

## TREATMENT OF HUMAN LUNG CANCER-BEARING NUDE MICE WITH $^{90}\text{Y}$ -LC-1

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$^{90}\text{Y}$ -labeled anti-human lung cancer monoclonal antibody LC-1 IgM was used to treat human lung cancer-bearing nude mice, which resulted in the inhibition or elimination of tumor growth.

### MATERIALS AND METHODS

Nude mice were purchased from the Animal Husbandry Center of Shanghai Institute of Cell Biology, Academia Sinica. Human lung cancer cell clone SPC-A-1 and anti-human lung cancer monoclonal antibody LC-1 IgM were generated in our laboratory.  $^{90}\text{Y}$  was provided by the Institute of Radiology, Shanghai Medical University.

Nude mice were grafted subcutaneously with human lung cancer cell clone SPC-A-1 and the treatment was initiated when the size of growing tumor reached approximately 1 cm<sup>2</sup>. The animals were divided into control and treatment groups. LC-1 IgM was labeled with  $^{90}\text{Y}$ . The size of the tumor was measured once a week to evaluate the effect of the treatment.<sup>[1-3]</sup>

### RESULTS

#### The Growth of Lung Cancer Cells

As shown in Figure 1, there was a rapid growth of lung cancer cells in the control group, whereas the tumor size in the treatment group which received different doses of LC-1 IgM was reduced ( $P < 0.05$ ). Figure 2 showed that the cancer cells proliferated slowly in the treatment group ( $P < 0.005$ ).

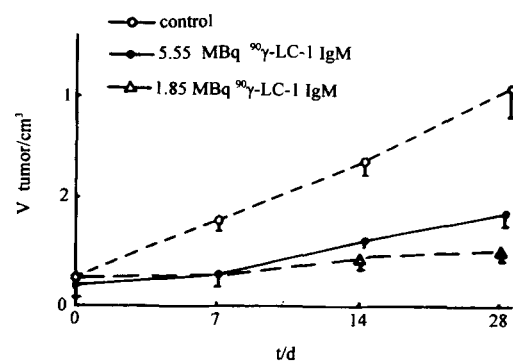


Fig 1. Growth of lung cancer cells in nude mice treated with different doses of  $^{90}\text{Y}$ -LC-1

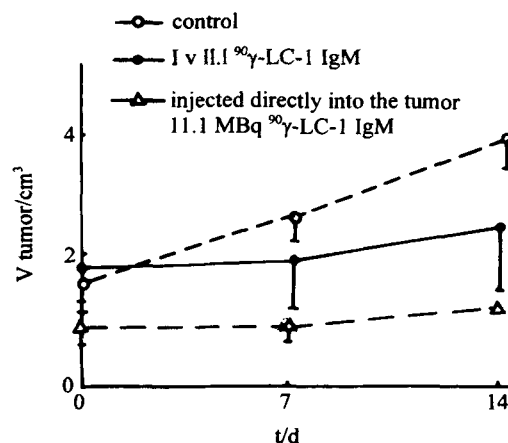


Fig. 2. Effect of injection routes on the growth of tumor in nude mice.

#### The Weight of Lung Cancer

The change in the weight of lung cancer after different doses of treatment: (1.005 ± 0.224) g for the dose of 1.85 Mbq,  $P < 0.05$ , and (1.21 ± 0.8) g for the dose of 5.55 MBq,  $P < 0.05$ .

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Effect of injection routes on the weight of lung cancer:  $(1.849 \pm 0.828)$  g for the dose of 11.1 MBq injected intravenously,  $P > 0.05$ , and  $(1.35 \pm 0.289)$  g for the same dose injected directly into the tumor,  $P > 0.05$ .

### DISCUSSION

The use of monoclonal antibodies, in combination with drug, radiation, and physical and chemical therapies, in the treatment of disease has been appreciated.<sup>[4,5]</sup> It has been demonstrated that imaging nuclide (such as  $^{99m}\text{Tc}$ )-labeled anti-human lung cancer monoclonal antibody LC-1 is able to target the tumor site resulting in the imaging of the tumor. In the present study, we used LC-1 IgM, which was labeled with  $^{90}\text{Y}$ , a therapeutic nuclide, to treat human lung cancer in nude mice. After LC-1 IgM was injected intravenously with different doses, it was able to carry  $^{90}\text{Y}$  to the lung cancer site, leading to the accumulation of  $^{90}\text{Y}$  in the tumor. The radiation from  $^{90}\text{Y}$  killed certain percentage of cancer cells, which resulted in the inhibition of the malignant growth of the cancer cells. In some cases a complete elimination of the tumor was observed after treatment.

After  $^{90}\text{Y}$ -LC-1 IgM was directly injected into the tumor, we observed that there was a depression at the center of the tumor with the raised edge. An ulcer

later developed in the center, whereas the cancer cells in the periphery continued to grow. This indicates that  $^{90}\text{Y}$  made a direct contact with the cancer cells and then killed cancer cells.

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