Center for Stem Cell Biology and Regenerative Medicine

Division of Stem Cell Processing
幹細胞プロセシング分野

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Stem cells represent a valuable cell source in the field of regenerative medicine. Human induced pluripotent stem cells (hiPSCs) have emerged as a promising tool, being utilized both in basic research and in the development of curative treatments for various diseases. Our focus has been specifically on precise control of the hiPSC differentiation process, thereby developing safe and effective cell replacement therapy for patients suffering from a wide range of currently incurable conditions.

Highly efficient generation of hiPSC derived proliferative hepatic progenitor for disease treatment

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Human induced pluripotent stem cells (hiPSCs) hold immense promise for cell replacement therapies in the treatment of various diseases. We previously established a robust differentiation protocol that efficiently directs hiPSCs into hepatic progenitors with a purity exceeding 99%. Under optimized culture conditions, these hepatic progenitors maintained stable identity and characteristic properties and showed no evidence of tumorigenicity following long-term transplantation. Importantly, hiPSC-derived hepatic progenitors demonstrated strong *in vivo* repopulation capacity, resulting in significant therapeutic benefits in models of liver disease. Collectively, these findings underscore the improved safety and therapeutic flexibility of transplantation strategies based on proliferative hiPSC-derived progenitors. In the past year, we further established a quasi–Good Manufacturing Practice (quasi-GMP)–grade manufacturing process for the generation and expansion of hepatic progenitors from clinical-grade hiPSCs. Hepatic progenitors produced under this quasi-GMP framework exhibited stable proliferative capacity and robust *in vivo* liver repopulation ability, thereby further enhancing the translational and clinical potential of hiPSC-derived hepatic progenitors for the treatment of liver diseases.