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UPTAKE OF RADIOCOLLOIDS, Ga-67 CITRATE AND Tl-201 CHLORIDE BY MACROPHAGES AND TUMOR CELLS.
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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 (Mø) and tumor cells was investigated. When the contact time with cells was 1 hr, uptake of radiopharmaceuticals by Mø obtained physiologically was 5% with Tc-99m antimony sulfide colloid, 0.3% with Tc-99m rhenum colloid, 0.016% with Ga and 0.005% with Tl. Incorporation of radiopharmaceuticals into Mø obtained by stimulating with thioglycolate medium was increased. Uptake of radiocolloids by HeLa S3 cells was 1/23 to 1/10 of that of Mø. Incorporation of Ga into each cell was 0.016% in Mø, 0.065% in Burkitt's lymphoma cells and 0.06% in HeLa S3 cells. Tl incorporated into the tumor cells to a greater degree than Mø, as well as Ga. However, Mø 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.
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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 μCi 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.
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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 99mTc-MDP AND 67Ga-CITRATE.
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For the purpose of investigating the mechanism of 99mTc-MDP accumulation we studied the distribution of 99mTc-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] VX tumor cells were injected into the marrow of a rabbit tubia. At the stage when bone destruction was seen with the aid of a simple X-ray image, 1mCi 99mTc- and 0.1mCi 67Ga-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 99mTc-MDP and 67Ga-citrate groups. In 99mTc-MDP the grains were slightly recognized along the blood vessel wall while in 67Ga-citrate the grains were taken in the tumor cells as well. The extent of the grains was found to be the same in both groups at the reactive bone formation sites around the site of transplant.