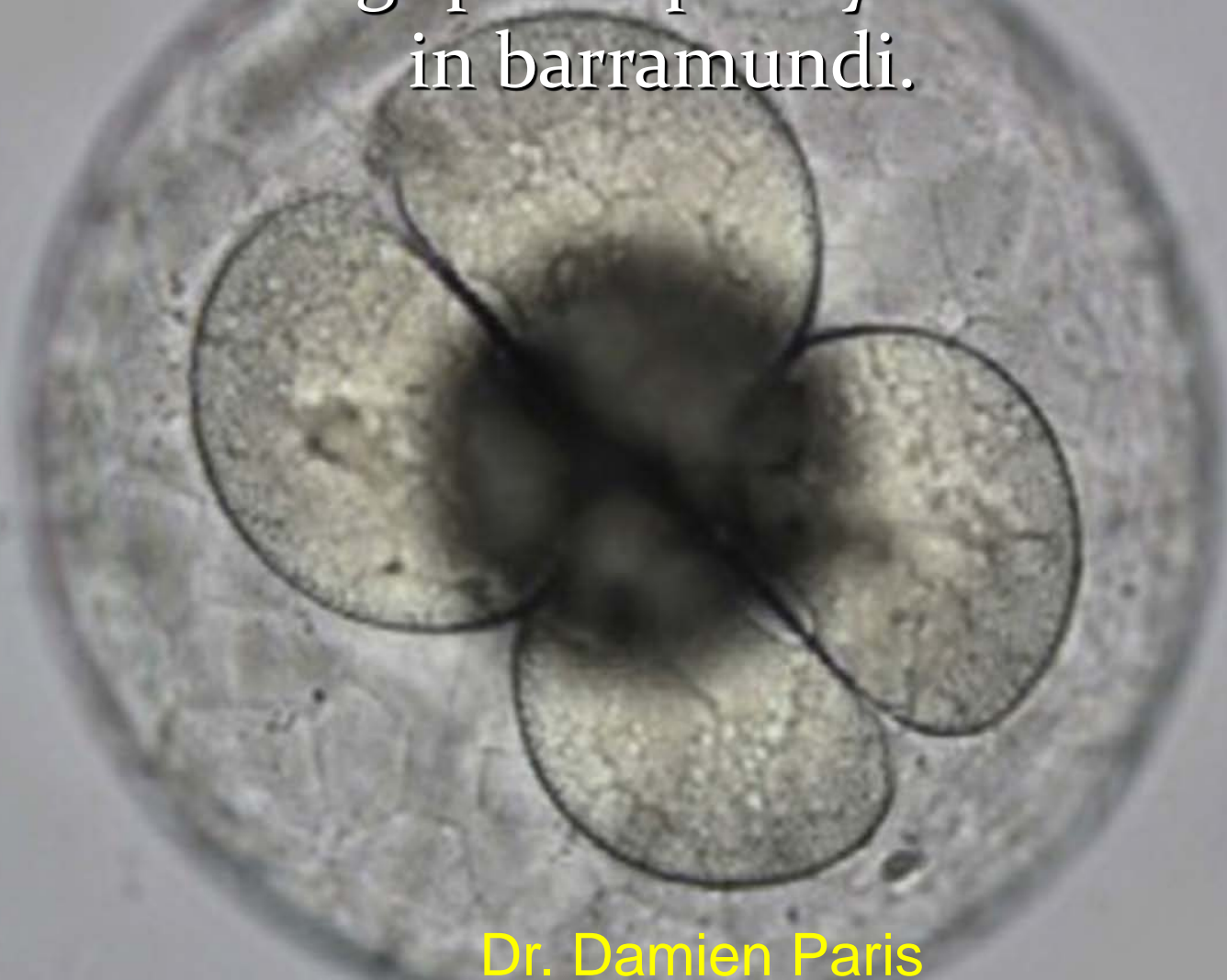


Fertility in Adverse Environments: Correlating sperm quality with fertility in barramundi.



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GAME Lab: About Us

- **Research Interest:**

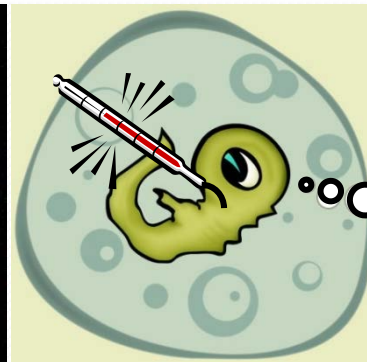
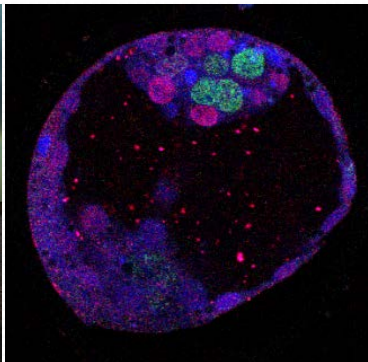
- Impact of adverse conditions on fertility (e.g. IVF, heat-stress, social-stress, disease)

- **Current Projects:**

- IVF on horse embryos; season & social stress on African wild dog sperm; chytrid infection on frog embryos; heat-stress on boar sperm

- **Tools Used:**

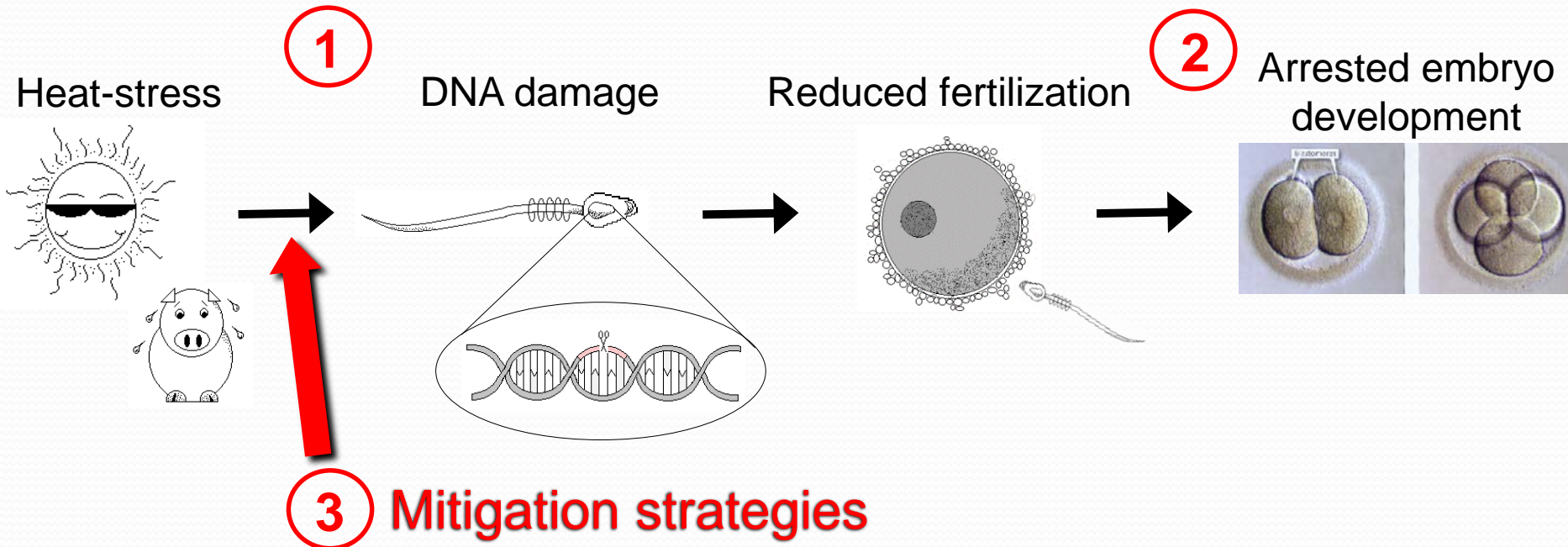
- highly sensitive cellular & molecular tools as 'barometer' to detect compromised survival in sperm & embryos:
- CASA, TUNEL/FACS, IVF, sperm freezing, gene & protein expression.



I don't feel so good!

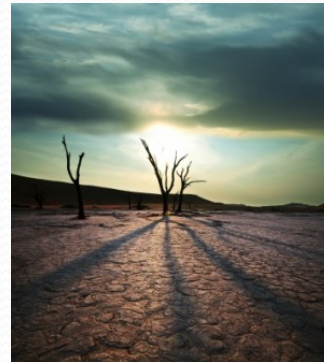
Heat-stress & Summer Infertility in Pig

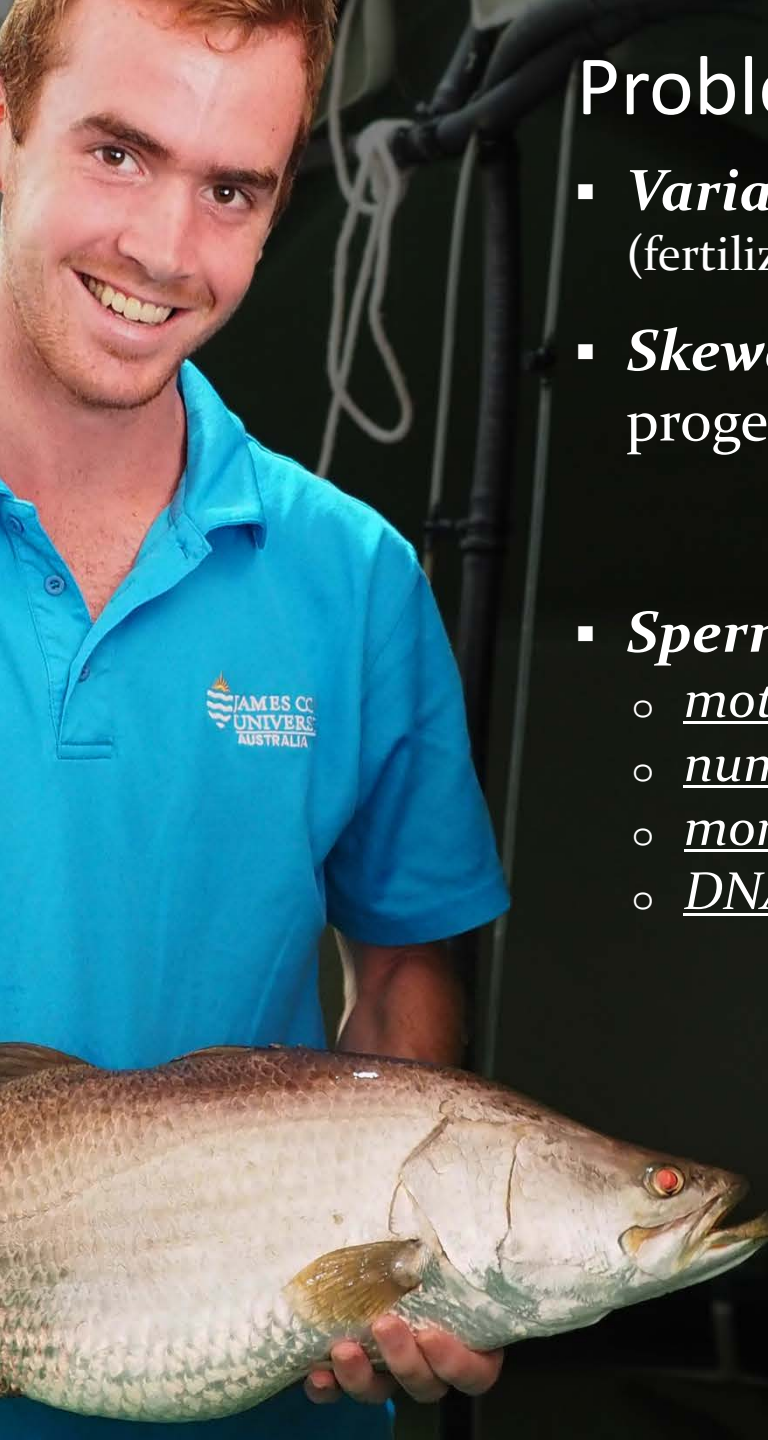
- pork is most consumed meat in the world (USDA 2008)
- costs industry ~\$300 million annually in US (St. Pierre *et al.* 2003)
- ***in mice***: heat-stress = sperm DNA damage = embryo failure (Paul *et al.* 2008; Perez-Crespo *et al.* 2008)
- ***Aim***: determine if heat-stress causes DNA damage in boar sperm, that results in embryo loss in the sow → develop mitigation strategy



Results: Summer causes sperm DNA damage in boars

- ***Sperm motility:*** did not change across seasons ***BUT***
- ***Sperm DNA damage:*** increased significantly in summer
- ***Treatment:*** 42-day antioxidant supplement significantly decreases sperm DNA damage in summer
- ***Ongoing research:*** IVF experiments to test if development arrested in pig embryos



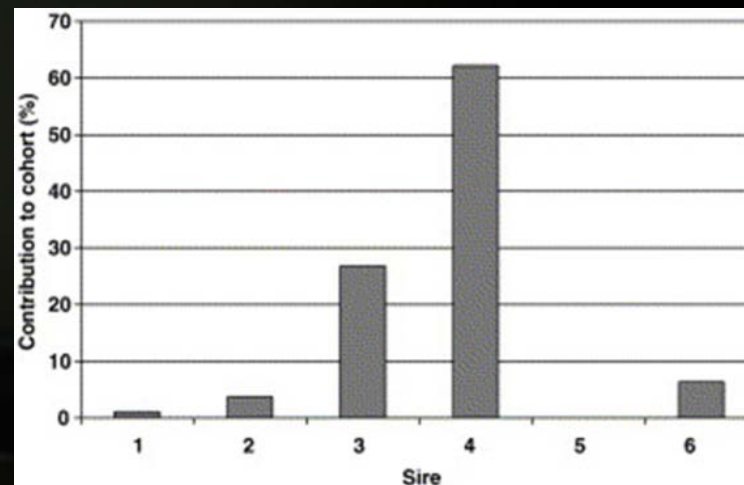


Problems in the Barramundi Industry

- **Variable spawning success:** across months/years (fertilization & hatch rates, arrested embryo development)
- **Skewed paternity:** selected males sire 0-1% of progeny vs. 60% by other males

Problem with male fertility?

- **Sperm parameters important to fertility:**
 - motility: how well they swim (analysed by CASA)
 - number: how many produced (by sperm counts)
 - morphology: normal shape (by microscopy)
 - DNA integrity: developmental potential (by TUNEL)



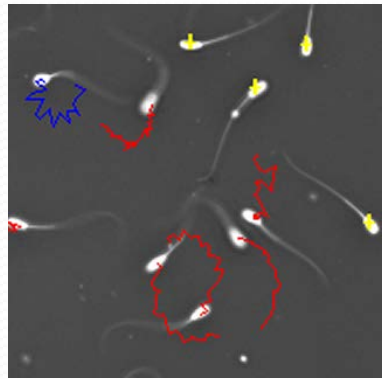
Pilot Project: Assess male influence on barramundi spawning performance

Collaboration with Prof Dean Jerry, Jarrod Guppy, Adrien Marc & Santiago Pena

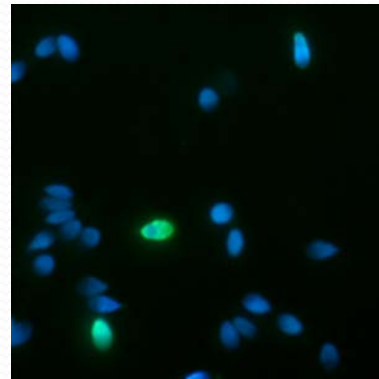
- Using state-of-the-art JCU Aquaculture/GAME Lab facilities
- Investigating differences in sperm quality between males prior to mass spawning events of commercially important broodstock
- If differences detected examine downstream effect on development & paternity of embryos



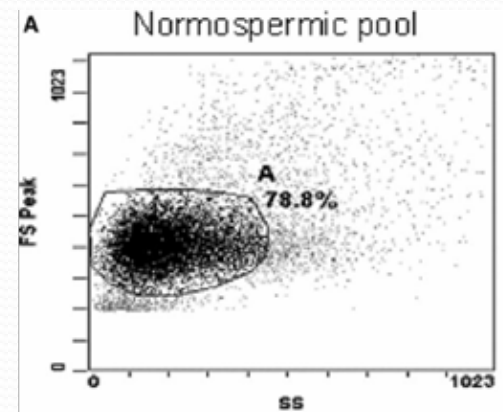
Semen Collection



Motility (CASA)



DNA integrity (TUNEL/FACS)



Our Expertise

- ***Sperm quality analysis tools:*** CASA, TUNEL/FACS, microscopy
- ***Sperm cryopreservation:*** develop sperm freezing techniques
- ***Embryo viability & paternity testing:*** DAPI, morphology, protein & gene expression, microsatellite analysis
- ***Management strategies:*** mitigation or broodstock selection



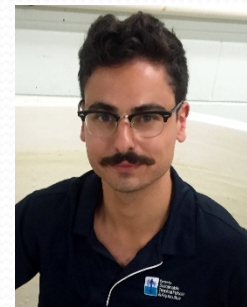
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