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Comparisons of Gene Expression Profiles between IVF and Cloned Embryo

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The low efficiency of animal production by nuclear transfer technique is considered to be result of an incomplete reprogramming of the donor cell nucleus, which leads to a lack of, or abnormal expression of developmentally important genes. There are a lot of genes related to embryo development and some of these genes are regulated by imprinting. IGF2 (insulin like growth factor 2) and IGF2R (IGF2 receptor) that play important roles in preimplantation development are included in imprinted genes also. Thus a high rate of embryonic, fetal and neonatal abnomalities that are summarized under the term large offspring syndrome may be due to abnormal methylation pattern of developmentally important genes during preimplantation development after nuclear transfer. In order to analyze the effect of different embryonic gene expression on preimplantation development, the transcription patterns of IGF2-IGF2R axis in single *in vitro* fertilized (IVF) and cloned embryos were compared by RT-PCR. Transcripts for IGF2 and IGF2R have been detected at all stages of preimplantation development. However, the intensity of PCR products was somewhat different between IVF and cloned embryos. Transcripts of IGF2 in cloned embryos were highly expressed than IVF embryos. In case of IGF2R, cloned embryos also show significantly high expression profiles than IVF embryos.

The absence or abnormal onset of embryonic transcription of these genes in cloned embryos indicates an incomplete reprogramming. These results suggest that IGF2-IGF2R axis expression profiles could potentially be used as a genetic marker for cloned embryo viability prior to embryo transfer.

Key words) ***reprogramming, imprinting, methylation, large offspring syndrome***