During the course of this program, we have drawn blood samples from study participants by use of a Becton-Dickinson Vacutainer Tube system. To minimize metal loss due to adsorption on the container walls, we selected for use Vacutainer Tube no. 4727 (0.10 mL of 0.15% K$_3$EDTA; 10-mL volume draw).

The determination of arsenic, cadmium, copper, manganese, and lead in whole blood proceeded smoothly. However, analysis of blood samples for zinc indicated gross contamination. Addition of dilute HNO$_3$ to an unused tube, inverting the tube, and analyzing an aliquot gave a high zinc blank value. Consequently, zinc could not be determined in the collected blood samples.

Investigating the matter further revealed that no Vacutainer system available during the sampling period (August 1977–January 1978) was free of zinc contamination. Discussing the situation with the Becton-Dickinson Technical Service Department confirmed this fact and also revealed that the problem was associated with a high and variable zinc content in the tube stopper.

A recent report [F. L. Cerklewski, Nutr. Rep. Int. 18, 1 (1978)] noted that standard rubber stoppers contain approximately 1% zinc and represent a source of contamination.

Becton-Dickinson has recently developed a Vacutainer system with a minimal zinc content (no. 6527), which this laboratory will use in the future for drawing blood intended for metal analysis.

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**An “Extra” Arylamidase Isoenzyme Band in the Serum of a Cancer Patient**

To the Editor:

Four electrophoretic bands with arylamidase activity were detected in the serum of a cancer patient who died in hematological aplasia. The patient suffered generalized metastases, six months after a mammectomy.

Total arylamidase (EC 3.4.11.2) activity is increased in liver involvement, both by metastatic disease and (or) other liver conditions such as hepatitis (1). The existence of several isoenzymes in normal serum was also demonstrated. By the method of Manildi et al. (2), three fractions with arylamidase activity were observed by cellulose acetate electrophoresis: one relatively large fraction (1) migrating anodically in the region of $\alpha_2$-globulins, a second fraction (2) in the $\beta$-globulin area and a minor fraction (3) remaining at the point of application (Figure 1a).

By the same technique, a significant change in the ratio of the 2/1 fractions can be seen to occur with serum from cancer patients as compared to normal controls (3). However this abnormality is not specific, because a similar pattern can be found in several liver diseases (Figure 1b).

We report for the first time an abnormal isoenzyme pattern with one "extra" isoenzyme band in the serum of a cancer patient. This additional band with arylamidase activity migrated cathodically (Figure 2). We could not correlate this "extra" band to a specific disease because the patient was in a generalized metastatic state. No other patient with malignant disease (of more than 2000 examined) showed this "extra" isoenzyme band.

**References**


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