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 Lucké (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-

DESCRIPTION OF FIGURES 1 TO 6

Fig. 1.—Gross appearance of primary tumor, Case 1, in October, 1939.

Fig. 2.—Gross appearance of metastatic tumor in celomic cavity of Case 1. Note also small subcutaneous tumors on each side of stump of tail.

Fig. 3.—Gross appearance of metastatic tumor removed from celomic cavity, and of 2 metastatic tumors in liver; one of the latter is richly melanotic, the other is but lightly pigmented. Case 1.

Fig. 4.—Tumors shown in Figs. 1 to 3 are composed of interlacing bundles of spindle-shaped cells. Mag. × 110.

Fig. 5.—This photomicrograph is representative of pigmented portions of tumor shown in preceding figure. Mag. × 100.

Fig. 6.—Pigment within tumor cells in form of small, brown granules. Mag. × 300.
abdominal tumor. One measured 1.3 x 3 cm., the
other 1.1 x 1.5 cm. Examination of the viscera dis-
closed 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
syncytagias. 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 consider-
ably 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 abnor-
malities except for the lesions about the mouth (Figs.
7, 8). Arising 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, includ-
ing multiple sections through the liver, failed to dis-
close any metastatic lesions.

Histology.—The morphology of the pigmented labial
tumors was the same as that of the lesions in the
preceeding 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 fibril-
lated 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 abor-
tive 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 can-
not 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 melanosarcomas 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 mal-
formed 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
impaired pigment formation affecting normal de-
velopment 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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