

Maturation Conditions Affecting on Blastocysts Development and Their Quality in Pig Embryos

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The modification of *in vitro* maturation (IVM) conditions should be required to efficient production of matured porcine oocyte *in vitro*. Estradiol-17 β (E₂) as steroid hormone exists in ovarian follicular fluid and plays a major role in ovulation. It has been reported that estradiol as well as other steroids are involved in keeping the oocytes in meiotic arrest. Dibutyryl cyclic AMP (dbcAMP) presents high concentration in GV oocytes and inhibits progress of GVBD for maintenance of GV stage. After hormone stimulation, amount of dbcAMP in oocyte cytoplasm is decreased gradually for meiotic resumption. Therefore, proper combination of E₂ and dbcAMP may be more useful in oocyte maturation through synchronization of nuclear and cytoplasm. This study was conducted to examine the effect of E₂ and dbcAMP on nuclear maturation, fertilization parameters and early embryo development of porcine oocytes. Oocytes were aspirated from antral follicles and cultured in NCSU23 medium supplemented with 10% (v/v) porcine follicular fluid, 10 ng/ml EGF, 25 μ M β -mercaptoethanol, 0.57 mM cysteine, 10 IU/ml PMSG, 10 IU/ml hCG, with or without E₂ and/ or dbcAMP. *In vitro* fertilization of matured oocytes was performed in a modified Tris-buffered medium (mTBM) with fresh ejaculated spermatozoa. Then oocytes were transferred to NCSU23 supplemented with 0.4% BSA at 10 h or 6 days after *in vitro* fertilization. Significantly higher ($P < 0.05$) rates of nuclear maturation, monospermy and further development were observed when oocytes were cultured in the medium containing both E₂ and dbcAMP than in the medium supplemented with either E₂ or dbcAMP or without both. Especially, blastocyst formation and their quality were increased in dbcAMP-treated group. We also confirmed that the dbcAMP plays a role in blocking of meiotic resumption for the oocytes arrested in GV stage through analysis of mitogen-activated protein kinase activity. Our results suggest that synchronization of nuclear and cytoplasm maturation by E₂ or dbcAMP is essential for production of high quality pig embryos.

Key words: *Estradiol-17 β* , *Dibutyryl cyclic AMP*, *Maturation*, *Porcine*