

## PHYSIOLOGY: REPRODUCTIVE PHYSIOLOGY

### 218 Effect of GnRH injection at -72 h in MGA-PG estrus synchronization protocol. McKay

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Beef heifers ( $n = 1524$ ) from two operations in central Nebraska were randomly assigned to one of two treatments [0 or 5  $\mu\text{g}$  GnRH at prostaglandin F $2\alpha$  (PGF) administration 72 hrs before insemination]. Both locations utilized MGA-PG fixed-time AI (TAI) estrus synchronization protocol. The first location (L1,  $n = 1076$ ,  $382 \pm 3$  kg) processed heifers 72 hours prior to insemination and every third heifer was assigned to receive an injection of GnRH (5  $\mu\text{g}$ ) (TRT) and an injection of PGF. The remaining heifers received PGF and 0  $\mu\text{g}$  GnRH. At insemination all heifers received 100  $\mu\text{g}$  GnRH. Heifers were then observed for estrus behavior from 10–21 days post TAI and re-inseminated if estrus was detected. Heifers pregnant from the second breeding were added to final pregnancy rate. The second location (L2) utilized estrus detection patches and performed only TAI ( $n = 448$ ,  $363 \pm 7$  kg) following MGA-PG synchronization protocol outlined above without the estrus observation period. Treatment did not significantly ( $P > 0.20$ ) improve TAI pregnancy rates [L1 TAI 56.3% (TRT) vs 57.3%; L1 AI Total 78.3% (TRT) vs 73.9%; L2 TAI 58.5% (TRT) vs 52.5%] among the two herds. The administration of 5  $\mu\text{g}$  GnRH at PGF tended to increase ( $P = 0.12$ , 74% vs 63%) pregnancy rates for those inseminated during the follow up heat detection period at L1. The treatment did not ( $P > 0.20$ ) improve pregnancy for the time-AI heifers. In addition, TAI pregnancy rates were similar ( $P > 0.20$ ) at L2. There were greater ( $P < 0.20$ ) effect of pen on pregnancy rate.

**Key words:** estrus synchronization, GnRH, fixed-time AI

### 219 Use of a genetically-engineered swine line to elucidate the role of GnRH-II and its receptor in gilts. Amy T. Desaulniers<sup>1</sup>, Rebecca Cederberg<sup>2</sup>, Ginger Mills<sup>2</sup>, Brett R. White<sup>2</sup>, <sup>1</sup>University of Central Missouri, <sup>2</sup>University of Nebraska-Lincoln

The second form of GnRH (GnRH-II) and its receptor (GnRHR-II) are produced in only one livestock species, the pig. Paradoxically, their interaction does not stimulate gonadotropin secretion. Instead, both have been implicated in autocrine/paracrine regulation of steroidogenesis. To elucidate their role in ovarian function, our laboratory generated transgenic swine with ubiquitous knockdown (KD) of GnRHR-II. Blood samples were collected from GnRHR-II KD ( $n = 8$ ) and littermate control ( $n = 7$ ) gilts at the onset of estrus (follicular) and 10 d later (luteal). Serum samples were subjected to HPLC-MS/MS to quantify concentrations of 16 steroid hormones. At euthanasia, ovarian weight, ovulation rate and weight of each excised corpus luteum (CL) were recorded; HPLC-MS/MS was also performed on CL tissue. A line (GnRHR-II KD versus control) x phase (follicular versus luteal) interaction was detected for serum progesterone concentrations; levels were reduced in transgenic compared with control gilts during the luteal phase ( $P = 0.0329$ ). A tendency for a line effect was observed for 11-deoxycorticosterone and 11-deoxycortisol; transgenic females tended to produce less of these corticosteroids ( $P < 0.10$ ). A phase effect was detected for cortisone, 11-deoxycortisol, cortisol, corticosterone, androstanedione, androsterone, testosterone, estrone and 17 $\beta$ -estradiol ( $P < 0.05$ ); concentrations were greater in follicular versus luteal samples ( $P < 0.05$ ). Conversely, 17 $\alpha$ -hydroxyprogesterone concentrations were elevated in luteal samples ( $P < 0.05$ ). Ovarian weight did not differ between lines, although ovulation rate was reduced in GnRHR-II KD versus control gilts ( $P = 0.0123$ ). However, average CL weight was greater in GnRHR-II KD compared with control females ( $P < 0.0001$ ); therefore, total CL weight tended to be reduced in transgenic gilts ( $P = 0.0958$ ). In tissue samples, concentrations of progesterone and estrone tended to be reduced in transgenics females ( $P \leq 0.10$ ). Ultimately, these data suggest that GnRH-II and its receptor may help regulate ovulation rate, CL development and progesterone production in gilts. Supported by USDA/NIFA AFRI-ELI predoctoral fellowship (2017-67011-26036; ATD) and AFRI (2017-67015-26508; BRW) funds.

**Key words:** swine, corpus luteum, GnRHR-II