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CHEMICALLY DESIGNED 99m-Tc-DIMERCAPTOSUCCINATE, AS A TUMOR IMAGING AGENT. N. Hata, A. Yokoyama, M. Morishita, H. Tanaka. Dept. of Radiopharmaceutical Chemistry, Faculty of Pharmaceutical Sciences, Kyoto University. H. Saji, R. Morita and K. Torizuka. Dept of Nuclear Medicine, Kyoto University, Kyoto, Japan.

In our search for a Ga-citrate like technetium (Tc) complex, our attention has been focussed on hydrolyzed polynuclear Tc complexes. Among the various possible Tc species, a pentavalent anion $Tc(V)O_4^{3-}$, whose structure resembles PO_4^{3-}, an essential metabolite, was regarded as a species most likely related with the metabolically active tumor cells.

Thus, upon selection of an appropiate ligand, dimercapto succinic acid (DMS) and reaction conditions favorable for a pentavalent Tc formation, a polynuclear complex of Tc-DMS was prepared by $SnCl_2$ method with good reproducibility.

This newly prepared Tc-DMSA showed singular characteristics, different from the previously reported kidney imaging Tc-DMSA, that is, clear images of bones and tumor, in VX-2 bearing rabbit. Further in vitro studies with Ehrlich tumor cells, showed the inhibition effect of PO_4^{3-} anion on the Tc-complex uptake, supporting our proposal. Further studies are under progress.

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Cancer Imaging by C-11 labeled Glucose. H. Fukuda, S. Endo, K. Yamada, J. Hatazawa, T. Sato, T. Matsuzawa Department of Radiology & Nuclear Medicine, The Research Institute for TB & Cancer, Tohoku University, Sendai

C-11 glucose and fructose mixture, which was made from C-11-CO_2 by photosynthesis, was tested as a tumor imaging agent in a transplanted rat hepatoma(AH109A) and rabit papiloma(VX7). The radiopharmaceutical was injected intravenously into rats and the tissue uptakes were measured. The tumor uptake was relatively low at 3 minutes, but increased with time and reached a peak by 30 minutes, with gradual wash out of C-11 activity. The brain showed a similar uptake curve as tumor, whereas other organs showed downward convex curves. The tumor uptakes was higher than other organs except for liver, kidney and small intestine. The tissue uptakes after oral administration were also examined. The uptakes of all organs and tumor increased with time and reached a plateau by 60 minutes. The tumor uptake was higher than other organs except for liver. Tumor images of rabit VX7 were taken by positron ECAT(ECAT-II). The image clearly deliniated the viable tumor central necrosis and abdominal lymphnode metastasis.

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EXPERIMENTAL STUDY FOR CANCER DIAGNOSIS WITH F-18-FDG AND F-18-FDM. Endo,S. Fukuda,H. Yamada,K. Hatazawa,J. Sato,T. Matsuzawa,T. Department of Radiology and Nuclear Medicine The Research Institute for Tuberculosis and Cancer, Tohoku University. Sendai Ido,T. Iwata,R. Ishiwata,K. Takahashi,T. Monma,M. Cyclotron and radioisotope center, Tohoku University. Sendai

The purpose of the present study is to show the usefulness of fluorinated glucose analogs for cancer diagnosis. F-18-fluoro-deoxy-glucose(F-18FDG) and F-18-fluoro-deoxy mannose(F-18FDM) were synthesized by the method developed by Ido et al. Ascites hepatoma(AH) 109A was transplanted subcutaneously to the Donryu-rats. F-18FDG and F-18FDM was injected intravenously. Rapid and increasing uptakes with passing time are observed in the tumor after injection. F-18radioactivities are cleared rapidly from blood and all normal organs(liver,pancreas,kidney,lung and muscle) except heart, brain, to much lesser extent, the small intestine. The differences of the uptakes of both radiopharmaceuticals between tumor and most normal organs become large and steady 60min after injection. Autoradiogramm of AH109A bearing rat after F-18 FDG injection demonstrates very high uptakes in tumor, brain and heart. Positron-emission tomogram of VX7 bearing rabbit after F-18FDM injection with ECAT-II shows the primary tumor and lymphnode metastasis clearly. These data suggest that both F-18FDG and F-18FDM are excellent cancer diagnostic pharmaceuticals for liver, pancreas, kidney, lung and muscle.

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MODIFICATION OF GA-67 DISTRIBUTION IN MAN FOLLOWING THE ADMINISTRATION OF IRON. T. Higashi, H. Wakao, K. Furukawa, M. Yamaguchi, K. Nakamura* and H. Kato* Department of Radiology, Kanagawa Dental College. Yokosuka, *Yokohama Keiyu General Hospital. Yokohama

In 1979, Larson reported that uptake of Ga-67 in tumor cells was preceded by binding of the Ga-67 to transferrin. This study was undertaken in an attempt to discern what changes were produced in Ga-67 images of malignant tumors after Fesin(ferric acid saccharated) was administered at different times post Ga-67 injection. After Ga-67 injection, Fesin was administered to 26 patients with malignant tumors of the lung, thyroid gland, maxillary sinus and neck. Fesin was administered 24, 48 and 72 hours after injection of Ga-67. One, 2 and 3 hours after Fesin injection, a scintigram or scinticamera was taken with the same technical conditions before and after Fesin administration.

In our clinical trials, Ga-67 images of tumor and background taken 1, 2 and 3 hours after Fesin administration was obviously diminished. However, the tumor image did not see to be as good as the results of the animal data would indicate because the Ga-67 excretion was not only from normal tissue but tumor tissue as well. Iron loading post Ga-67 injection in order to enhance the tumor image may not be very effective.