skills, and results remain the same for two weeks after sampling. Furthermore, blood spotted on filter paper can be analyzed.

We compared the sensitivity and specificity of these two methods, using 109 blood specimens that had been analyzed for lead and protoporphyrin. A true-positive result, a measure of the sensitivity, was defined as a protoporphyrin value >350 μg per liter of whole blood and a blood-lead concentration >250 μg/L. A result was considered negative when both of these fell below these cutoff values. This was a measure of specificity. The two methods had similar high sensitivities: method I 99%, method II 100%. However, their specificities differed: I had a specificity of 86%; II, 58%. We ascribe the lower specificity of II to the tendency of this method to give higher values than method I for the usual concentration of lead in whole blood, <250 μg/L. The mean value by II for lead in the blood of normal persons was 405 μg per liter of whole blood, whereas the corresponding value by I was 265 μg/L.

The high sensitivity and moderate specificity of II, coupled with its relative ease and low cost, prompts further investigation of this screening procedure.

Adaptation of 5'-Nucleotidase Assay for Use with the Olympus Demand, Jean I. Jarzabek, Pauline Z. Cassulis, and Ingo S. Kampa (The Valley Hospital, Dept. of Pathol. and Section of Clin. Biochem., Ridgewood, NJ 07451)

5'-Nucleotidase (5'NT, EC 3.1.3.5), which specifically hydrolyzes adenosine monophosphate to adenosine and inorganic phosphorus, is clinically useful for the diagnosis of hepatobiliary disease and for following the progression of metastatic carcinoma of the liver (1, 2). This enzyme may also be useful for differentiating between liver and bone as the source of increased alkaline phosphatase activity, because 5'NT is not present in bone tissue (3).

Current methods for measuring 5'NT activity are cumbersome, labor intensive, and lengthy. We have adapted a manual procedure for 5'NT, based on a kinetic method in which ammonia is formed by the hydrolytic action of deaminase on the nucleoside (4). The ammonia is quantified by reacting it with 2-oxoglutarate and NADH in the presence of glutamate dehydrogenase. 5'NT activity is proportional to the decrease in absorbance of NADH measured at 340 nm.

The reagents for the assay (5-ND 15.5 kit; Sigma Chemical Co., St. Louis, MO 63178) were reconstituted with 3.1 mL of de-ionized water instead of the 15.5 mL recommended for the manual assay. The settings of the Olympus Demand were: 17 μL sample volume, 50 μL reagent volume, calculation factor 2123. The assay was performed at 37°C.

Figure 1 summarizes the comparison of results by the manual and the automated procedure for 100 patients. The day-to-day precision (CV) of the three control sera was better for the automated procedure (1.9–7.5%) than for the manual method (3.6–9.4%). We concluded that the Arkessteijn enzymatic kinetic method for assay of 5'NT activity is easily performed on the Olympus Demand.

References

A Multilayer Element for Determining Urea Nitrogen in Whole Blood, B. A. Burdick (Research Laboratories–Life Sciences Division, Eastman Kodak Co., Rochester, NY 14650)

For determining urea nitrogen in whole blood, the current Kodak Ektachem slide for blood urea nitrogen (1) has been modified by adding a second spreading layer, which allows the application of undiluted whole blood. The element and the process are compatible with the Kodak Ektachem DT60 analyzer, and whole-blood urea nitrogen values can be obtained for 10-μL undiluted samples within 5 min.

The second spreading layer consists of 20- to 40-μm-diameter polymeric beads with latex binder and nonlysing surfactant to expedite uniform spreading of 10-μL blood samples. Blood cells are retained in the upper spreading layer, and the plasma rapidly (<10 s) diffuses into the lower region. The detection principle is the same as in the unmodified "BUN" slide (1).

The assay is calibrated by preparing and analyzing urea-supplemented whole-blood samples to span the range ~100 to 1000 mg/L. Calibration parameters thus obtained were used for quantifying unknown samples. For comparison I also assayed whole-blood specimens by using a Beckman urease/conductivity electrode (2).

To assess the sensitivity of the assay to blood volumes, I applied, in 1-μL increments, 8 to 12 μL of a blood sample to the slide. The effect of blood volume was small. Intra-assay precision was determined by analyzing 20 times two pooled blood samples, one with a normal blood urea content and one with added urea; precision (CV) was 1.6–2.7% for urea concentrations of about 140 and 825 mg/L. I assessed assay sensitivity to hemocrit by preparing a series of blood samples from a common blood pool (urea nitrogen, 190 mg/L) to have hemocrit values ranging from 10 to 60%.