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UPTAKE OF RADIOCOLLOIDS, Ga-67 CITRATE AND Tl-201 CHLORIDE BY MACROPHAGES AND TUMOR CELLS. K. Nagai, Y. Ito, N. Otsuka and N. Nagase Division of Nuclear Medicine, Kawasaki Medical School, Kurashiki

Keeping lymphoscintigraphy with subcutaneously injected Ga-67 citrate (Ga) in mind, in vitro uptake (% dose/ 10^6 cells) of radiocolloids, Ga and Tl-201 chloride (Tl) by rat peritoneal macrophages (M ϕ) and tumor cells was investigated. When the contact time with cells was 1 hr, uptake of radiopharmaceuticals by M ϕ obtained physiologically was 5% with Tc-99m antimony sulfide colloid, 0.3% with Tc-99m rhenium colloid, 0.016% with Ga and 0.065% with Tl. Incorporation of radiopharmaceuticals into M ϕ obtained by stimulating with thioglycollate medium was increased. Uptake of radiocolloids by HeLa S3 cells was 1/23 to 1/10 of that of M ϕ . Incorporation of Ga into each cell was 0.016% in M ϕ , 0.065% in Burkitt's lymphoma cells and 0.061% in HeLa S3 cells. Tl incorporated into the tumor cells to a greater degree than M ϕ , as well as Ga. However, M ϕ to tumor cells ratio was lower than that of Ga. These results suggest that Ga is chosen as a new agent for subcutaneous lymphoscintigraphy to delineate abnormal lymph nodes.

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LYMPHOSCINTIGRAPHY BY SUBCUTANEOUS INJECTION OF Ga-67 CITRATE. Y. Ito, N. Otsuka, K. Nagai, A. Muranaka, M. Yoneda, H. Terashima, S. Yanagimoto, and N. Nagase Div. of Nuclear Med., Kawasaki Medical School, Kurashiki

Lymphoscintigraphy by subcutaneous injection of Ga-67 citrate was carried out on 17 patients with lymph node metastasis and 5 patients with malignant lymphoma. Dose given at each injection site was about 200 μ Ci and scintigraphy started 5 to 10 min after injection. Metastatic lymph nodes and malignant lymphoma were successfully imaged. This positive delineation corresponded well to cold lesions by lymphoscintigraphy with Tc-99m-rhenium colloid in metastatic lymph nodes. Hotter lesions in malignant lymphoma with Tc-99m colloid were scanned positive by this method. Pathological confirmation was done on all the cases presented here. Also, the satisfactory correlation was obtained between subcutaneous Ga-67-lymphoscintigraphy and lymphography. In a normal subject, lymph nodes were not depicted with the procedure.

Thus, the combination of subcutaneous Ga-67-lymphoscintigraphy with colloid-scintigraphy seems valuable for diagnosis of diseases of lymph nodes.

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TUMOR AND LIVER ACCUMULATION OF Cr-51 CHLORIDE. A. Ando and I. Ando School of Paramedicine, Kanazawa University, Kanazawa

Ga-67, In-111 can be trivalent cation in solution. As Cr-51 chloride can be also trivalent cation in solution, tumor affinity of Cr-51 chloride was investigated, using the rats and mice which were subcutaneously transplanted with tumor cells.

From the observation of macroautoradiogram and hematoxylin-eosin stained sections, concentration of Cr-51 was predominant in viable tumor tissue rather than in necrotic tumor tissue, but deposition of Cr-51 was observed more avidly in connective tissue (especially inflammatory tissues), regardless of time after the administration.

Subcellular distribution of Cr-51 in tumor tissue and liver was quantitatively determined. In tumor tissues, considerably large amounts of Cr-51 was concentrated in the mitochondrial fraction (lysosome contains in this fraction), but in the liver, most of the radioactivity was concentrated in the mitochondrial fraction and the radioactivity of this fraction was increased with time after the administration. From tumor tissue and liver lysosome treated with pronase P, Cr-51-acid mucopolysaccharide complexes were isolated.

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THE MICROAUTORADIOGRAPHY OF 99m Tc-MDP AND 67 Ga-CITRATE. H. Ishikawa, T. Ohmukai, K. Soh, H. Okuno Department of Orthopedic Surgery, Nissei Hospital, Osaka, C. Hidaka, S. Murakami, S. Matsumoto, T. Nakai Department of Radiology, Nissei Hospital, H. Ochi Department of Radiology, Osaka City University Hospital.

For the purpose of investigating the mechanism of 99m Tc-MDP accumulation we studied the distribution of 99m Tc-MDP accumulation in clinical and experimental bone tumors and reported the results in the 19th and 20th symposia. In this paper we discussed the distribution from a microscopic point of view.

[Method] VX₂ tumor cells were injected into the marrow of a rabbit tibia. At the stage when bone destruction was seen with the aid of a simple X-ray image, 1mCi 99m Tc- and 0.1mCi 67 Ga-citrate were intravenously injected. About 3 hours later the rabbit was sacrificed to prepare the microautoradiography. The material was fixed with 10% formalin, embedded in paraffine, and treated by the dipping method.

[Result] The grains in the tumor cells accumulated in different manners between 99m Tc-MDP and 67 Ga-citrate groups. In 99m Tc-MDP the grains were slightly recognized along the blood vessel wall while in 67 Ga-citrate the grains were taken in the tumor cells as well. The extent of the grain was found to be the same in both groups at the reactive bone formation sites around the site of transplant.