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THE ENHANCEMENT EFFECT OF DEFEROXAMINE MESYLATE ON GA-67 CITRATE TUMOR IMAGES.
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The enhancement effect of deferoxamine mesylate (DFO) on Ga-67 citrate tumor images was evaluated using tumor-bearing rats, cultured tumor cells and patients with cancer. Ga-67 showed strong affinity to DFO in vitro, and Ga-67 DFO complex injected into rats was rapidly excreted through kidneys.

Administration of DFO to tumor-bearing rats 12hr after Ga-67 citrate injection decreased the blood concentration of the tracer rapidly without any change of the tumor concentration. On the contrary, administration of DFO 4hr after Ga-67 citrate injection decreased not only the blood concentration but also the tumor concentration.

Administration of DFO to cultured tumor cells uptaken Ga-67 did not show any washout effect of the tracer from the tumor cells.

Ordinary therapeutic dose of DFO also decreased the blood Ga-67 concentration in patients with cancer. Although a case demonstrating slightly enhanced Ga-67 image after administration of DFO was presented, enhancement effect in human is further to be investigated.

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GA-LOCALIZATION IN LIVE CELLS(5):THE ROLE OF FERRITIN AND LYSOSOMES IN INTRACELLULAR GA-TRANSPORT AND STORAGE.
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Ga-67 movement in the liver cells was studied on the eluate of continuous isopycnic rate-zonal ultracentifugaion(1,2) the localization of Ga in the lysosomes was investigated in a system of two phase aqueous polymer cuntercurrent systems consisting of detxrtrant 500 and 6 % polyethylene glycol 4000, and the partition behaviour of gallium in the system was assayed with respect to the pH ranges at verious pHs. In this system, the distribution of gallium in upper and the lower phase was demonstrated.
By the addition of sodium sulfate, it was found that lysosomal granules was distributed in the upper phase, while in the lower phase, the endoplasmic reticulum particles were fractionated. The Ga-67 radioactivity was in an identical pattern with that of acid phosphatase in the upper phase. And therefore, it was concluded that gallium was incorporated in the lysosomal particles and not in the heavy endoplasmic reticulum.
(1)Samezima K, H.Orii:Eur.J.Nucl.Med. 5, 281-288(1980)
(2)Samezima K, K Nakamura, H Orii:Int.J. nucl.Med.Biol.(in press)

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TUMOR UPTAKE OF POLYNUCLEAR COMPLEXES OF TECHNETIUM (III): EFFECT OF TECHNETIUM OXIDATION STATE.
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As previously reported polynuclear complexes of Tc prepared with various ligands like citric, pyrophosphoric and dimercaptosuccinic (DMSA) acids showed high tumor cell accumulation (Ehrlich). In this paper, the importance of Tc oxidation state in the polynuclear complex is discussed. High radioactivity ratio of tumor cell to blood could be achieved by high membrane transport followed by a retention in the cell and a rapid blood clearance. Various 99m-Tc complexes of citric, pyrophosphoric and DMS acids in polynuclear state can be prepared. But upon controlled condition of pH, Sn^{2+} concentration, ligand concentration, a very high tumor cell accumulation was achieved. Thus the several oxidation state of Tc allowed the incorporation of this metal Tc in a chosen form specific for the tumor uptake. Tc(V) state either in its cationic form as TcO^{3+} or its anionic form as TcO_4^- were postulated in its preparation, as its resemblance with the Ga form.

Thus our data showed promissing outcome for future development of 99m-Tc radiopharmaceuticals suited for tumor diagnosis.

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TUMOR UPTAKE OF POLYNUCLEAR COMPLEXES OF TECHNETIUM (IV): TUMOR TO BLOOD ACTIVITY RATIO ENHANCEMENT OF 99m-Tc-DIMERCAPTOSUCCININATE (Tc-DMS) BY Fe-ETHYLENEDIAMINEDIACETATE (Fe-EDDA).
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In the diagnosis of tumor, a high tumor to blood activity ratio is most desirable. In vitro study with Ehrlich tumor cells carried out with 99m-Tc-DMS complexes, high accumulation was observed with preparations performed at high pH , such as 8.0-8.5. In vivo study showed, nevertheless, high binding with albumin and transferrin of the blood, a negative phenomenon for the imaging process due to a delayed blood clearance. As previously reported, administration of Fe-NTA enhanced the tumor to blood ratio, but since NTA has been reported as a cancerigenic and acutely toxic drug, EDDA is thought as a possible substitute. In vitro study carried out with 99m-Tc-DMS-transferrin complex showed that the radioactivity released from that complex with Fe-EDDA was about 89.2% similar to the data reported with Fe-NTA (89.1%). Upon administration of Fe-EDDA to mice bearing Ehrlich tumor previously injected with the polynuclear complex of 99m-Tc-DMS enhanced tumor to blood ratio was obtained. Fe-EDDA showed an LD_{50} 1/20 of Fe-NTA, in mice.