Ehrlich's tumor (mouse), sarcoma 180 (mouse) and 3'-Me-DAB hepatoma (rat) were compared each other autoradiographically and histologically to investigate the uptake of Ga-67 citrate in tumor. In order to evaluate the associations between the growth of tumor and the uptake of Ga-67, animals were killed at 3, 5, 7 and 10 days after injection of Ehrlich's and sarcoma 180 tumor cells.

Following results were obtained. Accumulation of Ga-67 was seen in all experimental tumors. RI uptake ratio (tumor/normal tissue counts ratio, T/N ratio) was increased according to the growth of tumor in Ehrlich's tumor and sarcoma 180. T/N ratio calculated about 5 in the mice tumor at 10 days after injection of tumor cells. On the other hand, RI uptake ratio (hepatoma/normal liver tissue) calculated 1.62-3.31 in 3'-Me-DAB hepatoma. In all tumors, the evident accumulation of Ga-67 was demonstrated into the site of dense tumor cells without degeneration and necrosis. Ehrlich's tumor and sarcoma 180 showed a tendency to uptake Ga-67 into the granulation tissues around the tumor and most of them showed also higher uptake than that of tumor cells.

In order to clarify the molecular mechanism of Ga-67 uptake in malignant tumor cells, the effects of NaF on Ga-67 uptake in mouse leukemia cells were examined. The uptake of Ga-67 in control cells had gradually increased during incubation with a constant NaF content. However, when NaF was added to these cell suspensions, Ga-67 uptake did not increase and kept a constant level, and ATP content of these NaF treated cells was much lower than that of control cells, because NaF is a potent inhibitor of glycolysis. Therefore the process of Ga-67 uptake in these cells is considered to be dependent on intracellular ATP content.