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Apoptosis of Parthenogenetic Preimplantation Porcine Embryos Activated and Cultured in Different Condition

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Parthenogenesis and culture condition are essential to intracytoplasmic sperm injection and cloning by nuclear transfer. This study investigated apoptosis and *in vitro* development of parthenogenetic preimplantation porcine embryos. 42~44 h *in vitro* matured oocytes derived from a local abattoir were used. Apoptotic cell death was analyzed by using a terminal deoxynucleatidyl transferase mediated deoxyuridine 5-triphosphate nick-end labeling (TUNEL) assay. In experimnt 1, matured oocytes were activated with one of two direct current (1.2Kv/cm for 30μs)(E), E + 6-dimethylaminopurine (6-DMAP) or E + cycloheximide (CH) and cultured in PZM-3 under 5% CO_2 in air at 38.5 ℃. In experiment 2, oocytes were activated by E and cultured in PZM-3 or NCSU-23 under a gas atmosphere of 5% O_2 (5% CO_2, 5% O_2, 90% N_2) or 20% O_2 (5% CO_2, in air) at 38.5 ℃. Oocytes activated with 6-DMAP or CH following electric pulse showed higher blastocyst rates (36.3% and 32.5% vs. 27.7%) compared to electric pulse alone. The frequency of apoptosis according to treatments were 5.3%, 7.6% and 7.06%, respectively. Oocytes activated with E alone showed lower ($P<0.05$) frequency of apoptosis compared to additional activation treatment. In experiment 2, parthenotes cultured in PZM-3 showed higher blastocyte rates (28.2% and 29.7% vs. 22.6% and 24.4%) compared to NCSU-23 regardless of atmosphere. The frequency of apoptosis according to treatments were 20.7%, 14.0%, 9.2% and 17.3%, respectively. Blastocysts generated in PZM-3 showed lower ($P<0.05$) apoptosis rate under 20% O_2, whereas those in NCSU-23 had lower apoptosis rate under 5% O_2. These results represent that activation methods and culture condition can affect the frequency of apoptosis as well as *in vitro* developmental rate.

Key words: ***Apoptosis, Parthenogenesis, Activation, Culture***