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Effects of somatotropin injection on gene expression of follicular cells from the dominant follicle in cows

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The aim of this study was to determine the effect of somatotropin injection on gene expression of follicular cells from the dominant follicle of dairy cows. Twenty Jersey cows managed under the same conditions and nutritional regimen (pasture-based system) were used. Cows were randomly assigned to two treatments: somatotropin; (ST; n = 10), that received one dose of somatotropin (500 mg, subcutaneo, Lactotropin, Elanco, SP, Brazil) at -60 days relative to start the protocol of synchronization (day 0) and Control; (CN; n = 10) that did not receive somatotropin application. On day 0, cows received one injection of GnRH (100 mg, intramuscular, of gonadorelin hydrochloride; 2 mL of Factrel, Zoetis Animal Health, NJ, USA) and received a controlled internal drug-release insert (CIDR; Eazi-Breed CIDR, Zoetis Animal Health). On day 8, 12h before CIDR was removed, cows received one injection of PGF2a (25 mg, intramuscular of dinoprost tromethamine; 5 mL of Lutalyse, Zoetis Animal Health) and the dominant follicle from each cow was aspirated 12h after CIDR removal. To determine the number of follicles and identify the dominant follicle, follicular development was monitored via ultrasound at days -60, -53, -46, -14, -7, 0, 8 and at the moment of aspiration. The follicular fluid from the largest follicle for each cow was aspirated and follicular cells were retrieved immediately by centrifugation, frozen in liquid nitrogen and stored at -80°C until RNA extraction. Total RNA was extracted and gene expression of LHCGR, STAR, HSD3B, P450scc, CYP19A1, IGFr and PAPPa was measured by real-time PCR. T-tests were performed using GraphPad Prism 5 to compare means between groups. Average follicular cells STAR mRNA expression was higher in ST treated cows (2.88 ± 0.85 fold higher) than in CN cows ($P = 0.02$). However, ST cows had a lower ($P < 0.05$) mRNA expression of PAPPa, P450scc and CYP19A1 (0.19 ± 0.09 , 0.39 ± 0.17 and 0.24 ± 0.10 fold, respectively) than CN cows. Expression of HSD3B, IGFr and LHCGR mRNA was not different between treatments ($P > 0.05$). In conclusion, injection of somatotropin in dairy cows has long term effects on follicle development and was able to increase STAR mRNA expression of and decrease PAPPa, P450scc and CYP19A1 on follicular cells of the dominant follicle 60 days after injection, potentially increasing the chance of ovulation in this class of follicles.