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SPECIES OF Ga-67-BINDING ACID MUCOPOLYSACCHARIDE IN SOFT TISSUES.

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We originally determined that Ga-67 was bound to the acid mucopolysaccharides in tumor and liver(1979). We reported previously that the main Ga-67-binding acid mucopolysaccharide(m. wt. about 10000) in these tissues is keratanpolysulfate on the basis of chemical analysis.

To further confirm the structure of the Ga-67-binding acid mucopolysaccharides, the present study was undertaken. Ga-67 citrate was injected into the tumor-bearing animals. Tumor and liver were excised 24 hours after administration. The main Ga-67-binding acid mucopolysaccharide(m. wt. about 10000) was obtained by the method previously described.

The main Ga-67-binding acid mucopolysaccharide was treated with chondroitinase ABC, heparitinase, keratanase, and heparinase, separately. In these experiments, the Ga-67-binding acid mucopolysaccharide was not digested with these mucopolysaccharase, although each acid mucopolysaccharide was completely digested with the corresponding mucopolysaccharase in the same procedure.

Based on the present results and chemical analysis, it is presumed that the main Ga-67-binding acid mucopolysaccharide is keratanpolysulfate.

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Ga-67 ACCUMULATION IN ABSCESS AND BLOOD FLOW.

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It was previously reported by us that Ga-67 was accumulated in abscess and uptake rates of Ga-67 in abscess increased with time after injection of Ga-67 citrate.

The present study was undertaken to elucidate the blood flow influencing Ga-67 accumulation in abscess.

Five days after subcutaneous injection of 0.2 ml turpentine to the rats, I-131-human serum albumin(HSA) was injected intravenously to the rats. At various times afterwards, ranging from 10 min to 6 days, uptake rates of I-131-HSA in abscess and normal tissues were assayed. On the other hand, Cr-51-red blood cells(RBC) were injected intravenously to the above rats. Uptake rates of Cr-51-RBC in the above tissues were assayed.

1, 3, and 24 hours after injection of I-131-HSA, uptake rates of I-131-HSA in abscess were 1.33 %dose/g, 1.84 %dose/g, and 0.38 %dose/g, respectively. But uptake rates of Cr-51-RBC in abscess was very small, and that value was 0.14 %dose/g at 24 hours after injection.

In the case of abscess, blood in the tissue was very little, but the permeability of I-131-HSA from the blood vessel in the tissue was much larger than that of normal tissues.

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THE STUDY OF EARLY GA-67 SCINTIGRAPHY (SECOND REPORT).

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We studied early Ga-67 scintigraphy (5 hours after injection, E) in serial form. Our method was similar to the one we used previously. We studied 48 cases (98 accumulations) which had abnormal RI accumulation in E or delayed scintigraphy (48 hours after injection, D).

At first, we compared the detectabilities of abnormal RI accumulations of E and D by macroscopic examination. Next, the count ratios of abnormal RI accumulation and femoral soft tissue (A/F) of E and D were compared in some objects (54 accumulations). We subsequently compared the count ratios of abnormal RI accumulations of E and D (D/E) of malignant tumors and inflammatory lesions. We also compared the A/F of E of malignant tumors and inflammatory lesions.

Although abnormal RI accumulation was more detectable in D than in E, it was equally detectable in the limbs. A/F was higher in D than in E. There was no difference between the D/E of tumors and inflammatory lesions. There was also no difference between the A/F of E of malignant tumors and inflammatory lesions.

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A EXPERIMENTAL STUDY ON ABSENT LIVER UPTAKE IN Ga-67 SCAN (PART 1). Y.Hirono,M.Hasegawa*,I.Kamigaki*,H.Takenaka*,A.Shinotsuka*,H.Munehika* and T.Hishida*. Department of Radiology, Okura National Hospital and Showa University, School of Medicine*, Tokyo.

We have experienced many cases with absent liver uptake in Ga-67 scan and consequently suggested the correlation with iron metabolism, especially marked decrease of UIBC and administration of antitumor drugs. Therefore, we performed following experiments in order to identify the correlation.

In our experiments, male Wistar rats were used. The animals were scanned and killed 48 hr after intravenous administration of Ga-67. Tissue samples of blood, lung, liver, spleen, kidney and femoral bone were obtained. Count per gram of these samples were measured and serum TIBC and UIBC values were measured. In normal rats, the count ratio of liver to blood (L/B ratio) was 41.19 ± 10.0 .

After long term administration of iron, UIBC value was markedly decreased, but the liver uptake of Ga-67 was inversely increased. When a lot of vincristine (VCR) was given after iron administration, the Ga-67 scan showed completely absent liver uptake. The L/B ratio was decreased to 29.96 ± 9.91 . The UIBC value showed also marked low level. Only VCR administration without iron administration didn't make to decrease UIBC and liver uptake of Ga-67.

So, it was suggested that not only iron excess condition but also bone marrow suppression were significant factors of absent liver uptake in Ga-67 scan.