

Various Expression Pattern of Beta-catenin in the Preimplantation Stage of Porcine Embryos

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Beta-catenin is very important in early development including involvement in cell adhesion, cell signaling, and developmental fate specification. Cell-cell interaction is an important process during mammalian embryonic development. In preimplantation embryos, embryonic compaction is the process of increased cellular flattening and adhesion of junctional complexes and results in a polarized distribution. Beta-catenin is associated with embryonic compaction in mammals. Here, we examined the relationship between beta-catenin expression and compaction in porcine embryos derived from *in vitro* fertilization. First of all, we investigated beta-catenin expression in each embryonic developmental stage and also focused on expression pattern according to full, partial and non-compaction at morula stage. We used the immunocytochemical method in this research. To confirm compaction affects on the embryonic development, we compared between compaction and developmental rates to the blastocyst. The result showed that compaction and non-compaction rates were 14.6% and 63.8% at 4 days after IVF, respectively. The developmental rates to the blastocyst and their total cell number were 50.9% vs 36.4% and 41.4 ± 11.5 vs 26.8 ± 12.7 in compaction and non-compaction groups. Although no difference was detected in the ratio of ICM to total cells between two groups, total cell number of the blastocysts in compaction group was superior to that of the blastocysts in non-compaction group ($P < 0.05$). Expression of beta-catenin appeared in the boundary of membrane surface between blastomeres in 2- and 4-cell stage, and observed irregular pattern from 8-cell to blastocyst stage. We also investigated beta-catenin expression pattern according to the degree of compaction in the 3 groups; full, partial (>50%) and non-compaction. The expression signal in fully compacted embryos was stronger than those of partial and non-compacted embryos. Especially, beta-catenin expression appeared various patterns in morula stage suggesting the aberrant distribution of beta-catenin is affected by compaction patterns. Our results suggest that abnormal beta-catenin expression was affected by embryo quality and further development in porcine embryos *in vitro*.

Key words) *Beta-catenin, Expression, Compaction, Porcine, In vitro*