Stability of Catecholamines in Urine

To the Editor:

Various treatments of urine have been proposed to stabilize urinary catecholamines, including acidification with hydrochloric or formic acids and addition of EDTA/glutatione or sodium metabisulphite (1,2). For a proposed multilocation study we needed a simple treatment that would effectively stabilize the three compounds of interest.

Pooled urine from 10 healthy subjects was divided into eight portions. The eight treatments tested were: (a) no treatment, (b) adjustment to pH 3 with 3 mol/L hydrochloric acid, (c) EDTA/glutatione stabilizing solution (2), (d) both pH 3 and the stabilizing solution; in the remaining treatments (e–h) the samples were treated as above but were stored at −30°C. Five milliliter aliquots were then stored in glass vials until the 10 analyses were done over 57 days.

Dopamine, epinephrine, and norepinephrine were measured by "high-performance" liquid-chromatography with electrochemical detection (2).

The results (Table 1) show that catecholamines deteriorate in untreated urine at room temperature and urine with only the stabilizing solution at room temperature. The simplest effective treatment is acidification with hydrochloric acid, but refrigeration may offer an extra measure of security.

### Table 1. Changes in Serum Viscosity and Apparent Na⁺ Concentration at Two Different Temperatures

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Viscosity, cP (1.4–1.8)</th>
<th>Flame photometry</th>
<th>Potentiometry</th>
</tr>
</thead>
<tbody>
<tr>
<td>20°C</td>
<td>27</td>
<td>127</td>
<td>114</td>
</tr>
<tr>
<td>37°C</td>
<td>11</td>
<td>128</td>
<td>128</td>
</tr>
</tbody>
</table>

*Reference interval in parentheses.

*KiNa Flame; Beckman Instruments, Fullerton, CA 92634.

*Astra-8 Analyzer; Beckman Instruments.

**NOVA 1 Sodium/Potassium analyzer; NOVA Biomedical, Newton, MA 02164.

**References


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Effect of Temperature and Methodology on Spurious Hyponatraemia due to Serum Hyperviscosity

To the Editor:

Sera from patients with hyperviscosity have low sodium values when analyzed by flame photometry (1), because less sample is delivered to the instrument (because of the difference in viscosity) and also because of the displacement effect of the monoclonal proteins (2). Although changes in serum viscosity with temperature have been well described (3), the effect on results for serum sodium is less well appreciated. To demonstrate this, we measured sodium and viscosity at two temperatures (20 and 27°C), using a serum specimen from a patient with IgG myeloma and clinical features consistent with hyperviscosity. To show that values for serum sodium are also method dependent, we measured serum sodium by three methods: flame photometry, indirect potentiometry (in which the serum sample is diluted before analysis with the sodium-selective electrode), and direct potentiometry (sample not diluted before analysis). Because direct-potentiometric analysis measures the activity of the sodium ion in the water phase, true serum sodium values would be expected.

Table 1 shows our results. Because measurements of serum sodium are performed at the ambient laboratory temperature (which may differ from day to day), it is clear that values for serum sodium may vary greatly with the temperature-related changes in viscosity. Furthermore, the physician should be made aware of the method used for measuring serum sodium, especially if two or more methods are being used in the same laboratory.

### Table 1. Catecholamines Concentrations in Pooled Urine Stored under Various Conditions

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Noradrenaline</th>
<th>Epinephrine</th>
<th>Dopamine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room temp.</td>
<td>r²</td>
<td>p</td>
<td>r²</td>
</tr>
<tr>
<td>a</td>
<td>0.81</td>
<td>&lt;0.01</td>
<td>0.88</td>
</tr>
<tr>
<td>b</td>
<td>0.22</td>
<td>n.s.</td>
<td>0.77</td>
</tr>
<tr>
<td>c</td>
<td>0.07</td>
<td>n.s.</td>
<td>0.00</td>
</tr>
<tr>
<td>d</td>
<td>0.08</td>
<td>n.s.</td>
<td>0.01</td>
</tr>
<tr>
<td>−30°C</td>
<td>a</td>
<td>0.00</td>
<td>n.s.</td>
</tr>
<tr>
<td></td>
<td>b</td>
<td>0.04</td>
<td>n.s.</td>
</tr>
<tr>
<td></td>
<td>c</td>
<td>0.08</td>
<td>n.s.</td>
</tr>
<tr>
<td></td>
<td>d</td>
<td>0.08</td>
<td>n.s.</td>
</tr>
</tbody>
</table>

n.s., not significant

References


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