Stability of Prostatic Acid Phosphatase in Normal Human Sera

To the Editor:

Not only are radioimmunoassays for prostatic acid phosphatase (EC 3.1.3.2) more sensitive and specific than earlier enzymic methods (1, 2) but the immunological activity of the enzyme is more stable than the enzymic activity of the enzyme. We have examined the stability of the enzyme and immunological activities of the protein and compared them with earlier data (Figure 1 of ref. 3). We find the immunological activity of the protein to be far more labile than that reported would indicate, and careful handling of the patient’s sample is therefore required to avoid obtaining falsely low values for prostatic acid phosphatase.

Figure 1 shows the progressive loss of both immunological and enzymic activity of the enzyme at 23 and 37 °C. Purified prostatic acid phosphatase (4) was added to normal male sera to give a final concentration of about 25 µg/L. The radioimmunoassay used was the kit of Clinical Assays, Cambridge, MA 02139; the enzyme method was that of Worthington Diagnostics, Freehold, NJ 07728. At both temperatures, immunological activity deteriorated more slowly than enzymic activity, but the immunological activity was lost much faster than that described earlier. For example, we observed the assay value was half as large after 1.5 h at 37 °C, but Foti et al. (3) detected no loss under these conditions.

We then compared the sensitivity of several commercial radioimmunoassays to the inactivation of prostatic acid phosphatase in serum. Table 1 shows the results of assaying serum standards after various incubation conditions by use of radioimmunoassay kits commercially available from New England Nuclear, North Billerica, MA 01862; Yang Laboratory, Bellevue, WA 98005; and Clinical Assays, in addition to data on the enzyme activity. Purified prostatic acid phosphatase was added to sera from normal men to give values of about 5 and 10 µg/L. Enzyme activity was measured against standards of purified prostatic acid phosphatase. With all radioimmunoassays, 2 h at 37 °C sufficed to destroy most of the immunological activity. In each case the percentage loss of enzyme activity exceeded the loss of immunological activity. The latter was highly sensitive to temperature; it was preserved for seven days at 4 °C but was lost after 2 h at 37 °C; at 23 °C, activity was preserved for several hours.

In view of the sensitivity of prostatic acid phosphatase to temperature at the pH of serum it is important that the time the samples are left at temperatures above 4 °C be minimized. The discrepancy between the stability of prostatic acid phosphatase observed and that previously described may be due to the method of purification of Foti et al. (1), which appears to yield a partly purified preparation (5).

Fig. 1. Loss of immunological activity (circles) and enzymic activity (squares) of prostatic acid phosphatase as a function of time at 37 °C (open symbols) and 23 °C (filled symbols).

Table 1. Stability of Acid Phosphatase as Assessed by Various Radioimmunoassays and by Enzyme Assay

<table>
<thead>
<tr>
<th>Incubation</th>
<th>Clinical Assays</th>
<th>Yang Labs</th>
<th>NEN</th>
<th>Enzyme assay</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>4.7</td>
<td>4.6</td>
<td>5.7</td>
<td>4.5</td>
</tr>
<tr>
<td>7 days, 4 °C</td>
<td>11.3</td>
<td>10.4</td>
<td>11.8</td>
<td>10.3</td>
</tr>
<tr>
<td>6 h, 23 °C</td>
<td>4.4</td>
<td>7.1</td>
<td>6.2</td>
<td>4.5</td>
</tr>
<tr>
<td>24 h, 23 °C</td>
<td>3.8</td>
<td>4.9</td>
<td>6.0</td>
<td>4.0</td>
</tr>
<tr>
<td>2 h, 37 °C</td>
<td>2.3</td>
<td>3.0</td>
<td>4.8</td>
<td>1.0</td>
</tr>
</tbody>
</table>


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Before-Assay Liquification of Pulmonary Mucous Secretions with N-Acetyl-L-cysteine

To the Editor:

N-Acetyl-L-cysteine is used in vitro to liquefy pulmonary secretions in cystic fibrotic subjects who are undergoing therapy with nebulized aminoglycoside, intended to eradicate the upper or lower respiratory infections that commonly occur in conjunction with chronic airway disease. The untreated raw secretion is usually viscous and heterogeneous in content and appearance.

As previously described by other authors (1), we observed that when gentamicin or tobramycin was administered orally or parenterally, the sputum of these patients contained little or none of either drug, indicating that the drug was not reaching the site of infection, but when gentamicin was administered directly into the airways via a nebulizer, the clinical status of the patient improved. Thus, a reliable method is needed for monitoring the concentra-