As a result a good visualization of Co-57 bleomycin was recorded in the central type of bronchial carcinoma.

In the case of lung cancer with accompanying atelectasis, the accumulation of Ga-67 was only in the focal lesion, while the distribution of Co-57 bleomycin was not only in the tumor area but also in the area of atelectasis. In the follow up examination during Cobalt therapy, the accumulation of the two agents in the tumor areas was markedly decreased after the irradiation of 6,000 rads.

A significant difference in positive uptake of the two agents in the case of lung cancer was not in fact discerned.

Affinity of RI Labeled Bleomycin for Malignant Tumor

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Affinity of ^{67}Ga-bleomycin and ^{111}In-bleomycin for malignant tumor of the rats were investigated. The agents were injected intravenously to the rats that bore subcutaneous transplants of ascites hepatoma AH109A. They were sacrificed 1 or 24 hours after the injection. The radioactivity of the tumor, blood, muscle, liver, kidney, bone and spleen was measured by a well-type scintillation counter. Tumor to muscle concentration ratio of ^{111}In-bleomycin at 24 hours was 7.1 and that of ^{67}Ga-bleomycin was 11. Kidney to muscle ratio of ^{111}In-bleomycin was 13, liver or spleen were 6—7 and blood was 0.4. Kidney to muscle ratio of ^{67}Ga-bleomycin was 14, liver or spleen were 13—15 and blood was 3.0. The whole body retention of ^{111}In-bleomycin at 24 hours after the injection was about 1/3 dose, and that of ^{67}Ga-bleomycin was about 1/2 dose. The results appear to indicate that tumor imaging with ^{111}In-bleomycin and ^{67}Ga-bleomycin are prospective.

Tumor Scintigrams with ^{111}In-Chloride and ^{111}In-Bleomycinin Comparison with Those with ^{67}Ga-Citrate and ^{67}Ga-Malate

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One hundred and twenty tumor scannings were carried out with 4 kinds of so-called tumor seeking agents, such as ^{67}Ga-citrate (62 cases), ^{67}Ga-malate (30 cases), ^{111}In-chloride (14 cases), and ^{111}In-bleomycin (14 cases). When the efficiency of tumor visualization of one agent is compared to the other, it is a matter of course that the scintigram qualities should be assessed on the basis of whole body distribution of each

agent. In this respect, all the scintigrams in this series were taken by the whole body scanner and the data before the whole body scanner became available were excluded.

As for the general quality of the scintigrams, ^{111}In-chloride and ^{111}In-bleomycin were found to have stronger affinity to skeleton than ^{67}Ga-citrate and ^{67}Ga-malate in general, and also the former two agents showed some accumulation in the cardiac area not infrequently. Therefore, we have more favorable impression with ^{67}Ga-citrateand ^{67}Ga-malate than with ^{111}In-chloride and ^{111}In-bleomycin.

In 5 patients, ^{111}In-chloride and either ^{67}Ga-citrate or ^{67}Ga-malate were given with certain interval and the scintigram qualities were compared with each other. Equally definite accumulation were seen in one patient with Hodgkin's disease, equally weak accumulation in one lung cancer patient, and equally negative accumulation in one patient with pulmonary metastasis from the kidney cancer. In 2 patiens, one with metastatic lesions from ureter cancer and the other with recurrent lesion of esophageal cancer, however, ^{67}Ga-compounds showed strong accumulation in the diseased areas but indefinite with ^{111}In-chloride.

In 5 patients, ^{111}In-bleomycin and either ^{67}Ga-citrate or ^{67}Ga-malate were given with certain interval. In this group, ^{67}Ga-compounds were always better than ^{111}In-bleomycin except one with a metastatic lesion from thyroid cancer on whom both agents failed to visualize it. From our present studies, though the number of the patients tested is small, it can be said that ^{67}Ga-compounds in the form of citrate or malate are more practical and better agents than ^{111}In-chloride and ^{111}In-bleomycin clinically.

Changes of ^{111}In-Bleomycin in Vivo

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In order to investigate the changes taking place on bleomycin after administration, In-111 Bleomycin and In-111 chloride in liver was injected to rat. After 24 hrs the blood was collected and plasma was fractionated with Sephadex. It was found that the whole radioactivity was eluted at V_0, and no free radioactivity was found. In liver it was found as follows : 90 min after injection, the liver was excised, homogenized, and fractionated by Schneider's method. After fractionating the supernatant of 105, 000g, radioactivity was found at V_0 and there was another minor free radioactivity at column bed volume. An attempt was performed to separate this free radioctivity to find out whether this free radioactivity is In-111 ions or In-111 bound bleomycin, the separation was carried put using a large Sephadex G-50 column.

The results indicated that the peak of the eluates comes in between two authentic peaks of cold bleomycin and IN-chloride respectively, making the decision of the position difficult. It can be estimated at present that the radioactivity of the eluate is the sum of In-111 chloride and In-111 bleomycin. A more accurate separation is being carried out in our laboratory The distribution of radioactivity