respective (P <0.001, Wilcoxon rank-sum test). The reference interval for children (15 boys and 21 girls, ages five to eight years) was 8 to 54 μg/L (sex-related differences not significant).

We conclude that the DELFIA measures serum ferritin acceptably. Its detection limit (mean + 3 SD of the zero standard) was 0.7 μg/L. Ferritin concentrations up to 1500 μg/L could be measured in undiluted sera (30-fold higher than in the RIA assay), and no radionuclides are involved. However, the magnitude of interassay variation necessitates cautious interpretation of minor changes in ferritin concentrations between consecutive determinations.

We acknowledge Mrs. Merja Kahrpää and Mrs. Anne Virtanen for skillful technical assistance.

### Relationship between Plasma Cholesterol and Total and Ionized Calcium Concentrations in Serum from Postmenopausal Women

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Total calcium reported positively correlates with concentrations of plasma cholesterol (1) and also reportedly has no relationship with serum cholesterol concentrations (2) in women. Whether there is a relationship between cholesterol and ionized calcium concentration has not been reported.

Here we examine the association between plasma cholesterol concentration and both total and ionized calcium concentrations in 305 healthy postmenopausal women, ages 41 to 71 (mean 59, SD 5.6 y). All the women had at least one year since their last menses and menopausal status was verified by serum estradiol concentrations <31 pg/mL. Sera and plasma were collected after an overnight fast. Total and ionized calcium were measured in anaerobic specimens with a Nova 7 Total Calcium/Ionized Calcium Analyzer (Nova Biomedical, Waltham, MA), which adjusts results to pH 7.4 values. Concentrations of total protein and albumin in serum, and cholesterol in plasma, were measured using Roche reagents and a Cobas Fara centrifugal analyzer (Roche Instruments, Belleville, NJ).

Mean (and SD) concentrations in serum from the 305 women were: cholesterol 2.15 (0.38) g/L, total calcium 93 (3.2) mg/L, ionized calcium 50.7 (1.6) mg/L, and ionized calcium (pH 7.4) 50.8 (1.4) mg/L. There was a significant positive correlation between total serum calcium and plasma cholesterol concentrations (r = 0.14, P = 0.01, Table 1). However, both total calcium and cholesterol concentrations were related to albumin concentration (r = 0.19, P = 0.001, and r = 0.12, P = 0.03, respectively). In addition, concentrations of total calcium and albumin tended to decline with aging, and those of cholesterol tended to increase with aging. Therefore, we also assessed partial correlations (Table 1). When controlled for the effects of age and albumin, the significant positive correlation between total calcium and cholesterol persisted (r = 0.13, P = 0.02). We observed no relationship between serum globulin and either total calcium or cholesterol concentrations.

Neither ionized calcium in serum nor ionized calcium normalized to pH 7.4 correlated with plasma cholesterol concentration. Similarly, no relationship existed between ionized calcium and either albumin or age.

The positive correlation of cholesterol with total but not ionized calcium suggests that cholesterol concentration is related to serum component(s) binding to calcium. We could not identify a role for either albumin or globulin—proteins that bind calcium in serum (3)—or for serum pH, which influences that binding (4). Because it is the ionized calcium concentration that influences calcium-regulating hormones, including intact parathyrin (5), the observed relationship between total calcium and cholesterol is of uncertain physiological significance.

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References


### Table 1. Simple and Partial Correlations (r) between Calcium and Cholesterol Concentrations

<table>
<thead>
<tr>
<th></th>
<th>Simple</th>
<th>Age</th>
<th>Albumin</th>
<th>Age and albumin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>0.14</td>
<td>0.15</td>
<td>0.12</td>
<td>0.04</td>
</tr>
<tr>
<td>Ionized</td>
<td>0.07</td>
<td>0.07</td>
<td>0.06</td>
<td>0.06</td>
</tr>
<tr>
<td>Ionized (pH 7.4)</td>
<td>0.07</td>
<td>0.07</td>
<td>0.07</td>
<td>0.07</td>
</tr>
</tbody>
</table>

*a* Significant at P <0.05 or <0.01.

#### Measurement of Alkaline Phosphatase Activity by Kodak Ektachem 700 XR Analyzer Compared with Other Routine Analytical Methods

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A "dry" chemistry procedure, the Kodak Ektachem 700 XR system, was compared with various routine "wet" chemistry methods for measurement of serum alkaline phosphatase (AP) activity (1-4). The main difference between the wet chemistry methods concerns the buffer that is used. In the method described by Bretaudière et al. (3) and in that recommended by both the American Association for Clinical Chemistry (AACC) (1) and the International Federation of Clinical Chemistry (IPCC) (2) 2-amino-2-methyl-1-propanol (AMP) is used; in the method recommended by the Scandinavian Society for Clinical Chemistry (SSCC) (4) diethanol-