

# For black rhino, zoo diet might be too much of a good thing

June 22 2015, by Emily Caldwell

---



Credit: Cleveland Metroparks Zoo

A new study shows that captive black rhinos—but not their wild counterparts—are at high risk for two common health problems suffered by millions of humans: inflammation and insulin resistance.

The finding suggests captive black rhinos have metabolic problems. In humans, these same conditions can both result from a rich diet and sedentary lifestyle and contribute to obesity and other diseases.

To be clear, this study does not suggest that zoos cause health problems in black rhinos, said Pam Dennis, clinical assistant professor of veterinary preventive medicine at The Ohio State University and senior author of the study. Just as research in humans continues to shed new light on the metabolic complexities of obesity, she said veterinary research is 'just scratching the surface' of the same kind of thinking about animal health.

"We now recognize that obesity in humans leads to increased inflammation and a whole cascade of problems ranging from heart disease to immune dysfunction," Dennis said. "This is entering the vocabulary in zoo medicine, that obesity is much more than just a weight issue."

Dennis, also a veterinary epidemiologist at Cleveland Metroparks Zoo, said a change in zoo diet management is the most feasible first step toward improving captive black rhinos' health.

Worldwide, only about 5,000 black rhinos remain—a drop from an estimated 100,000 in the 1960s. Animals in the wild are threatened by poaching for their horns, and the roughly 250 captive black rhinos are at risk for a range of diseases.

"Given their plight on the planet, we need to do something for each and every one of them. If we can help the ones we are caring for in zoos, that could make the difference for the species," she said.

The research, co-led by first author Mandi Schook, associate research curator at Cleveland Metroparks Zoo, appears in the June-July issue of

the journal *General and Comparative Endocrinology*.

The African black rhinoceroses living in captivity are known to be at higher risk for a number of unusual diseases that include anemia, degraded muscle tissue, skin ulcers, liver disease, iron overload and low phosphate in the blood.

While some of these conditions can be treated, they often lead to death. In one large study of black rhinos living in North American zoos over a 70-year period, 73 percent of the captive-born animals died before reproducing.

Reduced phosphate in the blood is common to most of the [health problems](#) observed in captive black rhinos. Because low phosphate has been linked to [insulin resistance](#) in humans, Dennis set out to see whether the same could be true in the black rhino species she has studied for some time.

The scientists analyzed biomarkers in blood samples from 86 captive and 120 free-ranging black rhinos of both sexes and various ages, measuring two proteins signaling the presence of inflammation, the ratio of insulin to glucose, phosphate levels and iron stores.

Because this is the first known comparison of disease markers in captive and wild animals, the researchers used markers from both sick and healthy animals to set reference points for the comparison. They also used data from horses, the closest domestic relative of the rhinoceros, to create reference points for normal and disease conditions.

In all cases, samples from the captive black rhinos contained more markers for disease. About 95 percent of captive black rhinos had significantly higher concentrations of iron in their blood than did wild rhinos, and a ninefold difference in the insulin-to-glucose ratio between

wild and zoo animals suggested a much higher likelihood of insulin resistance in the captive rhinos. Consistently higher levels of pro-inflammatory proteins in the blood of zoo-dwelling rhinos also indicated chronic inflammation.

"We know in other species, including humans, how to address inflammation and insulin resistance, primarily with diet and exercise," Dennis said. "Can we apply some of that knowledge from other species to black rhinos to improve their care?"

Black rhinos are browsers that eat leaves, branches and parts of trees in the wild. Their zoo diets mainly consist of grass or hay, milled grains and fruits and vegetables.

"We are providing good, nutritious, high-quality food. And we may be overdoing it. We're just learning that providing high-quality food in excess can cause problems," Dennis said. "Knowing what we know now, how do we manage these animals in zoos in ways that decrease health risks? I think we're going to have to manage their nutrition differently."

Promoting exercise for these one-ton animals is another thing altogether. It's not an issue of space, but of inclination, Dennis said. Adult rhinos tend to stand around or lie in the shade most of the time, and are motivated to move at mealtime to their feed locations.

"We need to work harder to ensure that they move around just like we need to work harder to ensure we move around," she said.

The finding can't be extended to other species or even to other rhinos—the white rhino, for example, is a grazer with no known disease syndromes in captivity. However, insulin resistance and obesity, problems shared by humans and domestic animals, are becoming more common subjects of study among zoo veterinarians.

"That's the challenge when dealing with exotic species—figuring this out in the black rhino doesn't at all mean it applies across the board," Dennis said.

Provided by The Ohio State University

Citation: For black rhino, zoo diet might be too much of a good thing (2015, June 22) retrieved 26 April 2024 from <https://phys.org/news/2015-06-black-rhino-zoo-diet-good.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.