



PhD. Defence

OVARIAN TRANSPLANTATION IN THE DOMESTIC TURKEY

George Daniel Blyth Hall

Date: October 5th 2021 at 1:00pm

The PhD Defence for George Hall has been scheduled for October 5th, 2021 at 1:00pm. The defence will be held online via Teams: https://teams.microsoft.com/l/meetup-join/19%3ameeting_ZDk5N2NhZWUtY2MxMS00ODhiLWI1OGEtM2Q3OWE5ZWQwOGQw%40thread.v2/0?context=%7b%22Tid%22%3a%22be62a12b-2cad-49a1-a5fa-85f4f3156a7d%22%2c%22Oid%22%3a%22fbd28915-dda5-478f-8ecb-a3682dcf0c3a%22%7d

The exam committee will consist of:

Examining Chair: Dr. Wendy Pearson

Advisor: Dr. Gregoy Bedecarrats

Adv. Committee Member: Dr. Julie Long

Additional Graduate Member: Dr. Gabriela Mastromonaco

External Examiner: Dr. Pierre Comizzoli

Abstract:

Over the last 50 years we have seen a steady decline in the number of turkey breeds and lines, and many of the remaining ones are threatened with extinction. The main reason for the loss is that many organizations which maintain turkeys are under pressure to reduce costs, and so eliminate breeds and lines. Therefore, the solution is to reduce the cost of maintenance by switching from a generation-to-generation conservation plan to a biobanking one. To biobank turkey genetics there are two options, store primordial germ cells, or ovarian tissue with testes with or without semen. Since the latter model is more affordable and genetic material more readily available, we believe this is the preferred method. As turkey semen biobanking is more advanced than ovarian tissue this thesis will be focused on the latter. Unfortunately, to date, fresh turkey ovarian tissue has not been proven transplantable, and until this is demonstrated its biobanking is mere theoretical. Here, in this thesis, we aim to prove that the tissue can be transplanted.

The results here show that germ cell nest breakdown in turkeys is delayed by a couple of days compared to the domestic chicken, and that the follicle pool is established by 5 weeks posthatch. Proceeding this finding we were able to show that the age of ovarian tissue (1 to 15 days posthatch) does not affect the transplantability, although germ cell morphology was better in tissue which was 7 days old, versus the other time points. Meanwhile, for surgical technique, we demonstrated that the entire recipient ovary can be removed without affecting the transplant attachment rate. Finally, we identified that the cause of ovarian transplantation failure in the domestic turkey is lymphocytic infiltration, identified here as acute transplant rejection. This infiltration was overcome by using autotransplants, or with the use of cyclosporin A, an immunosuppressant.

In conclusion, this thesis demonstrates successful ovarian transplantation in the domestic turkey, for the first time. This achievement sets the stage for future work to produce donor-derived progeny from these transplants, with the eventual goal of producing progeny from biobanked turkey ovarian tissue.