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Abstract: In the New York Times of July 1983, the author mentions the rare genetic uniformity found in cheetahs, the bottleneck theory as the cause of this impoverishment, the problems with reproduction and man hunting, and its endangered status.

# Rare Genetic Uniformity Found in Cheetahs

By WALTER SULLIVAN

A study of blood samples from 55 cheetahs from two widely separated and isolated populations has shown them to be almost genetically identical.

Only in highly inbred strains of laboratory mice has such genetic uniformity ever been observed, according to the leader of the research team, Dr. Stephen J. O'Brien of the National Cancer Institute.

It is believed that some time in the past cheetahs went through a population "bottleneck," some kind of event occurred that left only a relatively few

individuals alive to pass on their limited genetic traits to future generations. A result was greatly reduced genetic diversity in the swiftest of all mammals, able to run as fast as 70 miles an hour.

Normally a population of mammals has a sufficiently wide range of genetic traits so that if disease, climate change or another factor threatens the species, some individuals will be equipped to cope with it.

## An Endangered Species

It now appears that the cheetahs are very poorly equipped for such challenges. As it is, the cheetah, with world-

wide population estimates ranging from 1,500 to 25,000, has been classed an endangered species. Its ability to reproduce, at least in captivity, is seriously limited.

Fifty of those whose blood was tested were at the De Wildt Cheetah Breeding and Research Center in Pretoria, but they or their parents had been captured in the northern Transvaal and Southwest Africa, now known as Namibia. The five others were from zoos.

In one of the tests, conducted at the National Cancer Institute's Laboratory of Viral Carcinogenesis in Frederick, Md., red blood cells from all 55 cheetahs

were subjected to a gel electrophoresis technique that sorts out enzymes in terms of their response to an electric field. As a rule, no two people or animals carry enzymes that are almost all identical genetically.

Of 47 indicators of enzyme composition widely used in assessing the genetic diversity of cats, mice and human beings, all were identical in all the animals tested. In these and additional tests more than 200 enzymes and other proteins were assessed and almost all proved identical.

## Problems With Reproduction

The study was financed by Friends of the National Zoo in Washington, D.C., in hope that it could be learned why cheetahs in captivity have such a low rate of

reproductive success. It was found that even in wild cheetahs sperm counts were only 10 percent of those in domestic cats. Furthermore 70 percent of the sperm were abnormal. Both traits typify extensive inbreeding.

The researchers suggested in the July 29 issue of *Science* that the population bottleneck could have occurred within the last 100 generations, perhaps from hunting by cattle farmers. Or, they said, it might have been as long ago as the end of the last Ice Age, when many large mammals, such as the mammoths and mastodons, became extinct. At that time, at least four species of cheetah roamed Europe, Asia, North America and Africa.

Perhaps, the authors say, the extinctions occurred after population bottle-

necks made the species vulnerable to environmental change.

The most dramatic previous example of genetic impoverishment to be found in mammals was in elephant seals. In the last century the northern elephant seal, native to the West Coast, was hunted to the brink of extinction. At one point, it is believed that only a few dozen survived on remote islands.

They are now protected and their population has soared, but they have never regained normal genetic diversity. They are not, however, as genetically uniform as the cheetahs, Dr. O'Brien said in a recent interview.

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