MAMMARY TUMOR LOCATION IN MICE*

SEWARD E. OWEN

Cancer Research Unit, Hines, Illinois

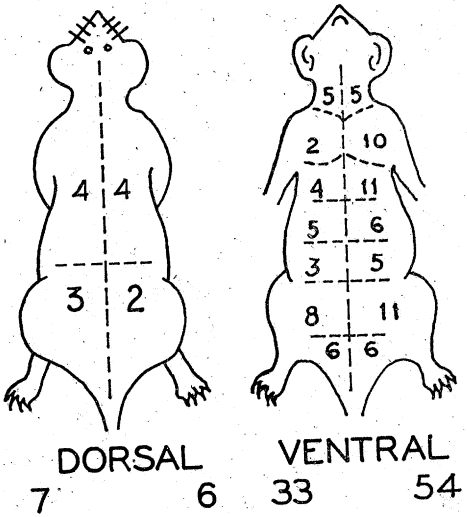
Spontaneous tumors are frequent in reflected or aberrant mammary tissue of the C3H female mice. This report deals with some possible etiological factors for these tumors.

Bagg (1) and Bogen (2) suggested blockage of the ducts with the resultant milk stagnation as a possible tumor cause. Fekete and Green (3) demonstrated duct blockage to be influential in determining tumor site and occurrence time but tumors were not produced in non-tumor strain animals by blockage alone. Mammary tissue in mice bearing a "latent cancerism" seems more susceptible to stimulation by ovarian endocrines than normal mammary tissue, Cramer (4). Loeb et al (5) have decreased breast cancer in tumor strain animals by early ovariectomy. Clinical evidence of specific endocrine dysfunction as a cause of human breast cancer is scanty, Allaben and Owen (6), Noronha (7). Cheatle (8) noted that the morphological effects produced in mice with estrogens by Lacassagne (9) were similar to Schimmelbusch's disease in women. Atypical growths in mammary glands of animals produced by large dosages of estrogens were first reported by Goormatigh and Amerlinck (10), and later by Burrows (12), Gardner et al (11) and others. Loeb et al (13) believe that cystic conditions, stagnation and inspissation of the secretions inhibit growth rather than promote

* Published with the permission of the Medical Director of the Veterans' Administration who assumes no responsibility for the opinions expressed or the conclusions drawn by the author.

cancerous changes. Davis (14) however, demonstrated that partial vessel ligation did lead to tumor formation in other organs.

In this study one hundred female mice of the C3H strain, selected at random, bearing spontaneous adeno-carcinomas of the mammary glands were used.



Tumors appeared in approximately seventy-three per cent of the multiparous females at an average age of ten months. In non-breeding females an incidence of four per cent was noted.

Growth activity coincident with pregnancy but not functional drainage (suckling) was found to be important in etiology. Spontaneous tumors in the aberrant mammary glands tissues were not more common than those occurring in the normally located glands. The aberrant glands are rarely suckled by the young as these glands possess but a vestigial or no nipple. It is thus difficult to specify lack of mammary gland drainage as an etiological factor in spontaneous mammary tumors in mice.

In a series of experiments utilizing irradiation it was found that non-sterilizing and sterilizing dosages of x-rays reduced the subsequent incidence of breast cancer. Conversely a period of breast hyperplasia induced in non-breeding females by a month of low estrogen dosage did not increase tumor incidence in these animals. In an occasional immature male of a non-tumor strain similar small doses of estrogens over a five week period, duct papillomata (a probable precancerous condition) were noted.

It is believed that the hyperplasia of breast tissue resulting from natural or induced endocrine stimulation is not alone the cause of mammary cancer in mice but that this hyperplasia may work in conjunction with a characteristic of the tissues which may be termed "latent cancerism."

BIBLIOGRAPHY

1. Bagg, H. J.: International Clinics, IV. 19. 1925.
2. Bogen, E.: Amer. Jour. Pub. Health. XXV. 245. 1935.
3. Fekete, E. and Green, C. V.: Amer. Jour. Cancer. XXVII. 513. 1936.
4. Cramer, W.: Lancet, CCXXXIV. 72. 1938.
5. Lathrop, A. E. C. and Loeb, L.: Jour. Cancer. Res. I. 1. 1916. See also Loeb, J.: Jour. Med. Research. XL. 477. 1919.
6. Allaben, G. R. and Owen, S. E.: In press. Jour. Am. Med. Assn.
7. Noronha, A. J.: Brit. Jour. Surg. XXIV. 143. 1936.
8. Cheatle, G. L.: Arch. Surgery. XVII. 535. 1928. See also Cheatle, G. L.: Brit. Jour. Surg. XXII. 710. 1935.
9. Lacassagne, A.: Compt. Rend. Acad. d. Sc. CVC. 630. 1932.
10. Goormatigh, N. and Amerlinck, A.: Bull. Assoc. franc pour l' etude du Cancer. XIX. 527. 1930.
11. Gardner, W. U., Diddle, A. W., Allen, E., and Strong, L. C.: Anatom. Record. LX. 457. 1934.
12. Burrows, H.: Amer. Jour. Cancer. XXIV. 613. 1935.
13. Loeb, L. Suntzeff, E. L. and Moskop, M.: Amer. Jour. Cancer. XXX. 47. 1937.
14. Davis, J. E.: Canad. Med. Assn. Jour. XXXVI. 237. 1937.