



METABOLIC AND OVARIAN FUNCTIONS OF LACTATING DAIRY COWS

Oral Defence by PhD Candidate Yasmin Schuermann

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October 12th, 2018 @ 1:15 pm — Macdonald Building, Room MS2-022

Abstract

Longevity of dairy cows on our Canadian farms is dependent on reproductive success. The number one reason cows are culled is poor reproductive performance. This research aimed at better understanding the impact of metabolic changes occurring during the transition period (3 weeks pre-calving to 3 weeks post-calving) on ovarian health and evaluating pathways required for ovulation. We showed that the metabolic environment between lactating cows and nulliparous heifers leading up to the estimated time of breeding is drastically different, which strengthens the current knowledge that lactating cows are less fertile than nulliparous heifers. We also investigated the impact of body condition (BC) loss during the transition period leading up to estimated time of breeding on multiparous cows. A greater BC loss suggested more lipid mobilization, which in turn hindered liver function as well as altered the granulosa cell gene expression in the dominant follicle. More specifically, mRNA levels of the genes involved in acquisition and maintenance of dominance were decreased along with lower IGF1 and estradiol concentrations in the follicular fluid of the dominant follicle of cows losing severe BC. Lastly, we established for the first time *in vivo* that the extracellular signal-regulated 1/2 (ERK1/2) pathway is indispensable for ovulation in cattle. We also predict that the ERK1/2 pathway may be involved in mediating transport of metabolites across the plasma membrane, thus affecting follicle quality. Overall, the results from these studies advance our current understanding of physiological and metabolic changes affecting ovarian function from the dominant follicle to ovulation.



About the Candidate

Yasmin Schuermann has completed both her B.Sc. and M.Sc. at McGill University in the field of animal science. She has continued her education here at Mac under the supervision of Drs. Raj Duggavathi and Vilceu Bordignon where she has focused her doctoral studies in the field of reproductive biology and dairy science. Overall, Yasmin's research has aimed at better understanding the impact of the transition period on reproductive performance of our modern dairy cows. Currently, she is acting as course lecturer in the Farm Management and Technology Program, as well as interning at Valacta and actively participating on the family farm.