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A Transplantable Spontaneous Bone Tumor in *Mus musculus*.

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Bone tumors, chiefly sarcomata, are occasionally observed in our laboratory as spontaneous new growths in some of the inbred stocks of *Mus musculus* and in their hybrids. The following preliminary report is, I believe, the first recorded case of a successfully transplanted spontaneous bone sarcoma in the common house mouse.

On August 25, 1936, virgin female mouse 26316 of the C57 Black stock was killed at the age of 743 days. She had 2 different types of tumors, (1) a bony growth, L946A, about 6 mm. in diameter which partially encircled the tail at about a third of the distance from the body to the tip, and (2) generalized lymphoblastomatosis, called tumor L946B. Tumor L946A was so bony that it

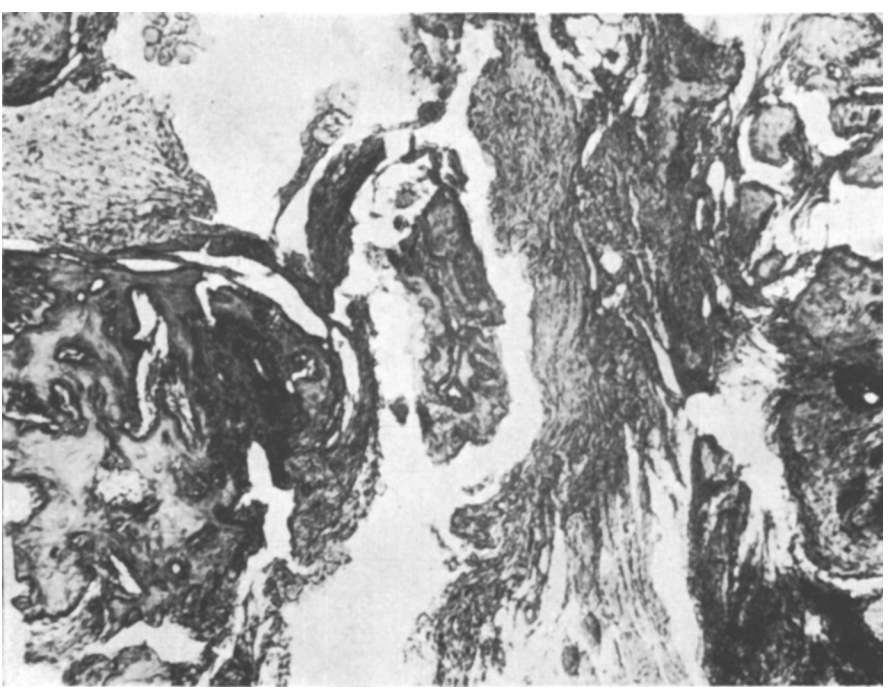

FIG. 1.
Primary osteogenic sarcoma, L946A, from tail vertebra of C57 Black virgin female mouse 26316. Remains of invaded striated muscle seen near right end of lower margin. × 75.

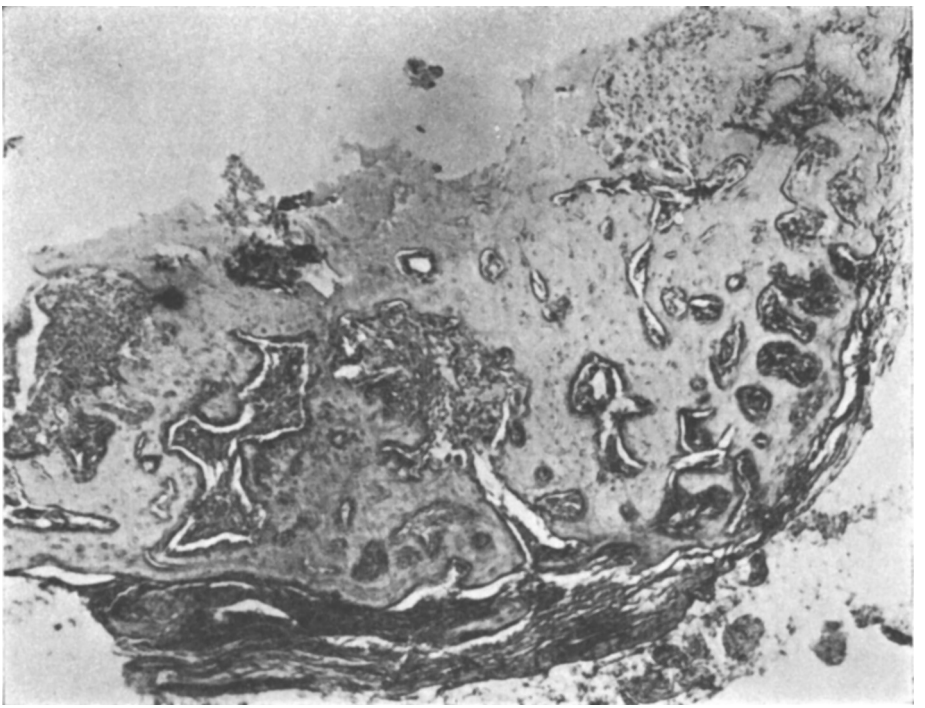

FIG. 2.
Implant I of tumor L946A composed chiefly of dense newly formed bone surrounded by fibrous capsule. × 75.

was broken, rather than cut, into 5 fragments. One piece was saved for sectioning and 4 were implanted subcutaneously into four C57 Black stock males aged 30 days.

These first 4 implants were given the numbers I, II, III and IV on the tumor chart used to record evidence of either their growth or their absorption. For the next 7 weeks these masses were palpated periodically and there was little if any noticeable change except that they became less angular in outline. At 8 weeks 3 of the 4 tumors showed an increase in size. Number II grew the fastest and was somewhat yielding on palpation in contrast to III and IV, which were both very hard, bony and irregular in outline. Number III remained the smaller of the bony growths.

At 14 weeks all 4 mice were killed, autopsied and specimens of all 4 tumors saved for sectioning. Implant I was apparently unchanged in size and consistency. Number II was 2.5 cm. in diameter and on gross section exhibited a fleshy bulging cut surface with only a small central gritty core. Number III was 1 cm. in diameter and

had bony spicules scattered throughout the growth. Implant IV was 1.5 cm. in diameter and was composed almost entirely of spongy bone. Small pieces of tissue from growths II, III and IV were transplanted into other mice of the same stock.

On histological examination the primary bony tumor was found to be a slowly growing osteogenic sarcoma which showed beginning invasion of the adjacent muscle (Fig. 1). Implant I was well encapsulated and was more like an osteoma, being more benign in appearance than was the primary growth (Fig. 2). Number II was composed of rapidly dividing spindle cells with a small central focus of osteogenic sarcoma apparently the remnant of the bony transplant. The actively growing part is shown in Fig. 3. Numbers III and IV were osteogenic sarcomata. The former had a moderate amount of newly formed bone while in the latter there was an abundance of newly formed bone and many rapidly dividing spindle cells (Figs. 4 and 5).

In the second transplant generation tumor II averaged between 2

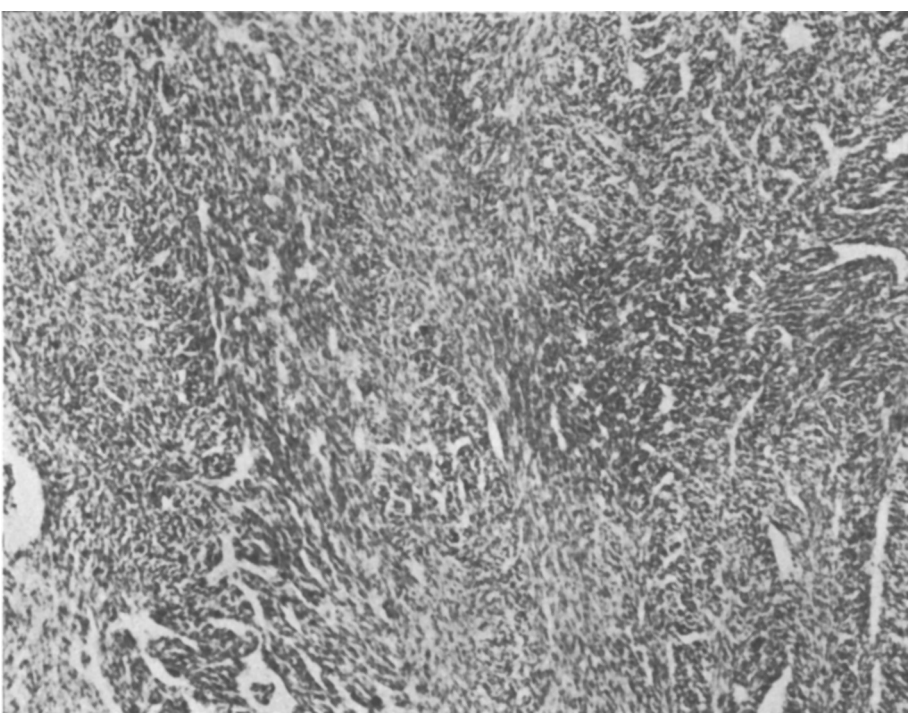

FIG. 3.
Implant II of tumor L946A with the actively growing part composed of rapidly dividing spindle cells. × 75.

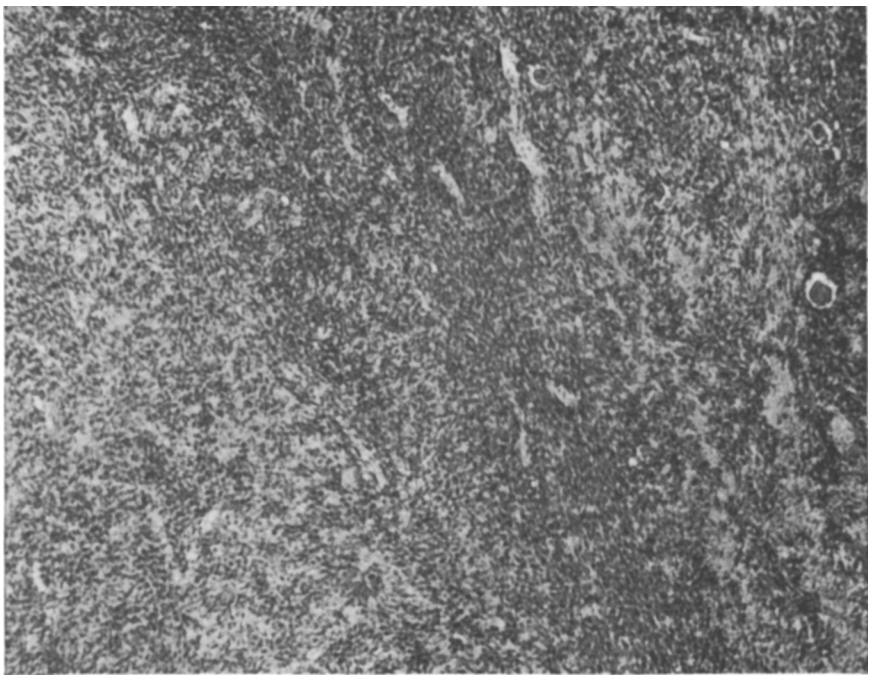

FIG. 4.
Implant III of tumor L946A showing small islands of newly found bone. × 75.

and 3 cm. in diameter at the end of 6 weeks. The growth was rather soft and the skin over it showed a definite tendency to ulcerate. All the animals died soon after this. Histological examination of these tumors showed no bone, but a rapidly growing fibrosarcoma which was invading and destroying the epidermis. At the end of this same period tumor III was about 0.5 cm. and tumor IV was 2 to 3 cm. in diameter. Both these tumors were bony, hard and nodular.

After 8 to 9 weeks of growth, IV weighed as much as its host and at 4 months the tumor masses were between 2 and 3 times as heavy as the mice bearing them. Only in the terminal stages did the skin show ulceration over the tumors. Toward the end the mice became almost unable to move about, yet until they were handicapped by the size of the tumor, their general health appeared nearly normal.

Tumor III grew in much the same manner. However, it took 5½ months to obtain masses which were slightly less than twice the weight of their hosts. This slower bone tumor metastasized to the lungs.

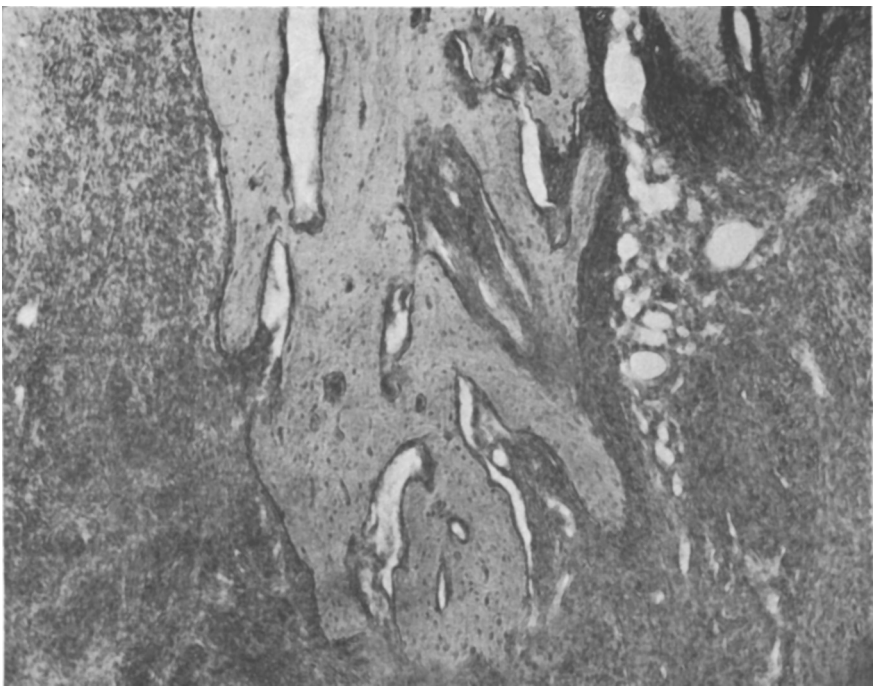

FIG. 5.
Implant IV of tumor L946A with great masses of dense newly formed bone. × 75.

Eleven months after the death of the female in whom the primary bone tumor originated, mass number II was in its ninth, III in its fifth, and IV in its seventh tissue transplant generation.

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Nitrogen Retention in a Child During Undernutrition.

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The purpose of this study was to determine if a child could add nitrogen to its body during a period of sharp undernutrition. A review of the literature fails to reveal any similar study. Since addition of protein to the organism is a normal accompaniment of growth, retention of nitrogen is interpreted as evidence of growth.

The subject, a 10½-year-old white female, had been markedly