

VIABILITY OF TUMOR CELLS CIRCULATING IN THE BLOOD STREAM

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Intraperitoneal injections of blood from animals with Ehrlich's ascites tumor into intact recipients showed that viable malignant cells circulate in the blood stream of the tumor carriers.

It is now known that tumor cells circulate in the blood stream of animals with malignant tumors, but the question of the viability of these cells remains open [1-3, 5]. After it had been established that malignant cells entering the blood stream can be viable [4, 6-8], the next step was to examine the effects of factors such as the degree of spread of the primary focus, the localization of the tumor, etc., in order to shed light on the hematogeneous dissemination of malignant tumors.

The object of the present investigation was to study the viability of tumor cells from the ascites form of Ehrlich's tumor circulating in the blood stream.

EXPERIMENTAL METHOD AND RESULTS

Noninbred albino mice and mice of lines C57BL, C3H, and BALB were used in the experiments. Ehrlich's ascites tumor was inoculated intraperitoneally in a dose of 0.2 ml of an ascites tumor suspension. After inoculation, the donors were divided into groups depending on the duration of growth of the tumor (up to 14 days inclusive). Blood obtained from the animals by decapitation was heparinized and injected, in a dose of 0.2-0.5 ml, intraperitoneally into intact recipient mice of the same line. After receiving the injections of blood, the animals were kept under observation for 2 months or until death. Mice of the control group received an injection of plasma obtained from blood of animals with an Ehrlich's ascites carcinoma by centrifugation. The attempt also was made to inoculate recipients with heparinized or citrated blood of animals with an intra-abdominal tumor by intracardiac injection in a dose of 0.1 ml.

Cytologically confirmed growth of a tumor was obtained after inoculation with blood from animals with Ehrlich's ascites carcinoma. Of the 19 tests with noninbred albino mice, six were positive, and tumors grew in 14 of the 114 animals, i.e., in 12.3% of cases; when C57BL mice were used all 10 tests were successful, and the percentage of positive inoculations was 76.2. One factor probably leading to the much larger number of successful inoculations in the inbred mice, especially the C57BL line, may be their "defective" immunological background, resulting from prolonged and close inbreeding.

Transplantation of circulating tumor cells into C3H mice took place in three experiments, all of which were successful. Transplantation into BALB mice was successful in one of the three experiments, and a tumor grew in four of the five animals.

No attempt was made in these experiments to study in detail the effect of the duration of the tumor in the donor on the percentage of successful inoculations. The highest rate of success was obtained when

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the blood injected was obtained from animals with tumors of between 7 and 10 days in duration: 82% of these inoculations were successful.

In the four experiments with intracardiac injection of circulating tumor cells into C57BLmice, growth of the tumor inside the skull occurred in three cases: in one experiment in three of five mice, in another in four of eight mice, and in the third in four of the 10 recipients. After inoculation with plasma obtained by centrifugation from the blood of animals with Ehrlich's ascites carcinoma, no tumor grew in any of the 20 animals.

LITERATURE CITED

1. I. F. Grekh and M. P. Yakovleva, Methods of Detection of Tumor Cells in the BloodStream [in Russian], Leningrad (1966).
2. I. Ya. Zitare, in: The Clinical Features and Treatment of Malignant Neoplasms [in Russian], Vol. 9, Riga (1963), p. 351.
3. R. N. Pelyukhova, Vopr. Onkol., No. 2, 56 (1968).
4. F. Blumenthal, Krebsforsch., 29, 549 (1929).
5. H. C. Engell, Ann. Surg., 140, 457 (1959).
6. H. Goldie et al., Cancer Res., 13, 566 (1953).
7. L. D. Parsons, J. Path. Bact., 47, 501 (1938).
8. M. D. Taylor and F. Vellios, Surgery, 44, 453 (1958).