

# Pulmonary Fibroblastomas in a Deer with Cutaneous Fibromatosis<sup>1</sup>

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## SUMMARY

Multiple fibroblastomas were found in the lungs of a white-tailed deer with cutaneous fibromatosis. The fibroblastic tumors in the lung were histologically similar to those of the skin. The pulmonary tumors were considered to be metastases. Such extension of cutaneous tumors in deer has not been previously reported.

## INTRODUCTION

Deer fibromatosis occurs occasionally in white-tailed deer, *Odocoileus virginianus*, of North America. The cutaneous growths can vary in diameter from about 0.5 to 20.0 cm; may be single or multiple; and are usually found on the neck, face, shoulders, and legs (2). The disease has been experimentally transmitted in deer (7, 8) by a virus which apparently (9) belongs in the papovavirus group (5).

A young adult (about 1.5 years old) male white-tailed deer with cutaneous fibromatosis was shot in northern Wisconsin by a game warden after its condition had been reported by local residents. The deer was brought to this laboratory for necropsy, and tissue was fixed in 10% buffered formalin for histological examination.

## NECROPSY FINDINGS

There were several cutaneous growths about the head and neck and a few on the abdomen and upper limbs (Fig. 1). The tumors varied in size from 1 to 12 cm, and the majority were somewhat pedunculated and pendulous. Many of the large lesions had a central depressed, ulcerated surface surrounded by thickened epithelium. There was a large growth on the left upper eyelid which probably obstructed vision to that eye. The tumors did not occur on the velvet of the antlers.

The cutaneous growths were composed primarily of a hard, white tissue mostly covered by a roughened epithelium. There were many discrete, firm, white nodules visible on the surface of the lung (Fig. 2). Small tumors could be palpated deeper in the lung and exposed by dissection, while others protruded from the surface but were still covered with pleura (Fig. 3). The largest nodules measured 2.5 x 2.5 x 1.5 cm. The mucous membranes of the eye, oral cavity, and trachea as well as the

heart, liver, kidney, intestines, and pulmonary lymph nodes were free of neoplasms.

## HISTOLOGICAL EXAMINATION

The stratified squamous epithelium covering the cutaneous growths was very thin on the outermost surface and increased in thickness in the more protected surfaces. Several long, narrow rete pegs extended into the underlying fibromatous tissue. Many of the basal cells contained a melanin-like pigment. The stratum corneum was thin. Virions of deer fibroma virus were seen by electron microscopy in a suspension of the epithelial portion that covered the cutaneous growths.

The principal mass of the skin tumors was a rather uniform growth of haphazardly arranged fibroblasts. Their nuclei were pleomorphic and varied greatly in size (Fig. 4). The tumors were well vascularized. A few hair follicles remained immediately beneath the epithelium.

The nodules in the lung were composed of fibroblasts similar in appearance and arrangement (Fig. 5) to those in the cutaneous tumors. In addition, there were small focal accumulations of calcium (Fig. 6) near the surface in the pulmonary growths.

## DISCUSSION

None of the several reports (1-3, 8) on cutaneous deer fibromatosis have described tumors in the internal organs. In this case, the microscopic structure of the cutaneous and pulmonary fibromas was remarkably similar. The nodules were scattered indiscriminately in the lung and were not associated with the bronchial tree. The lung tumors were much smaller than those on the skin. While not conclusive, these features suggest that metastasis to the lung had occurred and that the virally induced deer fibromas may be potentially malignant. Metastases to the lung occurred in 10% of the hamsters with s.c. fibromas produced by bovine papilloma virus (6) or deer fibroma virus (M. G. Robl and C. Olson, personal communication). These tumors in the lung were regarded as metastases because they were much smaller than the s.c. fibromas and were found only when the s.c. tumor was well developed.

The lung tumors might have been initiated from a viremic state. This would not be likely in a tumor-bearing hamster, since the fibromas caused by bovine papilloma virus did not contain infective virus (6). In cattle, warts developed at wounds made less than but not more than 1 hr after i.v.

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injection of a large quantity of bovine papilloma suspension containing infective virus (4).

The only difference between the cutaneous and pulmonary fibromas was the presence of dystrophic calcification in the lung growths. This occasionally occurs in tumors at sites of cellular degeneration.

Although it is difficult to obtain accurate information, probably most cases of naturally occurring cutaneous fibromatosis in deer are limited to only a few small tumors. Some of these tumors may regress, since regression has been observed in experimentally induced deer fibromatosis (8). Those deer with extensive tumors are more likely to be carefully examined and may represent the more unusual form of the natural disease. The tumors can indirectly be a cause of death when those of the eyelids become large enough to cause blindness or those around the mouth interfere with food consumption.

The present observation of multiple pulmonary fibroblastomas, apparently metastases from the skin tumors, would suggest that deer cutaneous fibromatosis can occasionally be a malignant disease. Careful examination of other naturally occurring cases of the disease should provide information on how commonly metastases occur.

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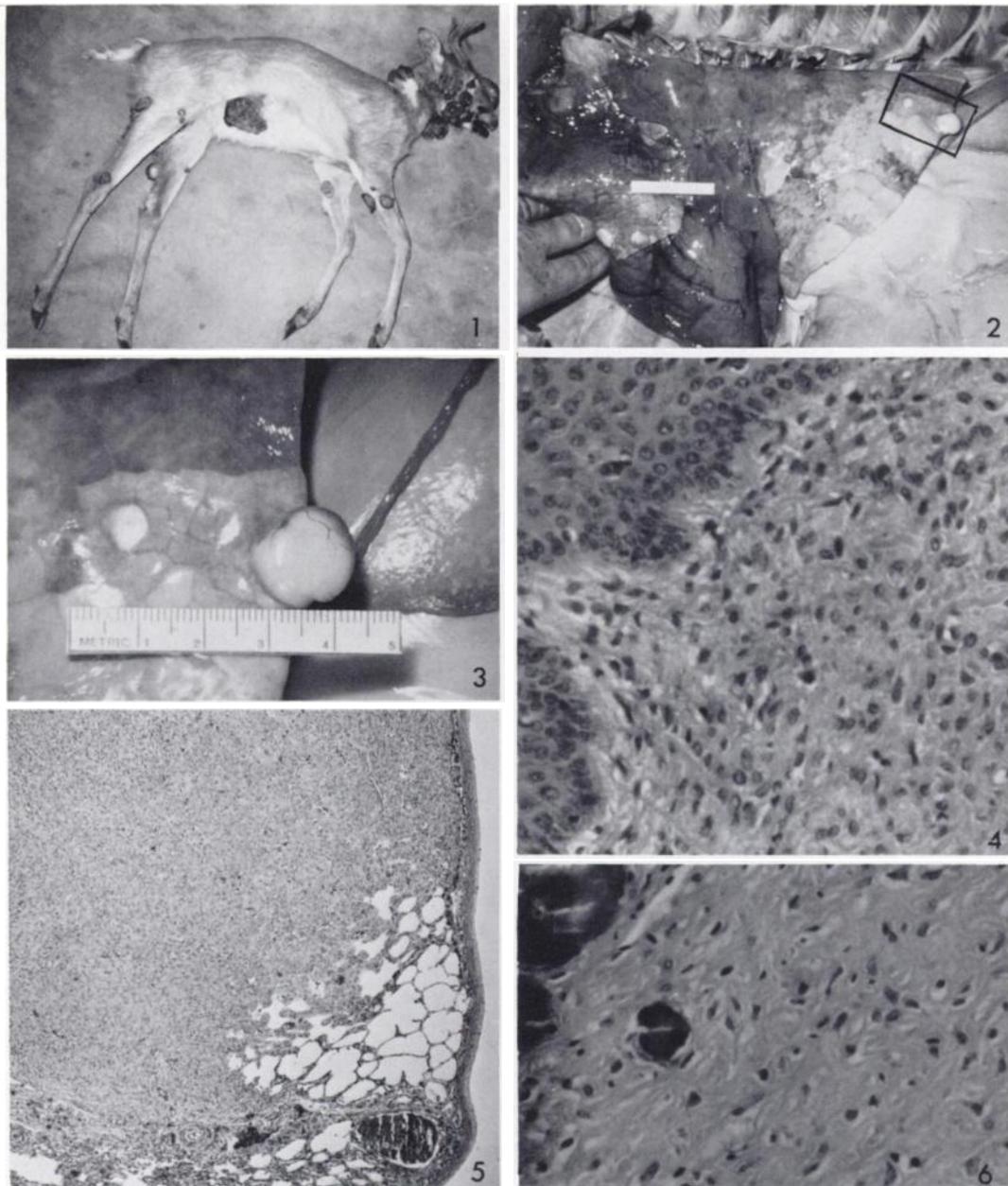


Fig. 1. Multiple cutaneous fibromas of a deer with metastasis to the lungs.

Fig. 2. White fibroblastic tumors near gloved fingers and posterior margin of left lung from deer shown in Fig. 1.

Fig. 3. Enlargement of area marked in Fig. 2. One tumor protrudes from the surface and the other is embedded in the lung.

Fig. 4. Haphazard arrangement of pleomorphic fibroblasts in a cutaneous fibroma at the epithelial junction. H & E,  $\times 250$ .

Fig. 5. Subpleural fibroblastic nodule in the lung. Such lesions usually had a discrete margin. In 1 area of this section, the tumor is invading the alveolar walls. H & E,  $\times 35$ .

Fig. 6. Deposits of calcium in a pulmonary fibroblastoma. H & E,  $\times 250$ .