

In conclusion, 201-Tl myocardial scintigraphy was valuable not only for IHD to identify the location and extent of perfusion defect, but also for HCM to identify the status of myocardial mass. Quantification of myocardial blood flow was espe-

cially useful on exercise loading, where an imbalance between oxygen supply and myocardial demand was suspected to exist such as in angina pectoris.

Elemental Analysis of Ascites Hepatomas by Proton Induced X-Ray Emission Spectroscopy

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Specimens were bombarded with protons accelerated by a Van de Graaff generator and this induced X-ray fluorescence. The X-ray have characteristics for each element, and indicate which elements are present in the specimens. Since Johansson et al. showed that proton-induced X-ray emission spectroscopy (PIXE) could be used to analyse many elements at the 10^{-12} g level simultaneously, a considerable number of reports have appeared in physics.

In this experiment PIXE method was used for elemental analysis of normal and malignant tissues. Specimens taken from liver, brain, serum and ascites hepatoma (AH-130) of rats, were bombarded with 3.5 MeV protons accelerated by the 5 MV Van de Graaff of Tohoku University, and induced X-rays were analysed with a Si (Li) detector. Absolute concentrations were determined with reference to a known concentration of uranium in the specimen. Small amounts of Ga, Yb and Tl which are known as the metals having tumors affinity were injected into rats implanted with AH-130 and its derivatives such as; AH-130 FG, AH-130 FGI, AH-130 FN, AH-130 FNI and AH-130 FNII. Twenty-four hours after injection, liver, brain, serum and hepatoma cells were removed from the rats and these specimens were analysed by PIXE

method.

Concentrations of Fe, Cu, Zn and Br in liver, brain, serum and hepatoma specimens showed characteristic patterns respectively. The patterns of liver and hepatoma were quite similar, but the total amount of elements in liver was greater. AH-130 and its derivatives cell lines showed a different accumulation rate for Ga, Yb and Tl. The Ga concentration in free cell type (AH-130 FG and AH-130 FN) was more than that in island forming cell type. The concentration of Yb in liver was the greatest of three metals injected, and Ga in serum had the highest concentration. Tl was the only injected metals detected in brain.

Using a computed tomography 10^{-4} mole/g of Ga solution was distinguished from water by CT number. Total amount of Ga, Yb and Tl was less than 10^{-9} mole/g in each hepatoma cell line. These metals are not available for CT as a contrast medium at present.

There is a good possibility that we may be able to diagnose the grade of malignancy and the character of cancer by PIXE method to analyse the accumulation of several metals injected simultaneously, or by scanning using several radioisotopes and pulse height analyser.