

SEQUENCING THE BLACK RHINO L-FERRITIN GENE: HOW ACCURATE IS OUR TESTING?

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Abstract

Black rhinoceros under human care must be monitored for their iron status due to detrimental but poorly epidemiologically documented consequences of iron overload disorder. The recommended approach to assessing iron status in black rhinoceros examines transferrin saturation and ferritin, a species-specific protein, known to be an iron carrier as well as an acute-phase reactant. Kansas State University Diagnostic Veterinary Laboratory measures black rhinoceros ferritin by using a polyclonal rabbit anti-horse light chain (L)-ferritin antibody (Smith et al. 1995). While this anti-horse ferritin antibody appears to react with black rhino L-ferritin, the question remained if a black rhino-specific antibody would provide a more accurate measure. While ferritin is relatively highly conserved among species, species-specific variations in sequence may affect cross reactivity. The aim of the present study was to determine the sequence of black rhino L-ferritin and compare it to horse L-ferritin. To determine the sequence of black rhino L-ferritin cDNA, we used 5' and 3' rapid amplification of cDNA ends (RACE) of RNA extracted from 4 black rhino livers. We found that the protein encoded by black rhino L-ferritin cDNA is 90% identical to horse L-ferritin. Based on the very high degree of homology between black rhino and horse L-ferritin, it is likely that polyclonal antibodies raised against horse L-ferritin will cross-react with black rhino ferritin. Nonetheless, the black rhino ferritin sequence will now allow for the development of black rhino ferritin-specific antibodies. By establishing the most accurate available test for long-term measurement of iron load in the critically endangered black rhinoceros, preventative iron monitoring can and should be implemented as a vital component of animal management in all black rhino holding institutions.

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Literature Cited

Smith, JE, Chavey, PS and Miller, RE (1995) Iron metabolism in captive black (*Diceros bicornis*) and white (*Ceratotherium simum*) rhinoceroses. *J Zoo Wildlife Med.*pp.525-531.