

LABORATORY MEDICINE

YESTERDAY · TODAY · TOMORROW

Diatoms in cytologic specimens of aquatic animals – Part II, dermal, respiratory, and gastric samples

Contributed by Nicole Stacy¹, Martine de Wit², Shane Boylan³, Frances Gulland⁴, Tom Frankovich⁵

¹University of Florida, Gainesville, FL; ²Fish and Wildlife Research Institute, St. Petersburg, FL;

³South Carolina Aquarium, Charleston, SC; ⁴The Marine Mammal Center, Sausalito, CA and

⁵Florida International University, Miami, FL

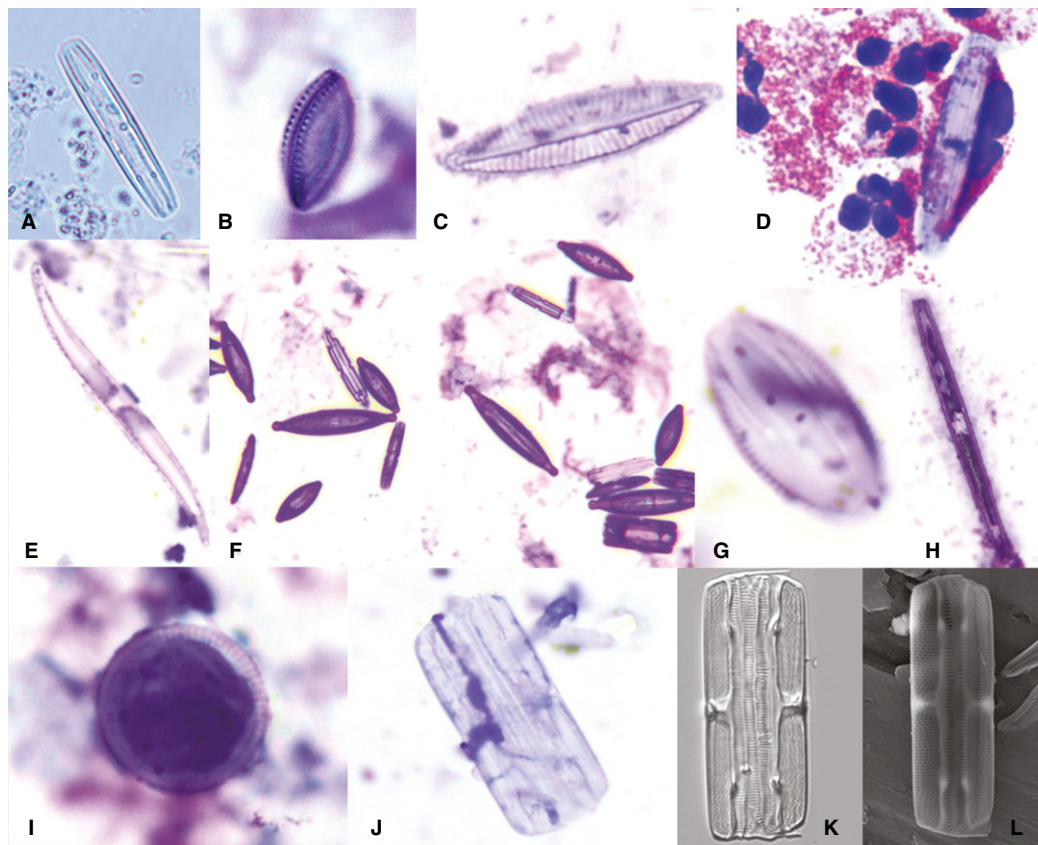


Figure 1. Diatoms in cytologic samples of Florida manatees (*Trichechus manatus latirostris*) in **A, C, D, F, G, J-L**, bottlenose dolphins (*Tursiops truncatus*) in **B, E, I**, and a seahorse (*Hippocampus erectus*) in **H**. Wright–Giemsa stain. $\times 100$ objective (except **F**; $\times 20$). (**A**) naviculoid benthic diatom; skin contamination of urine sediment; wet mount. (**B**) *Nitzschia* sp.; gastric fluid direct smear. (**C**) *Navicula* sp.; nasal swab. (**D**) *Tursiocola* spp. in teat fluid cytospin preparation with heterophilic inflammation, diatom phagocytized by heterophil consistent with incidental finding. (**E**) *Nitzschia* sp.; gastric fluid direct smear. (**F**) *Tursiocola* spp. and pennate diatoms; skin scraping. (**G**) *Amphora* sp.; nasal swab. (**H**) pennate diatom; skin scraping. (**I**) centric diatom; gastric fluid direct smear. (**J**) *Tursiocola* sp.; skin scraping. (**K**) *Tursiocola* sp.; skin scraping (cleaned). (**L**) *Tursiocola* sp.; skin scraping (SEM).

Please contact the editor if you have historical or other notes of interest you would like to contribute to this feature. Items will be published at the discretion of the editor. © 2014 American Society for Veterinary Clinical Pathology and European Society for Veterinary Clinical Pathology

LABORATORY MEDICINE

YESTERDAY · TODAY · TOMORROW

Diatoms are a common finding in cytologic samples of aquatic animals,¹ and it is necessary to differentiate these microbiota from parasite ova or protozoa. Although it may be sufficient for the clinician to identify these organisms simply as diatoms, diatomists are keenly interested in finer levels of distinction and seek to identify diatom taxa to individual species. The identification of diatom taxa to the species level is often not possible with cytologic samples and can only be accomplished by detailed examination of the ornamentation of the silica cell wall of these organisms using light microscopy and in some cases scanning electron microscopy (Figure 1K, L). This requires further processing of a sample to remove all organic material.

Some diatom species, (e.g., *Pseudo-nitzschia* spp.) can form harmful algal blooms and produce the biotoxin domoic acid.² The cytologic detection of toxigenic diatoms in gastrointestinal tract samples is neither sensitive nor specific. Differentiation between the similar *Nitzschia* sp. requires scanning electron microscopy for identification. When combined with clinical signs, the quantification of the toxin by HPLC or ELISA in feces or urine is used to make the diagnosis of biotoxin exposure.

Diatoms in cytologic specimens may be unique epizootic taxa new to discovery (Figure 1K, L), or they may be established taxa of known habitats or geography that may be used to infer the origins of migrating aquatic animals. For an excellent introduction to diatom biology and diversity, see *The Diatoms*³; for a reference of photomicrographs of marine benthic diatom taxa, see *Diatom Flora of Marine Coasts I*.⁴

References

1. Stacy N, Boylan S, Frankovich T. Diatoms in cytologic specimens of aquatic animals – Part I – fecal samples. *Vet Clin Pathol*. 2014;43:123–124.
 2. Scholin CA, Gulland F, Doucette GJ, et al. Mortality of sea lions along the central California coast linked to a toxic diatom bloom. *Nature* 1999;403:80–84.
 3. Round FE, Crawford RM, Mann DG. *The Diatoms, Biology and Morphology of the Genera*. New York: Cambridge University Press, 1990. ISBN 978-0-521-71469-3. 747 pp.
 4. Witkowski A, Lange-Bertalot H, Metzeltin D. *Diatom flora of marine coasts I*. Germany: A.R.G. Gantner Verlag K.G., Ruggell, 2000. ISBN 3-904144-10-3. 925 pp.
-