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Effect of duration for oocyte growth on acquisition of meiotic competence of porcine oocytes derived from early antral follicles

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Objectives

In vitro growth of growing oocytes (GOs) has a potential to supply mature oocytes for reproductive medicine and animal reproduction. For *in vitro* growth of mammalian oocytes, a culture period is one of important factors to obtain meiotic competence. However, proper culture period for porcine GOs has not been determined to attain their meiotic competence.

Materials and Methods

Porcine GOs were obtained from early antral follicles, and were cultured for 10, 12, 14 and 16 days. After the culture, survival, meiotic competence, chromatin configuration and fertilization competence of oocytes were assessed.

Results

The survival rate of oocytes after 10-day culture (62.8%) was similar to that of oocytes after 12-day culture (55%) and significantly higher than those of oocytes after 14- and 16-day culture (52.9 and 24.3%, respectively). The maturation rates of survived oocytes after 10- and 16-day culture (38.4 and 22.7%, respectively) were significantly lower than those after 12- and 14-day culture and *in vivo* counterparts (52.8–62.4%). There was no significant difference in the diameter of ooplasm among culture duration (117.4–118.3 μm).The rate of oocyte with surrounded-nucleolus chromatin after 10-day culture (78.4%) was significantly lower than those of oocytes after 14-day culture and *in vivo* counterparts (93.6 and 95.1%, respectively). After *in vitro* maturation and intra-cytoplasmic sperm injection, there was no significant difference in the rate of fertilization among culture groups and *in vivo* counterparts (10–47.2%).

Conclusion

Data of this study showed that porcine GOs required at least 12 days to acquire meiotic and

fertilization competence and that the culture duration to maximize the number of mature oocytes was from 12 to 14 days.