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GENERATION OF TRANSGENIC NONHUMAN PRIMATE WITH GERMLINE TRANSMISSION

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Since human embryonic stem cell lines and human induced pluripotent stem cell lines were established, both cell lines have shown their multipotency in vitro and offered much hope by promising to greatly extend the numbers and range of patients who could benefit from transplants. Before these stem cells can be used in clinical applications, the safety and efficacy of the stem cells therapy must be thoroughly examined. Thus, nonhuman primate experimental animals that mimic the human being in various aspects are essential for further advances in biomedical research. To assess the safety and efficacy of regenerative medicine using stem cells or gene therapy, genetically modified primates would be a more powerful human disease model for preclinical research. We established a procedure to produce transgenic marmosets using injection of a lentiviral vector containing the EGFP transgene into marmoset embryos. The transgenic marmoset production rate was 6.25% (number of tg birth/embryo transfer). Four of five transgenic marmosets expressed the EGFP transgene in neonatal tissues, and the remaining animal expressed EGFP in the placenta. Further, 2 of 5 animals show germ-line transmission of the transgene and they fathered and mothered healthy transgenic neonates. The efficient production of transgenic primates promises to be a powerful tool for developing new animal models to assess the efficacy and safety of new therapies and understanding the mechanisms of human diseases.

Keywords: Common marmoset, transgenic, regenerative medicine, Reproductive technology