Valproic acid improved *in vitro* development of pig cloning embryos but did not improve survival of cloned pigs to adulthood

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The objective was to examine the effects of valproic acid (VPA), a histone deacetylase inhibitor, on *in vitro* and *in vivo* development of Wuzhishan miniature pig somatic cell nuclear transfer (SCNT) embryos. Experiment 1 compared *in vitro* developmental competence of nuclear transfer embryos treated with various concentrations of VPA for 24 h. Embryos treated with 2 mM VPA for 24 h had a greater rate of blastocyst formation compared with control or embryos treated with 4 or 8 mM VPA (21.5% vs. 10.5%, 12.6%, and 17.2%, P<0.05). Experiment 2 examined the *in vitro* developmental competence of nuclear transfer embryos treated with 2 mM VPA for various intervals after chemical activation. Embryos treated for 24 h had higher rates of blastocyst formation than the control or those treated for 4 or 48 h (20.7% vs. 9.2%, 12.1%, and 9.1%, P<0.05). In experiment 3, an average of 207 (range, 192–216) nuclear transfer embryos from the VPA-treated group were transferred to surrogate mothers, resulting in three pregnancies. Two of the surrogates delivered a total of 11 live piglets. However, for unknown reasons, nine of 11 piglets in the VPA-treated group died within 1 to 5 d after birth. Untreated control embryos (average, 205; range, 179–225) were transferred to four surrogate mothers resulting in three pregnancies, two of which delivered a total of 12 live offspring, although four of 12 piglets in the VPA untreated group died (cause unknown) within 1 to 3 d, whereas eight of the 12 piglets in the VPA-untreated group survived more than 3 or 4 mo. The average birth weight of the two litters from the VPA-treated group tended (P<0.05) to be lower than that from the control groups (551.6 g vs. 675.2 g). In conclusion, VPA treatment increased the blastocyst formation rate of SCNT porcine embryos; both VPA-treated and the untreated clones developed to term, but offspring from VPA-treated embryos had a lower survival to adulthood than those from control embryos (18.2% vs. 67.0%; P<0.05).

Speaker Biography

Xi-Jun Yin is working as the Director of Jilin Provincial Transgenic Animal and Embryo Engineering Laboratory at Yanbian University. His research goal is to increase reproductive efficiency of swine and to expand the genetic potential present in pig embryos. Recently, his research team successfully produced myostatin gene knockout double-muscled adult pigs.

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