A148 OPU-IVP and ET

Gene expression in co-cultured granulosa cells from taurine and zebu cattle with high or low rates of *in vitro* embryo production

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In vitro embryo production (IVEP) is characterized by a large variation of results among donors. The absolute efficiency of IVEP is directly related to the variation in the production of cumulus-oocyte complexes (COC), as evidenced in the comparison between donors taurine and zebu breeds (Viana et al., Acta Sci Vet 39(1): 409, 2011). However, individual differences in embryo production rates are more complex and difficult to predict. The aim of this study was to evaluate the potential of the gene expression analysis of granulosa cells in co-culture as an indirect and noninvasive approach to explain IVEP results. Granulosa cells (GC) co-cultured with oocytes collected from Gir (*Bos indicus*) and Holstein (*Bos taurus*) donors were recovered and evaluated. The cell samples were allocated into groups according to breed (Gir or Holstein) and to blastocyst production rate (high: >50%, low: <20%), including at last six donors per group. The GC were recovered on the seventh day of culture and stored at -80°C with RNA later. RNA extraction and cDNA synthesis were performed using a commercial kit, RNeasy Micro Kit (Qiagen, Germany) and SuperScript III First-Stand Synthesis Supermix (Invitrogen, USA), respectively. The relative quantification of cDNA was performed by Real-Time PCR using the commercial kit Power SYBR Green PCR Master Mix (Applied Biosystems). The genes IGFR1, BAX, StAR, INHA, LHR and PRDX1 were evaluated using β-actin gene as an endogenous control. The results were analyzed by ANOVA and differences between groups were compared by Tukey's test. Results are presented as mean ± SEM. There was an interaction between breed and blastocyst production rate for the PRDX1 gene, which was over-expressed in the high production Holstein group ($P<0.05$). There was no difference ($P>0.05$) between expression values of other genes among groups. The PRDX1 gene is normally expressed in response to oxidative stress, and the results suggest a greater potential for adaptation to culture conditions for COC from Holstein donors with higher embryo production rates. The in vitro culture of GC, however, may have modulated other potential differences in the expression of other genes, limiting the use of the model proposed here.

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