

DISEASE RESISTANCE IN SPOTTED HYENAS

WHAT'S IN THE BLOOD?

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HYENAS often conjure up negative images due to their scavenging nature and have been associated with gluttony, cowardice and even black magic in some cultures. However, hyenas play an important ecological role especially as scavengers, by helping to recycle carrion inspiring the term “environmental health police”. Once widespread throughout Africa, Arabia, Asia, and the Indian subcontinent, their conservation status is now considered near threatened due to habitat loss and human persecution. There are three species of hyena: spotted hyena (*Crocuta crocuta*), a powerful predator that hunts in packs and is found throughout sub-Saharan Africa; striped hyena (*Hyaena hyaena*), a mostly solitary scavenger with a range including Africa, the Middle East, and Western India; and brown hyena (*Parahyaena brunnea*), a smaller cousin of the spotted hyena that scavenges in packs or singly in the arid regions of southern Africa.

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Two Spotted Hyenas

As a keystone predator in Africa, spotted hyenas have the greatest behavioral adaptation to habitat change, thus being indicators of ecosystem health. If a spotted hyena population declines or disappears, it suggests that the habitat has undergone severe degradation. Hyenas' other unique attributes warrant additional investigation such as their apparent resistance to diseases that can cause devastating effects on other carnivore populations such as rabies, canine distemper virus and bovine tuberculosis. Conservation programs to maintain and restore hyena populations in their current range are in progress. However, more information is required to assess health in animals that are being captured and potentially translocated. One of the primary principles of conservation is to minimize deleterious impacts such as introduction of disease. Therefore, the **Animal TB Research Group at Stellenbosch University in South Africa** along with the **Veterinary Wildlife Services staff in Kruger National Park**, have initiated a study to characterize the immune system and investigate its role in response to bovine tuberculosis in spotted hyenas. Our research focus has been to develop and evaluate a variety of techniques to determine health status, including biochemical panels using the **Abaxis comprehensive rotor**. One of the goals is to use this information to create a database that will facilitate disease detection in hyenas.

Very preliminary work has shown that spotted hyena have similar serum chemistry values compared to domestic dog parameters using serum on the Abaxis Comprehensive Rotor. Two healthy hyenas were being translocated from a

facility without a history of bovine tuberculosis or other diseases. On physical examination, both were in excellent condition without any abnormalities. Blood samples from these individuals were used for a series of immunological tests as well as providing a baseline range for serum chemistry parameters. The availability of field tests to provide rapid assessment of health status is critical to decision-making especially for translocation. The chemistry results from the two hyena are shown below compared to the reference range provided by the Abaxis VS2 Chemistry Analyzer for the domestic dog.



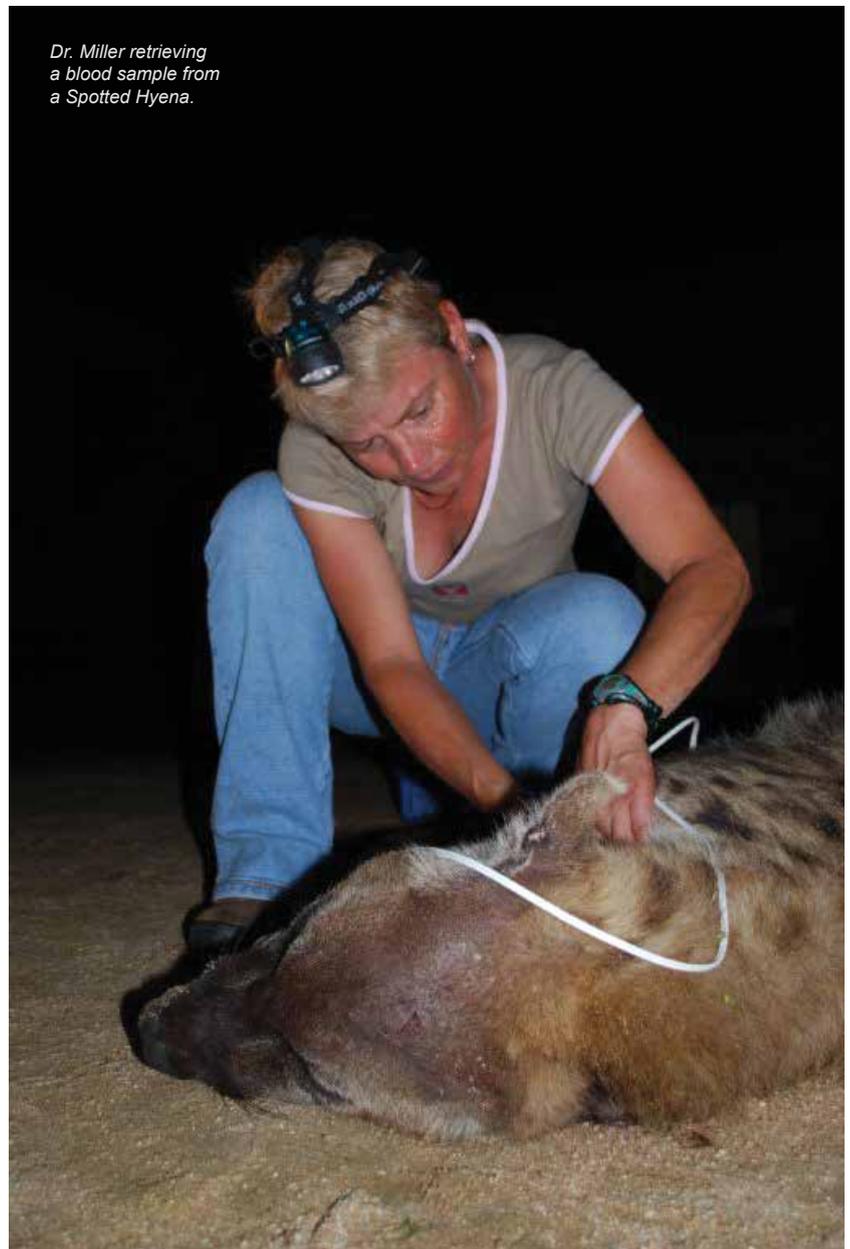
Comprehensive Diagnostic Profile (CDP)

| | Healthy hyenas | Dog normal range |
|-------------------|----------------|------------------|
| Alb g/dl | 2.3 | 2.5-4.0 |
| ALP u/l | 24-26 | 20-150 |
| ALT u/l | 105-109 | 10-118 |
| Amy u/l | 271-323 | 200-1200 |
| Tbil mg/dl | 0.4 | 0.1-0.6 |
| BUN mg/dl | 21-30 | 7-25 |
| Ca mg/dl | 10.1-10.3 | 8.6-11.8 |
| Phos mg/dl | 3.2-3.6 | 2.9-6.6 |
| Cre mg/dl | 2.0-2.3 | 0.3-1.4 |
| Glu mg/dl | 91-99 | 60-110 |
| Na mmol/l | 136-137 | 138-160 |
| K mmol/l | 4.8-5.1 | 3.7-5.8 |
| TP g/dl | 7.0-7.1 | 5.4-8.2 |
| Glob g/dl | 4.7-4.8 | 2.3-5.2 |



Spotted Hyenas scavenging a rhino carcass.

Hematology and biochemical values, along with clinical signs, and specific diagnostic tests being developed for TB in spotted hyenas will provide valuable information that can be used to assess health status in this species. Creating databases such as biochemical values adds to our knowledge of the biology of these unique animals.



Dr. Miller retrieving a blood sample from a Spotted Hyena.

