Reproduction, Fertility and Development

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227 THE EFFECTS OF SEXED SEMEN ON EMBRYONIC DEVELOPMENT TO THE BLASTOCYST STAGE

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Abstract

Sexed semen (SS) exhibits approximately 80% of the fertilizing ability of conventional semen (CS), and studies have shown that this continues through the 8-cell stage of bovine embryo development. At the time of this study, no information could be found that, when used for IVF and intracytoplasmic sperm injection (ICSI) development, had been carried to the blastocyst stage. In addition, questions have arisen regarding which of the measured sperm parameters are responsible for the difference between the SS and CS and contribute to this decline in fertility. The goals of this project were to evaluate the effects of using sexed sperm as it relates to embryonic development and to determine if any of the differences in sperm parameters affect embryonic development. A preliminary project evaluated SS and CS from 5 bulls for IVF and ICSI. One bull was selected to provide the sperm (both SS and CS) for the trial, and 1752 oocytes were assigned to either IVF or ICSI. The SS and CS were divided among the available oocytes used for IVF and ICSI. Straws were thawed for 30 s at 37°C, and sperm were then evaluated for motility (provided by CASA, SpermVision, MiniTube of America, Verona, WI), morphology, acrosomal integrity (Coomassie and Pope stains), viability, and nuclear decondensation (SYBR Green and HALO). Results for SS *v.* CS were as follows: motility, 8 *v.* 26%; viability, 40.6 *v.* 30%; nuclear decondensation, 40 *v.* 30%; normal morphology and acrosomal integrity, no differences. Oocytes were obtained from Applied Reproductive Technologies, LLC (Madison, WI). The fertilization rate was consistently lower (Table 1) for both IVF and ICSI when SS were used (Z = 3.65; *P* = 0.0003), and there was no evidence that this decline in fertilization rate differed for the 2 methods (Z = 0.18; *P* = 0.86). Nor was there any evidence that the method affected the fertilization rate in general (Z = 0.75; *P* = 0.45). Thus, the difference was specific for fertilization rate and had no effect on Day 3 cells or Day 7 blastocysts. A higher fertility rate using ICSI would have indicated that a surface membrane factor may have been decreasing the fertility rate with SS because of the elimination of binding factors associated with ICSI. Thus, it may not be the sperm surface membrane that is distorted in the sexing procedure, but likely the integrity of the spermal DNA, as indicated by the increased nuclear decondensation of SS.

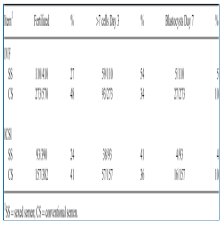

Table 1. Comparison of sexed sperm with conventional sperm when used for IVF and intracytoplasmic sperm injection (ICSI)

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