RESEARCH ABSTRACT

ANIMAL SCIENCE

Title: Effect of GnRH-II on reproductive efficiency and productivity of first parity sows – **NPB #12-184**

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Scientific Abstract:

Unlike the native form of gonadotropin-releasing hormone (GnRH-I), the recently identified, second isoform (GnRH-II) is produced in nearly every tissue of the body, including non-reproductive tissues, and has been linked to the interaction between nutrition and reproductive function in mammals. Since this relationship has never been investigated in pigs, we investigated the role of GnRH-II in the transition from first to second parity in sows. First parity sows were farrowed, weighed, backfat thickness was determined by ultrasound and standard farrowing traits were recorded. After farrowing, litter sizes were standardized within treatment and sows were fed either an ad libitum (n = 8) or restricted (80% of ad libitum; n = 9) standard lactation diet for 25 d. At weaning, sows were weighed, tenth rib backfat thickness was determined by ultrasound, and a blood sample was taken. Three sows from each treatment were sacrificed and tissue samples from the hypothalamus, anterior pituitary gland, ovaries, oviduct, uterus, fat and mammary glands were collected from each sow. The remaining sows in each treatment were exposed twice daily to boars for 15 d to determine wean-to-estrus interval and days in estrus. Blood samples were analyzed via ELISA for GnRH-II concentrations, RNA was isolated from each tissue sample and converted into cDNA, and GnRH-II gene expression assays were performed. As expected, average daily feed intake was reduced in restricted compared to ad libitum fed sows ($P < .05$). However, sow weight loss, sow backfat loss, litter weight gain, average piglet weight gain, wean-to-estrus interval and days in estrus did not differ between treatments ($P > .05$). Although there were no differences between treatments for GnRH-II gene expression in any of the tissues collected ($P > .05$), GnRH-II levels in the blood were significantly higher in restricted vs. ad libitum fed sows ($P < .05$). In our second study, first parity sows (n = 30) were weighed and farrowed and standard farrowing traits as well as feed intake were recorded. At weaning, a blood sample was collected and sows were weighed and treated with either an agonist specific to GnRH-II (d-ala^6 GnRH-II; 150 ng/kg body weight; n = 15) or an equivalent volume of 0.9% saline (n = 15). Once daily boar exposure was provided for 15 d to determine wean-to-estrus interval and blood samples were analyzed for GnRH-II concentrations. GnRH-II treatment had no effect on wean-to-estrus interval (5.7 d), exhibiting similar effects as saline (5.8 d; $P > .05$). Therefore, we determined Pearson correlation coefficients between serum GnRH-II levels at weaning and all other traits. Interestingly, GnRH-II concentrations were negatively correlated with average daily feed intake (-0.40; $P < .05$) and there was a tendency for a negative correlation with total feed consumed (-0.34; $P < .07$). GnRH-II concentrations were not correlated with any other trait measured, including wean-to-

estrus interval ($P > .05$). Next, we characterized females as having either HIGH (> 100 pg/ml; n = 15) or LOW (< 100 pg/ml; n = 15) GnRH-II concentrations. Sows with HIGH vs. LOW GnRH-II levels at weaning did not differ for any of the traits measured ($P > .05$) except average daily feed intake ($P < .05$) as well as a tendency for total feed intake ($P < .07$). Although we were unable to confirm a role for GnRH-II in return to estrus following lactation of first parity sows, we are intrigued by results suggesting a role of GnRH-II in appetite. Thus, GnRH-II levels in the blood may represent an early marker for potential appetite issues during lactation and could lead to development of novel therapeutic agents to control appetite in swine.