

THE MOUSE MAMMARY TUMOR SYSTEM

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My presence at this Symposium can be justified only by the fact that I have been asked to present a model tumor system which may be useful to you. Although multistage models for carcinogenesis have been proposed, most of these models lack well defined steps which can be enumerated and studied separately. The mouse mammary tumor system offers certain advantages since the various steps in the process of tumor formation can be handled separately.

In the mouse, mammary tumors arise from preexisting mammary gland hyperplasias [15], [16]. Similarly, it can be shown that these preneoplastic hyperplasias, in turn, arise from normal tissues [15], [16]. The hyperplastic areas can be identified and removed for study from living mammary gland tissues. Furthermore, they can be enumerated with great precision in stained mammary gland whole mount preparations. The preneoplastic hyperplasias include the classic hyperplastic alveolar nodules and other less well known lesions [2].

The preneoplastic nodules resemble the normal lobules seen in pregnant females [2]. They persist and can be identified in virgin or in nonpregnant, non-lactating parous females. They do not resemble neoplasms, however, according to histologic or cytologic criteria [21], hormonal requirements [3], [33], or metabolic behavior [28].

By means of the fat pad transplantation technique [15], it has been shown that mammary tumors arise in outgrowths derived from nodules, whereas nodules arise in outgrowths derived from normal tissues. These observations can be embodied in a simple schema (figure 1).



FIGURE 1

Simple schema for mammary tumors.

The three cell types included in the schema can be distinguished from one another according to a number of criteria. Some of these criteria are shown in table I. Intergrades between the normal cells and nodule cells, as well as between

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