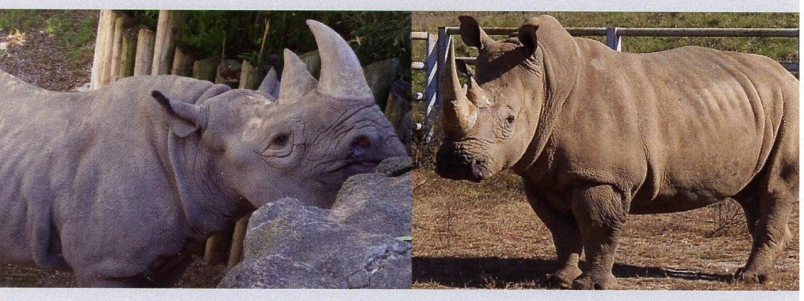
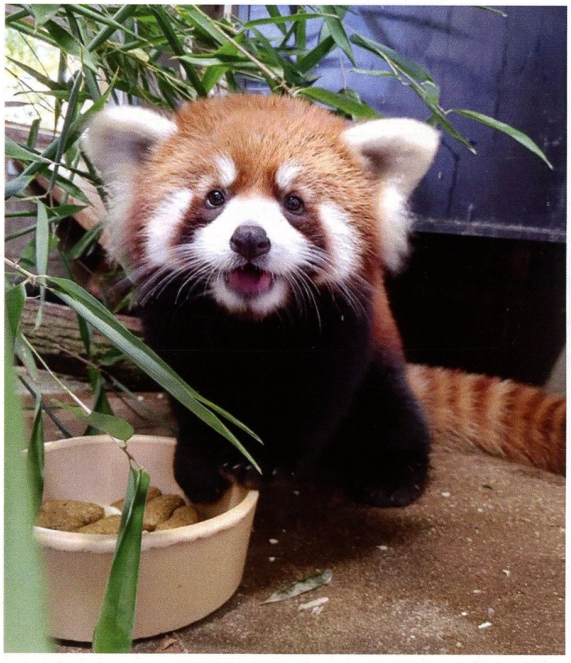
The Black and White of Serum Ferritin in Rhinos: Is There a Connection to Health?

CREW's scientists continue to work on the puzzle that is iron overload disorder (IOD) in black rhinos. Ferritin has been a biomarker of interest because it is the protein responsible for storing iron in the body, but it is also an acute phase protein which means it typically increases in response to illness or inflammation. Ferritin concentrations can be extremely high in the serum of some black rhinos, but black rhinos rarely die from liver failure due to excessive iron stores. Therefore, CREW scientists began to wonder if high ferritin concentrations in rhinos are associated with inflammation rather than iron load. Using previously collected samples stored in CREW's rhino serum bank, CREW scientists analyzed two inflammatory biomarkers and compared their values to those of ferritin. Rarely was an increase in ferritin coincident with a spike in the two other inflammatory biomarkers in either black or white rhinos. This result was somewhat surprising since serum ferritin can be one of the factors used to monitor the onset and recovery of an injury or illness in other mammals. Regardless, the absence of a strong, positive correlation between ferritin and the two inflammatory biomarkers, makes it unlikely that acute inflammation explains the very high ferritin concentrations detected in some black rhino serum samples. Unfortunately, these results do not answer our question about why some black rhinos have exceptionally high ferritin, but by now, we have learned that answers to rhino IOD questions are rarely black and white; instead, they tend to be shades of gray, much like the amazing creatures themselves.



Piecing Together Panda Pregnancy Puzzles



The Cincinnati Zoo & Botanical Garden boasts an impressive track record of successfully managing red pandas and has produced 98 cubs between 1983 and 2021; however, the overall population in zoological institutions exhibits a much lower success rate. Only 50% of pandas paired for breeding produce cubs, but the timing and reasons for reproductive failure are largely unknown. Insights into the rate and timing of reproductive failure may illuminate potential causes and contributing factors, ultimately allowing for improvements in animal care. To try to better understand pregnancy failure, scientists at CREW analyzed ultrasound videos and images obtained from Cincinnati Zoo pandas over the past 12 years and have detailed the incidence and timing of pregnancy loss. Results showed that 7 of 20 (35%) concepti were lost prior to birth and that the pregnancies failed between days 23-50 pre-partum. Both partial losses (vanishing twin syndrome) and full losses were documented. Recently, it was noted that a new pregnancy was established almost immediately following the loss of the first conceptus, an observation that has never before been described in this species. Results of this analysis provide novel insights into red panda pregnancy and may be relevant to other species, such as polar bears, that experience low reproductive rates.