Effects of Dietary Supplementation with Vitamins/Minerals and/or Energy on Fetoplacental Vascularity in Crossbred Angus Heifers. Bethania J. Davila Ruiz1, Carl R. Dahlen1, Jennifer L. L. Hurlbert1, Friederike Baumgaertner1, Kerri A. Bochantin1, Ana Clara B. Menezes1, Wellison Diniz2, James D. Kirsch1, Pawel P. Borowicz1, Sebastian Canovas1, Lawrence P. Reynolds1, Nathan M. Long1, 1Instituto Nacional de Tecnología Agropecuaria EEA Cuena del Salado, 2Facultad de Ciencias Veterinarias, Universidad Nacional de La Pampa, 3Facultad de Ciencias Veterinarias, Universidad Nacional de La Pampa, 4Animal and Veterinary Sciences, Clemson University

Abstract: The objective of these studies was to evaluate if vascularity of the fetal part of the placenta, termed cotyledon (COT), of crossbred Angus heifers is affected by vitamin and mineral (VTM) and/or energy (NRG) supplementation during pregnancy. We hypothesized that dietary supplementation with VTM and/or NRG would improve fetoplacental vascular development, which is an important index of placental function. Two experiments were conducted: In Exp. 1, 34 heifers were randomly assigned to VTM/NoVTM supplementation 71 days before artificial insemination (AI). At breeding, the diet was maintained and heifers were randomly assigned to receive NRG, resulting in the following treatments combinations: NoVTM-NoNRG (n=8), NoVTM-NRG (n=8), VTM-NoNRG (n=9), and VTM-NRG (n=9). Dietary supplementation was maintained until d 83 when heifers were ovariohysterectomized and COT was collected. On Exp. 2, 72 heifers were randomly assigned to VTM supplementation (n=36) or control (CON) (n=36) treatments at breeding and continuing until parturition when COT from a subset of 28 heifers was collected. The COT from both experiments was evaluated by immunohistochemistry using rabbit anti-CD34 and anti-CD31 antibodies as markers for vascularity along with DAPI for background nuclear staining. In the d 83 group, BS1 lectin was used as a marker of fetal placentinal tissue. Three images per animal were captured. The data were analyzed using the GLM procedure of SAS. Results indicated that on d 83 COT vascularity was not affected by VTM (P-value = 0.5030), NRG (P-value = 0.5450), or their interaction (P-value = 0.6664), whereas on parturition there was a tendency for COT vascularity to be greater in VTM than CON (P-value = 0.0723). These results suggest that dietary VTM supplementation from breeding until parturition potentially has a beneficial effect on placentonal vascular development in crossbred Angus heifers.
PSV-B-16 Correlation between Plasma, Uterine, and Vaginal Cytokine Concentrations in Postpartum Beef Cows Prior to Artificial Insemination.

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Abstract: Cytokines have a vital role in reproductive immune environment during the postpartum period. Previous data evaluated uterine and vaginal cytokine concentrations prior to insemination; however, was unable to correlate these data with plasma cytokine concentrations. The objective of this study was to determine relationships between uterine, vaginal, and plasma pro- and anti-inflammatory cytokine concentrations in postpartum beef cows prior to timed artificial insemination (TAI). Bos indicus-influenced beef cows (n=20) free of any physical, health or reproductive-related issues were subjected to the Bee Synch II protocol 8 days prior (d-8) to TAI (d0). Uterine and vaginal flushes and blood were collected on d-3 and d-1. Pregnancy was determined by transrectal ultrasonography on d28 (Pregnant, n=7; Open, n=13). Using the RayBiotech Quantibody Bovine Cytokine Array 1 the following cytokines concentrations were determined: interferon (IFN)-α, IFN-γ, interleukin (IL)-13, IL-1α, IL-1-F5, IL-21, tumor necrosis factor (TNF)-α, chemokine ligand (CXCL)-9, CXCL-10, and chemokine ligand 4 (CCL4). Concentration data were analyzed using PROC GLM and correlations using Pearson correlation in SAS. For plasma samples, 8 pro-inflammatory cytokines (IFN-α, IFN-γ, IL-13, IL-1α, IL-1-F5, IL-21, CXCL-9, and TNF-α) had greater (P<0.05) concentrations in open cows compared with pregnant cows. For uterine flushes, 3 pro-inflammatory cytokines (IFN-γ, IL-1α, and IL-21) had greater (P<0.05) concentrations in open cows compared with pregnant cows. For vaginal flushes, IFN-α concentrations were greater (P<0.05) in open cows, while CXCL-10 concentrations were greater in pregnant cows. There were no significant correlations between plasma and uterine or vaginal samples (P>0.05). Interestingly, for open cows there were correlations for IFN-α (r=0.46; P=0.02), IFN-γ (r=0.58; P=0.002), and IL-21 (r=0.54; P=0.004) between uterine and vaginal samples; however, no correlations were observed for pregnant cows. These results suggest a greater abundance of pro-inflammatory cytokines within the uterus, vagina, and in peripheral circulation for resulting open cows prior to TAI.

Keywords: beef, cytokines, reproduction

Keywords: placenta, supplementation, vascularity