

New genetic technologies offer hope for white rhino

February 27 2015

With support from the Seaver Institute, geneticists at San Diego Zoo Institute for Conservation Research are taking the initial steps in an effort to use cryopreserved cells to bring back the northern white rhino from the brink of extinction. Living cells banked in the Frozen Zoo have preserved the genetic lineage of 12 northern white rhinos, including a male that recently passed away at the Safari Park. Scientists hope that new technologies can be used to gather the genetic knowledge needed to create a viable population for this disappearing subspecies.

"Multiple steps must be accomplished to reach the goal of establishing a viable population that can be reintroduced into the species range in Africa, where it is now extinct," said Oliver Ryder Ph.D., Director of Genetics for the San Diego Zoo Institute for Conservation Research. "A first step involves sequencing the genomes of northern white rhinos to clarify the extent of genetic divergence from their closest relative, the southern white rhino."

The next step would require conversion of the cells preserved in the Frozen Zoo to stem cells that could develop into sperm and eggs. A process to do this was successfully developed in the laboratory of Dr. Jeanne Loring of the Scripps Research Institute and published in 2011.

"If we can take reprogrammed cells and direct them to become eggs and sperm, we can use in vitro fertilization to generate a new animal," said Jeanne Loring, Director of Regenerative Medicine for the Scripps Research Institute. "Bold new initiatives are required to save endangered

species, and we recognize the application of stem cell technology using cells in the Frozen Zoo provides hope for preventing extinctions, with scientific innovation helping to lead these efforts."

Researchers at the Safari Park have been working for decades to breed the species but had only four aged individuals to work with. After the recent death of the male rhino, Angalifu, reproductive physiologists from the San Diego Zoo Institute for Conservation Research collected and cryopreserved 200 vials of sperm and 75 vials of testicular tissue. This sperm, along with previously collected semen saved in the San Diego Zoo's Frozen Zoo, will be utilized for future assisted reproduction efforts.

"The reproductive system of rhinos is very complex and there is still so much we do not know," said Barbara Durrant Ph.D, reproductive physiologist at the San Diego Zoo Institute for Conservation Research. "We will meet the challenge to save this beautiful animal by combining recent advances in genetic and reproductive technology with our expertise in animal care and welfare."

The Seaver Institute has awarded San Diego Zoo Global \$110,000 to fund whole genome sequencing of northern and southern white rhinos in an effort to characterize genetic diversity. Understanding the genetic differences between rhino species will allow scientists to determine what assisted reproduction mechanisms may be used for future conservation.

"The Seaver Institute supports fundamental research and innovative inquiry for particular projects that offer the potential for significant advancement in their fields," said Victoria Dean, President for the Seaver Institute. "We are interested in supporting this project which will take advantage of the, until now, theoretical value of the Frozen Zoo."

Only one northern white rhino, an elderly female, remains at the San

Diego Zoo Safari Park. Three other northern [white rhinos](#) are in the Ol Pejeta Conservancy in Kenya and one is in the Dvur Kralove Zoo in the Czech Republic. The five remaining rhinos are all of an advanced age and have not reproduced.

Provided by Zoological Society of San Diego

Citation: New genetic technologies offer hope for white rhino (2015, February 27) retrieved 26 April 2024 from <https://phys.org/news/2015-02-genetic-technologies-white-rhino.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.