



FIG. 1. Body weight curves of rats of groups A, B and C (4-month-old females) showing alterations in the rate of change of body weight caused by administration of growth hormone and prolactin.

1). The experimental results are listed in Table I. These data confirm our prior observations that tumor induction by methylcholanthrene is significantly diminished if the initial treatment is withheld until the animals are 4 months of age. They also demonstrate that neither growth hormone nor prolactin

increases the rate of tumor induction by methylcholanthrene.

Despite the fact that the amount of contaminating prolactin is insufficient to inhibit the weight gain caused by GH, the experiment fails to resolve the possibility, however remote, that it impeded a potentiating effect by GH in tumor induction.

Summary. Four-month-old female rats are resistant to carcinogenesis by methylcholanthrene when compared to female rats 30-60 days of age. Neither growth hormone nor prolactin potentiate tumor induction by methylcholanthrene in mature female rats.

1. Shay, H., Harris, C., Gruenstein, M., J. Nat. Cancer Inst., 1952, v13, 207,
2. Harris, C., Shay, H., Gruenstein, M., Ciminera, J., Acta Union Contre Le Cancer, 1959, v15, 595.
3. Harris, C., Shay, H., Gruenstein, M., Proc. Am. Assn. Cancer Res., 1960, v3, 117 (Abst.).
4. Zarrow, M. X., Yochim, J. M., McCarthy, J. L., Experimental Endocrinology, Academic Press, N. Y., 1964, pp. 24, 299.

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Effect of Parabiosis on Tumor Induction with Methylcholanthrene in Rats.* (31017)

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A maximum yield of mammary tumors occurs when methylcholanthrene is administered *per os* to female rats 30-60 days of age(1). If administration of the initial dose is delayed until rats are 4 months of age, a drastic reduction in the number of induced tumors results (2). The purpose of this experiment was to determine whether or not a humoral substance exists in 30-60-day rats that will increase susceptibility of rats to tumor induction, or conversely, whether a circulating substance is present in 4-month-old rats that will inhibit tumor induction.

Method. Female rats of the histocompatible Lewis strain were paired by the modified Bun-

ster & Myer procedure(3) according to the following scheme.

Group A. 30-day-old females were paired with 4-month-old female rats and methylcholanthrene was administered to the 4-month-old twin.

Group B. 30-day-old females were paired with 4-month-old female rats, and methylcholanthrene was administered to the 30-day-old twin.

Group C. 30-day-old females were paired with each other, and methylcholanthrene was administered to one of each of the pairs.

Methylcholanthrene, in doses of 5 mg daily 5 times weekly was administered *via* an esophageal cannula as a .5% solution in olive oil for a period of 8 weeks. The experiment was

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TABLE I. Experimental Results: Tumor Incidence in 3 Groups of Parabiotic Rats.

Time (weeks)		0	4	8	12	16	20	24	28	32	36	Total
No. of surviving pairs		16	12	10	10	10	10	8	8	8	1	
Group A												
30 day female, no treatment	No. of rats with tumor	0	0	0	0	0	0	0	0	0	0	0
	No. of tumors	0	0	0	0	0	0	0	0	0	0	0
4 month female given Me	No. of rats with tumor	0	0	0	0	0	1	0	0	0	0	1
	No. of tumors	0	0	0	0	0	3	0	0	0	0	3
No. of surviving pairs		21	21	18	17	15	13	12	10	5	3	
Group B												
30 day female, given Me	No. of rats with tumor	0	0	0	2	4	4	4	5	5	5	5
	No. of tumors	0	0	0	2	4	4	5	6	6	6	6
4 month female no treatment	No. of rats with tumor	0	0	0	0	0	0	0	0	0	0	0
	No. of tumors	0	0	0	0	0	0	0	0	0	0	0
No. of surviving pairs		21	19	17	16	12	12	7	5	2		
Group C												
30 day female, given Me	No. of rats with tumor	0	0	3	4	4	4	4	4	4	4	4
	No. of tumors	0	0	3	4	4	4	4	4	4	4	4
30 day female, no treatment	No. of rats with tumor	0	0	0	0	0	0	0	0	0	0	0
	No. of tumors	0	0	0	0	0	0	0	0	0	0	0

terminated after an observation period of 9 months.

Each pair was housed in a wire mesh cage and fed Lab-Blox *ad libitum*. Successful parabiotic union was tested by the injection of 2 cc of 2% Evan's Blue dye to one of the pair.

Results. The results, listed in Table I, indicate that the critical factor with respect to tumor yield is the age of the animal receiving the methylcholanthrene, and that the age of the parabiotic partner does not influence the results. In the context of this experiment there appears to be no humoral substance in 4-month-old animals capable of crossing the parabiotic barrier in sufficient amounts to inhibit induction of tumors, and conversely 30-60-day parabionts do not promote the induction of tumors in 4-month-rats. Of parenthetical interest is the fact that regardless of age only rats receiving methylcholanthrene developed any tumors, suggesting that despite the daily doses administered over an 8-week-

period, insufficient concentrations of this carcinogen crossed the barrier to induce tumors in the untreated parabiont.

Summary. Mature female rats were paired in parabiosis with immature female rats, and methylcholanthrene was administered to one of each pair. Of rats in parabiosis, only those receiving the methylcholanthrene developed mammary tumors. Mature rats when compared to immature rats exhibited resistance to tumor induction. Rats not receiving the carcinogen failed to influence the tumor production by either their younger or older parabionts.

1. Shay, H., Harris, C., Gruenstein, M., J. Nat. Cancer Inst., 1952, v13, 207.
2. Harris, C., Shay, H., Gruenstein, M., Proc. Am. Assn. Cancer Res., 1960, v3, 117 (Abst.).
3. Bunster, E., Myer, R., Anat. Rec., 1933, v57, 339.

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