INCLUSION BODY DISEASE VIRUS

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■ HISTORY

Inclusion body disease of boid snakes has been recognized since the mid 1970's. It is named for the characteristic intracytoplasmic inclusions which are seen in epidermal cells, oral mucosal epithelial cells, visceral epithelial cells and neurons. In the 1970's, through the late 1980's, this disease was most commonly seen in Burmese pythons, *Python molurus bivittatus*. Starting in the late 1980's until present, it has been seen most commonly in boa constrictors, *Boa constrictor*.

■ HOST

All boid snakes should be considered susceptible. While the disease has not been identified in non-boid snakes, it is unknown whether nonboid snakes can harbor the virus. The primary host of this virus has not been identified.

■ DISTRIBUTION

The disease is distributed worldwide in captive boid snakes. Its occurrence in the wild is unknown.

■ AGES AFFECTED

Inclusion body disease has been identified primarily in adult snakes. However, all age groups should be considered susceptible. There are anecdotal reports of infection in neonates.

■ ETIOLOGIC AGENT

A retro-like virus has been incriminated as the causative agent of inclusion body disease. We have an isolate from a *Boa constrictor* that will be used in a transmission study to fulfill Koch's postulates and determine if it is the causative agent. Reverse transcriptase activity has been demonstrated in supernatant from viper heart cells infected with this virus. This virus is currently being purified for biochemical characterization and production of polyclonal antibodies in rabbits.

■ CLINICAL SIGNS

Clinical signs are quite variable. Regurgitation and signs of central nervous system disease are commonly seen in Boa constrictors. Stomatitis, pneumonia, undifferentiated cutaneous sarcomas, lymphoproliferative disorders, and leukemia have all been seen. Burmese pythons generally show signs of central nervous system disease without manifesting any other clinical signs; regurgitation is not seen in Burmese pythons.

■ PATHOLOGY

By light microscopy, in hematoxlin and eosin stained tissues sections of a wide variety of epithelial and neur-

onal cells, characteristic intracytoplasmic inclusions are seen. Several snakes have been seen with proliferative pneumonia. While inclusions are commonly seen in the liver, kidney, and pancreas, we have seen cases where there are very few inclusions. In a few snakes with signs of central nervous sytem disease, and with a severe encephalitis, no inclusions have been seen in any cells. While the presence of characteristic inclusions is diagnostic for the disease, the absence of inclusions does not necessarily mean the snake is disease or IBD virus free. While cells having inclusions may show mild degenerative changes, inflammation is rarely seen in visceral tissues. In the brain, mild to severe encephalitis, with lymphocytic perivascular cuffing may be seen. Several snakes with lymphoproliferative disorders have been identified with lymphoid infiltrates in multiple organs.

■ TRANSMISSION

Exact route of transmission has not been identified. Transmision may be possible by:

- direct contact
- intrauterine transmission to developing embryos in viviparous species and eggs in oviparaous species
- veneral transmission. The snake mite, *Ophionyssus natricis* has been implicated as a vector for the virus since mite intestations are commonly seen in epizootics of IBD.

■ DIAGNOSIS

Currently there is no serologic assay available for determining exposure. We are working toward developing an immunofluorescence assay. At the University of Florida College of Veterinary Medicine, we perform complete blood counts on suspect snakes. Infected snakes commonly have white blood cells counts >30,000/µl. Intracytoplasmic inclusions are occasionally seen in peripheral lymphocytes. We also take esophageal, gastric, and liver biopsies. If inclusions are identified in any cells, euthanasia is recommended.

■ CONTROL

Identify infected snakes and euthanatize. All new snakes should be quarantined for minimally 90 days before introduction into an established collection. Recommendations for boas is 6 month quarantine period. Mite control and elimination is essential. Fibroglass cages of infected snakes should be cleaned with chlorox and left out in the sun to dry before being used for other snakes. Wooden cages, unless sealed with urethane or some other sealeant should be discarded.

■ REFERENCES

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