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GALLIUM-67 UPTAKE AND HEPARAN SULFATE CONTENT IN THE MICE KIDNEY OF ACUTE IMMUNE COMPLEX GLOMERULONEPHRITIS INDUCED BY DAILY INJECTIONS OF BOVINE SERUM. T.Sasaki, S. Kojima, and A.Kubodera. Faculty of Pharmaceutical Sciences, Teikyo University and Science University of Tokyo. Kanagawa and Tokyo.

Relation between Ga-67 uptake and heparan sulfate(HS) content during the repair of an acute immune complex glomerulonephritis in mice kidney induced by bovine serum(BS) was studied. Moreover, effects of degradation and detergent enzymes of HS on the binding of Ga-67 to renal glomerular basement membrane(GBM) in Vitro was investigated.

Ga-67 uptake in kidney was elevated after the start of BS injection, and peaked at 20 days. The uronic acid content in 1.2 M NaCl-soluble fraction(which contained HS) and hydroxyproline(index of collagen) were increased at 10 days, reaching a maximum at 20 days. This pattern of HS content was essentially similar to that of Ga-67 accumulation in the kidney. Urinary protein content and γ-GTP activity were both reached to maximum at 5 days. Binding percent of Ga-67 to GBM was significantly inhibited by the treatment with heparitinase, nitrous acid, and detergent enzyme(trypsin or papain). On the other hand, it is not affected by the treatment with chondroitinase ABC.

These results indicated that HS may be a binding substance for Ga-67 in inflammatory tissues or tumor cells.

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IN VIVO BINDING OF GA-67 TO EHRLICH ASCITES TUMOR CELLS. S. Kojima, Y. Hama, and A. Kubodera. Faculty of Pharmaceutical Sciences, Teikyo University and Science University of Tokyo. Kanagawa and Tokyo.

Our previous studies on Ga-67 uptake in tissues suggested that the elevated uptake of Ga-67 was closely correlated with the repairing process from the tissue-damage, and that heparan sulfate(HS) might play an important role as a receptor for gallium.

In this study, we investigated the binding of Ga-67 to Ehrlich ascites tumor(EAT) cells which had been reported the presence of HS on the cell surface membrane.

EAT cells were obtained from the 10th-day mice after i.p. injection of 10^7 cells. The cells were pelleted by centrifugation (800 x g for 5 min.), washed 3 times with cold 0.9% NaCl solution, and resuspended in fresh cold 0.9% NaCl solution. The suspended cells were incubated with 0.1 μCi of carrier-free Ga-67 citrate at 37°C. After the incubation, they were centrifuged, and the sediment was washed twice with 0.9% NaCl solution and the radioactivity in the sediment was counted.

The binding percent of Ga-67 with EAT cell was significantly decreased by heparin , or mild pretreatment with trypsin or with papain. On the contrary, more hard treatment with trypsin resulted in increasing of the binding percent. Treatments of cations such as La(III), Ru(III), Er(III) etc., significantly increased the binding percent of Ga-67 with EAT cell.

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CHANGES IN UPTAKE OF Ga-67 AND I-125-TRANSFERRIN BY TRANSFORMATION OF HAMSTER EMBRYO CELLS (SECOND REPORT). J.Saito, A. Muranaka and Y.Ito. Department of Nuclear Medicine, Fukushima Medical School and Division of Nuclear Medicine, Kawasaki Medical School. Fukushima and Kurashiki.

We already reported that no correlation was noted in deposition of Ga-67-citrate (Ga) and I-125-transferrin (I-Tf) when hamster embryo (HE) cells were transformed with 4NQO. Using the above mentioned model and HeLa S3, further experiments were carried out to analyze Tf receptors by Scatchard plots of binding of I-Tf to cells and Ga and Fe-59-citrate (Fe) uptake as well. Numbers of Tf receptors per cell were 1.65×10^5 in normal HE cell, 1.11×10^5 in transformed HE cell (HEA-3), 3.14×10^5 in HeLa S3 respectively. Namely, Tf receptors did not increase in transformation of HE cells. Fe uptake by HeLa S3 was greater than that by normal HE or HEA-3 cells. Therefore, Fe uptake was correlated with the numbers of Tf receptors in cells. On the other hand, a different tendency was noted in Ga uptake by cells from Fe uptake. Namely, Ga uptake by HeLa S3 was similar to that by HEA-3. A marked increase was not seen in Ga uptake by normal HE with change of Tf concentration in medium. We conclude that Ga-deposition in tumor may be influenced by other factors rather than numbers of Tf receptors.

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THE RELATIONSHIPS BETWEEN GA-67 UPTAKE AND CELL CYCLE OF SYNCHRONIZED CULTURED TUMOR CELLS. M.Yamaguchi,H.Wakao and T.Higashi. Department of Radiology, Kanagawa Dental College. Yokosuka.

Clinically, we have previously reported that Ga-67 uptake by malignant tumor correlates well the degree of malignancy of tumor. The present investigation was, therefore, undertaken in order to study the relationship between Ga-67 uptake and cell cycle of synchronized cultured tumor cells such as mouse leukemia 15178Y cells and mouse Ehrlich ascites tumor cells. Mouse leukemia 15178 Y cells were cultured in Fischer's medium with 10% horse serum.

Atypical follow-up study of the synchronized population was made by the estimation of 2 easily measurable parameters, cell counts and C-14-thymidine uptake. The uptake of C-14-thymidine into synchronized cultured cells was very low for 1 hr and increased rapidly to reach a maximum at 3 hrs and then declined. The uptake of Ga-67 into synchronized cultured cells was almost simillary as well as C-14-thmidine accumulation. That is , the Ga-67 uptake in S phase of cell cycle was greater than that of other phase of cell cycle.

From these results, the authors postulate that the Ga-67 uptake into tumor cells correlates well the proliferation of tumor cells.