



So You Think You Can Research?

***In Association with Townsville Health Symposium and
North Queensland Festival of Life Science***

Student Research Presentation Competition

Robert Douglas Auditorium Townsville General Hospital

Tuesday 6th of October

A promotional banner for the 2015 North Queensland Festival of Life Sciences. The banner has a dark blue background with a central white banner containing the text "2015 NORTH QUEENSLAND Festival of Life Sciences - Thursday 5th of November -". Below this, it says "Explore an exciting range of research interests and technologies!". At the bottom, the website "www.jcu.edu.au/nqflsc" is listed. The background of the banner features abstract, colorful patterns resembling coral or biological structures.

Baked Boars to Blame?

Re-evaluating Summer Infertility in the Pig

Santiago Pena

PhD: Advisor – Damien Paris

College of Public Health, Medical and Veterinary Sciences

At 40% share, pork is the most widely eaten meat in the world. As such, research efforts must focus on improving production and efficiency in the pig industry. However, heat stress in summer has a significant negative impact on pig fertility; causing embryonic death and poor litter size that cost the industry millions in annual productivity losses. This problem is particularly prevalent in tropical regions where ambient temperatures rise beyond the animal's zone of thermal comfort.

Due to limited endogenous antioxidant systems inherent in mammalian spermatozoa and the loss of cytosolic repair mechanisms during spermatogenesis, the DNA in these cells are particularly susceptible to oxidative damage. While a seemingly healthy looking sperm may swim and fertilise an oocyte normally, studies in mice demonstrate that heat stress-induced DNA damage can disrupt expression of key developmental genes and distort the formation of the blastocyst; resulting in implantation failure and pregnancy loss. Our study aims to determine whether heat stress induces DNA damage to boar sperm that could significantly contribute to high rates of embryo loss and pregnancy failure observed in the sow during summer.

The quality of sperm obtained from boars housed in the dry tropics of Townsville, Queensland was evaluated across different seasons (summer, winter and spring). Sperm motility was characterised by Computer-Aided Sperm Analyser (CASA), and sperm DNA integrity evaluated by Terminal deoxynucleotidyl transferase dUTP Nick-End Labelling (TUNEL) assay and flow cytometry. Sperm from all seasons had equal motility, but sperm in summer exhibited ~7-fold higher DNA-damage than that in winter and spring (13.7% vs. 1.1% and 1.8% respectively). This sperm will be used for in vitro fertilisation to evaluate their effect on fertilisation rates and pig embryo survival. Our study emphasises the need for improved management practices and strategies to mitigate heat stress in boars during summer.