most probably involves the phosphorylation of mannitol to mannitol 1-phosphate. The enzyme mannitol 1-phosphate dehydrogenase has been purified over 160-fold, and its properties have been studied in detail. The details of this work will be published elsewhere.

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SALMONELLA LEXINGTON CULTURE OF COMPLEX ANTIGENIC CONSTITUTION

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The subject of Salmonella serotypes that possess three or more recognizable flagellar components was reviewed by Edwards, McWhorter, and Douglas (J. Bacteriol. 84:95, 1962) and by McWhorter and Edwards (J. Bacteriol. 85:1440, 1963). These investigators pointed out that in some instances complex diphasic forms possessed well-known and long-accepted Salmonella flagellar antigens such as in S. montgomery (11:d,a: d,e,n,z15), whereas in others the microorganisms contained newly recognized antigens (e.g., z14 or z6) as a major component of each of two phases. The culture to be described (757-63) was an unusual example of the second of the two categories mentioned above.

Culture 757-63 was isolated from soybean meal, but its ultimate source was unknown. The biochemical reactions given by the strain were characteristic of members of the genus Salmonella, and the culture was a member of subgroup I of Kauffmann (Acta Pathol. Microbiol. Scand. 49:293, 1960; 58:109, 1963).

Salmonella culture 757-63 was a member of O antigen group E1, was agglutinated to the titer of S. anatum O antiserum (3,10), and reduced the titer of that antiserum for the homologous microorganisms from 1:3,200 to 1:100 in absorption tests. When received, the strain was flocculated to the titer of H antiserum z49 derived from phase 1 of culture 2783-61 [characterized as a complex form of S. enteritis (6,7:z49,r:z9b,1,5) by Edwards et al., J. Bacteriol. 84:95, 1962] but not by diaphasic dilutions (1:1,000) of other Salmonella H antisera. When numerous single colonies from plateings of the original culture were examined, it was found that about 80% were agglutinated in diagnostic dilutions of z49 antiserum alone; the remainder reacted strongly in z49 and 1,5 antisera (phases 1 and 2, respectively, Table 1). Ten colonies that were agglutinated only by z49 antiserum were placed in semisolid medium containing z49 antiserum. Of these, four yielded forms agglutinated only by z10 antiserum, two yielded forms agglutinated by z10 and 1,5 antisera, and four gave rise to forms that were flocculated only by 1,5 antiserum. When treated similarly, six colonies which originally were agglutinated by both z49 and 1,5 antisera all yielded 1,5 forms. Single-colony isolations from the 16 cultures passed through z49 antiserum were placed in semisolid medium that contained both

<table>
<thead>
<tr>
<th>Antigen</th>
<th>S. enteritis phase 1 (z49)</th>
<th>S. enteritis phase 2 (1,5)</th>
<th>S. infantis* (z10) phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>757-63, phase 1†...</td>
<td>800</td>
<td>&lt;100</td>
<td>3,200</td>
</tr>
<tr>
<td>757-63, phase 2†...</td>
<td>400</td>
<td>12,800</td>
<td>1,600</td>
</tr>
<tr>
<td>757-63, z10 phase‡...</td>
<td>3,200</td>
<td>&lt;100</td>
<td>&lt;100</td>
</tr>
<tr>
<td>757-63, 1,5 phase‡...</td>
<td>&lt;100</td>
<td>12,800</td>
<td>&lt;100</td>
</tr>
</tbody>
</table>

* Culture 2783-61 (see text).
† From single colonies from original culture.
‡ The z10 and 1,5 phases of 757-63 were obtained by passage of phase 1 and phase 2, respectively, through z10 antiserum.
and 1,5 antisera. Of these cultures, 15 were immobilized during four serial transfers in this medium. However, one culture spread rapidly through the medium on the first transfer, and from it was isolated a form which was agglutinated to the titer of z10 antiserum and to a lesser degree by z10 antiserum.

The z10 and 1,5 phases (Table 1) of culture 757-63 were identified by means of appropriate agglutinin-absorption tests with S. illinois phase 1 (z10) and S. berlin phase 2 (1,5) antisera, respectively. The z10 antigen of 757-63 was agglutinated to the titer of S. infantis (2783-61) phase 1 antiserum and reduced the titer of that antiserum for the homologous bacteria from 1:6,400 to 1:200.

Thus, the antigenic composition of culture 757-63 was determined to be 3,10:z10, z10:z10, 1,5. Since it was possible to derive a culture indistinguishable from S. lexington (3,10:z10:1,5) from culture 757-63, it was regarded as a complex form of that serotype, and comparable to the complex culture of S. infantis (6,7:z10, r:z10, 1,5) cited above. In complex cultures which possess a common major antigenic component in both phases, it usually is not possible to recover that component after it has been suppressed by passage through appropriate antisera. However, in the culture described here it was possible in one instance to recover the z10 antigen. Similar recoveries have been noted in the case of S. goerlitz (LeMinor and Edwards, Ann. Inst. Pasteur 99:469, 1960), S. simonsbury (Edwards, Moran, and Bruner, Proc. Soc. Exptl. Biol. Med. 66:230, 1947), and in an unnamed serotype having the antigenic formula 8,3; d; i- (Edwards, Moran, and Bruner, J. Immunol. 60:529, 1948).

POLYMIXIN AGAR AS AN ADJUNCT IN THE ISOLATION OF EL TOR VIBRIO

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El Tor cholera has recently occurred in epidemic form in much of Southeast Asia and the islands of the Western Pacific. The large numbers of cases and the attendant extensive epidemiological surveys placed a heavy burden on local laboratories. Many were poorly equipped to carry out, in large scale, elaborate procedures for isolation and identification, especially those requiring expensive or unusual chemicals. Recently, a simple, nonselective nutrient agar medium was shown to be satisfactory for isolation of El Tor vibrios (Finkelstein and Gomez, Bull. World Health Organ. 28:327, 1963) when coupled with the oblique-light technique advocated by Lankford (J. Microbiol. Soc. Thailand 3:10, 1959) for recognition of the characteristic colonies of cholera vibrios. Similar observations were noted by Feeley (J. Bacteriol. 84:866, 1962) with classical cholera vibrios. Although the technique has proven useful and practical, two potential drawbacks are: (i) that a certain element of judgment and ability is needed to recognize and pick the characteristic cholera colonies among those of the commensals which may also be present, and (ii) in a small percentage of specimens overgrowth by commensals may interfere. The latter problem is minimal in specimens from typical early cholera cases but could be of greater consequence in the case of carriers passing only a small proportion of vibrios relative to their normal enteric flora. The sensitivity of the technique could be enhanced if growth of the indigenous normal flora could be reduced.

Recently, Han and Khie (Am. J. Hyg. 77:184, 1963) reported that El Tor vibrios, in contrast to classical cholera vibrios, were resistant to polymyxin (PM). Since PM has activity against many intestinal microorganisms (Schwartz et al., Antibiot. Ann. 1959–60, p. 41, 1960), we considered that it might prove advantageous to employ PM as a selective agent in the procedure for isolation of El Tor vibrios.

A total of 66 strains of El Tor vibrios (including isolates from the Philippines, Thailand, Korea, Malaya, New Guinea, Indonesia, Burma, and Calcutta) were employed in the present study.