



# **STRESS AND COPING RESPONSES IN EARLY EMBRYONIC DEVELOPMENT**

Oral Defence by PhD Candidate Naomi Dicks

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## **Abstract**

Impaired fertility is a developing concern both in humans and animals, necessitating the use of assisted reproductive technologies (ART). embryo production (IVP) is an integral component of ART, however, cellular stress during the IVP process negatively impacts embryo development and quality, leading to lower rates of pregnancy and live births. The goals of this research project were to evaluate the effects of cellular stress on embryo cleavage kinetics and development, determine the mechanism of action of the ER stress inhibitor, tauroursodeoxycholic acid (TUDCA), as well as evaluate its ability to mitigate nuclear stress. Findings from this study demonstrated that ER stress is a determining factor differentiating poorly developing slow-cleaving embryos, which can be rescued by treatment with TUDCA. Furthermore, the TGR5 receptor mediates the action of TUDCA to improve development and reduce both glucose-induced ER stress and UV-induced nuclear stress, suggesting a link between the ER stress response (unfolded protein response) and the genome damage response. Together, these results advance our understanding of cellular stress and coping responses in early embryo development, which is necessary to improve IVP and mitigate infertility.



## **About the Candidate**

Naomi completed her degree in veterinary medicine at the Ontario Veterinary College in 2008 and has been practicing in companion animal medicine ever since. In 2012, Naomi joined the laboratory of Dr. Bordignon and Dr. Agellon, completing her Master's degree in 2014 and subsequently pursuing her PhD, which focuses on how stress affects pre-implantation embryo development.