

## **Expression of Decorin, Ki67, Transforming Growth Factor $\beta$ 1, and Its Receptor in Prepubertal Bovine Mammary Tissue**

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Prepubertal mammary growth is a complex process. Epithelial ducts (EPI) “invade” more dorsally located mammary stroma (STR) as they grow. Because ovarian hormones are not a factor at this stage of development, it is thought that locally produced growth factors and extracellular matrix (ECM) molecules contribute to mammary growth. The objective was to study gene expression of: a cell proliferation marker (Ki67), transforming growth factor- $\beta$ 1 (TGF- $\beta$ 1) and its receptor (TGF $\beta$ 1-R), and ECM molecule decorin in EPI and STR of prepubertal heifers. Binding of TGF- $\beta$ 1 protein to TGF $\beta$ 1-R is largely growth inhibitory. In contrast, decorin can directly increase cell proliferation by binding and sequestering TGF- $\beta$ 1 away from TGF $\beta$ 1-R. We hypothesized that mRNA abundance of these genes would vary based on location (EPI or STR). Further, we posited abundance of decorin, TGF- $\beta$ 1, and TGF $\beta$ 1-R would be correlated with abundance of Ki67, either positively or negatively. Total RNA was isolated from previously collected samples of STR and EPI from ten 56d old heifers (n=20), reverse transcribed into cDNA, and used in quantitative reverse transcription PCR assays. PPP1R11, RPS15A, and MTG1 were endogenous control genes. Relative quantification showed that TGF- $\beta$ 1 was more abundant in EPI than in STR (P = 0.002). Location did not affect expression of Ki67, TGF $\beta$ 1-R, or decorin. No gene-to-gene correlations were evidenced in STR, but decorin and TGF $\beta$ 1-R were positively correlated in EPI (P = 0.015); however, neither was correlated to Ki67 (P = 0.961 and 0.305, respectively). Our correlation findings between TGF $\beta$ 1-R and decorin in EPI perhaps suggest competition between decorin and TGF- $\beta$ 1 for binding of TGF- $\beta$ 1. More in depth study of relevant signaling cascade molecules (e.g., SMAD2/3, c-Myc) at gene and protein levels in prepubertal bovine mammary tissue seems appropriate.