Title: Production of Transgenic Rats via Lentiviral Transduction and Xenogeneic Transplantation of Spermatogonial Stem Cells


Abstract: Spermatogonial stem cells (SSCs) continue to proliferate in the testis to support spermatogenesis throughout life, which makes them ideal targets for germline modification. Although recent success in the production of transgenic and knockout animals using SSCs has opened up new experimental possibilities, several problems, including the low efficiency of germ cell transplantation and poor fertility rates, remain to be resolved. In the present study, we took advantage of the xenogeneic transplantation to resolve these problems. Rat SSCs were transduced in vitro with a lentiviral vector that expressed enhanced green fluorescent protein (EGFP), and then transplanted into the testes of immunodeficient mice. The transduced rat SSCs produced EGFP-expressing spermatogenic cells, and microinsemination using these cells was used to produce transgenic rats, which stably transmitted the transgene to the next generation. Thus, xenogeneic transplantation is a powerful strategy for transgenesis, and smaller xenogeneic surrogates can be used for male germline modification using SSCs.