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## A COMPARISON OF OXIDATIVE STRESS MARKERS AND ANTIOXIDANT STATUS IN TWO SPECIES OF RHINOCEROS, *Diceros bicornis* AND *Ceratotherium simum*

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### Abstract

Captive black rhinoceroses (*Diceros bicornis*) are prone to developing iron overload disorder (IOD), a chronic, progressive accumulation of iron, usually in the form of hemosiderosis. An epidemiologic relationship between IOD and a variety of disease syndromes in captive black rhinoceroses has been suggested.<sup>1,3-8</sup> Neither IOD, nor any of the aforementioned syndromes have been reported in white rhinoceroses (*Ceratotherium simum*). A logical, albeit unproven, pathogenic link between IOD and these diseases in black rhinoceroses is oxidative stress secondary to iron toxicity. The measurement of thiobarbituric acid-reactive substances (TBARS), which are products of lipid peroxidation, can be used to objectively measure oxidative stress.<sup>2</sup> This study compared TBARS, oxidized low-density lipoprotein (oxLDL), and other markers of oxidative stress, along with measures of antioxidant status in healthy, captive black rhinoceroses and white rhinoceroses. The mean value  $\pm$  SD for TBARS in black rhinoceroses was  $1.63 \pm 0.26$  nmol/ml, and for white rhinoceroses was  $1.63 \pm 0.31$  nmol/ml ( $P = 0.96$ ). No significant difference was observed between species for any of the oxidative stress markers measured, or when comparing age, sex, and location (i.e., sampling institution) of animal. Significant differences between species were found for mean values of ascorbic acid and retinol, but not for any other antioxidant markers. Within the sample population, these data show no significant differences between markers of oxidative stress in these two species of clinically normal rhinoceroses. This may suggest that captive black rhinoceroses do not experience significantly more oxidative stress than captive white rhinoceroses, although further studies are needed.

**Key words:** Black rhinoceros, *Ceratotherium simum*, *Diceros bicornis*, oxidative stress, TBARS, white rhinoceros

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