

Public Abstract

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Title: EFFECT OF PREOVULATORY FOLLICLE SIZE ON CUMULUS CELL AND FOLLICULAR WALL TRANSCRIPT ABUNDANCE IN BEEF COWS

The physiological maturity of the preovulatory bovine follicle may affect pregnancy establishment and embryonic mortality in beef cattle. Hormone-induced ovulation of small dominant follicles decreased pregnancy rates and late embryonic/fetal survival in postpartum beef cows, which could be caused by inadequate oocyte competence. Cumulus cells surround the oocyte and aid in maturation. The objective was to determine the effect of size and physiological status of the preovulatory follicle on the transcriptome of the cumulus cells. Ovulation was synchronized in suckled beef cows and the cumulus cell-oocyte complex of the dominant follicle collected. Cumulus cells were removed from the oocytes and assigned to either: small (n=6; <11.7mm; no estrus expression), large (n=6; >12.5 mm; no estrus expression), or spontaneous (n=5; 11.6-13.9 mm; estrus expression) classifications. RNA was extracted from cumulus cell pools, sequenced, and aligned to the *Bos taurus* genome (UMD3.1). Transcripts encoding glycolytic enzymes were more abundant in the cumulus cells of follicles in the large and spontaneous follicles compared to the small follicle classification. Oocytes have a poor capacity for utilizing glucose and rely on the cumulus cells to supply pyruvate for energy production, which is necessary for oocyte maturation. In addition, increased abundance of established bovine cumulus cell markers of oocyte competence in cumulus cells from the spontaneous compared to both the small and large follicle classifications indicate that oocytes from small follicles may be less mature.