

Aberrant Distributions of ICM Cells in Bovine Blastocysts Produced by Somatic Cell Nuclear Transfer

D.B. Koo, Y.K. Kang, Y.H. Choi, J.S. Park, H.N. Kim, D.S. Son¹, Y.M. Han, K.K. Lee

Animal Developmental Biotechnology Lab. Korea Research Institute of Bioscience & Biotechnology (*dbkoo@mail.kribb.re.kr*)

¹National Livestock Research Institute

It has been reported that cloning cattle is inefficient. One of the problems was placental abnormality, finally resulting in fetal mortality after transfer of nuclear transfer (NT) bovine embryos. This study was focused on the allocations of embryonic cells to the inner cell mass (ICM) or to the trophectoderm (TE) in NT bovine blastocysts. Somatic cells were derived from a Day 45 fetus of gestation, individually transferred into enucleated oocytes and developed to the blastocyst stage in vitro. Differential staining was used to assess the quality of blastocysts derived from NT, IVF and in vivo. Development rate of NT embryos to blastocysts (25.0%, 41/164) was similar to that of IVF embryos (28.7%, 49/171). The total cell number of NT blastocysts (101.3 ± 45.9) was not different compared with that of IVF embryos (107.9 ± 34.2 , $P > 0.05$), but was lower than in vivo embryos (122.5 ± 21.6 , $P < 0.05$). Ratio of ICM/total cells was higher in NT embryos ($51.6 \pm 18.6\%$) than in IVF and in vivo embryos ($42.3 \pm 15.3\%$ and $34.9 \pm 8.9\%$, respectively) ($P < 0.05$). Most IVF (56.8%, 25/44) and in vivo blastocysts (80.8%, 21/26) was distributed in the proportion of ICM/total cells ranging from 20 to 40% group. However, most NT blastocysts was biased in the 40–60% (34.1%, 15/44) and >60% (31.8%, 14/44) groups. Our findings suggest that placental abnormalities or early fetal losses in the present cloning system may be due to aberrant allocation of NT embryos to the ICM cells.

(Key Words) nuclear transfer, differential staining, blastocysts, bovine