LETTER TO EDITORS

Study of Distribution of $^{169}$Yb, $^{67}$Ga and $^{111}$In in Tumor Tissue by Macroautoradiography

—Comparison between viable tumor tissue and inflammatory infiltration around tumor—

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It was reported previously that concentration of $^{169}$Yb, $^{67}$Ga and $^{111}$In was predominant in viable tumor tissue rather than in necrotic tumor tissue1). Macroautoradiographical and histological studies presented here lead to elucidation of a part of the mechanism of $^{169}$Yb, $^{67}$Ga and $^{111}$In uptake by tumor tissue.

Material and Methods

$^{169}$Yb-citrate, $^{67}$Ga-citrate and $^{111}$In-citrate were injected intravenously to the rats subcutaneously transplanted Yoshida sarcoma and were injected intraperitoneally to the mice subcutaneously transplanted Ehrlich tumor. These animals were sacrificed 3, 24 and 48 hours after injection. These tumor tissues were frozen in n-hexane ($-70^\circ$C) cooled with dry ice-acetone. After this, these frozen tumor tissues were cut into serial thin sections (10 $\mu$m) in the cryostat ($-20^\circ$C). One of these sections was then placed on X-ray film and this film was developed after exposure of several days, every second and third serial sections were fixed in ethanol, and the former was then stained with hematoxylin-eosin, the latter was stained with hematoxylin. On the other hand, every fourth serial section fixed in carnoy solution were stained with 0.05 percent toluidine blue (Fig. 1).

Results and Discussion

From the observation of these autoradiogram, hematoxylin-eosin stained sections, and toluidine blue stained sections, the following results were obtained. Concentration of $^{169}$Yb, $^{67}$Ga and $^{111}$In was predominant in connective tissue (especially inflammatory tissues) rather than in viable tumor tissue, regardless of time after the administration (Fig. 2). It was revealed that $^{169}$Yb was avidly accumulated in viable tumor tissue adjacent to areas of necrosis (Fig. 2.). In sections stained with toluidine blue, many metachromatic granules were seen in the part of tumor tissue.
Fig. 2 Morphological specimens. Concentration of $^{169}$Yb, $^{67}$Ga and $^{111}$In was predominant in connective tissue rather than in viable tumor tissue.

of connective tissues adjacent to areas of tumor tissues (Fig. 3A.), and these granules were generally sparse in areas composed of viable tumor cells (Fig. 3B.). And it was thought that the metachromatic granules were the mast cell from their size and figures. Metachromasia means that there exist many acidic mucopolysaccharide in this tissue and the mast cell produces heparin (a kind of acidic mucopolysaccharide).

Considering the above-described facts, it is presumed that these elements are associated with acidic mucopolysaccharide, as there are large amount of acidic mucopolysaccharide in inflammatory tissue, which has many carboxy radical, sulfinic group in its structure.

References