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Abstracts

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6.1

EMBRYO STORAGE, DEVELOPMENT, AND ESTABLISHMENT OF PREGNANCY AFTER EMBRYO TRANSFER IN PIGS

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Pig embryo preservation has been a subject of much interest and great progress in recent years. In Beltsville, we have used vitrification, cytoskeletal stabilization, and lipid isolation to successfully cryopreserve pig morulae, blastocysts, expanded and hatched blastocysts. This technology is now known as the USDA swine embryo cryopreservation technology. Our work and others have reported varying approaches, all of which seem to keep embryos alive during and after cryopreservation. In vitro development of these embryos is quite successful. However, in nearly all research to date, there is a significant reduction in survival following recovery of the cryopreserved embryos from storage and after embryo transfer. Todate most laboratories have found that only about 25% or less of cryopreserved embryos actually develop to live offspring following embryo transfer. There is a need for research to focus on this poor survival rate. Non-surgical embryo transfer has not yet been perfected to a degree where it can be routinely used. Pig embryo preservation and transfer technology needs to be improved along with the added research that is needed in order to better understand the biology of an embryo transfer recipient female in establishment of pregnancy. Additionally, the use of assisted reproductive technologies and biotechnologies such as in vitro embryo production and cloning by somatic cell nuclear transfer make these in vitro produced embryos less developmentally competent compared to in vivo produced

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embryos. Cryopreservation of in vitro produced or micromanipulated pig embryos has not been highly successful based on the few reports of survival and development in vitro or in vivo. This review will focus on the latest information available on pig embryo preservation and transfer, as well as efforts to improve embryo survival and the establishment of pregnancy after embryo transfer. Further research in these areas will enhance the use of embryo preservation and transfer technologies in global swine production.

6.2

TRANSPLANTATION OF DONOR BOAR SPERMATOGONIAL CELLS LEADS TO COMPLETE SPERMATOGENESIS IN BOARS AFFECTED BY THE HEREDITARY STERILIZING SHORT TAIL SPERM DEFECT

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Spermatogonial stem cell transplantation is a relatively novel reproductive technique, applied recently also in the research of male infertility. Spermatogonial stem cell transplantation has facilitated studies on defects of spermatogenesis. Due to spermatogonial transplantation, it has been possible to diagnose both conditions affecting the germ cells and conditions affecting somatic sertoli cells. In this study, spermatogonial cell transplantation was used to determine the underlying mechanisms of the hereditary short tail sperm defect in boars. The mutation causing the short tail sperm defect has recently been mapped on porcine chromosome 16. Spermatogonial cells were harvested from excised testes of young normal crossbred boars. The enzymatic digestion was performed by suspending the minced tissue into DMEM supplemented with trypsin (2 mg/ml), hyaluronidase (2 mg/ml), and collagenase (2 mg/ml). The cell suspension was transplanted into the testes of the recipient. Five weeks before the spermatogonial transplantations, the recipient was given busulphan per os for 4 days, for suppression of endogenous spermatogenesis. The total dosage of busulphan was 10.6 mg/kg. Three months after spermatogonia transfer, donor derived, progressively motile spermatozoa were observed in every ejaculate. At present (April 2003), 6 months after the successful spermatogonia transfer donor-derived spermatozoa are still present. To our knowledge, this is the first report on donor-derived motile spermatozoa in the boar ejaculate after spermatogonia transfer.

6.3

ARTIFICIAL INSEMINATION WITH SEXED SEMEN IN PIGS

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