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Depletion of Endogenous Germ Cells in Male Pigs and Goats in Preparation for Germ Cell Transplantation

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The efficiency of germ cell transplantation, the procedure of transferring germ cells from a donor male into the testes of recipient males, can be greatly increased by reduction of endogenous germ cells in recipient animals. To develop effective methods for suppression of endogenous spermatogenesis in potential pig and goat recipients, we either administered busulfan to pregnant sows or irradiated the testes of immature goats. Piglets from sows treated twice with busulfan (7.5 mg/kg) at days 98 and 108 of gestation showed reduced gonocyte numbers at 2, 4, and 8 weeks of age and reduced initiation of spermatogenesis at 16 weeks of age. For goats, groups of 3 kids at 1, 5, or 9.5 weeks of age received fractionated irradiation of the testes with 3 doses of 2 Gy on 3 consecutive days. At 2 months after irradiation, 5%-10% of seminiferous tubule cross sections contained pachytene spermatocytes, compared with 50%-100% in controls. At 3 months after irradiation, spermatozoa appeared in 20% of tubule cross sections in all treated goats and in 100% of tubules in control goats. By 6 months after irradiation, spermatogenesis had recovered in 60% of tubules in goats treated at 5 or 9.5 weeks of age but in only 29% of tubules after treatment at 1 week of age. Therefore, late gestation in utero treatment of pigs with low doses of busulfan and testicular irradiation of goats at 1 week of age will result in a reduction in the endogenous germ cell population that could facilitate donor cell colonization after germ cell transplantation.

Key words: Irradiation, busulfan, testis, transgenesis, large animals

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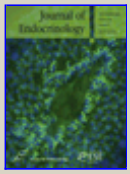

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