

tentatively decided to be 1 u/ml.

Diagnostic significance of serum CEA determination was evaluated in neoplastic and non-neoplastic diseases. The upper limit was serum CEA in healthy control was 10 u/ml. A slight elevation of the level was found in the aged. In malignant diseases, elevation was found in 33/50 (66%) for colorectal cancer, 80/200 (40%) for gastric cancer and in 25 to 60% for other cancers. The classification of stages of gastric carcinoma was possible in 88 patients. In early gastric cancer, stage I, the levels were elevated in 3/22, while in the advanced stages II, III and IV an increase was observed in 1/10, 10/32 (37%) and 27/39 (69%) of the cases, respectively. An especially high level was noted in 16/18

(89%) of patients of the stage IV with liver metastasis. In primary hepatoma, slightly elevated values were found in 11/20 (55%) of the cases. This incidence was higher than 20 to 32% seen in patients with hepatitis and liver cirrhosis.

It is, however, obvious that the simultaneous determinations of CEA and AFP during the clinical course are useful for the differential diagnosis of primary and metastatic liver carcinomata. In addition, despite the fact that CEA assay may not be valuable for the early detection of cancer, it may be useful for monitoring cancer patients during therapy and, especially, for predicting the metastasis to the liver.

Radioimmunoassay of α -Fetoprotein

Shinzo NISHI

Department of Biochemistry, Hokkaido University School of Medicine

Radioimmunoassay (RIA) of α -fetoprotein (AFP) was developed in 1971 and many findings have been accumulated during these five years. Among them I reported about the following three subjects.

1) *SOME PATHOPHYSIOLOGICAL CONDITIONS WITH INCREASED SERUM AFP:* Among malignant diseases, abnormal values (> 20 ng/ml) were found in hepatoma ($> 10,000$ ng/ml 70%, 10,000 ng/ml-20 ng/ml 20%), teratoblastoma ($> 10,000$ ng/ml 40%, 10,000 ng/ml-20 ng/ml 20%) and digestive tracts cancer mostly accompanied with liver metastasis ($< 10,000$ ng/ml very rare, 10,000 ng/ml-20 ng/ml rare). AFP positive teratoblastoma tissues contained yolk sac like elements.

Among non-malignant diseases, moderate elevations of AFP ($< 1,000$ ng/ml-20 ng/ml) were frequently observed (40-50%) in hepatitis and liver cirrhosis and the appearances were transient and related to liver cell regenerations. In some congenital diseases such as ataxia teleangiectasis and tyrosinemia, serum AFP were observed to increase frequently. During the pregnancies of abnormal fetuses with such as open neural tube defects, esophagus atresia and, etc, maternal serum AFP were found to elevate abnormally.

2) *PROPERTIES OF AFP IN NORMAL A-*

DULTS: AFP of normal adults or patients with liver cirrhosis has been suggested to have a mobility of γ -globulin in electrophoresis (C.C.A. 71, 343, 1976). We purified serum AFP from normal adults and it migrated between α_1 -globulin and albumin indicating that it was not different from AFP of fetus or hepatoma concerning the electrophoretic behavior as well as immunoreactivity.

3) *DEVELOPMENT OF A NEW RIA:* RIA in current uses are based on the competitive binding reaction of radioiodinated antigen and antigen in sample to a limited amount of antibody. We developed a more sensitive and simpler method based on sandwich technique using filter paper discs coated with antibody to AFP and the radioiodinated antibody. Filter paper disc with a diameter of 5 to 6 mm was activated with BrCN and coupled with the antibody. Antibody disc was incubated with serum specimen and after washing with saline reacted with the radioactive antibody. The radioactivities of the discs were proportional to the amounts of antigen adsorbed on the discs and AFP values were estimated from the radioactivities. The method covered a range as wide as 1 ng/ml-1,000 ng/ml and was sensitive 1 ng/ml of AFP being able to be measured with a satisfactory reproducibility.