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BRIEF COMMUNICATIONS

Microsporidiosis in a lovebird

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Microsporidian parasites belonging to the protozoan phylum Microspora are reported to cause disease in the majority of invertebrate phyla and all 5 classes of vertebrates.[4] The organisms cause serious diseases in silkworms, amphibians, reptiles, and fish, and are becoming of increasing importance in human and veterinary medicine.[2] The microsporidian parasite *Encephalitozoon cuniculi* is commonly found in rodents and laboratory rats, where reported incidence varies from 5 to 75%.[12] Microsporidian infections have been reported in humans and may become of even greater importance in immunocompromised patients in the future.[1,5,8] Four confirmed avian cases have been in lovebirds[3,6,7,9] and one case has been reported in a parrot[10]

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Microsporidia are small unicellular organisms that are obligate intracellular parasites with a unique mode of infecting host cells. Resistant spores, normally ingested by the host, hatch under suitable stimuli. A minute tube, the polar tube or polar filament, which lies coiled inside the intact spore, is everted through the spore wall with force enabling the tip to penetrate but not disrupt a host cell membrane. The developmental stages of an *Encephalitozoon* are monokaryocytic, and sporulation, which occurs in a large parasitophorous vacuole in contact with the host cell cytoplasm, is protected from lysosomal attack. The smallest microsporidian spores found in vertebrate hosts are the ovoid spores of *E. cuniculi*. The characteristic reddish purple reaction with Gram stain is of great value in detecting spores in smears and sections. Microsporidian spores are gram-positive and all other protozoa1 cysts or spores are gram-negative.[4]

Five well-documented reports of microsporidiosis in avian species have been recorded.[3,6,7,9,10] Lesions were described in the liver, intestine, and kidney in 4 cases. In 1 lovebird, lesions were found in the liver, lung, and kidney.

This case reports studies of a blue-black mask lovebird submitted intact to Kord Animal Disease Diagnostic Lab-

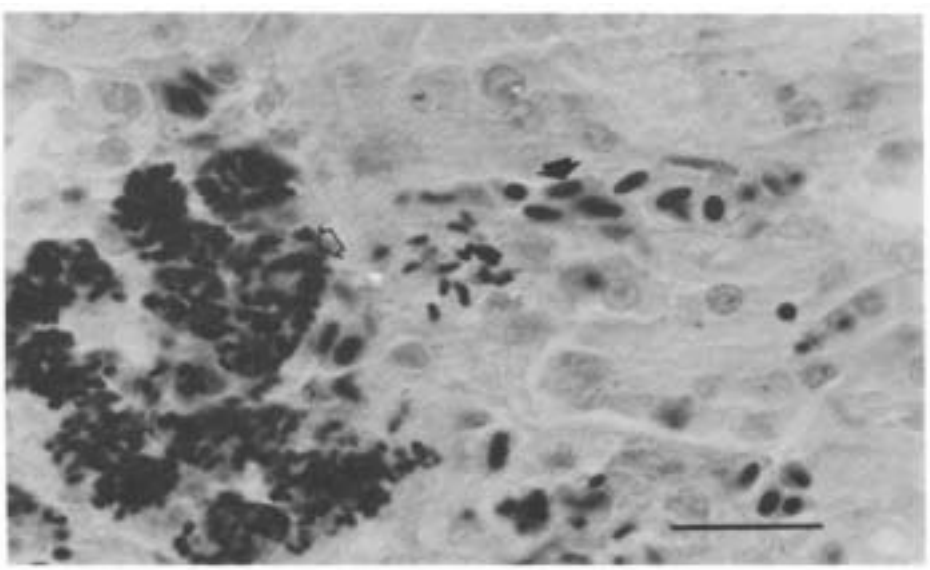

Figure 1. Kidney from a lovebird with elliptical-shaped microsporidia (open arrow). Red blood cells (solid arrow). Brown-Brenn Gram stain. Bar = 16 μm.

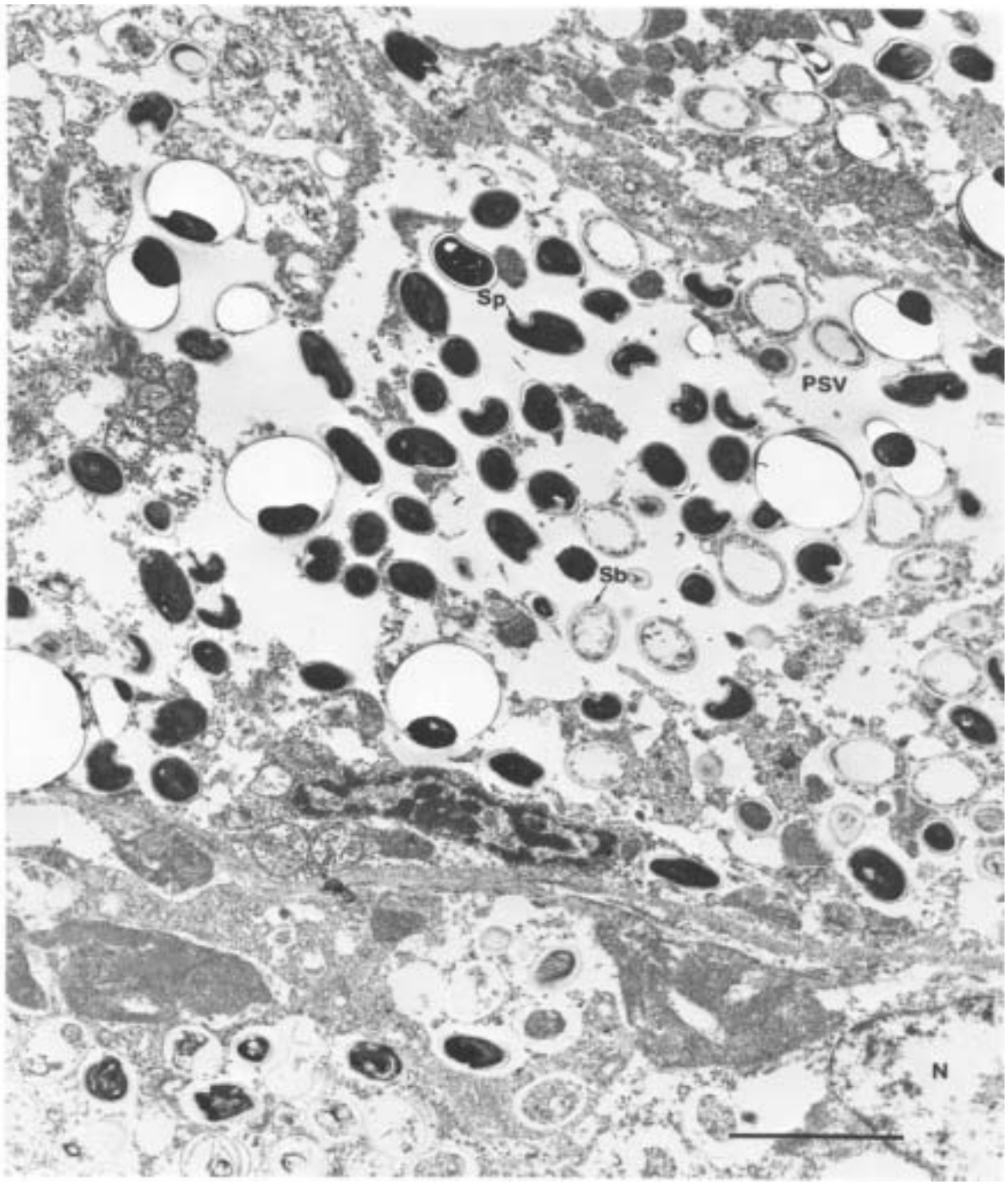

Figure 2. Electron photomicrograph of liver from a lovebird with many microsporidial spores (Sp) and sporoblasts (Sb) in a parasitophorus vacuole-like structure (Psv.). N, nucleus of hepatocyte. Bar = 4.8 μm.

oratory, Nashville, Tennessee. No signs of illness were noted prior to death. Psittacosis had been diagnosed in the group 1.5 months prior. Multifocal to confluent areas of yellowish discoloration scattered randomly throughout the liver were observed on gross examination.

Histologically there were massive, irregularly shaped, variable-sized areas of necrosis occurring in a random distribution pattern in the liver. Only scattered clusters of normal-staining intact hepatocytes were visible. The cell membrane of necrotic hepatocytes appeared markedly distended, and

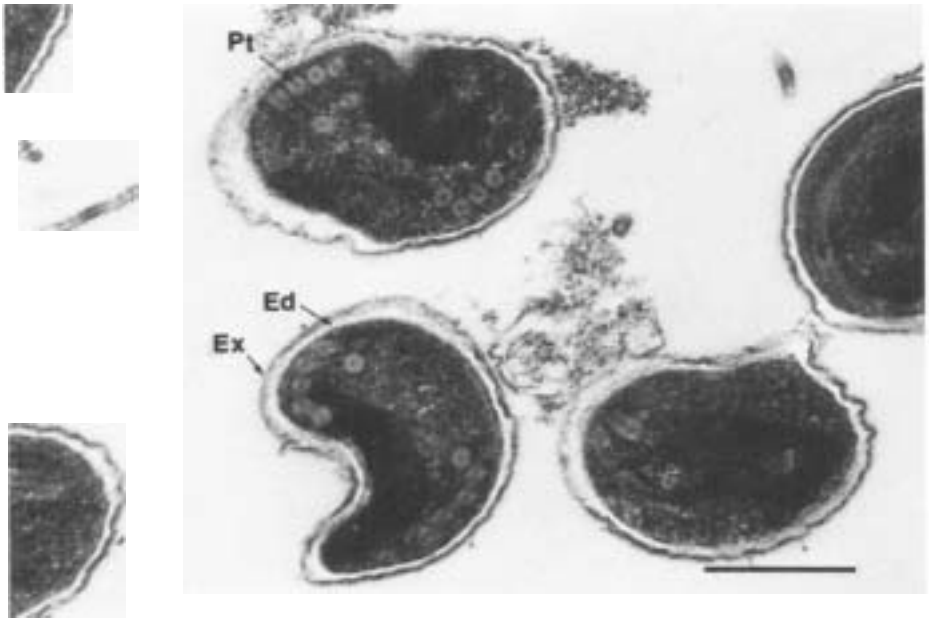

Figure 3. Electron photomicrograph of microsporidia. Ed, endospore; Ex, exospore; Pt, polar tube. Bar = 1.6 μm.

marked biliary hyperplasia was accompanied by the presence of mononuclear cell infiltrate. A Brown-Brenn tissue Gram stain revealed clusters of round to elliptical gram-positive organisms measuring approximately 2.4 x 1.4 μm in hepatocytes. Similar organisms were also seen in the lumens and lining epithelial cells of renal tubules (Fig. 1).

Ultrastructurally hepatocytes contained many microsporidial spores and sporoblasts in parasitophorous vacuole-like structures (Fig. 2). The spores had 5 or 6 coils of the polar tube and an electron-dense polaroplast enclosed by a double wall consisting of an inner layer of electron-lucent endospore and an outer layer of electron-dense exospore (Fig. 3). The number of coils of the polar tube is reported to be constant within limits for each species[4] *Encephalitozoon* species have been reported to have 5-7 coils of the polar tube. The genus of microsporidium was not determined in this case, but the number of coils observed is characteristic of that reported in descriptions of the genus *Encephalitozoon.*

Origin of infection in birds is unknown. Ingestion of infected arthropods has been suggested as a possibility of origin of infection in certain primates.[4] The organism has been adapted to tissue culture and has been isolated from the brain of a rabbit.[11] An indirect immunofluorescence test has been used to screen sera for antibodies against *E. cuniculi* (R. A. Meccoli, personal communication, 1987). Thirty Swedish homosexual men belonging to the group at risk for AIDS were examined for antibodies against various opportunistic parasites and 33% were found to be positive for *E. cuniculi.* Antibodies to *E. cuniculi* are not normally found in Swedish citizens, but were found in 12% of those who traveled to the tropics.' A new microsporidium has been described in the enterocytes of a Haitian patient with AIDS.[5]

Diagnosticians should examine necrotic liver lesions in pet birds using the tissue Gram stain. Immunocompromised human patients should be isolated from sick lovebirds and parrots because the birds present a potential source of infection.

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