

Application of wisdom teeth-derived mesenchymal stem cells to liver regenerative medicine

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Stem cell-based therapy has received attention as a possible alternative to organ transplantation, owing to the ability of stem cells to repopulate and differentiate at the engrafted site. Recently, we found that the dental papilla cells (DEPCs) contained in human impacted wisdom teeth had multi-potent mesenchymal stem cell character and expressed the hepatocyte marker after hepatic differentiation culture. The DEPCs were cultured in the presence of growth factors including hepatocyte growth factor and oncostatin M for hepatic induction. After 3 weeks induction, DEPCs were stained using the PKH fluorescent dye. Immunocompromised rats were given an intraperitoneal injection of 1 mL/kg CCl₄. Two days later, DEPCs were transplanted by injection into the portal vein. The CCl₄ treatment was then performed twice a week for 4 weeks to cause persistent inflammation and liver fibrosis. Engraftment of the donor DEPCs was confirmed by PKH26 fluorescence and the presence of the human DNA-specific *alu* gene in the rat liver. The serum levels of aspartate aminotransferase (AST) and alanine aminotransferase (ALT) increased markedly in the sham-operated rats after the CCl₄ treatment. In contrast, the AST and ALT levels were much lower in DEPC-transplanted rats. Azan staining revealed smaller areas of fibrosis in liver sections from the DEPC-transplanted rats than in those of sham-operated rats. These results indicated that the transplanted DEPCs could engraft to suppress the liver inflammation and fibrosis. Since wisdom teeth are usually discarded, DEPCs are an ethically and functionally promising source for stem cell-based therapy.