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Establishment of Human-Mouse Chimeric Animal by Injecting Human Embryonic Stem Cells into Mouse Blastocoele Cavity

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Chimeric animals are referred to as an organism composed of tissues derived from more than one species. In order to examine if a pluripotency of embryonic stem cells can cross the limitation of a species, we tried to establish human-mouse chimeric animals. Human embryonic stem cells were genetically modified to express eGFP using eukaryonic expression vector pcDNA 3.1 (In Vitrogene) for an easy identification. After selection with neomycin, approximately 15 cells were implanted into mouse blastocoele cavity. Ten chimeric blastocysts were transferred to one of the uterine horn of 2.5 days pesudopregnent ICR female. Out of 272 blastocysts transferred to pseudopregnant recipients 20 live newborn were obtained after 20 days. When newborn were obtained, pups were quickly removed immersed into 4% PFA. By histological examination using fluorescent microscope, green fluorescence was observed from the liver, heart, and spleen in newborn mice. Three weeks after born, presence of eGFP sequence within mouse genome (tail and kidney) was reconfirmed by PCR. eGFP sequence was amplified from the progenies of the animal suggesting a genetic transmission of the transgene. These chimeric mice having human cells at the beginning of development, are expected to recognize human cells as "self", therefore, human cells or tissues will be able to escape the immunological surveillance of the host if grafted into the animal. These animals will serve as a good model system for studying the graft rejection in tissue transplantation and the potential of the cells to work well in many human disease.

Key words) ***Chimeric animal, Human embryonic stem cell, Mouse blastocyst, eGFP gene***