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BILE DUCT ADENOCARCINOMA IN A PALLID BAT (*ANTROZEUS PALLIDUS*)

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Bats are common feral mammals in the United States, and are often maintained in zoos for extended periods of time, often for their life span of 5 to 10 yr (Thomas, pers. comm.). They are also maintained to a certain extent as a laboratory research animal, where they are available for observation and study. Numerous feral bats are also examined in laboratories for rabies surveillance programs, and in example, our department processes approximately 100 bats annually.

It is somewhat surprising, therefore, that reports of neoplasms in bats are rare. It may be that most which die in captivity are not examined to determine the cause of death. A search of the literature has produced a single case of a malignant neoplasm in a bat, and this was described as a cutaneous leiomyosarcoma in a long-eared bat (*Plecotus townsendii virginianus*) (Conrad, 1969, J. Natl. Cancer Inst. 35: 95-101).

This case report of a malignant neoplasm in a pallid bat was the result of a routine necropsy examination, part of a surveillance program for the prevalence of bat rabies.

The pallid bat is distributed from western North America to Central Mexico. It is primarily insectivorous, nocturnal, and usually lives in caves, rock crevices, and tree cavities (Walker, 1964, *Mammals of the World*, Johns Hopkins Press, Baltimore, Maryland 375 pp.)

The 6 cm long female bat described in this report was one of a pair received by the Los Angeles Zoo in 1969. They had

been on display in the zoo since then, and were provided a diet of larval meal worms (*Tenebrio molitor*), started in red bran kept moist with pieces of apple. They were fed every second day.

The bat was found dead in the bottom of the cage in late November, 1975, and it had been noted to be acting abnormally the day before. A necropsy was performed, and tissues were fixed in 10% buffered formalin, processed in the usual manner, and tissue sections were stained with H&E and by the PAS staining reaction. Fungal cultures were made from the bran in which the meal worms were maintained.

There was about 3 ml of clear yellow ascitic fluid in the peritoneal cavity, and a firm white lesion, $0.3 \times 0.3 \times 0.4$ cm was present in the left lobe of the liver, apparently confined to that lobe but infiltrating the adjacent liver parenchyma. The peritoneum was normal. Approximately 1 ml of dark clotted blood was found in the stomach, and some blood was present in the esophagus. No grossly visible mucosal lesions could be identified as the source of the esophageal hemorrhage. All other tissues were normal grossly.

Microscopic examination of tissues demonstrated a moderate amount of anthracotic pneumoconiosis along the bronchial and bronchiolar lymphatics. Hemorrhage was present in the muscular wall and submucosa, as well as intraluminally in the fundic area of the stomach. The serosal side of the fundus contained prominent venous and

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lymphatic vessels, and there were collections of histiocytes with hypertrophied mesothelial cells on the serosal surface of the fundic area of the stomach.

The liver lesion was a non-encapsulated neoplasm composed of irregular sized duct-like structures lined by cuboidal epithelial cells (Fig. 1). There was an abundant amount of mucin production by the neoplastic cells, and this stained pale blue with alcian blue stain and red with the PAS reaction (Fig. 2). The histologic pattern was characteristic of bile duct epithelium

which had undergone malignant proliferation as a mucinous adenocarcinoma. Many of the acini which were formed by the tumor cells had coalesced, forming large pools of mucinous material. Mitotic cells were few in any particular field. The adjacent liver parenchymal cells appeared to contain an excess of finely granular brown pigment, which was found to be both iron and hemosiderin by special stains. The pigment was present in both Küpffer cells and hepatocytes. This adenocarcinoma developed from the intrahepatic bile ducts, and it was extensively locally

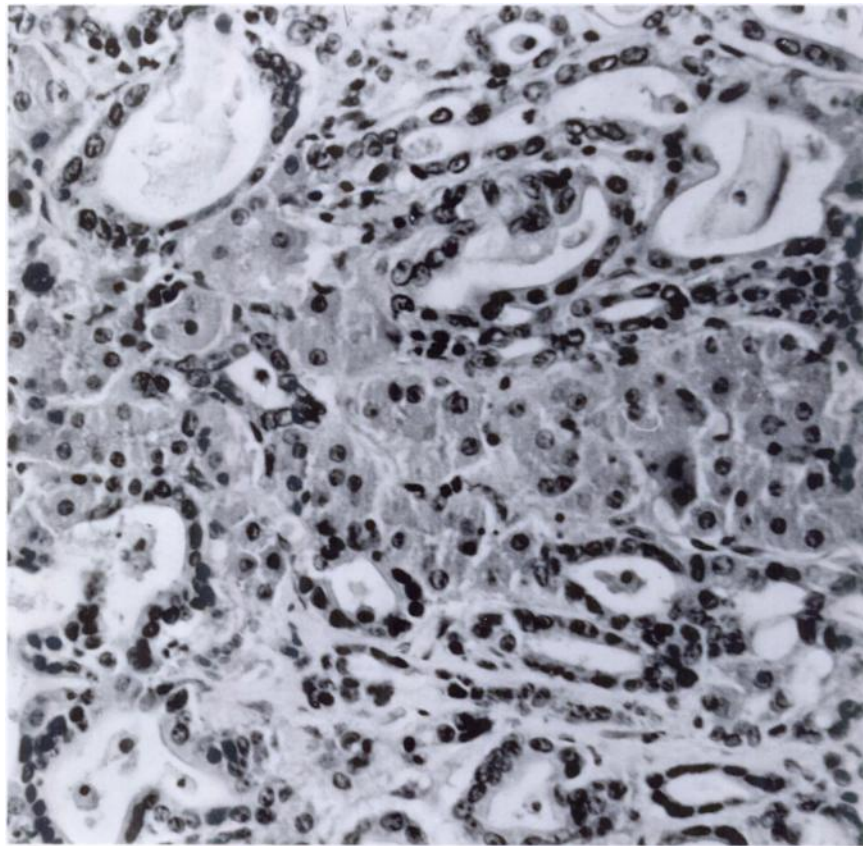


FIGURE 1. Tumor bile ducts lined by cuboidal epithelium, interspersed among the hepatocytes. H&E, 250 \times .

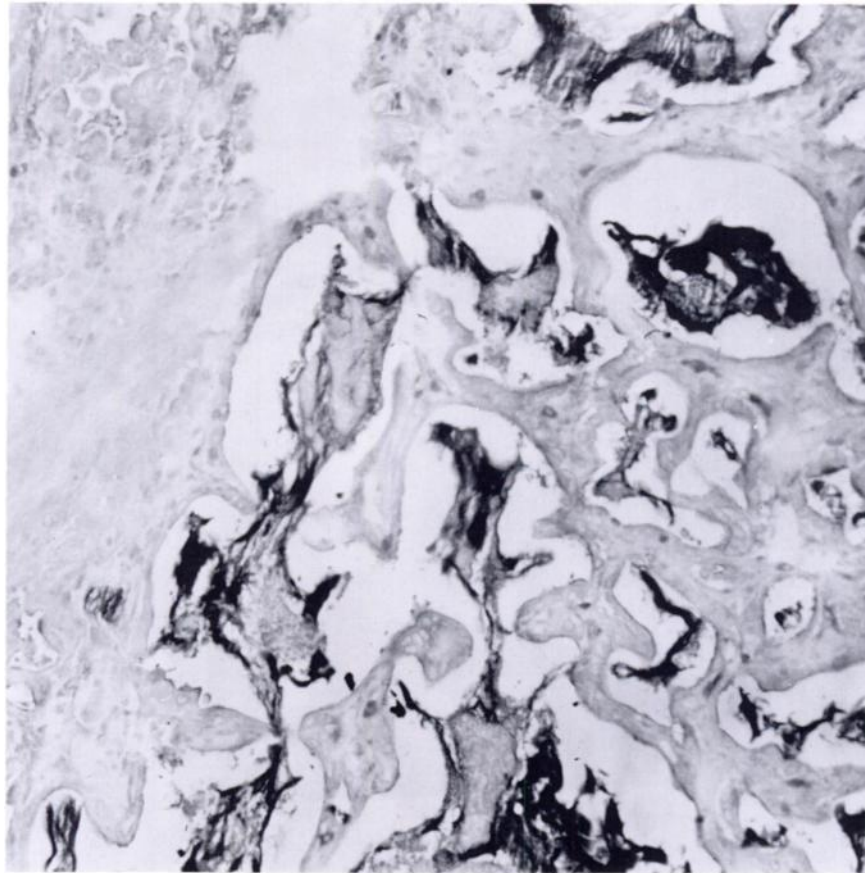


FIGURE 2. Lacunae of darkly stained mucin material produced by the tumor cells. Alcian blue, 160X.

invasive throughout the liver parenchyma of this lobe, and multiple small tumor emboli were present as metastases in the lungs.

The fluorescent rabies antibody test of the brain was negative, and cultures prepared from the brain meal yielded no mycotoxin producing fungus.

This intrahepatic bile duct adenocarcinoma appears to be the first such lesion described in bats. This particular tumor

is of interest because of the presence of ascitic fluid, the gross and microscopic demonstration of fresh blood in the lumen of the stomach and esophagus, along with the distention of veins and lymphatics in the wall of the esophagus and stomach, suggesting the possibility that the bat had portal hypertension caused by the neoplasm, with hemorrhagic esophageal varices, a lesion which is well described in man with this disease.

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