SUBSTRATE SPECIFICITY OF STREPTOMYCIN-ADENYLATING ENZYMES FROM GRAM-NEGATIVE BACTERIA

Sir:

Studies by Rake et al.\(^1\) showed mannosidostreptomycin to be less active and dihydrostreptomycin about equally active to streptomycin in inhibiting most Gram-negative and acid-fast bacteria. Davies et al.\(^3\) have reported that mannosidostreptomycin and dihydrostreptomycin were adenylated by enzymes from RTF-carrying strains of Escherichia coli, but did not indicate the relative efficiencies of adenylation of these substrates. We have examined the adenylation of these 3 streptomycins by crude enzyme preparations (ammonium sulfate precipitated material) from several Gram-negative bacteria using techniques described by Yamada et al.\(^4\) to study adenylation. As is shown in Table 1, mannosidostreptomycin is adenylated at between 10 and 20% of the rate of streptomycin and dihydrostreptomycin. If this is true for other Gram-negative streptomycin-resistant organisms, mannosidostreptomycin may be a more desirable antimicrobial agent than originally supposed\(^9\) in treating infections, especially those carrying RTF for streptomycin.

Table 1. Substrate specificity of adenylating enzymes from Gram-negative bacteria

<table>
<thead>
<tr>
<th>Culture</th>
<th>Specific activity (units)*</th>
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<tbody>
<tr>
<td></td>
<td>Streptomycin</td>
</tr>
<tr>
<td><em>E. coli</em> 8</td>
<td>9.45±0.7</td>
</tr>
<tr>
<td><em>E. coli</em> 15</td>
<td>7.3 ±0.6</td>
</tr>
<tr>
<td><em>Klebsiella species</em> 24</td>
<td>4.5 ±0.6</td>
</tr>
<tr>
<td><em>S. typhimurium</em> (culture S-1)</td>
<td>80.5 ±9</td>
</tr>
</tbody>
</table>

* 1 unit = 1 nmole substrate adenylated/mg protein/hr as determined by a modification of the technique described by Ozanne et al.\(^5\) using ATP-\(^{14}\)C.

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J. L. Schwartz
D. Perlman

School of Pharmacy,
University of Wisconsin,
Madison, Wisconsin, U.S.A.

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References