

OUTCOMES FROM THE SUCCESSFUL ORAL ADMINISTRATION OF AN IRON-SPECIFIC CHELATOR, HBED (N,N'-DI(2-HYDROXYBENZYL)ETHYLENEDIAMINE-N,N'-DIACETIC ACID MONOHYDROCHLORIDE) IN A BOTTLENOSE DOLPHIN (*TURSIOPS TRUNCATUS*) WITH IRON-RELATED HEPATIC DISEASE

Kathleen E. Sullivan, PhD, MS, Conrad Litz, Kim Odell, Scott M. Williams MS, and Natalie D. Mylniczenko, MS, DVM, DACZM*

Disney's Animals, Science, and Environment, Bay Lake, FL 32830, USA.

Abstract

A 39 yo male bottlenose dolphin (*Tursiops truncatus*) with long-term iron storage disease (ISD) had been previously managed utilizing phlebotomy as described (Johnson *et al.*, 2009). However, repeated abnormal clinicopathologic trends indicated worsening hepatopathy, requiring an increase in frequency of treatments. Peduncular discomfort with radiographic changes in the vertebrae at the phlebotomy site required an alternate treatment to manage the animal. Since excess iron can only be removed via phlebotomy or through chelation, the options were limited. Rhinoceros, another species prone to ISD, were evaluated with a unique chelator (Sullivan, 2016), HBED, (N,N'-Di(2-hydroxybenzyl)ethylenediamine-N,N'-diacetic acid monohydrochloride), an iron specific oral chelator that successfully excreted iron. Treatment was initiated in the dolphin at 40 IU/kg in February 2020, via fish fed throughout the day. The dose was increased incrementally to 70 IU/kg BW over 4 months and tapered down to complete removal by April 2021. Weekly blood count, serum chemistry, iron panels, inflammatory markers, and minerals were evaluated. The dolphin showed markedly improved liver enzyme and iron levels, including reduced transferrin saturation and ferritin (Figure 1). Clinical and behavioral improvements in this case suggests HBED has use as an iron chelator in dolphins. We have initiated another ISD challenged male dolphin on HBED treatment based on this success.

Acknowledgments

Special thanks to the marine mammal care and animal health teams, as well as the animal nutrition team.

Literature cited

Johnson SP, Venn-Watson S, Cassle SE, Smith CR, Jensen ED, and Ridgway SH (2009) Use of phlebotomy treatment in Atlantic bottlenose dolphins with iron overload. *J Am Vet Med Assoc* 235(2): 194–200.

Sullivan, KE (2016) Mitigating iron overload disorder in black rhinoceros (*Diceros bicornis*). Doctoral Dissertation, University of Florida. 1-137.

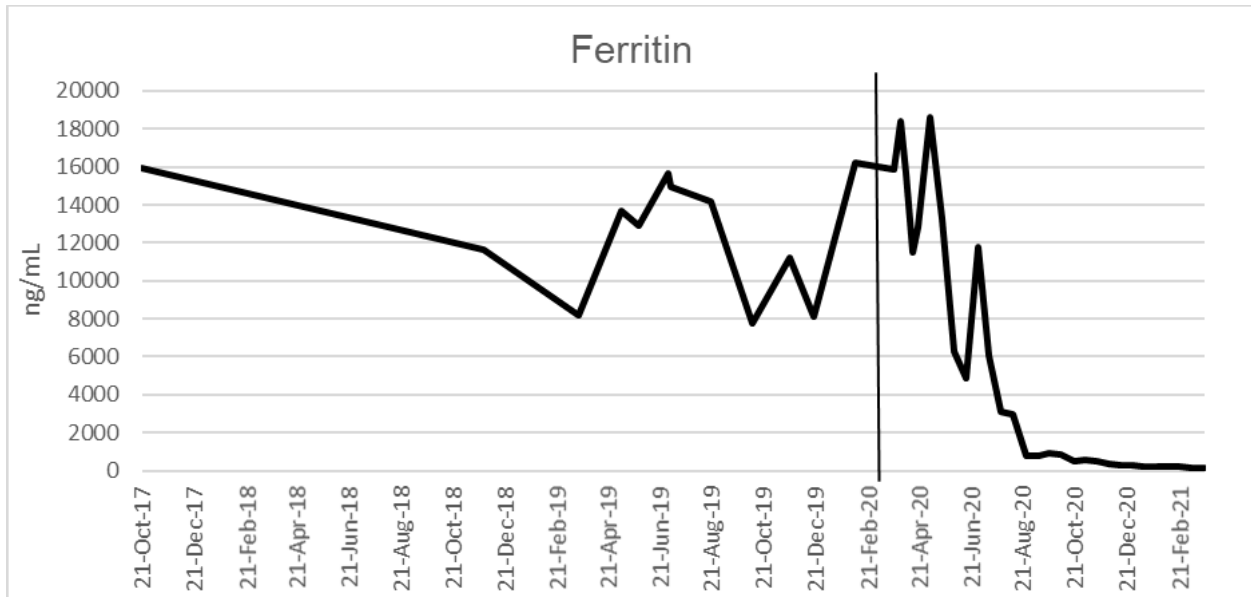


Figure 1: Ferritin (ng/mL) in a bottlenose dolphin (*Tursiops truncatus*) over the course of chelation with HBED; black vertical line marks the introduction of the chelator.