

Bovine blastocysts with developmental competence to term share similar expression of developmentally important genes although derived from different culture environments

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Abstract

This study was conducted to investigate the gene expression profile of in vivo-derived bovine embryo biopsies based on pregnancy outcomes after transferring to recipients. For this, biopsies of 30-40% embryos were taken from grade I blastocysts (International Embryo Transfer Society Manual) and the remaining 60-70% of the intact embryos were transferred to recipients. Frozen biopsies were pooled into three distinct groups based on the pregnancy outcome after transferring the corresponding parts, namely those resulting in no pregnancy (NP), pregnancy loss (PL), and calf delivery (CD). Array analysis revealed a total of 41 and 43 genes to be differentially expressed between biopsies derived from blastocysts resulting in NP versus CD and PL versus CD respectively. Genes regulating placental development and embryo maternal interaction (PLAC8) were found to be upregulated in embryo biopsies that ended up with CD. Embryo biopsies that failed to induce pregnancy were enriched with mitochondrial transcripts (FI405) and stress-related genes (HSPD1). Overall, gene expression profiles of blastocysts resulting in NP and CD shared similar expression profiles with respect to genes playing significant roles in preimplantation development of embryo. Finally, comparing the transcript signatures of in vivo- and in vitro-derived embryos with developmental competence to term revealed a similarity in the relative abundance of 18 genes. Therefore, we were able to present a genetic signature associated with term developmental competence independent of the environmental origin of the transferred blastocysts.

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