

全肝脱細胞化技術と幹細胞を用いた肝類洞構造の再構築

Reconstruction of the hepatic microvasculatures with decellularized whole-liver scaffold and mesenchymal stem cells

Hiroshi Yagi, Yoshie Kadota, Minoru Kitago, Masahiro Shinoda, Osamu Itano¹, Shigeyuki Kawachi, Minoru Tanabe, Yuko Kitagawa

¹Department of Surgery, School of Medicine, Keio University

Abstract :

Aim: To determine if the co-culture of liver cells with rMSCs(rat mesenchymal stem cells) can regenerate the hepatic microvasculatures in decellularized whole-liver scaffold. **Methods:** We achieved whole-organ decellularization in rat livers and introduced isolated rat hepatocytes and rat MSCs via portal vein. We applied perfusion culture method to the introduced cells in the scaffold for up to 7days, and the medium and tissues were sampled in each time point for the histological and functional analysis. **Results:** The histological analysis showed that the microvasculatures were not completely but partially reconstructed among the hepatocytes which were repopulated in the matrix. Albumin production and urea synthesis as a hepatic function were well maintained in the co-cultured cells in the matrix compared to the matrix repopulated with hepatocytes only. **Conclusion:** Our study demonstrated that the hepatic microvasculatures could be reconstructed by the co-culture of MSCs with hepatocytes in the decellularized matrix. This co-culture method would give a better sinusoidal function to the recellularized native liver scaffold, which will provide a novel liver graft for transplantation.