

Influence of Sex on the Transplantability of Mouse Mammary Tumors. (19735)

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While the relationship between sex and the development of certain spontaneous tumors in mice has been established definitely, there are comparatively few examples of a sex difference in susceptibility to transplanted tumors. Klein(1) cites several of these examples and further demonstrates that for the same tumor certain strains of rats fail to exhibit a sex difference, whereas another strain does exhibit a significant sex difference.

Experiments performed in this laboratory show that transplantable mouse adenocarcinomas always produce 100% takes in either sex, so that in routine transplantation by tumor fragment no sex difference has the opportunity to become apparent because a sufficient number of viable tumor cells is always inoculated to produce 100% takes. However, we have been able to control the percentage of takes by the inoculation of known quantities of viable tumor cells(2-4); and accordingly we have produced takes varying from 0 to 100%, depending on the number of viable cells inoculated. Therefore, if the percentage of takes can be considered a criterion of sex influence, this influence has the opportunity of manifesting itself where the expectancy of takes is less than 100%.

This study concerns observations which show that under certain specific conditions there is a distinct strain difference in the behavior of two transplantable mammary adenocarcinomas in male and female mice.

Materials and methods. The transplantable mouse mammary adenocarcinomas of the "dba" and Marsh-Simpson strains were used in our experiments. The method of preparing the tumors for suspension and counting the viable tumor cells was essentially that of Schreck(5). A subcutaneous tumor 7 to 10 days old, free of necrotic material, was removed aseptically from the mouse and placed in a sterile mortar. The tumor tissue was cut into small pieces with a scissors and then ground thoroughly in the mortar and made

into a suspension by the addition of Tyrode's solution. After 5 to 10 minutes of grinding, the suspension was filtered twice through a double thickness of handkerchief linen. To 0.1 cc of the suspension were added 4.9 cc of erythrosin stain dissolved in Tyrode's solution (1-1000) devoid of glucose. The solution was shaken for a 5-minute period and examined in a Neubauer hemocytometer. The appearance of the suspension under the microscope was that of individual cells with few or no clumps. Some cells were stained pink and others were unstained. According to Schreck, the unstained cells are viable cells and were so counted.

Male and female mice of the dba and Marsh strains, about 6 weeks old, were inoculated subcutaneously with 0.05 cc of cell suspensions made from dbrB and Marsh-Simpson tumors, respectively. The mice were palpated semiweekly for the appearance of tumors. When the tumors reached a size of approximately 0.2 cc, the animals were sacrificed and the tumors examined microscopically. Periodically there was a macroscopic

TABLE I. Percentage Takes in Males and Females of the Marsh-Simpson Strain of an Inoculated Transplantable Mammary Adenocarcinoma, Marsh.

Exp. No.	Males			Females		
	Total mice	Takes No.	%	Total mice	Takes No.	%
177	23	8	34.8	21	10	47.6
178	21	19	90.5	19	12	63.2
181	10	9	90	9	8	89
182 C	22	13	59	20	15	75
182	30	7	23.3	19	5	26.3
186	33	6	18.2	26	3	11.5
197	25	16	64	23	20	87
210	34	30	88.2	25	22	88
212	5	4	80	14	11	78.5
219	20	11	55	16	6	37.5
221	30	24	80	10	9	90
222	22	13	72.7	13	10	77
223	8	4	50	29	13	44.8
225	28	10	35.7	14	10	71.5
	311	177	57±1.9	258	154	59.7±2.06

TABLE II. Percentage Takes in Males and Females of the dba Strain of an Inoculated Transplantable Mammary Adenocarcinoma, dbrB.

Exp. No.	Males			Females		
	Total mice	Takes No.	%	Total mice	Takes No.	%
184	14	12	86	17	11	65
190	15	7	47	21	12	57
193	47	37	79	6	5	83
196	5	1	20	27	7	26
202	9	5	56	18	6	33
	90	62	69±3.3	89	41	46±3.57

examination of the gross tumor.

Results. A study of our data was carried out where there were less than 100% takes in the 2 strains of mice, *i.e.*, the Marsh and the dba strains. The data for 311 males and 258 females of the Marsh strain are shown in Table I. It is evident from this table that there is no consistent difference between the sexes in the individual experiments and no significant difference between the percentages when all animals are considered collectively.

On the other hand, the data of 90 males and 89 females of the dba strain, although showing no consistent sex influence for the individual experiments, do show a significant difference when considered collectively as shown in Table II.

Discussion. Thus, the growth and develop-

ment of the dbrB tumor in the dba strain appeared to be related to the sex of the host, whereas no significant sex difference in the number of takes was observed in the Marsh strain when inoculated with a Marsh-Simpson tumor suspension. Experiments are in progress to examine further the possibility that the difference in tumor-take incidence observed for these adenocarcinomas might be explainable on an endocrine basis. From these observations, probably a sex difference in susceptibility to transplanted tumors may be present in some strains and absent in others.

Summary. A significant sex difference in incidence of tumor takes appeared when a known quantity of viable mammary adenocarcinoma cells in a dbrB tumor cell suspension was inoculated subcutaneously into dba mice, where males were more susceptible than females under similar conditions. This sex difference was not noted when a Marsh-Simpson mammary adenocarcinoma tumor cell suspension was inoculated into Marsh mice.

1. Klein, Michael, *J. Nat. Cancer Inst.*, 1951, v11, 377.
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Concentration of Lipid Phosphorus in Tumor and Carcass of Rats Growing Walker Carcinoma 256.* (19736)

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The progressive growth of Walker carcinoma 256 in albino rats has been shown(1-3), to cause a loss of lipid from the carcass, which

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loss of lipid, rather than failure of appetite, accounts for the caloric deficit produced in the animals(4). In view of the lipemia characteristic of rats growing Walker carcinoma 256 (2,3), and the high concentration of phospholipids in this tumor, a direct comparison of the phospholipid concentration in the tumor and the carcass of the host rat, and in the carcass of the host rat and of suitable control