

Hybrid plan could save doomed rhino

Michael Le Page

IN *JURASSIC PARK*, a splash of 200-million-year-old blood was all it took to revive rampaging hordes of dinosaurs. In the real world, we're struggling to save species that are still living. Biologists are now resorting to desperate measures to bring the northern white rhino back from the brink.

The northern white rhino is one of two subspecies of white rhinos. About 20,000 southern white rhinos still survive in southern Africa, but their northern cousins in central Africa seem doomed. Those living in the wild have been wiped out by hunters and poachers, and those few living in captivity did not breed well enough to survive.

"The northern white rhino did not fail in evolution, it failed because it was not bullet-proof," says Thomas Hildebrandt of the Leibniz Institute for Zoo and Wildlife Research in Germany, part of an international team trying to save this rhino.

The last surviving male, called Sudan, died earlier this year. Only two females remain –

Sudan's daughter Najin and granddaughter Fatu, both under heavy guard in Kenya – and they have serious reproductive problems.

In theory, it should be possible to recreate a thriving population. The last northern white rhinos to die were highly diverse genetically, and we have frozen tissue samples, sperm

and 12 living cell lines derived from them.

The team has fertilised southern white eggs with some of the frozen sperm from northern whites, creating hybrid embryos that developed to the stage where they are ready to implant (*Nature Communications*, doi.org/crv3). The group plans to implant these embryos into southern white females in the next few months.

Hildebrandt's team wants to establish a small population of such hybrids, but they see it very

Just two northern white rhinos remain alive, and both are female

much as a backup – a way of preserving some of the northern subspecies' genes.

The real hope is to achieve a live birth of a pure northern rhino within three years. This will depend on the team getting permission from Kenyan authorities to extract eggs from Najin and Fatu, so they can implant them with unfrozen sperm from northern whites.

If that doesn't work, the plan is to derive embryonic stem cells from the living cell lines, and use those to generate eggs and sperm. This has been achieved only in mice so far, but the team is confident it can be done in rhinos within 10 years – ideally using hybrids as the surrogate mothers. The group has already derived stem cells from the embryos of southern white rhinos.

If all this fails, the team will try to breed something like the northern white rhino from the hybrids, assuming the team manages to create them. But this is no easy task.

In a first generation hybrid, each cell will have one set of chromosomes from the northern white father and one from the southern white mother. These chromosomes will swap DNA when sperm and eggs form, mingling the genomes of the two subspecies in a way that is impossible to completely reverse with conventional breeding. ■



TONY KARUMBA/AFP/GETTY IMAGES

Delivery drones learn to dodge obstacles

DRONES have a habit of crashing. If they are to be relied on to deliver packages in complex environments like cities, they are going to have to get smarter. Now a team from the University of Zurich in Switzerland and tech firm Intel has come up with a way for drones to learn to dodge obstacles as they fly.

Elia Kaufmann and his colleagues

wanted to develop drones that could autonomously fly through the hoops or gates used in drone racing. They prepared a track with gates laid out in a circuit, but planned to alter these obstacles' positions after each lap. Would their drone be able to stay on course?

First, they carried the drones through an example track so that each device's on-board camera could gather images of the gates as it passed through them. After 2 hours of this, the team had collected tens of thousands of images. The pictures allowed a neural network controlling

the drones to learn how to pass through gates on appropriate trajectories – when to turn left or right, for example.

"We didn't have to program our drones, we just showed the drones what we wanted them to do," says Kaufmann.

In simulated experiments, the system performed well so the team tried it out for real. The drone was

"We didn't have to program our drones, we just showed the drones what we wanted them to do"

able to pilot itself at speeds of up to about 3.5 metres per second – but the team believes it could go faster in an environment where it had more space (arxiv.org/abs/1806.08548).

"It's a key development," says Mirko Kovac at the Aerial Robotics Laboratory at University College London. He says a speedy drone that can autonomously dodge things in its way could be useful in a number of contexts: "For urgent delivery – such as in environments that have a lot of obstacles like forests, disaster zones, or inside collapsed buildings," he says. Chris Baraniuk ■