Name: Megan Mezera

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Major Professor: Milo Wiltbank

Degree Objective: PhD

Background: Animal Science BS, University of Wisconsin-Madison

Current Research Project:

The corpus luteum (CL) is an ovarian structure which forms after ovulation and produces progesterone. In non-pregnant cows, prostaglandin F2-alpha (PGF) causes CL regression (luteolysis) at the end of the cycle to allow for another opportunity for conception. In pregnancy, maintenance of the CL is required for pregnancy maintenance, and luteolysis is blocked by the presence of interferon tau (INFT) on days 16-25.

However, the mechanism(s) by which interferon tau prevents luteolysis from days 16-25 have not been fully elucidated. Current hypotheses involve increased secretion of PGE to block the action of PGF, a decrease in PGF secretion, or a direct endocrine effect of INFT on the CL. Evidence for each hypothesis exists, yet the relative contribution of each to CL, and thus pregnancy, maintenance remains undefined.

Even less is known about CL maintenance past the first month despite pregnancy losses of 12% in the second month of pregnancy. INFT is not secreted past day 25, making it unlikely the same mechanism maintains the CL in later pregnancy.

Therefore, the current goal of our research is to better understand the process of CL maintenance throughout bovine pregnancy.

Honors:

2019: ERP symposium poster award

Grants Received:

Publications:

Mezera MA, Hamm CS, Gamarra CA, Gennari RS, Prata AB, Sartori R, Wiltbank MC. Profiles of prostaglandin F2α metabolite (PGFM) in dairy cattle during luteal regression and pregnancy: implications for corpus luteum maintenance. Biol Reprod. 2019; 101(1):76-90

Wiltbank MC, **Mezera MA**, Toledo MZ, Drum JN, Baez GM, García-Guerra A, Sartori R. Physiological mechanisms involved in maintaining the corpus luteum during the first two months of pregnancy. Anim. Reprod. 2018; 15, 805-821

Garcia-Guerra A, Canavessi AMO, Monteiro PLJJ, **Mezera MA**, Sartori R, Kirkpatrick BW, Wiltbank MC. Trio, a novel bovine high fecundity allele: III. Acquisition of dominance and ovulatory capacity at a smaller follicle size. Biol. Reprod. 2018; 98(3)350-365

National Presentations:

Megan A. Mezera, Wenli Li, Rina Meidan, Caio A. Gamarra, Rodrigo S. Gennari, Andrea Edwards, Alexandre B. Prata, Milo C. Wiltbank. Transcriptome of the corpus luteum of pregnant dairy cows during secretion of interferon-tau: implications for luteal maintenance. Society for the Study of Reproduction. July 2019. San Jose, California.

Megan A. Mezera, Wenli Li, Caio A. Gamarra, Rodrigo S. Gennari, Andrea Edwards, Alexandre B. Prata, Milo C. Wiltbank. Whole transcriptome RNA-sequencing analysis of the corpus luteum throughout physiologic luteolysis in dairy cows. American Dairy Science Association. June 2019. Cincinnati, Ohio.

Megan A. Mezera, Wenli Li, Daniel J Koch, Andrea Edwards, Caio A. Gamarra, Rodrigo S. Gennari, Victor E. Gomez-León, Rafael Reis Domingues, Adam D. Beard, Milo C. Wiltbank. Identification of novel RT-qPCR reference genes for bovine corpus luteum via whole transcriptome RNA sequencing. American Dairy Science Association. June 2019. Cincinnati, Ohio.

Megan A. Mezera, Caleb S. Hamm, Caio A. Gamarra, Rodrigo S. Gennari, Victor E. Gomez-León, Rafael Reis Domingues, Alexandre B. Prata, Mateus Zucato Toledo, Milo C. Wiltbank. “Distinct mechanisms maintain pregnancy during the first and second month as highlighted by profiles of PGFM in dairy cattle” National Association of Animal Breeders Technical Conference. September 20-21. Green Bay, Wisconsin.

Megan A. Mezera, Caleb S. Hamm, Caio A. Gamarra, Rodrigo S. Gennari, Victor E. Gomez-León, Rafael Reis Domingues, Alexandre B. Prata, Mateus Zucato Toledo, Milo C. Wiltbank. “Distinct mechanisms maintain the CL during early vs later pregnancy as highlighted by profiles of prostaglandin F□ alpha metabolite in dairy cattle during the first and second months of pregnancy” Society for the Study of Reproduction. July 10-13 2018. New Orleans, Louisiana.

Megan A. Mezera, Alvaro García-Guerra, Aurea M. O. Canavessi, Pedro L. J. Monteiro Jr, Roberto Sartori, Brian W. Kirkpatrick, Milo C. Wiltbank. “Trio, a Novel Bovine High Fecundity Allele: Acquisition of Dominance of Smaller Follicles” Society for the Study of Reproduction. July 13-16 2017. Washington DC. Abstract n. 200

Other Presentations:

Megan A. Mezera, Wenli Li, Rina Meidan, Caio A. Gamarra, Rodrigo S. Gennari, Andrea Edwards, Alexandre B. Prata, Milo C. Wiltbank. Whole transcriptome sequencing of the corpus luteum of pregnant dairy cows during secretion of interferon-tau: implications for luteal maintenance. ERP Symposium. April 18, 2019. Madison, Wisconsin

Megan A. Mezera, Caleb S. Hamm, Caio A. Gamarra, Rodrigo S. Gennari, Victor E. Gomez-León, Rafael Reis Domingues, Alexandre B. Prata, Mateus Zucato Toledo, Milo C. Wiltbank. “Distinct Mechanisms Maintain the CL During Early vs Later Pregnancy as Highlighted by Profiles of

Prostaglandin F-2α metabolite (PGFM) in Dairy Cattle During the First and Second Months of Pregnancy" ERP Symposium. May 3, 2018. Madison, Wisconsin

Teaching and Mentorship:

2019: Teaching Assistant DySci 534: Reproductive Management of Dairy Cattle, Organized lab section, lectures: PGF, Pregnancy Diagnoses, Resynchronization Protocols

2018: Teaching Assistant: AnSci/ DySci 373: Animal Physiology, lecture: digestion

Agricultural Outreach:

Dane County Breakfast on the Farm, 2017

Cows on the Concourse: 2018, 2019

"Roaming Through the Rumen"

- Wisconsin Science Festival, 2018
- Expanding Your Horizons/ Exploring Your Future 2018/19

ERP Service:

Other Abstracts:

García Guerra A, Monteiro Jr P, Gamarra C A, Walleser E A, Prata A, **Mezera M A,** Gennari R, Sala R, Moreno, J F, Sartori R, Wiltbank M C (2019). 84 Evaluation of indirect methods for pregnancy diagnosis at Day 21 in in vitro-produced embryo transfer recipient heifers. Reproduction, Fertility and Development. 31. 167. 10.1071/RDv31n1Ab84.