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Authors: SUNDBERG, JOHN P., REILLY, MICHAEL J., WYAND, D.S., and FICHANDLER, PHILIP D.

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PANCREATIC ADENOCARCINOMA IN A COYOTE-DOG CROSS

JOHN P. SUNDBERG,^[1] MICHAEL J. REILLY, D.S. WYAND and PHILIP D. FICHANDLER, Northeastern Research Center for Wildlife Diseases, Department of Pathobiology, University of Connecticut, Storrs, Connecticut 06268, USA.

Pancreatic tumors are uncommon in domestic species, occurring most frequently in the dog (Priester, 1974, *Cancer Res.* 34: 1372-1375; Kircher and Nielsen, 1976, *Bull. W.H.O.* 53: 195-202). Exocrine adenocarcinomas, the most common pancreatic neoplasm in domestic carnivores (Kirchner and Nielsen, *op. cit.*), has been reported in the senegal jackal (*Canis anthus*) (Ratcliffe, 1933, *Am. J. Cancer* 17: 116-135) and the corsac fox (*Canis corsac*) (Fox, 1923, *Diseases in Captive Wild Mammals and Birds*, J.B. Lippincott Co., Philadelphia, Pennsylvania, 665 pp; Ratcliffe, 1933, *op. cit.*). This paper describes a poorly differentiated pancreatic adenocarcinoma in a coyote-dog cross with metastases to the liver, mesenteric lymph nodes, omentum, and lungs.

An eight-year-old captive female coyote-dog cross was born at the University of Connecticut and was part of a colony used for behavioral studies. She was a cross between a purebred beagle bitch and a coyote (*Canis latrans*). The original colony was established in 1960 with coyotes obtained from the Lincoln Park Zoo, Chicago, Illinois.

This canid was initially treated symptomatically with fluid therapy and antibiotics for an undiagnosed illness characterized by generalized weakness, lethargy, weight loss, icterus, and hematuria. Serological tests were negative for *Leptospira pomona*, *L. canicola*, *L. hardjo*, *L. grippotyphosa*, and *L. icterohemorrhagiae* by the microscopic agglutination test. During

the next 3 days, the animal's condition deteriorated, and on the fourth day, she became comatose and died.

The 12 kg coy dog was markedly icteric at the time of necropsy. The liver was enlarged with multiple yellow to red firm masses of variable size, up to 7 cm in diameter, many with necrotic centers (Fig. 1). The gall bladder was distended with bile. Manual expression demonstrated the bile duct to be patent. There was a firm, yellow-white, 4 × 2 cm, encapsulated mass extending from the body of the pancreas to the liver. The regional lymph nodes were enlarged, yellow to red on cut surface and resembled the liver masses. The omentum adjacent to the liver and pancreas had numerous firm white nodules, 0.3-1.0 cm in diameter. There was a firm nodule, 0.5 cm in diameter in the left diaphragmatic lobe of the lungs.

Microscopically, the pancreas consisted of nests of pleomorphic cells, many with necrotic centers (Fig. 2). The cells had large open nuclei with a single prominent nucleolus and a moderate amount of eosinophilic cytoplasm. Some cells within the nests formed acini and contained cytoplasmic zymogen granules. The tumor cell nests were accompanied by a moderate to extensive dense irregular collagenous connective tissue stroma. Vascular and perineural invasion were prominent. Nonneoplastic areas of the pancreas had mild interstitial lymphocytic infiltrates. The neoplasm was attached to the duodenum but did not invade through the outer

^[1] Present address: Department of Veterinary Pathobiology, College of Veterinary Medicine, University of Illinois, Urbana, Illinois 61801, USA.

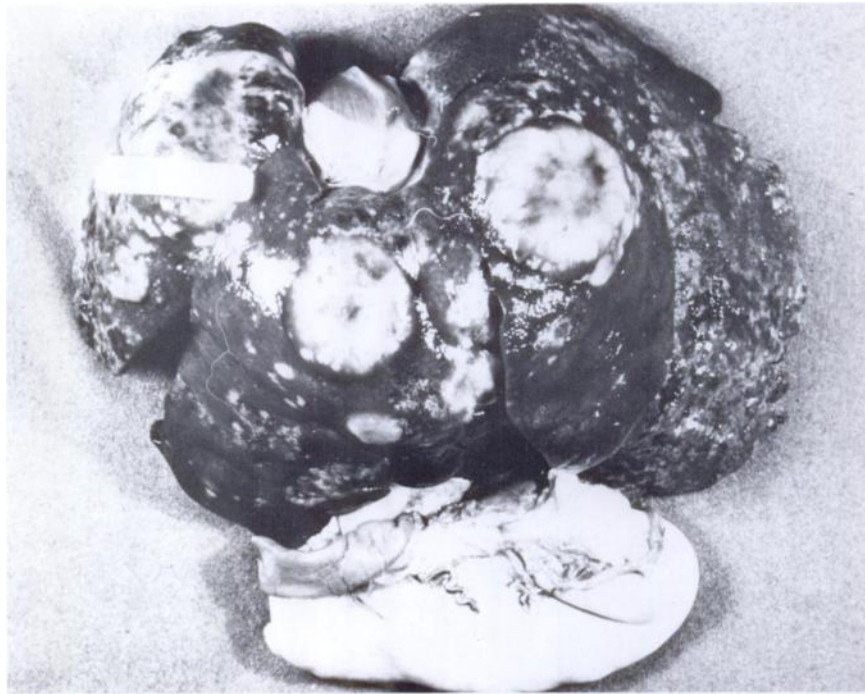


FIGURE 1. The liver was enlarged and contained multiple metastatic foci of variable sizes.

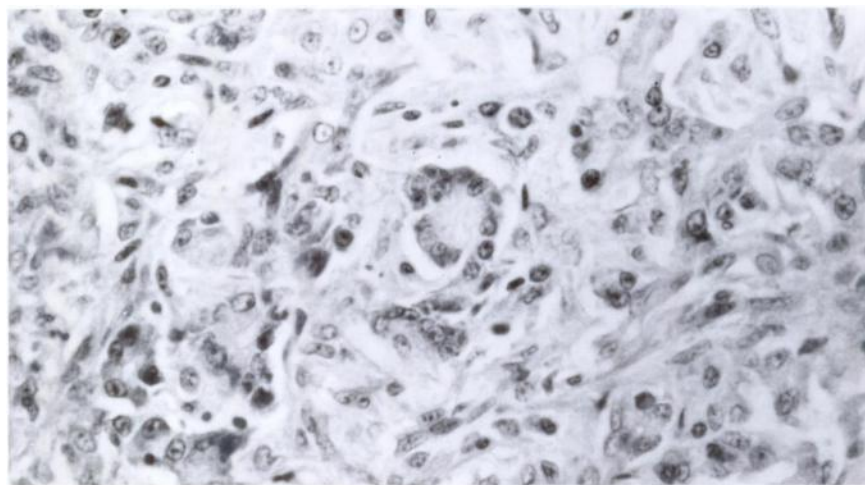


FIGURE 2. Cellular pleomorphism with loss of polarity characterized the primary tumor in the pancreas (H&E, 450 $\times$).

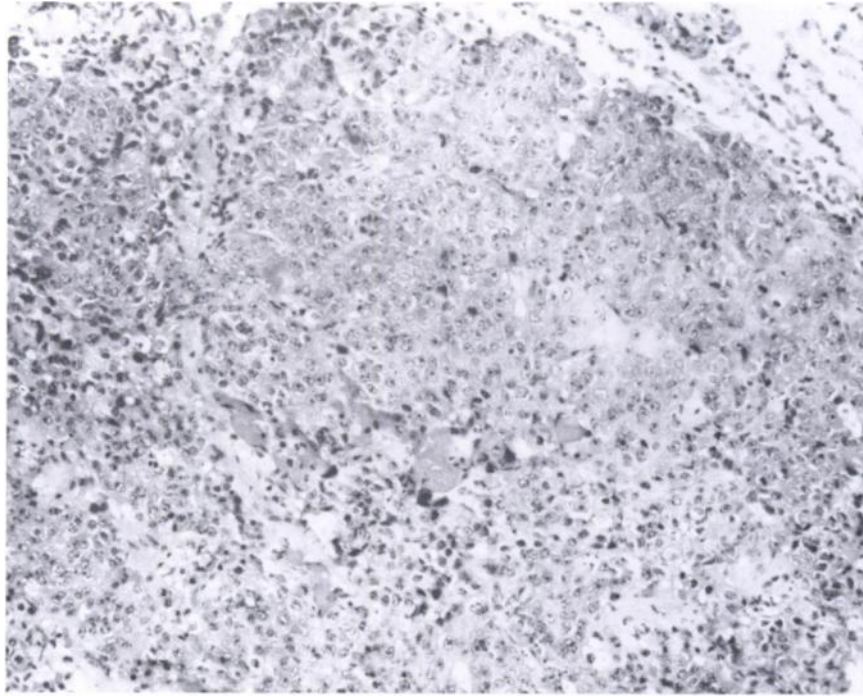


FIGURE 3. Multiple, small metastatic foci were scattered throughout the lungs (H&E, 180X).

longitudinal muscle layer. There were nests of neoplastic cells surrounding the portal triads in the least affected areas of the liver. The cells infiltrated the sinusoids causing compression of the hepatic cords and formed large masses, most of which were necrotic. The cortical and medullary sinuses of the mesenteric lymph nodes were infiltrated by neoplastic cells, which in some, destroyed the nodal architecture. The palpable lung mass consisted of cells with large pleomorphic vesicular nuclei with one or two prominent nucleoli and a moderate amount of foamy basophilic cytoplasm (Fig. 3). In addition to the large mass there were numerous small

metastatic foci scattered throughout the lung parenchyma. The histologic appearance of this neoplasm as well as the metastatic pattern are consistent with a pancreatic adenocarcinoma of acinar cell origin.

Pancreatic adenocarcinomas have not been reported previously in the coyote or coyote-dog cross, although this tumor has been reported in the beagle (Priester, *op. cit.*), corsac fox (Fox, *op. cit.*; Ratcliffe, *op. cit.*) and senegar jackal (Ratcliffe, *op. cit.*).

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