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PROBABLE CUTANEOUS PROTOTHECOSIS IN A BEAVER

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Abstract: Lesions in the pelt of a beaver (*Castor canadensis*) contained organisms which were probably members of the genus *Prototheca*.

Organisms of the genus *Prototheca* are unicellular, endospore-forming, achloric mutants of the genus *Chlorella*.¹ They are usually considered to be saprophytes but have been associated with disease in the potato and in various animal species, including man.⁵ Recent reviews and case reports on protothecosis, the disease in animals, have been published.^{2,3,4,6} This report concerns a probable case of cutaneous protothecosis in a beaver.

The frozen pelt of a male beaver trapped December 9, 1971 at Balsam Lake in Victoria County, Ontario was submitted for examination. There were four nodules, 1-3 cm diameter, in the dermis, located approximately in the centre of the pelt. Each consisted of a dense fibrous capsule surrounding a firm, rubbery core which was homogenous, glistening, and pea-green on cut surface (Figure 1). Three of the nodules were completely encapsulated; a tract containing creamy-white, viscous exudate extended from the other nodule to the external surface of the pelt. The condition of the remainder of the carcass was not reported.

Inocula from the cores of the nodules were streaked on bovine blood agar and MacConkey's agar and incubated aerobically at 37°C for 48 hours. No growth was evident and the plates were discarded. Pieces of the lesions were fixed in 10% buffered formalin and processed for histologic examination. Tissue sections were stained with hematoxylin and

eosin, periodic acid-Schiff (P.A.S.) and methenamine silver. The pelt was refrozen.

Histological examination of a nodule demonstrated a capsule of mature collagen surrounding a mass of organisms (Figure 2) embedded in fibrillar and granular material which was P.A.S. positive (Figure 3). Several small lesions were found in the fibrous capsule of the nodule and they differed from the main lesion in that there was a mild mononuclear cell infiltrate around the organisms. These were possible areas of active invasion by the causative organism.

Most of the organisms were round with a single large nucleus, granular cytoplasm and a well-defined, P.A.S. positive cell wall. Many binucleate and a few multinuclear organisms were also present and they were often oval or lobulated. Some cells were crenated, had a refractile cell wall and nuclear membrane and did not stain with P.A.S. and H & E. The notable feature of the histologic sections was the minimum cellular reaction. Cells identified as mature sporangia were rare (Figure 3).

From a comparison with descriptions and illustrations in the papers cited above we concluded that the organisms were probably *Prototheca* spp. The striking green colour of the cores of the nodules agrees with the findings of Migaki *et al.*⁸ in bovine lymph nodes. They believed that the cytoplasmic granules may have been responsible for the green colour.

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FIGURE 1. Gross appearance of underside of beaver pelt showing fibrous capsule cut to expose core of the nodule. Approx. life size.

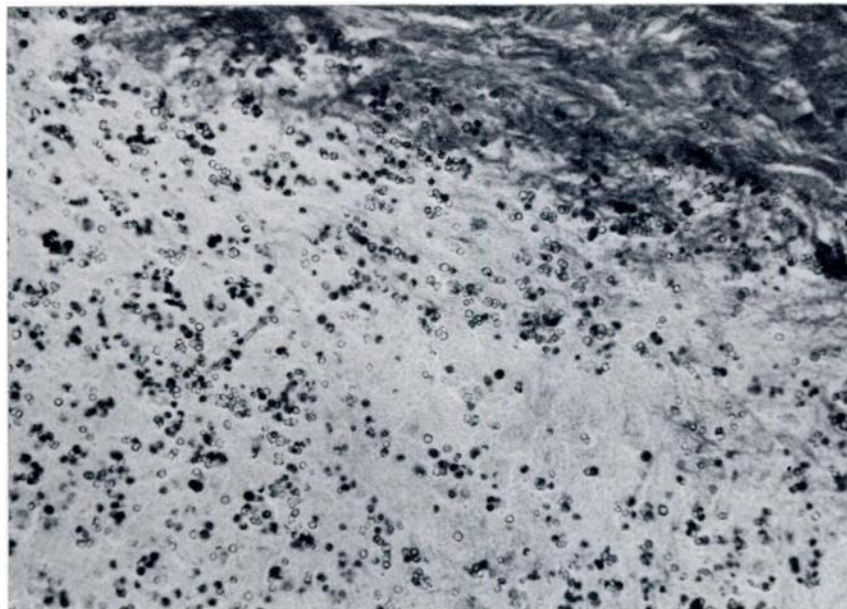


FIGURE 2. Histologic appearance of lesion shown in Figure 1. Fibrous capsule above with numerous organisms below. Methenamine silver. Approximate magnification 100 X.

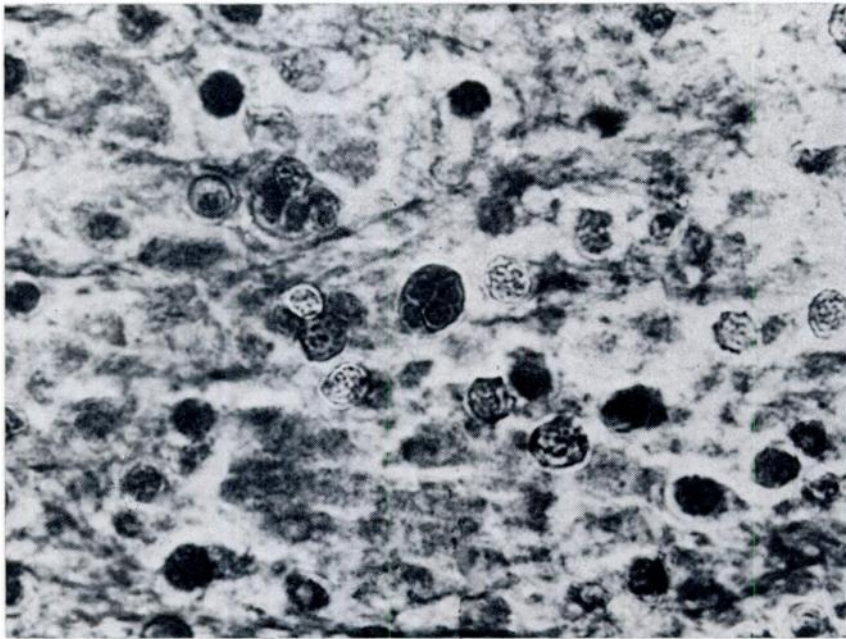


FIGURE 3. Histologic appearance of the organisms. A sporangium is located centrally. Approximately 500 X.

Following histologic examination, two additional attempts were made to culture an organism from the frozen pelt. Material from the cores of the nodules was macerated in tryptic soy broth, inoculated onto 5% bovine blood agar, 5% bovine blood agar containing 200 mcg neomycin per ml, Sabouraud's dextrose agar and Bacto-trichophyton agar (Difco Laboratories). The plates were incubated at 32C

for 4 days but no significant organisms were isolated. The fact that the pelt was frozen prior to culture possibly explains our failure to culture the organism.

We appreciate the assistance of Dr. J. R. Long, University of Guelph who attempted to culture the organism and thank Mr. H. Lumsden, Ontario Department of Lands and Forests for submitting the pelt for examination.

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