

PATHOLOGY

Breast Cancer in a Tree Shrew (*Tupaia glis*)

On May 29, 1965, a female tree shrew—*Tupaia glis sordida*, according to the system of Lyon¹—was found in a late stage of pregnancy on Tioman Island off Malaya. A nodular lesion measuring about 4 mm was present beneath the skin of the right thoracic breast near the nipple. No other lesions were found and there were no large ectoparasites. The animal was marked and released in accordance with standard procedure². Three days later, the animal was found dead in a trap; the cause of death was not apparent, and the animal was well preserved and had obviously given birth since it was released. The carcass was injected with 70 per cent alcohol, and a week later placed in a strong solution of formaldehyde, and taken to the United States. On arrival it was washed in water and examined.

The skin was intact except for a reddish-grey, wrinkled, somewhat indurated area of skin surrounding the right thoracic nipple, which measured about 4 mm in greatest dimension. The nipple itself was short and retracted. Beneath the skin about 1 cm to the right of this area and a little below it was a firm nodule 3 mm in diameter, which was not freely movable. A somewhat smaller area of discoloured and indurated skin was found near and above the abdominal nipple. The thoracic and abdominal breast nipples on the left side were prominent and intact, and measured slightly more than 2 mm in length. The skin on the left side showed no lesions and felt soft.

Dissection of the skin from the thorax and abdomen on the left side revealed a layer of enlarged, lobulated, yellow breast tissue extending from the upper thorax to the inguinal region, which measured 5 mm in thickness. Dissection of the skin and underlying breast tissue from the right side was more difficult. In general, the breast tissue on this side was much thinner (less than 3 mm), and less uniformly enlarged than on the left. Breast tissue was almost wholly absent from some parts of the thoracic and abdominal region. The subcutaneous nodule near the right thoracic nipple was found to consist of poorly demarcated, firm, grey tissue. The thoracic and abdominal viscera were grossly normal in arrangement and appearance. The bicornuate uterus was enlarged, and both uterine horns were dilated, which was consistent with the recent pregnancy. The ovaries were small.

Sections of skin and underlying breast tissue from the intact left side of the thorax and abdomen showed well-preserved normal epidermis and dermis and a large amount of normal lactating mammary tissue. Much of the subcutaneous fat and breast tissue from the right side of the thorax and abdomen was replaced by an invasive malignant tumour of epithelial origin.

The subcutaneous nodule consisted of (1) glandular tumour tissue (Fig. 1a); (2) extensive intraductal tumour growth with distension and inflammation of ducts; (3) a small amount of normal lactating mammary tissue. The tumour showed areas of acute and chronic inflammation with oedema and fibrosis, especially around the enlarged and greatly distended ducts filled with tumour cells and debris. Many tumour cells showed large secretory vacuoles in the cytoplasm, but only in the more differentiated portions of the tumour. Small calcified concretions were scattered throughout the tumour.

Sampling of the skin from the entire right side showed that the tumour had spread from above the right thoracic nipple to a little below the abdominal nipple. Although the tumour was confined to the subcutaneous tissues and the dermis, leaving the epidermis largely intact, it had invaded lymphatic channels in the dermis and perineural spaces, compressing the nerves (Fig. 1b). There was an isolated intraductal papillary lesion in one section of lactating breast tissue which otherwise showed no abnormalities.

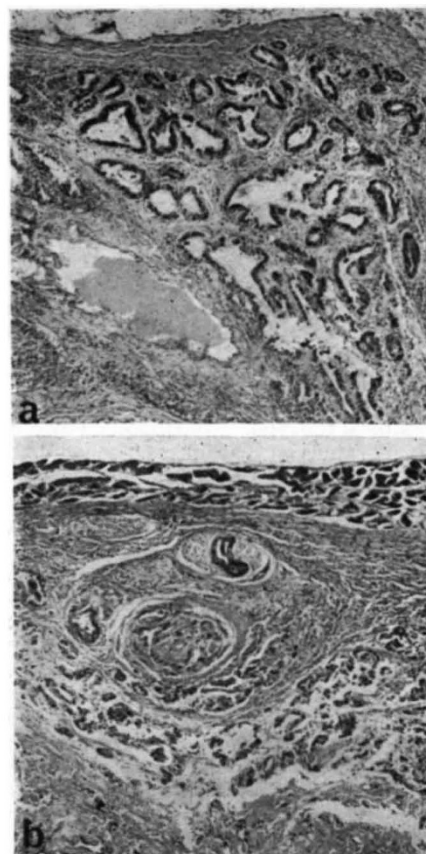


Fig. 1. Adenocarcinoma of breast (a) with invasion of perineural spaces compressing nerve (b) of a tree shrew (*Tupaia glis*). ($\times 50$.)

A careful search was made for parasites in the tumour and in adjacent breast tissue, but none was found.

This adenocarcinoma is the only tumour which we observed during a study of tree shrews on the Malayan Peninsula over a period of 4 years. About 400 animals were observed carefully enough to ensure detection of tumours or other external abnormalities had they been present. Of these 75 per cent were adults, 55 per cent females and thirty-nine were pregnant. Although many instances of "spontaneous" benign and malignant tumours in sub-human primates have been reported, we have found no reference to neoplastic disease occurring in Tupaioidea³.

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¹ Lyon, M. W., *Proc. U.S. Nat. Museum*, **45**, 1 (1913).

² Davis, D. E., *Manual for Analysis of Rodent Populations* (Pennsylvania State University, University Park, Pennsylvania, 1956).

³ Luther, M. (compiler), *Cancer in Subhuman Primates*, Public Health Service Publication No. 44 (Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 1962).