In Vitro Effect of Testosterone on Respiration of Mouse Liver and Mammary Tumor Slices. (18885)

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The known metabolic effects of androgens (1) suggested that studies on the *in vitro* effects of testosterone on the respiration of tissue slices would be of value in elucidating the above phenomena. In this report a comparison between the liver and spontaneous mammary carcinoma of the mouse is presented.

Method. The studies were carried out by the Warburg method with the modified flask and procedure of Marsh(2). The testosterone‡ was dissolved in 0.2 ml of 95% ethyl alcohol to which was added 12 ml of the Ringer's phosphate medium(2). The medium for the control flasks was prepared in an identical manner but without the testosterone.

The liver and spontaneous mammary carcinoma were obtained from the same female mouse¶ of either the C_3H or dba strain. The tissues were immediately removed after killing the animal and placed into separate beakers containing Ringer's solution buffered with N/150 phosphate mixture of pH 7.4(2) chilled in an ice-water bath. The tissue slices were prepared immediately and the oxygen consumption was determined usually in duplicate occasionally in triplicate. Measurements were made at 37.5° in air for 1.5 hour at intervals of 30 minutes. Oxygen consumption was calculated in mm^3 per hour per milligram of dry weight of tissue (Q_{O_2}). Duplicates which differed more than 5% were discarded.

Results. The presence of testosterone in the fluid medium produced identical results on the oxygen consumption of liver and spontaneous mammary tumor slices (Fig. 1). At a concentration of 0.035 micromolar, testosterone produced a small increase in the respiration of the tissues. As the amount of testosterone was increased, the enhancing effect disappeared and a progressive inhibitory action occurred.

Discussion. The pattern of response obtained in the adult tumor bearing female mouse is similar to that reported(3,4) for the liver and diaphragm of growing young male mice and not like that of normal female mice. Furthermore, the initial stimulating effect of testosterone on the respiration of the liver slices and diaphragm of young male mice required the presence of glucose(4), and was much greater than that observed in the tumor bearing female mice.

The decrease in oxygen consumption of the tissue slices does not occur until the concentration of testosterone greatly exceeds physiological levels as calculated from renotrophic and androgenic effects in the intact mouse(5). A relatively high concentration, 0.28 micromolar, of testosterone, however, did not affect the oxygen consumption of primary Brown-Pearce epithelioma (unpublished).

Testosterone has been reported to decrease the respiration of rat brain(6-8), striated

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‡ Testosterone was provided by Ciba Pharmaceutical Products, Inc.

¶ Mice were generously provided by Dr. Earle B. Mahoney, Department of Surgery.

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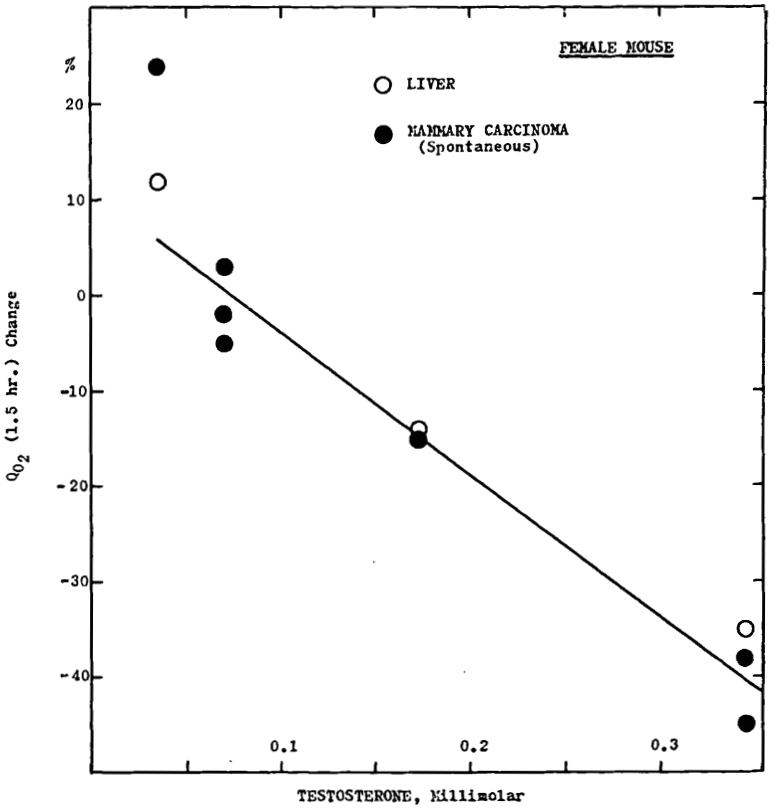

FIG. 1. Effect of testosterone on respiration of liver and spontaneous mammary carcinoma slices from female mice.

muscle(6,7), liver(8,9), and kidney(8,9) preparations. Moreover, the degree of inhibition has been correlated(9) with the quantity of testosterone added.

Summary. The oxygen consumption of liver and spontaneous mammary tumor slices from female mice was initially slightly increased and then progressively decreased by increasing concentrations of added testosterone.

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Distribution of Radioactive Colchicine in Some Organs of Normal and Tumor-bearing Mice.* (18886)

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A small quantity of radioactive colchicine labelled with carbon-14 was first prepared by the use of biosynthesis technics in this laboratory during the past year. The limited quan-

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