

Rounds

Animal Health
Department

Medical Rounds

"medicine for all"



Caring for Stranded Marine Animals

NATIONAL
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Notes

Veterinary Research
Department

Under the microscope

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Rounds Notes is a report on the health of animals at the National Marine Life Center from Sea Rogers Williams VMD for the staff, volunteers, and community of the center including professionals involved the captive care of similar species, the views expressed are not necessarily that of NMLC. Information in Rounds Notes should be considered confidential and used solely to benefit the health of aquatic animals everywhere.

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Rounds Notes

14: 39-41(2010)

Headlines News: Take Your Pick

Why the Diagnosis of Fungal Disease takes the Fun Out of 'gus'

The results from Catch-22's cultures and molecular diagnostics are complete. Catch has a superficial fungal keratitis of the shell. Not a true dermatomycosis as the skin was unaffected and the lesions restricted to the carapace and the plastron. We attempted to isolate the causative agent (the fungus) by traditional culture and molecular methods.

- 1) At IDEXX two cultures were overgrown with bacteria and finally on the third submission an isolate of *Penicillium sp.* was recovered, but thought to represent a contaminant.
- 2) At Cornell University, Animal Health Diagnostic Center, the culture was similarly overgrown but DNA sequences were detected, and while most similar to the genus *Aphanoascus* the homology was so low that a new and novel genus is suspected.
- 3) Northwest ZooPath forwarded this histopathology blocks from the shell biopsy, which gave us some nice images of the disease, to a fungal lab at the Washington State University, College of Veterinary Medicine. When the DNA was amplified for fungal DNA, it revealed a sequence with 99% homology to *Trichosporon dermatitis* and *Trichosporon mucoides* via both GenBank and CBS fungi database.



What can we do ?

Improvements in clinical collection and antibiotic suppression of bacteria during culture attempts along with newer and more productive and selective reptile fungal culture media may help.

As molecular methods become more wide-spread a validation system to confirm agents is necessary.

Koch's Postulates (side-bar) were among the first real attempt to advance "germ theory" and the concept that micro-organisms can cause disease, but by today's standards they may be considered quaint, and if met may still be sufficient they are far from the standard in modern medicine. Anyway, these don't help us as we can not unambiguously isolate the organism from even the index case.

What do we make of this ?

I believe the *Penicillium*, while sometimes (rarely) associated with pathology, and while call for diseases associated with

Penicillium species in reptiles has been given to all reptile veterinarians, is still a contaminate.

If the fungus is truly novel (unknown to science) and capable of invading the keratin layer of aquatic cooters, pathology at any level, it should be isolated and the extent of it's ability to cause pathology studies. Several cooters have been returned to the wild presumably with this isolate within their keratin layers, and its effect on the cooters, and other aquatic life is unknown. I think the risk to the extant endangered population is small, but endangered none the less and this argues for caution.

The homology to *Trichosporon dermatitis* is interesting as fungi in this genus are the etiology of the disease White Pellagra, a tropical fungal infection of the hair (originally a mustache) causing white discoloration of the hair, and a host of reptile associated infections [see chapter 16-(Mader 2006)]. Hair is also made of keratin, so this creates a nice analog in comparative disease between mammals and reptiles. *T. dermatitis* is a new organism, described in 2001 (Sugita, Takashima et al. 2001) from infected human skin in Germany and from sea water (Middelhoven, Scorzetti et al. 2004), so their is relevance in our investigation.

The genus *Trichosporin* is also closely allied with *Cryptococcus* a known animal pathogen also associated with respiratory disease in cetaceans(Miller, Padhye et al. 2002).

Koch's postulates are:

1. The microorganism must be found in abundance in all organisms suffering from the disease, but should not be found in healthy animals.
2. The microorganism must be isolated from a diseased organism and grown in pure culture.
3. The cultured microorganism should cause disease when introduced into a healthy organism.
4. The microorganism must be reisolated from the inoculated, diseased experimental host and identified as being identical to the original specific causative agent.



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Bibliography

- Mader, D. R. (2006). *Reptile Medicine and Surgery*. St. Louis, Missouri, Elsevier Inc.
- Middelhoven, W. J., G. Scorzetti, et al. (2004). "Systematics of the anamorphic basidiomycetous yeast genus *Trichosporon* Behrend with the description of five novel species: *Trichosporon vadense*, *T. smithiae*, *T. dehoogii*, *T. scarabaeorum* and *T. gamsii*." *Int J Syst Evol Microbiol* **54**(Pt 3): 975-986.
- Miller, W. G., A. A. Padhye, et al. (2002). "Cryptococcosis in a bottlenose dolphin (*Tursiops truncatus*) caused by *Cryptococcus neoformans* var. *gattii*." *J Clin Microbiol* **40**(2): 721-724.
- Sugita, T., M. Takashima, et al. (2001). "Two new yeasts, *Trichosporon debeurmannianum* sp. nov. and *Trichosporon dermatis* sp. nov., transferred from the *Cryptococcus humicola* complex." *Int J Syst Evol Microbiol* **51**(Pt 3): 1221-1228.

