Melanosarcoma and Rhabdomyoma in Two Pine Snakes

(Pituophis Melanoleucus)

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So few reports of tumors in snakes appear in the literature that it is desirable to record any new cases. No exhaustive search of the literature was undertaken. In a brief survey Lacké (5) lists only two specimens, both described by Bland-Sutton in 1885; one was a fibroma of the stomach, the other a carcinoma of the ovary with widespread metastases. Both tumors occurred in pythons. Ratcliffe (7) reported an instance of carcinoma of the pancreas in a pine snake, Pituophis sayi. In 1941 Mergman (6) stated that in 2,200 dissections of snakes he had found no macroscopic tumors.

The present report deals with melanosarcomas and a rhabdomyoma observed in a male and a female pine snake, Pituophis melanoleucus. Both specimens arrived at the San Diego Zoo from Michigan in 1936; they fed well in captivity and grew satisfactorily. I am indebted to Mr. C. B. Perkins, curator of reptiles at the Zoo, for much of the historical data.

CASE 1

History.—In May, 1939, an irregular dark swelling was noted on the tail of the female at the border of one of the dark markings. During the next 5 months this increased so in size that by October, 1939, the snake was no longer suitable for display (Fig. 1). The tail and attached tumor were amputated in February, 1940; the growth was diagnosed a malignant melanoma and the likelihood of future metastasis indicated. This opinion was substantiated by the subsequent appearance of 2 dark subcutaneous nodules about the head and 1 on the abdomen. All were removed by electrocautery.

Two months after the amputation the animal laid 6 eggs, all of which hatched. The young were entirely normal. At this time the snake weighed 1.73 kgm. and measured 157 cm. in length. In January, 1941, she again mated with the male to be described below, and laid another batch of 6 eggs. Three of these hatched, though one of the young was blind, the eyes being unusually small. Of the 3 young that failed to hatch out, 2 likewise had abnormal eyes.

In April, 1941, a large, deeply situated swelling was apparent near the tail. The snake ceased feeding properly at this time, and although she ate a medium sized rat in July she disgorged it 2 days later. Death occurred on October 12, 1941.

Autopsy.—A symmetrical fusiform enlargement of the body extended forward from the cloaca for a distance of 12 cm. The overlying skin was intact. On opening the abdominal wall in this region a firm, friable, ovoid mass 11 × 6 × 5 cm. was seen filling most of the celomic cavity (Fig. 2). It compressed the intestine and prevented the passage of 2 large boluses of hair and bone, remnants of rats previously eaten. The tumor was encapsulated and did not invade the surrounding tissues except at its site of origin.

On each side of the tail, 3 to 4 cm. distal to the cloacal orifice, was a subcutaneous nodule. Both were well circumscribed, ovoid, gray-black in color, and similar in consistency and appearance to the intra-
abdominal tumor. One measured 1.3 x 3 cm., the other 1.1 x 1.5 cm. Examination of the viscera disclosed 2 spherical nodules in the liver; one was light gray in color and measured 2.5 cm. in diameter; the other, 2 cm. in width, was black throughout (Fig. 3).

Histology.—The tumor was made up of spindle-shaped cells arranged in bundles with a tendency to interlace (Fig. 4). The cells had a generous amount of cytoplasm, which was slightly acidophilic, fibrillated, and often contained a brown, finely granular material (Figs. 5, 6) that did not give the Prussian blue reaction and was assumed to be melanin. The nuclei were large and oval, and occasionally those of adjacent cells were bunched together, leaving irregular cytoplasmic fields without nuclei between them. This was reminiscent of the nuclear palisading displayed by schwannian syncytia. The metastatic lesions in the liver were histologically identical with the primary tumor.

CASE 2

History.—A tumor was first noted on the left upper labial fold of the male snake on February 4, 1942. At that time it was estimated to be not more than 1 cm. in diameter. By August 25th it had increased considerably in size. The animal was sacrificed in November, 1942.

Autopsy.—The snake was 170 cm. long, appeared fairly well nourished, and was free of gross abnormalities except for the lesions about the mouth (Figs. 7, 8). Airing from the entire posterior half of the left upper labial fold was a 4 x 2.8 x 2 cm., ovoid, dark gray tumor; it was covered by thin, greatly expanded scales and bore a central, irregular, shallow area of ulceration. A similar lesion, measuring 2.5 x 1.5 x 1.5 cm., was present in the identical position on the right upper labium. A 1.5 cm., spherical, nonpigmented, and broadly sessile mass occupied the left anterior portion of the palate. Inspection of the viscera, including multiple sections through the liver, failed to disclose any metastatic lesions.

Histology.—The morphology of the pigmented labial tumors was the same as that of the lesions in the preceding case. However, the histology of the tumor of the palate was wholly different from that of the adjacent pigmented ones. Greatly elongated cells arranged in large bundles predominated. The large, nearly rectangular nuclei were grouped about a fibrillated syncytium, and in many instances distinct cross striations were visible (Fig. 9). Scattered through the section were plump giant cells with centrally located, multiple nuclei (Fig. 10). The cytoplasm of these cells was likewise frequently striated. The histological picture was typical of a rhabdomyoma.

DISCUSSION

The occurrence of malignant melanomas in reptiles is of considerable theoretical interest with regard to the recent work of Laidlaw and Murray (4) on human pigmented moles. These investigators believe that the latter is a phylogenetic tumor that represents an abortive tactile spot related to the well-developed structures normally found in reptiles. The arrangement of the spindle cells in the snake lesions was reminiscent of a schwannian cell tumor, and silver stains showed occasional neurites in the stroma; nevertheless, it cannot be stated with certainty that they were derivatives of the neuroectoderm rather than of the epithelial melanoblasts. No intimate relation of the tumor with the tactile spots could be demonstrated.

The location of the melanoma was comparable to that in man. In a review of human melanomas of the oral mucosa, Fuhs and Kumer (2) recorded 29 cases and added 2 of their own. The gingiva was second only to the hard palate as the most common site of origin. In only 1 instance did the lesion arise in the lower gum; in the remainder only the upper was involved. With this in mind it is interesting to note that both gingival tumors of Case 2 were on the inner aspect of the upper labial folds.

A possible genetic effect of the disturbed pigment metabolism in the parents is indicated by the malformed eyes of the offspring. That this is not wholly improbable is indicated by the experiments of Hale (3), who found that the pigs farrowed by a sow kept on a vitamin A deficient diet were completely devoid of eyeballs. Since vitamin A is closely related chemically to the lipochrome constituent of visual purple, this experiment is of interest as an example of impeded pigment formation affecting normal development of the eyes.

Although rhabdomyomas are known to occur in the tongue of man, striated muscle tissue in tumors of the palate has usually been associated with teratomas. In a monograph on axial bifurcation in serpents,
Cunningham (1) emphasized the relative frequency of anterior duplication (dicephaly) in snakes. Lesser developmental faults about the head may also be quite common; hence the rhabdomyoma of Case 2 might represent a teratoma in which striated muscle had replaced the other tissues.

SUMMARY

Malignant melanomas occurring in a male and female pine snake are reported. The primary tumor in the female snake arose at the margin of one of the large pigmented areas of the skin of the tail. Metastatic tumors were found in the liver and the celomic cavity. In the male snake 2 large melanomas occurred on the upper lip, and another tumor, a typical rhabdomyoma, sprang from the hard palate. These growths appear to be the third or fourth instances on record of malignant neoplasms in snakes.

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