

On the other hand,  $^{111}\text{In}$  was slowly and slightly taken into the bone from the blood, so the retention values in the soft tissues was remaining rela-

tively high.  $^{67}\text{Ga}$  showed the intermediate value of bone uptake rate between  $^{169}\text{Yb}$  and  $^{111}\text{In}$ .

### **Deposition in Tumor and Inflammation of $^{169}\text{Yb}$ , $^{99\text{m}}\text{Tc}$ - and $^{57}\text{Co}$ -bleomycin, with Special Reference to $^{67}\text{Ga}$ and $^{111}\text{In}$**

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Our interests in new tumor imaging agents are (1) if they would more selectively deposited in malignancies, and (2) if they not be accumulated in inflammatory lesions. Simultaneous, binuclear studies with  $^{169}\text{Yb}$ ,  $^{67}\text{Ga}$  and  $^{99\text{m}}\text{Tc}$ -bleomycin were undertaken in rabbits bearing VX-2 experimental carcinoma.  $^{169}\text{Yb}$  was cleared from the blood faster than  $^{67}\text{Ga}$ , and this resulted in a higher tumor to blood concentration ratio of the former radioisotope. The tumor masses were clearly scanned with either agent. Clinical tumor imaging was also attained successfully by either agent.

High VX-2 concentration was achieved in the

case of  $^{57}\text{Co}$ -bleomycin as well, and scanned positive.

Deposition in the typhoid vaccine-induced exudative inflammation was assessed of the tumor imaging agents. The concentration ratio to the control subcutaneous tissue was as follows:  $^{99\text{m}}\text{Tc}$  pertechnetate 1.4,  $^{67}\text{Ga}$  3.4,  $^{111}\text{In}$  2.7,  $^{169}\text{Yb}$  5.2,  $^{99\text{m}}\text{Tc}$  bleomycin 1.5, and  $^{57}\text{Co}$ -bleomycin 5.0.

Development of tumor imaging agents that would not be deposited in inflammatory lesions is so badly needed in order to efficiently cope with daily clinical problems.

### **Detection of the Extent of Malignant Lymphoma with Gallium-67 Whole Body Scanning**

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Gallium-67 citrate has been used in several malignant tumors. In this series, we studied 17 cases of malignant lymphoma (reticulum cell sarcoma:12 cases, others:5 cases) with whole body scanner.

Patients were received 1.0–1.5 mCi Ga-67 citrate intravenous injection 72–96 hours prior to scanning. The equipment used in our clinic was a whole body scanner with dual head (12.7 cm) and with 85 hole focused cone.

In 9 cases bearing obvious tumor before treatment or initial radiotherapy, the scintigram showed positive in all patients except one with dermal infiltration. Of these in 5 cases, for which another diagnostic measurement was not able to detect, the scintigram showed further new extent of the tumors. They were confirmed by biopsy, radiograph, and clinical course.

In 4 among 8 cases of follow up groups, the scintigram showed abnormal deposit. In 2 cases the diagnosis was confirmed by pathological examination and in 2 cases the diagnosis was false positive.

We conclude Ga-67 scanning is a useful examination in management of malignant lymphoma by repeated scintiscan.

### Scanning by $^{67}\text{Ga}$ -citrate in Malignant Lymphoma

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27 cases of malignant lymphoma were examined in these three years at our department. (Reticulum cell sarcoma 16 cases, Lymphosarcoma 6 cases, Hodgkin's disease 2 cases, Giant follic-

ular lymphoma 1 case, Other 2 cases.)

**Method:** Examinees were injected 0.5~2.0 mCi of  $^{67}\text{Ga}$ -citrate and scanned after 48 hours with Toshiba RDA I06I scanner

### Result

Reticulum cell sarcoma	16	(23)	++	+	±	—
non-therapeutic group	13		4	7	2	0
therapeutic group	10		0	1	5	4
Lymphosarcoma	6	(11)				
non-therapeutic group	5		3	2	0	0
therapeutic group	6		0	1	0	5
Hodgkin's disease	2	(4)				
non-therapeutic group	1		1	0	0	0
therapeutic group	3		0	1	0	2
Giant follicular lymphoma	1	(1)				
non-therapeutic group			1	0	0	0
Other	2	(2)				
non-therapeutic group	2		1	0	0	1

(1) Positive uptake of  $^{67}\text{Ga}$ -citrate on the scintigram was 86.4% in the non-therapeutic group, and was 16.7% in the therapeutic

group.

(2) This examination was effective for decision of location which were not visualized clearly