Modern Genetic Technology With The Potential To Save A Critically Endangered Species

In this presentation, I will be going into depth about how modern genetic technology has the potential to help save a critically endangered species from the brink of extinction.

In vitro fertilisation known as IVF is a type of assisted reproductive technology (ART). The process of IVF involves the collection of semen using a special needle and the harvesting of a female’s eggs. The sperm and eggs are then frozen and preserved in a lab until they are needed. Scientists then use the sperm to fertilise the eggs and create embryos. After the embryos have been created, they will be transferred into a female of the same species so that the embryo can develop and hopefully save that species of animal from extinction.

The Northern White Rhino is a critically endangered species of rhinoceros with only two females left in the world after the death of Sudan, the last surviving male in 2018. Due to people poaching these rhinos for their horns, the population declined from approximately 2000 to 2 in the last 50 years.

Conservationists and biologists hope that the Northern White Rhino can be saved from extinction by IVF. After Sudan died natural reproduction was no longer possible. Scientists extracted sperm from some of the last remaining male Northern White Rhinos and preserved the sperm by freezing it in a lab. In 2019 Veterinarians anesthetised the two remaining female Northern White Rhinos Najin and Fatu in their enclosures at Ol Pejeta conservancy in Kenya and collected their eggs. Reproductive Scientists were able to successfully create embryos in a lab from the stored sperm and the eggs of the remaining two rhinos. These embryos that have been created remain frozen. Seeing as the two remaining females are past their reproductive age or unable to carry out a pregnancy, scientists plan to insert the embryos into surrogate Southern White Rhino females.

The northern white rhino and southern white rhino are very similar species of rhinoceros, but they do have some differences. The northern white rhino is smaller, they have straighter backs and a shorter front horn unlike the curved back and longer front horn that the southern white rhinos have. The southern white rhino cows should be able to act as a surrogate considering that northern white rhinos are more than 400 kilograms lighter. Therefore, IVF could be a potential solution to save the northern white rhino from extinction.

Assisted reproductive technologies such as IVF have been criticised by the general public due to the ethical concerns surrounding these procedures. These types of operations can be invasive to the animal. To perform this surgery, they have to extract the eggs from the rhino's ovaries which is a delicate procedure. Animals that are born using artificial techniques also commonly suffer from unexpected birth defects and abnormities. This makes it very difficult for the offspring to live a healthy life because they might not be able to breed, and they might die from these deformities. The only two northern white rhino females that remain in the world are Sudan’s daughter and granddaughter. Therefore, they would be breeding these rhinoceros with relatives which could cause more abnormalities while also limiting genetic variation. Even though scientists have successfully created Northern White Rhino embryos in a lab there’s no

guarantee that the embryos will survive the 16-18-month long gestation period in the surrogate Southern White Rhino cow. Moreover, even if the southern white rhino cow could keep the calf alive, which is not certain, then the calf might still die or may not be genetically varied enough to repopulate the species. If scientists manage to repopulate the species, then it might have an impact on our ecosystems and cause another species of animal or plant to become extinct.

IVF is a reasonably new assisted reproductive technology and it has only been tested on around ten endangered species. This is due to the fact that scientists haven't been able to produce embryos using IVF for every endangered species of animal. Rhino calves have successfully been born using artificial insemination which is the process of male sperm being injected into a female's cervix or uterus. That's not an option though because the two remaining females can't carry a pregnancy. However, IVF hasn't successfully bred rhino calves before but it's one of the only options scientist have to save this species from extinction. Other conservationists also argue that the resources and money used to save the northern white rhino would be better spent on reducing the ecological threats to other threatened animals before they become critically endangered.

So to conclude, IVF has the potential to save the Northern white rhinoceros from extinction but there is no evidence that this technology will work. Even if a calf is born using a surrogate southern white rhino mother it might not survive or have enough genetic variation to maintain the population of the species.