

Physics

Superhuman sight in reach with lens that makes UV visible

Matthew Sparkes

A SERIES of coated lenses can allow people to see ultraviolet (UV) light superimposed onto the visible spectrum, extending the range of our senses without the need for electronic devices.

UV imaging can be used to diagnose skin conditions or detect faults in electrical systems. It can also help reveal normally camouflaged objects, which is perhaps why animals such as reindeer have evolved to see some forms of UV light.

There are already some devices for viewing UV light, but they have a major drawback in that they block the normally visible spectrum of light – you can see UV light, but nothing else.

Mikhail Kats at the University of Wisconsin-Madison and his colleagues have created an experimental system that allows visible light to pass through, which means it allows a viewer to see as normal, while also perceiving UV light.

The group coated a lens with crystals just 10 nanometres wide. These nanocrystals light up when hit by UV light, and further lenses focus the rays the crystals give off into a clear image. The UV light is transformed into visible green light, which is overlaid on a normal view (arxiv.org/abs/2101.02837).

Currently, the device's lenses are set up across a table, but Kats hopes that future research will shrink the apparatus until it becomes wearable. It could also be possible to add infrared vision to expand the visible spectrum in both directions at the same time.

"It enhances your range of perception, it gives you the ability to see some things that are hidden," says Kats. "You're getting towards the Geordi La Forge viewer from *Star Trek*. Having a bit of extra range in the spectrum is quite valuable." ■

Conservation

Hope of saving rhino from extinction remains alive

Gitonga Njeru



The last two northern white rhinos, Najin and Fatu, are both female

White rhinos are split into two subspecies. There are northern white rhinos (*Ceratotherium simum cottoni*), the last of which live in the Ol Pejeta Conservancy, and southern white rhinos (*Ceratotherium simum simum*), found in southern Africa.

Southern white rhinos are faring much better than their northern counterparts and currently number about 20,000. However, both are at risk from poaching. The northern white rhinos are under 24-hour armed guard.

Other methods are also being worked on to save the northern white rhino from extinction. The success rate of embryo implantation is unlikely to be high, so the team is trying to create hybrid embryos too, using southern white rhino eggs and stored northern white rhino sperm. These would then be implanted in female southern white rhinos.

A third option being explored is taking stored cells from some of the last northern white rhinos and converting them into stem cells. These stem cells could then be used to make both sperm and eggs. Embryos produced in this way would also be implanted in southern white rhinos. However, this technology is unproven.

Even if attempts are successful, the resulting northern white rhino population will have a very low genetic diversity because the samples all come from a few individuals. This could make the population vulnerable to disease. ■

THE northern white rhino may be able to avoid extinction for a while longer. Fertilised eggs are set to be implanted in the two remaining rhinos this year in the hope of producing offspring.

"There is still some hope left that we can save the white rhino species," says Thomas Hildebrandt at the Leibniz Institute for Zoo and Wildlife Research in Berlin, Germany, who is part of an international team working to do just that. However, time isn't on our side, he says.

The last male northern white rhino, named Sudan, died in March 2018. The only remaining northern white rhinos are two females: Najin and her daughter Fatu, both of which live in the Ol Pejeta Conservancy, a protected wildlife area in Kenya.

In 2019, Hildebrandt and his colleagues at Ol Pejeta retrieved 10 eggs from Najin and Fatu. These were then fertilised using a technique called intracytoplasm sperm injection with stored sperm from Sudan.

The process resulted in two viable embryos.

The team now plans to implant the embryos in Najin and Fatu. This could happen in the next few months, but it may take longer, partly because of impacts from the covid-19 pandemic.

The gestation period of a northern white rhino is between 16 and 18 months,

"The success rate is unlikely to be high, so the team is also trying to create hybrid embryos"

so it will be a while yet before we know if there will be any more northern white rhinos.

"We hope to implant very soon as we are now more sure than ever that it will work," says Hildebrandt. "In the next few months, we hope to have a major announcement."

"Insemination will take place as soon as possible in the near future, but before 2022," says Elodie Sempere at Ol Pejeta.