Establishment of Radioimmunoassay for γ-oncofetal Antigen (Basic Fetoprotein) and Study on Serological Diagnosis of Malignant Neoplasia by Use of the Radioimmunoassay

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A new fetoprotein electrophoresed in gamma region has been found in human fetal serum and human fetal gut and brain extracts as well as in several types of carcinomas by Ouchterlony tests using anti-γ-globulin fraction of human fetal gut extracts rabbit antiserum absorbed with both normal human plasma and normal human adult gut extracts. This fetoprotein was immunologically different from alpha fetoprotein, carcinoembryonic antigen, alpha 2-H immunologically identical to ferritin and other known serum proteins. Moreover, this fetoprotein was also seemed to be distinct from γ-fetoprotein already described by Edynak et al. because of discrepancy of those distributions in human fetal organs.

The fetoprotein was isolated from ascites of a patient with hepatoma by the techniques of ion-exchange chromatography, affinity chromatography, electrofocussing and gel filtration. The isolated fetoprotein was demonstrated to be highly pure by immunoelectrophoretic and electrophoretic methods. The fetoprotein was shown to have an isoelectric point of 9.3. Because of its property, it was named basic fetoprotein (BFP).

For the establishment of BFP radioimmunoassay anti-BFP antiserum and isotope-labeled BFP were prepared as follows. Monospecific anti-BFP antiserum was produced by immunizing the purified BFP to a rabbit. Preparation of 125-I labeled BFP was performed by the method of Hunter and Greenwood and 125-BFP had a radiospecific activity of 10 mCi/mg of BFP. A radioimmunoassay of BFP was developed based on a coprecipitation-inhibition technique using two antibody method. The sensitivity could allow reproducible detection of 5ng of BFP/m*l* of serum.

By this radioimmunoassay sera of 101 normal subjects, 214 patients with malignant neoplasia, 169 patients with non-malignant disease and 12 umbilical cord were tested for BFP. BFP could be detected in all out of 101 normal subjects and the BFP level was less than 100 ng/m*l* with the exception of a case. Sera of 157 out of 169 patients with non-malignant neoplasia were BFP level less than 200 ng/m*l*. Twelve cases that BFP level was more than 200 ng/ml were composed of 5 hepatitis, a cirrhosis of liver, 3 aplastic anemia, 2 pneumonia and a systemic lupus erythematosus. On the other hand, sera of 82 out of 214 patients with malignant neoplasia resulted in BFP level more than 200 ng/m*l* and those 82 cases were composed of various types of malignant neoplasia.

From above-described results, quantitative determination of BFP in serum by the radioimmunoassay was concluded to be useful for diagnosis of various types of malignant neoplasia.

Diagnosis of Intracranial Tumor by Brain Scanning with Combined Use of Different Radionuclides and Clinical Comparison with Computed Tomography

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The purpose of this paper is to compare the diagnostic value of radionuclide brain scanning and X-ray computed tomography (CT) in the evaluation of patients with brain tumor. Our study is based on 179 radionuclide scans and 133 CT scans on patients with brain tumor.

In radionuclide imaging, overall positive rate was 87.7%, while CT missed only one case with posi-