Autoradiographic Analysis of Cell Cycle of Yoshida Sarcoma in Ascitic and Solid Forms

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There are several articles of Baserga (1960, 1962) and Bertalanffy (1965) about the estimation of cell cycle of experimental tumors in ascitic and solid forms.

They reported that the generation time of experimental tumors in solid form is rather delayed compared with that in ascitic form.

Cell cycle of Yoshida Sarcoma in ascitic form and solid form was studied by means of tritiated thymidine autoradiography to analyse the proliferation of tumor cells of experimental animals in various forms.

YS-strain of Yoshida Sarcoma was transplanted intraperitoneally to Donryu rats weighed about 100 gr....

The ascitic form of Yoshida Sarcoma cells was examined by means of mitosis chase method after single pulse labelling method.

Two, four and seven days after transplantation, 100μCi of tritiated thymidine was injected intraperitoneally.

After injection of tritiated thymidine, cell samples were successively taken from individual rats by withdrawing a small volume of ascites at several hours interval.

By counting grains in nuclei of metaphase cells, labelled mitosis curve of ascitic form of Yoshida Sarcoma was figured.

Subcutaneous injection of 0.1 ml. of the tumor cell suspension containing 10^7 of Yoshida Sarcoma cells produced solid tumor in the abdominal wall which grew 1.5 cm. in diameter within ten days or so.

The solid form of Yoshida Sarcoma cells was examined by means of local or general cumulative labelling method.

Seven days and eleven days after transplantation, tritiated thymidine was repeatedly injected every ten hours directly into the subcutaneous tumor by “Clock method” (Ashihara, 1967).

Labelling indices were plotted against time and proliferation curve of solid form of Yoshida Sarcoma was obtained.

Generation time (tG) was estimated at 20.5~25.5 hrs. in ascitic form and at 28~31.5 hrs. in solid form, whereas DNA synthetic time (ts) was 13.5~18 hrs. in ascitic form and 13~16 hrs. in solid form.

The results revealed that the DNA synthetic time of ascitic form and solid form are within similar range but that the generation time of solid form was prolonged in comparison with that of ascitic form of Yoshida Sarcoma.

This fact suggests that presynthetic resting time (G1) in solid form was longer than that in ascitic form.

It was found that DNA non-synthesizing fraction of the cell population (or cells of limited life span) amounted to 7~10% in both forms of Yoshida Sarcoma.