. The phenylalanine test was negative.

Rabbit antisera were prepared against the Hafnia strain and a type-culture strain of S. flexneri 4a. Agglutination tests were performed before and after cross-adsorptions and the results of these show that the Hafnia strain possesses most of the antigenic complex of S. flexneri 4a, but is not able to exhaust the antiserum vs. the Flexner strain and the latter cannot remove all the antibodies from the Hafnia serum, i.e., both serotypes have a special factor and complete identity does not exist between them (Table 1).

The marked serological relationship, mentioned here for the first time, between a strain of Hafnia and a member of the genus Shigella would be of practical importance if cross-reactions occurred on a large scale. Such reactions would not minimize the practicability of serological methods for clinical diagnosis, but perhaps more attention should be drawn to the biochemical reactions which, if too few in number, could be misleading.

<table>
<thead>
<tr>
<th>Antigens</th>
<th>Hafnia</th>
<th>Shigella</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nonadsorbed</td>
<td>Adsorbed by S. flexneri “type” 4a</td>
</tr>
<tr>
<td>Hafnia</td>
<td>640</td>
<td>160</td>
</tr>
<tr>
<td>Shigella</td>
<td>320</td>
<td></td>
</tr>
</tbody>
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TABLE 1. Antigenic relationship between a Hafnia strain and Shigella flexneri serotype 4a

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