UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
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MEDIA RELEASE

University of Pretorias IVF Lab develops artificial reproduction technologies for rhino conservation

PRETORIA – The University of Pretoria (UP) is working with international partners to perform in vitro fertilisation (IVF) to support dwindling rhinoceros populations.

The In Vitro Fertility Laboratory, which is part of UP's Department of Production Animal Studies in the Faculty of Veterinary Science, is a major role player in this effort.

Professor Leith Meyer, Director of the Centre for Veterinary Wildlife Studies, said the focus of this laboratory is to develop artificial reproduction techniques that can be used to help with the conservation of threatened and endangered rhino species, and to help with the breeding of domesticated species where artificial methods are needed.

One of the main areas of research being conducted in the lab is related to finding the best way to preserve and use harvested eggs and sperm from white rhino to ensure that viable embryos can be produced using IVF techniques.

"We would like to develop robust and repeatable methods and techniques that can be used to do artificial reproduction to bolster populations of threatened and endangered species or help domesticated animals reproduce more effectively," Prof Meyer said. "These artificial reproduction technologies will also be used to help advance the genetic potential and diversity of certain species that require it."

The International Rhino Reproduction Collaborative (IRRC) was established as a result of a joint initiative between UP and the San Diego Zoo Global, a non-profit organisation committed to saving species around the world, to unite experts in animal care and conservation science. Earlier this year, a team from San Diego Zoo Global and other members of the IRRC – which included veterinary scientists from UP, Embryo Plus, SANParks, the Institute of Rhino Cryogenetics, Geolife and Buffalo Dream Ranch – visited the IVF Laboratory. These experts shared scientific expertise about rhino physiology and artificial reproduction technologies to investigate and promote methods to optimise rhino gamete (eggs and sperm) retrieval.

"Artificial reproduction attempts in rhinos involve the harvesting of sperm samples from rhino bulls, and the successful freezing and storage of the samples in straws or vials in liquid nitrogen for future use," explains Mario Smuts, veterinary technologist at the Department of Production Animal Studies. "Ovaries and/or eggs (oocytes) are also harvested from either rhino cows that are anaesthetised or from post-mortem material collected from rhinos that either died from natural causes or were poached. We are developing protocols to optimally transport ovaries and/or eggs from remote locations to the laboratories in a timely manner so that the eggs are still alive (viable) for fertilisation.

"Eggs that are successfully fertilised are then grown in incubators to form embryos (called blastocysts) that are stored in liquid nitrogen for future use. Each step in the in vitro fertilisation process is meticulously researched and tweaked for optimising oocyte survival, successful fertilisation, embryo growth and safe storage of embryos for later transfer to surrogate rhino cows."

"Further research on how to best preserve and store these embryos will be done, and then we will do research on how to implant these embryos in surrogate rhino mothers to produce rhino calves," adds Prof Meyer. "The ultimate research goal is to develop these techniques so that they can be used on stored genetic material to hopefully bring back the northern white rhino from the brink of extinction, though this research will also be used to help with the conservation of all rhino species. What we learn from this work should also help us to develop similar techniques for other endangered and domesticated animal species."

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ABOUT THE UNIVERSITY OF PRETORIA

The University of Pretoria (UP) is one of the largest contact and residential universities in South Africa, with its administration offices located on the Hatfield Campus, Pretoria. This 112-year-old institution is also the largest producer of research in South Africa.

Spread over seven campuses, it has nine faculties and a business school, the Gordon Institute of Business Science (GIBS). It is the only university in the country that has a Faculty of Veterinary Science which is ranked top in Africa, and overall has 120 academic departments, as well as 92 centres and institutes, accommodating more than 55 000 students and offering about 1 100 study programmes.

UP is one of the top five universities in South Africa, according to the 2019-2020 rankings by the Center for World University Rankings. It is also ranked among the top 100 universities worldwide in three fields of study (veterinary science, theology and law), and among the top 1% in eight fields of study (agricultural sciences, clinical medicine, engineering, environment/ecology, immunology, microbiology, plant and animal sciences and social sciences).

In June 2019, the annual UK Financial Times Executive Education Rankings once again ranked GIBS as the top South African and African business school. The University also has an extensive community engagement programme with approximately 33 000 students involved in community upliftment. Furthermore, UP is building considerable capacities and strengths for the Fourth Industrial Revolution by preparing students for the world beyond university and offering work-readiness and entrepreneurship training to its students.

As one of South Africa's research-intensive universities, UP launched the *Future Africa Campus* in March 2019 as a hub for inter- and transdisciplinary research networks within UP and the global research community to maximise 4IR innovation and address the challenges and stresses our continent and world is facing. In addition, UP also launched the Javett Art Centre in September 2019 as a driver of transdisciplinary research development between the Humanities and other faculties. In 2020 UP will launch Engineering 4.0. as a hub not only for Smart Cities and Transport, but also to link the vast resources in technology and data sciences to other faculties via Future Africa. These initiatives are stimulating new thinking at the frontier of 'science for transformation'.

For more information, go to www.up.ac.za