THE ENHANCEMENT EFFECT OF DEFEROXAMINE MESYLATE ON Ga-67 CITRATE TUMOR IMAGES. K.Kotsumi, K.Okouchi, K.Nakajima, N.Tonami, T.Hiada and I.Tatsuno, Kanazawa University Hospital and Kanazawa National Hospital, Kanazawa.

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 12h 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 4h after Ga-67 citrate injection decreased not only the blood concentration but also the tumor concentration.

Administration of DFO to cultured tumor cells uptake Ga-67 did not show any wash-out 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.

TUMOR UPTAKE OF POLYNUCLEAR COMPLEXES OF TECHNETIUM (III): EFFECT OF TECHNETIUM OXIDATION STATE. A.Yokoyama, N.Hata, Y.Terashiki, H.Tanaka, H.Saji, R.Morita and K.Torizuka Pharmaceutical Sciences and School of Medicine, Kyoto University, Kyoto.

As previously reported polynuclear complexes of Tc prepared with various ligands like citric, pyrophosphoric and dimercapto-succinic (DMSA) acids showed high tumor cell accumulation (Ehrlich). In this paper, the importance of Tc oxidation state in the polynuclear complex is discussed. High radiotracer 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 DMSA acids in polynuclear state can be prepared. But upon controlled condition of pH, Sn2+ 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(VI) on Ga-67citrate Tumor images as Tco34+ or its anionic form as Tco32- were postulated in its preparation, as its resemblance with the Ga form.

This shows some promising outcome for future development of 99m-Tc radiopharmaceuticals suited for tumor diagnosis.


Ga-67 movement in the liver cells was studied on the eluate of continuous isoporic rate-sonal ultracentrifugation (1,2) the localization of Ga in the lysosomes was investigated in a system of two phase aqueous polymer cutent systems consisting of detetraxtran 500 and 6% polylethylene glycol 4000, and the partition behaviour of gallium in the system was assayed with respect to the pH ranges at various 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 were 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.


TUMOR UPTAKE OF POLYNUCLEAR COMPLEXES OF TECHNETIUM (IV): TUMOR TO BLOOD ACTIVITY RATIO ENHANCEMENT OF 99m-Tc- DIMERCAPTO SUCININATE (Tc-DMS) BY Fe-ETHYLENEDIAMINEDIACETATE (Fe-EDDA). H.Hata, A.Yokoyama, H.Tanaka, H.Saji, R.Morita and K.Torizuka. Pharmaceutical Sciences and School of Medicine, Kyoto University, Kyoto.

In the diagnosis of tumor, a high tumor to blood activity ratio is most desirable. In vivo study with Ehrlich tumor cells carried out with 99mTc-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 99mTc-DMS transferrin complex showed that the radioactivity released from its 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 99mTc-DMS enhanced tumor to blood ratio was obtained. Fe-EDDA showed an LD50 1/20 of Fe-NTA, in mice.