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MECHANISM OF TUMOR AND LIVER CONCENTRATION OF Ru-103. A.Ando,I.Ando,T.Hiraki and K. Hisada. Kanazawa University. Kanazawa.

Tumor accumulation of Ru-103 was already reported by some groups. This study was undertaken to elucidate the mechanism of tumor and liver concentration of Ru-103. The following animals and transplanted tumors were used: male ddY mice SC implanted with Ehrlich tumor; male Donryu rats SC implanted with Yoshida sarcoma, and hepatoma AH109A.

Ru-103 chloride was injected to the above animals, and tumor and liver were excised at selected intervals after injection of Ru-103. Distribution of Ru-103 in tumor tissues was determined by macroautoradiography. And subcellular distribution of Ru-103 in these tissues was determined according to the modified method of Hogeboom and Schneider.

From these experiments, the following results were obtained. In Yoshida sarcoma and Ehrlich tumor, only a small amount of Ru-103 was localized in mitochondrial fraction (lysosome is contained in this fraction). But in liver, large amounts of Ru-103 were concentrated in mitochondrial fraction. In hepatoma AH109A, a considerably large amount of Ru-103 were localized in mitochondrial fraction. Large amounts of Ru-103 were accumulated in inflammatory infiltration around tumor. A small amount of Ru-103 was bound to the acid mucopolysaccharides (heparan sulfate, etc) in tumor. But a considerably large amount of Ru-103 was bound to the above acid mucopolysaccharides in liver.

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Ru-97 TRANSFERRIN UPTAKE IN TUMOR AND ABSCESS. K. MATSUI, YOKOHAMA CITY UNIV., YOKOHAMA. Y. YONEKURA, KYOTO UNIV., KYOTO AND P. SOM, BNL, USA.

The uptake of Ru-97 transferrin (Ru-TF) in tumor and abscess bearing animals was compared to Ga-67 citrate (Ga), and several other plasma proteins. Maximal concentration in tumor of Ru-TF in tumor-bearing mice was three times higher than Ga-67 citrate (16.80 ± 4.20 vs 5.08 ± 0.58) but it occurred later (24 hrs) as compared to Ga-67 which reached its maximum 2 hrs after injection. Whole body autoradiography (WBARG) with Ru-103 transferrin (Ru-103 TF) in tumor and abscess bearing rats demonstrated details of the distribution within these lesions. Turpentine-induced abscesses in the rabbits could be visualized with gamma camera as early as 30 minutes post injection of Ru-TF. It seems therefore that Ru-TF can be used for tumor and abscess localization. The results indicate that Ru-TF may have some advantages over Ga-67 citrate because of the higher concentration in the lesions. The two compounds investigated (Ru-TF, and Ga, which binds instantaneously to TF in vivo) have a common ligand, transferrin. It appears therefore, that tumor affinity is a property of the radionuclide-ligand complex rather than of the radionuclide itself.

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STUDIES ON THE MECHANISM OF TUMOR AFFINITY OF Tl-201. M.Katayama,A.Ando,I.Ando, T.Hiraki,N.Tonami,K.Hisada,H.Mori. Kanazawa University. Kanazawa.

Subcellular distribution and binding substances of Tl-201 in tumor tissue were examined. The following animals were used: rats implanted with Yoshida sarcoma and mice implanted with Ehrlich tumor. Tl-201 chloride were injected to the rats intravenously and to the mice intraperitoneally. Ten minutes to 48 hours after the administration of Tl-201, the animal were sacrificed, and the tumor tissues were excised. Subcellular fractionation of tumor tissues were carried out according to the modified method of Hogeboom and Schneider. Radioactivity of each fraction was counted by a well type scintillation counter. Supernatant fraction were filtered on Sephadex G-50. Mitochondrial and microsomal fraction was incubated with pronase P in buffer solution at 37°C for 48 hours. After digestion, the reaction mixtures were filtered on Sephadex G-50. On the other hand, the localization of Tl-201 in tumor tissues was determined macroautoradiographically.

The following results were obtained.

1. From the observation of autoradiogram, concentration of Tl-201 was predominant in viable tumor tissue rather in necrotic tumor tissue.
2. Most of radioactivity (about 80%) was localized in the supernatant fraction, and Tl-201 was in a free state. Specific substance to Tl-201 was bound, was not found.

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SCINTIGRAPHIC EVALUATION OF HEAD AND NECK TUMORS BY Tc-99m DIMERCAPTOSUCCINIC ACID. H.Ohta,K.Endo,H.Sakahara,T.Nakajima,R.Mori-ta,K.Torizuka,H.Masuda,A.Yokoyama,Y.Shimizu,Y.Ishii, and K.Makimoto. Kyoto Univ. School of Medicine, Kyoto.

Tumor scintigraphy, using Tc-99m Dimercaptosuccinic acid [Tc(V)-DMS] was performed in 84 patients (malignant 60, benign 24) with head and neck tumors. Tc(V)-DMS was found to have good sensitivity (73%) and specificity (81%), especially in maxilla, mandibular cancer and medullary thyroid carcinoma. But in other thyroid carcinoma or lymphoma, and inflammatory regions, there was no significant uptake of Tc(V)-DMS. The superior nuclear properties of Tc-99m deriving in better images within 2 hours post injection and suitable for ECT along with the easy and lower supply cost, justify the use of Tc(V)-DMS in diagnosis head and neck tumors.