EFFECT OF ZONA PELLUCIDA ON PORCINE PARTHENOGENETICALLY ACTIVATED EMBRYOS

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Background

The need for zona pellucida (ZP) during pre-implantation embryo development is still debated, especially for in vitro produced embryos. Although ZP can handicap the hatching and implantation of in vitro produced embryos, there was few studies comparing the development between zona free and zona intact embryos.

Aim of study

To determine the effect of ZP on developmental time and quality of porcine parthenogenetically activated (PA) embryos.

Material and methods

Experiment design

Exp. 1: Time-lapse observation on porcine PA embryos with (PAZI) or without (PAZF) zona pellucida.

Exp. 2: To compare the developmental rates and quality of porcine PAZI and PAZF embryos.

Exp. 3: To evaluate the robustness of porcine PAZI and PAZF embryos by vitrification.

Table 1. Timing of developmental stages of porcine PA embryos with (PAZI) or without (PAZF) zona pellucida.

Group	Embryos No.	2-cell (h)	3-cell (h)	5-cell (h)	Morula (h)	Blastocyst (h)
PAZI	19	21.8±0.7	45.6±4.1	78.8±1.9^a	92.5±2.1	109.5±2.8
PAZF	23	20.5±0.4	40.5±3.5	72.3±2.2^b	87.6±1.7	105.1±2.1

^{a, b} Different superscripts in the same column indicate significant difference ($P<0.05$). Values are mean±SEM

Figure 1. Effect of ZP on development and quality of porcine PA embryos

Figure 2. Effect of ZP on vitrification of porcine PA embryos

* Significant difference ($P<0.05$)

Results

✓ PAZF embryos developed faster than PAZI embryos, especially from the third cell cycle ($P<0.05$, Table1).

✓ The total blastocyst rate and good morphology blastocyst rate of PAZI embryos were significant higher than PAZF embryos ($P<0.05$, Figure 1).

✓ More PAZI embryos than PAZF embryos survived after vitrification/warming ($P<0.05$, Figure 2).

Conclusion

✓ Removal of zona pellucida can increase the speed of development of porcine PA embryos, especially at the time of embryonic genome activation (5-cell stage).

✓ Zona pellucida can benefit blastocyst formation and cryo-tolerance for porcine PA embryos.