

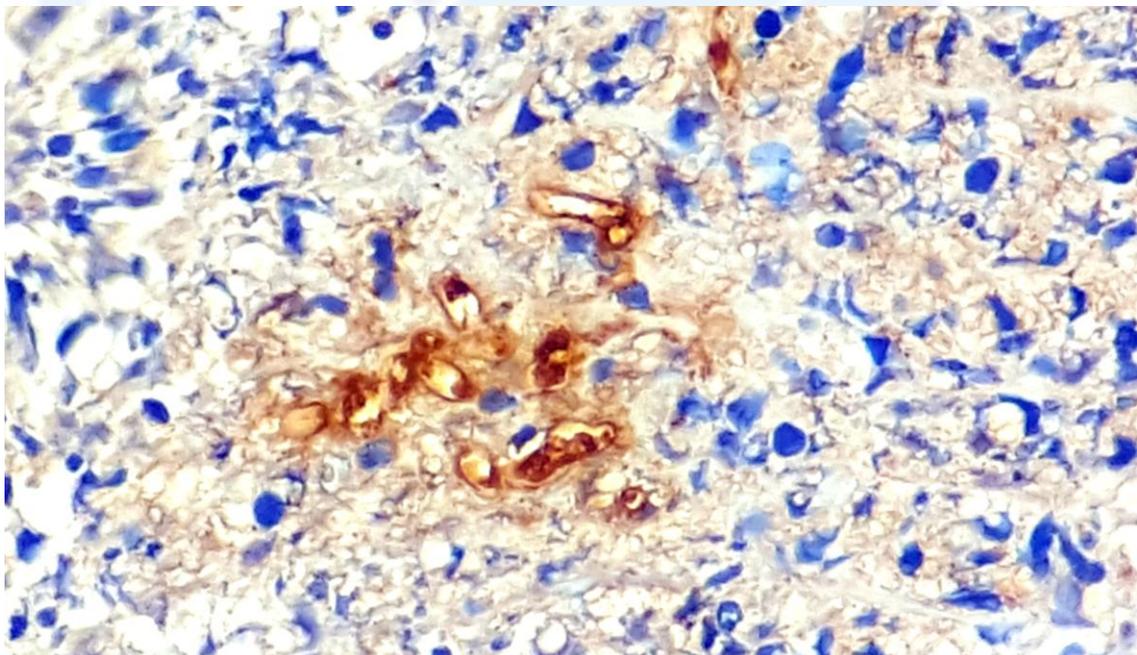
# Diagnostic Exercise

## From The Davis-Thompson Foundation\*

Case #: 96 Month: May Year: 2018

*Answer Sheet*

**Title:** *Horse, intestinal pythiosis.*



**Figure 5**

- 1) Based on the gross and histologic pictures, what is the most probable cause (agent)? *Pythium insidiosum*.
- 2) How do we call the yellow, friable, well-demarcated structures observed in the intestinal wall (Figure 2, arrows)?  
Kunkers.
- 3) What is the most probable source of infection of this horse with this pathogen? Contaminated water.
- 4) Describe the classic presentation of this disease in horses, since this is an atypical presentation. Horses often develop the cutaneous form of pythiosis, in contrast to dogs, which more frequently present intestinal lesions.

**Typical Gross Findings:** The gastrointestinal lesions of pythiosis are characterized by segmental thickening of the stomach or intestine. Mesenteric lymph nodes may also be involved. In horses, small, friable and well-demarcated yellow areas (“kunkers”) can be seen within the thickened wall.

**Typical Microscopic Findings:** Equine pythiosis is histologically characterized by large areas of fibrotic tissue associated with multiple aggregates of eosinophils that contain negative images of hyphae, which are generally difficult to see with hematoxylin and eosin. The hyphae are 3–7 µm wide, rarely septate filaments, with non-parallel walls and non-dichotomous irregular branching. The hyphae are best demonstrated with silver stains and can be confirmed by immunohistochemistry (Figure 5).

**Discussion:** This horse had an uncommon form of pythiosis that caused acute onset of colic followed by death. The presence of a water source is an important epidemiologic information in this case as it suggests that the horse was infected by ingesting contaminated water. *Pythium insidiosum* is a fungus-like aquatic oomycete, which means it is not truly a fungus. Horses and dogs are the most frequently affected species, yet the pathologic presentation differs among them: while horses often develop a cutaneous form of pythiosis, acquired by direct contact of the skin with contaminated water, dogs commonly present the gastrointestinal form from ingesting water containing the oomycete. Uncommonly, the intestinal and the cutaneous form can develop in the same dog.

The histological lesions seem to differ among these species as well: the lesions in horses are characterized by dense eosinophilic infiltrates associated with extensive fibrotic tissue, while in dogs, granulomatous to pyogranulomatous inflammation predominates. The presence of yellow, friable, well-demarcated structures (“kunkers”) within firm, fibrotic tissue is a key feature of the gross lesions of equine pythiosis. These correspond histologically to the dense accumulations of eosinophils. It is important to emphasize that most hyphae are embedded in these eosinophilic infiltrates, which means these “kunkers” are the ideal material to submit for culture or PCR. Apart from these two ancillary techniques, immunohistochemistry is a useful tool to confirm the diagnosis, especially in cases of which only formalin-fixed material is available and culture is therefore not possible.

An important differential diagnosis of equine pythiosis is infection caused by several genera of fungi in the class Zygomycetes, the hyphae of which are broad, coarse and irregular, with non-parallel walls, and may therefore be morphologically like *P. insidiosum*. Culture, immunohistochemistry and PCR may help in the diagnosis in these cases.

## References and Recommended Literature:

*Uzal, F.A.; Plattner, B.L.; Hostetter, J.M. Alimentary system. In: Jubb, Kennedy and Palmer's Pathology of Domestic Animals, V.2, 6<sup>th</sup> edition, 2015.*

*Martins et al. A Comparative Study of the Histopathology and Immunohistochemistry of Pythiosis in Horses, Dogs and Cattle. Journal of Comparative Pathology. V146, p.122-131.*

\*The Diagnostic Exercises are an initiative of the **Latin Comparative Pathology Group (LCPG)**, the Latin American subdivision of The Davis-Thompson Foundation. These exercises are contributed by members and non-members from any country of residence. Consider submitting an exercise! A final document containing this material with answers and a brief discussion will be posted on the CL Davis website ([http://www.cldavis.org/diagnostic\\_exercises.html](http://www.cldavis.org/diagnostic_exercises.html)).

**Associate Editor for this Diagnostic Exercise:** Mariana Flores

**Editor-in-chief:** Vinicius Carreira