

# CLINICAL AND FUNDAMENTAL STUDIES ON THE DIFFERENTIAL DEPOSITION OF $^{67}\text{Ga}$ and $^{201}\text{Tl}$ IN MALIGNANCIES

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Equal mM per gm body weight of cold nonradioactive gallium and thallium were intraperitoneally administered into Donryu rats bearing various histological types of ascites hepatomas. The ascites were collected 24 hours later, and were submitted to microelemental analysis by the proton-induced excitation elemental analysis. Gallium was seen to deposit predominantly in undifferentiated types. Thus, the tumor deposition of these elements suggested a probable radioisotopic diagnosis of different histological types.

$^{67}\text{Ga}$  tumor uptake in cancer patients revealed a characteristic pattern: a gradual rise during the initial 2 days was followed by a gradual decline, thus the maximal  $^{67}\text{Ga}$  tumor concentration was seen on day-2 after the dose. At the moment, histological difference in the deposition patterns was not apparent. On the other hand,  $^{201}\text{Tl}$  behaved differently. Its maximum tumor concentration was observed at minutes post-dose, and the radioactivity monotonously declined during the subsequent days. Histological discrimination in the deposition patterns of  $^{201}\text{Tl}$  was not observed. A technique of quantitative assessment of such radionuclides in cancer patients is being developed, and it would hopefully help evaluating histological difference of their radioisotopic accumulation.

# THIRTEEN CASES WITH DIFFUSE LUNG $^{67}\text{Ga}$ -67 UPTAKE

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$^{67}\text{Ga}$ -scan was performed on 1237 cases with various diseases from December 1973 to May 1978. Sixty-nine of them (5.4%) showed bilateral diffuse lung  $^{67}\text{Ga}$ -uptake, among which 13 cases (0.1%) showed extremely high lung  $^{67}\text{Ga}$ -uptake. The factors causing diffuse lung  $^{67}\text{Ga}$ -uptake were investigated in these 13 cases.

Most of these 13 cases had various malignancies as a primary disease (4 lung carcinoma, 3 malignant lymphoma, 1 malignant melanoma, 1 breast carcinoma, 1 uterine carcinoma, 1 colon carcinoma, 1 lung fibrosis, 1 asthma pulmonare). Among 13 cases, 10 were given a great amount of anticancerous drugs before  $^{67}\text{Ga}$ -scan. Six cases in which some bacteria or true fungi such as staphylococcus epidermidis, klebsiella and candida albicans were observed by sputum culture, were the most likely to be "opportunistic infection" associated with decreased immunity.

Three cases in which no ~~bacteria or true fungi~~ were observed all received various kinds of anticancerous drugs such as mitomycin C, bleomycin and cyclophosphamide. Then, these 3 cases were considered compatible with "drug-induced pneumonitis". But it could not be determined which drug was the most likely to cause an interstitial inflammatory reaction.

$^{67}\text{Ga}$ -scan seems to be useful for early detecting pulmonary infection or drug-induced pneumonitis associated with any malignancies being treated.