



## SRF VACATION SCHOLARSHIP REPORT 2019

The form below should be completed by the student, then forwarded to the supervisor for approval and submission to [srf@conferencecollective.co.uk](mailto:srf@conferencecollective.co.uk) within 8 weeks of completing the project. Please submit the form as a Word document.

A maximum of one figure (with legend of less than 100 words) may be appended if required.

**Please note:** excerpts from this form may be published on the SRF website, so please ensure content is suitable for website publication, and does not compromise future dissemination of data in peer-reviewed papers etc. The SRF reserves the right to edit responses to ensure suitability for publication on the website, newsletter or in promotional material.

|  |  |   |  |
|--|--|---|--|
| <b>Student's Name:</b>                 | Georgia O'Sullivan   | <b>Student's Institution/University:</b>        | University College Dublin                        |
| <b>Degree Title and year of study:</b> | MB BCh BAO Medicine (Graduate entry)<br>First year   |   |  |
| <b>Supervisor's Name:</b>              | Dr Lynne O'Shea  | <b>Supervisor's Department and Institution:</b> | School of Medicine,<br>University College Dublin |
| <b>Project Title:</b>                  | Assessment of cryopreserved ovarian tissue at a morphological, molecular and endocrinological level. |   |  |

### **BRIEFLY OUTLINE THE BACKGROUND AND AIMS OF THE PROJECT (MAX 200 WORDS)**

Ovarian tissue cryopreservation (OTC) is a fertility preservation method that can be offered to cancer patients who are not suitable for conventional preservation methods before undergoing chemotherapy. It is the only option available to prepubertal girls, and it has the potential to restore both fertility and native endocrine function.

Despite the success of over 100 babies born through OTC since 2004, it is still considered an experimental treatment and is not widely available. Optimisation and validation of OTC is necessary in order to make it available to more patients. This project aims to assess the effect of cryopreservation on bovine ovarian tissue, focusing on follicular quality, hormone secretion and protein expression.

Aims of the project:

- Determine effect of OTC on follicle and oocyte quality by calculating the percentage of follicle survival and incidence of apoptosis post-thaw.
- Measure sex hormone secretion levels (progesterone and  $17\beta$ -estradiol from both fresh and frozen ovarian cortical sections following *in vitro* culture.
- Determine expression and localisation of proteins of the progesterone, WNT and apoptotic pathways (nPR, AVEN, WNT4, ATRX), comparing fresh and frozen-thawed ovarian tissue

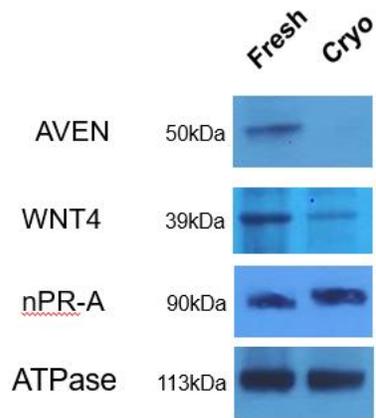
**Did the project change from that proposed in the application? If so, what changes were made and why? (max 100 words)**

The project did not change from that proposed in the application.

**What were the main results/findings of the project? (max 300 words)**

- Cryo-thaw of ovarian tissue caused a significant decrease ( $P < 0.05$ ) in progesterone secretion versus the fresh control; however, it had no effect on  $17\beta$ -estradiol levels.

- Molecular analysis shows that WNT4 protein expression is decreased in ovarian tissue following cryopreservation (Fig 1).
- Molecular analysis shows that AVEN protein expression is decreased in ovarian tissue following cryopreservation (Fig 1).
- Molecular analysis shows no effect on nuclear Progesterone Receptor -A protein expression in ovarian tissue following cryopreservation (Fig 1).
- Inter-ovary variation in Wnt4 expression was observed between the 4 ovaries analysed.



**Figure 1:** Representative western blot detection of AVEN, WNT4, and nPR protein expression in Fresh and Cryo-thawed ovarian tissue. ATPase (113 kDa) shows equal loading. (n=2)

**WHAT DO YOU CONCLUDE FROM YOUR FINDINGS? (MAX 150 WORDS)**

In the present study we determined that cryo-thawing of ovarian tissue has a significant effect on WNT4 and AVEN protein expression. However, folliculogenesis is a temporally variable process, and so analyzing an ovary at a given time may only tell us so much.

Further studies include:

- Increased sample size for bovine studies.
- Analysing ovaries at both the follicular and luteal phase of the reproductive cycle.
- Translation of the results to human ovaries is necessary to determine clinical significance of our findings.

**HOW HAS THIS EXPERIENCE INFLUENCED YOUR THINKING REGARDING YOUR FUTURE/ONGOING STUDIES, AND/OR CAREER CHOICE? (MAX 150 WORDS)**

This internship allowed me to gain a better appreciation for fertility and reproductive research. It is interesting to be part of a lab group whose research has real translational medical potential. Working alongside other lab members for the summer gave me the chance to talk to them in depth about their work, both the scientific aspect of it and the day-to-day aspect. There is no substitute for this type of experience.

This scholarship gave me the opportunity to learn more lab techniques and protocols, and confirmed to me that my thoughts on pursuing a research career are right. Real experience in a lab outside of teaching labs and lectures is an invaluable part of a scientific education, and being supported by this scholarship while doing it has allowed me to see the daily realities of biological research and to fully assess if a career in research is right for me.

**PLEASE USE THE SPACE BELOW TO ADD ANY OTHER COMMENTS/THOUGHTS ABOUT THE SRF VACATION SCHOLARSHIP (MAX 100 WORDS)**

Gaining real experience in a lab as a science student is really important, and I would encourage anyone who has an interest in reproduction and fertility to apply for the SRF Vacation Scholarship. Being awarded a small bit of funding at an early stage not only serves as a stepping stone for the future for anyone thinking about pursuing a research career, but also allows you to fully immerse yourself in research over a summer.