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Abstract: It have been recognized for decades that anthrax (that disease now so notorious for its biological warfare and bioterrorism associations) is a common natural seasonal disease among the herbivorous species of the Etosha National Park, occasionally affecting livestock and wildlife in other parts of Namibia. Of particular concern all along has been the additional threat is poses to the already endangered black rhino in Etosha, but it was only very recently realized that cheetah were dying in
substantial numbers there from this disease.

Anthrax Vaccination Evaluation Study in Cheetah

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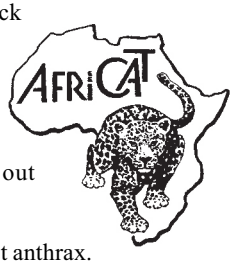
Do scientists and their research usually seem remote and other-worldly to you? The detail in a recent paper in the 3 September 2004 issue of the research journal *Vaccine* on vaccine-induced protection against anthrax in cheetah and black rhino may seem a little hard to follow for the lay reader but, overall, it offers a glimpse into the attempt of a research project to answer practical questions.

It have been recognized for decades that anthrax (that disease now so notorious for its biological warfare and bioterrorism associations) is a common natural seasonal disease among the herbivorous species of the Etosha National Park, occasionally affecting livestock and wildlife in other parts of Namibia. Of particular concern all along has been the additional threat is poses to the already endangered black rhino in Etosha, but it was only very recently realized that cheetah were dying in substantial numbers there from this disease.

Anthrax is not exclusive to Namibia; it similarly affects wildlife and livestock in most other sub-Saharan countries of Africa. In livestock it is controlled by vaccination with a live vaccine. In wildlife, though, it is seen as part of the natural ecosystem and, for most wildlife situations, vaccination is generally impractical or counter to policies of hands-off management, except when it starts to threaten a particular at-risk population severely. Under those auspices, vaccination of Etosha black rhino has been carried out periodically since the 1970s.



As another endangered species, cheetah also qualify for intervention against anthrax. However, with their peculiar genetic monomorphism (meaning that, unlike any other mammalian species, there are very few animal-to-animal gene differences), questions arose about what reaction these animals might have to a live vaccine and what would be their ability to mount and immune response following vaccination.

Historically the value of animal vaccines such as the livestock anthrax vaccine has been tested by vaccinating a set of animals and then infecting both the vaccinated group and an unvaccinated "control" group with the disease agent, comparing the outcome. Clearly a challenge study of this type could not be done in the case of cheetah, so the approach in this study was to vaccinate cheetah and collect blood samples from the vaccinated animals at several time points afterwards; and then to inject the serum (the fluid remaining when the blood cells have been removed) into mice, which were then tested for protection against infection. The theory behind the tests is that, if cheetah sera protected the mice, then the cheetah themselves had protective immunity against the disease. It is hard to prove this absolutely, but it is reasonably logical. Antibody tests were also done on the cheetah sera in an attempt to see if measurable antibodies were a reliable indicator of protection, thereby providing a way to determine if cheetah were protected without needing to use mice.

In all, 12 of the AfriCat cheetahs were enrolled in this study. No adverse reactions to the vaccine or ill effects were observed, and their immune response proved to be what would be considered normal for any other animal. From the results it was possible to offer the advice to wildlife management that, in situations where the cheetah were at a high risk of exposure to anthrax, two vaccinations, two or more months apart, would result in the best chance of protection.

The black rhino was not forgotten either. It was possible to assure the vets in Etosha using dart guns to administer the vaccine from a distance, that the darts were indeed delivering the vaccine and inducing protective immunity against anthrax in these precious animals.