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MAMMOGENESIS IN THE MOUSE:  
A STUDY OF THE RESPONSES OF THE IMMATURE  
MAMMARY GLAND TO MINIMAL OESTROGENIC  
STIMULATION

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by KHIN MAUNG AYE

The response of the mammary glands of immature ovariectomized mice of the NOS strain to minimal levels of oestradiol monobenzoate was investigated in two experiments using both objective and subjective measurements as indices of response. Uterus weight, thickness of the uterine wall and vaginal opening were used as additional measures of the effectiveness of the oestrogenic stimulation.

In the first experiment single injections of OMB at four levels (0.01, 0.03, 0.09 and 0.27 $\mu$ g ) were used and mice were killed at four intervals after the injection (1,2,4 and 8 days). A significant dose response relationship was observed for mammary gland area to OMB which was essentially linear. Different stages of the response were observed both with respect to the morphology (in whole mounts) and the micro-anatomy (in serial histological sections) of the duct system. The sampling errors of a histometric estimate of volume of glandular tissue were investigated and the results used to design a stratified sampling system for the second experiment.

In the second experiment dual injections at one of three levels (0.04, 0.1 and 0.2 $\mu$ g total), given at one of three spacings (2, 4 and 8 days) were used and mice were killed at one of three intervals after the second injection (2, 6 and 14 days). The

response of the mammary gland to log-dose of OMB was essentially linear for the estimate of volume of glandular tissue, but no response to increasing level of OMB was seen with mammary gland area. The detailed observations of the morphological and histological changes have been discussed in relation to the results reported in other studies.

The following stages have been proposed as the sequence of events, which can extend over a period greater than a week, following discrete doses of oestrogen at minimally effective levels:

(1) Increase in width of principal ducts, thickening of the epithelial wall and the appearance of a non-specific secretion:

(2) Formation of peripheral 'clubs' accompanied by mitotic activity along the length of the principal ducts;

(3) Extension of the principal ducts from the peripheral clubs and formation of small end buds at discrete points along the principal ducts.

(4) Extension of the small end buds to form higher order duct branches.

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