

## **Apoptosis in Bovine Blastocyst following Nuclear Transfer and *In Vitro* Fertilization**

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The mechanisms underlying the visual assessment and resulting in optimum embryonic development following *in vitro* maturation, fertilization, and culture are unclear. It is known that *in vitro* produced embryos show more frequent occurrence of fragmentation, which result in poor developmental potential and decreased implantation rate. The objective of this study was to investigate the apoptotic rates in *in vitro* fertilization (IVF) and nuclear transferred (NT) bovine blastocyst. In addition, expression levels of *Bcl-2* and *Bax* gene were investigated in IVF and NT blastocyst to confirm their potential roles in the regulation of apoptosis during preimplantation embryo development. Apoptosis of analysis was carried out terminal deoxynucleotidyl transferase mediate dUTP nick end labeling (TUNEL) method. The levels of *Bcl-2* and *Bax* gene in IVF and NT blastocyst determined by RT-PCR.

The proportion showing TUNEL positive signal of NT blastocyst significantly higher than IVF blastocyst ( $p < 0.001$ ). *Bcl-2* expression level that of IVF blastocyst was higher than that of NT blastocyst. In contrast, *Bax* expression level of IVF blastocyst was lower than that of IVF blastocyst. These results indicated that increment of developmental failure after nuclear transfer could be caused by nuclear fragmentation, as apoptosis. It is also suggested that *Bcl-2* and *Bax* expression may be good marker for detection of apoptosis in bovine preimplantation embryos.

Key words) *apoptosis, nuclear transfer, blastocyst, Bcl-2, Bax*