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BASIC STUDIES USING RADIOIODINATED PEANUT AGGLUTININ AS A TUMOR SEEKING AGENT.

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We have previously reported that peanut agglutinin (PNA) is a good tumor seeking agent. The present study was undertaken to confirm the specific binding of PNA to the tumor cells and investigate the relationship between the administered dose of PNA and accumulation into tumor. We used Ehrlich ascites tumor as a tumor model.

In cultured cells, the uptake of I-125 PNA to tumor cells was dose-dependently inhibited by galactose administration. So it was proved that PNA bound to tumor cells specifically.

And % uptake of I-125 PNA was decreased when the total PNA dose was increased.

But in in vivo biodistribution, % dose/g•tumor was also increased when the total PNA dose was increased.

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CALCULATION OF RATE CONSTANTS OF [18F]-2-FLUORO-2-DEOXY-D-GLUCOSE(FDG) IN LUNG CANCERS.

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We tried to calculate the individual rate constants k*1,k*2,k*3 of FDG by dynamic scanning of human lung cancers. PET images were taken every five minites for 1 hour using ECAT II. Arterial blood sapling was also performed after injection of FDG. Based on the three compartment model, three parameters of a 3-exponential functions were calculated by nonlinear least-square curve fitting. The results are shown in the table. The values of the rate constants for FDG have varied each other. Although we have no knowledge about these differences of values, we felt that the differences represent the characters of tumor cells.

Calcurated rate constants of FDG in lung cancers

		k*1	k*2	k*3	(k*1×k*3)/(k*2+k*3)
1 T.C.	squamous cell carcinoma	0.077	0.053	0.062	0.0411
2 S.S.	small cell carcinoma	0.212	0.556	0.080	0.0266
3 H.N.	large cell carcinoma	0.105	0.102	0.057	0.0376

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LUNG CANCER AND C-11 PYRUVATE

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Tumor tissue has distinctive type of metabolism of glucose, that is to say that tumor produces more lactate than normal tissue and tumor can not convert glucose to carbon dioxide and water.
We synthesised C-11 pyruvate from C-11 carbon dioxide using pyruvate ferredoxine oxidoreductase of clostoryzum butyrcum.
We studied C-11 pyruvate metabolism in tumor.Patients with lung cancer were lying on the bed in the supine position. Scan was performed with ordinary r-camera. Some patients were taken blood sample every minute for 5 min and every 5 minute for 30 min to study C-11 activity in the blood. Clearance of C-11 from blood was rapidly. C-11 activity of blood arrived at base line about 5 min. Scan started as soon as C-11 pyruvate was injected. C-11 accumulated in heart muscle, tumor and liver. C-11 accumulation in kidney and urin bladder gradually appeared. It sugested that C-11 excluded from urinary system. C-11 accumulation in liver was very high, so we subtract liver scan image of Tc-99m phytate from C-11 pyruvate image and decreased the counts in liver. This procedure made the accumulation in tumor cleary, Also metastic lision and metastic lymphnode had high uptake of C-11. Clearance in tumor was slowly. This is that tumor convert C-11 pyruvate to C-11 lactate and C-11 remained in the tumor.

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CLINICAL STUDIES WITH (F-18)-5-FLUORODEOXY-URIDINE FOR CANCER DETECTION.

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We studied tissue distribution of (F-18)-5-fluorodeoxyuridine([F-18]-FdUR) in a volunteer and tumor uptake in four lung cancer patients. Histological diagnosis were small cell carcinoma and squamous cell carcinoma. In a normal volunteer, most of [F-18]-FdUR accumulated to the liver and the kidneys, and was excreted to the urine. In lung cancer patients, tumor uptake were various. Three tumors were clearly visible and easily distinguished from the surrounding tissues. But a tumor was not clearly observed and was almost equivalent to the soft tissue like muscle. We are studying the relationship between tumor uptake of [F-18]-FdUR and tumor proliferation.