at nearly the same position as the internal standard, 8-chlorotheophylline. Thus, cefazolin interferes positively with the analysis, cefalothin negatively. The ultraviolet absorption curves for the compounds are such that even stopped-flow scanning of the chromatographic peak may not quantitatively resolve the interference, particularly if both theophylline and the cephaplorin are present in the sample. The other cephalosporins tested did not interfere, nor did acacetominophen, under these conditions. Other workers have reported interference by citrated plasma (9), ampicillin, and methicillin (11).

The interference by cefazolin and cefalothin can be resolved by a preliminary solvent extraction step before chromatography (8, 11) or by resorting to another technique such as ultraviolet spectrophotometry or enzyme immunonassay (EMIT; Syva Corp., Palo Alto, Calif. 94304). Less than 5% of the compounds are recovered on using the Schack and Waxler procedure, and they do not cross react in the immunoassay procedure. The use of another internal standard should also eliminate the interference from cefalothin in the HPLC method.

The interference with the HPLC assay for theophylline by two cephalosporin antibiotics, as well as the previously described interference by ampicillin and methicillin (11) is of great practical concern, because antibiotics and theophylline are often co-administered to the patient who has serious respiratory distress along with an active infection. Such a patient can ill afford any inaccuracy in dosing, as might be occasioned by the use of a nonspecific HPLC technique for the determination of theophylline (6, 7, 9, 10).

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Serum Enzymes in the Diagnosis of Hepatic Metastatic Carcinoma

To the Editor:
The recent paper in Clinical Chemistry by Kim et al. [23, 2034 (1977)] showed the value of several enzymes in the diagnosis of liver metastases. They found increased 5'-nucleotidase (5'-NT) and γ-glutamyltransf erase (γ-GT) activities, singly or in combination, in a very high proportion of patients with hepatic metastases. They also drew attention to the high false positivity rate, particularly with γ-GT. We have also found (1) a similar false positivity rate with γ-GT and 5'-NT in patients with colonic cancer, thus diminishing the value of γ-GT for preoperative screening for metastases. However, the false positivity rate decreased after successful removal of the primary tumour.

In contrast to Kim et al., we found that only 58% of γ-GT activities and 40% of 5'-NT activities were above normal in patients with liver metastases at the time of initial presentation. The diagnosis of liver metastases in our patients usually was made at laparotomy, whereas Kim et al. relied largely on liver scans, which are less reliable for the detection of small metastatic deposits (2). In our study, only one of eight patients with solitary or small localized liver secondary metastases showed increased γ-GT or 5'-NT activities preoperatively. However, 81% of patients with widespread liver metastases had increased γ-GT activities. Although we agree that γ-GT and 5'-NT are valuable indexes in the later stages of liver metastases, we have found them to be of limited value in the preoperative detection of liver metastases, and particularly the earlier stages of disease.

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Serum Haptoglobin Concentrations in "Pure" Iron-Deficiency Anemia

To the Editor:
In recent years hemolysis in iron deficiency anemia has been a subject of increasing interest (1). Clinically, in iron deficiency a degree of splenomegaly (2) and shortening of erythrocyte lifespan (3) is well recognized. Studies also show the presence of oxidative hemolysis and defective erythropoiesis in cases of iron deficiency anemia (4, 5). Haptoglobin is a serum α-glycoprotein that binds free hemoglobin stoichiometrically, in vivo and in vitro. The resulting complex is rapidly removed from the circulation by the reticuloendothelial system. Low haptoglobin concentrations usually indicate hemolysis. Hence serum haptoglobin determination is important in studies of hemolytic disease.

We measured serum haptoglobin concentrations in 10 cases of what we judged to be pure iron-deficiency anemia and compared them with those in sera of 10 normal healthy adults and five cord sera. Pure iron deficiency was categorized on the basis of the following criteria: (a) serum iron less than 400 μg/liter, (b) serum vitamin B12 greater than 200 μg/liter of packed erythrocytes, (c) serum folate greater than 6 μg/liter of packed erythrocytes, and (d) bone marrow appearance consistent with the present of iron deficiency. Serum hap-